NASA SBIR/STTR Technologies

THE DESIGN AND OPTIMIZATION OF AN INTEGRATED ARRIVAL/DEPARTURE SCHEDULER

Intelligent Automation, Inc.– Rockville, MD

PI: Dr. Frederick Wieland

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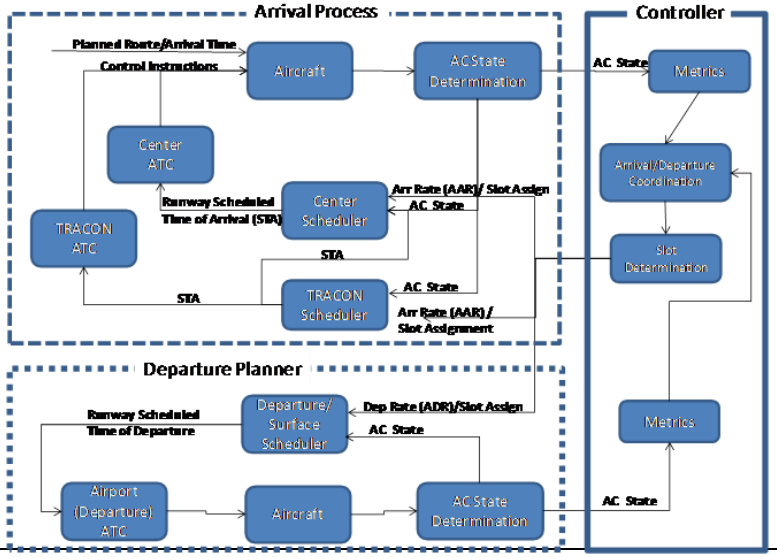

Identification and Significance of Innovation

The key innovation of this effort is the design and validation of a dynamic *integrated* arrival/departure scheduler. In contrast to current approaches, we propose changing arrival and departure runway assignments dynamically based upon the traffic situation, weather conditions, surface congestion, and planned departure pushbacks as well as planned arrivals flowing into the terminal area from the enroute centers**.** When complete, this project has the potential to provide (1) a strategy to handle the FAA's Best-Equipped Best-Served concept at airports, (2) a significant increase in Metroplex capacity without building additional runways and (3) support for a new aviation business model in which flights are scheduled to Metroplexes rather than specific airports.

TRL level 1 at beginning of project, TRL level 2 at end of project.

Technical Objectives and Work Plan

Technical Objective 1. Development of a control algorithm that allocates flights to available arrival and departure slots. The control algorithm integrates the arrival and departure situation, to minimize flight delay, maximize airport throughput, and maximize the quality of service perceived by all flights.
Technical Objective 2. Design a simplified testbed to understand the limitations of the algorithm.
Technical Objective 3. Using the testbed, the control algorithm will be evaluated under different traffic and weather scenarios, with recommendations for enhancements or changes to the algorithm. One of the objectives will be to evaluate the algorithm's usefulness for handling the Best-Equipped, Best-Served policy at the airport level.

Work Plan:

1. Develop scenarios and a simplified testbed for the control algorithm.
2. Develop the control algorithm.
3. Design a sophisticated testbed for later (phase II) experimentation.
4. Run experiments with the control algorithm to assess its feasibility.
5. Reports and documentation.
6. Develop Phase II and transition plans.

NASA and Non-NASA Applications

As an airport scheduler, will provide an integrated view of arrivals and departures combined, as opposed to extant schedulers, which look at arrival and departure streams separately.
The FAA's Best-Equipped Best-Served policy, which has yet to be refined into an operational concept, can utilize the results of this work.
NASA's ongoing development and evaluation of airport schedulers are potential users of the information derived from the investigation of this controller.
Large Metroplexes around the country (approximately fourteen of them) could benefit from an integrated arrival/departure schedule controller for each of their runways at each of their major airports. costly infrastructure upgrades.

Firm Contacts

Dr. Frederick Wieland, Director, Air Traffic Management, Intelligent Automation Inc., 301-294-5268.

NON-PROPRIETARY DATA