



Cyber Physical Cloud Computing Group

We Love UAVs



What is Cyber Physical Cloud Computing?

Cyber Physical Cloud Computing (CPCC) is an area of research that brings together both the physical world and the world of computing in an effort to create sophisticated processes that were previously impossible. Berkeley's CPCC group is currently investigating:

- Cyber Physical Networked Systems
- Spatial Queuing Theory
- Computer Networks, Wireless Mobile Communications
- Intelligent Transportation Systems, Vehicle Safety



Research Projects

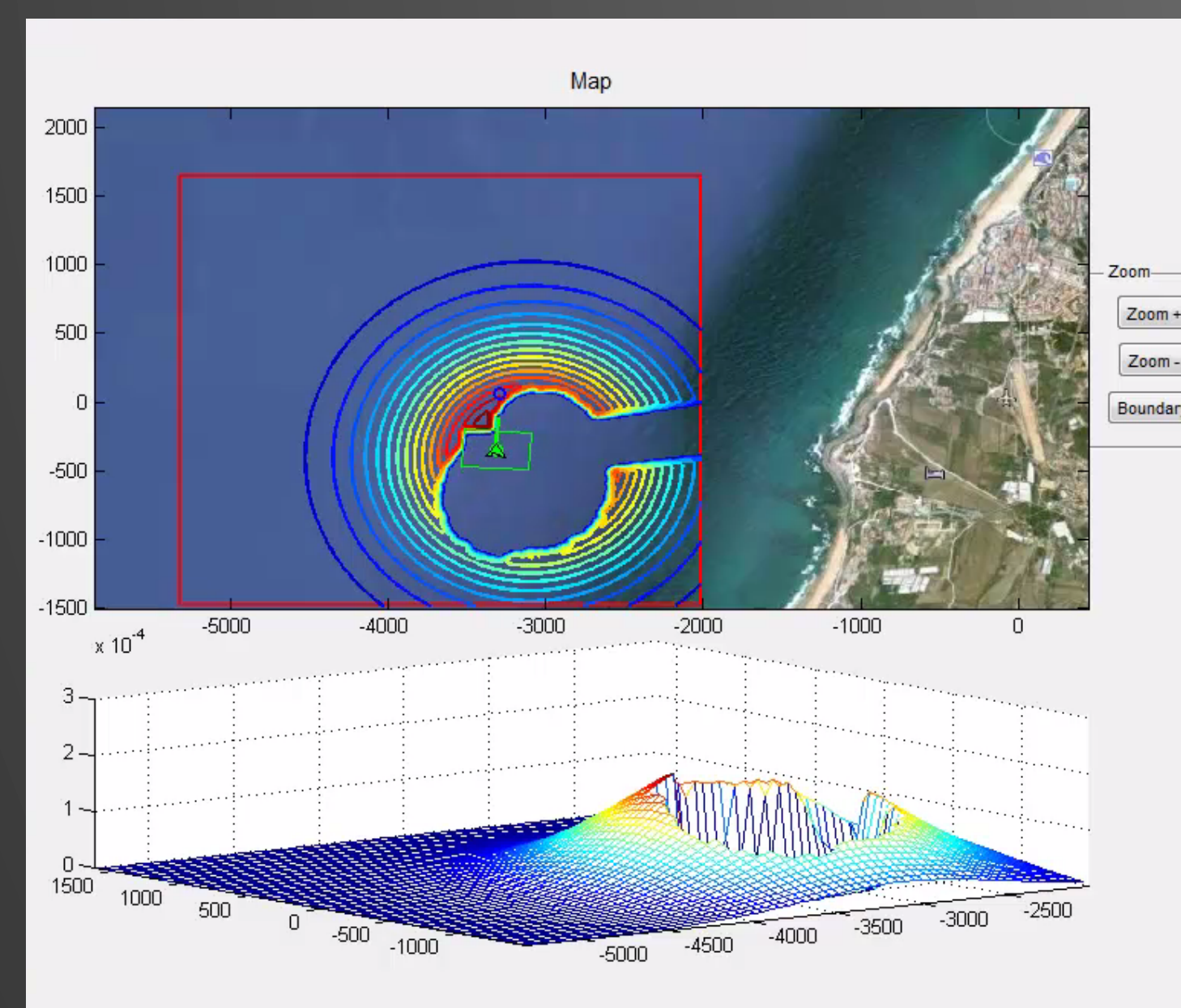


Summer 2012 – Probability - Based Tracking

CPCC, Porto University researchers, and the Academia da Força Aérea partnered to test and demonstrate searching and tracking algorithms in real environment. Seen below, a UAV navigates an area searching for a target with unknown location. Probability of detection are shown in real-time below.



