



Cooperative Relative Navigation of Multiple Aircraft in GPS-Denied/Degraded Environments

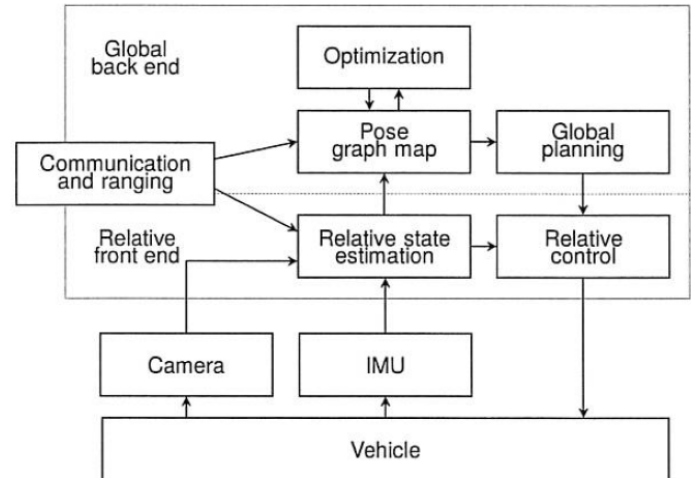
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DESCRIPTION

This invention improves unmanned aerial vehicle (UAV) navigation by enabling small, fixed-wing aircraft to communicate with each other about their movements. As UAVs fly, they can exchange odometry information with each other and use radio signals to measure the ranges between them. Each aircraft can then use odometry and the inter-vehicle range measurements to optimize its estimate of its position.

PROBLEM SOLVED

UAVs need to navigate in cities and inside buildings. To do this, they must be able to navigate when GPS is unavailable or unreliable. The existing GPS-denied navigation methods have neglected small, fixed-wing aircraft. This technology enables multiple small UAVs to improve navigational accuracy in GPS-denied environments by cooperatively sharing information.



The relative navigation architecture. Inter-vehicle operations are enabled by incorporating other vehicles' odometry measurements into the back-end and coordinating front-end resets between UAS.

KEY ADVANTAGES

- » *Navigate without GPS*
- » *Efficient computation*
- » *Supports small, fixed-wing aircraft*

APPLICATIONS

Civil applications include delivery and inspection services. Military applications also exist, where various types of UAVs, including fixed-wing aircraft, must navigate in GPS-denied environments.

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IP Status:
Patent Pending



Dave Brown
dave_brown@byu.edu
(801) 422-4866