

Intelligent Systems

Papers Presented at the AIAA SciTech Forum and Exposition
2025

Orlando, Florida, USA
6-10 January 2025

Volume 1 of 3

ISBN: 979-8-3313-1801-7

Printed from e-media with permission by:

Curran Associates, Inc.
57 Morehouse Lane
Red Hook, NY 12571



Some format issues inherent in the e-media version may also appear in this print version.

The contents of this work are copyrighted and additional reproduction in whole or in part are expressly prohibited without the prior written permission of the Publisher or copyright holder. The resale of the entire proceeding as received from CURRAN is permitted.

For reprint permission, please contact AIAA's Business Manager, Technical Papers. Contact by phone at 703-264-7500; fax at 703-264-7551 or by mail at 12700 Sunrise Valley Drive, Suite 200, Reston, VA 20191, USA.

TABLE OF CONTENTS

VOLUME 1

DISTRIBUTED SENSING FOR AUTONOMOUS AIR MOBILITY I

Sensing Small Uncrewed Aerial Vehicles With Distributed Radars for Advanced Air Mobility Surveillance	1
<i>Federica Vitiello, Flavia Causa, Roberto Opromolla, Giancarmine Fasano, Chester Dolph, Todd Ferrante, Thomas Lombaerts, Corey A. Ippolito</i>	
Considerations for Optimal Sensor Placement for Higher Accuracy Object Localization for Urban Air Mobility	16
<i>Thomas Lombaerts, Evan Kawamura, Keerthana Kannan, Corey A. Ippolito, Vahram Stepanyan, George Gorospe, Chester Dolph</i>	
Distributed Vision Sensing of Small Uncrewed Aircraft Systems in Urban Traffic Corridors	52
<i>Chester Dolph, Dasarath Katragadda, Thomas Lombaerts, Vahram Stepanyan, Evan Kawamura, Todd Ferrante, Federica Vitiello, Flavia Causa, Roberto Opromolla, Giancarmine Fasano</i>	

GUIDANCE, NAVIGATION, AND CONTROL ARCHITECTURES FOR AUTONOMOUS SYSTEMS I

Model Predictive Control for Autonomous Landing in Complex Scenarios	70
<i>Konstantinos Sotirakos, Richard J. Prazenica</i>	
Nonlinear Model Predictive Guidance for 6DOF Pursuer/Evader Engagements	84
<i>Rami Alhazmi, Syed Aseem Ul Islam, Dennis Bernstein</i>	
A Robust Observer Based End-Effector Trajectory Tracking Control of Collaborative Robotic Manipulators Actuated by Brushless DC Motors	108
<i>Irem Saka, Sukru Unver, Erman Selim, Enver Tatlicioglu, Erkan Zergeroglu, Kadriye Merve Dogan</i>	
Experimental Results on Distributed Adaptive Control of Mobile Robots to Perform Cooperative Behaviors	122
<i>Eren Sarioglu, Atahan Kurttisi, Kadriye Merve Dogan</i>	
Missile Avoidance Using Reinforcement Learning	143
<i>Vlad Gavra, Alasdair Cook, Stefan Neumeier, Johannes Haindl, Janaina Ribas De Amaral, Antonio Perez-Acal</i>	
Deep Nonlinear Adaptive Control for Unmanned Aerial Systems Operating Under Dynamic Uncertainties	162
<i>Zachary O. Lamb, Zachary I. Bell, Matthew A. Longmire, Jared Paquet, Prashant Ganesh, Ricardo Sanfelice</i>	

DISTRIBUTED SENSING FOR AUTONOMOUS AIR MOBILITY II

Computer Vision Dataset for Aircraft Taxi Operations	173
<i>Ryan M. Horn, Nelson Brown</i>	

