Update to MCAC General Meeting

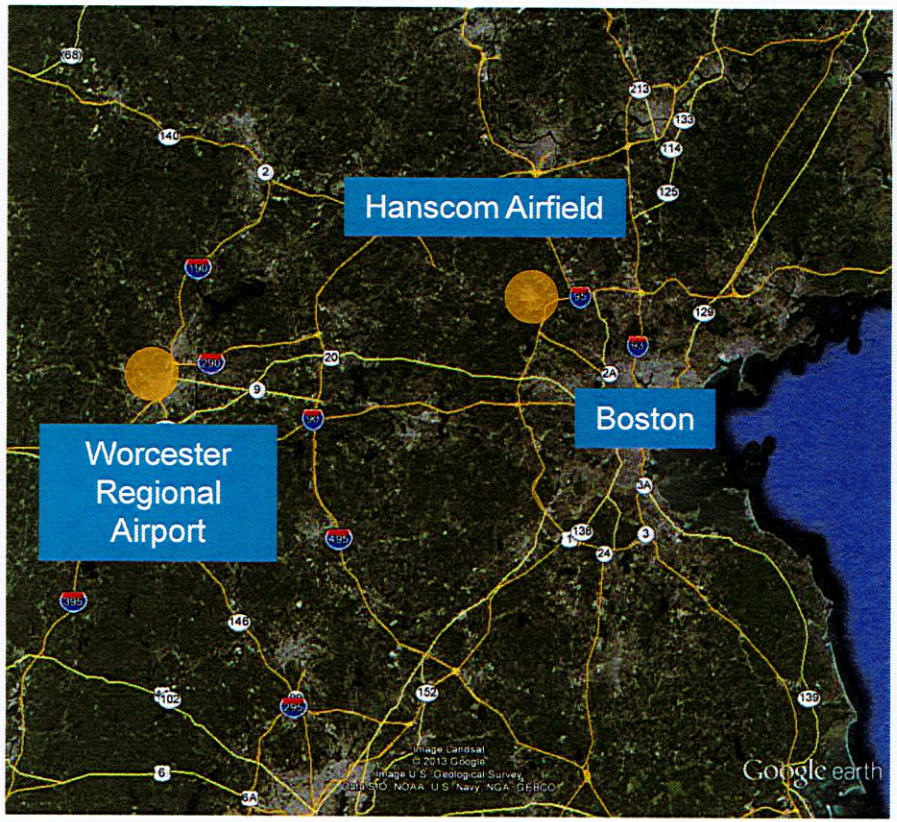
June 14, 2018

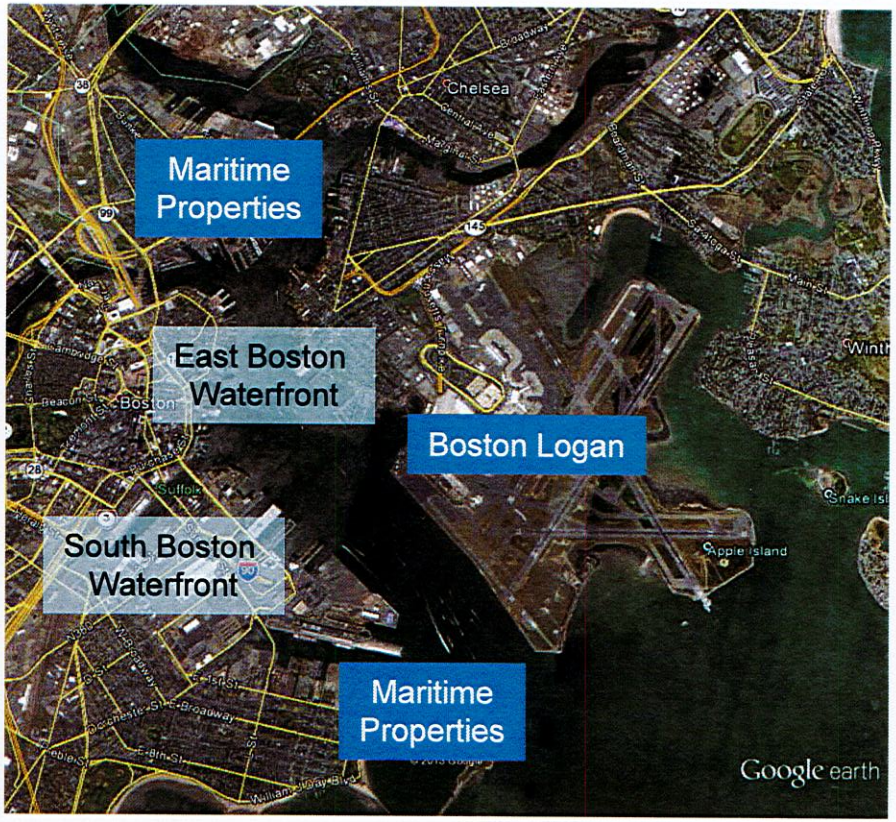
Agenda

- Massport Context
- Massport Airports
- Worcester Regional and Hanscom Field
- Boston Logan Overview and Update

Massachusetts Port Authority

- Independent State Authority
- Corporate Structure
- Self Sustaining Finances (no state/local tax revenue)
- Portfolio: Airports, Container and Cruise Port, Maritime Properties and Real Estate





Massport Owns and Operates Three Airports, Each with a Unique Role within the Regional and National Airport Systems

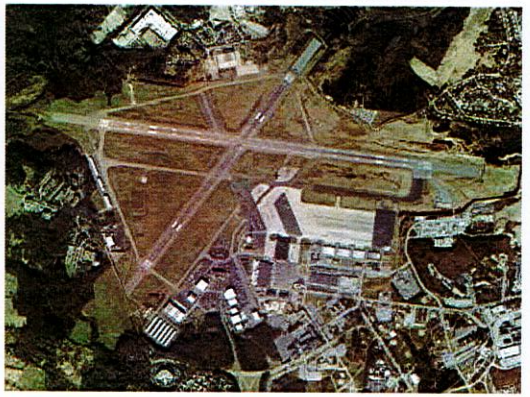
Logan International Airport

New England's Leading Commercial Service Airport and International Gateway

Worcester Regional Airport

A Multi-Use Corporate/ General Aviation and Commercial Service Airport

Hanscom Field



A Full-Service General Aviation Airport and Corporate Reliever for Logan Airport

Regional Transportation Status

- Regional Aviation System continues to serve New England
- Total regional air passengers increased from 48.8M in 2015 to 51.9 in 2016
- Passengers at regional airports:
  - Bradley Int'l – 6.06 million passengers in 2016
  - T.F. Green – 3.65 million passengers in 2016
  - Manchester-Boston – 2.02 million passengers in 2016
  - Worcester – over 500,000 JetBlue passengers to date
- Acela ridership (BOS-DC) has increased three fold since inception from 1 million in 2001 to 3.5 million in 2016
- In 2016, NEC ridership reached a new record, surpassing 2015 record levels. Amtrak carried more riders between New York City and Boston than all airlines combined

