Dr. Kostas Alexis

Computer Science & Engineering

Personal Information

Date of Birth	12 March 1984
Place of Birth	Irakleio, Crete, Greece
Nationality	Greek
Work Address	1664 N. Virginia St. Reno, NV 89557, US
Job Position	Assistant Professor (Tenure Track) at the Computer Science & Engineering, University of Nevada, Reno

Education

2007–2011	**PhD with dissertation title "Control of Cooperative Unmanned Aerial Vehicles" (Defended at: 6 July 2011, Awarded at: 15 July 2011)**, *University of Patras*, Greece.
2001–2007	**Diploma of Electrical and Computer Engineering (2007)**, *University of Patras*, Greece.

PhD Dissertation

Title	*Control of Cooperative Unmanned Aerial Vehicles*
Advisor	Prof. Anthony Tzes
Examination Committe	Prof. N. Aspragathos, Asoc. Prof. E. Dermatas, Asist. Prof. K. Eustathioy, Prof. S. Koumpias, Asoc. Prof. S. Manesis, Prof. A. Tzes, Prof. K. Valavanis

Masters Thesis

Title	*Exploration of Unknown Environment by a Team of Autonomous Robotic Systems*
Supervisor	Prof. Anthony Tzes

Research Interests

Unmanned Aerial Systems, Robotics, Autonomous Systems, Path Planning, Control, Localization and Mapping, Sensor Fusion, State Estimation, Multi-Robot Systems, Optimization Strategies, Dynamics, Machine Learning, Navigation and Guidance Systems.

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Working Experience

2015–Present **Assistant Professor (Tenure Track) at the Computer Science & Engineering department**, UNIVERSITY OF NEVADA, RENO, Focusing on advanced navigational and operational autonomy for Aerial Robotics.

More broadly establishing a lab in the field of cognizant robotics and autonomy, `http://www.autonomousrobotslab.com/`

2011–2015 **Senior Postdoc Researher at the Autonomous Systems Lab**, ETH ZURICH, Leading activities in the fields of Control and Path–Planning for Aerial Robots.

Participating in multiple European Commission–funded and national research projects (detailed list below), `http://www.asl.ethz.ch/people/index`

2007–2011 **Researcher and Teaching–Laboratory Assistant**, UNIVERSITY OF PATRAS, GREECE, Leading the aerial robot development activities at the Electrical and Computer Engineering Department.

Acquiring self–funding via the Herakleitos excellence scholarship of the Greek Secretariat of Research and Technology and participating in private-sector funded projects (detailed list below), `http://anemos.ece.upatras.gr/index.php/people`

Research Projects and Grants

2017–Present **Mine Inspection Robotics**, BARRICK GOLD CORPORATION, NEVADA GOVERNOR'S OFFICE OF ECONOMIC DEVELOPMENT, ABOVEGEO, BUDGET: $398,174, Principal Investigator.

Further details: `http://www.autonomousrobotslab.com/projects.html`

2018–Present **REU in Collaborative Human Robot Interaction**, NATIONAL SCIENCE FOUNDATION, BUDGET: $360,000, Senior Personnel.

Further details: Newly awarded project starting summer 2018. PI: Dave Feil-Seifer.

2016–Present **NRI: Collaborative Research: Multi-Modal Characterization of DOE-EM Facilities**, DEPARTMENT OF ENERGY AWARD (DOE-EM0004478), BUDGET: $1,371,287, Principal Investigator for the University of Nevada, Reno. UNR portion is $349,058. The project is in collaboration with Carnegie Mellon University. The project was further extended to include the additional activities of "PCAMS: Pipe Crawling Assay Measurement System" with an additional budget to UNR of $163,130.

The project started on September 2016: `http://www.autonomousrobotslab.com/projects.html`

2016–Present **Intelligent Mobility: Living Labs Project**, NEVADA GOVERNOR'S OFFICE OF ECONOMIC DEVELOPMENT - "KNOWLEDGE FUND" - COLLABORATION WITH PROTERRA INC, BUDGET: $3,121,830, PI: Mridul Gautam, Co-I: Carlos Cardillo, Kostas Alexis and Richard Kelley.

Further details: `https://www.unr.edu/ncar` and `http://www.autonomousrobotslab.com/projects.html`

2016–2017 **Improving UAV Vehicle Safety: Algorithms for Computer Vision Based Detect and Avoid and Failure-Resistant Control**, STATE OF NEVADA, KNOWLEDGE FUND, BUDGET: $ 140,000, Co-Principal Investigator for the University of Nevada, Reno. PI: Dave Feil-Seifer, Co-I: Kostas Alexis..

The project started on February 2015: `http://www.autonomousrobotslab.com/projects.html`

2016–2017 **Motion Analysis Flight Training Arena**, Motion Analysis, Budget: $ 12,000, Principal Investigator.

The project started on October 2016: http://www.autonomousrobotslab.com/projects.html

2017–Present **IEEE CEMRA: Drones Demystified!**, IEEE RAS, Budget: $ 10,000, Principal Investigator.

The project starts in Spring 2017 semester http://www.autonomousrobotslab.com/projects.html

2017–2017 **Active Information Seeking for Autonomous Aerial Robotic Search and Rescue**, IEEE RAS-SIGHT, Budget: $ 2,500, Principal Investigator.

The project started on January 2016: http://www.autonomousrobotslab.com/projects.html

2017–2017 **NVIDIA Hardware Grant**, NVIDIA, Principal Investigator.

One-time hardware donation: http://www.autonomousrobotslab.com/projects.html

2015–Present **Start-Up Package**, University of Nevada, Reno, Budget: $ 300,000, Principal Investigator.

This corresponds to the start-up package of the Tenure–Track position.

