



Federal Aviation Administration

Memorandum

Date: June 17, 2009

To: FAA Evaluation Team Members and File

cc: Dianne Sanders (FAA), Barry Knight (FAA), Stephen Smith (PC-Ricondo & Associates)

From: BLANS Project Manager, Terry English

Prepared by: Alan Reed

Subject: Boston Overflight Noise Study - Phase 1 RNAV Design Updates

This memo serves as a chronological record of events relative to the development of the RNAV flight procedures design from Phase 1 of the Boston Overflight Noise Study (BONS) as described in the October 2007, FAA Categorical Exclusion/Record of Decision (CATEX/ROD) and highlights interim design changes since the initial January 29, 2009 submission of procedures to FAA Flight Technologies and Procedures Division up until June 10, 2009.

The FAA's effort to begin design of the BOSTON BONS RNAV SID's (Phase 1) as required in the October 2007 CATEX/ROD began with an official RNAV 18 STEP KICK OFF Meeting, held at A90 on May 28, 2008. Following months of design and coordination, the Phase 1 RNAV procedures for aircraft departing RWYS 4R, 9 and 15R were initially submitted for publication on January 29, 2009, having a publication date of August 27, 2009. The graphics/designs of these procedures were coordinated with the Project Consultant (PC) and Independent Consultant (IC). In an IC memo dated January 20, 2009, the IC concurred with the FAA's assertion that the procedures met the spirit and intent of the Phase 1 RNAV recommendations for Runways 4R, 9 and 15R. About this time work resumed on an initial RNAV design utilizing a "Vector To RNAV Route" for aircraft departing RWYS 22R/L, that would also remain within Integrated Noise Model (INM) Phase 1 corridors and thereby satisfy the spirit and intent of the October 2007 CATEX/ROD.

On February 19, 2009, the FAA's Flight Technologies and Procedures Division, AFS-400, directed RNAV developers nationwide to re-evaluate all RNAV procedures using revised design criteria relative to determining minimum straight segment lengths for performance based navigation (including RNAV) procedures. All the BONS RNAV SID's were successfully re-evaluated and re-submitted on March 5th. The "Vector to RNAV Route" design for RWYS 22R/L had also recently been completed, and this procedure was also submitted on March 5th, anticipating an August 27, 2009, publication date.

After initial review, on March 10, 2009, the National RNAV office working with the Quality Oversight and Technical Advisory Office informed the office developing the BOS RNAV procedures, that the Vector to RNAV procedure for RWY 22R/L was not feasible due to inadequate DME coverage in the area. Following that notification, design work shifted to first evaluating and then developing an RNAV procedure for aircraft actually departing RWYS 22R/L that would be successful in meeting the spirit and intent of the October 2007 CATEX/ROD.

On April 15, 2009, the FAA's Flight Technologies and Procedures Division, AFS-400, directed RNAV developers nationwide to once again re-evaluate all RNAV procedures using revised design criteria relative to determining minimum straight segment lengths for performance based navigation (including RNAV) procedures. All the BONS RNAV SID's were successfully re-evaluated and re-submitted.

The six RNAV procedures were re-submitted again on June 10, 2009. The packages included (1) RWYs 22R/L runway transitions, (2) at or above 4,000 feet altitude crossing restrictions at HURBE and CLAWW for Runways 4 and 9, respectively, and (3) a fix name change to ROEDE instead of JOEDE. In addition, a new publication date of October 22, 2009 has been established for all of the procedures. This includes RWYs 22R/ L, which were previously scheduled for a publication date of November 2010.

Over the course of multiple re-evaluations, and in an effort to reduce and consolidate routes and way points wherever possible without negatively impacting proven aircraft flyability within designated Phase 1 INM corridors, the original BOSTON BONS RNAV SID's, have changed ever so slightly, yet they still meet the spirit and intent of RNAV departure procedures as required in the 2007 CATEX/ROD.

The following details how the six RNAV procedures submitted June 10th have changed since January 29, 2009 original submittal:

BRUWN - The primary change to the BRUWN is the addition of an RNAV procedure for aircraft departing RWY 22R/L. This results in a new route beginning at the RWY's departure end, going out to a new flyby waypoint (WP) TJAYY then proceeding direct to BRRRO, a WP that was already included in the RWY 15 RNAV procedure, and continuing out to BRUWN. Due to new minimum segment length criteria standards, WP FENWY shifted slightly to the west resulting in a slight shift of the flyability route over the water until reaching BRUWN. The important point to note is that all minimal changes are over the water and the BRUWN procedure takes aircraft previously destined for an over land route, over the water.

