

STAR: (Saving Time, Adding Revenues) Boarding/Deboarding Strategy

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Summary

Our goal is a strategy to minimize boarding/deboarding time.

- We develop a theoretical model to give a rough estimate of airplane boarding time considering the main factors that may cause boarding delay.
- We formulate a simulation model based on cellular automata and apply it to different sizes of aircraft. We conclude that outside-in is optimal among current boarding strategies in both minimizing boarding time (23–27 min) and simplicity to operate. Our simulation results agree well with theoretical estimates.
- We design a luggage distribution control strategy that assigns row numbers to passengers according to the amount of luggage that they carry onto the plane. Our simulation results show that the strategy can save about 3 min.
- We build a flexible deboarding simulation model and fashion a new inside-out deboarding strategy.
- A 95% confidence interval for boarding time under our strategy has a half-width of 1 min.

We also do sensitivity analyses of the occupancy of the plane and of passengers taking the wrong seats, which show that our model is robust.

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