

# **2021 IEEE International Conference on Unmanned Systems (ICUS 2021)**

**Beijing, China  
15-17 October 2021**

**Pages 1-519**



**IEEE Catalog Number: CFP21M77-POD  
ISBN: 978-1-6654-4615-0**

**Copyright © 2021 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 is a print representation of what appears in the IEEE Digital Library. Some format issues inherent in the e-media version may also appear in this print version.***

IEEE Catalog Number:	CFP21M77-POD
ISBN (Print-On-Demand):	978-1-6654-4615-0
ISBN (Online):	978-1-6654-3885-8

**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](mailto:curran@proceedings.com)  
Web: [www.proceedings.com](http://www.proceedings.com)

CURRAN ASSOCIATES INC.  
**proceedings**  
.com

# Table of Contents

20210004	<b>A CSCM-SA Method for Multi-UAV Task Assignment</b> <i>Weijian Pang*, Hui Li, Peng Li, Hailin Zhang</i>	1
20210005	<b>GeoSOT-OctoMap: An Octree Grid Map Model for Autonomous Driving</b> <i>Jian Yu, Huaqiang Fang, Guoliang Pu, Bo Chen</i>	5
20210007	<b>Dilated-CBAM: An Efficient Attention Network with Dilated Convolution</b> <i>Junyan Yang, Jie Jiang</i>	11
20210008	<b>Improved SVM-AdaBoost Stacking Algorithm with ResNet18</b> <i>Minxian Wei, Yuezu Lv, Jialing Zhou</i>	16
20210012	<b>A New Robust Filter for Nonlinear System Based on Multiple Scaled Multivariate Skew-t Distribution</b> <i>Chunguang Lu, Yongshun Zhang, Hongqiang Liu, Fuyu Lu</i>	21
20210014	<b>A Magnetic Vector Aided Calibration Method for MEMS Gyroscope</b> <i>Yifan Sun, Feng Li, Yanghao Chen, Xiang Xu*</i>	26
20210018	<b>Data-Based Output Formation Tracking Control for Heterogeneous Multi-Agent Systems</b> <i>Yu Shi, Jianglong Yu, Yongzhao Hua, Xiwang Dong, Zhang Ren</i>	32
20210020	<b>Enhanced Capsule Networks With Improved Residual Modules</b> <i>Ru Zeng, Jiali Zhu, Yan Song*, Chongjing Wang</i>	39
20210021	<b>Networked Trajectory Tracking Control for a Nonlinear Wheeled Mobile Robot</b> <i>Haixin Zhang, Hongjiu Yang*, Hai Zhao, Hao Cheng</i>	45
20210027	<b>Multi-Vehicle Coordinated Motion Planning Based on Interactive Primitive Tree</b> <i>Boyang Wang, Yaomin Lu, Tingrui Zhang, Jianwei Gong*, Huijing Zhao</i>	51
20210030	<b>Adaptive Sliding Mode Fault-Tolerant Control for Automatic Carrier Landing with Actuator Faults</b> <i>Yixuan Xue, Chenggang Tao, Ziyang Zhen*, Teng Cao</i>	58
20210033	<b>A Registration Framework for Air-ground Point Cloud Maps</b> <i>Man Zhang, Yi Yang*, Junbo Wang, Linzhe Shi, Yufeng Yue, Mengyin Fu</i>	63
20210036	<b>Deep Reinforcement Learning Based Collaborative Optimization of Communication Resource and Route for UAV Cluster</b> <i>Lizhen Huang, Chunhui Liu, Zanliang Dong</i>	69