CELTK - The primary change to the CELTK is the addition of an RNAV procedure for aircraft departing RWY 22/L. This results in a new route beginning at the RWY's departure end, going out to a new flyby WP TJAYY then proceeding direct to BRRRO, a WP that was already included in the RWY 15 RNAV procedure, and continuing out to CELTK. The important point to note is that all minimal changes are over the water and the CELTK procedure takes aircraft previously destined for an over land route, over the water.

SSOXS - The primary change to the SSOXS is the addition of an RNAV procedure for aircraft departing RWY 22R/L. This results in a new route beginning at the RWY's departure end, going out to a new flyby WP TJAYY then proceeding direct to BRRRO, a WP that was already included in the RWY 15 RNAV procedure, and continuing onto LUCOS . An effort to reduce and consolidate the number of WPs in the procedure (without causing any adverse impact to its flyability) was completed, and multiple WP's were deleted such as BAWLL, SRTKK, and OUTTT. WP FENWY was relocated and existing fix KYLES utilized instead of RREDD. These changes also satisfied new minimum segment length criteria standards without impact to flyability profiles in the Phase 1 INM corridors. A RWY 27 transition for LUCOS routed jets was also deleted. A90 would like to examine including RWY 27 LUCOS departures in the SSOXS at a later date.

PATSS -The primary change to the PATSS is the addition of an RNAV procedure for aircraft departing RWY 22R/L. This results in a new route beginning at the RWY's departure end, going out to a new flyby WP TJAYY then proceeding direct to BRRRO, a WP that was already included in the RWY 15 RNAV procedure and continuing onto DEDHM. An effort to reduce and consolidate the number of WPs in the procedure (without causing any adverse impact to its flyability) was completed, and WP SCORE located along the RWY 4R Phase 1 INM corridor was deleted, and several other WP names were changed or swapped: TRRAP became FOXXX, CHWDH became BRRRO, STEEM became FENWY, STADM became STEEM, PATSS was swapped with DEDHM and CLAMZ became GLEET. Due to new minimum segment length criteria standards, several WP's located along the westbound route for aircraft departing RWY's 15 and 22R/L were adjusted slightly, having minimal to zero impact on flyability within the corresponding Phase 1 INM corridor. A RWY 27 transition for westbound BOSOX routed jets was deleted and A90 would like to examine including RWY 27 BOSOX departures in the PATSS at a later date.

