

Motivation and Objectives

- Motivation
 - Airport surface congestion leads to increased taxi times, fuel burn and emissions
 - Potential to mitigate impacts through departure metering tools such as those being tested by NASA at Charlotte (CLT) under ATD-2 and enabled by the FAA's Terminal Flight Data Manager (TFDM)
- Objectives
 - Explore specific departure metering algorithms to support CLT analysis
 - Investigate effect on departure metering algorithms of Surface CDM (S-CDM) data supplied by airlines, specifically Earliest Off Block Time (EOBT) for each flight
 - Feed lessons learned into relevant FAA and NASA activities

Methods

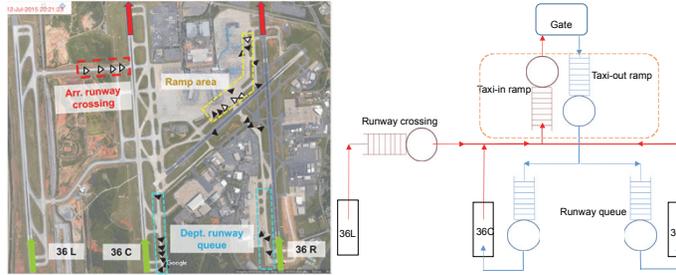
Exploring impact to S-CDM ConOps and estimated benefits of:

- Specific departure metering algorithms at CLT airport
 - Characterize airport dynamics with/without metering
 - Conversion of TOBTs to TMATs for different non-movement area complexities
- Availability and quality of airline-derived data, e.g., EOBT, Gate information (departures and arrivals), at CLT and other airports
- Synthesize findings and implications for relevant other programs



Recent Results & Accomplishments

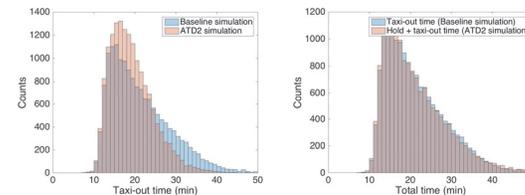
- Queuing network model for CLT taxi time prediction:



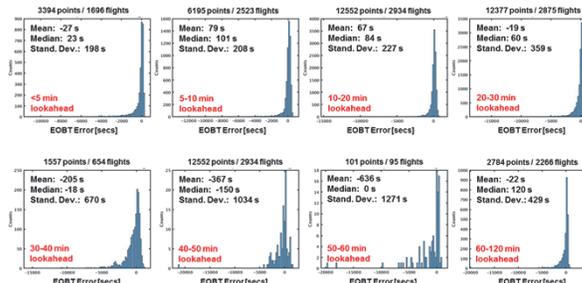
CLT North-Flow model predictions: 14,122 departures + 16,383 arrivals

(minutes)	Gate-to-spot	Spot-to-runway	Taxi-out	Taxi-in
Mean value	9.7	10.5	20.2	10.2
Mean error	-0.3	1.0	0.7	0.5

- Departure metering impacts using ATD-2 logic



- Sample EOBT analysis for one airline/airport



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Discussion

- Developed a queue model capable of predicting ramp and aircraft movement area taxi-times for departures & arrivals.
- The queue model predictions are used to assign gate hold times using the ATD-2 logic for departure metering.
- Preliminary analyses indicate a taxi-out time reduction of ~2 min at CLT in North-Flow, with no EOBT uncertainty.
- Need to determine relationship between EOBT accuracy and departure metering benefits to build case for better EOBT algorithms.
- EOBT accuracy at different lookahead times varies significantly by airline and airport.

Conclusions and Next Steps

- Team is leveraging experience on departure metering algorithm development, simulation and field test to conduct high value research to feed into FAA & NASA departure metering programs.
- Next steps:
 - Refine and exercise CLT models to assess departure metering impacts of different scenarios
 - Expand EOBT analyses to cover more airlines and airports of interest
 - Synthesize results into key "lessons learned" and socialize with relevant stakeholders to maximize value of the work