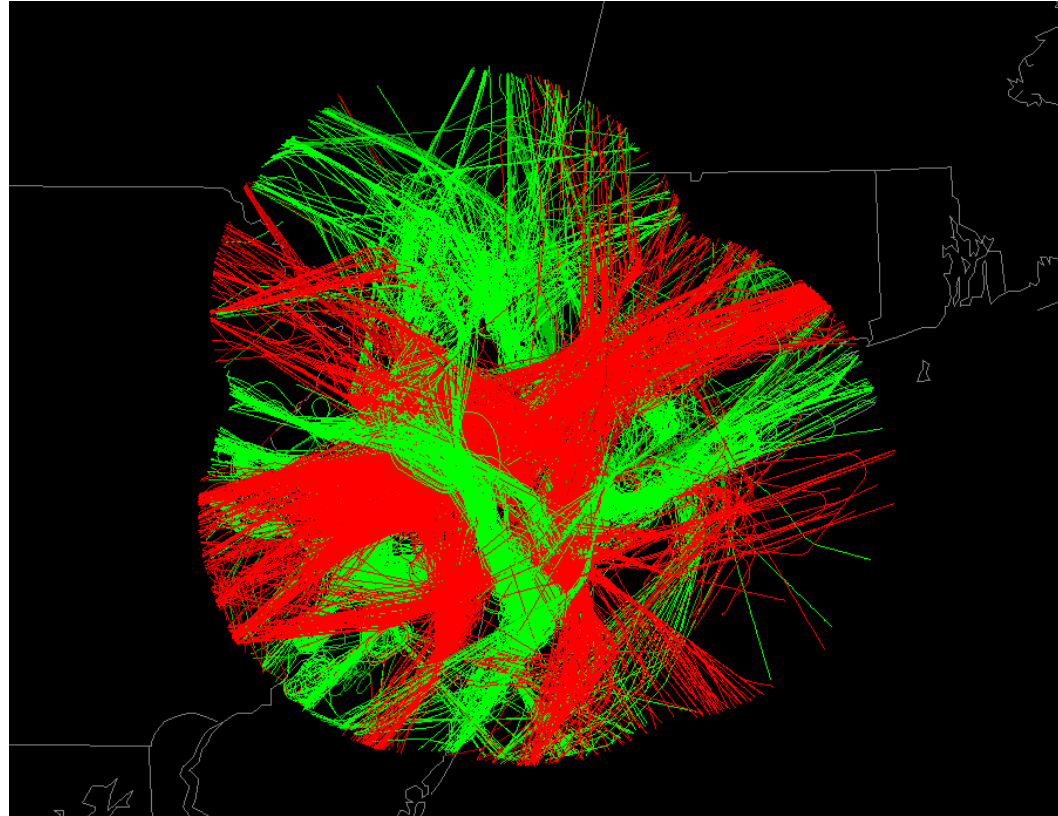


Using SIMMOD to Model NASA's Advanced Technology Vehicles



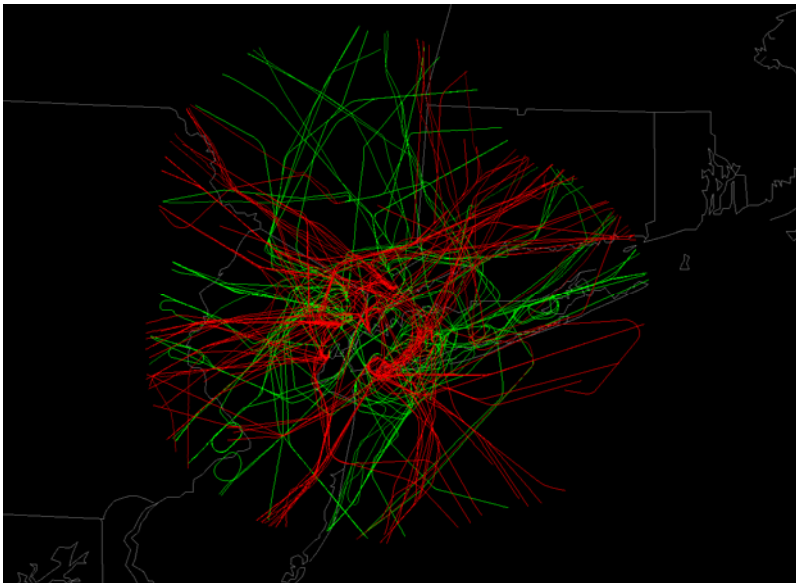
North American SIMMOD Users Meeting
12 March 2009
Arlington, VA

Advanced Vehicles

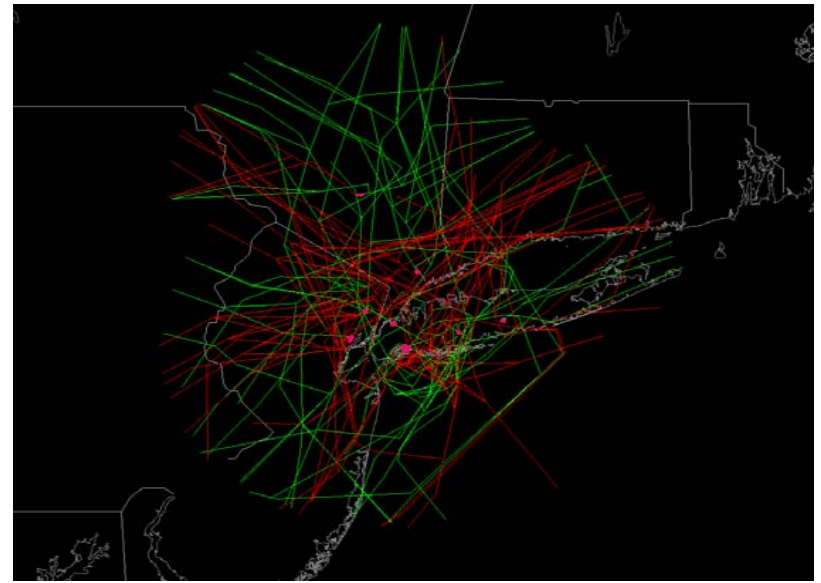
- Cruise Efficient Short Takeoff & Landing (CESTOL)
 - 100 passenger
 - 600 NM to 2,000 NM range
- Supersonic Transport (SST)
 - 98 passenger
 - Supersonic over land
- Unmanned Aerial Systems (UAS)
 - Express carrier truck replacement
- Very Light Jets (VLJ)
 - Eclipse 500 “like” aircraft with newer technology
- Rotorcraft
 - Tiltrotor
 - 100 passenger

