

CAS Lab

Cooperative Autonomous Systems Lab

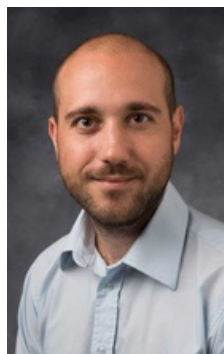
Developing control algorithmic solutions for the safe deployment of autonomous aerial, marine, and ground vehicles. An excellent research environment allows for the design, implementation, and testing of multiple autonomous system planning, control, and collision-avoidance algorithms, and for the experimental validation of these algorithms.

The CAS Lab focuses on controlling multiple autonomous vehicles in real time. A state-of-the-art motion capture system provides GPS data with sub-millimeter accuracy. A handful of different quadrotor unmanned aerial vehicles and ground robots are also available. Cooperative autonomous systems could benefit medical and rehabilitation environments, as well as scenarios where multiple unmanned vehicles are working together, such as during an avalanche rescue or in military operations.

Who We Work With

- Air Force Research Lab
- Office of Naval Research
- University of Iowa Hospitals and Clinics
- University of Iowa College of Public Health
- General Motors
- Naval Postgraduate School
- University of Illinois
- University of Lisbon
- University of Bologna

Lab Expertise

**Director: Venanzio Cichella**

- PhD: Mechanical Engineering, University of Illinois, Urbana-Champaign
- MS: Automation Engineering, University of Bologna
- BS: Automation Engineering, University of Bologna

RESEARCH HIGHLIGHTS

- **Cooperative Autonomous Systems:** Developing, implementing, and testing cooperative planning and control strategies for the safe execution of multiple autonomous vehicles missions in real-world environments.
- **Robust and Adaptive Control:** Focusing on the design and testing of inner-loop adaptive controllers for the execution of complex maneuvers of underwater vehicles.
- **Optimal Motion Planning:** Developing and implementing solutions to optimal motion planning problems for multiple autonomous vehicle missions.
- **Control of Artificial Muscles:** Collaborating with the Smart Multifunctional Material Systems Lab to develop robotic arms using twisted and coiled artificial muscles.

LEARN MORE



SCHEDULE A VISIT

by contacting Venanzio Cichella at venanzio-cichella@uiowa.edu or 319-467-0333



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on our website venanziocichella.com



Experimental testing arena for ground robots and quadrotor UAVs



Quadrotor UAV and four ground robots autonomously performing cooperative tasks