

Magnetic Field Aided Indoor Navigation

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Sponsor: Air Force Research Laboratory (AFRL)



*Magnetic Field Intensity Map of AFIT Hallway for
One Magnetometer Axis*

The focus of this research is to use magnetic field intensities to aid an inertial navigation system in providing robust, passive navigation ability. Motivated by the requirement for passive navigation in environments where external navigation reference sources (such as the Global Positioning System) are unavailable, the objective is to accurately traverse an indoor environment by supplementing an inertial navigation system with position measurements generated by measuring the magnetic field intensity. The method used is adapted from a terrain navigation technique that uses multiple terrain measurements to locate the vehicle's position according to a terrain map. The magnetic field intensities are measured using three-axis magnetometers. Each independent measurement is compared to a map of magnetic field intensities for each axis. The algorithm was validated experimentally and then applied to a lead-follow algorithm, which uses magnetic information collected by the first vehicle in order to guide the second vehicle along the same path. The lead-follow algorithm has been demonstrated via simulation.

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