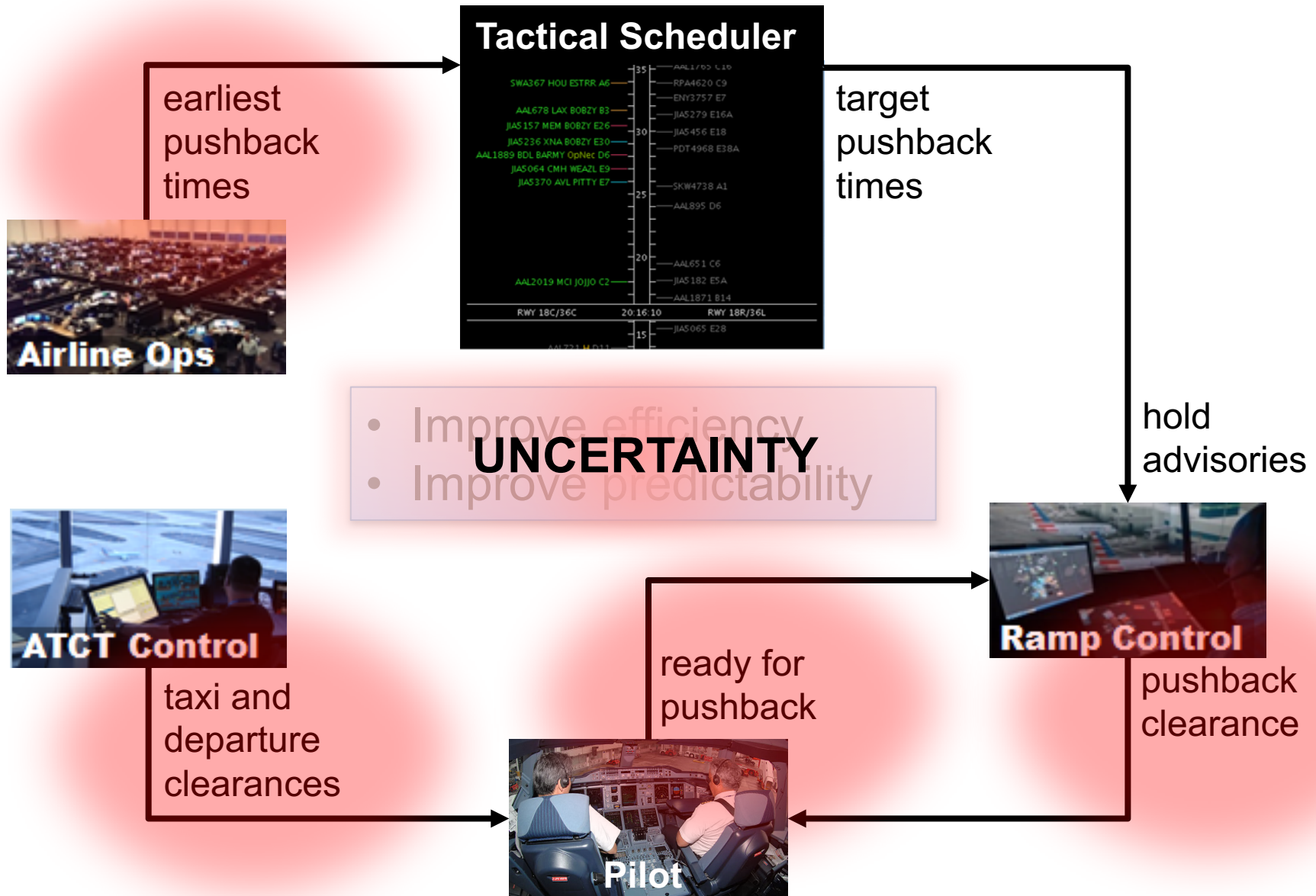


Assessing Tactical Scheduler Options for Time-Based Surface Metering

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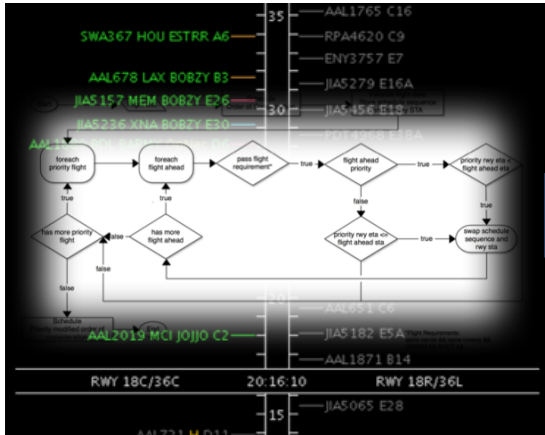


- Field Demonstration
 - Demonstrate viability of ATD-2 tools in the real operating environment
- Human-In-The-Loop simulation
 - Develop/test human factors interfaces and procedures
- Fast-time simulation
 - Extrapolate field results
 - Refine scheduler for future phases of field demonstration
 - Easily adapt concepts to other airports

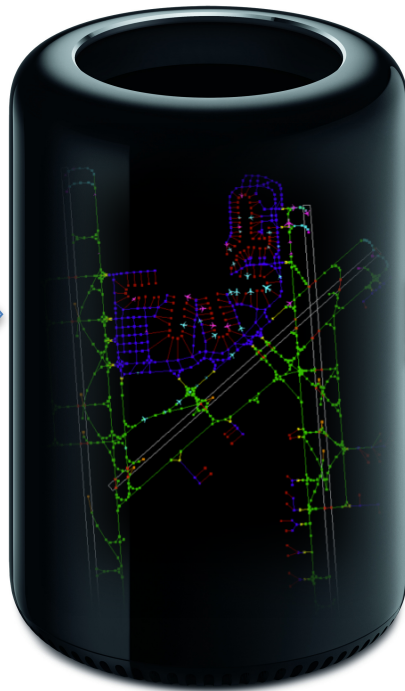


- **Benchmark evaluation of the ATD-2 tactical scheduler in fast-time simulation**
- **Parametric analysis of taxi time delay buffer mitigation of surface congestion uncertainty**