2015–2016 **AEROWORKS: Collaborative Aerial Robotic Workers**, European Commission, Horizon 2020, Budget: 5.2 Mil. Euros, Technical Director of the project and postdoc Senior Researcher responsible for the relevant activities of the Autonomous Systems Lab - ETH Zurich leading the work packages on aerial manipulation control and inspection path–planning.

The project started on January 2015: http://www.aeroworks2020.eu/

2012–2015 **ICARUS**, European Commission, FP7, Grant Agreement: 285417, Budget: 17.5 Mil. Euros, Responsible for ETH Zurich and the ASL team research activities, work package leader of the project Unmanned Aerial Vehicle developments.

The project is of very large scale (24 partners), more information: http://www.fp7-icarus.eu

2012–2015 **SHERPA**, European Commission, FP7, Grant Agreement: 600958, Budget: 11.3 Mil. Euros, Participating in the ASL team research activities.

This is a large scale integration project (10 partners), more information: http://www.sherpa-project.eu/sherpa/

2012–2015 **AtlantikSolar**, Private Investors, Budget: > 1 Mil. Euros, Participating in the ASL team and leading the control and autonomous path-planning algorithms of the UAV.

The project aims to demonstrate the capability of crossing the Atlantic Ocean with a hand-launchable fixed-wing solar-powered UAV flying below cloud coverage, more information: http://www.atlantiksolar.ethz.ch/

2011–2012 **AIRobots**, European Commission, FP7, Grant Agreement: 48669, Budget: 3.6 Mil. Euros, Leader of the ETH Zurich UAV Control research efforts and handling project deliverables.

The project was a STREP project with 6 partners, more information: http://airobots.ing.unibo.it/

2013–Present **AETOS**, Greek Secretariat of Reseach and Technology, Budget: 250 k. Euros, Scientific advisor of the project.

2010–2011 **Herakleitos II**, Greek Secretariat of Research and Technology, PhD Excellence Fellowship.

This fellowship provided support during my PhD studies, more information: `http://erawatch.jrc.ec.europa.eu/`

2011–2012 **SaR–Robots**, Latsis Foundation private funding, Prototype development project.

This project studies the development of robot prototypes for search and rescue applications, more information: `http://www.sar-robots.upatras.gr/`

Awards & Records

2017 Best CSE Research Award - for outstanding research performance during the academic year 2016–2017

2015 The AtlantikSolar UAV demonstrated $81.5h$ of continuous–flight, corresponding to the world record for any aircraft below $50kg$ - AtlantikSolar Wepbage

2014 Journal [J3] gained the IET 2014 Premium Award for Best Paper in Control Theory & Applications

2014 Our work at ASL on fixed-wing UAVs was selected among the "Success Stories" of SPARC - The partnership for Robotics in Europe

2014 Conference paper [C29] was selected among the 5 finalists for the Best Automation Paper award during the IEEE International Conference on Robotics and Automation, ICRA 2014, Hong Kong, China, May 31-June

2011 Swiss Government Scholarship Award (H2011x0397) for postdoc research in Autonomous System Lab - Institute of Robotics and Intelligent Systems - ETH Zurich, certificate available at: `http://goo.gl/kg4yPw`

2011 Journal [J2] was almost constantly being ranked among the 25 Hottest Articles in Journal of Control Engineering Practice from December 2012 to May 2014.

2010 Graduate Fellow, (Herakleitos II Program), funded by the Greek Ministry of Education, Lifelong Learning and Religious Affairs, "Control of Cooperating Robotic Vehicles", Project Number 12-260-6

2008 Part of my PhD work on the development of a Quadrotor Micro Aerial Vehicle was selected for presentation in "Science and Technology Festival", Athens 2008

Academic Teaching Experience

2016–2017 CS491/691: Introduction to Aerial Robotics, University of Nevada, Reno. This course educates undergaduate and graduate students on aerial robotics and in particular on the topics of flight dynamics, state estimation, control, and path planning. A semester–long project of real robot development is provided to students organized in teams.

2016–2017 CS491/691: Autonomous Mobile Robot Design, University of Nevada, Reno. This course educates undergaduate and graduate students on mobile robotics and in particular on the topics of dynamics, perception systems, state estimation, localization and mapping, control, and path planning. A semester–long project of real robot development is provided to students organized in teams.

2017 CS791: Robotics for Dirty, Dull and Dangerous Operations, University of Nevada, Reno. This seminar course educates graduate students on advanced robotics sensing, control and planning for nuclearized robotics, remote access in mines, search and rescue and more. A semester–long project of real robot development is provided to students.

2016–2017 ENGR 471: UAS Flight Coordinator Course, University of Nevada, Reno. This course educates undergaduate students on aerial robotics operation and mission planning.

2012–2015 Supervision of multiple Master & Bachelor Thesis as well as Semester projects supervision at the Autonomous Systems Lab, at ETH Zurich. These include work in the fields of path planning, UAV control and navigation, manipulation and more

2013 Lecturing on the topic of advanced rotorcraft modeling, 2013 identification and control within the framework of the Unmanned Aerial Systems graduate course at ETH Zurich

2012 Organization and Lectures at the AIRobots Summer School, more information: http://www.roboticsschool.ethz.ch/airobots

2010 Teaching Assistant, Laboratory of Control Systems II, Electrical and Computer Engineering Department, University of Patras, Greece

2010 Teaching Assistant, Laboratory of Control Systems I, Electrical and Computer Engineering Department, University of Patras, Greece

2009 Teaching Assistant, Laboratory of Control Systems II, Electrical and Computer Engineering Department, University of Patras, Greece

2009 Teaching Assistant, Laboratory of Control Systems I, Electrical and Computer Engineering Department, University of Patras, Greece

2008 Teaching Assistant, Laboratory of Analog and Digital Control I, Electrical and Computer Engineering Department, University of Patras, Greece

2007 Teaching Assistant, Laboratory of Control Systems I, Electrical and Computer Engineering Department, University of Patras, Greece

