



3-D LiDAR scan of an indoor lab environment

Problem Statement

- To investigate and exploit the complementary nature of the inertial navigation system (INS) and 3-D light detection and ranging (LiDAR) for localization of unmanned ground systems
- To mitigate the INS error growth resulting from double integration using the zero velocity update (ZUPT) technique
- To combat the IMU orientation error growth using 3-D LiDAR scan matching

Impact

- GPS is widely deployed for accurate tracking of equipment asset as well as personnel. However, GPS signals are susceptible to attack by adversaries via jamming or spoofing
- The proposed approach has the potential to significantly reduce the INS error growth and enable unmanned ground systems to accurately navigate over extended periods of time without GPS

Transition

- The proposed localization method is aimed to meet the Navy's unmanned system (UxS) goals of developing technically superior unmanned systems that are able to navigate accurately in every domain under any environmental conditions
- The feasibility of the approach is to be validated in this proposed effort
- External sources of support for further development are actively pursued