复杂航天领域动态

2017 年第 4 期（总第 11 期）2017 年 9 月

本期目录

本期概要：

本期动态专题扫描了自主导航与智能控制及应用在无模型控制、无人机、强化学习、深空自主导航、深空测速，这 5 个研究方向发表的论文情况。

【研究动态：自主导航与智能控制】

随着深空探测任务的实施，国外深空探测航天器控制技术的发展经历了遥测遥控(地面控制)、半自主控制和自主控制 3 个阶段。相比遥控等其他控制方法，自主控制能够在很大程度上减轻地面测控的负担，比较适合深空探测这种长时间、长距离的空间任务。但是，由于自主导航与控制算法复杂，对星载设备和计算机要求高，因此，早期的深空探测航天器很少应用自主导航技术。随着星载计算机、敏感器及执行部件的性能、精度和可靠性的不断提高，自主导航与控制技术越来越受到重视和关注，成为深空探测技术研究的热点。目前，国外深空探测航天器自主导航与控制技术已经逐步从理论和方法的研究走向飞行试验和实际应用，成为深空探测一些特殊任务段的主要控制方式。

✧ 自主导航与智能控制（autonomous navigation and intelligent control）[1]

通过检索 EI 数据库，2016 年以来在自主导航与智能控制研究方向涉及 26 篇最新的研究论文：

1. **Real-Time Obstacle Avoidance for Humanoid-Controlled Mobile Platform Navigation**
   Ariffin, Ilmi Mohd (Center for Humanoid Robots and Bio-sensing (HuRoBs), Faculty of Mechanical Engineering, Universiti Teknologi MARA, Shah Alam, Selangor; 40450, Malaysia); Baharuddin, Azhar; Atien, Anderson Cyril; Yussof, Hanafiah**Source:** *Procedia Computer Science*, v 105, p 34-39, 2017, *IEEE International Symposium on Robotics and Intelligent Sensors, IRIS 2016*

2. **Development of Autonomous Radiation Mapping Robot**
   Zakaria, Abd. Hafiz (Department of Mechatronics Engineering, Kulliyah of Engineering, International Islamic University Malaysia, P.O Box 10, Kuala Lumpur; 50728, Malaysia); Mustafah, Yasir M.; Abdullah, Jaafar; Khair, Nahrul; Abdullah, Taufiq**Source:** *Procedia Computer Science*, v 105, p 81-86, 2017, *IEEE International Symposium on Robotics and Intelligent Sensors, IRIS 2016*

3. **Human-like Artificial Intelligent Wheelchair Robot Navigated by Multi-Sensor Models in Indoor Environments and Error Analysis**
   Hua, Bin (Univirsity of Toyama, Gofuku, Toyama; 3190, Japan); Hossain, Delowar; Capi, Genci; Jindai, Mitsuru; Yoshida, Ichiro **Source:** *Procedia Computer Science*, v 105, p 14-19, 2017, *IEEE International Symposium on Robotics and Intelligent Sensors, IRIS 2016*

4. **A novel approach to a mobile robot via multiple human body postures**
   Zhou, Dajun (Cognitive Science Department, Fujian Province Key Lab of Machine Intelligence and Robotics, School of Information Science and Engineering, Xiamen University, China); Chao, Fei; Zhu, Zuyuan; Lin, Chih-Min; Zhou, Changle**Source:** *Proceedings of the World Congress on Intelligent Control and Automation (WCICA)*, v 2016-September, p 1463-1468, September 27, 2016, *Proceedings of the 2016 12th World Congress on Intelligent Control and Automation, WCICA 2016*

5. **Fuzzy attitude control for a nanosatellite in low Earth orbit**
   Calvo, Daniel (Universidad Politécnica de Madrid, Edificio E-USOC, Campus de Montegancedo, M40

[1] EI 数据库检索策略：((((({INTELLIGENT CONTROL}) WN CV)) AND (({NAVIGATION}) WN CV)) AND ((2016 OR 2017) WN YR)

km36-38, 28223 Pozuelo de Alarcón, Madrid, Spain); Avilés, Taisir; Lapuerta, Victoria; Laverón-Simavilla, Ana **Source:** *Expert Systems with Applications*, v 58, p 102-118, October 1, 2016

6. **Wadoro: An autonomous mobile robot for surveillance**
Mittal, Shubham (Amity School of Engineering and Technology, Amity University, Noida, Uttar Pradesh, India); Rai, Jaynendra Kumar **Source:** *1st IEEE International Conference on Power Electronics, Intelligent Control and Energy Systems, ICPEICES 2016*, February 13, 2017, *1st IEEE International Conference on Power Electronics, Intelligent Control and Energy Systems, ICPEICES 2016*

7. **Design and implementation of a GPS based personal tracking system**
Janwadkar, Sudhanshu (MIT College of Engineering, Pune, India); Bhavar, Dipak; Kolte, M.T. **Source:** *1st IEEE International Conference on Power Electronics, Intelligent Control and Energy Systems, ICPEICES 2016*, February 13, 2017, *1st IEEE International Conference on Power Electronics, Intelligent Control and Energy Systems, ICPEICES 2016*