PostDoc Mentorship

1 Christos Papachristos, Field: *Autonomous Navigation for Aerial Robots*, Period: 2016–Present

2 Sotirios Diamantas, Field: *Computer Vision for Autonomous Driving*, Period: 2017–Present

PhD Student Supervision

2 Frank Mascarich, University of Nevada, Reno Field: *Autonomous Exploration and Source Estimation for Nuclearlized Robotics*, Period: 2016–Present

3 Tung A. Dang, University of Nevada, Reno, Field: *Curisotiy–driven Robotic Autonomy*, Period: 2016–Present

4 Shehryar Khattak, University of Nevada, Reno, Field: *Visually-degraded Simultaneous Localization And Mapping*, Period: 2016–Present

5 Sebastian Verling, ETH Zurich, Co-Supervision with Prof. Roland Siegwart, Field: *VTOL Aerial Robot Autonomous Navigation*, Period: 2015–Present

6 Philipp Oettershagen, ETH Zurich, Co-Supervision with Prof. Roland Siegwart, Field: *Development and Autonomous Path–Planning for Solar–powered Unmanned Aerial Vehicles*, Period: 2013–2015

7 Konrad Rudin, ETH Zurich, Co-Supervision with Prof. Roland Siegwart, Field: *Fault–Tolerant Control for Unmanned Aerial Vehicles*, Period: 2014–2015

8 Mina Fekry Kamel, ETH Zurich, Co-Supervision with Prof. Roland Siegwart, Field: *Control and Autonomous Path-Planning for Aerial Robotic Manipulation and Structural Inspection*, Period: 2014–2015

9 Michael Burri, ETH Zurich, Co-Supervision with Prof. Roland Siegwart, Field: *A Framework for Vision Based Navigation and Parameter Identification of MAVs*, Status: PhD Defense, April 19 2017

10 Sankalp Arora, Carnegie Mellon University Co-Supervision with Dr. Sebastian Scherer , Field: *Path Planning for Agile Autonomous Flight*, Period: 2016–2017

Selected Further Student Advising

1 Tyler Sorey, University of Nevada, Reno Field: *Master Thesis: GPU–based Semantic Classification*, Period: 2016–Present

2 Mat Boggs, University of Nevada, Reno, Field: *Undergraduate work: Fixed–Wing Aerial Robots and Marine Robots Development*, Period: 2016–2017

3 Jason Rush, University of Nevada, Reno, Field: *Undergraduate work: Marine– and Aerial Robots Development*, Period: 2016–2017

5 Sidney Taylor, Davidson Academy, Field: *Curiosity–driven Exploration*, Period: 2017–Present

6 Manuel Retata, Austin Lopez, Nikhil Sidher, Joshua Gavin, University of Nevada, Reno, Field: *Cable-driven Robots for Space Applications (Capstone)*, Period: 2017–Present

7 Jack Currie, Brenda Penn, University of Nevada, Reno, Field: *Vehicle and Pedestrian Detection in Visually–degraded Environments (Capstone)*, Period: 2017–Present

8 Jiao Yuqing, Visiting Scholar, Field: *Human Detection from Multiple Views*, Period: 2017

9   Nayak Varun Uday, Visiting Scholar, Field: *Aerial Manipulation Design and Control*, Period: 2017–Present

10   Jason Schmitt, University of Nevada, Reno, Field: *Leq–wheel Subterranean Robots*, Period: 2017–Present

11   Etzal Corona, University of Nevada, Reno, Field: *Leq–wheel Subterranean Robots*, Period: 2017–Present

11   Deev Patel, University of Nevada, Reno, Field: *Feature detection and tracking in thermal vision*, Period: 2017–Present

Spin–off Advising

2015–Present   **Wingtra**, ETH ZURICH, Developing hybrid aerial robots that combine the flight envelope of a multicopter with that of a fixed–wing aircraft.
Company and project started as large–scale student project, http://wingtra.com/

Publications

Citations   1508 based on Google Scholar, accessed April 10 2018)

h–index   21 (based on Google Scholar, accessed April 10 2018)

h10–index   43 (based on Google Scholar, accessed April 10 2018)

Thesis

T1   K. Alexis, **Control of Cooperative Unmanned Aerial Vehicles**, Doctoral Dissertation, Electrical & Computer Engineering Department, University of Patras, Greece, July 2011

T2   K. Alexis, **Cooperative Area Exploration under Unknown Time Constraints using a Team of Unmanned Ground Vehicles**, Electrical & Computer Engineering Department, University of Patras, Greece, June 2007

Journals

[J1]   K. Alexis, G. Nikolakopoulos, A. Tzes, **Autonomous Quadrotor Position and Attitude PID/PIDD Control in GPS-denied Environments**, in The International Review of Automatic Control, May 2011, Vol. 4, N.3, Praise Worthy Prize [PDF]

[J2]   K. Alexis, G. Nikolakopoulos, A. Tzes, **Switching Model Predictive Attitude Control for a Quadrotor Helicopter subject to Atmospheric Disturbances**, in the Control Engineering Practice Journal, Elsevier, DOI (10.1016/j.conengprac.2011.06.010) (almost constantly being ranked in the 25 Hottest Articles in Journal of Control Engineering Practice from December 2012 to May 2014)) [PDF]

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[J3] K. Alexis, G. Nikolakopoulos, A. Tzes, ***Model Predictive Quadrotor Control: Attitude, Altitude and Position Experimental Studies***, IET Control Theory & Applications, DOI (10.1049/iet-cta.2011.0348), awarded with the IET 2014 Premium Award for Best Paper in Control Theory & Applications [PDF]

[J4] K. Alexis, G. Nikolakopoulos, A. Tzes, ***On Trajectory Tracking Model Predictive Control of an Unmanned Quadrotor Helicopter subject to aerodynamic disturbances***, Asian Journal of Control, Wiley, DOI: 10.1002/asjc.587 [PDF]