Worcester Regional Airport

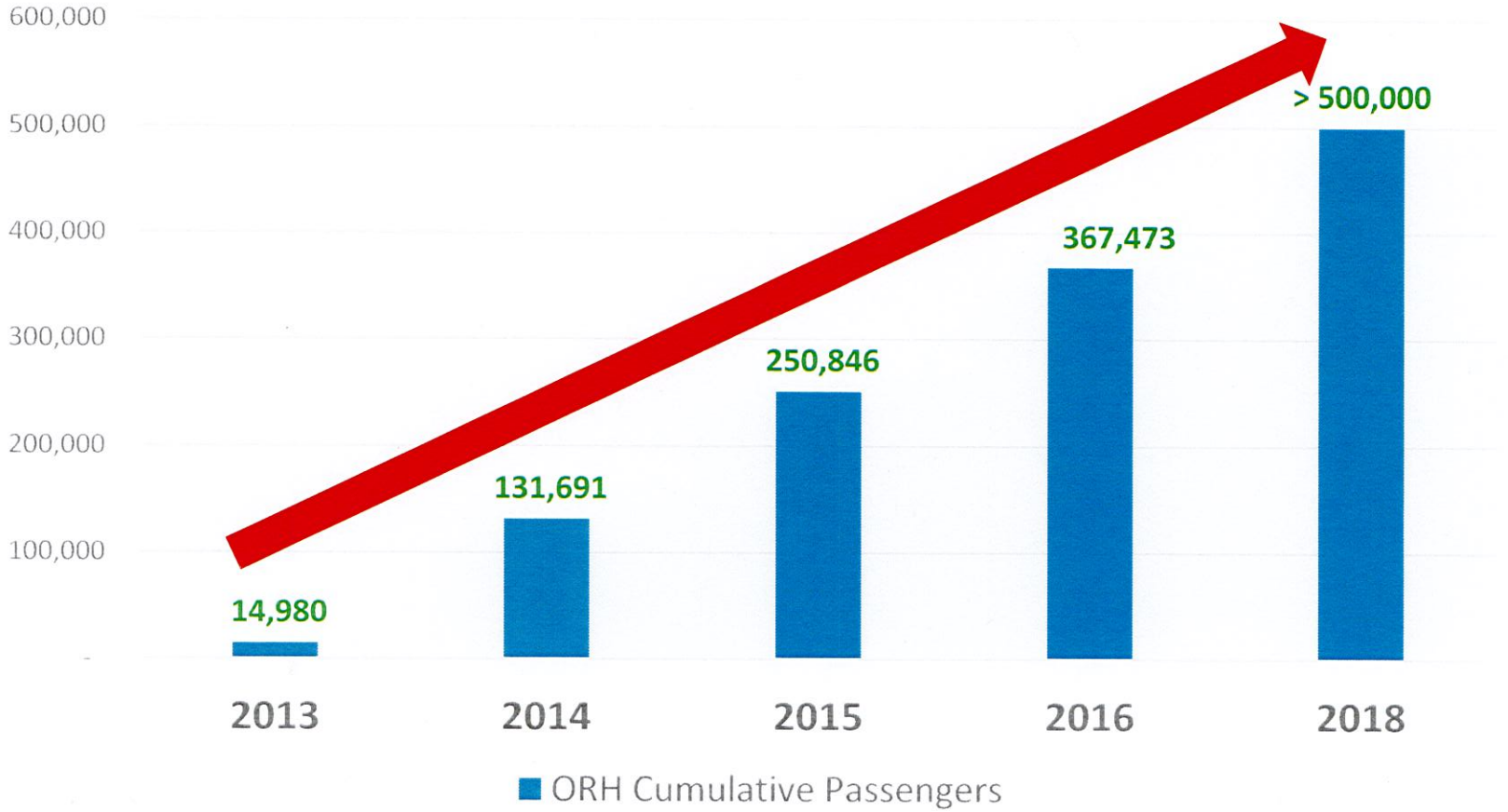
Massport investments in ORH totals approximately $150 Million

- Massport assumed ownership of Worcester Regional Airport on July 1, 2010 as part of the Transportation Reform Act.

Acquisition costs	$ 17 M
Cumulative Annual Operating Deficits	$ 70 M
CAT III Landing System	$ 22 M
New Taxiway	$ 10 M
Runway Resurfacing	$ 4.5 M
ARFF Building Renovation	$ 5.5 M
ARFF Emergency Vehicles	$ 1.2 M
Snow Removal Equipment	$ 3.4 M
Rectrix New FBO	$ 7.8 M

Successful Establishment of Commercial Service, (JetBlue and American)

Worcester has served a <u>cumulative total</u> of over 500,000 passengers since 2013

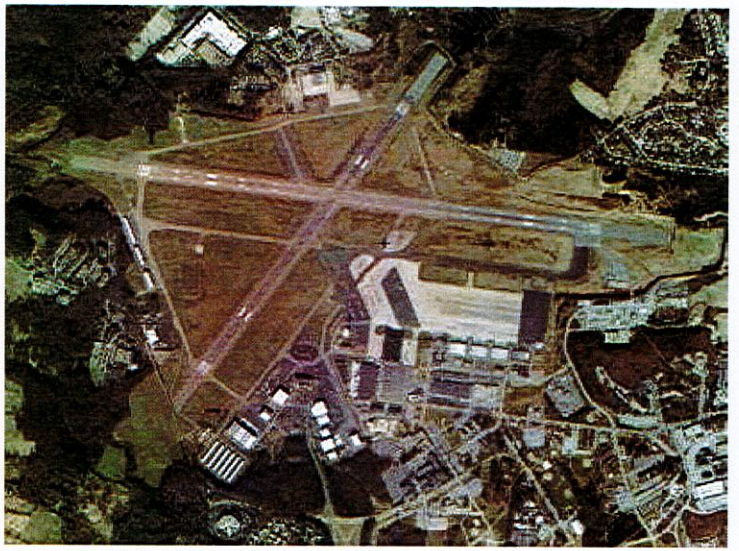


ORH CAT III ILS (Operational on March 19, 2018)

Hanscom Field

Hanscom Field plays a crucial role in the strength of the local economy

- $348 million in annual economic impact (2014)
- 1,745 full-time equivalent jobs related to Hanscom Airfield activity (2014)
- Close proximity to Route 128 (I-95) Massachusetts' Tech Highway
- Two runways - RW 5/23 and RW 11/29, which are 5,107 and 7,011 feet in length
- Three Fixed Base Operators

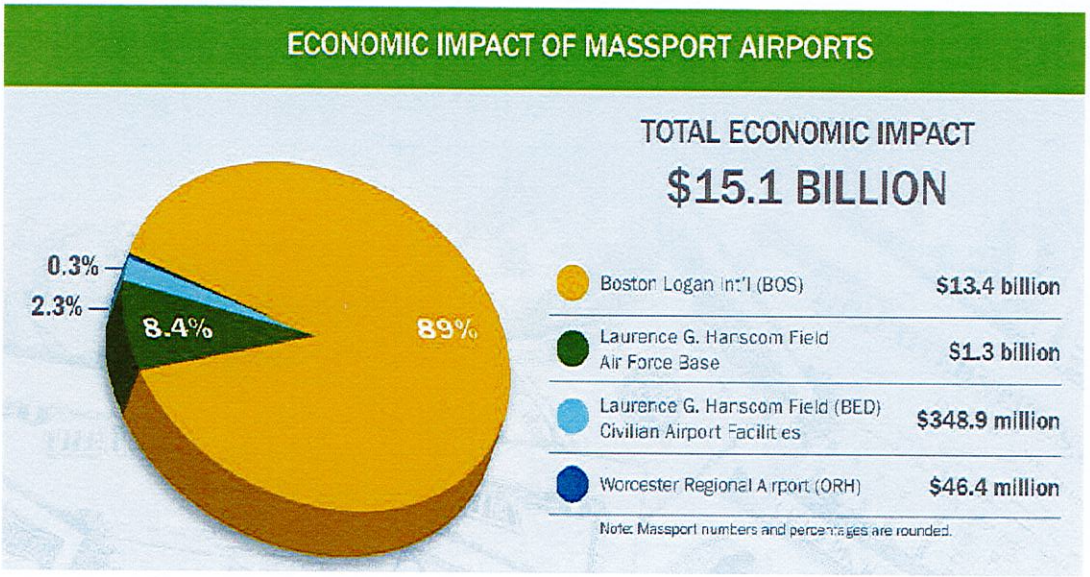


Source: *Annual State of Hanscom Report*, Massport, 2016

Logan Airport Update

Logan, Boston Region's Economic Engine

- Logan generates $13 Billion in annual economic impact
- Economic impact of new, nonstop international flights total $1.4 billion annually
- 17,000 direct jobs and over 100,000 indirect jobs



Key factors that under-pin air passenger demand at Boston Logan

1. The Boston Metro Area is a large, high income market area with low unemployment
2. The Boston Metro Area has a well-diversified, travel intensive economic base
3. 95% of Logan passengers are origin-destination (O&D) passengers
4. Logan is served by a well-diversified mix of airlines

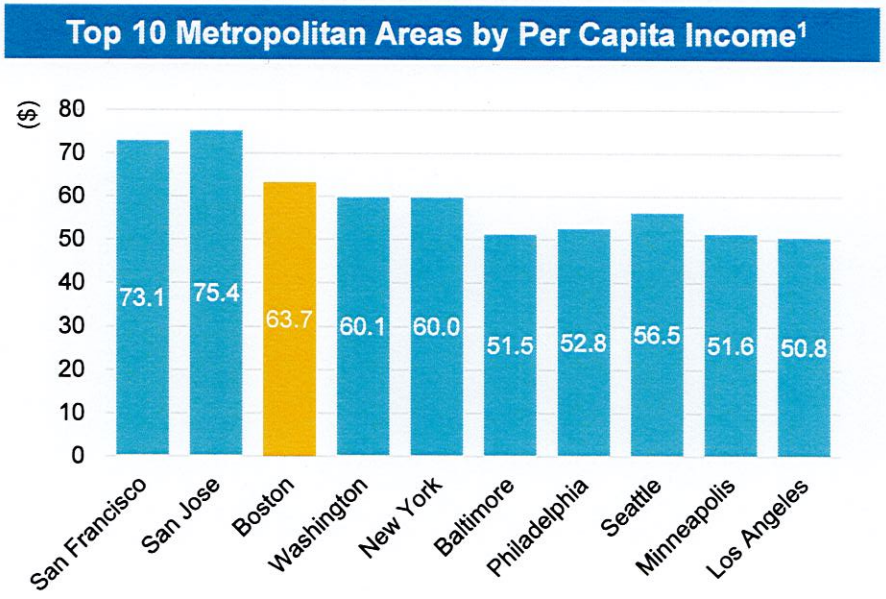
Boston's per capita personal income is the 3rd highest in the U.S.