8. **Predictive control based target tracking control for a carangiform robotic fish**
Chen, Siyuan (Control and Simulation Center, Harbin Institute of Technology, Harbin, Heilongjiang; 150080, China); Chen, Songlin; Liu, Chang; Yang, Baoqing; Zhang, Feitian **Source:** *Proceedings of the World Congress on Intelligent Control and Automation (WCICA)*, v 2016-September, p 3236-3241, September 27, 2016, *Proceedings of the 2016 12th World Congress on Intelligent Control and Automation, WCICA 2016*

9. **Adaptive fuzzy tracking control for switched stochastic nonlinear systems with input constraint**
Cui, Guozeng (School of Automation, Nanjing University of Science and Technology, Nanjing; 210094, China); Zhang, Baoyong **Source:** *Proceedings of the World Congress on Intelligent Control and Automation (WCICA)*, v 2016-September, p 114-119, September 27, 2016, *Proceedings of the 2016 12th World Congress on Intelligent Control and Automation, WCICA 2016*

10. **Planning optimal trajectory for histogram-enabled mapping and navigation by an efficient PSO algorithm**
Luo, Chaomin (Advanced Mobility Lab, Department of Electrical and Computer Engineering, University of Detroit Mercy, MI, United States); Zhu, Anmin; Mo, Hongwei; Zhao, Wenbing **Source:** *Proceedings of the World Congress on Intelligent Control and Automation (WCICA)*, v 2016-September, p 1099-1104, September 27, 2016, *Proceedings of the 2016 12th World Congress on Intelligent Control and Automation, WCICA 2016*

11. **An active disturbance rejection controller with hysteresis compensation for piezoelectric actuators**
Liu, Weichuan (State Key Laboratory of Management and Control for Complex Systems, Institute of Automation, Chinese Academy of Sciences, Beijing; 100190, China); Cheng, Long; Hou, Zeng-Guang; Tan, Min **Source:** *Proceedings of the World Congress on Intelligent Control and Automation (WCICA)*, v 2016-September, p 2148-2153, September 27, 2016, *Proceedings of the 2016 12th World Congress on Intelligent Control and Automation, WCICA 2016*

12. **Mobile robot autonomous path planning based on fuzzy logic and filter smoothing in dynamic environment**
Yan, Yupei (Key Laboratory for Advanced Mechatronic System Design and Intelligent Control, School of Mechanical Engineering, Tianjin University of Technology, Tianjin; 300191, China); Li, Yangmin **Source:** *Proceedings of the World Congress on Intelligent Control and Automation (WCICA)*, v 2016-September, p 1479-1484, September 27, 2016, *Proceedings of the 2016 12th World Congress on Intelligent Control and Automation, WCICA 2016*

13. **Voltage tracking control of DC-DC boost converter using brain emotional learning**
Khorashadizadeh, Saeed (Dept. Electrical and Computer Engineering, University of Birjand, Birjand, Iran); Mahdian, Mohsen **Source:** *2016 4th International Conference on Control, Instrumentation, and Automation, ICCIA 2016*, p 268-272, June 1, 2016, *2016 4th International Conference on Control, Instrumentation, and Automation, ICCIA 2016*

14. **Feedback tracking control of a class of non-Markovian quantum systems**
Xue, Shibei (School of Information Technology and Electrical Engineering, University of New South Wales Canberra, Australian Defence Force Academy, Canberra; ACT; 2600, Australia); Petersen, Ian R. **Source:** *Proceedings of the World Congress on Intelligent Control and Automation (WCICA)*, v 2016-September, p 1170-1173, September 27, 2016, *Proceedings of the 2016 12th World Congress on Intelligent Control and Automation, WCICA 2016*

15. **Improved artificial bee colony algorithm based optimal navigation path for mobile robot**
Shengjun, Wen (School of Electrical and Information Engineering, Zhongyuan University of Technology, Zhengzhou; 450007, China); Juan, Xia; Rongxiang, Gao; Dongyun, Wang **Source:** *Proceedings of the World*

Congress on Intelligent Control and Automation (WCICA), v 2016-September, p 2928-2933, September 27, 2016, *Proceedings of the 2016 12th World Congress on Intelligent Control and Automation, WCICA 2016*

16. **Minimum entropy tracking control for non-Gaussian systems using proportional-integral strategy**
Tian, Bo (School of Automation Science and Electrical Engineering, Beihang University, Beijing; 100191, China); Wang, Yan;Guo, Lei **Source:** *Proceedings of the World Congress on Intelligent Control and Automation (WCICA)*, v 2016-September, p 1914-1919, September 27, 2016, *Proceedings of the 2016 12th World Congress on Intelligent Control and Automation, WCICA 2016*