Large-Scale Simulation of a Distributed Sensing Network Supporting Regional Urban Air Mobility Operations	180
<i>Keerthana Kannan, Joshua E. Baculi, Corey A. Ippolito, Vahram Stepanyan, Thomas Lombaerts, Evan Kawamura</i>	
Enabling Smart Urban Airspaces Through Distributed Sensing Technologies.....	198
<i>Corey A. Ippolito, Rodney A. Martin, Evan Kawamura, George Gorospe, Wendy Holforty, Keerthana Kannan, Vahram Stepanyan, Thomas Lombaerts, Nelson Brown, Chester Dolph</i>	
Optimal Communication Topology Construction and Sensor Selection for Independent Airspace Surveillance	220
<i>Vahram Stepanyan, Corey A. Ippolito, Keerthana Kannan, Evan Kawamura, Thomas Lombaerts</i>	
Vision-Based Distributed Sensing at Vertiports for Advanced Air Mobility and Urban Air Mobility Approach and Landing	232
<i>Evan Kawamura, Keerthana Kannan, Thomas Lombaerts, Vahram Stepanyan, Chester Dolph, Nelson Brown, Corey A. Ippolito</i>	

GUIDANCE, NAVIGATION, AND CONTROL ARCHITECTURES FOR AUTONOMOUS SYSTEMS II

Indirect Adaptive Control for Autonomous Flight Vehicles Using Parameter Informed Reinforcement Learning	250
<i>Nathan Schaff, Richard J. Prazenica</i>	
Prediction-Based Target Tracking Using Adaptive Input and State Estimation for Real-Time Numerical Differentiation.....	271
<i>Shashank Verma, Dennis Bernstein</i>	
Reinforcement Learning Control with Reciprocal Barrier Function for Safety-Critical Distributed Systems.....	283
<i>Michael Budihartono, Hever Moncayo</i>	
Stability Limits of Uncertain Systems in the Presence of Unmatched Coupled Dynamics and Actuator Dynamics With Adaptive Architectures.....	294
<i>Bronson Saulo, Kadriye Merve Dogan</i>	
Goal-Oriented Multi-Modal Motion Prediction for Multi-Agent Systems.....	311
<i>Anegi James, Efsthathios Bakolas</i>	
Adaptive Combustion Regulation in High-Fidelity Computational Model of Solid Fuel Ramjet.....	328
<i>Parham Oveissi, Alex Dorsey, Gohar T. Khokhar, Kyle M. Hanquist, Ankit Goel</i>	

GUIDANCE, NAVIGATION, AND CONTROL ARCHITECTURES FOR AUTONOMOUS SYSTEMS III

Hierarchical Learned Auctions for Communication-Sparse Satellite Environments.....	336
<i>Hannah Lehman, John Valasek</i>	
Machine-Learning Based Validation of a Digital Twin Spacecraft for Health-Management System Applications.....	346
<i>Sebastian Leon, Hever Moncayo</i>	

Neural Network-Based Magnetometer Sensor Model for Virtual Magnetic-Based Navigation Testbed.....	361
<i>Aditya Penumarti, Nikhil Iyer, Loi Park, Kristy L. Waters, Jose H. Ramos, Jane Shin</i>	
Experimental Results With an Embedded Model Reference Adaptive Control System on a Multirotor UAS	374
<i>Jesse Jaramillo, Samuel Cartaya, Tansel Yucelen, Mehrdad Pakmehr</i>	
Adaptive Control of Variable Speed Control Moment Gyroscopes Considering Actuator Dynamics.....	385
<i>Kyle J. Vernyi, Kadriye Merve Dogan, Morad Nazari</i>	
Neural Network Based Collision-Free Trajectory Generator for Quadcopters.....	405
<i>Praveen Jawaharlal Ayyanathan, Ehsan Taheri, Tyler C. Flegel , Nan Li</i>	