[J5] K. Alexis, G. Nikolakopoulos, A. Tzes, ***Experimental Constrained Attitude Control of a Quadrotor subject to Wind Disturbances***, International Journal of Control, Automation and Systems, December 2014, Volume 12, Issue 6, pp 1289-1302 (ISSN: 0020-7179, DOI: 10.1007/s12555-013-0290-7) [PDF]

[J6] G. Nikolakopoulos, K. Alexis, ***Switching Networked Attitude Control of an Unmanned Quadrotor***, International Journal of Control, Automation and Systems, Springer-Verlag, DOI: 10.1007/s12555-011-0132-4, ISSN: 1598-6446 [PDF]

[J7] K. Alexis, C. Huerzeler, R. Siegwart, ***Hybrid Modeling and Control of a Coaxial Unmanned Rotorcraft Physically Interacting with its Environment through Contact***, Control Engineering Practice, Vol. 32, November 2014, Pages 96-112 (DOI: 10.1016/j.conengprac.2014.07.006) [PDF], [Video], [Video]

[J8] K. Alexis, C. Papachristos, R. Siegwart, A. Tzes, ***Robust Model Predictive Flight Control of Unmanned Rotorcrafts***, Journal of Intelligent and Robotic Systems, Springer *(DOI: 10.1007/s10846-015-0238-7)*

[J9] C. Papachristos, K. Alexis, A. Tzes, ***Dual–Authority Thrust–Vectoring of a Tri–TiltRotor employing Model Predictive Control***, Journal of Intelligent and Robotic Systems, Springer *(DOI: 10.1007/s10846-015-0231-1)*

[J10] K. Alexis, G. Darivianakis, M. Burri, R. Siegwart, ***Autonomous Aerial Contact-based Inspection***, Autonomous Robots, Springer US, *DOI: 10.1007/s10514-015-9485-5*, ISSN: 0929-5593

[J11] H. Balta, J. Bedkowski, S. Govindaraj, K. Majek, P. Musialik, D. Serrano, K. Alexis, R. Siegwart, G. de Cubber, ***"Integrated Data Management for A Fleet of Search and Rescue Robots"***, Journal of Field Robotics, DOI: 10.1002/rob.21651, [PDF]

[J12] A. Bircher, K. Alexis, U. Schwesinger, S. Omari, M. Burri and R. Siegwart ***An Incremental Sampling–based approach to Inspection Planning: the Rapidly–exploring Random Tree Of Trees***, Robotica Journal , DOI: https://doi.org/10.1017/S0263574716000084, [PDF], [Video]

[J13] A. Bircher, M. Kamel, K. Alexis, M. Burri, P. Oettershagen, S. Omari, T. Mantel, R. Siegwart, ***Three-dimensional Coverage Path Planning via Viewpoint Resampling and Tour Optimization for Aerial Robots***, Autonomous Robots, Springer US, DOI: 10.1007/s10514-015-9517-1, ISSN: 1573-7527,[PDF], [Video]

[J14] A. Bircher, M. Kamel, K. Alexis, H. Oleynikova, R. Siegwart, ***Receding Horizon Path Planning for 3D Exploration and Surface Inspection***, Autonomous Robots, Springer US, 2016, DOI:10.1007/s10514-016-9610-0,[PDF], [Video]

[J15] P. Oettershagen, A. Melzer, T. Mantel, K. Rudin, T. Stastny, B. Wawrzacz, T. Hinzmann, S. Leutenegger, K. Alexis, and R. Siegwart, ***Design of small hand-launched solar-powered UAVs: From concept study to a multi-day world endurance record flight***, Journal of Field Robotics, [Video]

Conferences

[C1] K. Alexis and A. Tzes, ***Application of a Quadtree-based Market-Allocation algorithm for Cellular Environment Coverage with Cooperative Robots***, In Proceedings of the 16th Mediterranean Conference on Control and Automation, p.938-945, June 25-27, 2008, Ajaccio, Corsica, France. [PDF]

[C2] A. Tzes, K. Andrianesis, K. Alexis, ***Design and Simulation of electronic controlled Ilizarov Platforms***, ASAMI - Greece, Patras 17-19 September, 2009

[C3] K. Alexis, G. Nikolakopoulos, A. Tzes, ***Design and Experimental Verification of a Constrained Finite Time Optimal Control Scheme for the Attitude Control of a Quadrotor Helicopter Subject to Wind Gusts***, IEEE International Conference on Robotics and Automation, p.1636-1641, May 3-8, 2010 Anchorage, Alaska. [PDF]

[C4] K. Alexis, G. Nikolakopoulos, A. Tzes, ***Constrained Optimal Attitude Control of a Quadrotor Helicopter subject to Wind-Gusts: Experimental Studies***, IEEE American Control Conference, p.4451-4455, June 30-July 2, 2010, Baltimore Marriot Waterfront. [PDF]

[C5] K. Alexis, G. Nikolakopoulos, A. Tzes, ***Constrained-Control of a Quadrotor Helicopter for Trajectory Tracking under Wind-Gust Disturbances***, 15th IEEE Mediterranean Electromechanical Conference, Valletta, Malta, p.1411-1416, 26-28 April 2010. [PDF]

[C6] K. Alexis, G. Nikolakopoulos, A. Tzes, ***Model Predictive Attitude Control of an Unmanned Quadrotor Helicopter subject to atmospheric disturbances***, IEEE International Symposium on Industrial Electronics, Bari, Italy, 4-7 July, 2010

[C7] G. Nikolakopoulos, N. Roussos, K. Alexis, ***A Constrained Finite Time Optimal Controller for the Diving and Steering Problem of an Autonomous Underwater Vehicle***, 7th International Conference on Informatics in Control, Automation and Robotics, 2010 [PDF]