17. **Perimeter Detection and Surveillance of Polluted Areas by Robotized Agents in a Hybrid Wireless Sensor Network**
Ahmed, Sevil A. (Control Systems Department, Technical University of Sofia, Branch Plovdiv 25 Tsanko Dyustabanov St, Plovdiv; 4000, Bulgaria); Popov, Vasil L.; Topalov, Andon V.; Shakev, Nikola G. **Source:** *IFAC-PapersOnLine*, v 49, n 29, p 247-252, 2016

18. **Design of an intelligent trimaran USV for maritime rescue**
Huang, Zhen (Department of Naval Architecture, Ocean and Structural Engineering, School of Transportation, Wuhan University of Technology, Wuhan, Hubei, China); Liu, Weiqin; Wang, Xuming; Song, Xuemin; Xu, Xiaoqiang; Chen, Xuehua;Ma, Li; Tang, Lei **Source:** *Proceedings of the International Offshore and Polar Engineering Conference*, v 2016-January, p 927-932, 2016, *Proceedings of the 26th International Ocean and Polar Engineering Conference, ISOPE 2016*

19. **Fuzzy fault-tolerant attitude tracking control for Mars Entry Vehicle under partial loss of actuator effectiveness**
Lei, Furong (School of Instrumentation Science and Opto-Electronics Engineering, Beihang University, Beijing; 100191, China); Zhang, Bin; Li, Tao **Source:** *Proceedings of the World Congress on Intelligent Control and Automation (WCICA)*, v 2016-September, p 86-91, September 27, 2016, *Proceedings of the 2016 12th World Congress on Intelligent Control and Automation, WCICA 2016*

20. **Unscented Kalman Filter-based adaptive tracking control for wheeled mobile robots in the presence of wheel slipping**
Cui, Mingyue (College of Mechanic and Electronic Engineering, Nanyang Normal University, Nanyang Henan; 473061, China); Liu, Wei; Liu, Hongzhao; Lu, Xiaodong **Source:** *Proceedings of the World Congress on Intelligent Control and Automation (WCICA)*, v 2016-September, p 3335-3340, September 27, 2016, *Proceedings of the 2016 12th World Congress on Intelligent Control and Automation, WCICA 2016*

21. **Output feedback tracking control of a class of continuous nonlinear systems via adaptive dynamic programming approach**
Yang, Yang (College of Automation, Nanjing University of Posts and Telecommunications, Nanjing, China); Yue, Dong; Shi, Jing **Source:** *Proceedings of the World Congress on Intelligent Control and Automation (WCICA)*, v 2016-September, p 1647-1652, September 27, 2016, *Proceedings of the 2016 12th World Congress on Intelligent Control and Automation, WCICA 2016*

22. **Zero-error tracking control of nonlinear systems with input saturation**
Liu, Yong-Hua (Hunan Provincial Key Laboratory of Health Maintenance for Mechanical Equipment, Hunan University of Science and Technology, Xiangtan, Hunan, China); Hu, Xiaoping; Huang, Liangpei **Source:** *Proceedings of the World Congress on Intelligent Control and Automation (WCICA)*, v 2016-September, p 319-322, September 27, 2016, *Proceedings of the 2016 12th World Congress on Intelligent Control and Automation, WCICA 2016*

23. **Fusing sound and dead reckoning for multi-robot cooperative localization**
Cheng, Yu-Han (Tianjin Key Laboratory of Process Measurement and Control, Institute of Robotics and Autonomous Systems, Tianjin University, Tianjin, China); Meng, Qing-Hao; Liu, Ying-Jie; Zeng, Ming; Xue, Le; Ma, Shu-Gen **Source:***Proceedings of the World Congress on Intelligent Control and Automation (WCICA)*, v 2016-September, p 1474-1478, September 27, 2016, *Proceedings of the 2016 12th World Congress on Intelligent Control and Automation, WCICA 2016*

24. **Robust trajectory tracking control for a quadrotor unmanned aerial vehicle using disturbance observer**
Yang, Yi (College of Automation Engineering, Nanjing University of Aeronautics and Astronautics, Nanjing, China); Wu, Qingxian; Chen, Mou **Source:** *Proceedings of the World Congress on Intelligent Control and Automation (WCICA)*, v 2016-September, p 697-702, September 27, 2016, *Proceedings of the 2016 12th World Congress on Intelligent Control and Automation, WCICA 2016*

25. **Optimization of tracking control and ESO vibration suppression for free-floating flexible space robot with**

bounded torque
Pang, Zhenan (High-Tech Institute of xi'An, Shaanxi; 710025, China); Zhang, Guoliang; Yang, Fan; Lin, Zhilin; Jia, Xiao**Source:** *Proceedings of the World Congress on Intelligent Control and Automation (WCICA)*, v 2016-September, p 3265-3270, September 27, 2016, *Proceedings of the 2016 12th World Congress on Intelligent Control and Automation, WCICA 2016*