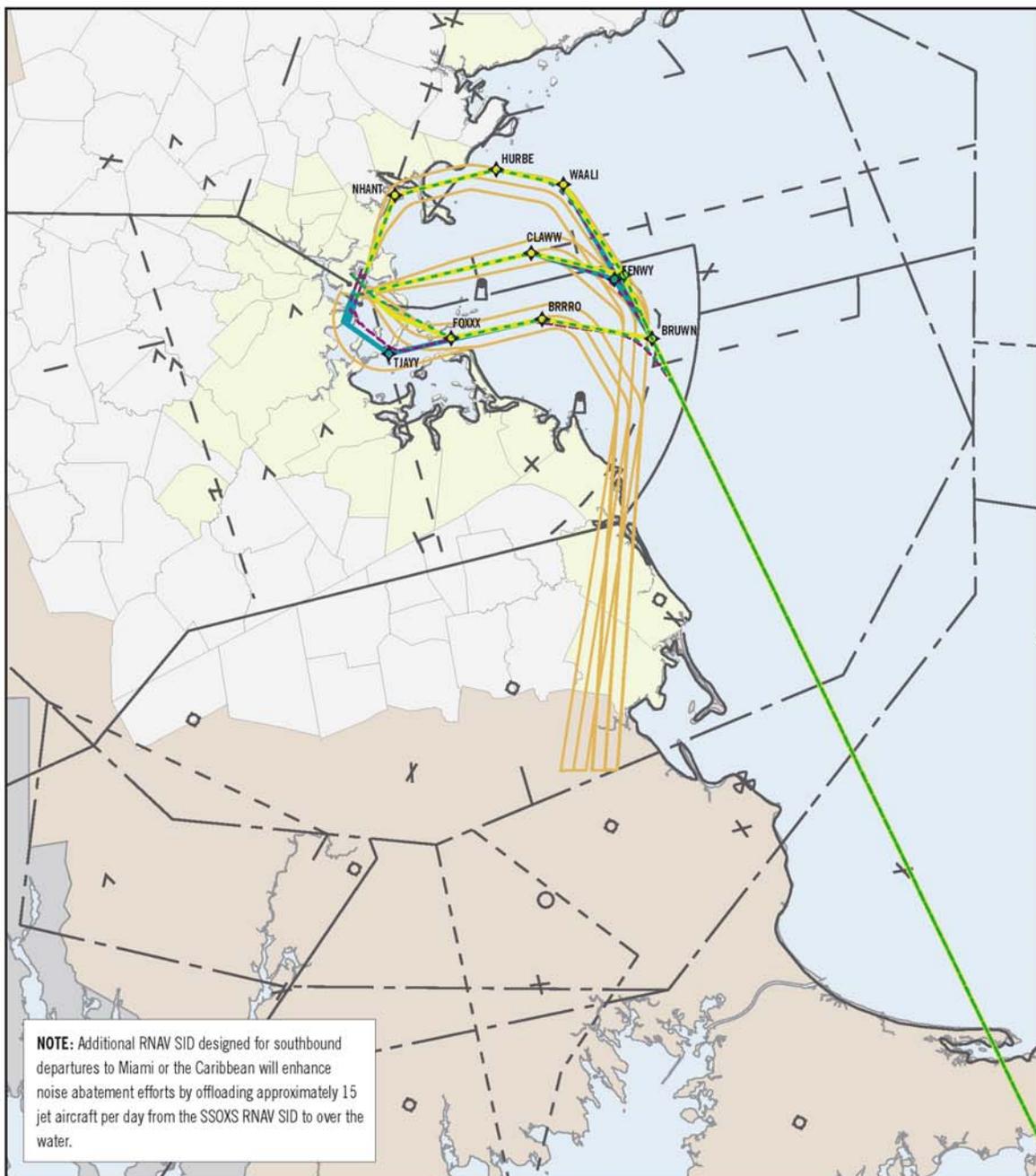
LBSTA - The primary change to the LBSTA is the addition of an RNAV procedure for aircraft departing RWY 22R/L. This results in a new route beginning at the RWY's departure end, going out to a new flyby waypoint TJAYY then proceeding direct to BOATT, a waypoint that was already included in the RWY 15 RNAV, and continuing out to LBSTA. Waypoint name TRRAP was replaced by FOXXX as the initial waypoint for Rwy 15 departures, and HERBI became HURBE. Waypoint KNOFF was swapped with SHAUN, a waypoint on the HYLND to reduce potential pilot confusion between HYLND waypoint names SHAUN and SHAAN.

HYLND - The primary change to the HYLND is the addition of an RNAV procedure for aircraft departing RWY 22R/L. This results in a new route beginning at the RWY's departure end, going out to a new flyby waypoint TJAYY then proceeding direct to BOATT, a waypoint that was already included in the RWY 15 RNAV and continuing out to MHT. Waypoint name TRRAP was replaced by FOXXX as the initial waypoint for Rwy 15 departures, and HERBI became HURBE. Waypoint SHAUN was swapped with KNOFF, a waypoint on the LBSTA to reduce potential pilot confusion between HYLND waypoint names SHAUN and SHAAN. Due to the new minimum segment length criteria standards, WP KANGY was shifted slightly to the east, which had minimal to zero impact on flyability within the corresponding Phase 1 INM corridor.

The above procedures are attached.

Attachments:
BRUWN RNAV
CELTK RNAV
SSOXS RNAV
PATSS RNAV
LBSTA RNAV
HYLND RNAV

Boston Logan International Airport



Legend

— RNAV Route - APR 09
 - - - Flyability Route - APR 09
 ◆ Waypoint - APR 09
 — Phase 1 RNAV Design Corridor
 □ CAC Communities
— RNAV Route - JAN 09
- - - Flyability Route - JAN 09
◆ Waypoint - JAN 09
□ Other Study Area Communities
□ Massachusetts State