Large and Stable Population:

- The Boston Metro Area is the 10th largest by population – 5.7 million
- Accounts for approximately 84% of Massachusetts' total population.

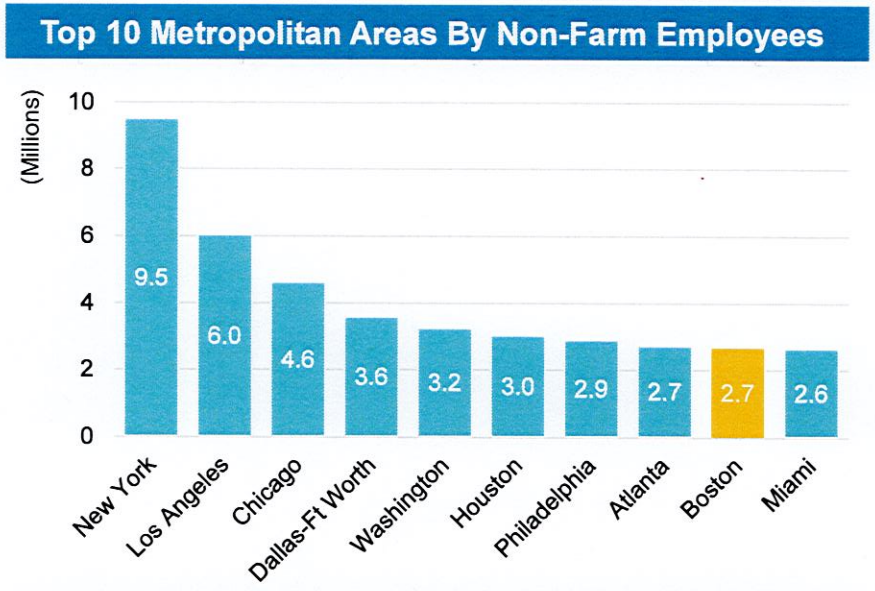
High Income:

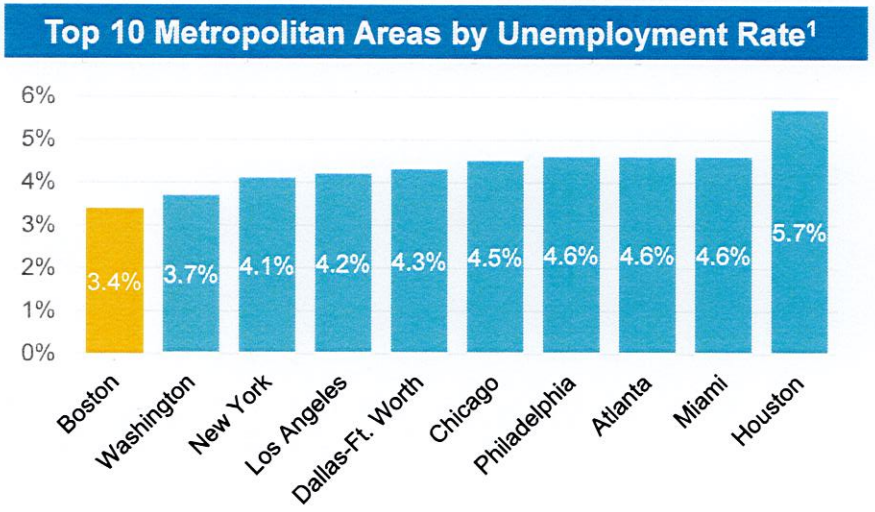
- Boston's per capita personal income is the 3rd highest in the U.S.



Sources: U.S. Department of Commerce, Bureau of Labor Statistics
[1] As of December 2016

Logan serves an economically vibrant service area





Sources: U.S. Department of Commerce, Bureau of Labor Statistics
[1] As of March 2017

Strong Employment Base:

- 9th largest employment base in the U.S.

Low Unemployment[1]:

- Lowest unemployment rate among top 10 Metro Areas
- Consistently below national average at 3.4% compared to 4.5% for the U.S.

Boston Logan Statistics (2017)

- Total Passengers : 38.4M
- Int'l Passengers: 7.2M
- Cargo: 680 Million LBS
- Flights (takeoffs & landings): 401,000

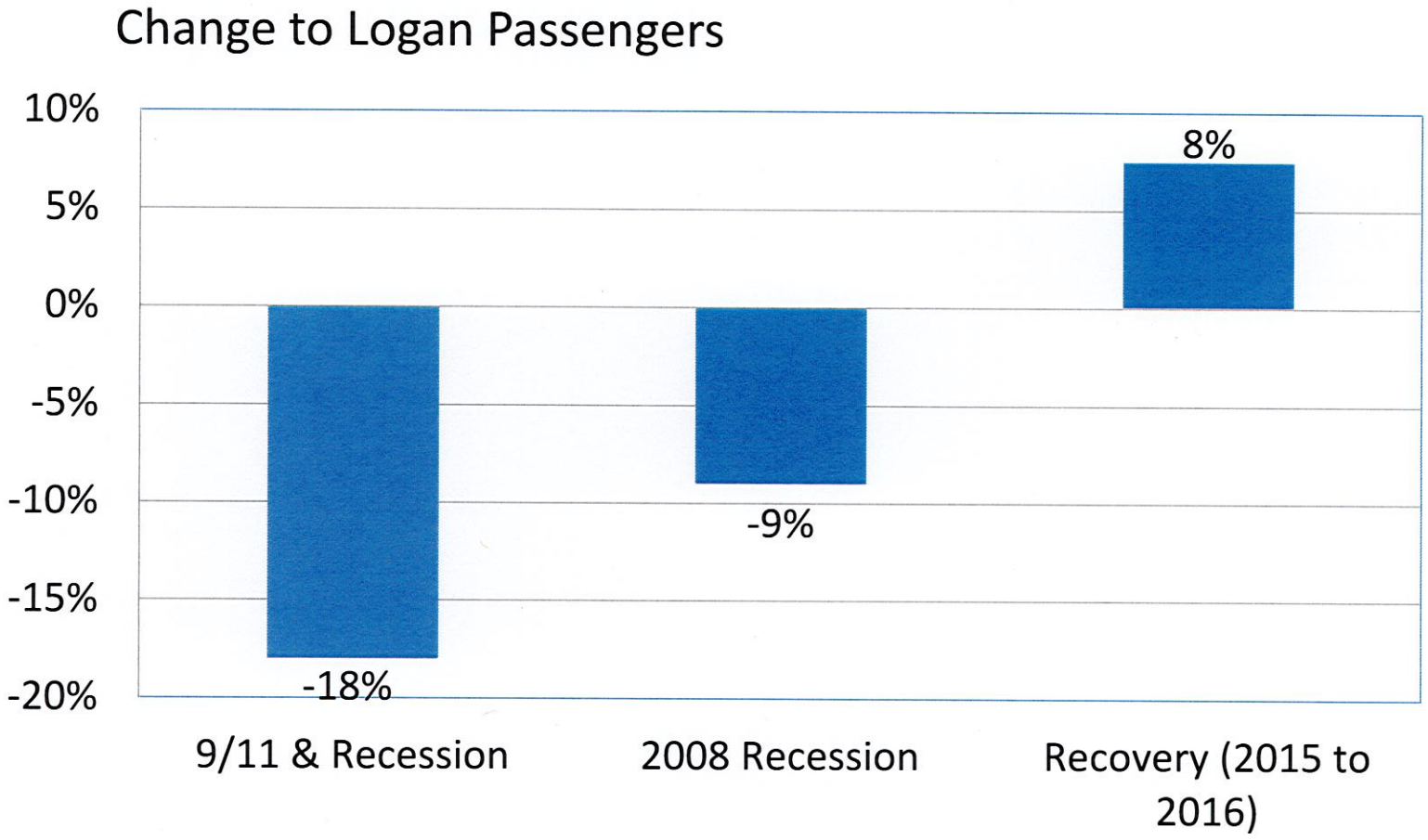
How Boston's Airport Bounced Back From the Storm That Crippled J.F.K.

Snow plows in waiting at Boston Logan International Airport. Though the same January storm hit Boston and New York, the cities' airports had very different outcomes.