20210039	<b>Distributed No-wait Task Allocation for Multi-UAV System with Coupling Temporal Constraints</b>	74
	<i>Wei Cui, Yikang Yang*</i> ,	
20210044	<b>Research on Visual Navigation Marker Detection Algorithm Based on Multi-Constraints</b>	80
	<i>Huaijian Li, Linlin Wan, Hong Chen, Xiaojing Du*</i>	
20210045	<b>Design of Trajectory Tracking Controller of Unmanned Tracked Vehicles Based on Torque Control</b>	85
	<i>Junfeng Tao, Haiou Liu, Yan Li, Haijie Guan, Jia Liu, Huiyan Chen</i>	
20210047	<b>Co-Kriging Based Multi-fidelity Aerodynamic Optimization for Flying Wing UAV with Multi-shape Wingtip Design</b>	93
	<i>Ruochen Wang, Yanping Yang*, Xiangyu Wang, Bo Wang, Guoxin Zhang</i>	
20210060	<b>Multi-agent System Sequential Formation Switching via Interval Decomposition</b>	99
	<i>Letian Li, Wei Sheng, Runnan Shen, Jian Zhang</i>	
20210061	<b>Research on UAV Detection Technology of Gm-APD Lidar Based on YOLO Model</b>	105
	<i>Yuanxue Ding, Yanchen Qu, Qing Zhang*, Jiahui Tong, Xianhui Yang, Jianfeng Sun</i>	
20210066	<b>Real-time AUV Path Planning Algorithm in Complex Marine Environment</b>	110
	<i>Chang Liu, Ruihang Liu, Feng Gao</i>	
20210069	<b>A Linear Quadratic Gaussian Optimal Control Approach for Train Platoon Formation</b>	116
	<i>Daxin Tian, Jiawei Li, Jianshan Zhou*, Xuting Duan, Zhengguo Sheng, Dezong Zhao, Wei Hao, Kejun Long</i>	
20210070	<b>Optimal Control of Mixed Platoons with Autonomous and Human-Driven Vehicles</b>	122
	<i>Daxin Tian, Peiyu Zhang, Jianshan Zhou, Xuting Duan, Zhengguo Sheng, Dezong Zhao, Mianfeng Lin, Lei Li</i>	
20210071	<b>Robust Distributed Time-Varying Vehicle Formation Control under Switching Topologies and External Disturbances</b>	128
	<i>Yanmin Shao, Daxin Tian*, Jianshan Zhou, Xuting Duan, Zhengguo Sheng, Guixian Qu, Dezong Zhao, Yun Xiong, Shengmin Guo</i>	
20210075	<b>Cooperative Guidance for Seeker-less Missile Based on Leader-follower Framework</b>	134
	<i>Jianbo Zhao*, Yidong Chen, Xi Liang, Lujing Chao</i>	
20210076	<b>Multiple Moving Obstacles Avoidance for USV using Velocity Obstacle Method</b>	140
	<i>Jiayuan Zhuang, Yuhang Zhang, Peihong Xu, Yi Zhao, Jing Luo, Shengqing Song</i>	

20210078	<b>Output Tracking based Distributed State Estimation</b> <i>Yuheng Li, Yuezuo Lv, Peihu Duan, Jialing Zhou</i>	146
20210079	<b>Transmission Power Optimization for An Air-Ground Cooperative Vehicular Network</b> <i>Guixian Qu, Songge Zhang, Jianshan Zhou, Daxin Tian, Zhengguo Sheng, Xuejun Ran, Lei Li, Shengmin Guo</i>	151
20210080	<b>Multi-Agent Confrontation Game Based on Multi-Agent Reinforcement Learning</b> <i>Shuo Han, Liangjun Ke*, Zhigang Wang</i>	157
20210081	<b>Adaptive Kalman Filter for SINS/GPS Integration System with Measurement Noise Uncertainty</b> <i>Jingchun Li*, Guangsong Yuan, Haibin Duan</i>	163
20210082	<b>Preliminary Configuration Design of Deformable Bionic Flying-wing Aerial-aquatic Unmanned Vehicle</b> <i>Da Lyu, Haoqin Su, Yun Li, Yu Ma, Xiaowei Liu, Junbo Zhao</i>	169
20210085	<b>Design of Four Wheel Steering and Direct Yaw Moment Control for Unmanned Vehicle with Path Tracking Controller in Extreme Maneuvers</b> <i>Yiwen Sun, Runfeng Li, Ziwang Lu, Guangyu Tian</i>	176
20210086	<b>Formation Control of Omnidirectional Mobile Robots Based on Bionic Coupling Mechanism</b> <i>Zhanwei Yang, Shengjin Li, Hao Xu, Dengxiu Yu*, Zhen Wang, C. L. Philip Chen</i>	184
20210088	<b>Intelligent Information Fusion for Conflicting Evidence Using Reinforcement Learning and Dempster-Shafer Theory</b> <i>Fanghui Huang, Yu Zhang, Wen Jiang*, Yixin He, Xinyang Deng</i>	190
20210091	<b>High-Accuracy Autonomous Navigation Algorithm For Long-Distance Land Navigation In GNSS-Denied Environments</b> <i>Xueyu Du, Maosong Wang*, Wenqi Wu, Jiarui Cui</i>	196
20210093	<b>Gravity Disturbance Compensation in Long-Distance High-Precision SINS/ODO Integration of Land Vehicle</b> <i>Jiarui Cui, Maosong Wang*, Wenqi Wu, Xueyu Du</i>	203
20210095	<b>A Dynamic Scale UAV Weighted Clustering Algorithm</b> <i>Xiangyu Wang, Zhengyang Liu, Chunxiao Jian*, Shuhao Shi, Junbo Gu, Fengyuan Shi</i>	209
20210096	<b>Research on Modeling of USV Swarm Target Defense Mission System from DoDAF Operational Viewpoint</b> <i>Shengnan Song, Xiaoye Guo, Fengchi Xu, Zishuai Wang, Yangliu Xie, Yulun Wu</i>	214
20210098	<b>Flight Strategy Design for Unmanned Aerial Vehicle Flying in Multi-threats Environment</b> <i>Kai Zhou, Haifeng Guo, Qirui Zhang, Guowen Zhang</i>	219