[C8] K. Alexis, G. Nikolakopoulos, A. Tzes, ***Experimental Model Predictive Control of a Quadrotor Helicopter subject to Wind-Gusts***, 18th IEEE Mediterranean Conference on Control and Automation, p.1461-1466, June 23-25, 2010, Congress Palace, Marrakesh, Morocco [PDF]

[C9] G. Nikolakopoulos, K. Alexis, A. Tzes, ***A Collaborative Unmanned Helicopter Control Strategy for Image Compression and Wireless Transmission***, 18th IEEE Mediterranean Conference on Control and Automation, p.1206-1211, June 23-25, 2010, Congress Palace, Marrakesh, Morocco [PDF]

[C10] K. Alexis, G. Nikolakopoulos, A. Tzes, **_Model Predictive Control for a Miniature Coaxial Helicopter_**, 7th IFAC Symposium on Intelligent Autonomous Vehicles, p.139-144, September 6-8, Lecce, Italy (DOI: 10.3182/20100906-3-IT-2019.00026) [PDF]

[C11] K. Alexis, G. Nikolakopoulos, A. Tzes, **_Experimental Application of a Model Predictive Controller to an Unmanned Quadrotor Helicopter_**, 2nd Hellenic Robotic Conference, 9-10 December, 2010, Patras, Greece

[C12] C. Papachristos, K. Alexis, G. Nikolakopoulos, A. Tzes, **_Modeling and Control of an Unmanned Tilt-Rotor flying in Helicopter Mode_**, 2nd Hellenic Robotics Conference, 9-10 December, 2010,Patras, Greece

[C13] K. Alexis, G. Nikolakopoulos, A. Tzes, **_Switching Model Predictive Control for a Quadrotor Helicopter under Severe Environmental Flight Conditions_**, 18th IFAC World Congress, p.11913-11918, August 28 - September 2 2011, Milan, Italy (DOI: 10.3182/20110828-6-IT-1002.03010) [PDF]

[C14] C. Papachristos, K. Alexis, G. Nikolakopoulos, A. Tzes, **_Model Predictive Attitude Control of an unmanned Tilt-Rotor aircraft_**, 20th International Symposium on Industrial Electronics, p.922-927, June 27-30 2011, Gdansk, Poland [PDF]

[C15] K. Alexis, G. Nikolakopoulos, A. Tzes, **_Model Predictive Control Scheme for the Autonomous Flight of an Unmanned Quadrotor_**, 20th International Symposium on Industrial Electronics, p.2243-2248, June 27-30 2011, Gdansk, Poland [PDF]

[C16] K. Alexis, C. Papachristos, G. Nikolakopoulos, A. Tzes, **_Model Predictive Quadrotor Indoor Position Control_**, 19th Mediterranean Conference on Control and Automation, p.1247-1252, June 20-23 2011, Aquis Corfu Holiday Palace, Corfu, Greece [PDF]

[C17] C. Papachristos, K. Alexis, G. Nikolakopoulos, A. Tzes, **_Design and Experimental Attitude Control of a Unmanned Tilt-Rotor Aerial Vehicle_**, 15th International Conference on Advanced Robotics, Tallin, p.465-470, June 20-23 2011 [PDF]

[C18] K. Alexis, A. Tzes, **_Revisited Dos Samara UAV: Design and Control_**, International Conference on Robotics and Automation, p.465-470, May 14-18 2012, Minessota, USA [PDF]

[C19] C. Papachristos, K. Alexis, A. Tzes, **_Towards a High–End Unmanned Tri–TiltRotor: Design, Modeling and Hover Control_**, Mediterranean Conference on Control and Automation, p.1579-1584, 3-6 July, 2012 [PDF]

[C20] K. Alexis, C. Huerzeler, R. Siegwart, **_Hybrid Modeling and Control of a Coaxial Unmanned Rotorcraft Interacting with its Environment through Contact_**, IEEE International Conference on Robotics and Automation (ICRA), May, 2013 (ICRA 2013), p. 5417-5424, Karlsruhe, Germany [PDF]

[C21] C. Huerzeler, K. Alexis, R. Siegwart, **_Configurable Real-Time Simulation Suite for Coaxial Rotor UAVs_**, IEEE International Conference on Robotics and Automation (ICRA), May, 2013 (ICRA 2013), p. 309-316, Karlsruhe, Germany [PDF]

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[C22] C. Papachristos, K. Alexis, A. Tzes, ***Model Predictive Hovering-Translation Control of an Unmanned Tri-TiltRotor***, IEEE International Conference on Robotics and Automation (ICRA), May, 2013 (ICRA 2013), p. 5425-5432, Karlsruhe, Germany [PDF], [Video]

[C23] C. Papachristos, K. Alexis, A. Tzes, ***Hybrid Model Predictive Flight Mode Conversion Control for Unmanned Quad–TiltRotors***, European Control Conference, July, 2013, p. 1793-1798, Zurich, Switzerland [PDF]

[C24] C. Huerzeler, K. Alexis, R. Siegwart, ***Explicit Constrained Optimal Trajectory Control of an Unmanned Coaxial Rotorcraft***, Mediterranean Conference on Control and Automation, June, 2013, p. 363-368, Chania, Crete, Greece [PDF], [Video]

[C25] C. Papachristos, K. Alexis, A. Tzes, ***Trajectory control of an unmanned Tri-TiltRotor in hover flight via direct longitudinal actuation***, Mediterranean Conference on Control and Automation, June, 2013, p. 369-374, Chania, Crete, Greece [PDF]

[C26] K. Alexis, C. Huerzeler, R. Siegwart, ***Unmanned Coaxial Rotorcraft Force and Position Control for Physical Interaction through Contact***, Invited Session, Mediterranean Conference on Control and Automation, 2013, June, 2013, Chania, Crete, Greece [PDF], [Video]