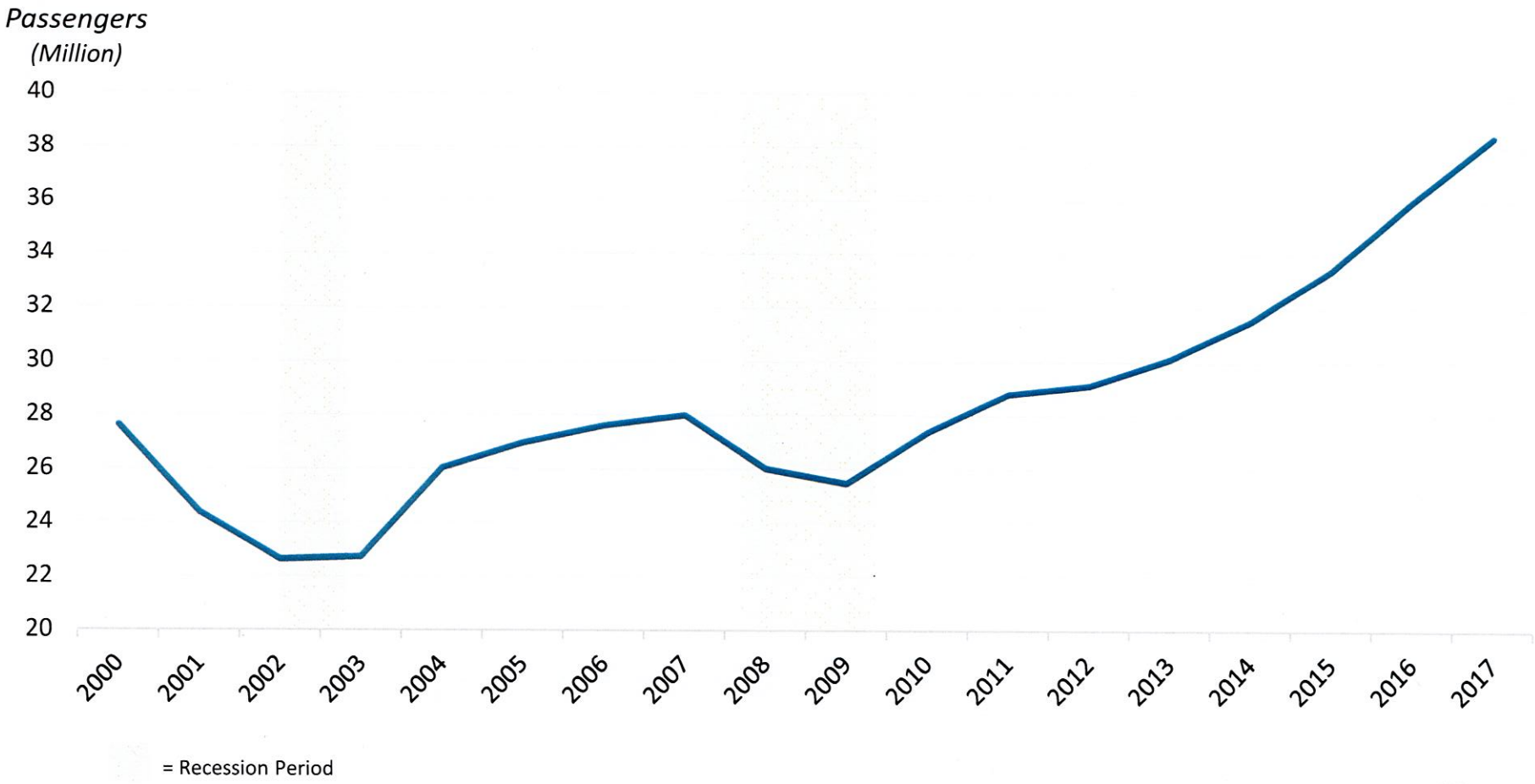
M. Scott Brauer for The New York Times

By Patrick McGeehan

Logan's passenger demand is highly correlated to economic conditions and other socio-economic factors



Logan's passenger forecast is dependent on continued economic conditions. The 2017 ESPR will provide a more detailed forecast…



Continued growth in aviation demand will be dependent on economic conditions… For example, oil prices have been on the rise since hitting a low in June/July 2017

THE WALL STREET JOURNAL.

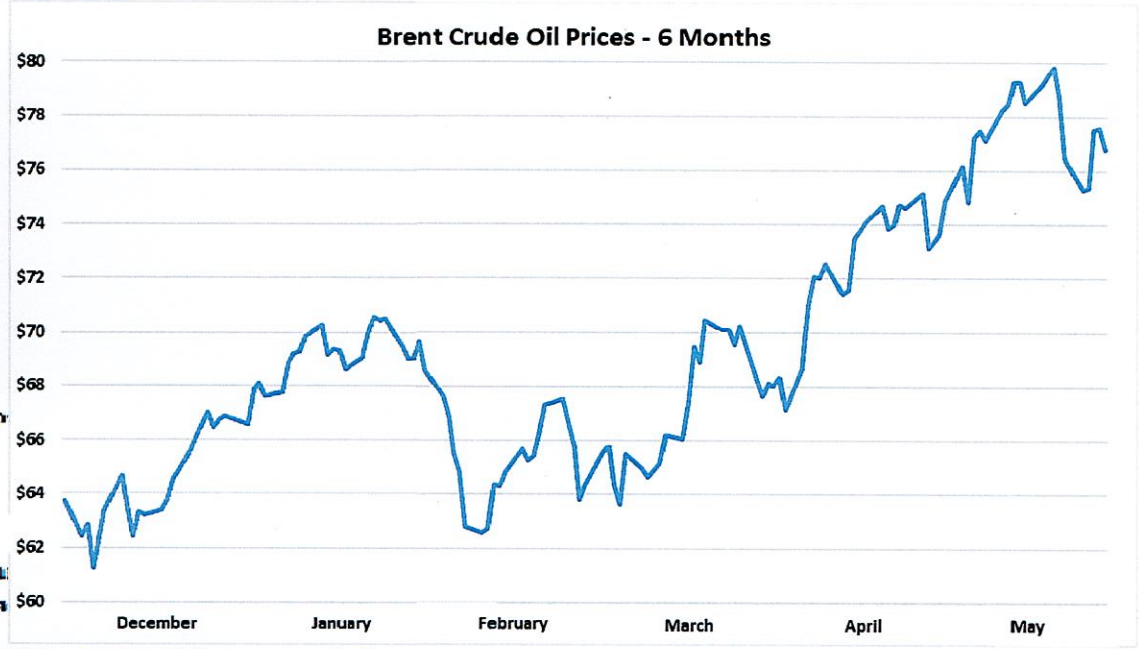
Airlines Raise Ticket Prices as Fuel Costs Surge

Oil is again the largest expense for most airlines prompting higher domestic fares, surcharges on international flights

Investors are concerned about the impact of fuel prices on airline profits. PHOTO:

By Doug Cameron and Alison Sider
Updated June 6, 2018 4:01 p.m. E.T

Jet-fuel prices have surged more than 50% over the past yea
and Delta Air Lines Inc. DAL +1.89% ▲ to cut its profit expecta



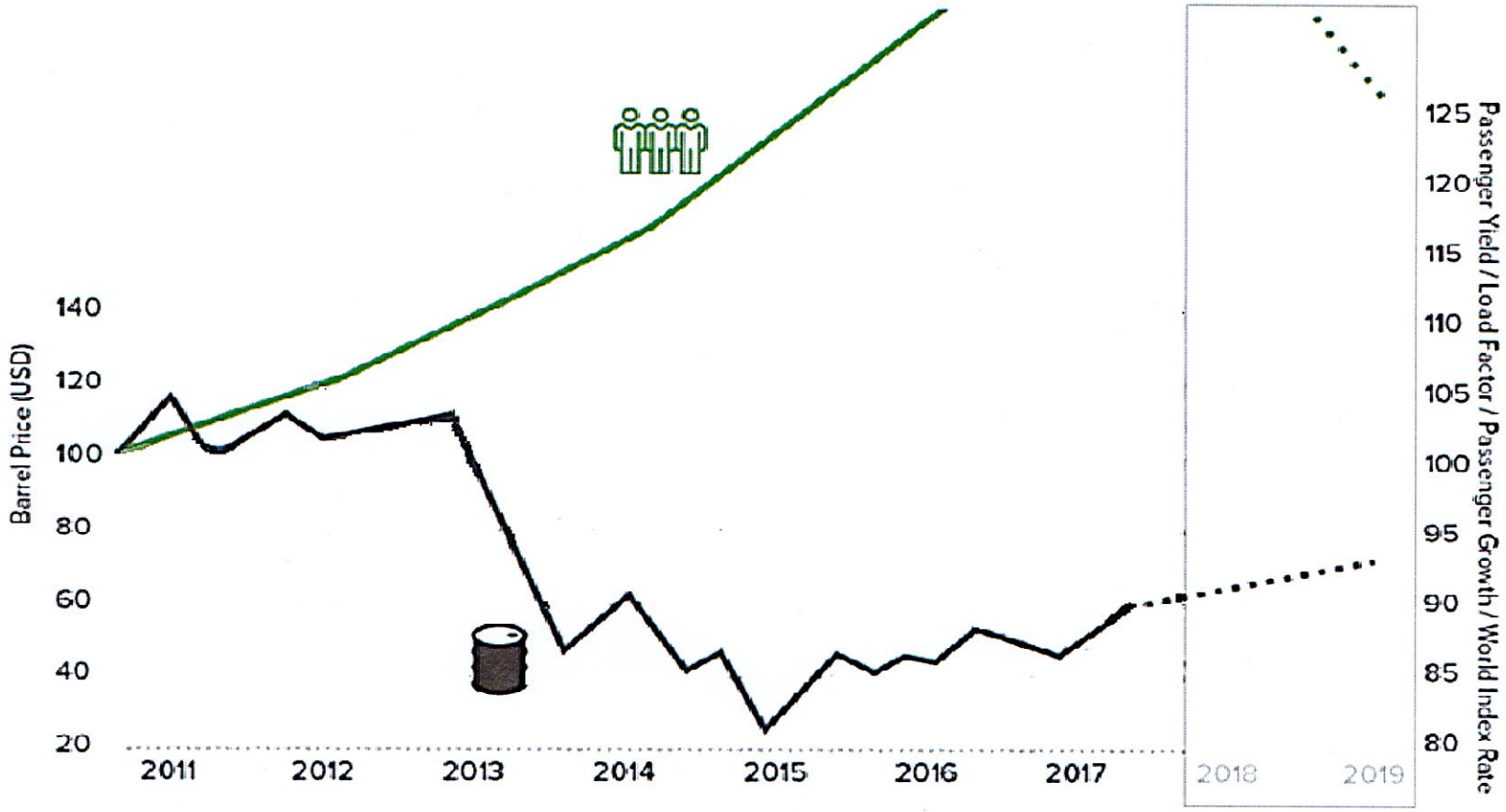
Delta, the nation's No. 2 carrier, said Wednesday it could take six to 12 months to recoup the extra fuel costs via pricier tickets.

