

AAE SPECIAL SEMINAR

Improved Robot Localization in Harsh Environments

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3:00PM-4:00PM ARMS 1103



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Abstract

A key enabler for increased robot autonomy is more reliable self-localization capabilities. This can be a challenge in environments without reliable access to external aiding systems like GPS/GNSS and in environments with harsh conditions such as challenging terrain and poor lighting. This seminar will discuss some research conducted in the Navigation Lab at West Virginia University to address some of these challenges. First, it will review our recent work on methods that employ simple zero-velocity updates to improve the performance of wheel-inertial odometry based localization for the application of planetary exploration rovers. The benefits of these approaches are then extended to multi-agent systems. Next, it will overview other robotics projects that have leveraged cooperative localization approaches, motion planning, and the advances of estimation algorithms to yield more reliable localization in harsh environments. Some interesting projects include our team's entry to the recent NASA Space Robotics Centennial Challenge, a robot/drone teams developed for subterranean exploration, and other GNSS-degraded applications.

Biography

Jason Gross is Professor and Chair of the Department of Mechanical, Materials and Aerospace Engineering at West Virginia University (WVU). He received his Ph.D. in Aerospace Engineering from WVU in 2011 and undergraduate degrees in both Mechanical Engineering and Aerospace Engineering from the same department in 2007. From 2011 until his faculty appointment at WVU he worked in the Near Earth Tracking Applications Group at NASA's Jet Propulsion Laboratory. His research focuses on robotic systems and unmanned aerial systems with an emphasis on localization and perception. He directs the WVU Navigation Lab and is a coordinator of WVU's growing robotics program. He is the past recipient of a National Geospatial Intelligence Agency's new investigator (early career) program grant, AFOSR Faculty Fellowship, Big XII Faculty Fellowship, and he has been awarded multiple college and department level teaching and research awards. He is an associate fellow of the AIAA, senior member of the IEEE, and member of the Institute of Navigation. He serves as associate editor for IEEE's Transactions on Aerospace Electronic Systems (T-AES) and for IEEE's AES Systems Magazine.