An IMMKF Implementation in the PHOENIX Multi-Radar Tracker System for the Portuguese Airspace

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The PHOENIX radar data processing system of the German air navigation service provider “Deutsche Flugsicherung” (DFS) has been developed for the German airspace as a one model Kalman Filter tracker (1MKF), which was efficient for a multiradar coverage situation as in Germany. Since the Portuguese airspace is mainly over sea, large areas of monoradar coverage exist. An interactive multiple model Kalman Filter implementation (IMMKF) in PHOENIX proved to be suitable in these circumstances. The problems with the 1MKF, and the improvement by the IMMKF are shown as well as the evaluation results with the tracker evaluation tool SASS-C, and finally a comparison is made with the widely used Eurocontrol tracking system ARTAS.

Can Schedule Reduction Initiatives Reduce Delay Volatility? A Case Study of Chicago O’Hare International Airport

Tony Diana

Chicago O’Hare International Airport (ORD) represents a key node in the National Airspace System (NAS) network and a major hub for two of the largest U.S. carriers (American Airlines and United Airlines). Faced with growing passenger and airline discontent due to chronic delays and congestion, the Federal Aviation Administration (FAA) led the carriers serving ORD through a gradual schedule adjustment in 2004. A time series analytical technique called Exponential Generalized Autoregressive Conditional Heteroskedasticity (EGARCH) is used to compare the volatility of delays for all arrivals and for all departures before and after the introduction of schedule reductions in 2004 at ORD. The purpose is not to explain why delays vary, but rather how they evolve. The empirical findings indicate that the volatility of delayed departures decreased after the introduction of schedule reductions, while the volatility of delayed arrivals was contained. Finally, Cox proportional hazards models show that the lack of available capacity, the volume of operations and longer taxi times were more likely to increase the odds of arrival and departure delays whether schedules were reduced or not.

The Design of a Distributed Scheduling System for Multi-Center Time-Based Metering of Air Traffic into Congested Resources

Steven J. Landry

A distributed scheduling system has been developed and implemented within NASA’s Multi-center Traffic Management Advisor (McTMA) prototype research system. This paper describes the design and operation of the distributed scheduling system, its testing, and potential future use. The distributed scheduler is a loosely-coupled network of schedulers, each operating over short distances to deconflict aircraft merging into local points of congestion, while informing all other networked schedulers of its constraints. This architecture coordinates aircraft arrivals into congested resources by allocating delay over long distances while being robust to uncertainties in long-range estimates of arrival times. The system reduced airborne delay by 20–42% (without a comparable increase in ground delay), reduced airborne holding by 90%, reduced vectoring, and resulted in a shorter final approach in field tests at four FAA Air Route Traffic Control Centers, the Philadelphia Terminal Radar Approach Control facility, and the FAA’s Air Traffic Control System Command Center. The FAA is currently incorporating technology from the distributed scheduler into its nationwide deployment of the Traffic Management Advisor system.