20210099	<b>Research On Fish Variable Stiffness: A Review</b> <i>Hongxiu Zhu, Yupeng Sha*, Haonan Ding</i>	224
20210102	<b>Modality Representation Learning for Geometry Feature of Skeleton Based Human Action</b> <i>Siyu Qiu, Hao Liu*, Hui Tong</i>	232
20210103	<b>A Resilience Analysis Method for Distributed System Based on Complex Network</b> <i>Lin Su, Xiaohong Wang, Lizhi Wang*</i>	238
20210107	<b>A Complex Dynamic Weight Assignment Method for Conflict Management in Complex Evidence Theory</b> <i>Yuting Li, Fuyuan Xiao*</i>	244
20210113	<b>Kinematics Simulation Based on Fluent of a Bionic Manta Ray Robot</b> <i>Pengxiao Bao, Liwei Shi*, Zhongyin Zhang, Shuxiang Guo**</i>	249
20210118	<b>Coordinated Planning Research on Distributed Command and Control System based on UAV</b> <i>Bo Dong, Xiaofang Liu, Aiguo Lu, Xiaoye Tong, Wen Li, Xing Fan</i>	255
20210119	<b>Data Construction Method of Unmanned Underwater Vehicle Test Scene based on Linear Interpolation</b> <i>Yangliu Xie, Fengchi Xu, Qianyi Wang, Wei Han</i>	260
20210120	<b>Multi-Sensor Fusion Localization with Factor Graphs for UGVs Under Adverse Conditions</b> <i>Xudong Yu, Changhong Wang</i>	266
20210122	<b>A Risk-Bounded Cooperative Path Planning Model for Multi-UAVs Based on Chance Constrained Optimization</b> <i>Lin Zhao, Yanzhen Wang*, Weiyan Ren</i>	272
20210123	<b>Blind Adaptive Gait Planning on Non-stationary Environments via Continual Reinforcement Learning</b> <i>Hao Hu, Yang Liu*</i>	280
20210127	<b>Research on Cooperative Guidance and Control Method of Exoatmospheric Multi Interceptors</b> <i>Hongyu Li, Xiaobiao Dun, Tong Yin, Jingzhu Cai</i>	285
20210128	<b>Coverage Control of Unmanned Aerial Vehicles for Periodical Monitoring of Geohazards</b> <i>Wei Zhang, Chao Zhai</i>	293
20210129	<b>A Less Noisy Time Surface for Event-based Visual Odometry</b> <i>Rui Hu, Yuanqing Xia, Zhongqi Sun</i>	299

20210135	<b>Handling Uncertainty in View of Inner Product</b> <i>Qianli Zhou, Yong Deng*</i>	305
20210138	<b>Unmanned Collaborative Intelligent Edge Computing Task Scheduling</b> <i>Zhiyong Luo, Xin Qian, Chenyu Huang, Rui Ding, Ning Xin, Daoyi Su</i>	309
20210141	<b>A Fast-response Leader Node Election Scheme for Unmanned Surface Vehicle Cluster Network</b> <i>Liang Zhao, Cuican Wang, Botao Hou, Bin Wu, Linghao Li, Qiao Shi</i>	315
20210142	<b>A Trusted Networking Scheme for Unmanned Equipment Based on Blockchain</b> <i>Liang Zhao, Botao Hou, Qiao Shi, Xianwang Xie, Linghao Li, Cuican Wang</i>	321
20210143	<b>UAV Spectrum Sensing of Normalized Spectrum based on GRU network</b> <i>Zhiyong Luo, Jiu Xiong, Feifan Luo, Xiti Wang, Chun Shan, Shichao Jin, Dunge Liu</i>	328
20210144	<b>Reduced-Order Output-Feedback Bipartite Consensus of Linear Multi-Agent Systems</b> <i>Zichen Li, Xianwei Li, Shaoyuan Li</i>	334
20210147	<b>Design of Reconnaissance Image Compression System Based on Semantic Segmentation</b> <i>Siyang Zhang, Hongxiang Chen, Zepeng Wang</i>	340
20210148	<b>A Novel Reliability Evaluation Method for Complex Evidences</b> <i>Chaosheng Zhu, Fuyuan Xiao</i>	346
20210150	<b>Collaborative Fault-Tolerant Navigation Method for Unmanned Swarm based on MHSS</b> <i>Xin Chen, Rong Wang, Zhi Xiong, Jianye Liu, Weixing Qian, Huiyuan Zhang</i>	352
20210152	<b>Detection of Vigilance in L3 Autonomous Driving Based on EEG</b> <i>Chancheng Zhou, Boyang Li, Shengtao Li, Kai Huang</i>	359
20210154	<b>Ship Target Tracking Algorithm Based on Adaptive Improvement Unscented Particle Filter</b> <i>Chulin Zhou, Jingdong Chen, Fan Huang, Zhekun Hu, Xinyu Wang, Zhen Zeng</i>	366
20210157	<b>Anti-sweep-jamming Method based on instantaneous correlation and harmonic time sequence test for pseudo code and linear frequency hybrid modulation detector</b> <i>Sibei Cheng, Xiao Luo, Qile Chen</i>	371
20210159	<b>Min-Punishment Sweep Coverage based Path Plan Algorithm for USV</b> <i>Jun WEI, Ding DONG, Xianggen MENG</i>	377
20210160	<b>Research on the Aviation Support Groups Scheduling for Multi-wave Aircrafts Based on the Ammunition Transportation</b> <i>Lianfei Yu, Cen Zhu, Weijun Li, Manguli Qi, Jin Liu</i>	383

