

2016 4th International Conference on Methods and Systems of Navigation and Motion Control (MSNMC 2016)

**Kiev, Ukraine
18-20 October 2016**



**IEEE Catalog Number: CFP1652Y-POD
ISBN: 978-1-5090-1054-7**

**Copyright © 2016 by the Institute of Electrical and Electronics Engineers, Inc
All Rights Reserved**

Copyright and Reprint Permissions: Abstracting is permitted with credit to the source. Libraries are permitted to photocopy beyond the limit of U.S. copyright law for private use of patrons those articles in this volume that carry a code at the bottom of the first page, provided the per-copy fee indicated in the code is paid through Copyright Clearance Center, 222 Rosewood Drive, Danvers, MA 01923.

For other copying, reprint or republication permission, write to IEEE Copyrights Manager, IEEE Service Center, 445 Hoes Lane, Piscataway, NJ 08854. All rights reserved.

******This publication is a representation of what appears in the IEEE Digital Libraries. Some format issues inherent in the e-media version may also appear in this print version.***

IEEE Catalog Number:	CFP1652Y-POD
ISBN (Print-On-Demand):	978-1-5090-1054-7
ISBN (Online):	978-1-5090-1053-0

Additional Copies of This Publication Are Available From:

Curran Associates, Inc
57 Morehouse Lane
Red Hook, NY 12571 USA
Phone: (845) 758-0400
Fax: (845) 758-2633
E-mail: curran@proceedings.com
Web: www.proceedings.com

CURRAN ASSOCIATES INC.
proceedings
.com

Table of Contents

Plenary Session

Intelligent System for Visual Navigation V. Sineglazov, V. Ischenko	7
Synthesis of the Quad-Rotor Flight Control System V.B. Larin, A.A. Tunik	12
Comparison of the UAV Adaptive Control with the Robust Control based on Mu-synthesis A.S. Holtsov, R.M. Farhadi, V.I. Kortunov, A. Mohammadi	18
Application of Nonclassical Quaternions and Pentanions of Half-Rotations in Problems of Inertial Orientation A. Panov, S. Ponomarenko	22

Session A. Methods of Navigation and Flight Control Synthesis for UAVs

Robust Optimization of the UAV Path Following Guidance Systems A.A. Tunik, M.M. Komnatska	25
Modeling of the Decision Making by UAV's Operator in Emergency Situations T. Shmelova, D. Bondarev, E. Znakovska	31
LTE and Wireless Sensor Networks Integration in the Concept of "Smart Home" R. Odarchenko, A. Abakumova, O. Tklich, O. Ustinov	35
Method for UAV Trajectory Parameters Estimation using Additional Radar Data V. Kozlovskyy, I. Parkhomey, R. Odarchenko, S. Gnatyuk, T. Zhmurko	39
Control System Algorithms for Groups of UAVs S.P. Borsuk, I.O. Tretiakov	43
Method of Voice Control Functions of the UAV O.Y. Lavrynenko, G.F. Konakhovych, D.I. Bakhtiiarov	47
Group Behavior of UAVs in Obstacles Presence D. Kuchеров, A. Kozub, O. Kostyna	51
A Real-Time System for Detection and Avoidance of Dynamic Obstacles for Micro UAVs A. Molchanov, V. Kortunov, S. Mozolyuk	55
Integrated Computer-Aided Design System Software of Navigation Complex V. Sineglazov, A. Godny	59

Session B. Aviation Instruments and Sensor Design Testing and Calibration

Model of Side-looking Airborne Radar Controller Activity S. Pavlova L. Blahaia O. Kozhokhina T. Herasymenko	63
Antenna System of Radiomonitoring with Advanced Features L. Ilitsky, O. Shcherbyna, I. Mykhalchuk	67
Improved Algorithm for Real Time Search of WSN Routers Placement S. Valuiskiy, V. Novikov, T. Prischepa, R. Romanyuk	72
Hybrid Localization Method for Sensor Networks with Low Nodes Density S. Kashuba, V. Novikov, B. Trach, T. Prischepa	76
Analysis of the Gyroscope Motion in the Canonical Variables Andoyer-Deprit V. Kyrchenko, V. Veselovskaya	80