Test Aircraft and Pilot

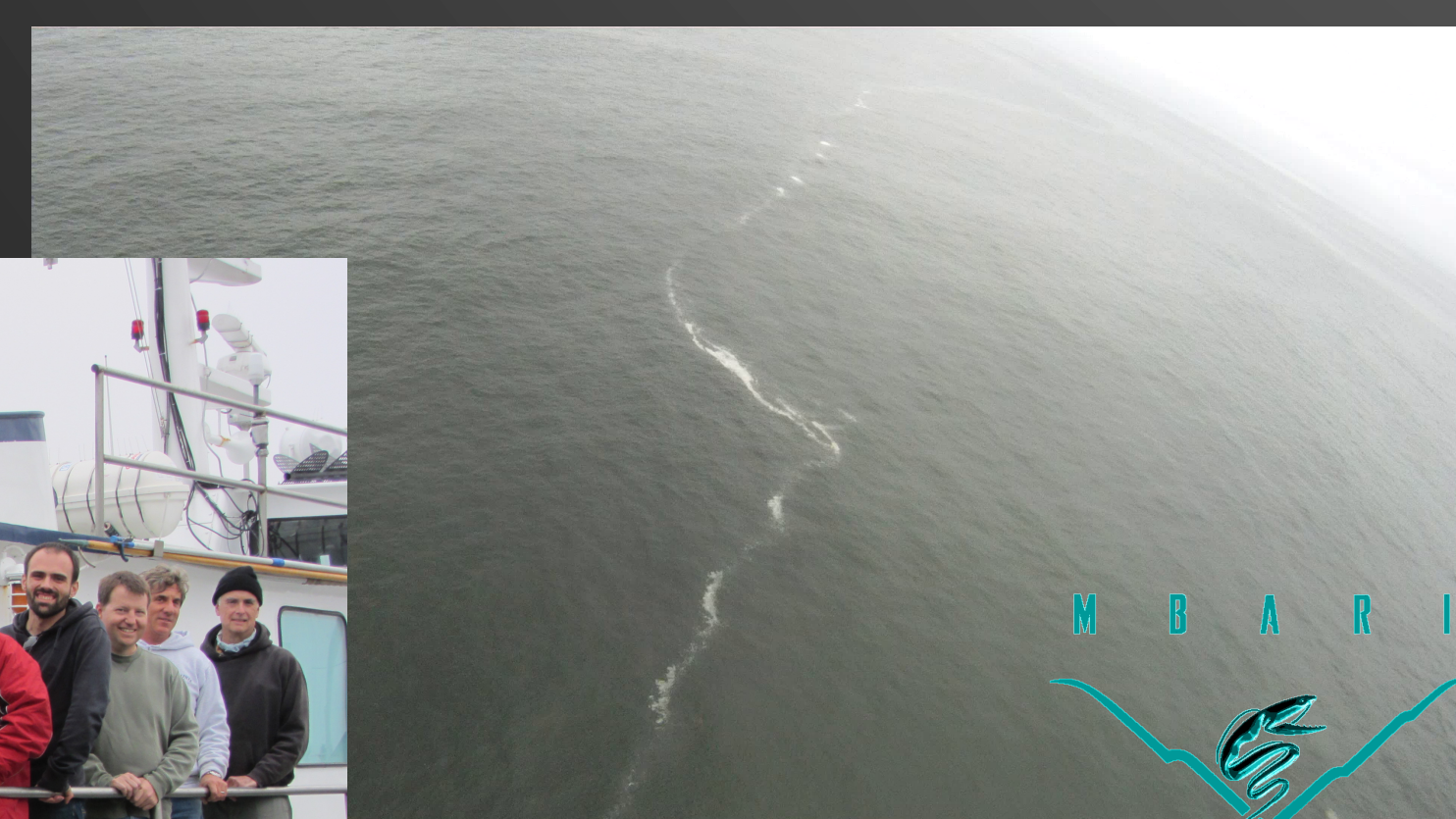
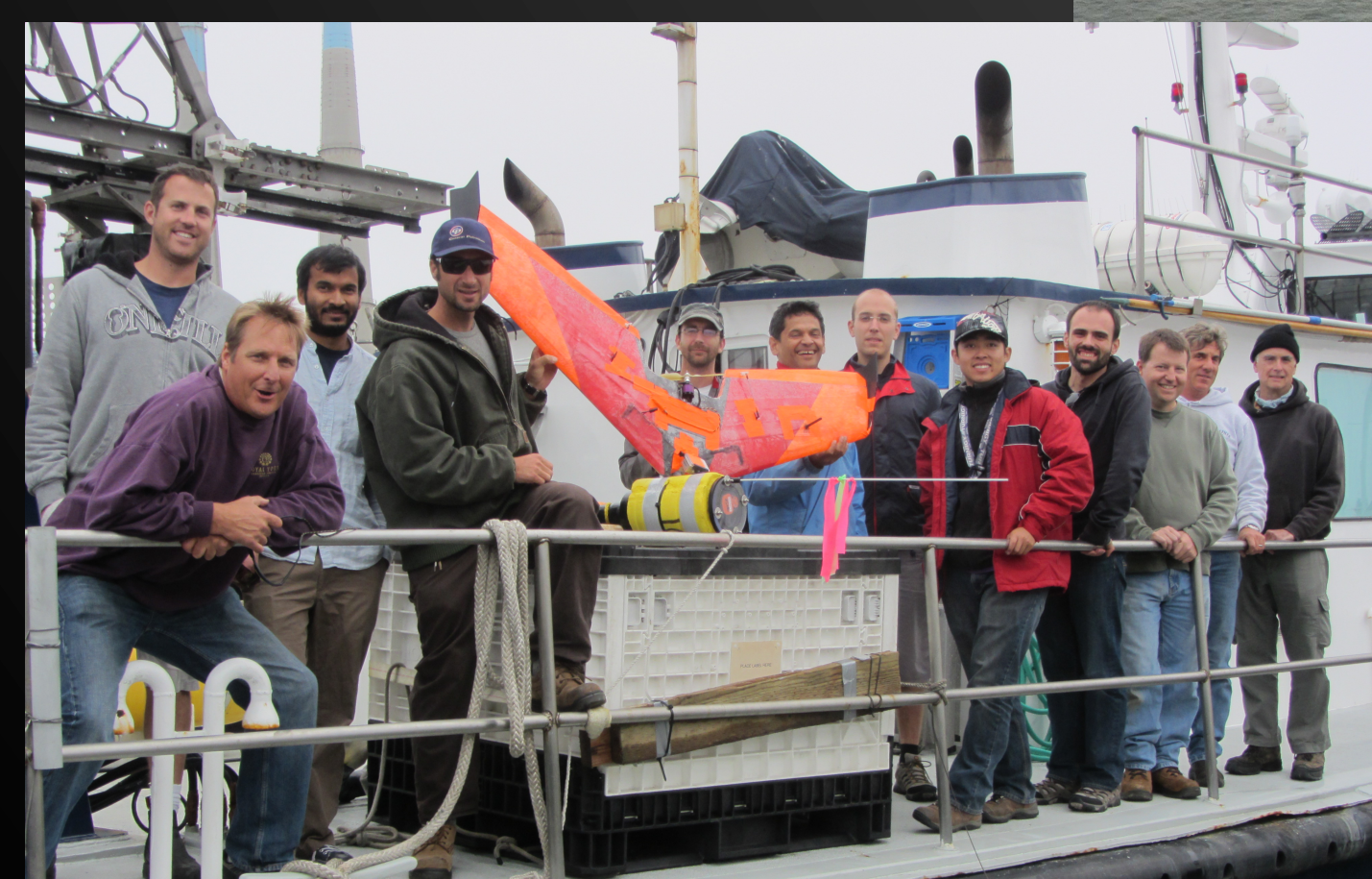


Probabilistic Position Estimation Based Target Search

Fall 2012 – Ocean Front Tracking

CPCC researchers and the Monterey Bay Aquarium Research Institute (MBARI) worked closely together to investigate using UAVs to autonomously detect and track ocean fronts in Monterey Bay

