

Integrated Operations Control at Hub-Airports with Uncertain Arrival Times

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Abstract— Airline operations are subject to a number of stochastic influences which result into variable ground and block times for same flights on different days. Our research explores how airline hub operations control centers may benefit from an integrated decision support system for disrupted situations. In this paper, we study the sensitivity of an optimal set of schedule recovery measures towards uncertain arrival times. The calculation of recovery measures is based upon an integrated and iterative scheduling and optimization algorithm, which incorporates uncertainties for arrival flights as a function of a given look-ahead time. Potential recovery measures include stand re-allocation, quick-turnaround, quick passenger transfer, waiting for connecting passengers, cancellation of passenger connections, stand-by crews and taxi-in prioritization. Within a simulated scenario, 20 aircraft are analyzed during a morning peak at Frankfurt Airport given their estimated arrival times (including potential arrival delays). The analysis of simulation results reveals an almost identical set of optimal recovery measures selected under high uncertainty circumstances and from post-operational point-of-view, which indicates high solution stability.