

CURRICULUM VITAE
Yaroslav Mashtakov

Current Occupation &Affiliation:

Researcher, Keldysh Institute of Applied Mathematics of RAS, Space Systems Dynamics Department

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Education

Bachelor degree in applied physics and mathematics at MIPT (2013)

Master degree in applied physics and mathematics at MIPT (2015)

PhD degree in Analytical Mechanics at KIAM (2019)

Experience

May 2021- until now	Post-doctoral Fellow, project MAGAL, Center for Mechanical and Aerospace Science and Technology (C-MAST), University of Beira Interior
January 2021 – Until now	Associate Professor at MIPT Department of Analytical Mechanics
July 2019 – until now	Researcher at Keldysh Institute of Applied Mathematics of RAS
September 2016 – December 2020	Assistant professor at MIPT Department of Analytical Mechanics
September 2015 – until now	Assistant professor at MIPT Department of Mathematical Modelling and Applied Mathematics
February 2013 – June 2019	Junior Researcher at Keldysh Institute of Applied Mathematics of RAS

Field of interests

Spaceflight dynamics, formation flying, spacecraft angular motion, attitude control systems, Lyapunov-based control, sliding mode control, stability theory

Scientific projects

Principal investigator

- 2017 Grant of the Moscow Region Government for PhD students and young scientists «Reference attitude motion synthesis and implementation»
- 2017 Grant of the German Academic Exchange Service (DAAD) «Implementation of AOCS models into X-HPS Software focusing on GRACE/ GRACE-FO mission scenarios »
- 2020-2022 Grant of the Russian Science Foundation №20-71-00149 «Fuelless means for spatial spacecraft configurations deployment and maintenance »

Investigator

- 2018-2020 Grant of the Russian Foundation for Basic Research №18-31-20014 «Study of satellite controlled motion during rendezvous and capture of the noncooperative target»
- 2017-2020 Grant of the Russian Science Foundation № 17-71-00117 « New attitude control methods of small satellites under restrictions »
- 2016-2018 Grant of the Russian Foundation for Basic Research № 16-01-00634 «Simulation and motion control of flexible elongated space constructions»
- 2016-2018 Grant of the Russian Foundation for Basic Research № 16-01-00739 «Modeling and Motion Control of Distributed Satellite Systems»
- 2015-2016 Grant of the Russian Foundation for Basic Research № 15-31-20058 «Precise angular motion control algorithms for small satellite with limited control authority and sensor deficiency »
- 2014-2016 Grant of the Russian Science Foundation № 14-11-00621 « Development of new dynamical models and control algorithms for the orbital and attitude motion of small spacecraft in prospective missions to Moon, planets, and small bodies of Solar System »
- 2013-2015 Grant of the Russian Foundation for Basic Research № 13-01-00665 «Motion study and control algorithms development for dynamic reconfiguration of a microsatellites formations, including their de-orbiting »
- 2012-2014 Grant of the Russian Foundation for Basic Research № 12-01-33045 «Advanced algorithms and methods for their implementation for controlling the angular and orbital motion of small spacecraft in single and group flights»

Publications:

- Papers that are included in WoS and/or SCOPUS: 25
- Total amount of papers: 41

Publications in highly rated journals (Q1):

1. M.Yu. Ovchinnikov, D.S. Roldugin, V.I. Penkov, S.S. Tkachev, **Y.V. Mashtakov**. Fully magnetic sliding mode control for acquiring three-axis attitude // *Acta Astronautica*, 2016, V. 121, pp. 59-62
URL: <http://dx.doi.org/10.1016/j.actaastro.2015.12.031>
2. M.Yu. Ovchinnikov, S.S. Tkachev, D.S. Roldugin, A.B. Nuralieva, **Y.V. Mashtakov**. Angular motion equations for a satellite with hinged flexible solar panel // *Acta Astronautica*, 2016, V. 128, pp. 534-539
URL: <http://dx.doi.org/10.1016/j.actaastro.2016.07.038>
3. **Y.V. Mashtakov**, M.Yu. Ovchinnikov, S.S. Tkachev. Study of the disturbances effect on small satellite route tracking accuracy // *Acta Astronautica*, 2016, V. 129, pp. 22-31
URL: <http://dx.doi.org/10.1016/j.actaastro.2016.08.028>
4. **Ya.V. Mashtakov**, M.Yu. Ovchinnikov, S.S. Tkachev. Use of External Torques for Desaturation of Reaction Wheels // *Journal of Guidance, Control, and Dynamics*, 2018, V. 41, No. 8, pp. 1663-1674.
URL: <https://arc.aiaa.org/doi/abs/10.2514/1.G003328>
5. D. Ivanov; M. Koptev; **Y. Mashtakov**; M. Ovchinnikov; N. Proshunin; S. Tkachev; A. Fedoseev; M. Shachkov. Determination of disturbances acting on small satellite mock-up on air bearing table // *Acta Astronautica*, 2018, V. 142, pp. 265-276
URL: <https://doi.org/10.1016/j.actaastro.2017.11.010>
6. S. Shestakov, M. Ovchinnikov, **Y. Mashtakov**. Analytical Approach to Construction of Tetrahedral Satellite Formation of disturbances acting on small satellite mock-up on air bearing table // *Journal of Guidance, Control and Dynamics*, V. 42, No. 12, pp. 2600-2614
URL: <https://doi.org/10.2514/1.G003913>
7. **Y. Mashtakov**, M. Ovchinnikov, T. Petrova, S. Tkachev. Two-satellite formation flying control by cell-structured solar sail // *Acta Astronautica*, V. 170, pp. 592-600
URL: <https://doi.org/10.1016/j.actaastro.2020.02.024>
8. **Y. Mashtakov**, M. Ovchinnikov, F. Wöske, B. Rievers, M. List. Attitude determination & control system design for gravity recovery missions like GRACE // *Acta Astronautica*, V. 173, pp. 172-182
URL: <https://doi.org/10.1016/j.actaastro.2020.04.019>
9. **Mashtakov Y.** et al. Single-axis attitude control for slew maneuvers with the keep-out zones // *Acta Astronautica*. – 2021. – V. 180. – PP. 527-537.

