



Delay Banking for Managing Air Traffic

NASA has patented a new method for efficient Collaborative Decision Making (CDM) between a Traffic Flow Management system and airspace users.

“Delay Banking” enhances air-traffic management in a way that increases the degree of fairness in assigning arrival, departure, and enroute delays and trajectory deviations to aircraft impacted by congestion in the National Airspace System (NAS). In Delay Banking, an aircraft operator (airline, military, general aviation, etc.) is assigned a numerical credit when any of their flights are delayed because of an air-traffic flow restriction. The operator can subsequently bid against other operators competing for access to congested airspace to utilize part or all of its accumulated credit. Operators utilize credits to obtain higher priority for the same flight, or other flights operating at the same time, or later, in the same airspace, or elsewhere. Operators can also trade delay credits, in accordance with market rules determined by stakeholders in the National Airspace System.

This patented technology is available for licensing from NASA to benefit U.S. industry.

Technology Details

Delay Banking is a NAS-wide distributed system that could be implemented as an add-on to the Federal Aviation Administration Traffic Flow Management System (TFMS) and its derivatives for real-time access.

A delay credit can be allocated to an operator of a flight that has accepted, or upon which was imposed, a flow restriction. The amount of the credit would increase with the amount of delay caused by the flow restriction, the exact amount depending on which of several candidate formulas is eventually chosen. For example, according to one formula, there would be no credit for a delay smaller than some threshold value (e.g., 30 seconds) and the amount of the credit for a longer delay would be set at the amount of the delay minus the threshold value. Optionally, the value of a delay credit can be made to decay with time according to a suitable formula (e.g., an exponential decay). Also, optionally, a transaction charge can be assessed against the value of a delay credit that an operator used on a flight different from the one for which the delay originated or that was traded with a different operator. The delay credits accumulated by a given airline can be utilized in various ways. For example, an operator can enter a bid for priority handling in a new flow restriction that impacts one or more of the operator’s flights; if the bid is unsuccessful, all or a portion of the credit would be returned to the bidder. If the bid pertained to a single aircraft that was in a queue, delay credits could be consumed in moving the aircraft to an earlier position within the queue. In the case of a flow restriction involving a choice of alternate routes, planned altitude profile, aircraft spacing, or other non-queue flow restrictions, delay credits could be used to bid for an alternative assignment.

Patent

This technology has been patented. U.S. Patent No. 7,313,475 (Reference No. ARC-15392-1)

Benefits

- Allows for collaborative decision making on tactical flow restrictions
- Allows for implicit flight priority
- Ability to credit flights in one time/region/restriction and apply those credits elsewhere later
- Ability for users to improve on the departure-release decision for en route spacing and arrival metering



Commercial Applications

- Air Traffic Management System
- Aerospace Industry
- Aviation Industry