20210161	<b>Joint Optimization of Broadcast Frequency and Transmission Power for LTE-V2V Based Cooperative Awareness of Connected Vehicles</b>	390
	<i>Yaqing Yan, Jianshan Zhou, Daxin Tian, Xuting Duan, Zhengguo Sheng, Guixian Qu, Yuanxi Wu, Xuejun Ran</i>	
20210162	<b>Feedback Forecasting based Deep Deterministic Policy Gradient Algorithm for Car-Following Control of Autonomous Vehicle</b>	396
	<i>Zheng Yuqi, Yan Ruidong*, Jia Bin*, Jiang Rui</i>	
20210163	<b>Research on UGV Formation Based on Fixed-Time Sliding Mode Control</b>	402
	<i>Yunping Liu, Jinhu Ma, Tingting Zhang, Zhongyuan Zhao, Zhiliang Deng</i>	
20210164	<b>Online Inverse Identification of Noncooperative Dynamic Games</b>	408
	<i>Zhenhua Zhang, Yao Li, Chengpu Yu</i>	
20210165	<b>Market-Based Robots Cooperative Exploration In Unknown Indoor Environment</b>	414
	<i>Tianyou Yu, Baosong Deng, Wen Yao, Xiaozhou Zhu, Jianjun Gui*</i>	
20210167	<b>Control Method of Grid Rudder Correction Fuze based on Terminal Sliding Mode Control</b>	420
	<i>Jisong Xiao, Dongguang Li, Yu Wang</i>	
20210169	<b>Two-stage motional target encircling control of general linear networked systems</b>	427
	<i>Bowen Xu, Yaozhong Zheng, Yue Wu, Hai-Tao Zhang</i>	
20210170	<b>A Novel Track Association Method Based on Overlapping Clustering and Evidence Combination</b>	432
	<i>Xinxin Shen, Xinyang Deng, Wen Jiang</i>	
20210172	<b>CIV: Information Volume of Complex Mass Function</b>	438
	<i>Jixiang Deng, Yong Deng*</i>	
20210173	<b>Sustainable Collaborative Planning of Heterogeneous for Disaster Emergency</b>	443
	<i>Weiwei Bian, Yanxiang Jia, Yanxiang Jia, Xin Lv, Wennan Yuan, Chan Liu</i>	
20210175	<b>Heterogeneous Interception Equipment Deployment Method Based on Heuristic Optimization Algorithm</b>	449
	<i>Yanxiang Jia, Weiwei Bian, Kuihua Huang, Chan Liu, Xin Lv, Wennan Yuan</i>	
20210176	<b>Multi-agent Distributed Formation Control Based on Improved Artificial Potential Field and Neural Network for Connectivity Preservation</b>	455
	<i>Bao Chen, Hongjun Ma*, Xinkai Liang</i>	
20210180	<b>Road Roughness Estimation for Intelligent Vehicles Based on SNE and Semantic Segmentation</b>	461
	<i>Jingyi Xu, Li Gao, Junyi Ma, Yanan Zhao*, Zhiyang Song, Yutian Lin</i>	



20210182	<b>Vision for Developing Unmanned Delivery System</b> <i>Weijian Pang*, Xue Li, Xiaosu Zhan, Peng Li</i>	467
20210187	<b>Dynamic Resilience Assessment of UAV Swarm for Battlefield Surveillance Mission</b> <i>Hongxu Li, Qin Sun, Kezhou Ren, Yuxian Xie, Chengyu Liu, Yingchao Zhang</i>	472
20210188	<b>A TensorFlow Serving-based Method for Deploying Intelligent Algorithms for Unmanned Craft</b> <i>Yulun Wu, Qianyi Wang, Zhuo Chen, Wei Han, Shengnan Song, Zishuai Wang</i>	478
20210190	<b>Lateral Control of Intelligent Driving Vehicles under Extreme Conditions</b> <i>Fei Zhang, Juping Zhu, Yuansheng Li, Qing Xu, Yuanlong Wan*, Hongbo Gao, Chengcai Wang</i>	482
20210191	<b>Track Prediction Algorithm Based on Multidimensional Local Hausdorff Distance</b> <i>Hao Liu, Yuqing Pu*, Haipeng Wang, Xiaolong Liu, Jingjing Huang, Xinlong Pan*</i>	489
20210195	<b>Image Stabilization Based on Panoramic Dense Optical Flow Matching for Camera on Flapping Wing</b> <i>Tian Shen, Cui Long, Liu Zhaoming, Wang Hongwei, Zhang Feng, Liu Qinchao</i>	493
20210197	<b>An Incentive Stackelberg Strategy Towards Intelligent Connected Vehicles</b> <i>Fen Liu, Weihao Liang, Wei Meng*</i>	501
20210198	<b>Target-Driven Mapless Navigation for Self-Driving Car</b> <i>Mingxing Wen*, Feiyu He, Yufeng Yue, Jun Zhang, Hongrun Zhu, Danwei Wang</i>	505
20210205	<b>Drowning Detection Algorithm For Intelligent Lifebuoy</b> <i>Dasheng Yang, Yan Cao, Yujing Feng, Xiao Lai, Zaisheng Pan*</i>	512
20210207	<b>Architecture and Design of Unmanned Sailboat Control System with Open Source, Accessibility and Reliability</b> <i>Zaisheng Pan, Yan Cao*, Dasheng Yang, Qizhi Yu, Yunpeng Qiu</i>	520
20210210	<b>Mutual Pose Recognition Based on Multiple Cues and Uncertainty Capture in Multi-robot Systems</b> <i>Junyi Ma, Guangming Xiong*, Jingyi Xu, Jiarui Song, Dong Sun</i>	527
20210214	<b>Uncertainty Measure for Quantum of Mass function</b> <i>Xiaozhuan Gao, Lipeng Pan, Yong Deng*</i>	534
20210215	<b>An Adaptive Real-time Gesture Detection Method Using EMG and IMU Series for Robot Control</b> <i>Xiaochuan Zhao, Yanlin Ma, Jie Huang, Junzhe Zheng, Yixue Dong</i>	539
20210218	<b>Distributed time-varying formation optimal tracking for multi-agent systems with optimal formation reference</b> <i>Peixuan Shu, Yongzhao Hua*, Xiwang Dong, Zhang Ren</i>	548

