# Revamped crew scheduling model cuts airline delays by as much as 30%

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Delays and disruptions in airline operations annually result in billions of dollars of additional costs to airlines, passengers and the economy. Airlines strive to mitigate these costs by creating schedules that are less likely to get disrupted or schedules that are easy to repair when there are disruptions—new research in the INFORMS journal *Transportation*

*Science* has found a solution using a mathematical optimization model.

The study, conducted by Vikrant Vaze of Dartmouth College and David Antunes and Antonio Pais Antunes, both of the University of Coimbra, looks at data from Virgin America airline from 2014, that is 94 daily flights connecting 14 continental U.S. airports.

Using this data, researchers determined that introducing buffers or slack times that are distributed in an intelligent way across a crew schedule can reduce extreme delays by as much as 20-30% on average, with only a 2-3% increase in crew salary costs.

"Our model can lead to significant overall benefits, fewer flight delays, more importantly fewer worst-case delays, fewer crew infeasibilities, and lower passenger delays and disruptions," said Vaze, a professor in the Thayer School of Engineering at Dartmouth.

This research allows airlines and airline managers to seek the best trade-off between the goals of reducing delays and disruptions while not being overly conservative in buffer placement.

"If you err on one side, you will have large delays/disruptions. If you err too much on the other, you will have to pay the crew for sitting around doing nothing. Neither is quite a good situation to be in. So, we optimize the buffer placement in crew schedules," continued Vaze. "Paying the crew a little extra ahead of time and then using that extra time as buffers strategically located throughout their work schedules can provide big gains in terms of delay reductions, if we use our optimization model."

**More information:** David Antunes et al, A Robust Pairing Model for Airline Crew Scheduling, *Transportation Science* (2019). DOI: 10.1287/trsc.2019.0897

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