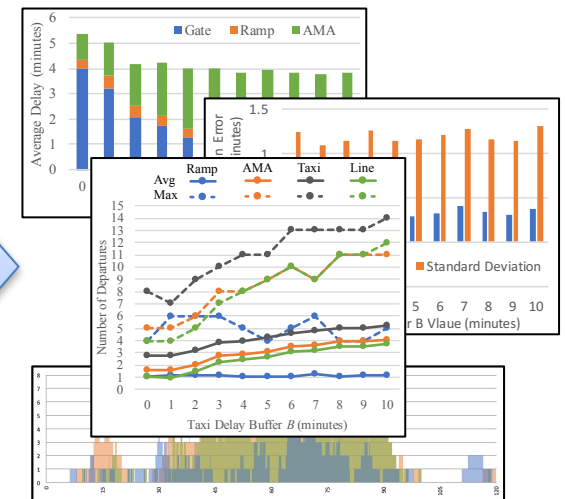
Tactical Scheduler

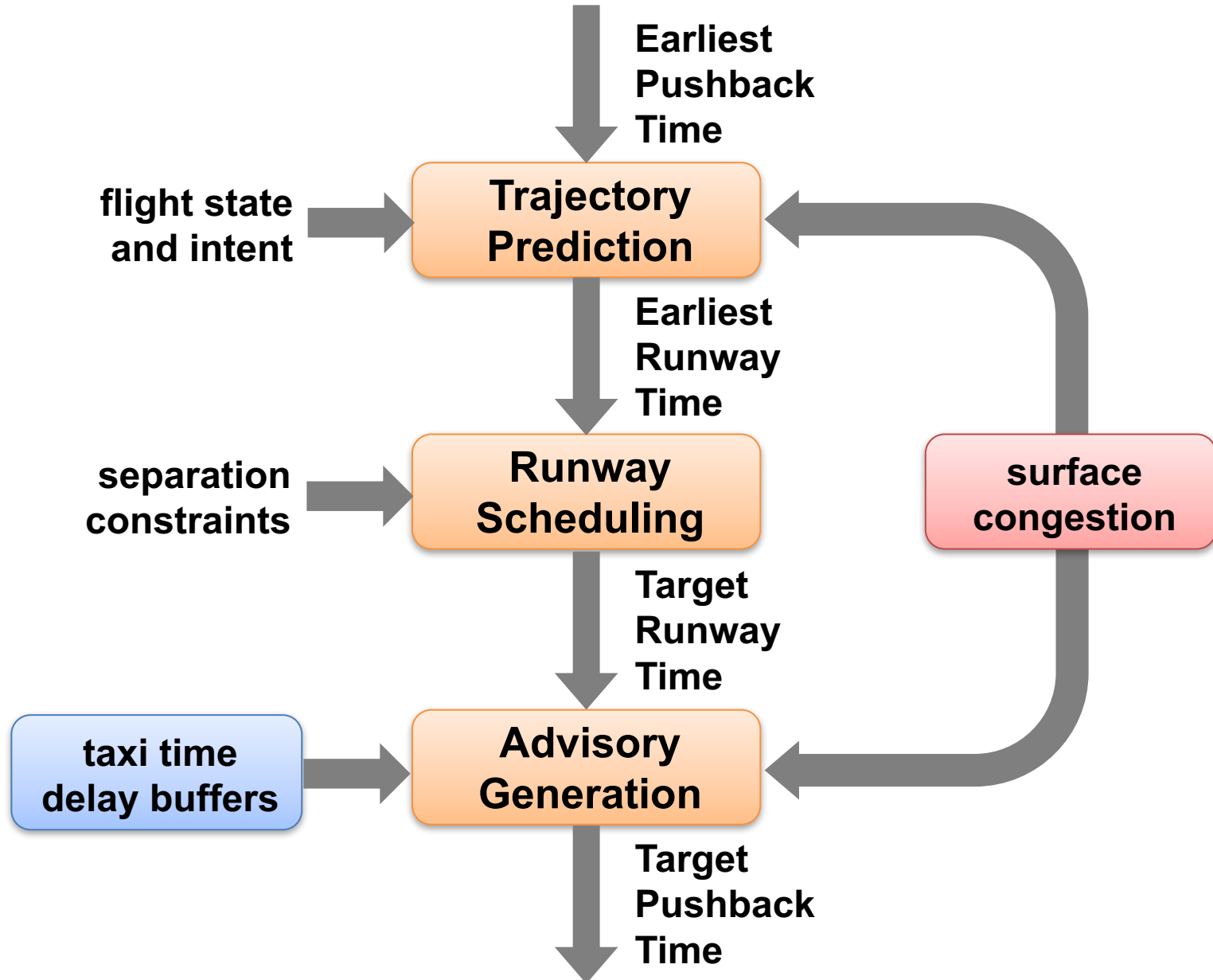


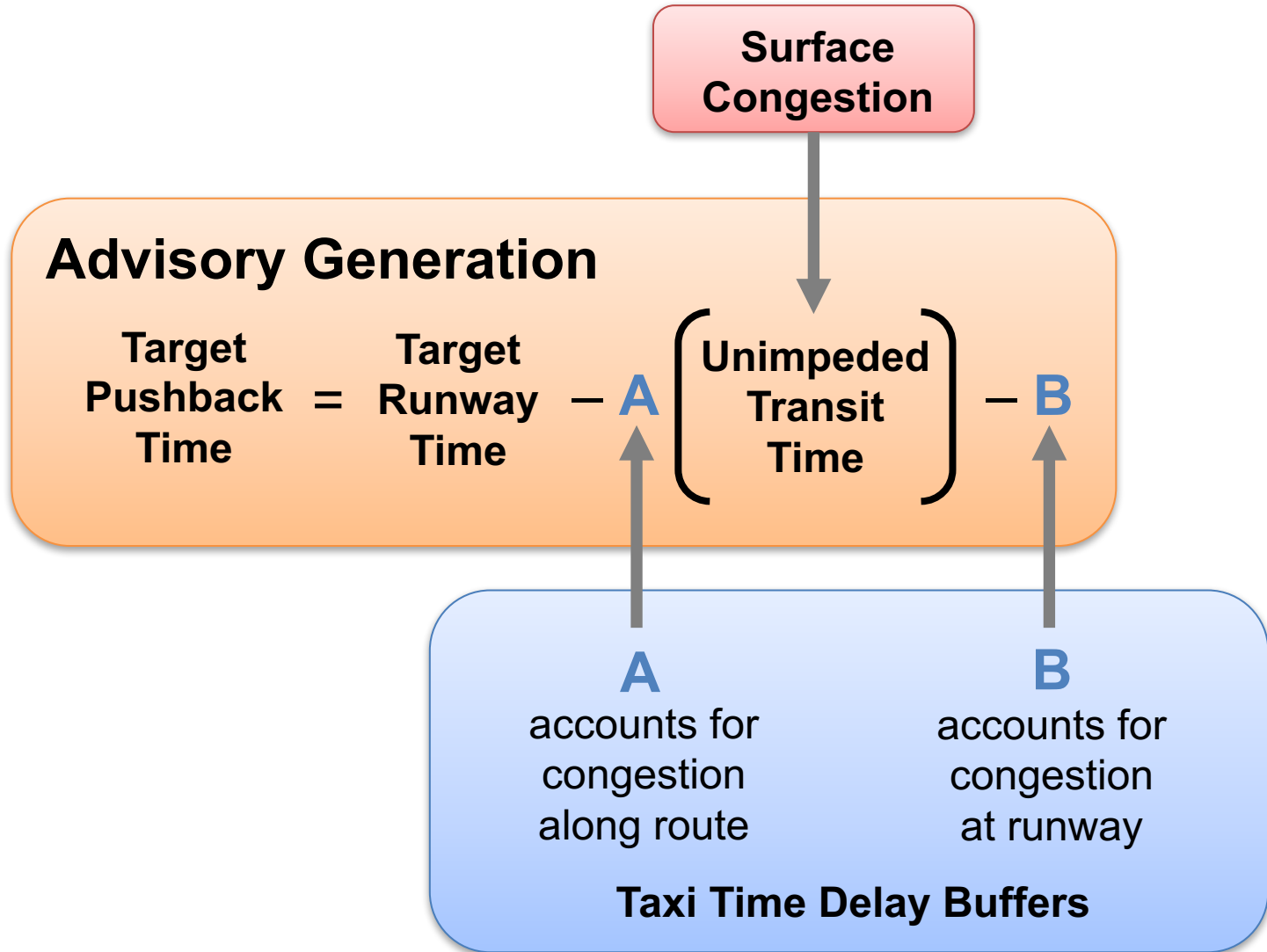
Fast-Time Simulation



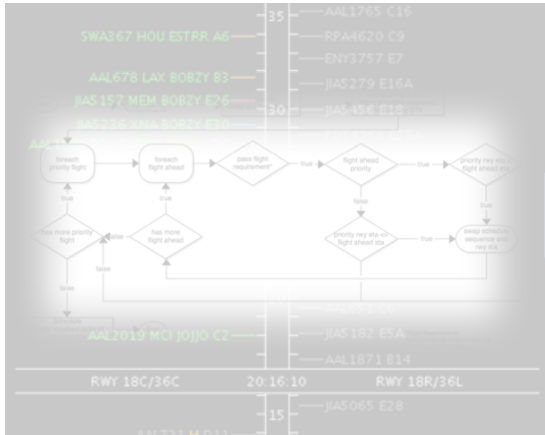
Evaluation Results



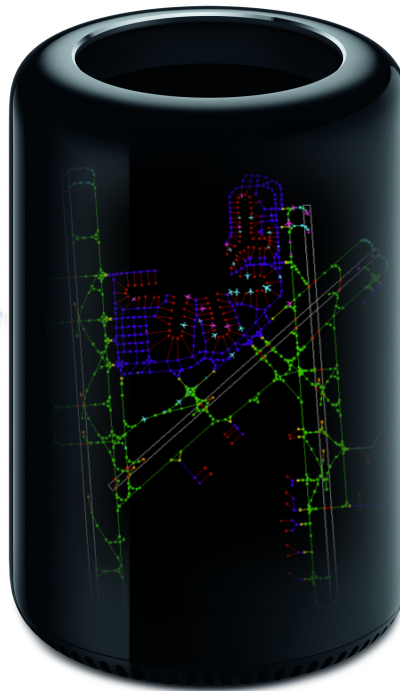