CPCC Researchers and MBARI Crew

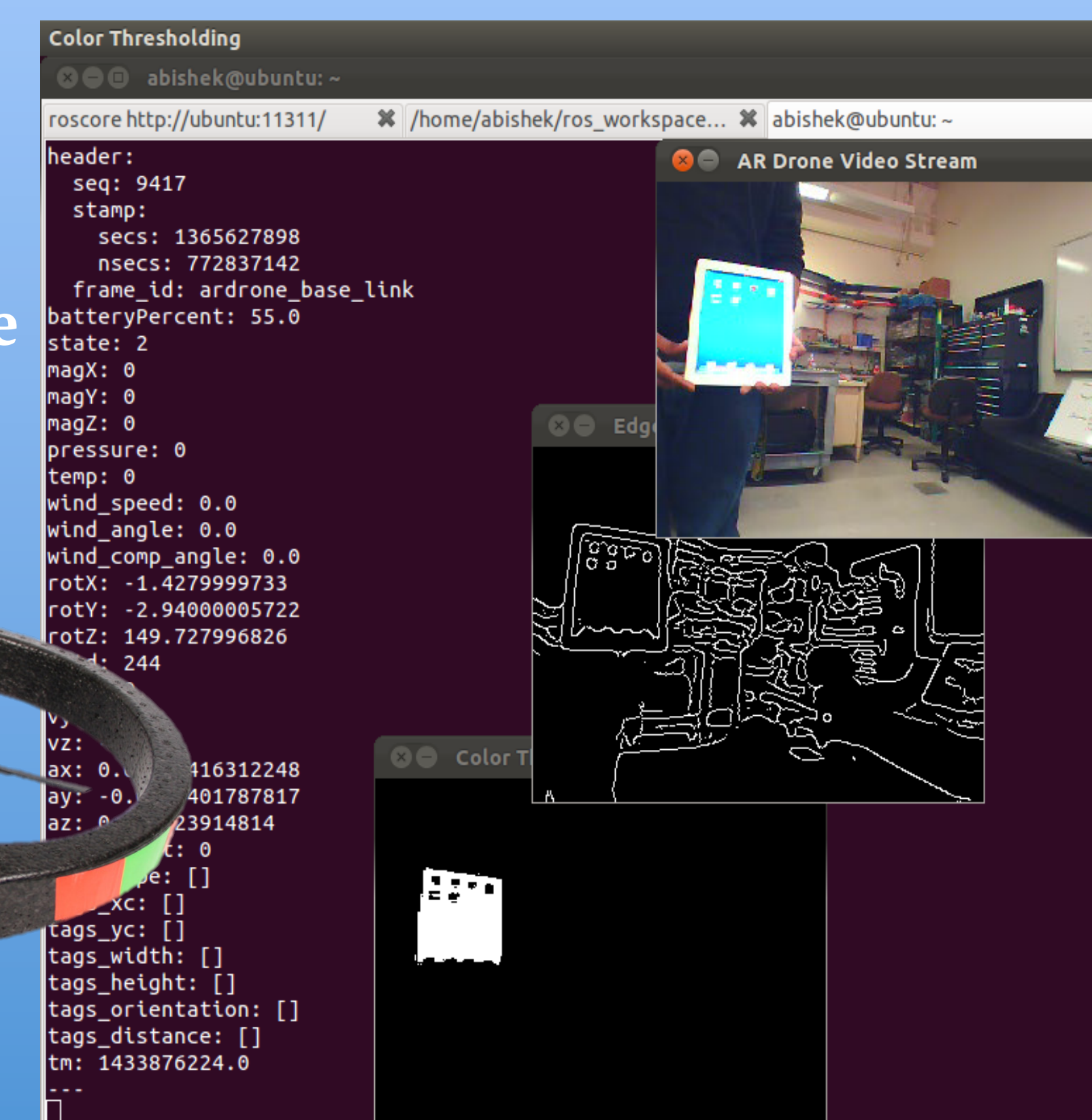


Aerial View of Ocean Front

Today's Demonstration

Computer Vision Based Target Following

CPCC Researchers have developed a method of tracking an object with a Quadrotor UAV based on the color and shape of an object.

