

1. **Research Title:** “Precision In-Door and Out-Door Navigation using Existing Signals of Opportunity and Inertial Navigation Sensors.”

2. **Individual Sponsor:**

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3. **Academic Area/Field and Education Level:** Electrical Engineering and Computer Science / Vehicle Guidance, Navigation, and Control (MS or Ph.D. level)

4. **Description:** There is a great need for the military to develop non-GPS precision navigation technologies in order to be able to operate in environments where GPS is not available (such as indoors or in high threat situations). This topic covers algorithm development and integration of two different non-GPS sensors: low-cost MEMS-based inertial measurement units (IMUs) and systems using existing Signals of Opportunity (such as TV, radio, or satellite communication signals). Both of these technologies offer significant promise for precision navigation when GPS is not available, particularly when they are integrated together.

5. **Objectives:** The end goal is to have a functioning real-time integration of a MEMS IMU and a Signal of Opportunity based navigation sensor that together can provide sub-meter accuracy positioning indoors or outdoors. This involves development of algorithms, hardware, and software for the two systems on their own, followed by an integration of the two systems.

6. **Research Classification/Restrictions:** None at this time.

7. **Eligible Institutions:** DAGSI