Air Traffic Control Discrete Event Simulation

Type: Type 1
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Problem Statement (or Background):
The challenges of air traffic management are realized in many levels of travel experience. People in the United States use air travel for business and pleasure at an increasing rate. Air traffic control (ATC) is a vital part of business in the world economy. If ATC management systems fail, the ripple effect can have significant negative impact on most, if not all airports. The use of discrete event simulation as a tool for analysis and prediction of capacity at airports gives the consumer a better travel experience and saves money for the air carriers. Several recent papers have been presented that address these problems [1], [2], [3] with simulation, model, and automation systems.

Modeling and simulation goals.
The goal of the project is to understand airport aircraft access maximization based on numerous factors. There are factors of aircraft configurations, prioritization of airport resources, commercial versus chartered (private), and air carrier influence that controls when and where an aircraft may land. These attributes can be modeled using the DEVSJAVA framework and experimentation can reveal efficient and inefficient operations of an airport as well as dynamic optimization based on simulation models. ATC in the United States is a high pressure and serious job, thus using a tool to help model and predict capacity impact can be of high value to the air travel industry. Our system will implement an airport model with multiple runways of varying characteristics, numerous aircraft with varying influential factors, and possibly atmospheric conditions of variability to determine efficiency of the ATC in a given environment. Simple object representation of these entities will be the first step, then introduction of influential factors with atmospheric variations will be our goal for the event simulation.

References