Optimal UAV Trajectory Planning for Radiological Search

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Abstract: Future radiological search will be conducted using coordinating groups of autonomous air and ground vehicles instrumented with a heterogeneous array of sensors. A key problem in the development of such systems involves how the vehicles should plan paths to characterize the radiation environment in an efficient and accurate manner.

Radiological search can be viewed as a problem of function approximation using measurements at a discrete set of points. In this talk, the aerial vehicle path planning problem for radiological search will be cast in the framework of active sampling or optimal experiment design. Vehicle paths are determined by solving for sequential points that maximize the information obtained, given the set of prior measurements. Limited simulation results will be presented, and plans will be discussed for prototype UAV and UGV systems that use these optimal planning algorithms in future experiments.