



MIT  
International Center for  
Air Transportation

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# 4R Arrivals

## Noise comparison of peak day 2017 vs. 2010 *and*

## 24 deg offset RNP

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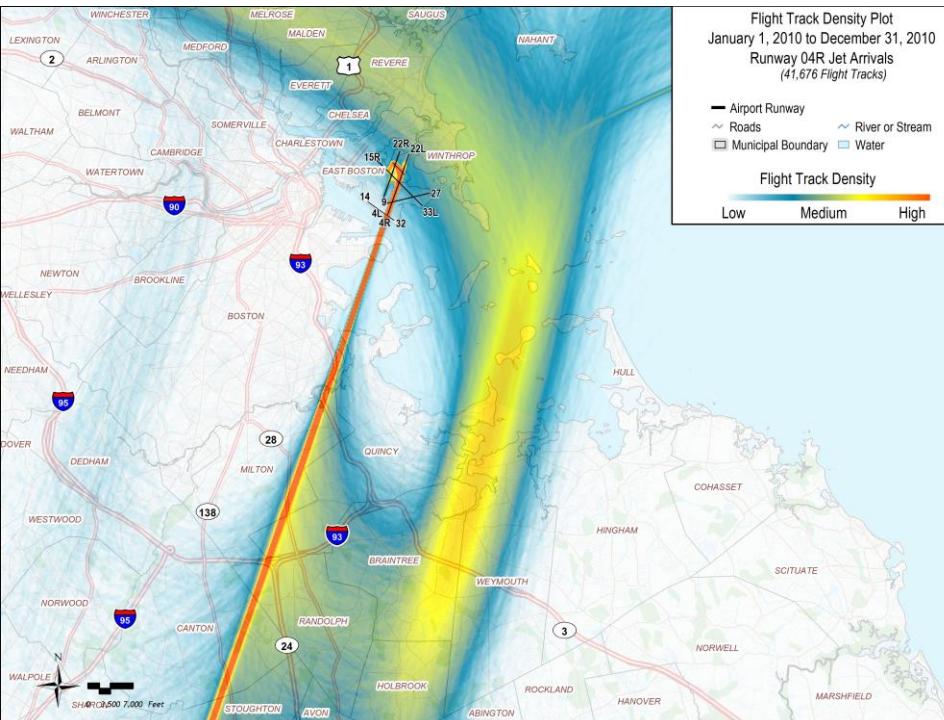
Technical support from MIT ICAT students, HMMH, and Massport



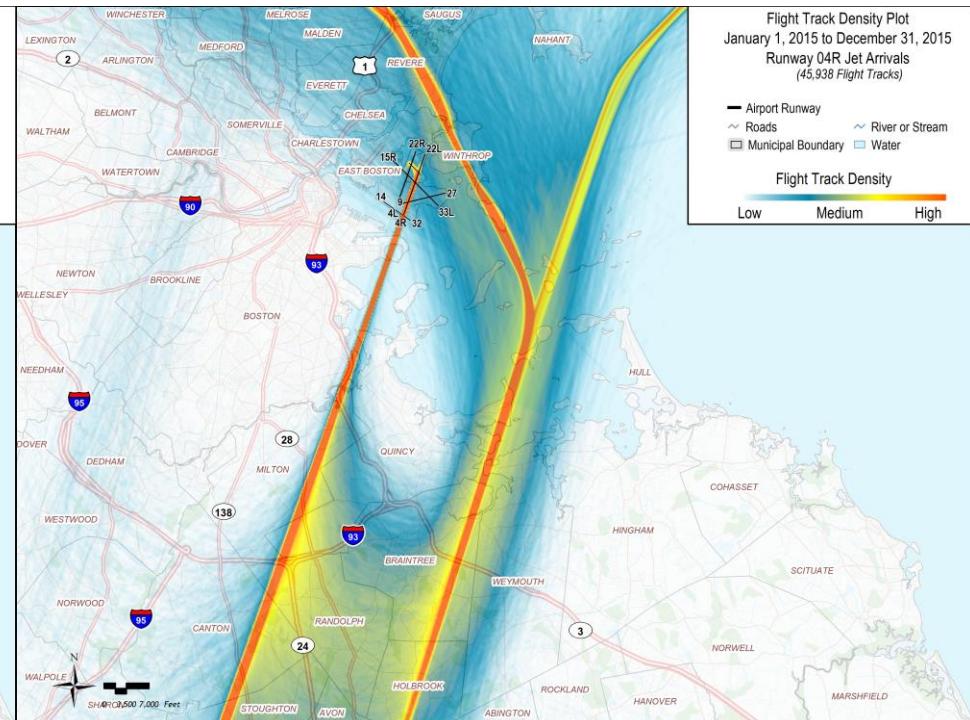
# Runway 4R Arrivals: 2010-2015

Pre/post RNAV tracks show concentration on downwind leg for 4R arrivals, but not on final approach

