NEXTOR: The National Center of Excellence for Aviation Operations Research

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NEXTOR undertakes projects in air traffic management, drawing on multidisciplinary research teams from Operations Research, Applied Mathematics, Economics, Civil Engineering and Electrical Engineering.

BACKGROUND

The Federal Aviation Administration (FAA) established The National Center of Excellence for Aviation Operations Research (NEXTOR) on June 26, 1996 as one of several Centers of Excellence in aviation research. NEXTOR is a consortium of five universities.

EDUCATION

More than 100 graduate students have participated in NEXTOR research programs since the organization's formation in 1996. UC Berkeley, Virginia Tech, MIT, Maryland, and George Mason also work with many university partners to provide students with numerous opportunities for research and higher education.

NEXTOR also co-sponsors short courses with the FAA that are open to any FAA, federal government, or industry affiliate employee interested in air transportation systems analysis.

RESEARCH EXAMPLES

Positive Passenger Bag Match (PPBM)

PBBM is an antiterrorist measure aimed at preventing baggage unaccompanied by passengers from traveling in aircraft luggage compartments. In 1997, the FAA conducted a two-week live test with the help of NEXTOR faculty, that involved 11 airlines, 8,000 flights, and nearly 750,000 passengers. Findings of the research challenged the widely held industry view that PPBM would have grave impacts on domestic operations. It was estimated that

- PPBM would delay domestic departures by an average of approximately 1 minute per flight
- It would cost the airlines roughly 40 cents per passenger
- It would cause no reduction in the number of flights performed

Integration of Reusable Launch Vehicles Into Air Traffic Management

Space launch and reentry operations are becoming more common and more widespread. As a result, there is a growing concern that the historical policy of always giving priority to space operations and may need to shift to a more equitable method that aids in offsetting the costs to the airlines due to diversion. This research project is focused on articulating a general airspace policy development methodology, and applying this methodology to the air and space transportation problem for developing more equitable methods of cost-sharing between the parties involved.
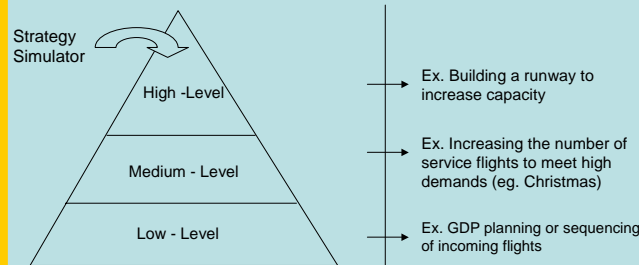
Strategy Simulator

Strategy Simulator is a high level decision support tool for the Federal Aviation Administration to analyze the impact of new technologies for the entire NAS and devise new operational concepts and procedures.

Some examples of problems addressed:

- "Right" combination of demand management and infrastructure investments
- New FAA cost-recovery models
- Introduction of major new ATC technology

Where does it fit?

Collaborative Decision Making (CDM)

Officially formed in 1995, Collaborative Decision Making (CDM) is a joint government/industry initiative aimed at improving air traffic management through increased information exchange among the various parties in the aviation community and improved automated decision support tools.

CDM program activities include

- Ground Delay Program Enhancements
- NAS Status Information Distribution
- En Route Congestion Management

Factors Influencing Estimated Time En Route

Routes used in this study

This research investigates the influence of several factors that might be expected to influence a flight's estimated time en route (ETE): origin airport, destination airport, month of year, day of week, hour of day, aircraft type, and carrier. The main interest is to see whether the ETEs in filed flight plans differed within and among carriers. It is found that route, month, hour of day and carrier are all statistically significant influences on ETE.