SPACE TRUSTED AUTONOMY I

Assessing Autonomous Inspection Regimes: Active Versus Passive Satellite Inspection.....	425
<i>Joshua Aurand, Christopher Pang, Sina Mokhtar, Henry Lei, Steven C. Cutlip, Sean Phillips</i>	
Demonstrating Reinforcement Learning and Run Time Assurance for Spacecraft Inspection Using Unmanned Aerial Vehicles	452
<i>Kyle Dunlap, Nathaniel P. Hamilton, Zachary Lippay, Matthew Shubert, Sean Phillips, Kerianne L. Hobbs</i>	
Optimizing Potential Information Gain From Satellites Over Space and Time for Heterogeneous Information Fusion	471
<i>Esther Jose, Rajan Batta, Moises Sudit, David Sudit, John L. Crassidis, Christopher Nebelecky, Sean Phillips, Alexander Soderlund</i>	
Risk-Sensitive Orbital Debris Collision Avoidance Using Distributionally Robust Chance Constraints.....	480
<i>Kanghyun Ryu, Jean-Baptiste Bouvier, Shazaib Lalani, Siegfried Eggel, Negar Mehr</i>	

SPACE TRUSTED AUTONOMY II

Rapid Determination of Low-Thrust Spacecraft Reachable Sets Subject to Eclipse Constraints.....	495
<i>Ehsan Taheri</i>	
Space Processor Computation Time Analysis for Reinforcement Learning and Run Time Assurance Control Policies	509
<i>Nathaniel P. Hamilton, Kyle Dunlap, Francisco Viramontes, Derrek Landauer, Evan Kain, Kerianne L. Hobbs</i>	
Satellite Reorientation Using Reinforcement Learning Under Unknown Attitude Failure: Sun-Searching Implementation.....	527
<i>Matthew Willoughby, Kai Richelmy, Hao Peng</i>	
Stability Analysis of Deep Reinforcement Learning for Multi-Agent Inspection in a Terrestrial Testbed.....	542
<i>Henry Lei, Zachary Lippay, Anonto Zaman, Joshua Aurand, Amin Maghareh, Sean Phillips</i>	
Decentralized Consensus-Based Algorithms for Satellite Observation Reactive Planning With Complex Dependencies	564
<i>Alan Aguilar Jaramillo, Ben J. Gorr, Huilin Gao, Ankur Mehta, Yizhou Sun, Vinay Ravindra, Cedric David, George Allen, Daniel Selva</i>	

INTELLIGENT COMPUTER VISION AND APPLICATIONS I

Improving Sim-to-Real Transfer in Vision-Based Robot Navigation via Instance-Level GAN-Based Data Augmentation	575
<i>Ignacio G. Lopez-Francos, Rory Lipkis, Pavlo G. Vlastos, Adrian Agogino</i>	
Remotely-Processed Vision-Based Control of Autonomous Lighter-Than-Air UAVs With Real-Time Constraints.....	590
<i>Caeden Taylor, Matthew Widjaja, Or D. Dantsker</i>	
Autonomous 3D Reconstruction With Small Unmanned Aerial Vehicle (UAV) Using Structure From Motion: Practical Aspects	601
<i>Nathan Rayon, Raymond Stevens, Hakki Erhan Sevil</i>	
Aerial Reconnaissance Utilizing UAV With GNSS-RTK for Computer Vision-Based Analysis of Concrete Cracks	613
<i>Xiemes Jaerica Jullienne P. Ofamin, Ma. Alyza Rovyn C. De Guzman, Mark Anthony Rotor, Jenith Banluta</i>	

MULTI-AGENT CONTROL AND COORDINATION I

Cooperative Target Encapsulation Using Variable Deviated Pursuit.....	632
<i>Gautam Kumar, Ashwini Ratnoo</i>	

VOLUME 2

Influence of Malicious Agents in a Team Seeking to Contain an Evader.....	641
<i>Braulio Mora, Animesh Chakravarthy, Alexander Von Moll, Isaac E. Weintraub, David Casbeer</i>	
An Optimal Strategy for Off-Board Proximal Sensing of a Target: Part 1	660
<i>Isaac E. Weintraub, Alexander L. Von Moll, Alexander Hansen, Michael D. Zollars</i>	
An Optimal Strategy for Off-Board Proximal Sensing of a Target: Part 2	672
<i>Alexander Hansen, Michael D. Zollars, Isaac E. Weintraub, Alexander L. Von Moll</i>	
Maximum Kinetic Energy Paths for a Decaying-Speed Dubins Vehicle.....	681
<i>Artur Wolek, David Casbeer, Isaac E. Weintraub, Alexander Von Moll</i>	
Multi-Agent Integrated Path Planning and Scheduling in Advanced Air Mobility	697
<i>Dhananjay Tiwari, Salar Basiri, Srinivasa Salapaka</i>	