26. **Global finite-time trajectory tracking control of autonomous surface vehicles**
Lv, Shuailin (Marine Engineering College, Dalian Maritime University, Dalian; 116026, China); Wang, Ning; Liang, Xiaoling;Er, Meng Joo **Source:** *Proceedings of the World Congress on Intelligent Control and Automation (WCICA)*, v 2016-September, p 686-690, September 27, 2016, *Proceedings of the 2016 12th World Congress on Intelligent Control and Automation, WCICA 2016*

✧ 无模型控制（model-free control）[2]

通过检索 EI 数据库，2016 年以来无模型控制在自主导航与智能控制研究方向涉及 9 篇最新的研究论文：

1. **Adaptive dynamic programming for H∞ tracking design of uncertain nonlinear systems with disturbances and input constraints**
Cui, Xiaohong (School of Information Science and Engineering Northeastern University Shenyang 110819, Liaoning China);Zhang, Huaguang; Luo, Yanhong; Jiang, He **Source:** *International Journal of Adaptive Control and Signal Processing*, 2017
Article in Press

2. **A Highly Accurate Model-Free Motion Control System with a Mamdani Fuzzy Feedback Controller combined with a TSK Fuzzy Feed-forward Controller**
Ren, Qun (Department of Automatic Manufacturing Engineering, École de Technologie Supérieure, University of Quebec, 1100 Notre-Dame St W, Montreal; QC; H3C 1K3, Canada); Bigras, Pascal **Source:** *Journal of Intelligent and Robotic Systems: Theory and Applications*, v 86, n 3-4, p 367-379, June 1, 2017

3. **An adaptive speed control approach for DC shunt motors**
Tapia-Olvera, Ruben (Departamento de Ingeniería Eléctrica, Universidad Nacional Autónoma de México, Cd. Universitaria, Delegación Coyoacán, Av. Universidad 3000, Mexico City; C.P. 04510, Mexico); Beltran-Carbajal, Francisco; Aguilar-Mejia, Omar; Valderrabano-Gonzalez, Antonio **Source:** *Energies*, v 9, n 11, November 2016

4. **Discrete-Time parallel robot motion control using adaptive neuro-fuzzy inference system based on improved subtractive clustering**
Ren, Qun (Department of Automatic Manufacturing Engineering, ÉCole de Technologie Supérieure, University of Quebec, Montreal; QC, Canada); Bigras, Pascal **Source:** *2016 IEEE International Conference on Fuzzy Systems, FUZZ-IEEE 2016*, p 1000-1006, November 7, 2016, *2016 IEEE International Conference on Fuzzy Systems, FUZZ-IEEE 2016*

5. **Practical Tracking Control of Robot Manipulators with Continuous Fractional-Order Nonsingular Terminal Sliding Mode**
Wang, Yaoyao (State Key Laboratory of Fluid Power and Mechatronic Systems, Zhejiang University, Hangzhou; 310027, China); Gu, Linyi; Xu, Yihong; Cao, Xiaoxu **Source:** *IEEE Transactions on Industrial Electronics*, v 63, n 10, p 6194-6204, October 2016

6. **Direct Adaptive Fuzzy Tracking Control of Marine Vehicles with Fully Unknown Parametric Dynamics and Uncertainties**
Wang, Ning (Marine Engineering College, Dalian Maritime University, Dalian; 116026, China); Er, Meng Joo **Source:** *IEEE Transactions on Control Systems Technology*, v 24, n 5, p 1845-1852, September 2016

7. **Research on backstepping model free control method based on command filter**
Zhou, Hongcheng (Institute of Information, JinLing Institute of Technology, Nanjing; 211169, China); Yang, Juan **Source:***Revista de la Facultad de Ingenieria*, v 31, n 3, p 210-218, 2016

[2]EI 数据库检索策略：((((({INTELLIGENT CONTROL}) WN CV)) OR (({NAVIGATION}) WN CV)) AND ((model-free) WN FL)) AND ((2016 OR 2017) WN YR)

8. **Model-free robust optimal feedback mechanisms of biological motor control**
   Bian, Tao (Control and Networks Lab, Department of Blectrical and Computer Hngineering, Tandon School of Hngineering, New York University, 5 Metrotech Center, Brooklyn; NY; 11201, United States); Jiang, Zhong-Ping **Source:** *Proceedings of the World Congress on Intelligent Control and Automation (WCICA)*, v 2016-September, p 2029-2034, September 27, 2016,*Proceedings of the 2016 12th World Congress on Intelligent Control and Automation, WCICA 2016*

9. **Model-Free Optimal Tracking Control via Critic-Only Q-Learning**
   Luo, Biao (State Key Laboratory of Management and Control for Complex Systems, Institute of Automation, Chinese Academy of Sciences, Beijing 100190, China); Liu, Derong; Huang, Tingwen; Wang, Ding **Source:** *IEEE Transactions on Neural Networks and Learning Systems*, v 27, n 10, p 2134-2144, October 2016

✧ 无人机（unmanned aerial vehicle）[3]