[C27] C. Papachristos, K. Alexis, A. Tzes, ***Linear Quadratic Optimal Trajectory–Tracking Control of a Longitudinal Thrust Vectoring–Enabled Unmanned Tri–TiltRotor***, International Conference on Informatics in Control, Automation and Robotics, November, 2013, p. 4174-4179, Vienna, Austria [PDF]

[C28] Christoph Huerzeler, Roberto Naldi, Vincenzo Lippiello, Raffaella Carloni, Janosch Nikolic, Kostas Alexis, Lorenzo Marconi, Roland Siegwart, ***AIRobots: Innovative Aerial Service Robots for Remote Inspection by Contact***, Video Submission, IEEE/RSJ International Conference on Intelligent Robots and Systems (IROS), 2013, p. 4174 - 4179, Tokyo, Japan [PDF], [Video]

[C29] G. Darivianakis, K. Alexis, M. Burri, R. Siegwart, ***Hybrid Predictive Control for Aerial Robotic Physical Interaction towards Inspection Operations***, IEEE International Conference on Robotics and Automation, ICRA 2014, Hong Kong, China, May 31-June 7, 2014, p. 53-58 (Best Automation Paper Finalist) [PDF], [Video]

[C30] C. Papachristos, K. Alexis, A. Tzes, ***Efficient Force Exertion for Physical Manipulation with UAVs: Exploiting the Direct Thrust–Vectoring Capabilities of a Tri-TiltRotor***, IEEE International Conference on Robotics and Automation, ICRA 2014, Hong Kong, China, May 31-June 7, 2014, p. 4500-4505 [PDF], [Video]

[C31] C. Papachristos, K. Alexis, A. Tzes, ***Technical Activities Execution with a TiltRotor UAS employing Explicit Model Predictive Control***, 19th World Congress The International Federation of Automatic Control, August 24-29, 2014, Cape Town, South Africa, p. 11036-11042 [PDF], [Video]

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[C45] A. Bircher, M. Kamel, K. Alexis, H. Oleynikova, R. Siegwart, ***Receding Horizon "Next-Best-View" Planner for 3D Exploration***, IEEE International Conference on Robotics and Automation 2016 (ICRA 2016), Stockholm, Sweden, [PDF], [Video]

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[C47] C. Papachristos, K. Alexis, L. R. G. Carrillo, A. Tzes, ***Distributed Infrastructure Inspection Path Planning for Aerial Robotics subject to Time Constraints***, 2016 International Conference on Unmanned Aircraft Systems, June 7-10, 2016, Atlanta, VA, USA, [PDF]

[C48] L.R.G. Carrillo, F. M. Palacios, E. S. Espinoza Quesada, K. Alexis, ***Adaptive High Order Sliding Mode Control for Relative Positioning and Trajectory Tracking of Spacecraft Formation Flying***, Mediterranean Control Conference, 2016, Athens, Greece, June 21-June 24, 2016, [PDF]

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[C50] S. Khattak, C. Papachristos, K. Alexis, ***Change Detection and Object Recognition Using Aerial Robots*** , International Symposium of Visual Computing (ISVC) 2016, 2016, Las Vegas, US [PDF]

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[C52] S. Verling, T. Stastny, G. Battig, K. Alexis, R. Seigwart, ***Model-based Transition Optimization for a VTOL Tailsitter***, IEEE International Conference on Robotics and Automation (ICRA), May 29-June 3, 2017, Singapore

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[C54] C. Papachristos, S. Khattak, K. Alexis, ***Autonomous Exploration of Visually-Degraded Environments using Aerial Robots***, International Conference on Unmanned Aircraft Systems (ICUAS), June 12-June 16, 2017, Miami, [Video]

[C55] S. Diamantas, K. Alexis, ***Modeling Pixel Intensities with Log-Normal Distributions for Background Subtraction***, IEEE International Workshop on Imaging Systems and Techniques, 2017

[C56] F. Mascarich, T. Wilson. T. Dang, S. Khattak, C. Papachristos, and K. Alexis, ***Towards Robotically Supported Decommissioning of Nuclear Sites***, arXiv preprint arXiv:1705.06401, [Video]

[C57] Frank Mascarich, Taylor Wilson, Christos Papachristos, and Kostas Alexis, "Radiation Source Localization in GPS-denied Environments using Aerial Robot", IEEE International Conference on Robotics and Automation (ICRA), May 21-25, 2018, Brisbane, Australia[Video]

[C58] Tung Dang, Christos Papachristos, Kostas Alexis, "Visual Saliency-aware Receding Horizon Autonomous Exploration with Application to Aerial Robotics", IEEE International Conference on Robotics and Automation (ICRA), May 21-25, 2018, Brisbane, Australia[Video]

[C59] F. Mascarich, T. Wilson, Shehryar Khattak, T. Dang, and K. Alexis, "Autonomous 3D and Radiation Mapping in Tunnel Environments Using Aerial Robots", Waste Management Symposia 2018, March 18-22, Phoenix, USA[Video]

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[C61] C. Papachristos, and K. Alexis, "Thermal-Inertial Localization for Autonomous Navigation of Aerial Robots through Obscurants", International Conference on Unmanned Aircraft Systems (ICUAS), Dallas, TX, USA, 2018 [Video]

Book Chapters

[B1] K. Alexis, G. Nikolakopoulos, A. Tzes, L. Dritsas, **Coordination of Helicopter UAVs for Aerial Forest–Fire Surveillance**, Applications of Intelligent Control to Engineering Systems, Springer-Verlag, 2009, pp. 169-193

[B2] S. Leutenegger, C. Huerzeler, A. K. Stowers, K. Alexis, M. Achtelik, D. Lentink, P. Oh and R. Siegwart, **Flying Robots**, Handbook of Robotics, Springer-Verlag

