MODELING OF AIRPORT OPERATIONS USING AN OBJECT-ORIENTED APPROACH

by

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(ABSTRACT)

This research develops an object-oriented approach to model airport ground network traffic operations. A generic modeling library is developed as a tool kit to model the basic traffic operations in the airfield using an object-oriented approach. The proposed generic modeling library for airfield operations is a collection of predefined abstract components implemented in the Java object-oriented programming language. Classes are defined and used as the basic components in a variety of airfield operation modeling, simulations, and optimizations.

The generic airport modeling framework consists of a set the components that are necessary for modeling the basic activities of airfield traffic operations. By using the multi-threading techniques, components are integrated into the proposed modeling framework. Unlike traditional sequential simulation model, this framework organizes simulation activities into four major groups which are: flight schedule, aircraft movement, time, and animation. Instead of using built-in control logic, the framework adapts an open system policy which gives the flexibility to the end users to incorporate the user-preferred control logic into the end models. Another purpose in this research is to provide a future mechanism to study airfield ground traffic automated control systems with Just-In-Time forecasting and model system performance in a real-time ATC environment. The proposed generic library could be implemented into a Internet/intranet ready application which can query real time information and

provide real time advice to pilots and air traffic controllers. This study is one of a few current research projects that are of using multiple threading technique to study traffic operation problems.

The proposed generic library is originally implemented with C++ and, in the final stage, with Java, a truly cross-platform object-oriented language. Application written in Java can run on most of the mainstream computer operating systems without modifications. Although the proposed library is for airfield traffic control system, it could also be extended into air traffic control system as well as advanced transportation system.

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