通过检索 EI 数据库，2016 年以来无人机在自主导航与智能控制研究方向涉及 8 最新的研究论文：

1. **Robust Adaptive Control for Unmanned Helicopter with Stochastic Disturbance**
   Li, Rong (College of Automation and Engineering, Nanjing University of Aeronautics and Astronautics, Nanjing; 210000, China); Wu, Qingxian; Chen, Mou **Source:** *Procedia Computer Science*, v 105, p 209-214, 2017, *IEEE International Symposium on Robotics and Intelligent Sensors, IRIS 2016*

2. **Human-computer interaction in intelligent control of an unmanned aerial vehicle**
   Xu, Yuecong (School of Electrical and Electronic Enginneeing, Nanyang Technological University, Singapore, Singapore); Joo Er, Meng **Source:** *2016 International Conference on Intelligent Control, Power and Instrumentation, ICICPI 2016*, p 42-46, February 21, 2017, *2016 International Conference on Intelligent Control, Power and Instrumentation, ICICPI 2016*

3. **Attitude control of fixed wing UAV using Multiple Sliding Surface**
   Sagar, Andra Saicharan (National Aerospace Laboratories, College of Engineering, Pune, India); Shendge, P.D.; Vaitheeswaran, S.M. **Source:** *1st IEEE International Conference on Power Electronics, Intelligent Control and Energy Systems, ICPEICES 2016*, February 13, 2017, *1st IEEE International Conference on Power Electronics, Intelligent Control and Energy Systems, ICPEICES 2016*

4. **Vision-based behavior for UAV reactive avoidance by using a reinforcement learning method**
   Zhaowei, Ma (National University of Defense Technology, China); Yifeng, Niu; Lincheng, Shen **Source:** *Proceedings of the World Congress on Intelligent Control and Automation (WCICA)*, v 2016-September, p 3301-3306, September 27, 2016,*Proceedings of the 2016 12th World Congress on Intelligent Control and Automation, WCICA 2016*

5. **Multilayer cognitive architecture for UAV control**
   Emel'yanov, Stanislav (Federal Research Center 'Computer Science and Control' of RAS, pr. 60-letiya Octyabrya 9, Moscow, Russia); Makarov, Dmitry; Panov, Aleksandr I.; Yakovlev, Konstantin **Source:** *Cognitive Systems Research*, v 39, p 58-72, September 1, 2016

6. **Path planning for unmanned aerial vehicle under geo-fencing and minimum safe separation constraints**
   Liu, Yang (Civil Aviation Management Institute of China, Beijing; 100121, China); Lv, Renli; Guan, Xiangmin; Zeng, Jie**Source:** *Proceedings of the World Congress on Intelligent Control and Automation (WCICA)*, v 2016-September, p 28-31, September 27, 2016, *Proceedings of the 2016 12th World Congress on Intelligent Control and Automation, WCICA 2016*

7. **Robust trajectory tracking control for a quadrotor unmanned aerial vehicle using disturbance observer**
   Yang, Yi (College of Automation Engineering, Nanjing University of Aeronautics and Astronautics, Nanjing, China); Wu, Qingxian; Chen, Mou **Source:** *Proceedings of the World Congress on Intelligent Control and Automation (WCICA)*, v 2016-September, p 697-702, September 27, 2016, *Proceedings of the 2016 12th World Congress on Intelligent Control and Automation, WCICA 2016*

[3]EI 数据库检索策略：(((((({UNMANNED AERIAL VEHICLES (UAV)}) WN CV) AND (({INTELLIGENT CONTROL}) WN CV)) + ({robotics} OR {control systems} OR {fighter aircraft} OR {flight control systems} OR {free flight} OR {navigation} OR {air navigation} OR {robustness (control systems)}) WN CV) AND ((2016 OR 2017) WN YR)

8. **Identification and control of a hovering tiltrotor UAV**
   Chen, Chao (College of Mechatronic Engineering and Automation, National University of Defense Technology, Changsha, Hunan; 410073, China); Shen, Lincheng; Zhang, Daibing; Zhang, Jiyang **Source:** *Proceedings of the World Congress on Intelligent Control and Automation (WCICA)*, v 2016-September, p 2226-2231, September 27, 2016, *Proceedings of the 2016 12th World Congress on Intelligent Control and Automation, WCICA 2016*

✧ 强化学习（reinforcement learning）[4]

通过检索 EI 数据库，2016 年以来强化学习在自主导航与智能控制研究方向涉及 10 篇最新的研究论文：

1. **Navigation in Multi Robot system using cooperative learning: A survey**
   Singh, Priyanka (Robotics and Intelligent System Design Lab, Indian Institute of Information Technology and Management, Gwalior, India); Tiwari, Ritu; Bhattacharya, Mahua **Source:** *2016 International Conference on Computational Techniques in Information and Communication Technologies, ICCTICT 2016 - Proceedings*, p 145-150, July 15, 2016, *2016 International Conference on Computational Techniques in Information and Communication Technologies, ICCTICT 2016 - Proceedings*