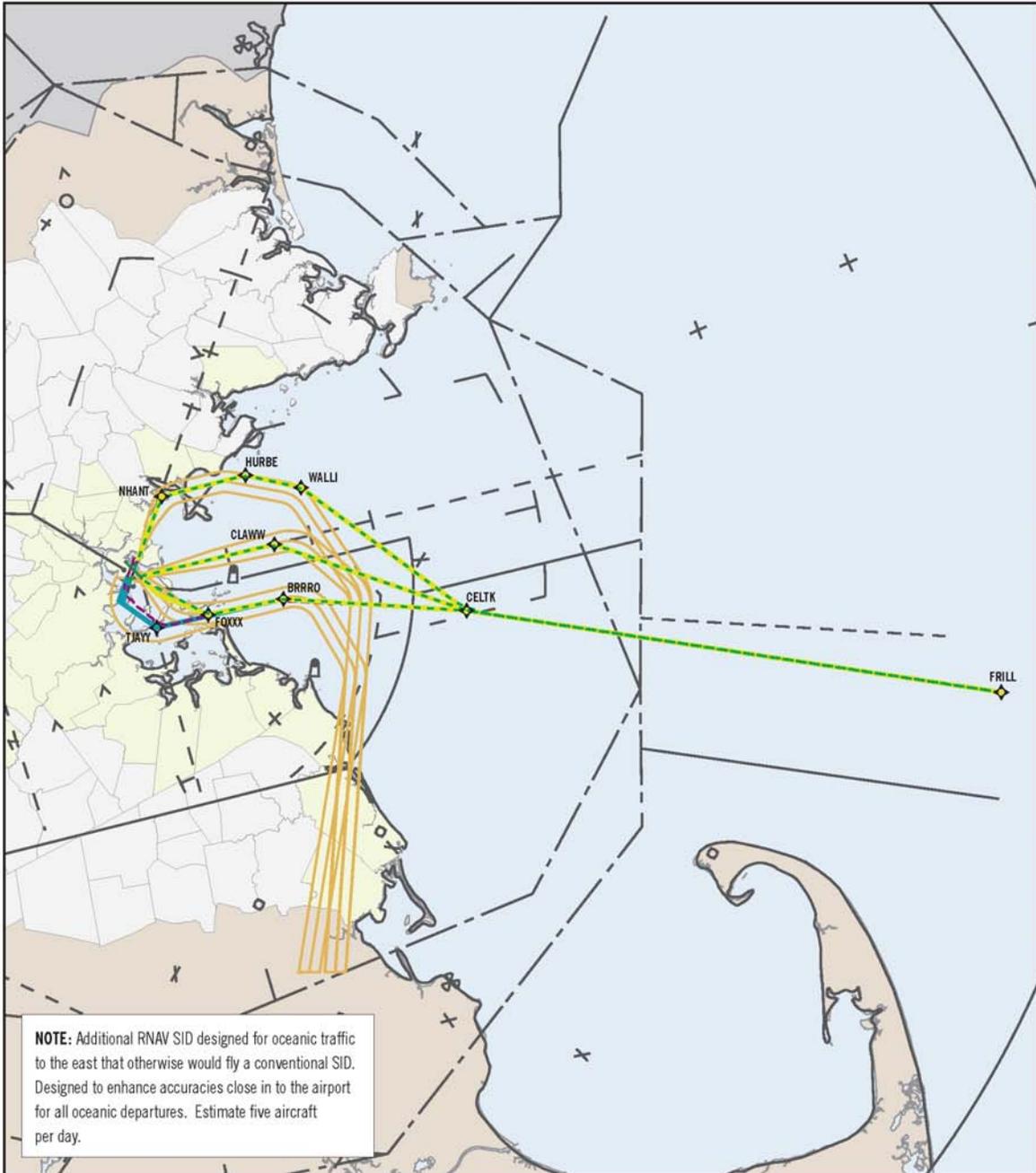
*APR 09 updates were conducted in accordance with FAA April 15th Flight Technologies and Procedures Division Memo entitled: Performance Based Navigation Instrument Procedure Division Memo Segment Length Standard.

Source: FAA, January 2009, May 2009 (RNAV Routes); MassGIS, Extracted January 2009 (State and Community Boundaries); Ricondo & Associates, Inc., April 2006 (Phase 1 RNAV Design Corridors).
 Prepared by: Ricondo & Associates, Inc., May 2009.



**BRUWN RNAV
Full Extent**

Boston Logan International Airport



NOTE: Additional RNAV SID designed for oceanic traffic to the east that otherwise would fly a conventional SID. Designed to enhance accuracies close in to the airport for all oceanic departures. Estimate five aircraft per day.

Legend *APR 09 updates were conducted in accordance with FAA April 15th Flight Technologies and Procedures Division Memo entitled: Performance Based Navigation Instrument Procedure Division Memo Segment Length Standard.

