

ABSTRACT

Aircraft Flight Path Reconstruction Based on ADS-B Data Using Kalman Filter

by

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In this thesis, the Kalman filter algorithm was used to perform flight path reconstruction. The flight path reconstruction was based on the ADS-B data set that has been obtained from opensky-network.org. Other methods, such as interpolation calculation, also can be used to perform the flight path reconstruction. However, in using interpolation methods, the ADS-B data inaccuracy is not taken into account. Since the position information in the ADS-B data has an error that are indicated by NIC (Navigation Integrity Code). So, the result of the flight path reconstruction based on interpolation calculations are theoretically inaccurate. There were 3 interpolation methods that were explored in this research; they were linear interpolation, spline interpolation, and PCHIP interpolation. These methods were used as preliminary tools to construct the flight path and to see how they might diverge from the Kalman Filter's results. To minimize the ADS-B data inaccuracy, this research used the Kalman filter method; in this research, the Kalman filter calculation was based only on the kinematic equation. The Kalman filter results were compared with the original data in order to observe how the inaccuracy could deteriorate the aircraft trajectory.

Keyword: *ADS-B, Interpolation, Kalman Filter, Flight Path, Navigation Integrity Code (NIC)*