2. **Neural inverse reinforcement learning in autonomous navigation**
   Xia, Chen (Research Center CRIStAL, UMR CNRS 9189, École Centrale de Lille, Villeneuve d'Ascq; 59651, France); El Kamel, Abdelkader **Source:** *Robotics and Autonomous Systems*, v 84, p 1-14, October 1, 2016

3. **Autonomous path planning scheme research for mobile robot**
   Cai, Jianxian (School of Electronic and Control Engineering, Beijing University of Technology, No 100, Pingleyuan, Chaoyang District, Beijing; 100124, China); Ruan, Xiaogang; Li, Pengxuan **Source:** *Cybernetics and Information Technologies*, v 16, n 4, p 113-125, 2016

4. **Mobile robots navigation in unknown environments by using fuzzy logic and learning automata**
   Adib, Akram (Department of Computer, Faculty of Electrical and Computer Engineering, Islamic Azad University, Iran);Masoumi, Behrooz **Source:** *7th Conference on Artificial Intelligence and Robotics, IRANOPEN 2017*, p 58-63, June 23, 2017, *7th Conference on Artificial Intelligence and Robotics, IRANOPEN 2017*

5. **Learning high-level navigation strategies via inverse reinforcement learning: A comparative analysis**
   Herman, Michael (Robert Bosch GmbH, Stuttgart; 70442, Germany); Gindele, Tobias; Wagner, Jörg; Schmitt, Felix;Quignon, Christophe; Burgard, Wolfram **Source:** *Lecture Notes in Computer Science (including subseries Lecture Notes in Artificial Intelligence and Lecture Notes in Bioinformatics)*, v 9992 LNAI, p 525-534, 2016, *AI 2016: Advances in Artificial Intelligence - 29th Australasian Joint Conference, Proceedings*

6. **Practical bayesian inverse reinforcement learning for robot navigation**
   Okal, Billy (Social Robotics Lab, University of Freiburg, Freiburg, Germany); Arras, Kai O. **Source:** *Lecture Notes in Computer Science (including subseries Lecture Notes in Artificial Intelligence and Lecture Notes in Bioinformatics)*, v 9853 LNCS, p 271-274, 2016, *Machine Learning and Knowledge Discovery in Databases - European Conference, ECML PKDD 2016, Proceedings*

7. **Autonomous navigation of an over-actuated marine platform using reinforcement learning**
   Tziortziotis, Konstantinos (Department of Computer Science and Engineering, University of Ioannina, Ioannina, Greece);Tziortziotis, Nikolaos; Vlachos, Kostas; Blekas, Konstantinos **Source:** *ACM International Conference Proceeding Series*, v 18-20-May-2016, May 18, 2016, *9th Hellenic Conference on Artificial Intelligence, SETN 2016*

8. **Reinforcement learning-based mobile robot navigation**
   Altuntas, Nihal (Department of Computer Engineering, Faculty of Engineering, Fatih University, Istanbul, Turkey); Imal, Erkan; Emanet, Nahit; Öztürk, Ceyda Nur **Source:** *Turkish Journal of Electrical Engineering and Computer Sciences*, v 24, n 3, p 1747-1767, 2016

9. **Goal-directed affordance prediction at the subtask level**

[4]EI 数据库检索策略：((((({NAVIGATION}) WN CV)) AND (({REINFORCEMENT LEARNING}) WN CV)) AND ((intelligent) WN All fields)) AND ((2016 OR 2017) WN YR)

Min, Huaqing (School of Software Engineering, South China University of Technology, Guangzhou, China); Yi, Chang'an;Luo, Ronghua; Zhu, Jinhui **Source:** *Industrial Robot*, v 43, n 1, p 48-57, January 18, 2016

10. **Game-theoretic tracking control for actuator attack attenuation in cyber-physical systems**
Vamvoudakis, Kyriakos G. (Center for Control, Dynamical-systems and Computation (CCDC), University of California, Santa Barbara; 93106-9560, United States) **Source:** *Proceedings of the International Joint Conference on Neural Networks*, v 2016-October, p 4233-4240, October 31, 2016, *2016 International Joint Conference on Neural Networks, IJCNN 2016*

✧ 深空自主导航（deep space autonomous navigation）[5]

通过 EI 数据库检索，2016 年以来深空自主导航在自主导航与智能控制研究方向涉及 19 篇最新的研究论文：

1. **Observability analysis of autonomous navigation for deep space exploration with LOS/TOA/velocity measurements**
Ma, Xin (School of Instrumentation Science and Opto-electronics Engineering, Beihang University(BUAA), Beijing; 100191, China); Chen, Xiao; Fang, Jiancheng; Liu, Gang; Ning, Xiaolin **Source:** *IEEE Aerospace Conference Proceedings*, v 2016-June, June 27, 2016, *2016 IEEE Aerospace Conference, AERO 2016*

2. **Autonomous optical and pulsar hybrid navigation method for deep space probe**
Liu, Y. (Shanghai Institute of Spaceflight Control Technology, Shanghai, China); Yang, G. **Source:** *23rd Saint Petersburg International Conference on Integrated Navigation Systems, ICINS 2016 - Proceedings*, p 484-490, 2016, *23rd Saint Petersburg International Conference on Integrated Navigation Systems, ICINS 2016 - Proceedings*