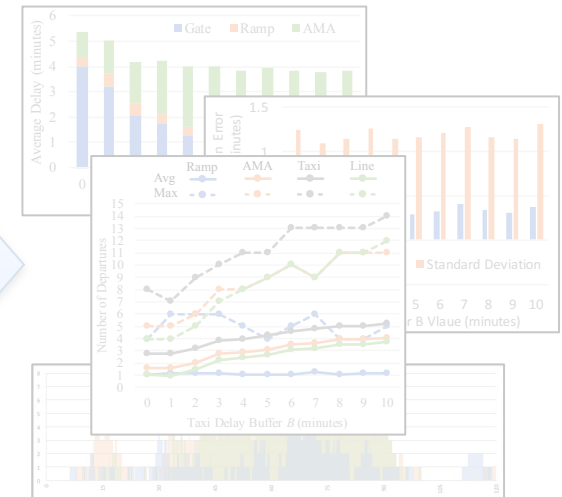
Tactical Scheduler



Fast-Time Simulation



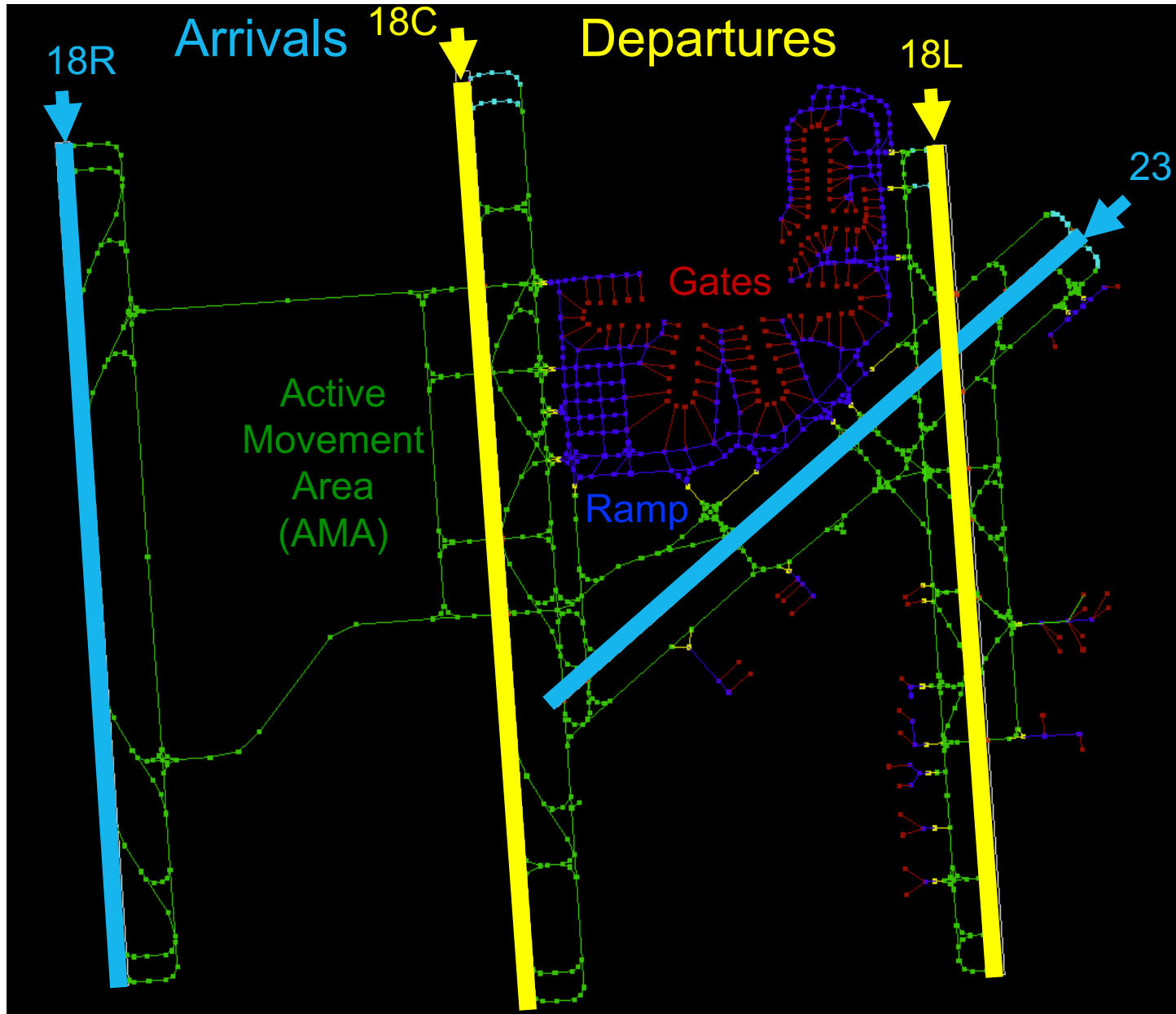
Evaluation Results



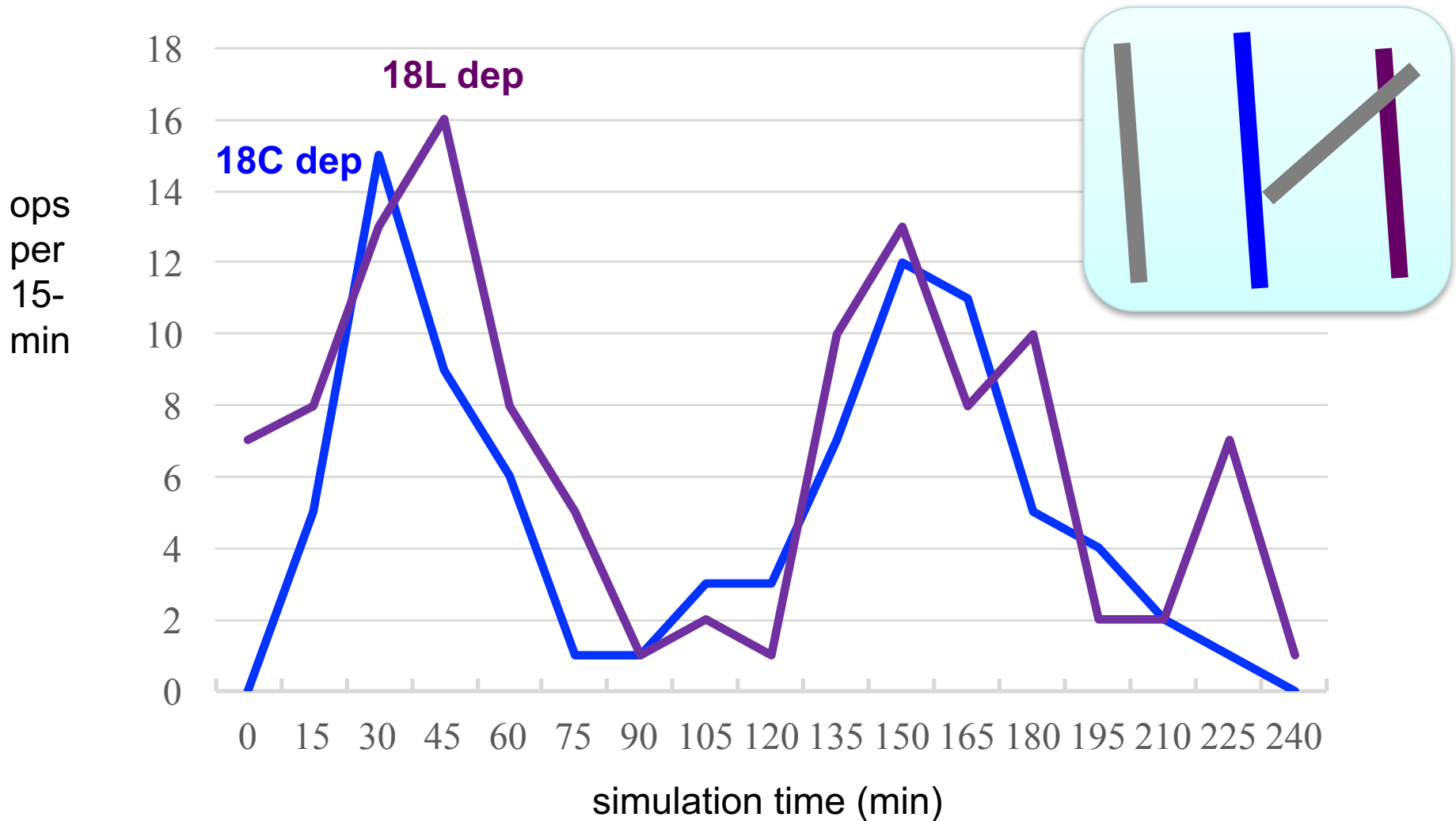
Surface
Operations
Scheduler &
Simulator
(SOSS)

Charlotte
Douglas
International
(CLT)