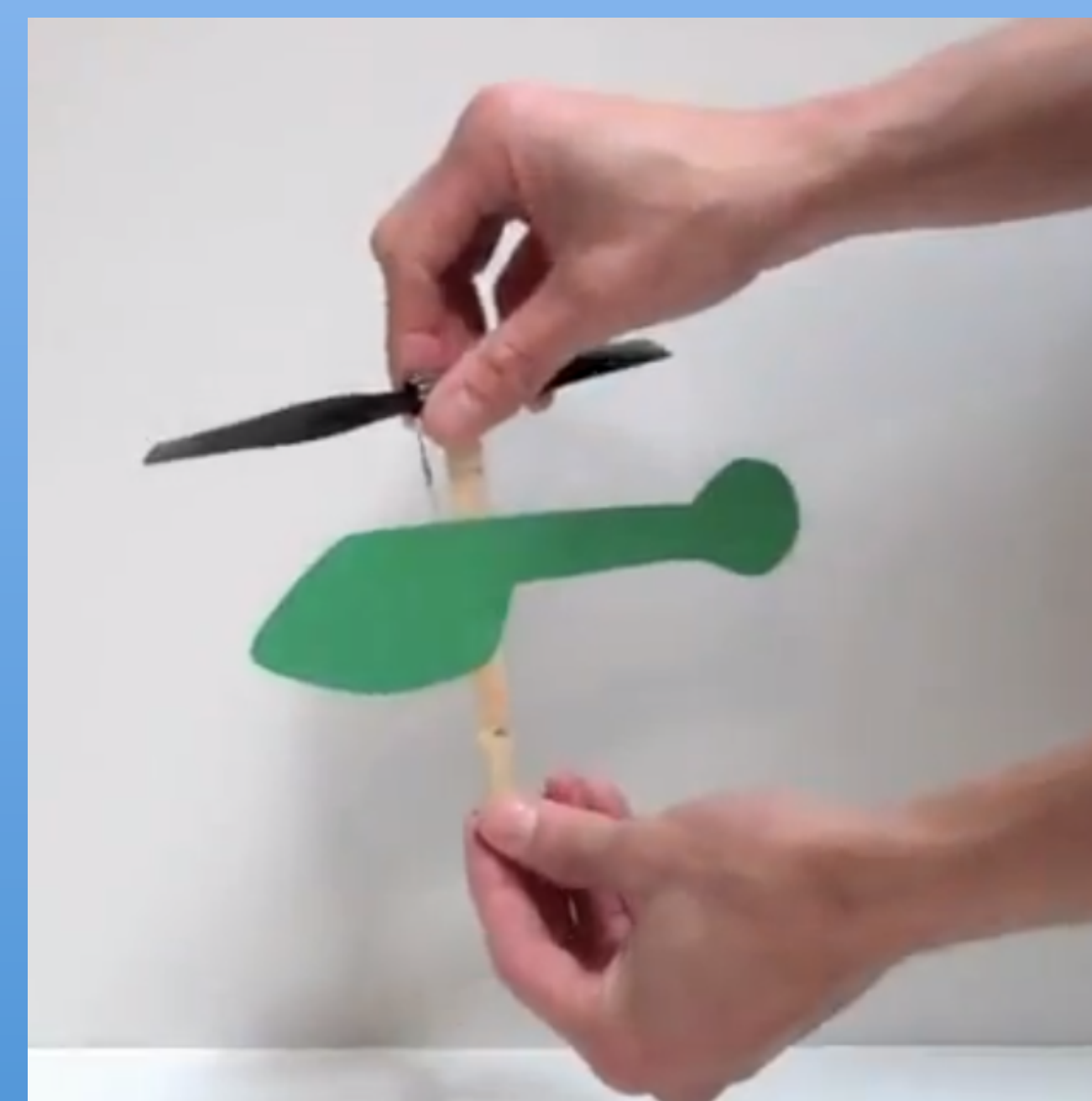


Come see it in action!

Want to Build Your Own?

In just a few minutes, you can make your own helicopter!

Explore the difference a design can make in performance.
Try your hand at powered and non-powered flight!



Come see how!

You can even fly it yourself!



Come test your piloting skills!