3. **Analysis on error propagation in velocity vector synthesis of deep-space celestial autonomous navigation based on radial velocity measurement**
You, Wei (Harbin Institute of Technology, Harbin; 150001, China); Zhang, Wei; Ma, Guang-Fu **Source:** *Zhongguo Guanxing Jishu Xuebao/Journal of Chinese Inertial Technology*, v 25, n 3, p 338-342, June 1, 2017 **Language:** Chinese

4. **Overview of autonomous navigation based on sequential images for planetary landing**
Wang, Dayi (Beijing Institute of Control Engineering, Beijing; 100190, China); Xu, Chao; Huang, Xiangyu **Source:** *Harbin Gongye Daxue Xuebao/Journal of Harbin Institute of Technology*, v 48, n 4, p 1-10, April 28, 2016 **Language:** Chinese

5. **Autonomous navigation using x-ray pulsars and multirate processing**
Chen, Po-Ting (Department of Mechanical and Aerospace Engineering, University of California, Los Angeles; CA; 90095, United States); Speyer, Jason L.; Bayard, David S.; Majid, Walid A. **Source:** *Proceedings of the American Control Conference*, p 4563-4569, June 29, 2017, *2017 American Control Conference, ACC 2017*

6. **Scheme and key technologies of autonomous optical navigation for mars exploration in cruise and capture phase**
Wang, Mi (State Key Laboratory of Information Engineering in Surveying, Mapping and Remote Sensing, Wuhan University, Wuhan; 430079, China); Zheng, Xinghui; Cheng, Yufeng; Chen, Xiao **Source:** *Wuhan Daxue Xuebao (Xinxi Kexue Ban)/Geomatics and Information Science of Wuhan University*, v 41, n 4, p 434-442, April 1, 2016 **Language:** Chinese

7. **Autonomous navigation using X-ray pulsars and multirate processing**
Chen, Po-Ting (Department of Mechanical and Aerospace Engineering, United States); Speyer, Jason L.; Bayard, David S.;Majid, Walid A. **Source:** *Journal of Guidance, Control, and Dynamics*, v 40, n 9, p 2237-2249, 2017

8. **An image-based autonomous navigation method for precise landing on mars**
Li, Jian-Jun (Beijing Institute of Control Engineering, Beijing; 100190, China); Wang, Da-Yi **Source:** *Yuhang Xuebao/Journal of Astronautics*, v 37, n 6, p 687-694, June 30, 2016 **Language:** Chinese

[5]EI 数据库检索策略：((((autonomous) WN KY) AND (("deep space") WN KY)) + ({navigation} OR {navigation systems}) WN CV) AND ((2016 OR 2017) WN YR)

9. **Research on autonomous navigation method for the cruise phase of mars exploration**
Song, Min (State Key Laboratory of Geodesy and Earth's Dynamics, Institute of Geodesy and Geophysics, Chinese Academy of Sciences, Wuhan; 430077, China); Yuan, Yunbin **Source:** *Wuhan Daxue Xuebao (Xinxi Kexue Ban)/Geomatics and Information Science of Wuhan University*, v 41, n 7, p 952-957, July 1, 2016 **Language:** Chinese

10. **A Novel Differential Doppler Measurement-Aided Autonomous Celestial Navigation Method for Spacecraft during Approach Phase**
Ning, Xiaolin (School of Instrument Science and Opto-Electronics Engineering, Beihang University, Beijing; 100191, China);Gui, Mingzhen; Fang, Jiancheng; Dai, Yu; Liu, Gang **Source:** *IEEE Transactions on Aerospace and Electronic Systems*, v 53, n 2, p 587-597, April 2017

11. **Research on the Effectiveness of Different Estimation Algorithm on the Autonomous Orbit Determination of Lagrangian Navigation Constellation**
Gao, Youtao (College of Astronautics, Nanjing University of Aeronautics and Astronautics, Nanjing, China); Chen, Junkang;Xu, Bo; Zhou, Jianhua **Source:** *International Journal of Aerospace Engineering*, v 2016, 2016

12. **On-orbit calibration approach for optical navigation camera in deep space exploration**
Wang, Mi (State Key Laboratory of Information Engineering in Surveying, Mapping and Remote Sensing, Wuhan University, Wuhan, China); Cheng, Yufeng; Yang, Bo; Jin, Shuying; Su, Hongbo **Source:** *Optics Express*, v 24, n 5, p 5536-5554, March 7, 2016

13. **Modeling and simulation of blurred star images by the complicated motion based on the separable kernel**
Yuan, Honglin (School of Instrumentation Science and Opt-electronics Engineering, Beihang University, Beijing; 100191, China); Li, Fan; Yu, Tao; Zhang, Cundu; Zhao, Jianhui **Source:** *Hongwai yu Jiguang Gongcheng/Infrared and Laser Engineering*, v 45, n 11, November 25, 2016 **Language:** Chinese