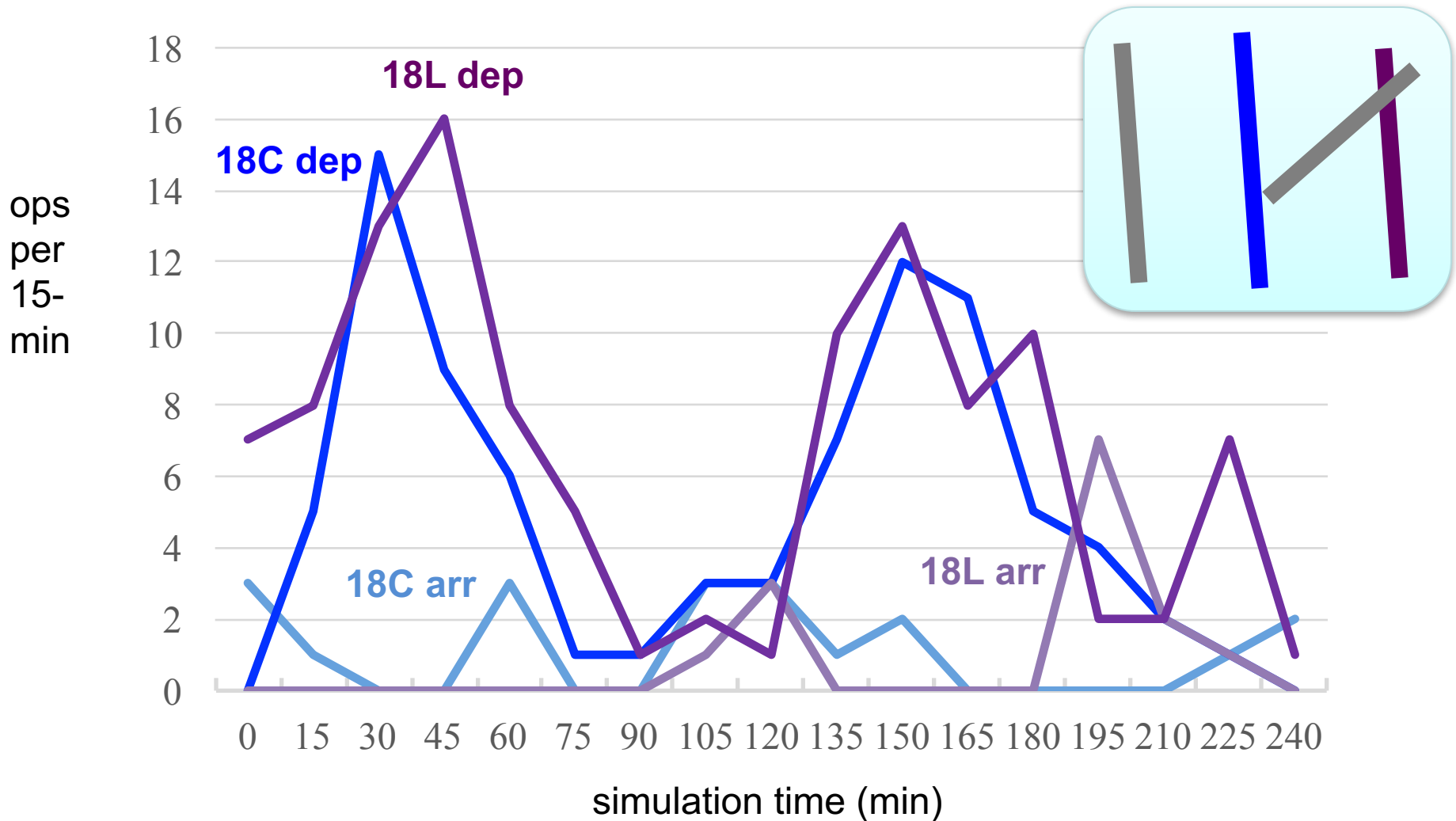
South flow
configuration



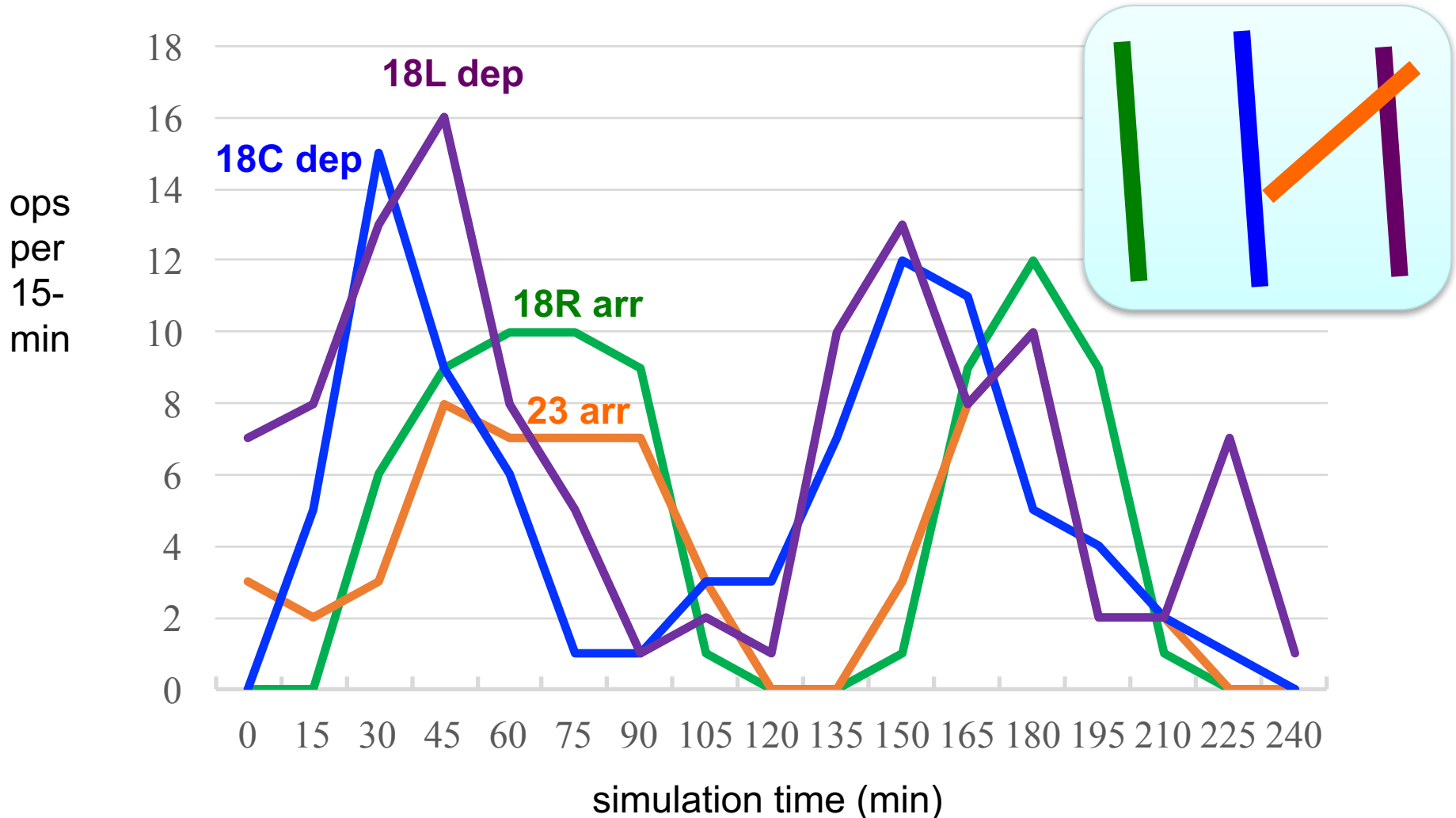
4 hours from 3/11/2016, high demand, low weather impact