Table of Contents

Data Processing System for Altitude Navigation Sensor O.A. Sushchenko, V.O. Golitsyn	84
Massively Parallel Technologies Based on Microelectromechanical Systems for Improving Effective Functioning of the Aircraft S. Tovkach	88
Algorithm of Attitude Determination using Vectors Measurements L.M. Ryzhkov	92
Influence of External Acoustic Disturbances on Differential Vibratory Gyroscope Output Signals V.V. Chikovani, H.V. Tsiрук, A.N. Beregovoy, V.N. Makarenko, V.G. Paraschanov	95
On a Scheme Integration of Inertial Primary Information Sensors with on-board Navigation Correctors Aircraft F. Zakharin, S. Ponomarenko	98
Smart Navigational Antenna Array L.Y. Ilnitsky, L.V. Sibruk, D.V. Polishchuk	102
Session C. Methods and Systems for Navigation and Flight Control Testing	
Noise Method of Electrical Resistance Measuring for Testing of Motion Control Systems M.P. Vasylenko	106
System of the Monitoring the Aircraft Construction in the Tests Process A.P. Kozlov, A.S. Yurchenko	109
Identification of the signals in position control circuits of a hexapod platform M.M. Melnichenko, S.I. Osadchy, V.A. Zozulya	113
Multi Objective Optimization for UAV Navigation Equipment Test Table Design V. M. Sineglazov, S.O. Dolgorukov	117
Session D. Aviation Trainers and Simulators	
Models of Personality and Activities of Remotely Piloted Aircraft System's Operator T.F. Shmelova, Y.M. Kovaljov, O.V. Shostak	121
Reliability Problem of Ergatic Control Systems in Aviation Y.V. Hryshchenko	126
Methodical Complex of Accelerated Training for Operators of Unmanned Aerial Vehicles Y.A. Gunchenko, N.D. Rudnichenko, V.D. Boyko, S.A. Shvorov	130
Theoretical Basis Development of the Intelligent Training Systems for the Intensive Training of Air Traffic Controllers Y.A. Gunchenko, P.S. Emelyanov, S.A. Scvorov, E.S. Lenkov	134
An Optimal Algorithm of Aircraft Flight Simulator Control V.N. Azarskov, O.V. Ermolaeva, A.U. Kurganskyi, G.I. Rudyuk	138
Partial Criteria System of Estimation of Pilot Preparedness Level Before Simulator Training V. Sineglazov, V. Glykhov	143
Session E. Optimal Control Systems and Methods of State Estimation	
Basic Stages of Design of Competitive Stabilization Systems O.P. Krivonosenko, O.V. Savchenko	147
Variable Structure Robust-Optimal Systems for Control of Marine Vehicles V.L. Timchenko, O.A. Ukhin	151

Table of Contents

Optimal Injection Path for Group of Nanosatellite Multisensor-Based Platforms O.M. Tachinina, V.P. Zakharchenko, O.I. Lysenko, I.V. Alekseeva	155
Analysis of Methods for Orientation and Stabilization of Nano-Satellites V. Yavisiya, N. Bendasiuk	158
Adaptive Control System of the Ship's Motion at the Cross Slipway G.V. Rudakova, O.V. Polyvoda, A.A. Omelchuk	162
Synthesis of Optimal Observer for Dynamic Object N.D. Novitska	166
Is the I_1 -Optimal Lateral Autopilot of PI Type Robust? V.N. Azarskov, A.Yu. Pilchevsky, L.S. Zhiteckii, K.Yu. Solovchuk	170
Control by Nonstabilized Drive for Traking Systems O.A. Sushchenko	175
Optimal Stabilization System Analysis of Unstable Multivariate Movable Object S.I. Osadchy, I.Yu. Prokofyeva	179