SENSOR FUSION AND SYSTEMS HEALTH MANAGEMENT

A Feature-Engineering Based Variational Autoencoders Method for Mode S Radar Anomaly Detection	709
<i>Qf J, Di Zuo, Kaiyan Jin, Wenhua Zou, Peng Zhao</i>	
Gradient Evaluation in Spatiotemporal Plumes Using a Sensing Autonomous Vehicle.....	718
<i>Nicholas B. Orlovsky, Tyler Lizotte, Michael A. Demetriou, Nikolaos A. Gatsonis</i>	
Optimizing Signal Interference in Airborne Radar Systems: A Systems-of-Systems Analysis	727
<i>Zhaoyang Chen, Gavin Becker, Bradley Meyer, Cody H. Fleming</i>	

Integrated Prognostics and Health Monitoring Tool for Software Components Aboard UAS Swarm Agents.....	744
<i>Landen D. Fogle, Grant Phillips, Justin M. Bradley</i>	

INTELLIGENT COMPUTER VISION AND APPLICATIONS II

3D Global Localization of a UAV Using 2D Monte Carlo Localization and Ground Plane Extraction	754
<i>Elle Whitney, Bala Prenith Reddy Gopu, Madhur Tiwari</i>	
Cooperative Localization of UAVs in Multi-Robot Systems Using Deep Learning-Based Detection	765
<i>Veera Venkata Ram Murali K. Muvva, Yogesh Chawla, Kunjan Theodore Joseph, Santosh Pitla, Marilyn Claire Wolf</i>	
Infrared-Constellation-Aided Landing of eVTOL Aircraft.....	774
<i>Aaron Brown, David Akagi, Ian Reid, Jacob Moore, Brandon Sutherland, Tim W. McLain</i>	
Deep Learning-Based Data Association in Infrared Camera Images for GPS-Denied Aircraft Landing.....	795
<i>David Akagi, Tim W. McLain</i>	

LEARNING, REASONING, AND DATA DRIVEN SYSTEMS I

A Survey of Current Applications of Inverse Reinforcement Learning in Aviation and Future Outlooks	813
<i>Rupal Nigam, Jimin Choi, Niket Parikh, Max Z. Li, Huy Tran</i>	
Grammarization-Based Robotic Grasping: Adaptive Gripper Finger Design and Control for Unknown Environments and Targets.....	840
<i>Leonidas Askianakis</i>	
Reinforcement Learning Environment to Realistic Simulations for Multi-Agent System Validation and Deployment	864
<i>Seth Johnson, Laura Escamilla, Hannah Lehman, John Valasek</i>	
Visual Language Models as Operator Agents in the Space Domain.....	879
<i>Alejandro Carrasco, Marco Nedungadi, Victor Rodriguez-Fernandez, Richard Linares</i>	

MULTI-AGENT CONTROL AND COORDINATION II

Policy for Optimal Avoidance of Multiple Engagement Zones	891
<i>Dejan Milutinovic, Alexander L. Von Moll, Isaac E. Weintraub, David Casbeer</i>	
Cascading Delay Mitigation With Quadratic Bézier Curve Trajectory Planning	899
<i>Michael Variny, Travis W. Moleski, Jay Wilhelm</i>	
Reinforcement-Learning-Based Cooperative Dynamic Weapon-Target Assignment in a Multiagent Engagement	910
<i>Gleb Merkulov, Eran Iceland, Shay Michaeli, Oren Gal, Ariel Barel, Tal Shima</i>	
Toward Simultaneous Localization and Guidance for Collaborative Combat Aircraft (CCA) Effectiveness	928
<i>Shivam Bajpai, Rohith Boyinine, Abhinav Sinha, Rajnikant Sharma</i>	