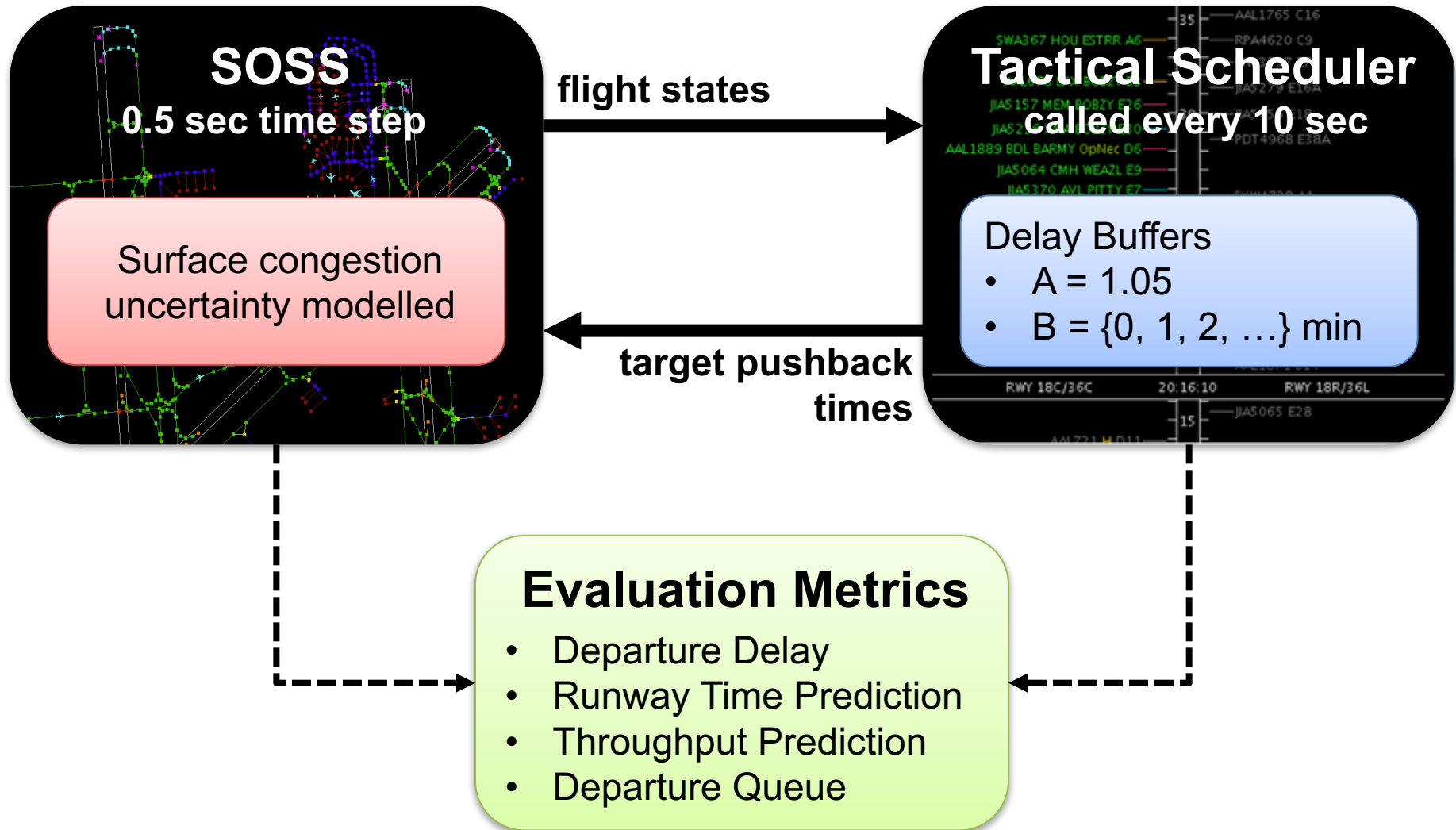


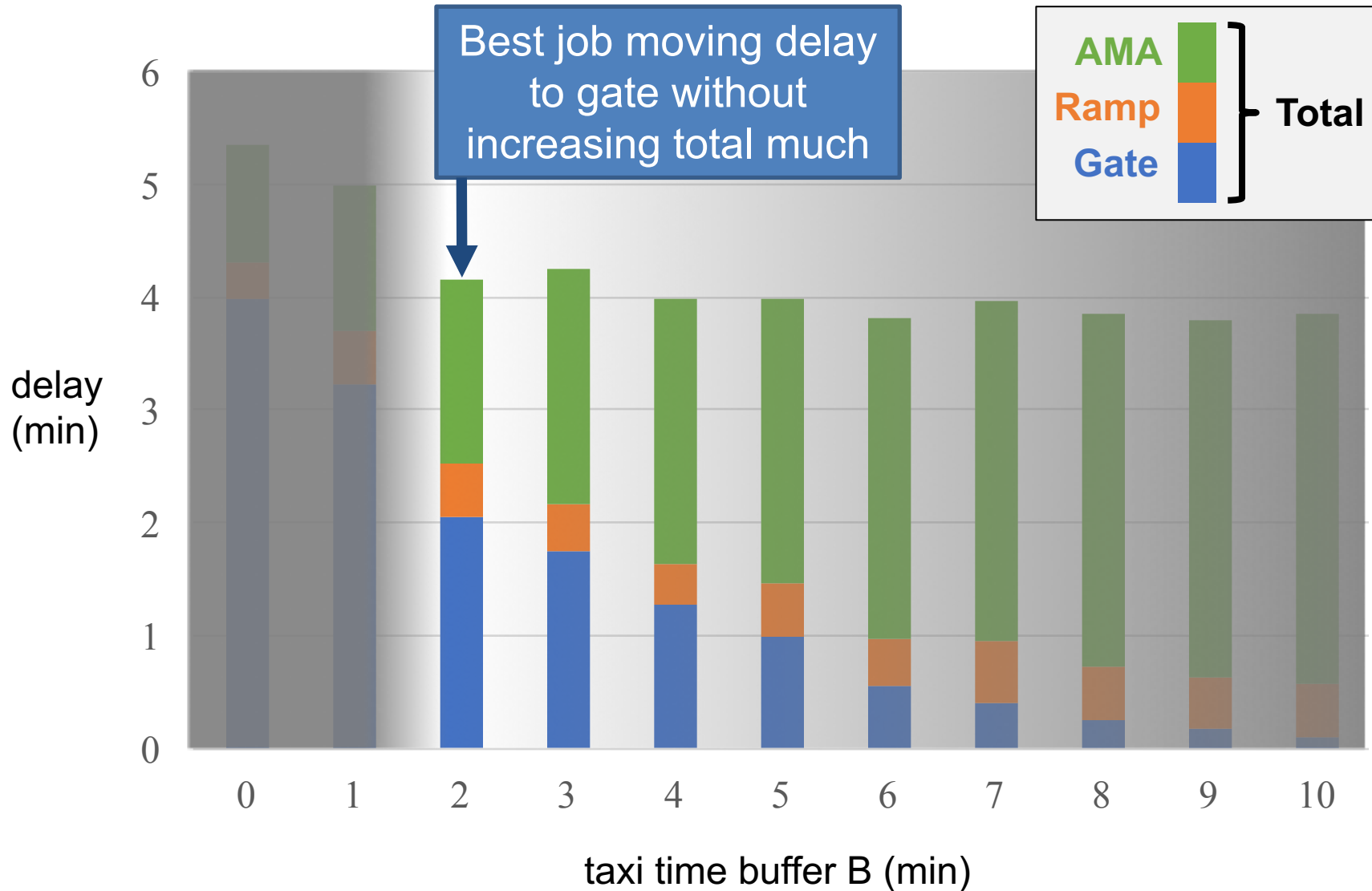
4 hours from 3/11/2016, high demand, low weather impact