Fuel is again the single largest expense for most airlines, accounting for about a quarter of operating costs. The recent run up in prices echoes the jump seen from 2005 to 2011, which first spawned stand-alone surcharges on many international flights.

Oil Prices vs PAX – As oil prices are projected to rise, passenger growth is projected to decrease

THE LINES CONVERGE. AS OIL PRICES RISE, THE FUNDAMENTALS BEGIN TO CONVERGE IN 2018

SOURCE: CAPA – CENTRE FOR AVIATION, IATA, OILPRICE.NET, THE ECONOMIST



GRAPHICS KEY

Passenger Growth

Oil Barrel Price

Aviation Industry Trends

Safety and Security	Geopolitical Changes: Impact on international air travel; Terrorism: Adapting to new terrorism techniques, Homegrown Violent Extremists, aviation continues to be soft target
Increased Demand	Strong US economy and growing economies globally, growing populations, reduced prices
Cargo	Rebounding market, particularly in Asia
Airline Economics	Decline of fuel/energy prices, industry consolidation, high load factors and capacity growth in ASMs (available seat miles)
Reduced Ticket Prices For Passengers	Airline cost reductions, Low Cost Carriers (LCCs) / Ultra Low Cost Carriers (ULCCs) driving down base fares, hub and spoke model
Technology	Enhancing customer service, new and more efficient aircraft, navigation, security/cybersecurity
Airport Access Landside Trends	Introduction of TNCs and EVs, and future AVs

Safety And Security Is The Number One Priority At Logan Airport

MASS LIVE

BOSTON NEWS - MASSLIVE.COM

Boston Logan one of the safest airports, TSA director says

Comment Posted on August 18, 2017 at 7:03 AM

(Wikimedia)

110
shares

By **Michelle Williams**, Michelle.Williams@masslive.com

Safety is the top priority for Transportation Security Administration employees and Boston is doing well, according to the new director of the TSA.

David Pekoske visited Boston Logan International Airport on Thursday.

Airport security effectiveness is our number one job," he told Boston 25, a job Boston officials are doing well.

"Boston has a long history of being on the leading edge of security and being one of our very best airports for partnerships across the board," he told the television station.

Influence of Technology – Passenger Processing

- Customer service and passenger process – Airport Operators and Airlines
  - Emerging technologies for automated processes such self check-in on mobile devices and kiosks for bag tags—reducing processing time by up to 30 percent
  - Integrating flow of information to and from stakeholders (such as reserving parking) – importance of cybersecurity
- Security Aspects – TSA Passenger/Baggage Screening
  - Automated Screening Lanes (ASLs) and explosive detection integration (CT Scanner)
  - Biometrics to automate verification (piloting)

Influence of Technology – Aircraft and Equipment

- The aviation industry is embracing technology and it is improving what is being flown and how:
  - Aircraft
    - Longer range
    - Quieter
    - Lower emissions
    - Right-size seat capacity for market
    - Opens new markets
    - Lower threshold for profit
  - Navigation

Modern, Efficient Aircraft
C-Series
737-MAX
A321-NEO
A350
777
787

2016 EDR

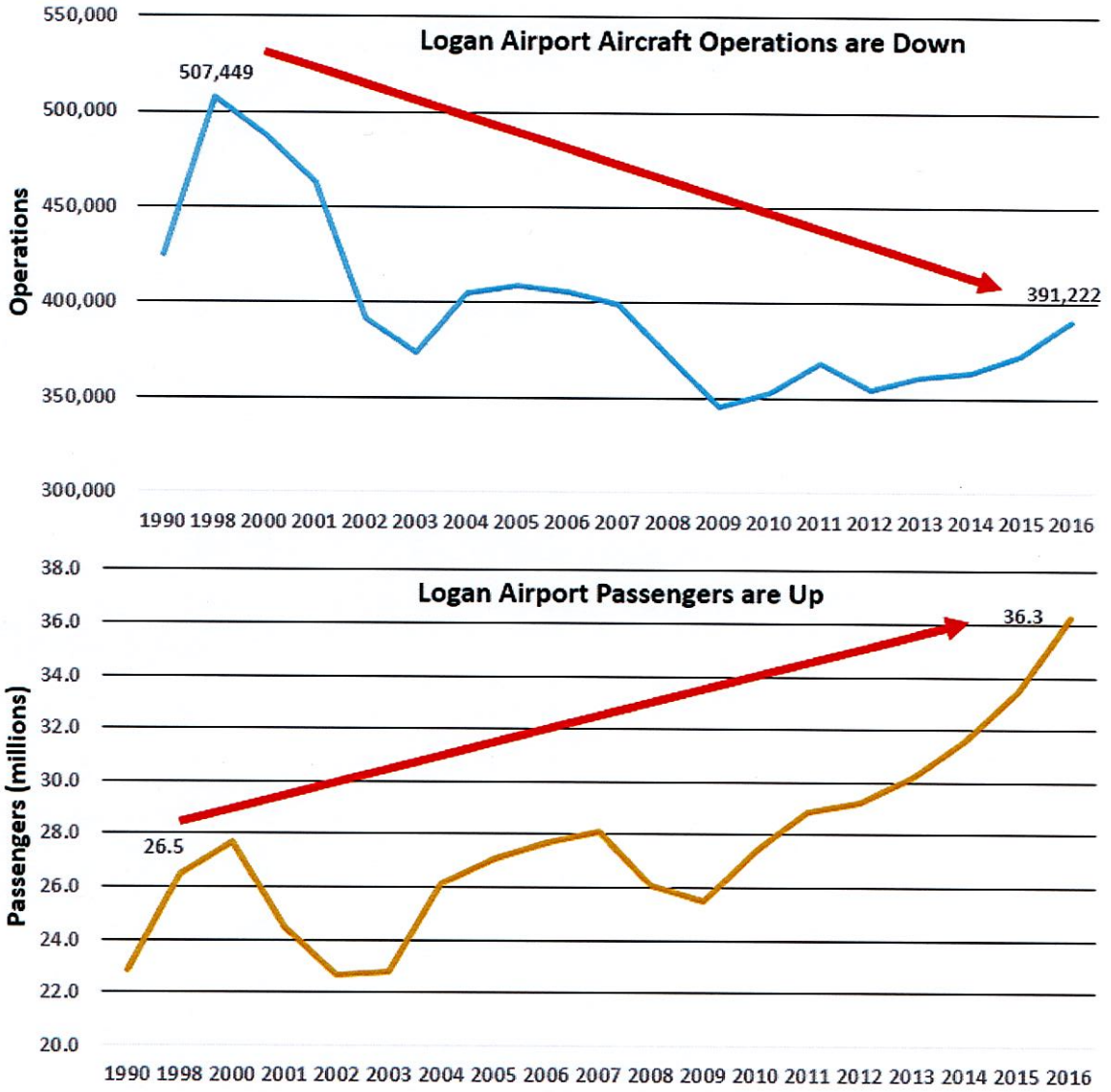
For over 30 years Massport has prepared the longest detailed tracking of cumulative environmental impacts of any US airport

