



## AEROSPACE ENGINEERING SCIENCES

# Seminar



## Andrzej Banaszuk

Program Leader

Sikorsky Program Office

**United Technologies Research Center**

## Autonomous and Intelligent Systems at UTRC

We will present a broad overview of UTRC's research initiative in Autonomous and Intelligent Systems (AIS) that was created to conceive, develop and mature a broad range of intelligent mobile robotic systems and capabilities to enhance and support the diverse array of businesses that comprise the United Technologies Corporation. While initial efforts have been focused on Sikorsky Aircraft unmanned rotorcraft, the initiative is now expanding to include other aerospace and commercial applications, as well. The research, conducted by a diverse team of researchers in robotics, dynamical systems, control, applied mathematics, computer vision, and computer science (in partnership with several leading universities including CMU, MIT, UPenn, and UCB) includes:

- Real-time algorithms for dynamic collision avoidance in an obstacle-rich environment using probabilistic roadmaps.
- Navigation with imperfect and intermittent sensors in GPS degraded environments.
- Multi-vehicle missions including efficient robotic search algorithms based on ergodic theory methods.
- Collaborative motion planning for multiple aerial and ground robots in large, cluttered environments, trading off mission objectives while satisfying logical/spatial/temporal constraints.
- Intelligent system design methodology including architectures for autonomy, human-machine systems, and formal verification.

We will conclude with research problems of interest to UTRC and discuss existing and future career opportunities in the broad area of autonomy and robotics.

**Friday, April 3, 2015**

**2:00 – 3:00 pm**

**DLC Bechtel Collaboratory**

## **Biography:**

**Andrzej Banaszuk** is a Program Leader of Sikorsky Program Office at United Technologies Research Center. Since joining UTRC in 1997, he has conducted research in analysis, design, and control of dynamical systems applied to jet engines, rotorcraft, electric power networks, and buildings. Since 2000 he has led collaborative multi-university research teams in the area of flow control, control of combustion instabilities, robust design of large uncertain dynamic networks, and autonomy. He is an author of 44 journal papers, 71 conference papers, and 9 patents. From 1999 to 2002, he was an Associate Editor of IEEE Transactions of Controls Systems Technology. He was appointed to serve on the Board of Governors of IEEE Control Systems Society in 2004. For his work on active and passive control of flow instabilities in jet engines he received IEEE Controls Systems Technology Award in 2007. He became an IEEE Fellow in 2011. He holds Ph.D. in EE from Warsaw University of Technology and Ph.D. in Mathematics from Georgia Institute of Technology.