4 hours from 3/11/2016, high demand, low weather impact

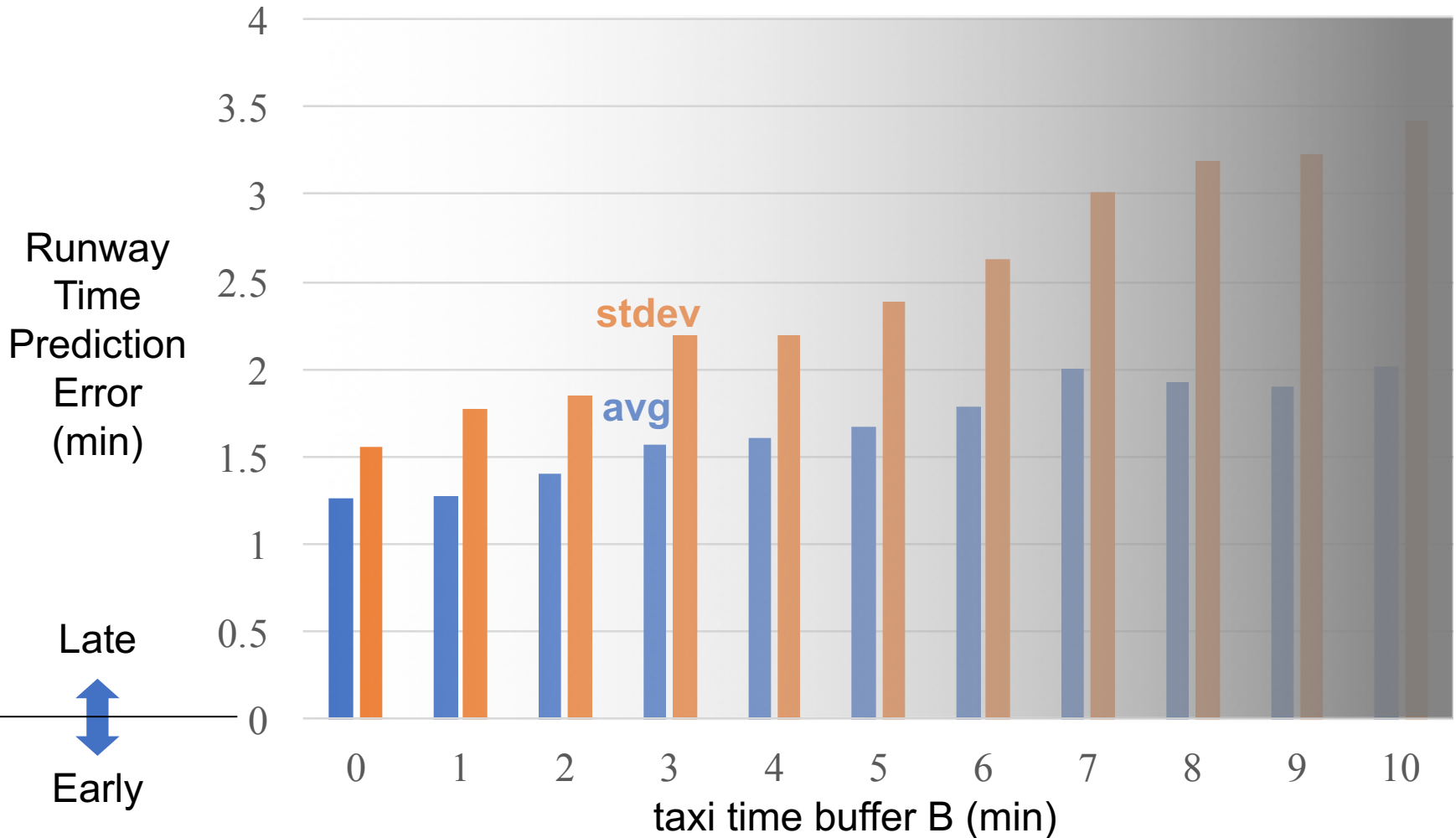




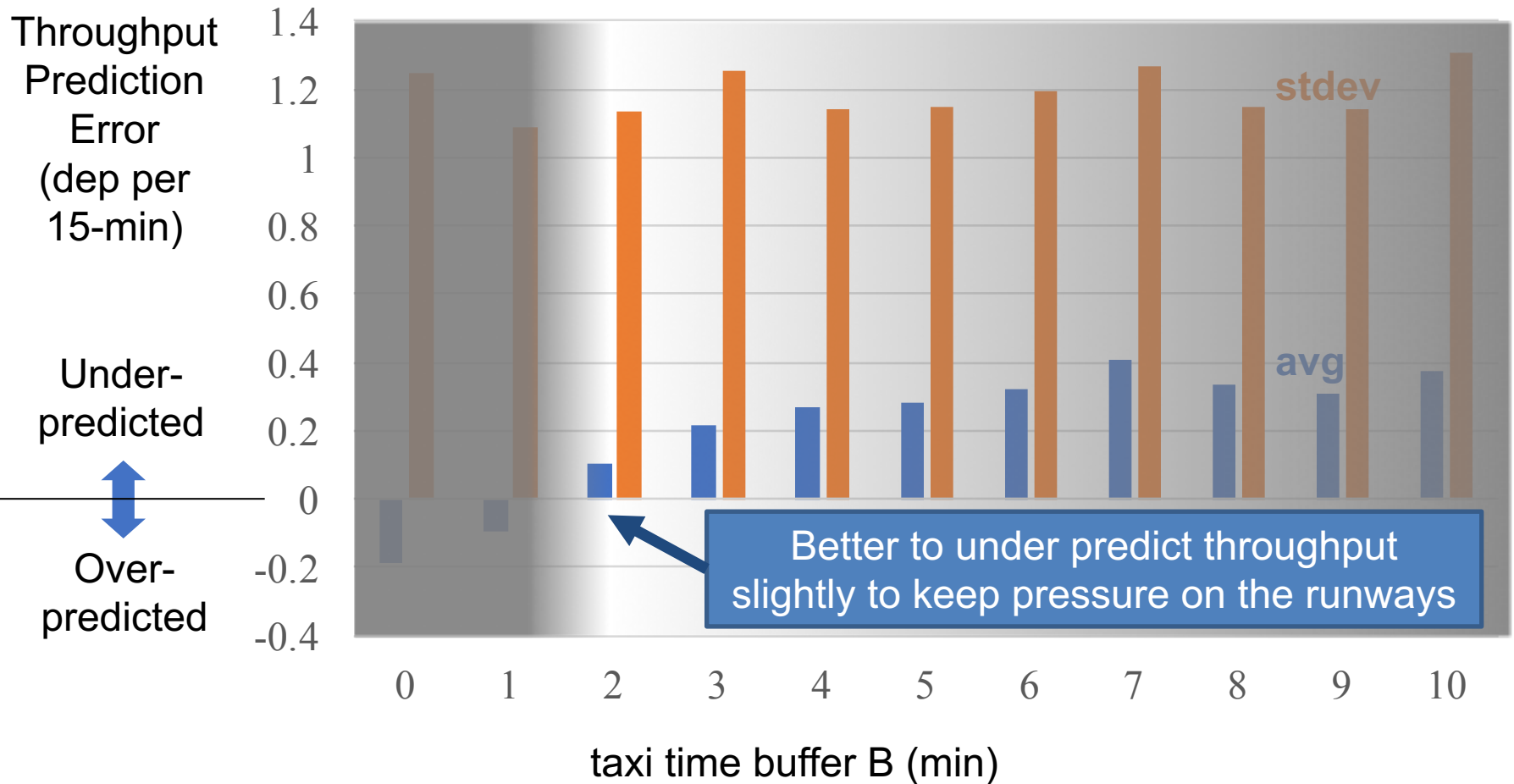


Departures are late on average

