ABSTRACT

The use of Global Positioning System (GPS) to navigate more and more. A GPS Navigation System that uses guidance from satellite readings promises good outdoor positioning but there is a problem when losing satellite signals. And conversely the navigation system with inertia and initial positioning has an accumulation of errors, both when a satellite signal is available then the position calculation uses satellite signals, but when a signal is lacking, INS from the IMU is needed in order to replace the position so as not to lose track. And the integration of both uses the Unscented Kalman Filter with the Unscented Transform approach which promises better value estimation in uncertain conditions. And the estimated GPS coordinate values show more accurate results with a difference of 0.021 m and 1.67 m respectively for latitude and longitude. And the results of the calculation of the x-axis acceleration with a difference of 0.016 m / s2 and the z-axis angular velocity with a difference of 2.28 rad / s.

Keyword**:** *Global Positioing System (GPS), accelerometer, gyroscope, navigation, unscented kalman filter*