LEARNING, REASONING, AND DATA DRIVEN SYSTEMS II

A Physics-Informed Approach for Learning Vehicle Dynamics in High-Speed Autonomy	937
<i>Mohini Priya Kolluri, Sushant V. Shelar, Shah Akib Sarwar, Zohaib Hasnain</i>	
Online Training and Implementation of Parameter Informed Reinforcement Learning for Aircraft System Identification.....	950
<i>Nathan Schaff, Richard J. Prazenica</i>	
BIRD: Battlefield-Integrated Reconnaissance Drone With VQA.....	972
<i>Nathan Rayon, Kobi Menser, Louis Catalano, Jonathan Vega, Julio Najarro, Hakki Erhan Sevil</i>	
Integral Reinforcement Learning Control for Classes of Airplanes	982
<i>Brian C. Reitz, Alireza Farahmandi</i>	
AI Assistance for Firefighting Enabled by Real-Time Satellite Data	992
<i>Christine M. Edwards</i>	
From Simulation to Reality With Random Noise.....	1005
<i>Steven Luo, Rory Lipkis, Ignacio G. Lopez-Francos, Pavlo G. Vlastos, Adrian Agogino</i>	

MULTI-AGENT CONTROL AND COORDINATION III

Multiple Aircraft Trajectory Prediction Based on Bayesian Social LSTM.....	1012
<i>Xianglin Zhong, Kaiquan Cai, Gang Wang, Peng Zhao</i>	
Multi-Agent Multi-Target Tracking Using Curriculum Learning for Reinforcement Learning	1021
<i>Caroline R. Vincent, Andrea Henshall, Begum Cannataro, Michael Ricard, Sertac Karaman</i>	
Integrated Guidance, Navigation and Control for Coordinated Capture of Intruder Swarms by Multiple Pursuing Quadcopters	1034
<i>Rishab Rijal, Abhishek Kashyap, Animesh Chakravarthy</i>	
Nonlinear Guidance and Control of Coordinated Unmanned Aerial Manipulators for Delivering a Payload on a Moving Platform.....	1051
<i>Ravi Gyawali, Abhishek Kashyap, Animesh Chakravarthy</i>	

AUTONOMY I

Introducing Control Reallocation-Ability for UAV Reliability Optimization	1069
<i>Jonathan Liscouët, Yan Grytsyk, Alexandru Toma, Haoyu Tan, Sivaranjini Ramesh</i>	
Integrating Explainable AI into Two-Tier ML Models for Trustworthy Aircraft Landing Gear Fault Diagnosis.....	1085
<i>Kadripathi Kn, Adolfo Perrusquia, Antonios Tsourdos, Dmitry Ignatyev</i>	
Inefficiency of Self-Interested Behaviour in Markov Games: State-Dependent Price of Anarchy	1101
<i>Niket Parikh, Rupal Nigam, Max Z. Li, Huy Tran</i>	
Enhancing Autonomous Aerial Refueling With a Hybrid Deep Neural Network and Unscented Kalman Filter Predictive Model	1115
<i>Leo Wagner, Donald H. Costello, Violet Mwaffo</i>	