[B3] M. Kamel, T. Stastny, K. Alexis, R. Siegwart, **Model Predictive Control for Trajectory Tracking of Unmanned Aerial Vehicles Using ROS**, Springer Book on Robot Operating System (ROS) - The Complete Reference (Volume 2)

[B4] C. Papachristos, M. Kamel, M. Popovic, S. Khattak, A. Bircher, H. Oleynikova, T. Dang, F. Mascarich, K. Alexis, and R. Siegwart, **Autonomous Exploration and Inspection Path Planning for Aerial Robots using the Robot Operating System**, Springer Book on Robot Operating System (ROS) - The Complete Reference (Volume 3)

Workshops and Invited Talks

[W1] A. Tzes, K. Alexis, G. Nikolakopoulos, **Constrained Finite Time Optimal Controllers for Helicopters subject to Wind–Gust Disturbances**, UAS Civilian Applications: Fire Detection, Forest Protection, Emergency Response Workshop, IEEE 17th Mediterranean Conference on Control and Automation, June 23-26, 2009, Thessalloniki, Greece.

[W2] K. Alexis, C. Papachristos, A. Tzes, ***Low–cost designs for Vertical and/or Short Take-Off and Landing Unmanned Aerial Vehicles: Sensors, Actuators, Controllers and Communication***, Micro and Small Unmanned Aerial Vehicles Design, Sensor–based Control and Applications Workshop, IEEE 19th Mediterranean Conference on Control and Automation, June 20-22, 2011, Corfu, Greece.

[W3] K. Alexis, ***Autonomous Infrastructure Inspection and Maintenance***, European Robotics Forum, Rovereto, Italy, 2014

[W4] K. Alexis, G. Nikolakopoulos ***AEROWORKS: Collaborative Aerial Robotic Workers***, European Robotics Forum, Vienna, Austria, 2015

[W5] K. Alexis ***Path–Planning and Control for Aerial Robotic Infrastructure Inspection and Maintenance***, Summer School on Mobile Manipulators, Castellon, Spain, July 13-14, 2015

[W6] K. Alexis, M. Chli, M. Achtelik, D. Kottas, G. Bebis ***Special track on Advancing Autonomy for Aerial Robotics***, International Symposium on Visual Computing (ISVC) 2015, December, 2015

[W7] K. Alexis, M. Chli, A. Ollero ***Aerial Robotics Manipulation: from Simulation to Real-life***, IEEE International Conference on Robotics and Automation 2016 (ICRA 2016), Stockholm, Sweden

[W8] K. Alexis, M. Chli, P. Oh, C. Papachristos, P. Oettershagen, G. Nikolakopoulos, L.R.G. Carillo, ***Special track on Advancing Autonomy for Aerial Robotics***, International Symposium on Visual Computing (ISVC) 2015, December, 2016

[W9] K. Alexis, ***ETH Meets California***, AtlantikSolar - flying forever, October, 2016

[W10] K. Alexis, ***Carmegie Mellon University - Robotics Seminars***, RI Seminar: Kostas Alexis : Autonomous Exploration and Inspection using Aerial Robots, October, 2016

[W11] K. Alexis, M. W. Achtelik, G. Antonelli, M. Chli, A. Ollero, R. Siegwart, K. Valavanis, ***Autonomous Structural Monitoring and Maintenance using Aerial Robots***, IEEE International Conference on Robotics and Automation 2017 (ICRA 2017), Singapore

[W12] K. Alexis, ***University of Maryland, Lockheed Martin Seminars***, Cognizant Autonomous Exploration and Mapping Using Aerial Robots, October, 2017

[W13] K. Alexis, G. Antonelli, M. Calva, M. Chli, M. Fumagalli, A. Ollero, ***Aerial Robotic Inspection and Maintenance: Research Challenges, Field Experience and Industry Needs***, IEEE International Conference on Robotics and Automation 2018 (ICRA 2018), Brisbane, Australia

[W14] K. Alexis, M. Mueller, C. Papachristos, T. Stastny, ***Autonomous Navigation for Aerial Robots in Extreme Environments: From Subterranean Environments to the Arctic***, International Conference on Unmanned Aircraft Systems (ICUAS), Dallas, TX, USA, 2018

Technical Reports

[TR1] C. Huerzeler and K. Alexis, ***AIRobots Coaxial helicopter prototype linear simulator***, ETH Zurich, http://www.roboticsschool.ethz.ch/airobots , Tech. Rep., July 2012

[TR2] K. Alexis, ***Technical Report: Optimal Surveillance of Dynamic Parades using Teams of Aerial Robots***, University of Nevada, Reno, arXiv preprint arXiv:1701.00019, 2016

Open Source Contributions

[OS1] ***Uncertainty–aware Receding Horizon Exploration and Mapping Planner*** , https://github.com/unr-arl/rhem_planner

[OS2] ***Next–Best–View Planner*** , https://github.com/ethz-asl/nbvplanner

[OS3] ***Structural Inspection Planner*** , https://github.com/ethz-asl/StructuralInspectionPlanner

[OS4] ***Lin-Kernighan-Helsgaun TSP Solver Interfaces***, https://github.com/unr-arl/LKH_TSP

[OS5] ***Robust MPC***, https://github.com/unr-arl/rmpc_mav

[OS6] ***Dubins Aircraft***, https://github.com/unr-arl/DubinsAirplane

[OS7] ***UAV Model Predictive Control Library***, https://github.com/unr-arl/mav_control_rw

[OS8] ***Motion Analysis Cortex Mocap ROS Bridge***, https://github.com/unr-arl/cortex_ros_bridge

Released Datasets

[D1] ***Aerial Views of the CTC UAV Test Site in Collsuspina, Spain*** , http://www.kostas-alexis.com/research/5-datasets/ctc-uav-test-site

