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Speaker: Professor Hamsa Balakrishnan, MIT

Date: Friday, September 27, 2013

Time: 2:00 – 3:15 pm

Location: Room 1520

Title: Pushback Rate Control: The Design and Field-Testing of an Airport Congestion Control Algorithm

Abstract:

Increased congestion on the airport surface has increased taxi times, fuel consumption, and emissions. In this talk, I will describe how operational data can be used to develop and validate queuing models of airport operations. These models yield new insights on the effect of different factors such as weather, runway usage, and aircraft fleet mix on airport performance. They also help us predict the behavior of an airport under different operating conditions.

I will then show that these queuing models can be used to design Pushback Rate Control, a new airport congestion control technique to regulate the rate at which flights push back from their gates. The algorithm computes optimal pushback rates using approximate dynamic programming, but equally important, is a method that can be implemented in practice because it works in concert with human air traffic controllers. To evaluate the effectiveness and practicality of the algorithm, we conducted field tests with our implementation at Boston's Logan Airport. I will describe the results of these field tests and what we learned in the process.

Bio: Hamsa Balakrishnan is an Associate Professor of Aeronautics and Astronautics at the Massachusetts Institute of Technology (MIT). She received a B.Tech in Aerospace Engineering from the Indian Institute of Technology, Madras and a PhD in Aeronautics and Astronautics from Stanford University. Her research interests address various aspects of air transportation systems, including algorithms for air traffic scheduling and routing, integrating weather forecasts into air traffic management and minimizing aviation-related emissions; air traffic surveillance algorithms; and mechanisms for the allocation of airport and airspace resources. She was a recipient of the NSF CAREER Award in 2008, the Kevin Corker Award for Best Paper of ATM-2011, the AIAA Lawrence Sperry Award in 2012, and the inaugural CNA Award for Operational Analysis in 2012.