Actual vs. Modeled

19 March 2007



RADAR Data

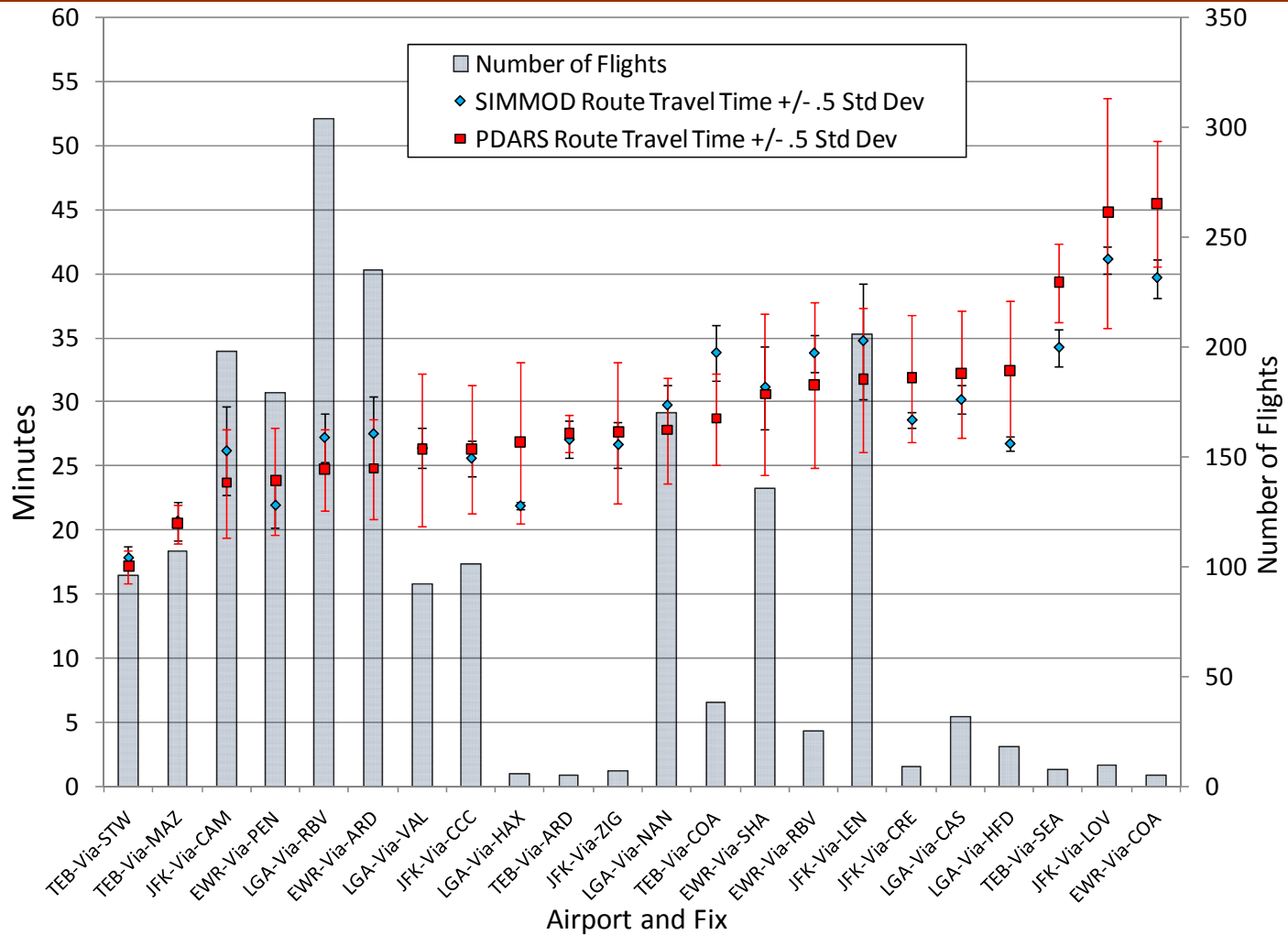


SIMMOD

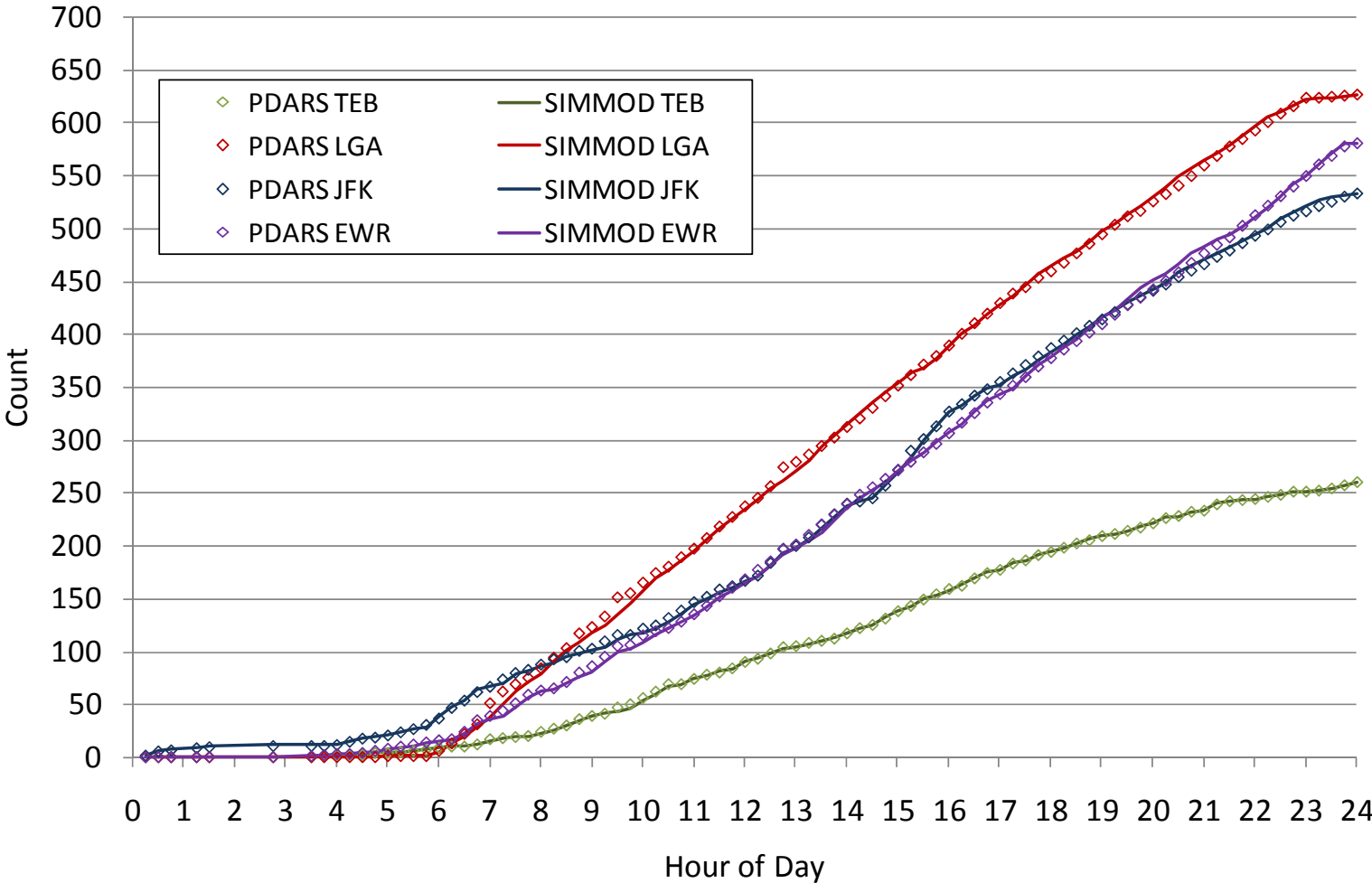
Calibration Results

- Simulated operations at the eight metroplex airports were calibrated against actual results.
- Calibration measures include:
 - Arrival and departure airspace transit times. Since there is no way to identify the amount of air delay in the PDARS data, the calibration statistic used is the average transit time from runway lift-off to departure fix, or TRACON entry to runway touch-down.
 - Average transit times for each aircraft airspace group. In SIMMOD, aircraft types are placed into groups that have similar performance and separation criteria, such as B757 or heavy jets. This metric will identify whether there is an aircraft performance bias in the model.
 - Runway throughput in 15 minute intervals. Runway throughput for each airport was computed in 15 minute buckets for comparison.