GUIDANCE, NAVIGATION, AND CONTROL IN INTELLIGENT SYSTEMS

Versatile UAS Platform for Indoor Law Enforcement and First Responders Applications.....	1129
<i>Venkatakrishnan V. Iyer, Vitor Tumelero Valente, Rachel M. Axten, Eric N. Johnson</i>	
Conflict Detection and Resolution for VTOL Vehicle Trajectories in 4D	1145
<i>Marc Welsch, Walter Fichter</i>	
Relational Maneuvering Guidance Strategy for Leader-Follower Flexible Formation in Three Dimensions	1160
<i>Praveen Kumar Ranjan, Abhinav Sinha, Yongcan Cao</i>	
A Reinforcement Learning Approach to Target Capture in the Presence of a Defender	1176
<i>Suraj R. Bandela, Abhinav Sinha, Yongcan Cao</i>	
Barrier Lyapunov Function-Based Controller for Surface Vessels With Motion Constraints	1190
<i>Ram Milan K. Verma, Shashi Ranjan Kumar, Hemendra Arya</i>	
Trajectory Tracking Control of Surface Vessels With Constrained Input in the Presence of Disturbances	1201
<i>Ram Milan K. Verma, Shashi Ranjan Kumar, Hemendra Arya</i>	

INTELLIGENT SPACE AUTONOMY

Orbit Determination Using Physics-Informed Neural Networks.....	1215
<i>Gus E. Loshelder, Rohan Sood, Weihua Su</i>	
Machine-Learning Based Pose and Attitude Estimation for Enhanced Spacecraft Proximity Operations	1226
<i>Gabriela Gavilanez, Hever Moncayo</i>	
Uncertainty-Aware Autonomous Mars Landing Guidance With Curriculum Reinforcement Learning	1240
<i>Jimin Choi, Jaemyung Ahn</i>	
Autoencoder-Based Anomaly Detection for an Active Debris Removal Spacecraft	1260
<i>Edward Gregson, Mae Seto</i>	

INTELLIGENT TRAJECTORY AND PATH PLANNING I

Physics-Informed Pontryagin Neural Networks for Path-Constrained Optimal Control Problems.....	1272
<i>Andrea D'Ambrosio, Boris Benedikter, Roberto Furfaro</i>	

VOLUME 3

Polynomial Quadratic Bézier Approximation for Gradient Vector Field Trajectory Following.....	1292
<i>Travis W. Moleski, Jay Wilhelm</i>	
Scalable UAV Routing: Integrating Neural Networks With Facility Location and Optimal Path Planning.....	1308
<i>Ghazal Hassani, Srinivasa Salapaka</i>	

Identification of Precursors to Go-Around Events Using Machine Learning to Enhance Collision Risk Modelling in the Terminal Area	1321
<i>Alberto Cardenas Melgar, Yohan Auguste, Mamoun Bencheekroun, Alexia P. Payan, Evan Harrison, Dimitri Mavris</i>	

Physics-Guided Versatile Trajectory Generation Based on BERT	1357
<i>Hong-Cheol Choi, Chuhao Deng, Inseok Hwang</i>	

AUTONOMY II

Efficiently Training Observable Control Policies.....	1367
<i>Andres Enriquez Fernandez, John J. Bird</i>	

Deep Learning Based Approach for Underwater Acoustic Target Detection	1378
<i>Fatma K. Akin Kucuk, Mustafa Bilgin, Mehmetcan Kaymaz, Yagiz Parali, Mehmet Avinc</i>	

UniSaT: Unified-Objective Belief Model and Planner to Search for and Track Multiple Objects.....	1387
<i>Leonardo Santos, Brady Moon, Sebastian Scherer, Hoa Van Nguyen</i>	

Distributed Hamiltonian Adaptive Disturbance Rejection Control With Actuator Dynamics.....	1400
<i>Nhan T. Nguyen</i>	

SAFE AUTONOMY

Statistical Safety Analysis for a DNN-Controlled Collision Avoidance System Using SYSAT	1419
<i>Yuning He, Prashin Sharma</i>	

Separation Assurance in Urban Air Mobility Systems Using Shared Scheduling Protocols	1429
<i>Surya K. Murthy, Tyler Ingebrand, Sophia Smith, Ufuk Topcu, Peng Wei, Natasha A. Neogi</i>	

Monocular 3D Pedestrian Detection and Tracking With Neural Network with Uncertainty Estimate for Safe Drone Operation	1446
<i>Tyler C. Flegel, Praveen Jawaharlal Ayyanathan, Ehsan Taheri, David Bevly</i>	