20210219	<b>RLDA-based Braking Intention Detection Algorithm for L3 Autonomous Driving</b> <i>Chancheng Zhou, Boyang Li, Shengtao Li, Kai Huang*</i>	554
20210221	<b>Research on the Operational Mode of Manned/Unmanned Collaboratively Detecting Drone Swarm</b> <i>Shuai Yin, Renjie He*, Jingjing Li, Li Chen, Shuangxiong Zhang</i>	560
20210223	<b>3D Position Measurement Algorithm for Military Vehicles Based on Deep Learning</b> <i>Shuyuan Wu, Derong Chen, Jiulu Gong, Zepeng Wang</i>	565
20210224	<b>Underwater Object Detection based on Yolo-v3 Network</b> <i>Yanmei Wang, Jiaxin Liu, Siquan Yu*, Kai Wang, Zhi Han, Yandong Tang</i>	571
20210226	<b>The Study of Resilience on Unmanned Swarms Systems</b> <i>Jingyi Ai, Liang Geng*, Yu An, Haipeng Wang, Hao Liu</i>	576
20210227	<b>Unmanned Aircraft Trajectory Prediction Based on Isolated Forest and LSTM Algorithm</b> <i>Yizhi Wang*, Hanbao Wu, Hao Liu, Shanqiang Zhang</i>	580
20210230	<b>Fine-grained Recognition Based on Improved EfficientNet Model</b> <i>Jiang Shao, Hanbao Wu, Hao Liu</i>	585
20210231	<b>Formation tracking control for multiple unmanned surface vessels system with a noncooperative target</b> <i>Ke Yi, Shun Zhang, Sihong She, Bohan Shao</i>	590
20210234	<b>Multiplex Graph Clustering with Network Embedding Technique: review, methods and challenges</b> <i>Beibei Han, Yingmei Wei*, Xianghan Wang, Qingyong Wang</i>	596
20210235	<b>A Review of Graph Neural Networks for Recommender Applications</b> <i>Yuxuan Yang, Yingmei Wei*, Tianrui Shen</i>	602
20210237	<b>Autonomous Water Sampling System and Experiment Based on the Unmanned Surface Vehicle</b> <i>Mengwei Zhang, Decai Li, Yuqing He, Junfeng Xiong, Zhi Li, Chunhong Xiong</i>	608
20210238	<b>Research on Unstructured Road Boundary Detection</b> <i>Jihui Li, Chan Liu</i>	614
20210239	<b>A Task Planning Method for Multi-UAV from Local LTL Specifications</b> <i>Yuchong Huang, Nan Wang, Jie Li*</i>	618
20210241	<b>Cooperative Trajectory Tracking of Multiple Unmanned Surface Vehicles via Distributed Time-Varying Optimization</b> <i>Shengnan Gao, Lu Liu, Zhouhua Peng, Dan Wang, Haoliang Wang, Anqing Wang</i>	624

