

Attitude Determination of a Land Vehicle Using Inertial Measurement Units



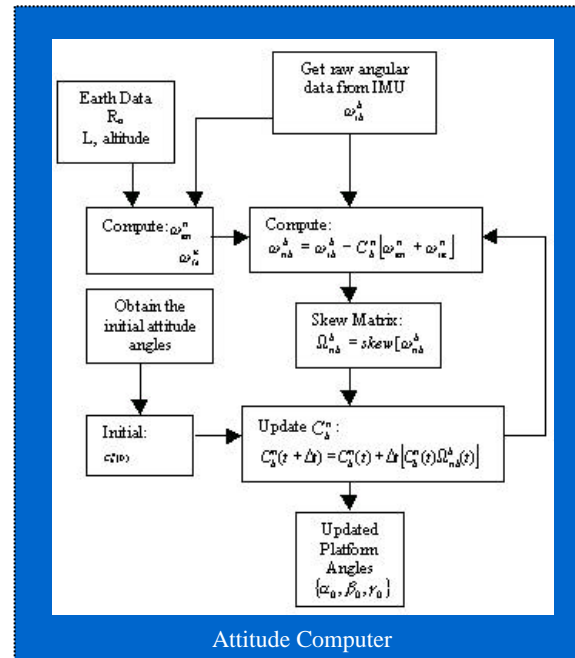
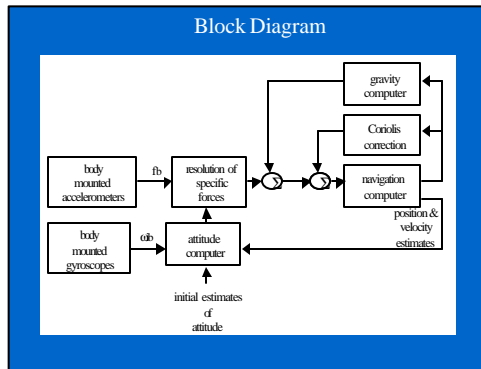
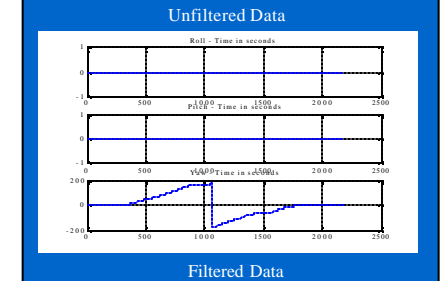
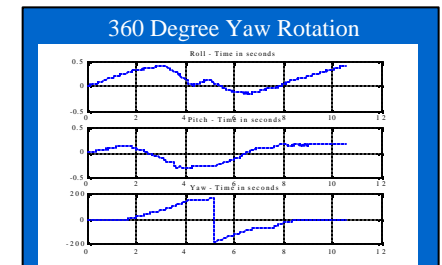
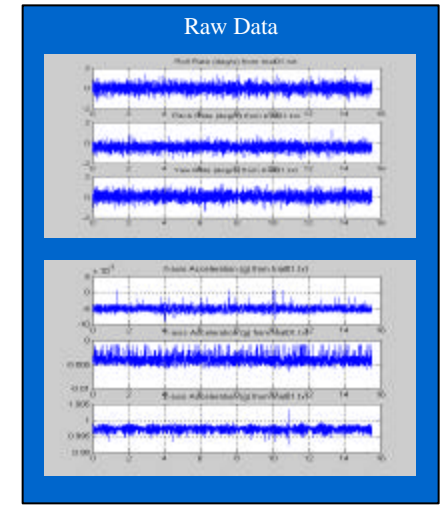
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Abstract

The objective of the project is to determine the attitude of a land vehicle with respect to local navigation coordinates. Angular rates and accelerations from an inertial measurement unit (IMU) are processed to form a strapdown solution of the vehicle's attitude and position. The system can operate independently or in conjunction with other navigation systems like GPS.



Software Library

- Direction cosine matrix
- Earth parameters
- Gravity computer
- Geographic position: latitude, longitude, and altitude

Signal Processing

- Slope filter in velocity
- Variance filter

Outputs of Strapdown System

- Position, velocity, and acceleration of the vehicle
- Attitude of the vehicle: roll, pitch, and yaw