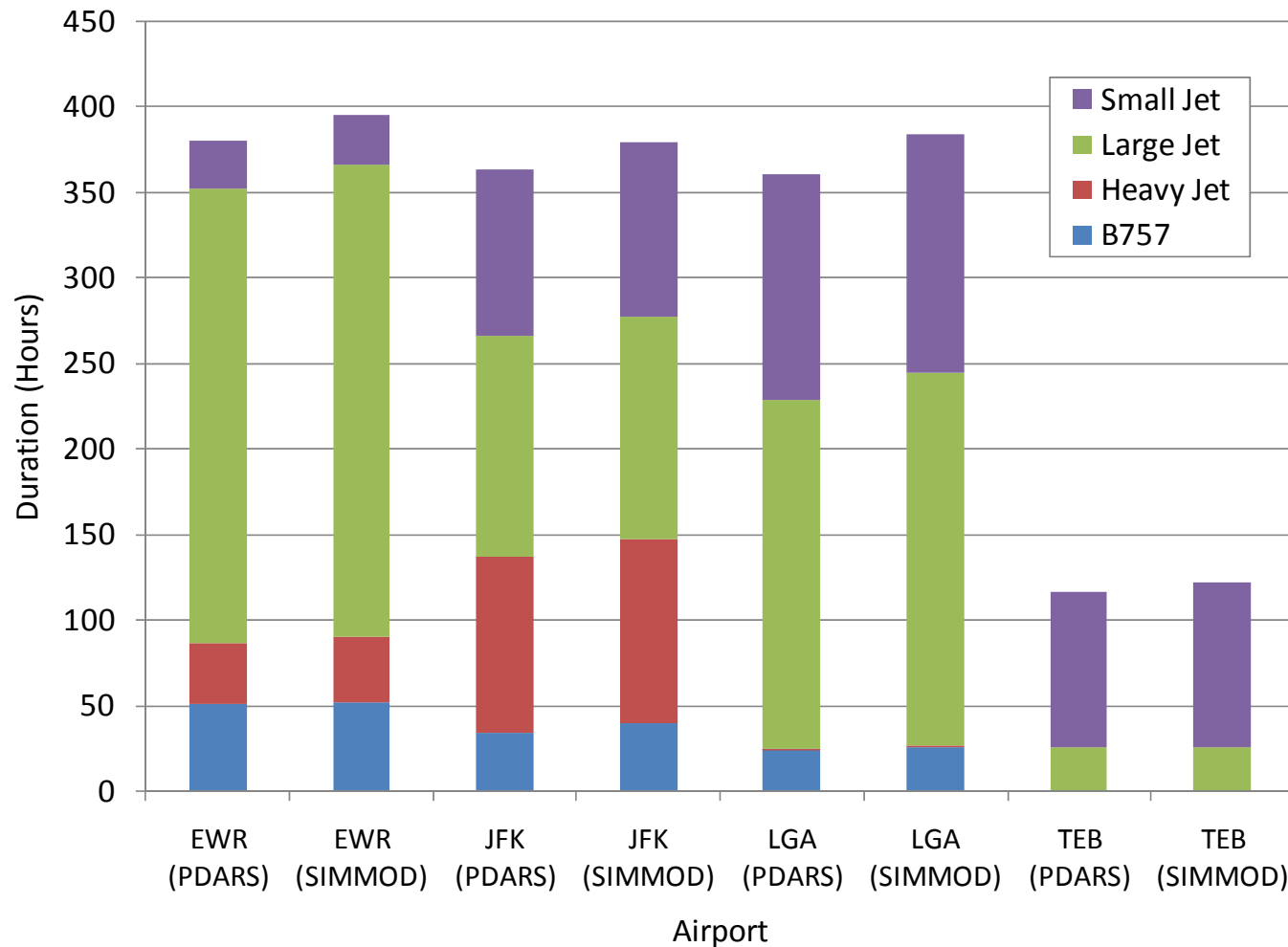
Arrival Travel Times



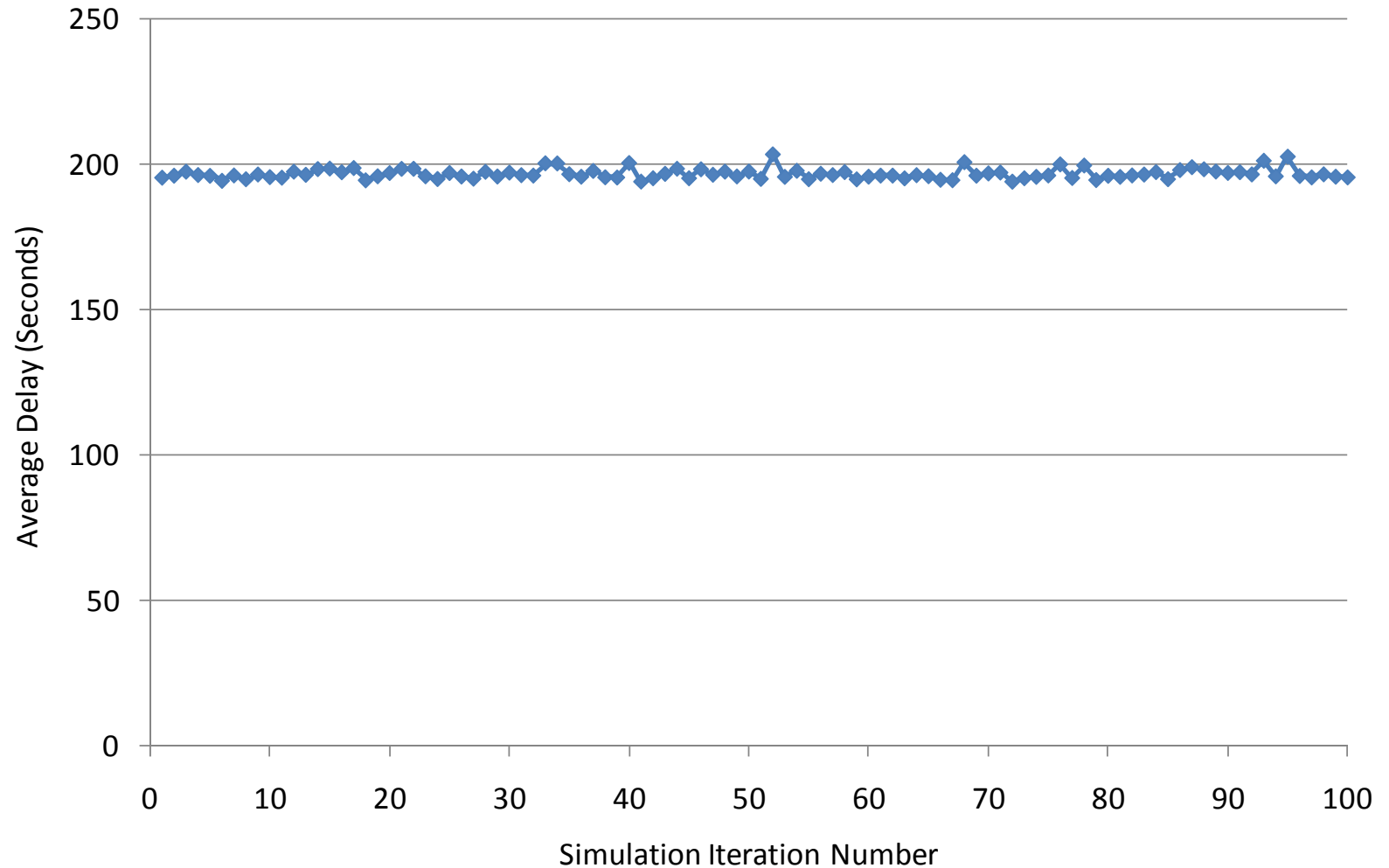
