



Development of a Fast-Time Flight Plan Simulation Tool

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Abstract

The ‘Fast-Time Flight Plan Simulator’ is a web application designed to simulate and analyze flight plans by allowing users to upload pre-defined flight data. The application facilitates real-time simulations based on specified time parameters. A key feature of this simulator is the collision detection system, which promptly identifies potential risks and provides users with vital information regarding the collision, collision time, location, and involved flights. The application graphically pinpoints the exact locations of potential flight collisions on the map, which is a process facilitated by using the spherical law of cosines with the Geometric library of Google Maps. The system considers a collision not as an exact impact between two flights but as a critical range (5 nautical miles). Also, by selecting specific flights, the users can

obtain data such as departure time, arrival time, departure airport, etc. The graphical representation of flight parameters, such as speeds and altitudes against pre-defined waypoints, enhances the analytical capabilities. Furthermore, the simulator introduces a proactive approach to flight safety by enabling users to mark specific regions as no-fly zones. In response, the application dynamically reroutes flights to circumvent these designated areas, contributing to heightened situational awareness and risk mitigation. This simulation tool can be used in research as a platform to simulate optimized or predefined flight plans by facilitating potential collisions or abnormalities in scheduling them.

Keywords: Collision Detection, Flight Simulator, Fast Time Flight Plan Simulator, Graphical Representation, Simulation

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