- Provides detailed data on Logan Airport, planning, projects, ongoing studies, mitigation status and annual environmental conditions
- Analyzes cumulative effects of Logan Airport operations and activities
- The EDR/ESPR process was developed to allow individual projects to be considered in the broader Airport-wide context

Environmental Data Report
EDR Outline

- Introduction/Executive Summary *(English/Spanish)*
- Activity Levels *(passengers, aircraft, cargo)*
- Airport Planning
- Regional Transportation
- Ground Access to and from Logan Airport
- Noise Abatement
- Air Quality/Emissions Reduction
- Water Quality/Environmental Compliance and Management
- Project Mitigation Tracking

Logan Continues to Handle Increased Passengers with Reduced Operations



Projects Status

- Terminal E New Large Aircraft Wing *(complete)*
- Terminal E Modernization *(Final Design)*
- Logan Parking Project *(Permitting)*
- Runway 4R Light Pier Replacement *(Complete)*
- Terminal B Optimization *(Construction)*
- Terminal C Optimization and Roadway Improvements *(Planning)*
- Convenience and Filling Station, Transportation Network Company (TNC) and Taxi Pool Relocations *(final design)*
- Runway Incursion Mitigation (RIM) Study *(Nearing Completion)*
- Automated People Mover (APM) *(Feasibility)*
- Piers Park II *(Design)*
- Piers Park III *(Feasibility)*

Massport Airports Contributing to Regional Air Transportation System

- Worcester Regional Airport's role is growing
  - Massport is investing $100 million over 10 years to revitalize and grow ORH commercial operations
  - New Category III Instrument Landing System will significantly improve ORH's all-weather reliability (*Opened March 2018*)
  - JetBlue has already served over 500,000 ORH passengers
  - JetBlue service to La Guardia started May 2018
  - American Airlines service to Philadelphia recently announced
- Hanscom Field, 2nd busiest New England airport *(2017: 128,598 ops)*
  - Premier general aviation airport
  - Reliever to Logan Airport
  - Rectrix FBO open
  - New Jet Aviation FBO now open

Ground Access to Logan

- HOV Mode Share to Logan grew from 28% in 2013 to 30.5% in 2016
- Logan Express Bus ridership increased by 42,665 from 2015 to 2016
- Rental Car Center Consolidated bus fleet
- Bus & Limousine lots relocated
- Free Silver Line boardings at Logan Airport continue (since June 2012)
- Long-Term Parking Management Plan has a comprehensive approach to parking operations and supply – the *2016 EDR* includes current status.

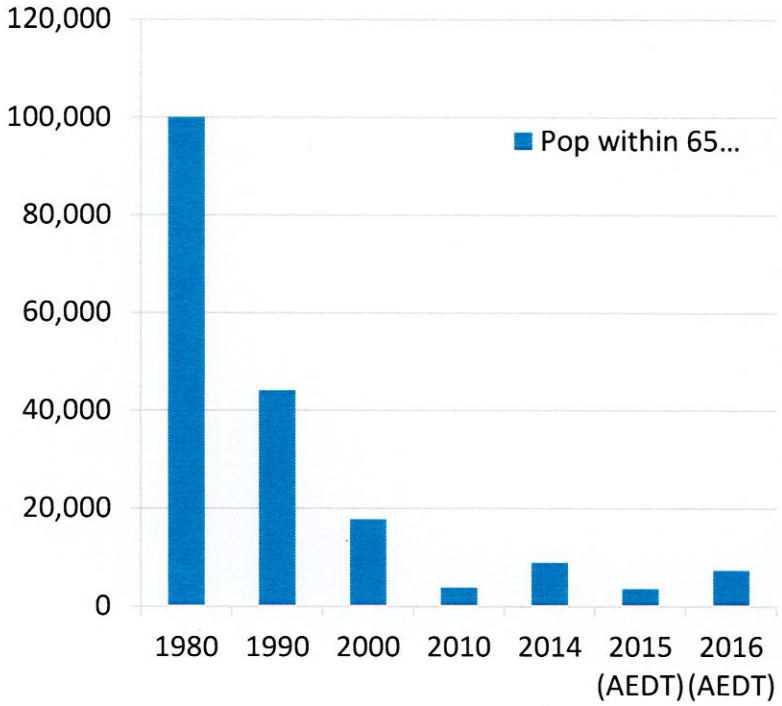
Over 97% of Logan's Fleet is Stage 4 or Better – With about 18% Meeting FAA's Latest Stage 5 Standard

Table 6-2 Percentage of Commercial Jet Operations by Part 36 Stage Category[1]

Year	Stage 5 Requirements[5]	Stage 4 Requirements[2]	Certificated Stage 3	Recertificated Stage 3[3]	Stage 2 Greater than 75,000 lbs.	Total
1990	N/A	N/A	51.1%	0.0%	48.9%	100%
2000	N/A	N/A	70.0%	21.0%	9.0%	100%
2010	N/A	93.2%	4.7%	1.1%[4]	0.0%	100%
2011	N/A	95.5%	4.0%	0.5%[4]	0.0%	100%
2012	N/A	95.8%	4.1%	0.1%[4]	0.0%	100%
2013	N/A	97.4%	2.6%	0.0%	0.0%	100%
2014	N/A	97.4%	2.6%	0.0%	0.0%	100%
2015	N/A	96.7%	3.3%	0.0%	0.0%	100%
2016	17.8%[6]	79.2%	3.0%	0.0%	0.0%	100%

Source: Massport's Noise Monitoring System, Revenue Office and HMMH, 2017.

Over the long term, Logan Airport's Noise and Population within 65 dB DNL contour dramatically reduced compared to 1990



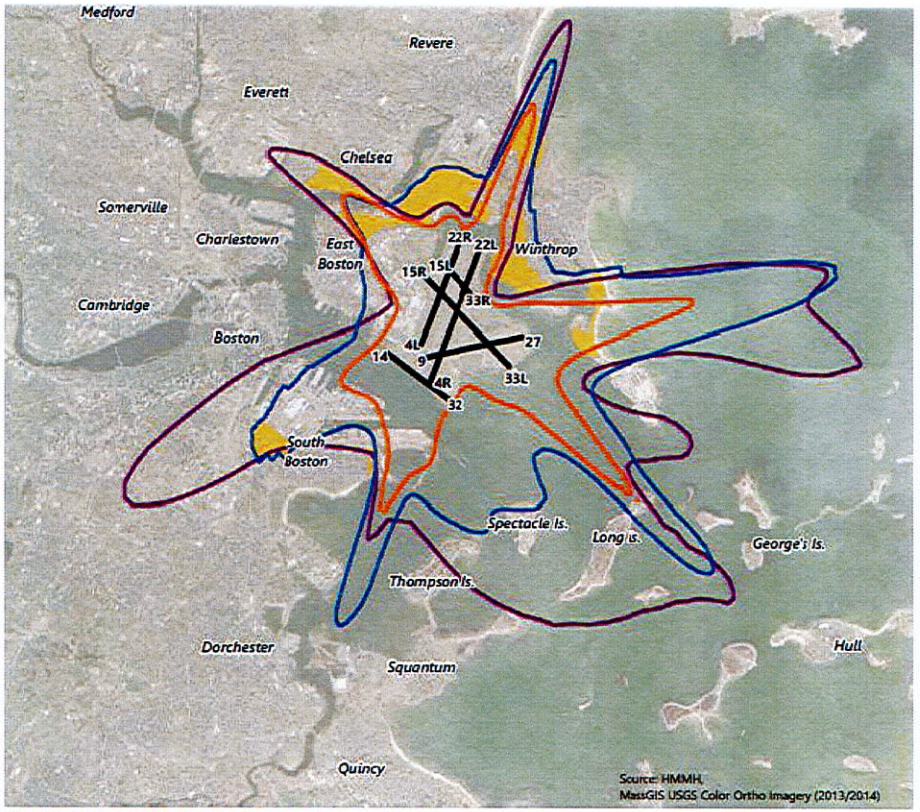


FIGURE 1-13 DNL 65 dB Contour Comparison with Historical Contour

2016 Environmental Data Report

Massport has Implemented Many Programs to Reduce Emissions

Logan Express Improvements:

- Logan Express Back Bay/MBTA Discount
- Braintree Facility Purchase
- Framingham Garage
- Curbs Realignment for HOV priority
- 2:15 am Service (22 hours a day)
- Vacation discounts

Sustainability Measures:

- Renewable Power (solar/wind)
- LEED Buildings
- Energy & GHG Goals
- EV Infrastructure (cars & GSE)
- Energy Efficiency Upgrades