Airport Throughput



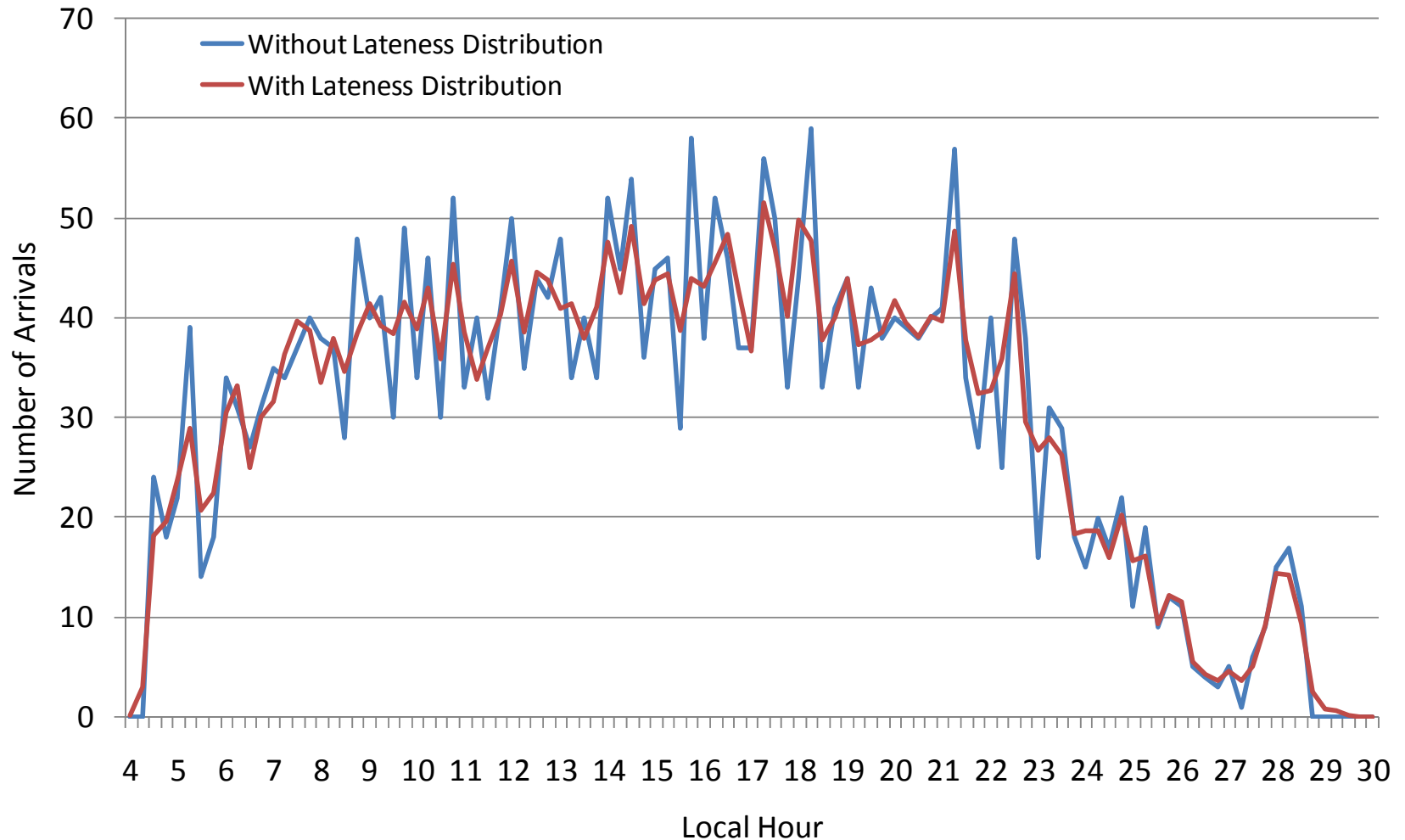
Total Flight Duration



Iteration Variability