2010

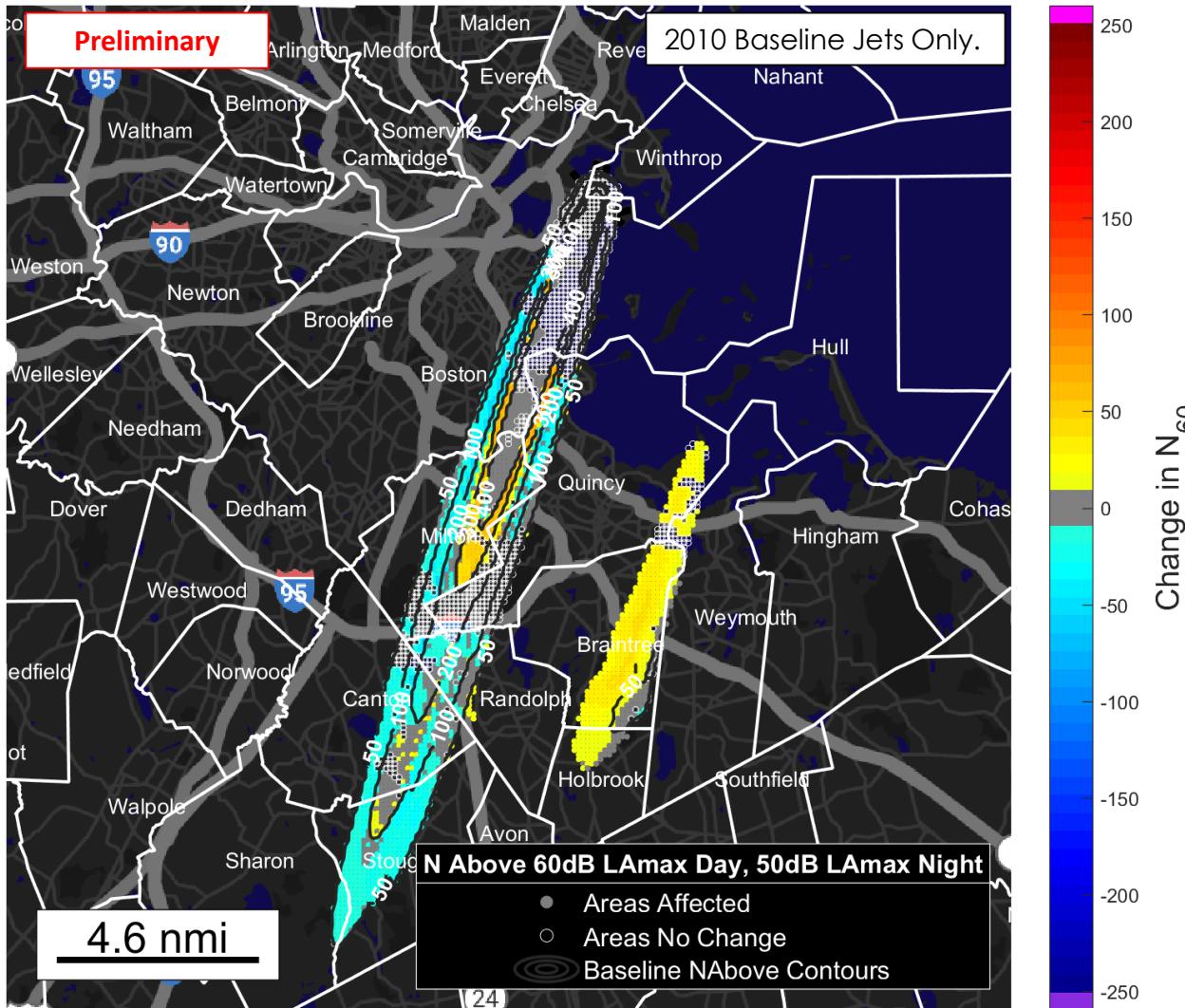


2015



# RWY 4R, Change in $N_{60}$ from Peak Day 2010 to Peak Day 2017

**Changes in  $N_{60}$  on final approach due to change in fleet mix (increase in average aircraft size, decrease in older aircraft) and on downwind leg due to track concentration**



Population Exposure	
$N_{60}$	> 50
Baseline 2010	94,842
2017	111,824
Difference	-16,982

2010 baseline

Change in  $N_{60}$  omitted in areas with no population.

Peak days: 6-10-2010 and 10-12-2017

Analysis includes change in fleet mix over the 2010 and 2017 peak days

Population exposure numbers updated 11/12/21 for refinement of grid modeling at analysis borders (outside of depicted region)

