

# Desensitized Optimal Filtering and Sensor Fusion Toolkit

## *Processing navigational data from multiple sensor sources*

Analytical Mechanics Associates, Inc., has developed a software toolkit that filters and processes navigational data from multiple sensor sources. A key component of the toolkit is a trajectory optimization technique that reduces the sensitivity of Kalman filters with respect to model parameter uncertainties. The sensor fusion toolkit also integrates recent advances in adaptive Kalman and sigma-point filters for non-Gaussian problems with error statistics.

This Phase II effort provides new filtering and sensor fusion techniques in a convenient package that can be used as a stand-alone application for ground support and/or onboard use. Its modular architecture enables ready integration with existing tools. A suite of sensor models and noise distribution as well as Monte Carlo analysis capability are included to enable statistical performance evaluations.

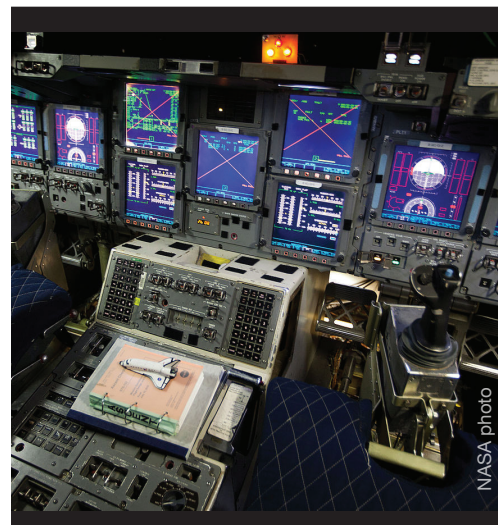
## Applications

### NASA

- ▶ Use in spacecraft and aircraft ground and/or onboard facilities to process navigational data from multiple sensor sources
- ▶ Analysis and testing of flight software and onboard data processing algorithms

### Commercial

- ▶ Marine vessel navigation
- ▶ Commercial airline navigation
- ▶ Seismic data acquisition and analysis
- ▶ Atmospheric observation data collection and processing



## Phase II Objectives

- ▶ Investigate approaches to reducing the sensitivity of the Kalman filter with respect to model parameter uncertainties
- ▶ Develop the detailed software design for the desensitized filtering and sensor fusion toolkit
- ▶ Integrate the toolkit modules with existing applications, such as NASA's GPS-Enhanced Onboard Navigation System (GEONS)

## Benefits

- ▶ Convenient
- ▶ Autonomous
- ▶ Modular

## Firm Contact

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