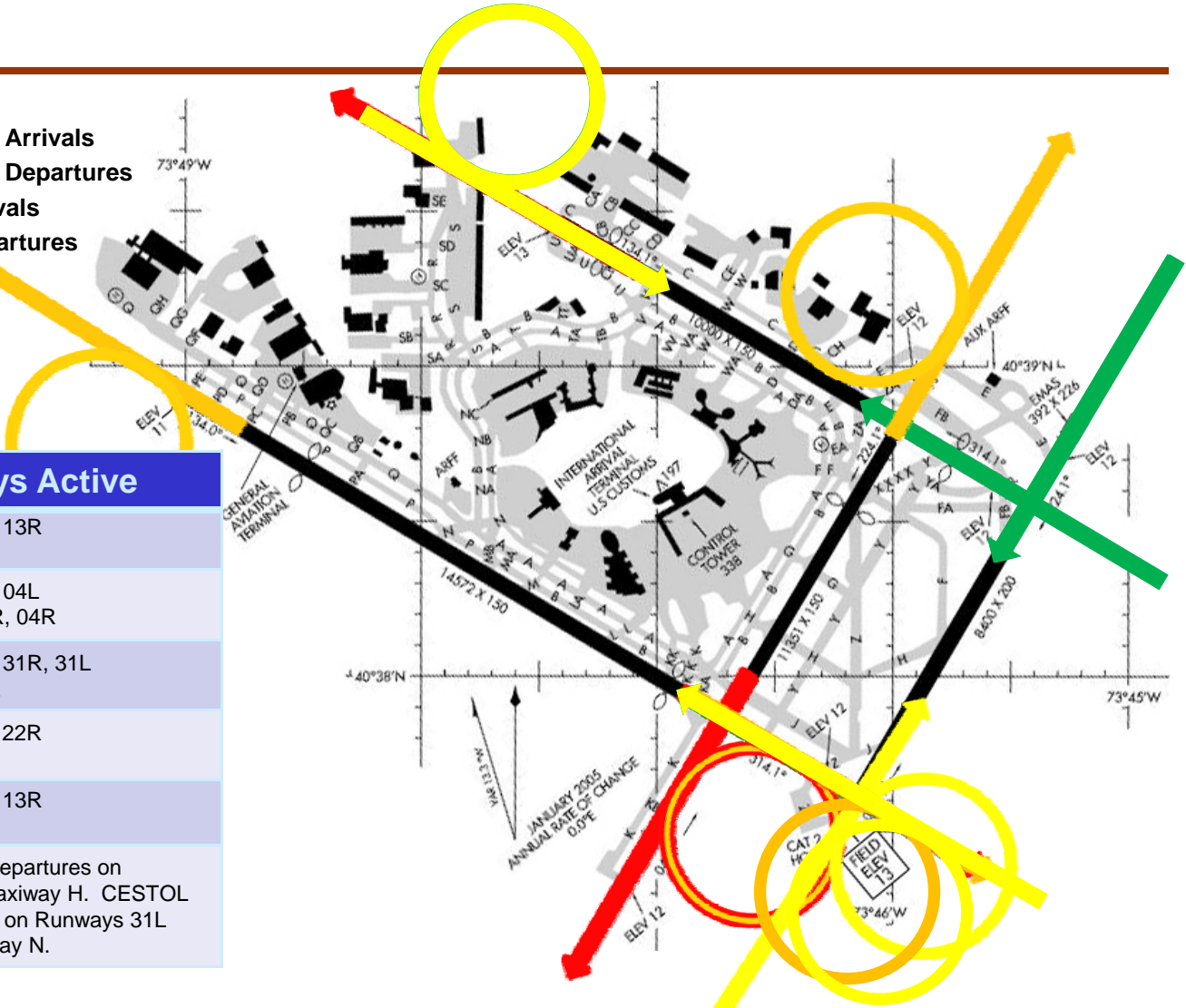
Lateness Distribution Impact



John F. Kennedy (JFK)

