The Field Robotics Center

Seminar Series

Wednesday, 20th April **GHC 4405 1:00pm –2:00pm**

Lunch will be served

Garrett Hemann
M.S. Student
Robotics Institute

Long-range GPS-denied Aerial Inertial Navigation

Abstract: GPS-denied aerial state estimation techniques have recently demonstrated significantly robust solutions in small, indoor environments, but not much work has been done for larger, outdoor environments. This work presents a GPS-denied inertial navigation solution using LIDAR localization for long-distance traversals (up to and beyond 200 km). By using an a priori digital elevation model (DEM) and a continuous ground-scanning LIDAR, intermittent LIDAR projections can be matched against the DEM to provide absolute (global) localization. To reduce the search space of the matching, a type of Kalman filter with IMU bias estimation propagates the state with minimal drift. I present results of several flight tests from a full-sized helicopter. This work is in conjunction with Near Earth Autonomy and is part of the ONR AACUS program.

Speaker Bio: Garrett Hemann received his bachelors in Aerospace Engineering from MIT in 2011. During that time, he worked in CSAIL under Nick Roy working on control for indoor UAVs. After graduation, he worked at Lockheed Martin Advanced Technology Lab for 3 years. There he worked on control and multirobot coordination of monocopters, auto-pilot perception and control, and contributed to both the Darpa Robotics Challenge and the ONR AACUS competition. He currently works in the FRC and plans to continue working in robotic perception and state-estimation post-graduation.




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