TRAFFIC MANAGEMENT AND URBAN AIR MOBILITY

A Reinforcement Learning Approach to Quiet and Safe UAM Traffic Management.....	1458
<i>Surya K. Murthy, Zhenyu Gao, John-Paul B. Clarke, Ufuk Topcu</i>	

Effect of Congestion Mitigation Strategy on UAS Traffic Flow in Dense Urban Airspace	1470
<i>Sajid Ahamed Mohammed Abdul, Debasish Ghose, Prathyush P. Menon</i>	

A Cross-Attention Based Diffusion Convolutional Recurrent Neural Network for Air Traffic Forecasting	1480
<i>Di Zuo, Meng Li, Lingchao Zeng, Meng Wang, Peng Zhao</i>	

Ground Stop Adjuster: A Machine Learning Approach to Improve Air Traffic Management Initiatives.....	1492
<i>Farzan Masrour Shalmani, Milad Memarzadeh, Aida Sharif Rohani, Krishna Kalyanam</i>	

HUMAN - AUTOMATION INTERACTION

Requirement Preferences for Humanoid Robotics by Expert Discipline.....	1503
<i>Luke W. Symasek, Kristin Weger, Amy Guerin, Nicholas Jones, Bryan Mesmer</i>	
A Physics-Informed Deep Learning Model for Estimating Human Pilot Behavior and Mitigating Adverse Interactions.....	1514
<i>Stephen Brutch, Rocio Jado-Puente, Hever Moncayo</i>	
Performance Analysis of Machine Learning Algorithms to Human-Pilot-Model Parameter Estimation.....	1527
<i>Rocio Jado-Puente, Stephen Brutch, Hever Moncayo</i>	

INTELLIGENT TRAJECTORY AND PATH PLANNING II

Deep Reinforcement Learning for Autonomous Target Tracking of Hostile Ground Targets in Wind Disturbed Environments With Sun Concealment	1538
<i>Payton Clem, John Valasek</i>	
Energy-Efficient Control for Multicopters in the Presence of Wind for Advanced Air Mobility	1561
<i>Sofia Aranda Rocha, Liang Sun</i>	
Mapping Urban Wind Fields via Gaussian Processes Regression Models That Consider Building Morphology	1576
<i>Nicholas P. Kakavitsas, Mesbah Uddin, Artur Wolek</i>	
A Two-Phase Algorithm for Joint Task Assignment and Coordination in Hierarchical Multi-Vehicle Systems.....	1592
<i>Yoonjae Lee, Ahmed Khalil, Efstathios Bakolas, Gregory Gremillion</i>	
Optimizing Monitoring Routes for Electric Vehicles With Access to Multiple Charging Stations Using Mixed Integer Programming: Case Study With Non-Perennial Rivers.....	1604
<i>Vinay Ravindra, Molly Stroud, George Allen, Daniel Selva, Sarah Godsey, Ken Fritz, Jacob Honsen, Michelle Busch, Shang Gao</i>	

GUIDANCE, NAVIGATION, AND CONTROL ARCHITECTURES FOR AUTONOMOUS SYSTEMS VI

On the Structure of Robust Controllers and Weight Selection in the Mixed Sensitivity Minimization.....	1617
<i>Hitay Ozbay, A. Erdem Karagul, Nagihan Karadavut, N. Kubra Yurdaer</i>	
Model Reference Adaptive Control of Uncertain Over-Actuated Nonlinear Systems With Nonlinear Reference Models.....	1624
<i>Andrew Bray, Kadriye Merve Dogan</i>	
A Graph Theoretic Approach to Dynamic Stability of Formations of Autonomous Systems	1636
<i>Nicole Flinders, Mark J. Balas, Clayton Kerce</i>	
A Comparative Study of Norm-Based and Norm-Free Event-Triggered Control Architectures	1648
<i>Deniz Kurtoglu, Tansel Yucelen, Dzung Tran, David Casbeer, Eloy Garcia</i>	
Predictive Cost Adaptive Control of 3DOF CFD-Simulated Flight	1663
<i>Dennis Serbin, Krzysztof Fidkowski, Dennis Bernstein</i>	

