

# Mitigating demand-capacity unbalances through inter-airline slot tradings

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When airspace capacity is reduced, some flights may be delayed through the allocation of air traffic flow management slots, in accordance with the FPFS rule. Although this reassignment seems the natural way to handle such a situation, the fact that different flights have generally different economical values suggests that other reallocation mechanisms may provide more convenient solutions from the airlines' cost perspective. For instance, each airline could propose a set of slot swap offers, with the Network Manager (NM) playing the role of the mediator and deciding which offers to match [1]. However, this mechanism requires a huge effort from the airlines to evaluate all possible offer combinations, a number which is exponentially growing with the size of their fleet. In addition, all airlines make their offers simply relying on their flights and their current schedule, without the possibility to fully exploit what is available on the market, as they have no information regarding other airlines' offers. With our Inter-airline Slot Swap Offer Provider model, we aim to invert this process: we allow airlines to assign preferences to their flights and let the NM instead to play the role of the airlines' broker, who, based on the preferences and ensuring no negative impact to all airlines, provides a set of ready-made offers that each airline can decide either to accept or refuse. Hence, a slot trade is represented by the matching of several offers of different airlines; if all the offers defining a trade are accepted then the corresponding slot swap eventually takes place, otherwise all the flights involved in the trade keep their initial position in the schedule.

- [1 ] Vossen, TW and Ball MO (2006) Slot trading opportunities in collaborative ground delay programs, *Transportation Science*, 40, 1, 29-43