Predictability (stdev) worsens quickly as taxi time buffer is increased



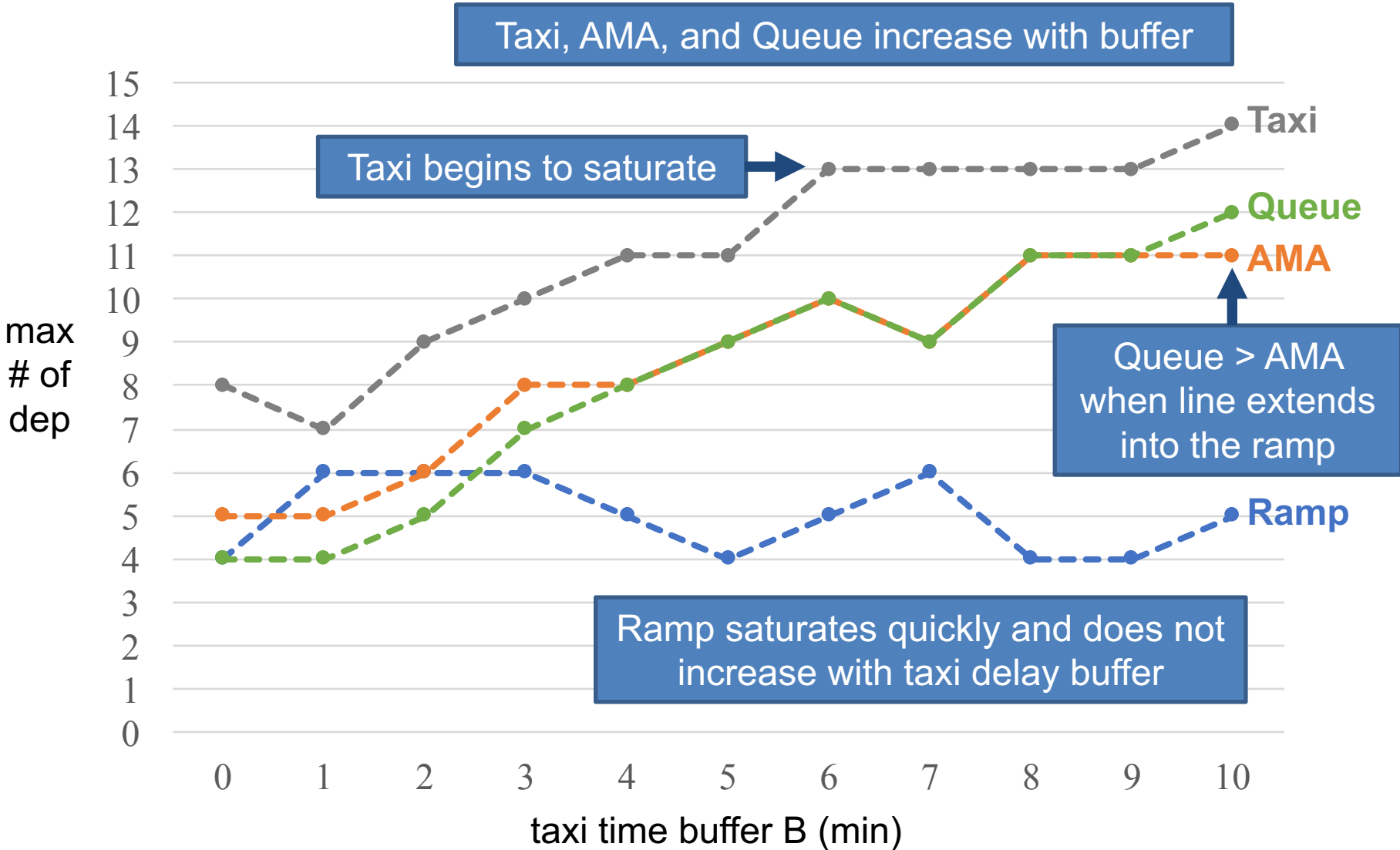
Predictability (stdev) independent of buffer

