

Science and Engineering Council of Santa Barbara: October Luncheon

Elephant Bar Restaurant, Thursday October 9, 2008, 12:00-1:30

----- THIS MONTH'S TOPIC -----

Autonomous Control Algorithms for Unmanned Air Vehicles

Abstract: Toyon Research Corporation develops algorithms to automate surveillance tasks such as *search*, *location*, and *identification* of objects in video, radar imagery, or other sensor feeds. These tasks are increasingly being performed by Unmanned Air Vehicles (UAVs) and unmanned sensors that are remotely controlled or operate autonomously using control algorithms. This talk will outline a recent Toyon program in which a collection of specialized control algorithms were developed to facilitate autonomous search and vehicle tracking by small UAVs equipped with wireless video cameras. The autonomous control algorithms were first developed in software and tested against Toyon's SLAMEM® simulator. Once verified in simulation, the algorithms were hardware-in-the-loop (HIL) tested using Toyon's small UAV testbed. A unique HIL-with-simulation system was designed to facilitate testing of a small-scale hardware system within a larger scale simulated system.

----- PRESENTER -----



Gaemus Collins, Analyst, received his B.S degree in mathematics from Salisbury University in 1996, and subsequently received M.S. and Ph.D. degrees in mathematics from University of California, Santa Barbara (UCSB) in 1999 and 2002 respectively. Working under Mihai Putinar, Dr. Collins' graduate research was devoted analysis of the Orr-Sommerfeld and Squire operators that model viscous fluid flow in a parallel channel. Following his graduate work, Dr. Collins held a two-year post-doctorate position at University of California, San Diego (UCSD). Working with Bill McEneaney, Dr. Collins studied Hamilton-Jacobi equations using max-plus algebraic techniques, and developed a state-feedback dynamic program for DARPA's Mixed Initiative Control for Automa-teams (MICA) program. As an analyst at Toyon Research Corp., Dr. Collins leads two STTR projects sponsored by the Air Force Office of Scientific Research (AFOSR). He is working with faculty and graduate students from UCSB to develop cooperative multi-agent, multi-sensor UAV search and tracking algorithms.

----- OTHER INFORMATION -----

\$14 SEC members, \$20 non-members.

Information: Barbara Keaney (E-mail scieng@silcom.com) or call (805) 684-4927.

Reservations are not required. **Visit our web page at <http://www.scieng.org>**

Elephant Bar Restaurant: 521 Firestone Road, off Hollister just west of Fairview Avenue, in Goleta.

From the Co-Presidents: This month we wish to express our gratitude to the SEC members who have contributed to the Dos Pueblos Engineering Academy's fundraising efforts. This is an ongoing effort, so please keep the Academy in mind for contributions in the months ahead, and please use the SEC form provided on our website so that the SEC can match your contribution up to \$1,000. Join us in October to learn about Toyon Research's ongoing successes in advanced sensor technology.

Tim Murphy and Gary Kravetz



Please Note: luncheon seating is limited and available on a first-come basis.