[D2] ***ICARUS project field-trials in Marche-en-Famenne: a multi-robot reconstruction of the environment***, http://www.kostas-alexis.com/research/5-datasets/icarus-robots-at-mef

[D3] ***Datasets accompanying the ICRA 2015 Paper: Structural Inspection Path Planning via Iterative Viewpoint Resampling with Application to Aerial Robotics***, http://projects.asl.ethz.ch/datasets/doku.php?id=koptinspection:koptinspection

[D4] ***Datasets accompanying the FSR 2015 Paper: Long-Endurance Sensing and Mapping using a Hand-Launchable Solar-Powered UAV***, http://projects.asl.ethz.ch/datasets/doku.php?id=fsr2015

[D5] ***Datasets accompanying the ICRA 2017 Paper: Uncertainty-aware Receding Horizon Exploration and Mapping using Aerial Robots***, https://github.com/unr-arl/icra-2017-datasets

[D6] ***Radiation Source Localization Dataset***, `https://github.com/unr-arl/` `radiation-source-localization-dataset`

Industry-focused Conferences/Exhibitons

[CE1] V. Fotinopoulos, K. Alexis, ***AETOS: Automated Autopilot & Geopointing Payload***, 14*th* Remotely Piloted Aircraft Systems (RPAS) 2012, 5-7 June, 2012, Planete Equinoxe, 18-20 rue du Col. Pierre Avia, 75015 Paris, France

[CE2] CPExpo 2014 & SRC Security Research Conference 2014, ***The ICARUS project UAV developments relevant to security applications***, Genova, Italy

[CE3] Search and Rescue Europe 2015, ***Aerial Robotic Assisted–Search and Rescue***, Portsmouth, United Kingdom (to be presented: 21-23 April, 2015)

[CE4] Nevada Advanced Autonomous Systems Innovation Center, ***Annual UAS Search & Rescue Symposium***, Reno, Nevada, USA, April, 2016

[CE5] TIECON, ***Democratization of Drones***, Santa Clara Convention Center, California, USA, May, 2017

Indicative Media Coverage

[MC1] EuroNews, Futuris, Covering our work on Aerial Robotics for Contact–based Inspection, 2012 Futuris Video

[MC2] Discovery Channel, Swiss TV, Multiple Websites,AtlantikSolar Endurace World Record, Summary of links

[MC3] MIT Technology Review - German Version, Covering the early steps of the development of the Autonomous Robots Link at the University of Nevada, Reno, Link to PDF

[MC4] Nevada Today, Covering the early steps of the development of the Autonomous Robots at the University of Nevada, Reno, Link

[MC5] Interview at KTVN2 - Face the State for the Research Activities Autonomous Robots at the University of Nevada, Reno, Video

[MC6] Forbes, CityLab, NewAtlas and other media covered our work on autonomous electric buses - example: Forbes and NewAtlas

[MC7] Firmatek - Toxic Site Cleanup: How the Tools We Use Help Emergency Response Teams, Too, Link

[MC8] Northern Nevada Business Weekly - UNR tests drones to help clean nuclear waste, Link

[MC8] BBC Click - interview for activities of robotics research at the University of Nevada, Reno, Link

Membership in Scientific and Technical Organizations

1. Member of the Institute of Electrical and Electronics Engineers (Member of the Control Systems Society and Robotics and Automation Society)
2. Member of the Technical Chamber of Greece (No: 115009)
3. Zurich.Minds, `http://zurichminds.com/`

Programming and other Hands–on Experience

1. C++, C, Mixed C++ & C programming especially for robotics, control systems, signal processing, optimization strategies, perception and planning algorithms.
2. Embedded Microprocessors programming including ARM, AVR, PIC both in high and low-level
3. Programming and using the Robot Operating System (ROS) middleware
4. Hardware interfacing and driver writing
5. Project-based development & GUI design (Qt Framework)
6. Cross-Platform Development (CMake)
7. Design control systems using MATLAB, its Embedded Coder and a variety of optimization-related software (e.g. YALMIP, MPT, FORCES, SeDuMi, CVX)
8. Python scripting and mixed Python & C++
9. Go language programming
10. Design control systems using LabVIEW
11. Partial experience in CAD Design and 3D printing/Milling (mostly using Solidworks)
12. Partial experience using the openCV libraries

Reviewing Activities

Grants

1. Reviewer for the National Science Foundation (NSF)
2. Reviewer in multiple projects of the National Research Fund in Luxembourg (FNR)
3. Reviewer for the National Defense Science & Engineering Graduate Fellowship (NDSEG)

Editorial board

1. Editor, Journal of Intelligent and Robotic Systems, Springer

Journals

1. IEEE Transactions on Robotics (T-RO)
2. Journal of Intelligent and Robotic Systems, Springer
3. Control Engineering Practice Journal, Elsevier
4. Robotica Journal
5. Automatica, Elsevier

6 IEEE Transactions on Control Systems Technology

7 IET Control Theory & Applications

8 IEEE Transactions on Mechatronics

9 Springer, International Journal of Control, Automation and Systems

10 European Journal of Control (EJCON)

11 International Journal of Robotics Research

Conferences

1 IEEE International Conference on Robotics and Automation (ICRA)

2 IEEE/RSJ Conference on Intelligent Robots and Systems (IROS)

3 IEEE Mediterranean Conference on Control & Automation (MED)

4 American Control Conference (ACC)

5 European Control Conference (ECC)

6 IEEE International Symposium on Industrial Electronics (ISIE)

7 IFAC World Congress

8 IEEE Conference on Control Applications (CCA)

9 International Conference on Advanced Robotics (ICAR)

10 IEEE Annual Conference on Decision and Control (CDC)

Books

1 Reviewer for Springer–Verlag books

Languages

English	**Excellent**
Greek	**Mothertongue**
German	**Basic**

References

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