Sampling-Based Motion Planning for Lunar Water Exploration Under Time-Variant Illumination Areas.....	1684
<i>Yuki Uehara, Kazumune Hashimoto, Shigemasa Takai</i>	

AIR COMBAT AND FLIGHT CONTROL

Computer-Generated Forces Team Behavior Within Air Combat Simulations: Clustering Opponent Entities and Recognizing Tactical Maneuvers.....	1700
<i>Philippe Ruther, Michael Strohal, Peter Stütz</i>	
Computer-Generated Forces Team Behavior Within Air Combat Simulations: Interpreting Risks and Opportunities	1709
<i>Luca Devin Winkler, Michael Strohal, Peter Stütz</i>	
Computer-Generated Forces Team Behavior Within Air Combat Simulations: Coordinated Path Planning With Constraints.....	1718
<i>Fabian Reinisch, Michael Strohal, Peter Stütz</i>	
Uncertainty-Driven Distributional Reinforcement Learning for Flight Control.....	1731
<i>Marek Homola, Yifei Li, Erik-Jan Van Kampen</i>	
Longitudinal Handling Qualities Evaluation for Soft Actor-Critic Deep Reinforcement Learning Flight Control	1755
<i>Hidde Jansen, Erik-Jan Van Kampen</i>	
Safe & Intelligent Control: Hybrid and Distributional Reinforcement Learning for Automatic Flight Control.....	1774
<i>Lucas Vieira Dos Santos, Erik-Jan Van Kampen</i>	

GUIDANCE, NAVIGATION, AND CONTROL ARCHITECTURES FOR AUTONOMOUS SYSTEMS V

A Control Framework for Direct Adaptive Estimation With Known Inputs for LTI Dynamical Systems.....	1793
<i>Kevin Fuentes, Mark J. Balas, James Hubbard</i>	
Adaptive Control for Nonlinear Cyber-Physical Systems in the Presence of Actuator Attacks	1803
<i>Wassim Haddad, Dhruva Venkat, Tansel Yucelen, Mark Whorton</i>	
An Open-Source Framework to Design, Tune, and Fly Nonlinear Control Systems for Autonomous UAVs	1823
<i>Mattia Gramuglia, Giri Mugundan Kumar, Giorgio A. Orlando, Andrea L'Afflitto</i>	
Discrete Adaptive Control Allocation for Uncertain Over-Actuated Systems.....	1839
<i>Nathaniel Sisson, Kadriye Merve Dogan</i>	
Adaptive Learning Control of Thrust in a Simplified Solid Fuel Ramjet Missile	1847
<i>Alireza Farahmandi, Brian C. Reitz</i>	

INTELLIGENT APPROACHES FOR PHYSICAL SYSTEMS

Multi-Fidelity Analysis of LCO Control in Modified Glauert Airfoil	1862
<i>Vladimir V. Golubev, Stanley Ossyra, Logan White, Ethan L. Deweese</i>	

Prediction of Droplet Statistics in Sprays Using Deep Neural Networks	1876
<i>Mohsen Broumand, Sean Yun</i>	
Online Data-Driven Optimization of Aerodynamic Performance for an Unconventional Morphing Aircraft	1886
<i>Thymen Woldhuis, Salvatore Asaro, Xuerui Wang</i>	
Learning-Based Thrust Regulation of Solid-Fuel Ramjet in Flight Conditions	1905
<i>Parham Oveissi, Alex Dorsey, Joshua McBeth, Kyle M. Hanquist, Ankit Goel</i>	
Vertically-Integrated Modular Distributed Data Acquisition System for Cryogenic Liquid Bi- Propellant Rocket and Component Testing Based on SAMDAS Architecture.....	1919
<i>Darell Chua, Anchit Kumar, Anthony Pertsel, Karcher Morris</i>	

Author Index