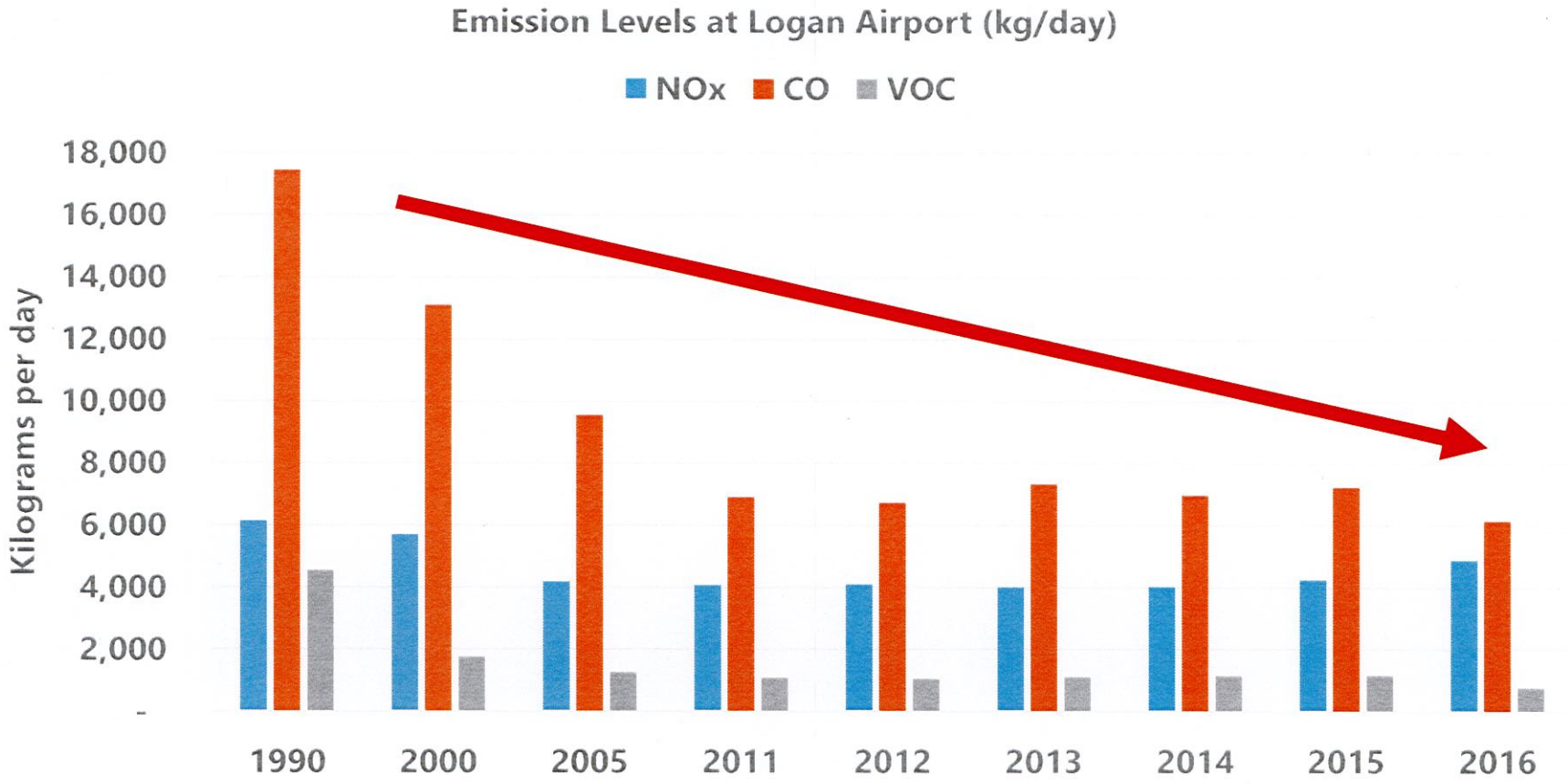
Silver Line HOV Improvements:

- 2005 Purchase of 8 Silver Line Buses
- Mid-Life rehab of 8 Silver Line Buses
- Operating subsidy to T for SL1
- Subsidy for Free inbound SL1
- New SL3 route to Chelsea

Other Improvements:

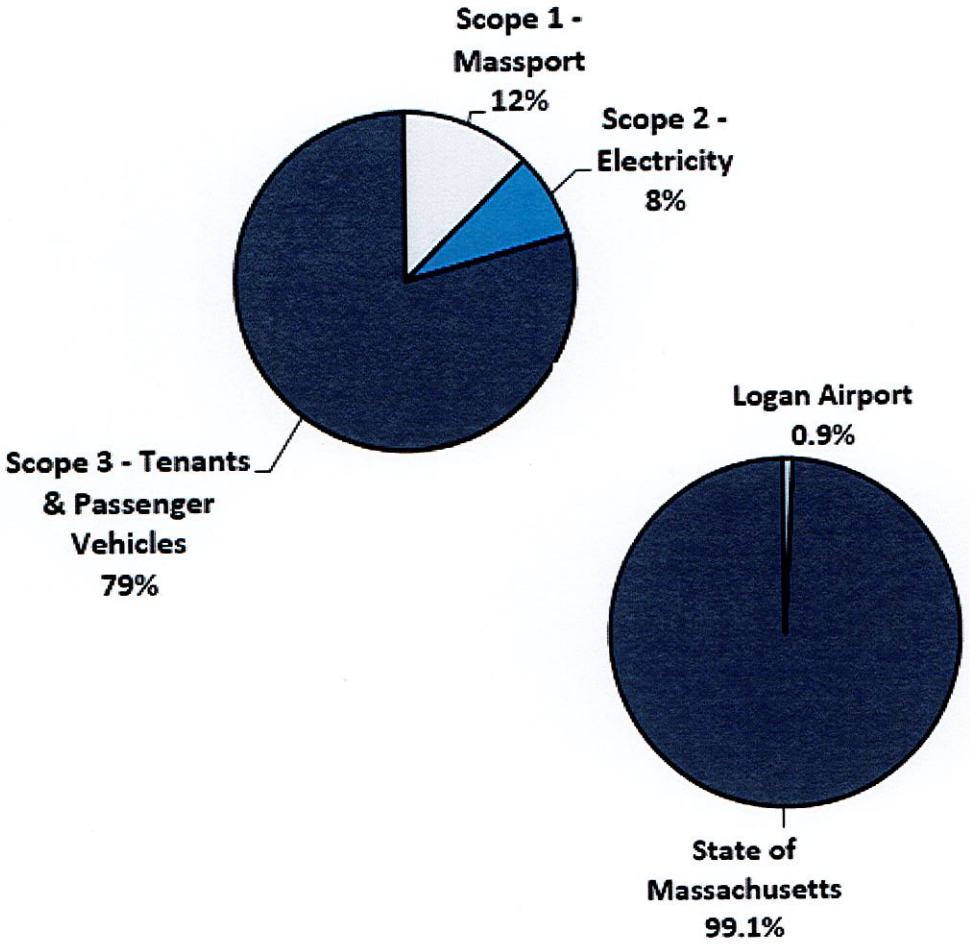
- Unified Bus system reduced 100 shuttle trips/hour to 30 shuttle trips/hour
- Massport hybrid/CNG shuttle buses
- Private bus – marketing – signage campaign
- Water Shuttle Subsidy – Shuttle Bus continued

Long Range Trend of Reduced Emissions



Logan GHG Emissions
Remain Less than 1% of Statewide Totals

- 0.65 MMT of GHGs emitted in 2016 <1% of state-wide total (compared to 0.63 MMT in 2015)
- Massport controlled emissions (Scope 1) remain at 12% of the total Logan GHG emissions in 2016



Massport Has Extensive Sustainability and Resiliency Programs

- Massport is focused on a holistic approach – ensuring Economic viability, Operational efficiency, Natural resources conservation, and Social responsibility
- Massport released its 2nd *Sustainable Massport Report* in April 2018, which provides a progress summary of sustainability efforts at Logan Airport
- Extensive Massport-wide Resiliency Goals
  - Vulnerability Assessment for key facilities
  - Floodproofing Measures
  - Assessing next steps

Review Schedule for the 2016 EDR

- **May 15, 2018** 2016 EDR filed with MEPA Office
- **May 23, 2018** 30 day Public Comment Period Commences
- **June 12, 2018** Public Information Meeting at the Logan Rental Car Center
- **June 22, 2018** **MEPA Comment period closes**
- **June 29, 2018** Secretary's Certificate/Scope for *2017 ESPR* Issued

Submit Comments By June 22nd To:

Secretary of Energy and Environmental Affairs
Executive Office of Energy and Environmental Affairs (EEA)
Attn: MEPA Office
Anne Canaday, EEA No. 3247
100 Cambridge Street, Suite 900
Boston MA 02114

Massport and FAA RNAV Study
Update to Massport CAC

Block 1 Ideas Overview

FAA Technical Team Internal Meetings Ongoing Includes Visit to Boston TRACON in May