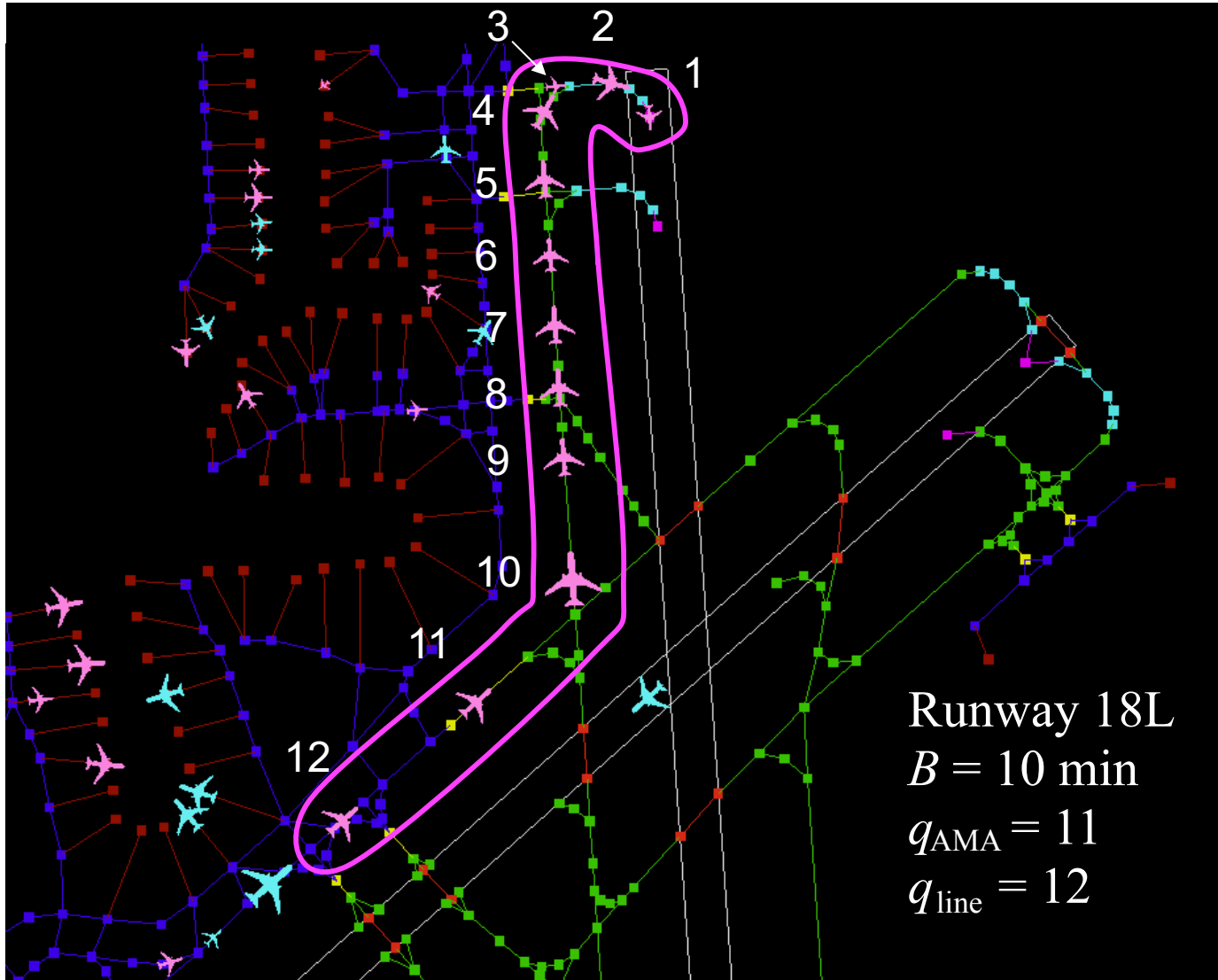




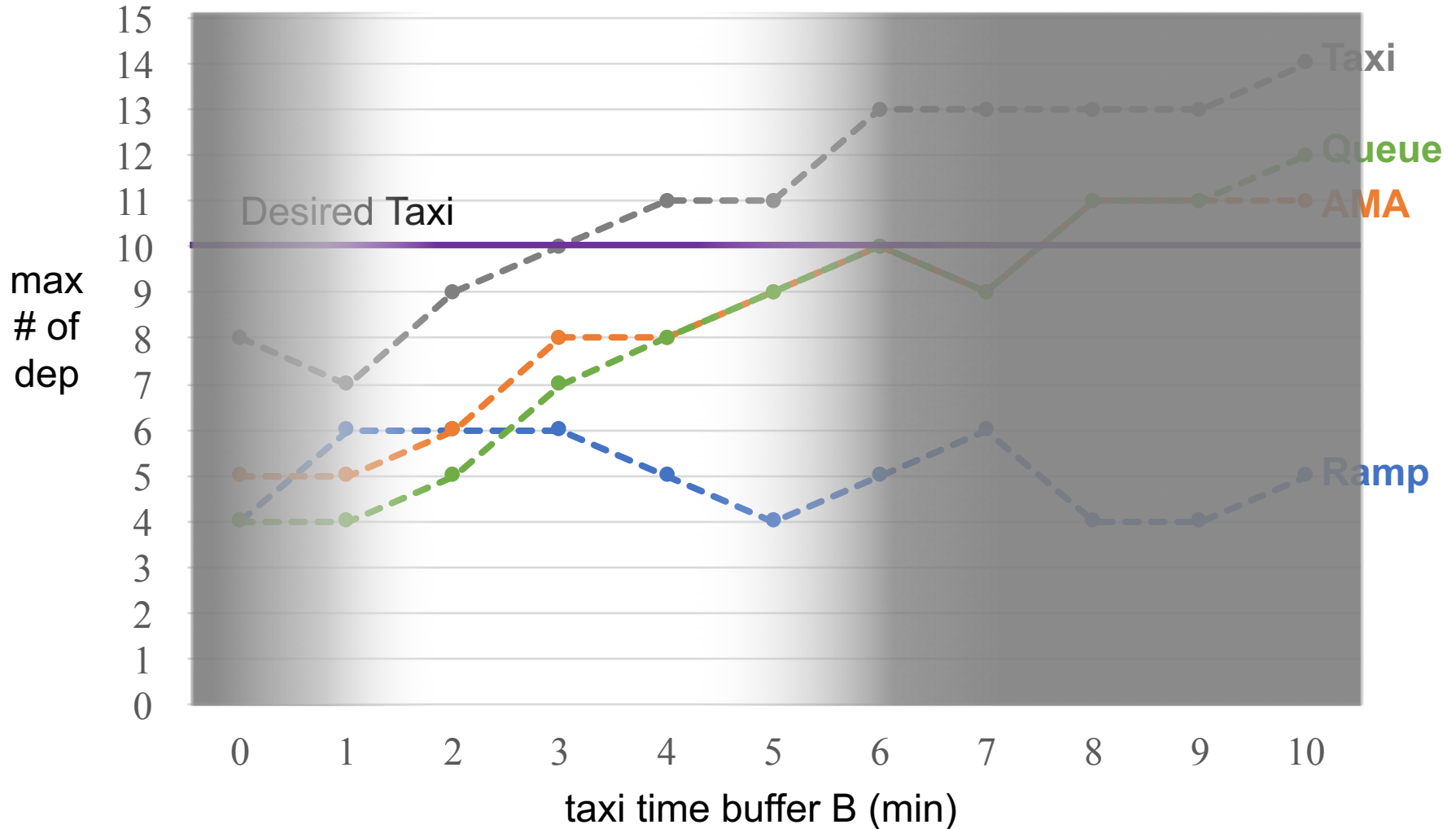
Departure queues	Number of departures:
Ramp	In ramp
AMA	In Active Movement Area (AMA)
Taxi = Ramp + AMA	In ramp and AMA
Queue	in line from runway within 200m of each other

Maximum queue lengths for 18L (0-120 min)





Maximum queue lengths for 18L (0-120 min)



Departure Delay	Move as much delay to gate without increasing total
Runway Time Prediction	Keep buffers small for better predictability
Throughput Prediction	Under-predict slightly to maintain pressure on runways
Departure Queue	Avoid saturating the Taxi and AMA queues

Buffer B

0 1 2 3 4 5 6 7 8 9 10



Recommend buffers
between 2 and 5 minutes
for future simulations



- Add other uncertainties
- Add traffic management initiatives
- Add airline priority



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