-  Conventional Arrivals
-  Conventional Departures
-  CESTOL Arrivals
-  CESTOL Departures

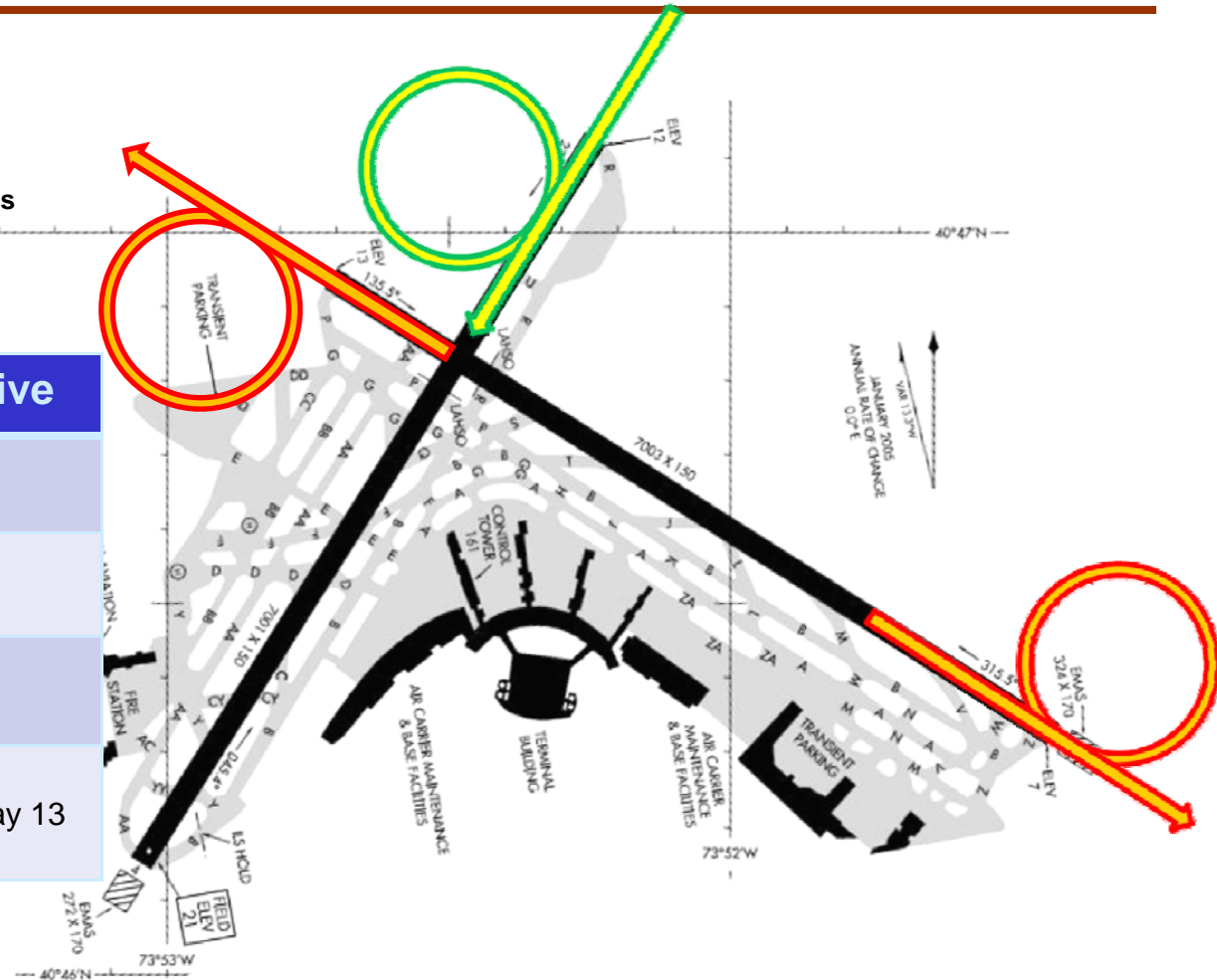
Hours	Runways Active
00:00 – 01:00	Departures – 22R, 13R Arrivals – 22L, 13L
01:00 – 09:00	Departures – 31R, 04L Arrivals – 31L, 31R, 04R
09:00 – 13:00	Departures – 22R, 31R, 31L Arrivals – 22L, 31L
13:00 – 18:00	Departures – 13R, 22R Arrivals – 13L, 22L
18:00 – 24:00	Departures – 22R, 13R Arrivals – 22L, 13L
Notes:	CESTOL midfield departures on Runway 04L use Taxiway H. CESTOL midfield departures on Runways 31L and 13R use Taxiway N.