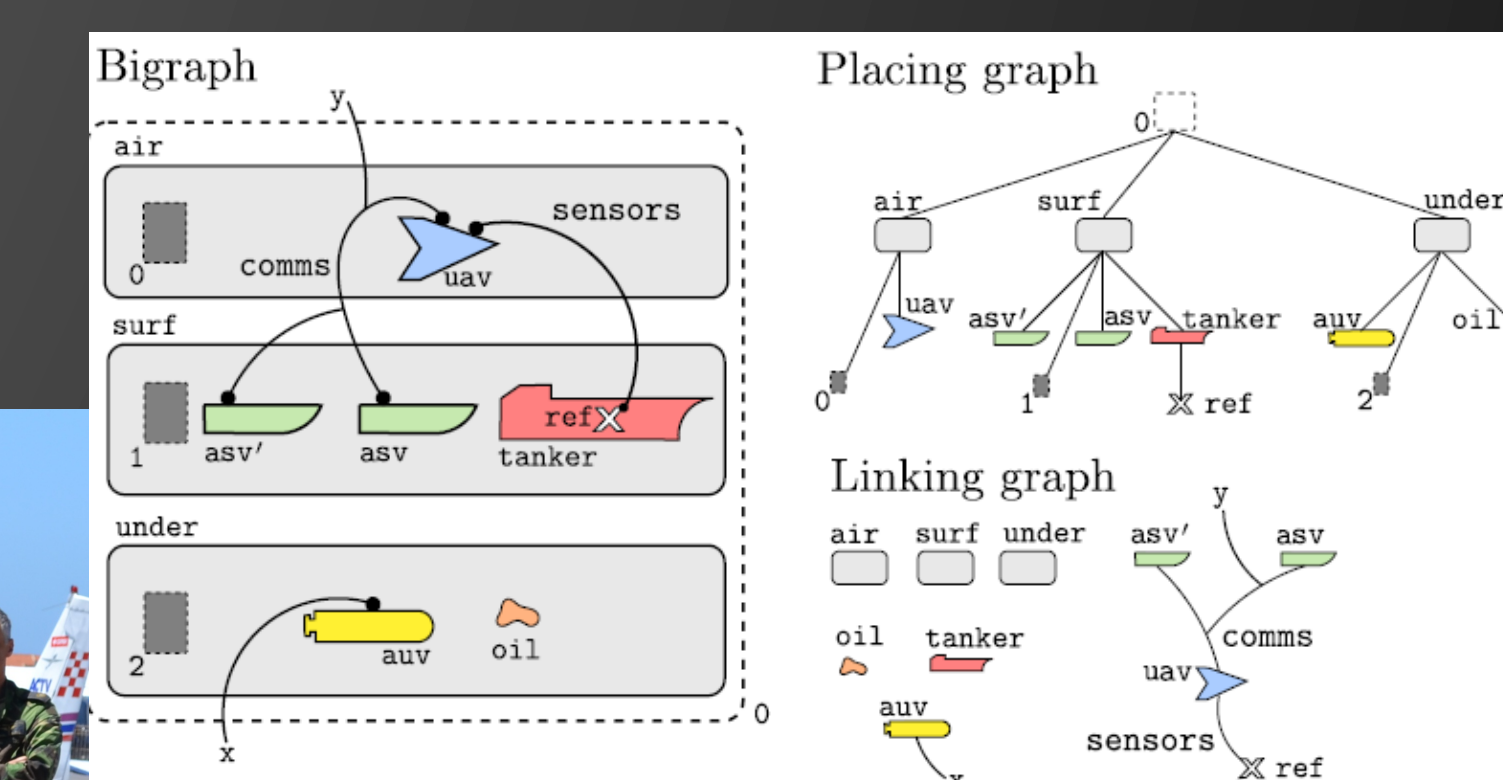


Future Work



The BigActor Approach

The group intends to apply a new theoretical modeling concept to a real-world mission. Through the use of bigraphs, CPCC researchers have enabled the execution of complex missions using many different types of autonomous vehicles.



CPCC, Porto University Researchers, and AFA Team, Santa Cruz, Portugal

Bigraph describing mission consisting of Unmanned Aerial Vehicle (UAV), Autonomous Surface Vehicles (ASV), and Autonomous Underwater Vehicle (AUV)

Acknowledgments

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BigActors work partially funded by Fundação para a Ciência e Tecnologia HeliProject used with permission from Lance. More projects can be found at: <http://www.instructables.com/id/Inexpensive-Rubberband-Powered-Helicopter>

