

## **INTRODUCTION TO INERTIAL AND MULTI-SENSOR NAVIGATION**

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Introduction to Inertial Sensors: Operating principle of inertial sensors, Observations and types. Brief introduction of coordinate frames used by inertial sensors. Allan variance and performance quantification of inertial sensors. State space model, Measurement model, Smoothing, Filtering, Estimation theory: Least squares, Sequential Least Squares, Kalman filter, Extended Kalman Filter, Unscented Kalman Filter. Introduction to Inertial Navigation, Kinematic Navigation Equations, IMU/AHRS/INS, INS errors and propagation. INS/GNSS Integration approaches: Loosely coupled, Tightly coupled, Ultra-Tightly coupled Overview of other sensors and integration approaches for navigation in indoor/outdoor environments: Ultra-Wide-Band, Wi-Fi, LiDAR. Brief overview of Centralized Cooperative Localization.