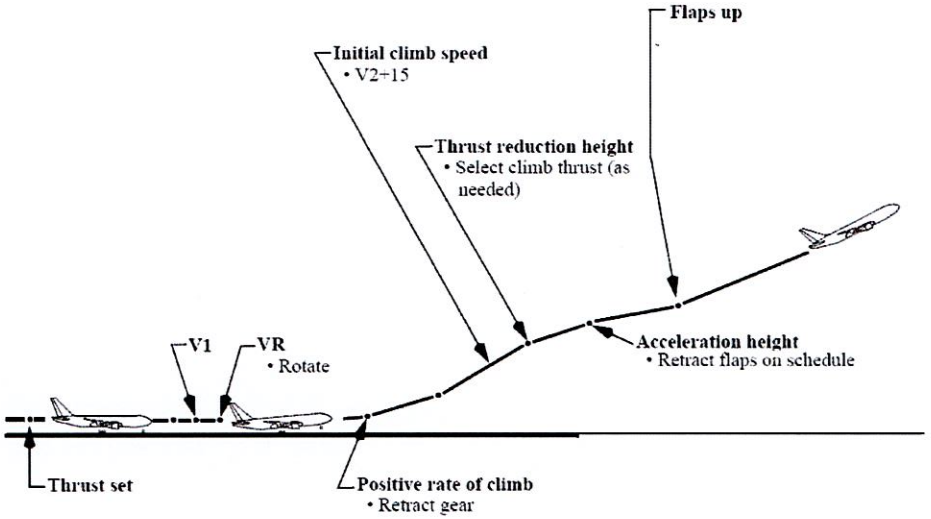
Block 1

- Departure Mods
  - 33L and 27
    - Reduced speed departures (1-D1)
      - 220 Knots (clean) to 10,000'
      - NADP-1 to 6,000'
  - 15R
    - RNAV waypoint relocation (1-D2)
  - 22L/R
    - RNAV waypoint relocation
      - Climb to intercept course (1-D3a)
      - Climb to altitude then direct (1-D3b)
    - Heading-based departure (1-D3c)
- Arrival Mods
  - 33L Low-noise overwater approach procedures
    - Overwater RNAV Instrument Approach Procedure with RNP Overlay which as closely as possible flies the jetBlue RNAV Visual track (1-A1a)
    - Public distribution mechanism for the jetBlue RNAV Visual procedure (1-A1b)

FAA announced procedure could be in place by this September

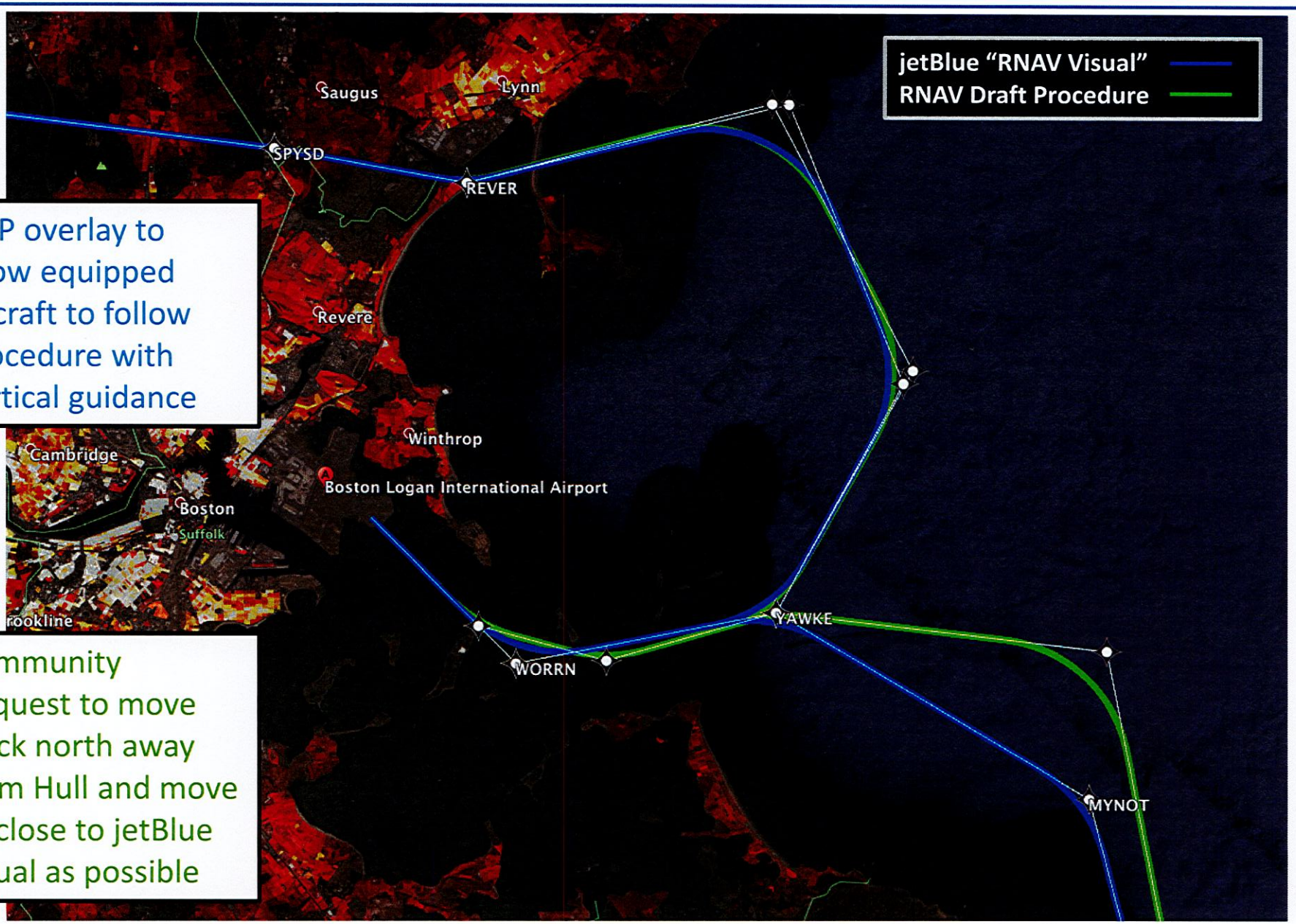
Reduced Speed Departures
Proposed Modification

- Standard departure procedures vary by airline
- **Baseline**: Typical profile includes thrust reduction at 1,000' AGL followed by an **acceleration to 250 kt climb speed** and **flap retraction**
- **Recommended procedure:**
  a. Thrust reduction at 1,000' AGL followed by an **acceleration to 220 kt climb speed or minimum safe airspeed in clean configuration, whichever is greater** until a TBD altitude (i.e. 6,000' or 10,000')
  b. NADP-1 extended to 6,000'



Simulator Tested for Flyability

33L RNAV Visual vs. RNAV GPS (Draft)



RNP overlay to allow equipped aircraft to follow procedure with vertical guidance

Community Request to move track north away from Hull and move as close to jetBlue visual as possible

Block 2 Procedures Under Consideration

May be updated after additional input from the MCAC Subcommittee Meeting April 18th

Block 2

More complex due to operational/technical barriers or results in shifting of noise (equity issue)

- Departure Mods
  - 33L and 27
    - Introduce dispersion with Open SID or direct-to flexibility on RNAV procedures
- Arrival Mods
  - Low-noise overwater approach procedures
    - 4R
      - RNAV approach to 4R with RNP Overlay
      - RNP approach to 4R
    - 22L
      - RNAV approach to 22L with RNP Overlay

Preliminary/Subject to Change

Massport/FAA MOU Process and MIT Technical Timeline

(Preliminary/Subject to Change. Version as-of 05/14/18)

- Block 1 (ongoing elements)

– MCAC/Public Meetings/MIT Report/MPA Ltr to FAA	Feb 2017 to Dec 2017
– FAA internal review (safety, efficiency, NEPA)	Ongoing
– FAA Implementation Process	Ongoing

- Block 2

– MCAC/Public Meetings/Technical Review	Feb. 2017 – Hold pending Block1
– MIT Draft Technical Approach to Block 2	December 2018 – April 2018
– MIT Brief MCAC on Block 2 Technical Approach and Ideas	April 2018
– MCAC provide any additional ideas from April Meeting	April - June 2018
– MIT finalize technical approach (noise metrics and noise changes analytics/graphics)	Summer 2018
– MIT conduct feasibility review of ideas, identify ideas to model and initial/follow up modeling	May - Dec 2018
– MIT Brief MCAC on model results for each idea	Sept/Oct 2018
– MCAC Meetings on Block 2 ideas	Oct-Dec 2018
– MCAC Block 2 final recommendations to Massport	TBD
– MPA Recommendation to FAA	TBD
– FAA internal review (safety, efficiency, NEPA)	TBD
– FAA implementation (may include extensive NEPA process)	TBD

Including interim briefings to MCAC and Briefings to general public