$N_{60}$  Thresholds:  
60dB L<sub>A,max</sub> Day, 50dB L<sub>A,max</sub> Night

# 2010 - 2017 Peak Day Fleet Mix Changes

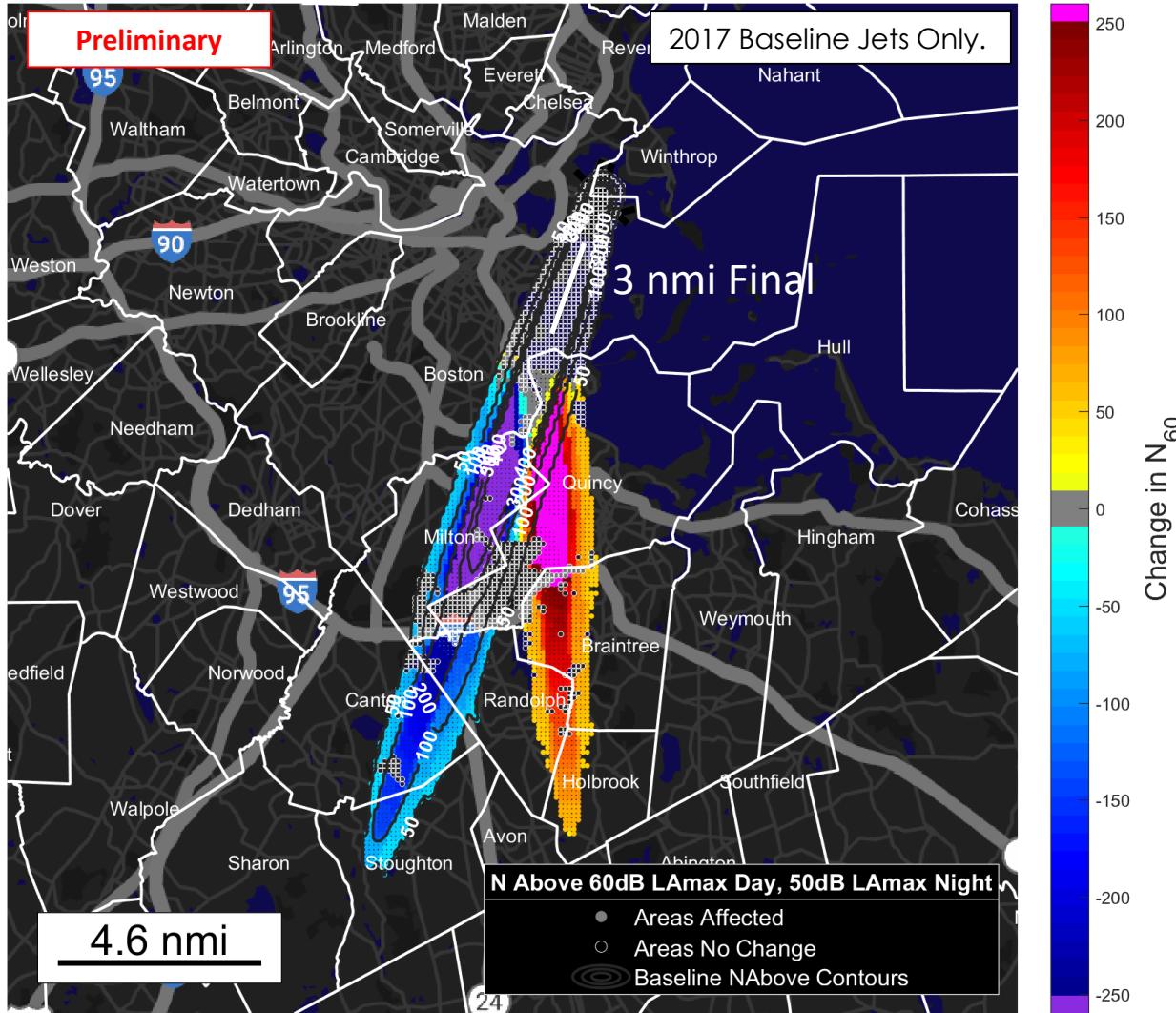
**Analysis of the fleet mix between 2017 and 2010 peak days shows a substantial reduction in small regional and older narrow-body aircraft, and an increase in larger narrow-body and wide-body aircraft**

Aircraft Bin Type (Representative Aircraft)	# of Flights on Peak Day 2010	# of Flights on Peak Day 2017	Difference
Twin-aisle (B777)	14	36	+22
B757 family (B752)	31	18	-13
A320 family (A320)	93	125	+32
B737 family (B738)	54	100	+46
Older jet (MD88)	40	18	-22
Large regional jet (E170)	91	123	+32
Small regional jet (E145)	117	13	-104
<i>Total</i>	<b>440</b>	<b>433</b>	<b>-7</b>

Peak days: 6-10-2010 and 10-12-2017

# RWY 4R, 24° Offset RNP with 3 nmi Final Change in $N_{60}$ Compared to 2017

Case study requested by MCAC, Milton



Population Exposure	
$N_{60}$	> 50
Baseline 2017	111,824
Recommended Procedure	125,990
Difference	-14,166

All jets assumed to fly 24° offset RNP

No base or downwind legs included in analysis

Modeling/Discretization effects near airport removed.

Change in  $N_{60}$  omitted in areas with no population.

Not all aircraft currently RNP-capable.  
Potential airline concerns with short final approach.

$N_{60}$  Thresholds:  
60dB L<sub>A,max</sub> Day, 50dB L<sub>A,max</sub> Night