20210242	<b>Temporally-Embedded Self-Supervised Video Representation Learning</b> <i>Feng Wang, Huaping Liu</i>	630
20210244	<b>Graphical State Space Model</b> <i>Shaolin Lv</i>	637
20210245	<b>Data Compression and Transmission Technology of USV Radar Image</b> <i>Zishuai Wang, Yangliu Xie, Shengnan Song, Wei Han, Zhuo Chen, Yulun Wu</i>	644
20210251	<b>Task Allocation for Multiple Unmanned Aerial Vehicles Based on Combinatorial Auctions</b> <i>Sa Xu, Lianfei Yu, Xin Deng*, Luohao Tang</i>	648
20210254	<b>Track correlation uncertainty evaluation for Multi-sensor Data Fusion System and its application</b> <i>Shiyou Chen, Hao Liu, Hou Xiao</i>	654
20210255	<b>Multi-sensor Area Deployment Optimization Method Based on Improved Cuckoo Search Algorithm</b> <i>Yanjun Wang, Guoping Zhang</i>	660
20210256	<b>An Algorithm for Mining Track Law Based on Adaptive Clustering</b> <i>Shanqiang Zhang, Hao Liu, Wei Chen, Yizhi Wang</i>	666
20210258	<b>A Multi-Objective Parking Space Decision-Making and Path Planning Method</b> <i>Wei Wang, Meiling Wang, Yufeng Yue, Yi Yang</i>	672
20210259	<b>Path Planning for UAV Reconnoitring in Complex Environment Based on Improved Visibility Graph and Genetic Algorithm</b> <i>Jinpeng Huang, Zhe Xu, Xiangming Zheng*</i>	678
20210261	<b>Control Rights Distribution Weights and Takeover Authority for Human-machine Co-driving based on Fuzzy Control Algorithm</b> <i>Yuanyuan Wang, Fei Zhang*, Hongbo Gao, Yuansheng Li, Qing Xu, Chengcai Wang</i>	684
20210262	<b>Hypersonic Vehicle Trajectory Classification Using Improved CNN-LSTM Model</b> <i>Kun Zeng, Xuebin Zhuang*, Yangfan Xie, Zepu Xi</i>	691
20210263	<b>PD Control for Finite-Time Passivity and Synchronization of Complex Networks with Multiple Weights</b> <i>Lu Wang, Lin-Hao Zhao, Jin-Liang Wang, Yougang Bian, Manjiang Hu</i>	697
20210265	<b>Review of Situation Cognition--taking Trajectory Prediction as an example</b> <i>Yixiang He, Jie Jiang</i>	703
20210269	<b>Multi-Agent Reinforcement Learning for Distributed Cooperative Targets Search</b> <i>Yang Sun, Zhenning Wu, Qiyuan Zhang, Zongying Shi, Yisheng Zhong</i>	711

20210271	<b>Operation Scheduling for an Unmanned Coal Port System with Constraint Programming</b>	717
	<i>Xuan Lu, Xin Tang, Lanbo Zheng</i>	
20210276	<b>Bio-Inspired Geomagnetic Underwater Navigation by Multi-Agent Gradient Optimization</b>	724
	<i>Guo Chen, Xiaofeng Liu*, Zejian Zhou, Xu Zhou, Huan Wang</i>	
20210277	<b>A Software-defined Modular Architecture for Heterogeneous Unmanned System</b>	730
	<i>Peiwen Zhuang, Tao Xu, Shan Wang, Quan Peng</i>	
20210278	<b>Finite-time Disturbance Observer Based Parameter Self-tuning PID Path-following Controller Design</b>	735
	<i>Shuai Zheng, Ziyang Huang, Enhua Zhang</i>	
20210280	<b>System Design and Balance Control of a Novel Electrically-driven Wheel-legged Humanoid Robot</b>	742
	<i>Lingxuan Zhao, Zhangguo Yu*, Xuechao Chen, Gao Huang, Weiwei Wang, Lianqiang Han, Xuejian Qiu, Xiaochen Zhang, Qiang Huang</i>	
20210284	<b>Generating Radar Track Using Cycle-consistent Generative Adversarial Network</b>	748
	<i>Haipeng Wang, Hao Liu*, Liqiang Ren*, Tiantian Tang, Xinlong Pan*, Chen Guo, Fengsi Wei, Pingbing Zuo</i>	
20210285	<b>The Challenges of Autonomous Unmanned Aerial System Test and Evaluation</b>	752
	<i>Shengjun Qi, Feng Wang, Xinlong Wu</i>	
20210286	<b>Tomato Harvesting Robot System Based on Binocular Vision</b>	757
	<i>Yujun Wu, Chengrong Qiu, Sujie Liu, Xuefeng Zou, Xiongzi Li</i>	
20210287	<b>A Black Box Attack Based on Visual Sensitivity</b>	762
	<i>Cailong Li, Chunlong Fan*, Jizhao Zhu, Zhenxin Zhang, Jianzhong Qiao</i>	
20210288	<b>The Requirement Traceable Modeling Method and Application of UAV Command System-of-systems Based on SysML</b>	767
	<i>Yuzhi Wang, Qin Sun, Maohuan Wang, Yingchao Zhang*</i>	
20210289	<b>Modeling and Optimization of Deploying Anti-UAV Swarm Detection Systems Based on the Mixed Genetic and Monte Carlo Algorithm</b>	773
	<i>Jiading Yan, Haibin Xie*, Jie Li</i>	
20210290	<b>Autonomous Navigation with Human Observation for a Biped Robot</b>	780
	<i>Zhifa Gao, Xuechao Chen*, Zhangguo Yu, Min Zhu, Runming Zhang, Zhengyuan Fu, Chao Li, Qingqing Li, Lianqiang Han, Qiang Huang</i>	