Other publications from WoS/Scopus

1. R.V. Yelnikov, **Y.V. Mashtakov**, M.Yu. Ovchinnikov, S.S. Tkachev. Orbital and angular motion construction for low thrust interplanetary flight // *Cosmic Research*, 2016, V. 54, No. 6, pp. 483-490
URL: <https://doi.org/10.1007/s10509-018-3400-4>
2. M. Koptev, S. Trofimov, S. Shestakov, **Y. Mashtakov**. Design and keeping of nanosatellite-based highly elliptical orbit formation // *Advances in the Astronautical Sciences*, 2017, V. 161, pp. 1097-1109

3. **Y. Mashtakov**, M. Ovchinnikov, S. Tkachev. Fuelless means of reaction wheels desaturation formation // *Advances in the Astronautical Sciences*, 2017, V. 161, pp. 903-919
4. **Y. Mashtakov**, M. Ovchinnikov, S. Tkachev. Usage of solar and gravitational torques for reaction wheels desaturation // *Proceedings of the International Astronautical Congress*, 2017, pp. 6888-6896
5. D. S. Ivanov, M. D. Koptev, **Ya. V. Mashtakov**, M. Yu. Ovchinnikov, N. N. Proshunin, S. S. Tkachev, A. I. Fedoseev, M. O. Shachkov. Laboratory Facility for Microsatellite Mock-up Motion Simulation // *Journal of Computer and Systems Sciences International*, V. 57, 2018, No. 1, pp. 115-130
URL: <https://doi.org/10.1134/S1064230717060077>
6. **Y. Mashtakov**, M. Ovchinnikov, S. Tkachev, M. Shachkov. Lyapunov based attitude control algorithm for slew maneuvers with restrictions // *Advances in the Astronautical Sciences*, 2018, V. 163, pp. 355-364
7. **Y. Mashtakov**, M. Ovchinnikov, T. Petrova, S. Tkachev. Attitude and relative motion control of satellites in formation flying via solar sail with variable reflectivity properties // *Proceedings of the International Astronautical Congress*, 2018
8. **Y. Mashtakov**, S. Tkachev, S. Shestakov. Lyapunov control for attitude maneuvers with restricted areas // *Proceedings of the International Astronautical Congress*, 2018
9. M. Ovchinnikov, **Y. Mashtakov**, S. Shestakov. Analytical approach to construction a reference motion for tetrahedral satellite formation // *Proceedings of the International Astronautical Congress*, 2018
10. G. V. Smirnov, **Y. Mashtakov**, M. Ovchinnikov, S. Shestakov, A. F. B. A. Prado. Tetrahedron formation of nanosatellites with single-input control // *Astrophysics and Space Science*, 2018, V. 363, No. 9, p. 180.
URL: <https://doi.org/10.1007/s10509-018-3400-4>
11. A. Okhitina, **Y. Mashtakov**, S. Tkachev. Distribution of correction thrusters under delta-v constraints in local horizontal plane // *Advances in the Astronautical Sciences*, 2020, V. 170, pp. 203-211
12. **Y. Mashtakov** et al. Nanosatellites triangle formation flying for terrestrial gamma-ray flashes and transient luminous events study // *Proceedings of the International Astronautical Congress*, 2020
13. Y. Mashtakov et al. Attitude control and determination accuracy study of small satellite with limited set of sensors // *Proceedings of the International Astronautical Congress*, 2020
14. **Y. Mashtakov**, T. Petrova, S. Tkachev. Relative motion control of two satellites by changing the reflective properties of the solar sails surface // *Advances in the Astronautical Sciences*, 2020, V. 170, pp. 399-416
15. Okhitina A. S. **Mashtakov, Y. V.**, Tkachev, S. S., Shestakov, S. A., Ovchinnikov, M. Y. Minimal Thrusters Configuration for Simultaneous Orbit Correction and Reaction Wheels Desaturation for GEO Satellite // *Cosmic Research*. – 2020. – V. 58. – №. 5. – PP. 379-392.
16. **Mashtakov Y.** et al. Study of the accuracy provided by small satellite attitude determination & control system // *AIP Conference Proceedings*. – AIP Publishing LLC, 2021. – V. 2318. – №. 1. – P. 050004.