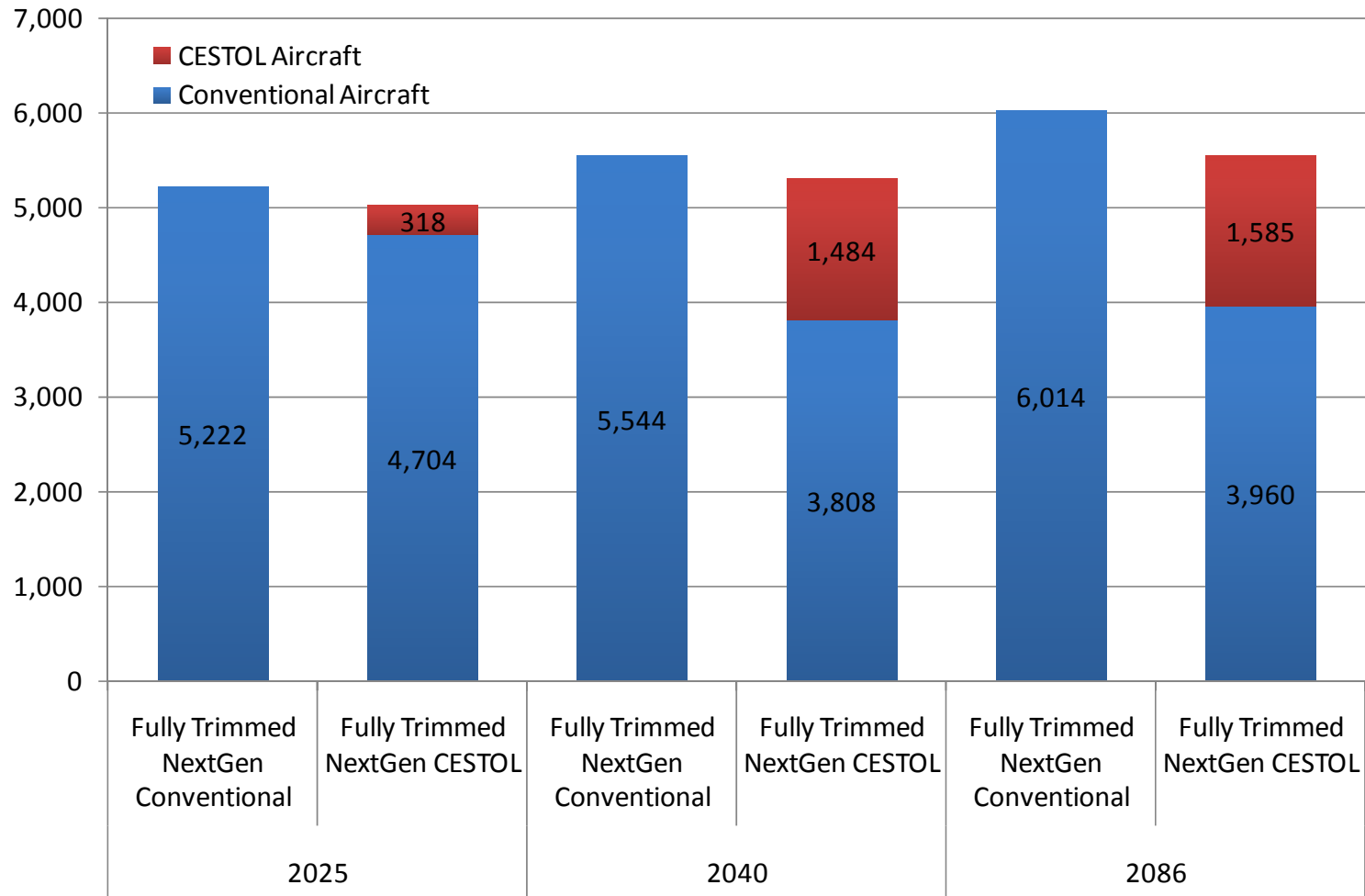
La Guardia (LGA)

-  Conventional Arrivals
-  Conventional Departures
-  CESTOL Arrivals
-  CESTOL Departures

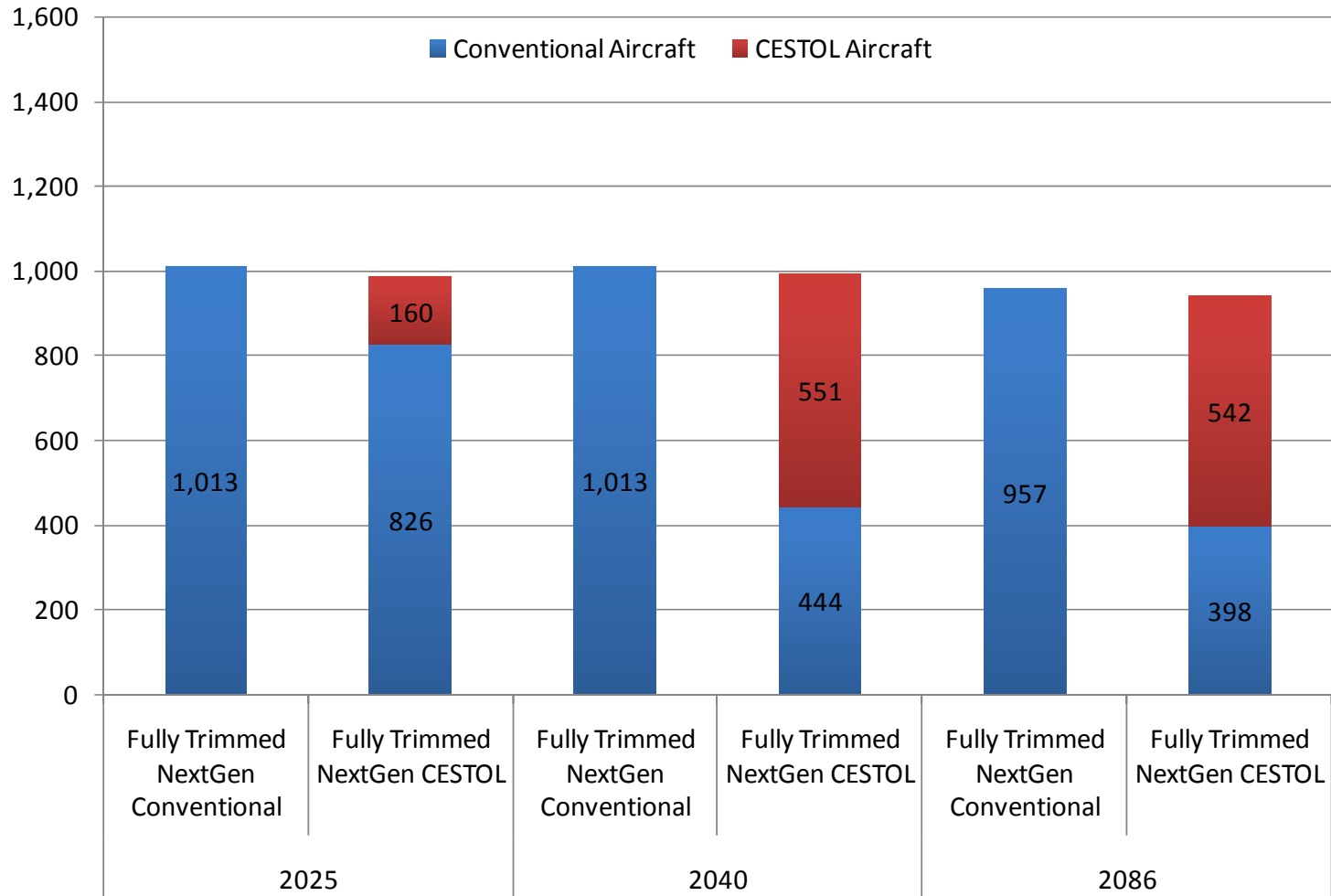
Hours	Runways Active
00:00 – 01:00	Departures – 13 Arrivals - 22
01:00 – 13:00	Departures – 31 Arrivals - 22
13:00 – 24:00	Departures – 13 Arrivals - 22
Note:	CESTOL midfield departures on Runway 13 use Taxiway T.