20210293	<b>A Novel Distributed Cubature Kalman Filter and Its Application to Target Tracking</b>	786
	<i>Zhentao Yu, Peng Liu, Zhongqing Wang, Zhigang Lu, Yuedong Ma</i>	
20210294	<b>A novel target tracking method in unmanned drones by gaze prediction combined with YOLO algorithm</b>	792
	<i>Ao Zhu, Jia Yang, Wenyong Yu*</i>	
20210295	<b>Space Robot Arm Deployment Path Planning Based on FMT*Algorithm</b>	798
	<i>Ning Chen, Yasheng Zhang, Wenhua Cheng</i>	
20210296	<b>Multimodal Speech Emotion Recognition Based on Aligned Attention Mechanism</b>	802
	<i>Mingxin Liu, Nannan Xue*, Meiqi Huo</i>	
20210297	<b>BA-GAN: Block Attention GAN model for Underwater Image Enhancement</b>	809
	<i>Yue Wang, Huijie Fan, Shibei Liu, Jiabin Liu, Sun Li, Yandong Tang</i>	
20210300	<b>Model-Free Load Frequency Control Based on Multi-Agent Deep Reinforcement Learning</b>	815
	<i>Gang-Xiang Liu, Zhi-Wei Liu*, Gui-Xi Wei</i>	
20210301	<b>Distributed Model Predictive Control of Vehicle Platoons with Random Packet Loss</b>	820
	<i>Yan Tan, Yougang Bian*, Chongkang Li, Manjiang Hu, Changkun Du, Biao Xu</i>	
20210302	<b>A Cooperative Navigation System of Multiple Quadrotor Aerial Vehicles: Design, Development and Performance</b>	826
	<i>Xiaodan Zhang, Zebo Zhou*, Xin Luo, Zeliang Zhang, Guoquan Lin, Junxi Tian</i>	
20210303	<b>An observable degree analysis method for nonlinear Systems with noise correlation</b>	832
	<i>Tang Shuaishuai, Li Hong, Ge Quanbo, Zhu Bingtao</i>	
20210305	<b>Multi-robot Area Coverage and Environment Estimation Based on the Mixture of Gaussian Processes</b>	840
	<i>Yixian Zhao, Jiashuai Chen, Jinming Xu, Shuai Liu</i>	
20210308	<b>Design of a Bird-inspired Flapping Wing Robot Based on Spatial Four-bar Mechanism</b>	846
	<i>Jiang Liu, Zhang Shi, Xiaowen Guo, Ruochao Wang, Yao Zou, Qing Shi</i>	
20210309	<b>Marine Targets Spatiotemporal Trajectory Similarity Measurement Method Based on Multidimensional Features</b>	852
	<i>Qiaowen Jiang*, Yu Liu*, Shun Sun, Daning Tan</i>	
20210310	<b>A Bi-LSTM Based Network with Attention Mechanism for EEG Visual Classification</b>	858
	<i>Liangyan Mo, Yuhan Wang, Wenhui Zhou*, Xingfa Shen, Wanzeng Kong</i>	

20210312	<b>Influence of Traffic Flow Around the Intelligent Vehicle on Takeover Time in a Bottleneck of the Expressway</b> <i>Qingchao Liu, Tianyu Xu, Yingfeng Cai, Long Chen</i>	864
20210313	<b>Trajectory tracking of unmanned tracked vehicle based on model-free algorithm for off-road driving conditions</b> <i>Zeyue Tang, Haiou Liu, Ziyue Zhao, Jiaying Lu, Haijie Guan, Huiyan Chen</i>	870
20210315	<b>Three-dimension Visual Simulation for Formation Tracing Control of Multiple Underwater Vehicles</b> <i>Qirong Tang*, Jiang Li, Daopeng Jin, Thao Ngogia, Minghao Liu, Yinghao Li</i>	878
20210317	<b>Dynamic Modelling and Position-force Control for a Mobile Manipulator Based on Particles System Theory</b> <i>Pengjie Xu, Jingtao Zhang, Yuanzhe Cui, Kun Zhang, Xinyi Chen, Qirong Tang*</i>	884
20210318	<b>Research on Lane Change Constraint Control Based on Pavement Pothole Detection</b> <i>Ekponoimo King Ibritam, Youguo He, Chaochun Yuan</i>	890
20210319	<b>Intelligent Fault Diagnosis Method for AUV Integrated Navigation System</b> <i>Yuxin Zhao, Yang Chen, Liheng Chen, Xiong Deng, Nan Jiang, Lihua Hou</i>	896
20210321	<b>Collective Dynamics and Visual Interaction Topology of Bionic Flapping-wing Robot Flock</b> <i>Qirong Tang*, Yuanzhe Cui, Jingtao Zhang, Pengjie Xu, Kun Zhang</i>	902
20210323	<b>Weapon-target Assignment of Ballistic Missiles Based on Q-Learning and Genetic Algorithm</b> <i>Quan Cheng, Derong Chen, Jiulu Gong</i>	908
20210328	<b>LiDAR-Interacted and Self-Guided Further Scene Parsing for Road Detection</b> <i>Binyu Zhao, Wei Zhang*, Panyu Peng</i>	913
20210329	<b>Formation control of second-order multi-agent systems with multiplicative noises</b> <i>Xianfu Ke, Xiaofeng Zong</i>	919
20210330	<b>Game-model Prediction Hybrid Path Planning Algorithm for Multiple Mobile Robots in Pursuit-Evasion Game</b> <i>Jianfeng Cui, Dongchang Li, Peng Liu, Jia Qin, Yuedong Ma, Zhigang Lu</i>	925
20210331	<b>A Hybrid Intelligent Anti-disturbance Control Approach for Unmanned Surface Ship Autopilot</b> <i>Yongqiang Zhuo</i>	931
20210332	<b>Applicability Analysis and Simulation Verification of UAV Flight Verification</b> <i>Zige Huang, Xiaoying Xin, Jinming Yuan, Yihao Shu, Chuangang Wang</i>	935

