

3-D Airport Safety Risk Assessment

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Abstract

Before structural or procedural changes are made in or around an airport, the FAA must perform a safety analysis to determine what impact the changes may have. Traditionally, this has been accomplished with a combination of manual data collection and time consuming analysis using legacy command line software, which only a few experts understand how to apply.

The MITRE Corporation's Center for Advanced Aviation System Development (CAASD) developed a prototype called the Safety Assessment Toolset (SAT) to provide the user with a graphical interface to visualize airport, obstacle, and terrain data. The SAT meets the need for an integrated set of analytic capabilities. This includes an enhanced Collision Risk Model (CRM) integrated with a graphical user interface, and tools to allow a user to model buildings, terrain, terminal instrument procedures (TERPS) surfaces, and airport safety surfaces.

The productivity of safety analysts is greatly increased by the SAT's graphical interface. This enables them to perform assessments that were previously impractical due to time and software limitations. Analysts will use the SAT to determine the safety of proposed structures near airports, and decide what procedural changes may need to be made for existing ones.

The ESRI MapObjects-Java GIS library allowed MITRE to quickly build a two-dimensional display. We also leveraged Google Earth and the (Keyhole Markup Language) KML specification to provide a three-dimensional visual analysis of our models. Using Java 3D, MITRE created an environment to build aircraft simulation animations. These digital earth capabilities provide visual substantiation that is simply not possible with a 2-D view.

We will demonstrate a 3-D analysis of obstacles using Google Earth's existing building models and integrated web information for visualization. Obstacle penetration and spatial relationship between key safety surfaces will be apparent. We will also show an animation of taxiing aircraft and their relationship to safety surfaces with incorporated imagery from Microsoft Terraserver.