



Abstract

The recently established “*Agile Robotics & Autonomy Lab*” (AERIAL) at the University of Nevada, Reno (UNR) is opening PhD positions in the field of advanced navigational and operational autonomy for aerial robotics. The main focus of the envisaged research efforts will be related with leveraging the currently achieved autonomy levels towards enabling what we call autonomous aerial service robotic co-workers, a new class of robots that simultaneously perceive their environment, decide their actions, collaborate with other robots, plan and actuate themselves so that useful work tasks take place for the benefit of our societies. We explicitly aim to contribute into closing the “Perception–Navigation–Action loops” and through that not only improve the individual modules (perception, path planning and control) but further exploit them through their tight combination. PhD candidates with path planning/control or robotic perception background are equally welcome to apply. The salaries are competitive by international and national standards.

1 Key Research Directions

Miniature aerial robots are reaching the level of being able to robustly control their motion and perceive their environment. These outstanding developments enable us to consider their wide utilization in challenging real-life scenarios – enable us to consider them as smart aerial service robotic co-workers. Aerial robots can monitor and supervise our infrastructure, provide unique ways of immediate action in case of a disaster scenario, facilitate the means for rapid door-to-door distributed delivery or even manipulation and execution of physical work-tasks on their environment. A key challenge to achieve such a broad usage is to establish the required navigational and operational autonomy. For example, the current state-of-the-art in the fields of control, path planning and perception not only has to be pushed forward but also new ways to tightly close the “Perception–Navigation–Action loop” have to be invented. In that sense, an aerial robot will be able to react and modify its global path and pick new viewpoints such that its confidence and understanding about the environment increases up to sufficient levels, adapt its motion plan or generate a new set of actions in order to efficiently execute an abstractly assigned task. What we essentially aim for is to achieve new levels of navigational, decisional and overall operational autonomy via a set of contributions to the independent algorithmical components of control, path planning, robotic perception and intelligence as well as a tight integration of them that will allow to treat the problem from a holistic perspective. Therefore, we currently seek two or more highly motivated PhDs to contribute in the aforementioned fields.



The envisaged research efforts are aligned with the state-of-the-art research projects currently taking place in the US, Europe and the world. All PhD candidates will have the opportunity to deal with a variety of research fields including those of control, path planning and robotic perception, focus on his/her preferred topic and subsequently combine them in a formally meaningful framework. We aim to thoroughly test all our results in extensive field trials using the aerial robots of our lab. Towards that we will also benefit from the advanced capabilities that the fact that Nevada is among the 6 FAA-approved UAV test sites as well as the several and booming collaborations that take place between UNR and the aerial robots industry.



2 Working Environment and Conditions

The student will be based at the Computer Science & Engineering Department of the University of Nevada, Reno and will have access to a number of robotic Unmanned Aerial Vehicles and all the required hardware components and software tools, laboratory infrastructure for safe testing and ground-truth analysis as well as access to large field-testing areas. Interdisciplinary research is encouraged across laboratories, including the Computer Vision Laboratory, the human-robot interaction team, the Human⁺ team, the Socially Assistive Robotics team and the group of researchers under the Nevada Advanced Autonomous Systems Innovation Center (NAASIC). The research group collaborates with leading national and international laboratories. The PhD salaries are competitive by international and national standards (1800 \$ /month, tuition waiver and fringe benefits) while a highly integrated, open to different cultures and experiences and top-notch environment is to be expected.

3 Requirements

The ideal candidate holds (or is about to obtain) a first-class honor undergraduate/postgraduate degree (or equivalent) in Computer Science, Electrical/Electronic Engineering, Mechanical Engineering, Aerospace Engineering, Mathematics or has authored publications in recognized conferences/journals. Good programming skills are necessary. We seek for highly autonomous researchers but also good team players. Collegiality and interpersonal skills are essential. Experience with robotics-related projects will be highly valued, so make sure to mention these in your application. Excellent English language skills are highly desired. As 2+ positions are to be fulfilled, applicants adept in both control/path-planning as well as robotic vision are equally encouraged to submit their application.

4 Submit your Application

The positions are to be fulfilled immediately and ideally before the Spring 2016 Semester. Prospective candidates should submit their application by e-mail to the following address by **30 September 2015**:

Prof. Dr. Kostas Alexis

Dept of Computer Science Engineering MS-171

University of Nevada, Reno

e-mail: kalexis@unr.edu

www-unr: <http://www.unr.edu/cse/people/faculty/alexis>

www-personal: www.kostas-alexis.com

Please include:

- A letter of motivation describing your skills and plans
- Your current CV
- A list of three references together with contact information
- Possible publications or any project description you consider relevant

Happen that you have any question, please do not hesitate to contact us.