20210335	<b>Self-supervised Learning of Occlusion Aware Flow Guided 3D Geometry Perception with Adaptive Cross Weighted Loss from Monocular Videos</b> <i>Jiaojiao Fang, Guizhong Liu*</i>	941
20210337	<b>Implementing Trajectory Tracking Control Algorithm for Autonomous Vehicle</b> <i>Xuting Duan, Qi Wang, Daxin Tian*, Jianshan Zhou, Jian Wang, Zhengguo Sheng, Dezong Zhao, Yafu Sun</i>	947
20210338	<b>Aerial Small Object Tracking with Transformers</b> <i>Chang Liu, Sheng Xu, Baochang Zhang*</i>	954
20210339	<b>Building Footprint Extraction of Coastal Cities from Multi-source Aerial Images Based on Semantic Segmentation</b> <i>Daning Tan, Yu Liu*, Qiaowen Jiang, Shun Sun, Ziran Ding, Chen Guo</i>	960
20210342	<b>Consensus-Based State Estimation over Sensor Networks with Correlated Noise</b> <i>Wenbiao Ge, Jialing Zhou*, Mengfei Niu</i>	964
20210345	<b>A Novel Modeling Analysis of Carrier Air Wake Based on Component Coupling Correlation</b> <i>Wang Yuanliang, Li Hong, Ge Quanbo*</i>	970
20210346	<b>Research and Practical Exploration of Test and Validation Technologies Applied on Unmanned Surface Vehicle Optical Recognition</b> <i>Yi Huang, Hongdong Wang*, Jilin Ma, Jiankun Lou, Hong Yi</i>	976
20210347	<b>Reduced-Order Disturbance-Observer-based Control for Nonlinear Singularly Perturbed Systems</b> <i>Jiaying An, Huanhuan Yuan</i>	982
20210351	<b>Decision-making for Choosing Parking Spaces Based on Automatic Vehicles in Traditional Parking Lots</b> <i>Mulin Han, Zhaobo Qin*, Yougang Bian, Biao Xu, Xiaohui Qin, Manjiang Hu</i>	989
20210355	<b>Deep Transfer Learning Based Method for Radar Automatic Recognition with Small Data Size</b> <i>Chen Guo, Haipeng Wang*, Xuezhi Xia, Long Chen, Chang Liu, Guoping Zhang</i>	995
20210360	<b>Design of a Computer Wargaming System</b> <i>Jidong Huang, Qingzheng Fan, Yan Li, Juan Fang</i>	1000
20210363	<b>A Visual Marker Detection and Position Method for Autonomous Aerial Refueling of UAVs</b> <i>Yongsheng Fan, Jinsong Huang, Tao Jia, Chengchao Bai*</i>	1006
20210365	<b>Design and Analysis of AEGIS Command and Control System Based on C2BMC Architecture</b> <i>Peikang Zhang, Jingsong Huang, Jifeng Guo*</i>	1012

- 20210366 **An Improved Artificial Potential Field Algorithm with Swerving Force for USV Path Planning** 1019  
*Xiaowei Li, Haisheng Song, Zhijiu Han, Dan Zhang\*, Yan Peng*
- 20210368 **Observability Analysis of Rotational MEMS-INS Based Cooperative Navigation System** 1025  
*Kai Shen, Jianwen Zuo, Yuelun Li, Siqi Zuo, Wenjun Guo, Xinqian Wu*
- 20210369 **Occlusion Handling Based On Motion Estimation For Multi-Object Tracking** 1031  
*Ganglin Tian, Xinyu Zhang\*, Shichun Guo, Yuchao Liu, Xiaonan Liu, Kun Wang*
- 20210378 **Distributed Finite-Time Cooperative Guidance Against a Moving Target: A Finite-Time Observer Approach** 1037  
*Dong Xiaofei, Ren Zhang*
- 20210388 **Absolute Anchor-Negative Distance Based Metric Learning for Day-Night Feature Matching** 1045  
*Linzhe Shi, Meiling Wang, Yufeng Yue\*, Yi Yang*