Session F. Hardware and Software in Flight Control and Navigation Systems

Statistical Data Processing Procedures for Ground Navigation Equipment O.V. Solomentsev, M.Yu. Zaliskyi, T.S. Herasymenko, I.V. Choked	182
Automated Guidance System Drogue to Probe Tanker During in-Flight Refueling M.K. Filyashkin	186
Methods of Determining the Desired Frequency Characteristics of the Automatic Control Systems A.K. Ablesimov, M.A. Pylypenko, L.V. Pogribnyak, N.V. Usenko	189
Problems of Radio Navigation Systems Adaptive Operation O. Zuiev	193
Protected System of Radio Control of Unmanned Aerial Vehicle D. Bakhtiiarov, G. Konakhovych, O. Lavrynenko	196
Method of Injection of Subminiature Satellites with the Aid of Flying Space Launch Facility Based on An-124-100 and An-225 Airplanes O.M. Tachinina, A.V. Gusynin, O.I. Lysenko, S.M. Chumachenko	200
Calculation of Consumer and Manufacturer Risks for Unmanned Aerial Vehicle Checkout Equipment N.F. Tupitsin, E.O. Krymov, I.C. Stepanenko	206
Generalized Structural Scheme of the Measurement Converter Using an Iteratively Integrating Conversion Method I. Sergeev	210
Adaptive Control of the Combined Propulsion System Yu.O. Lebedenko, V.V. Danyk, P.O. Krupitsa	214
Solar Rechargeable Airplane: Power System Optimization D. Karabetsky	218

Session G. Aircraft Control Systems with Elements of Artificial Intellect:

Training of Automatic Speech Recognition System on Noised Speech A. Prodeus, K. Kukharicheva	221
Several Models of Artificial Intelligence Elements for Aircraft Control A.V. Goncharenko	224
Classification of Decision-Making Information Models as a Part of Aircraft Control System O. Zaritskyi, P. Pavlenko	228

Table of Contents

Intelligent Control System Against Aircraft's Structural Damage in the Flight V.M. Kazak, D.O. Shevchuk, N.A. Tymoshenko, L.V. Pomytkina	232
Monitoring and Control Systems of Modern Intellectual Interfaces V.A. Tkach, P.V. Kashtalyan, S.A. Rozhkov	237
Method of State Estimation and Identification of the Aerial Vehicle under Destabilizing Action of Weather Conditions V.M. Kazak, D.O. Shevchuk, N.A. Tymoshenko, I.V. Prochorenko	241
Case-Based Approach to Intelligent Safety Domains Assessment for Joint Motion of Vehicles Ensembles M. Zharikova, V. Shersjuk	245
Intelligent Image Recognition System V.M. Sineglazov, V. Ischenko	251
Object's Movement Prediction in 3D Space Using Neural Networks O. Chumachenko, V. Gorbaturk	255
 Session H. Methods of Navigation and Ground Navigation Equipment	
New Methods for Radio Sources Coordinates Determination in the Multiposition Passive Radar System V.N. Tkachenko, Y.K. Pozdnyakov, R.L. Pantyeyev	259
Application of Polarymetry in Aviation Navigation Systems A.E. Klochan, A. Al-Ammouri, V.G. Romanenko, V.D. Tronko	263
Signal Constructions with Low Resultant Sidelobes for Pulse Compression Navigation and Radar Systems A.G. Holubnychy, G.F. Konakhovych, R.S. Odarchenko	267
Minimum Landing Speed Criteria Generated by Means of Avionics O.O. Chuzha	271
Integration of Inertial and Satellite Navigation Systems with using Corrective Circuits and Filtering V.M. Vasyliiev, B.I. Dolintse	275
Using Data of Multilateration Surveillance System for Aircraft Tracking V.M. Vasyliiev, D.V. Vasyliiev, K.V. Naumenko	279
Creating a Digital Map of the Lower Ukrainian Air Space S. Kredentsar, L. Dolgova	284
Optimization Structures of Onboard Aircraft Navigation Systems A. Al-Ammouri, A.O. Kasyanenko, H. Al-Ammouri, A.O. Degtiarova	288
Accuracy Estimation of Alternative Positioning in Navigation I.V. Ostroumov, N.S. Kuzmenko	291
Multi-Parametric Data Recovery for Unmanned Aerial Vehicle Navigation System V.P. Kharchenko, N.S. Kuzmenko, A.G. Kukush, I.V. Ostroumov	295
Applying of the Walsh Functions Systems in Navigation Digital Data Processing L.B. Petryshyn	300
Author Index	305