14. **On-board orbit determination using sun sensor and Optical Navigation Camera for interplanetary trajectory**
Kawabata, Yosuke (Department of Advanced Energy, Graduate School of Frontier Sciences, University of Tokyo, Tokyo, Japan);Kawakatsu, Yasuhiro **Source:** *Advances in the Astronautical Sciences*, v 158, p 3237-3250, 2016, *Spaceflight Mechanics 2016*

15. **Solar oscillation time delay measurement assisted celestial navigation method**
Ning, Xiaolin (School of Instrument Science & Opto-electronics engineering, Beihang University, Beijing; 100191, China);Gui, Mingzhen; Zhang, Jie; Fang, Jiancheng; Liu, Gang **Source:** *Acta Astronautica*, v 134, p 152-158, May 1, 2017

16. **A method of X-ray pulsar-based navigation for constellation in libration points**
Zhang, Lu (College of Aerospace Science and Engineering, National University of Defense Technology, Changsha, China);Wang, Yidi; Zheng, Wei; Zhang, Dapeng **Source:** *Lecture Notes in Electrical Engineering*, v 388, p 309-319, 2016, *China Satellite Navigation Conference, CSNC 2016, Proceedings*

17. **Recursive adaptive filter using current innovation for celestial navigation during the Mars approach phase**
Ning, Xiaolin (School of Instrumentation Science & Opto-Electronics Engineering, Beihang University, Beijing; 100191, China); Li, Zhuo; Wu, Weiren; Yang, Yuqing; Fang, Jiancheng; Liu, Gang **Source:** *Science China Information Sciences*, v 60, n 3, March 1, 2017

18. **A fast pulse phase estimation method for X-ray pulsar signals based on epoch folding**
Xue, Mengfan (School of Aerospace Science and Technology, Xidian University, Xi'an; 710126, China); Li, Xiaoping; Sun, Haifeng; Fang, Haiyan **Source:** *Chinese Journal of Aeronautics*, v 29, n 3, p 746-753, June 1, 2016

19. **INS/VNS/CNS integrated navigation method for planetary rovers**
Ning, Xiaolin (School of Instrument Science and Opto-electronics Engineering, Beihang University, Beijing, China); Gui, Mingzhen; Xu, YongZhi; Bai, Xinbei; Fang, Jiancheng **Source:** *Aerospace Science and Technology*, v 48, p 102-114, October 29, 2015

✧ 深空测速（deep space velocity measurement）[6]

通过检索 EI 数据库，2015 年以来深空测速在自主导航与智能控制研究方向涉及 5 篇最新的研究论文：

1. **Research on time registration method of celestial integrated navigation system for deep space exploration**
   Heng, Zhang (Shanghai Key Laboratory of Deep Space Exploration, Shanghai Institute of Satellite Engineering, China); Wei, Zhang; Xiao, Chen **Source:** *Proceedings of the International Astronautical Congress, IAC*, v 5, p 3785-3790, 2015, *66th International Astronautical Congress 2015, IAC 2015: Space - The Gateway for Mankind's Future*

2. **X-ray pulsar/Doppler difference integrated navigation for deep space exploration with unstable solar spectrum**
   Liu, Jin (School of Instrumentation Science and Opto-electronics Engineering, Beihang University (BUAA), Beijing, China);Fang, Jian-Cheng; Yang, Zhao-Hua; Kang, Zhi-Wei; Wu, Jin **Source:** *Aerospace Science and Technology*, v 41, p 144-150, February 2015

3. **Analysis on error propagation in velocity vector synthesis of deep-space celestial autonomous navigation based on radial velocity measurement**
   You, Wei (Harbin Institute of Technology, Harbin; 150001, China); Zhang, Wei; Ma, Guang-Fu **Source:** *Zhongguo Guanxing Jishu Xuebao/Journal of Chinese Inertial Technology*, v 25, n 3, p 338-342, June 1, 2017 **Language:** Chinese

4. **A space-ground combined navigation method based on celestial velocity measurement for Mars capture phase**
   You, Wei (School of Astronautics, Harbin Institute of Technology, Harbin; 150001, China); Ma, Guang-Fu; Zhang, Wei **Source:***Yuhang Xuebao/Journal of Astronautics*, v 37, n 6, p 695-703, June 30, 2016 **Language:** Chinese

5. **X-ray pulsars/Doppler integrated navigation for Mars final approach**
   Cui, Pingyuan (Institute of Deep Space Exploration, School of Aerospace Engineering, Beijing Institute of Technology, Beijing, China); Wang, Shuo; Gao, Ai; Yu, Zhengshi **Source:** *Advances in Space Research*, v 57, n 9, p 1889-1900, May 1, 2016

[6]EI 数据库检索策略：(((((VELOCITY MEASUREMENT}) WN CV)) OR (({VELOCITY MEASUREMENTS}) WN CV)) AND (("deep space") WN All fields)) AND ((2015 OR 2017) WN YR)

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