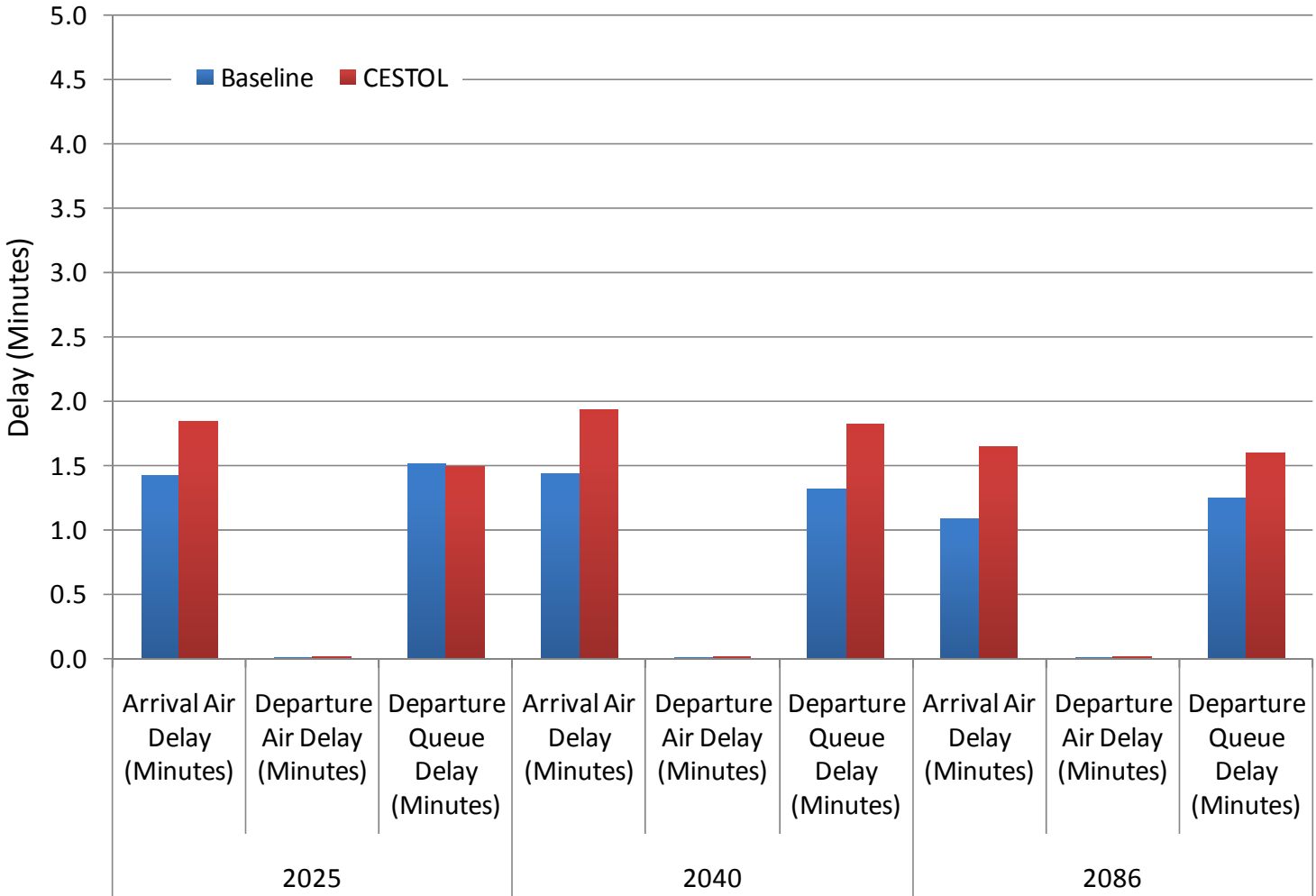
Metroplex CESTOL Demand



LGA CESTOL Demand



Average Delay at LGA



Next Steps

- Calibrate Current Day
- Comparison of Current Day to NextGen Airspace
- Comparison of Conventional Vehicle vs. CESTOL
- Comparison of Conventional Vehicle vs. VLJ
- Comparison of Conventional Vehicle vs. UAS
- Comparison of Conventional Vehicle vs. SST
- Comparison of Conventional Vehicle vs. Tilt-Rotor
- Off-nominal – Convective Weather
- Perform noise, fuel burn and emissions analysis on all of the above