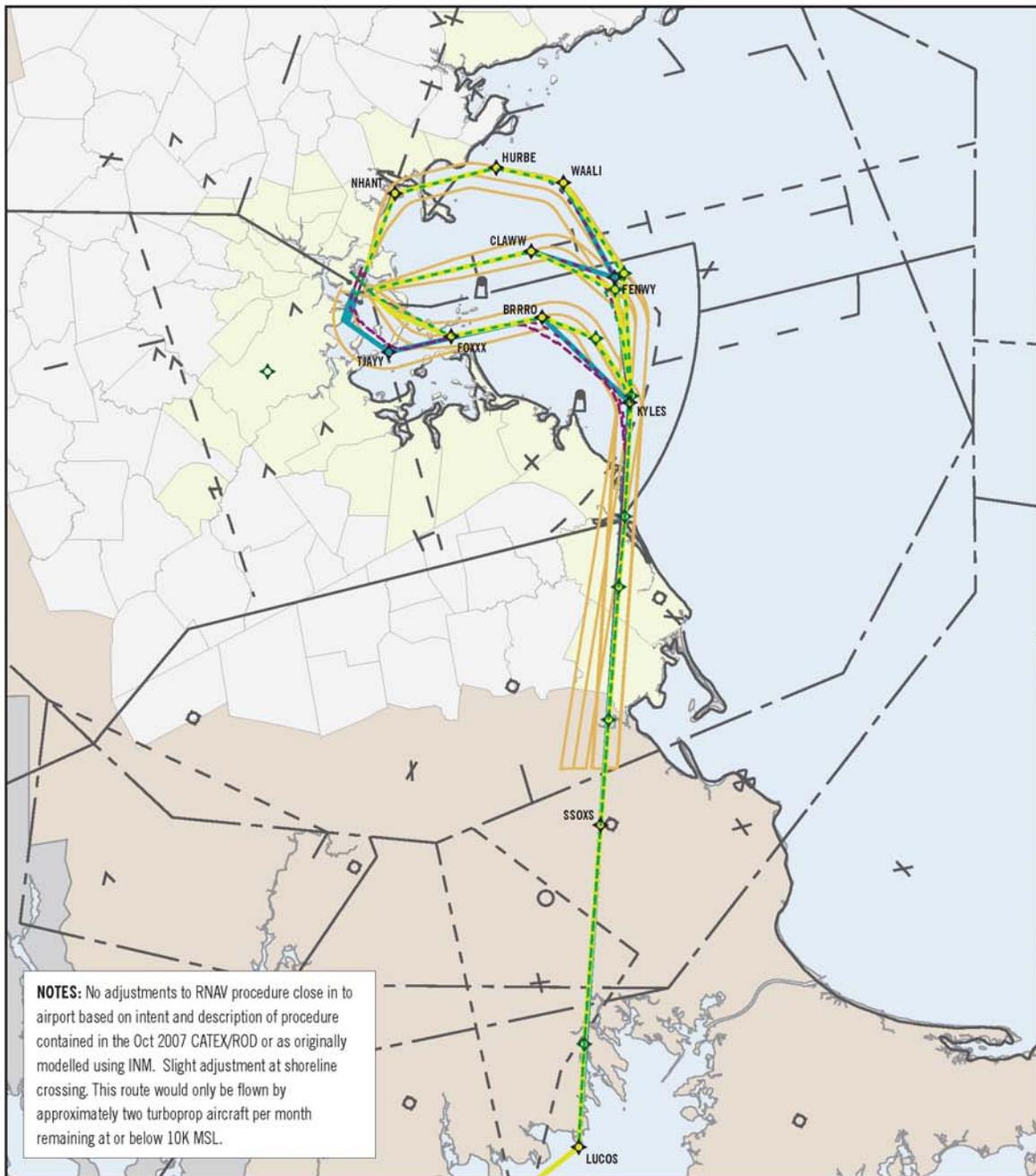
- RNAV Route - APR 09 - - - Flyability Route - APR 09 ◆ Waypoint - APR 09 — Phase 1 RNAV Design Corridor ■ CAC Communities
- RNAV Route - JAN 09 - - - Flyability Route - JAN 09 ◆ Waypoint - JAN 09 — Other Study Area Communities ■ Massachusetts State

Source: FAA, January 2009, May 2009 (RNAV Routes); MassGIS, Extracted January 2009 (State and Community Boundaries); Ricondo & Associates, Inc., April 2006 (Phase 1 RNAV Design Corridors). Prepared by: Ricondo & Associates, Inc., May 2009.



CELTK RNAV Full Extent

Boston Logan International Airport



Legend

RNAV Route - APR 09	Flyability Route - APR 09	Waypoint - APR 09	Phase 1 RNAV Design Corridor	CAC Communities
RNAV Route - JAN 09	Flyability Route - JAN 09	Waypoint - JAN 09	Other Study Area Communities	Massachusetts State

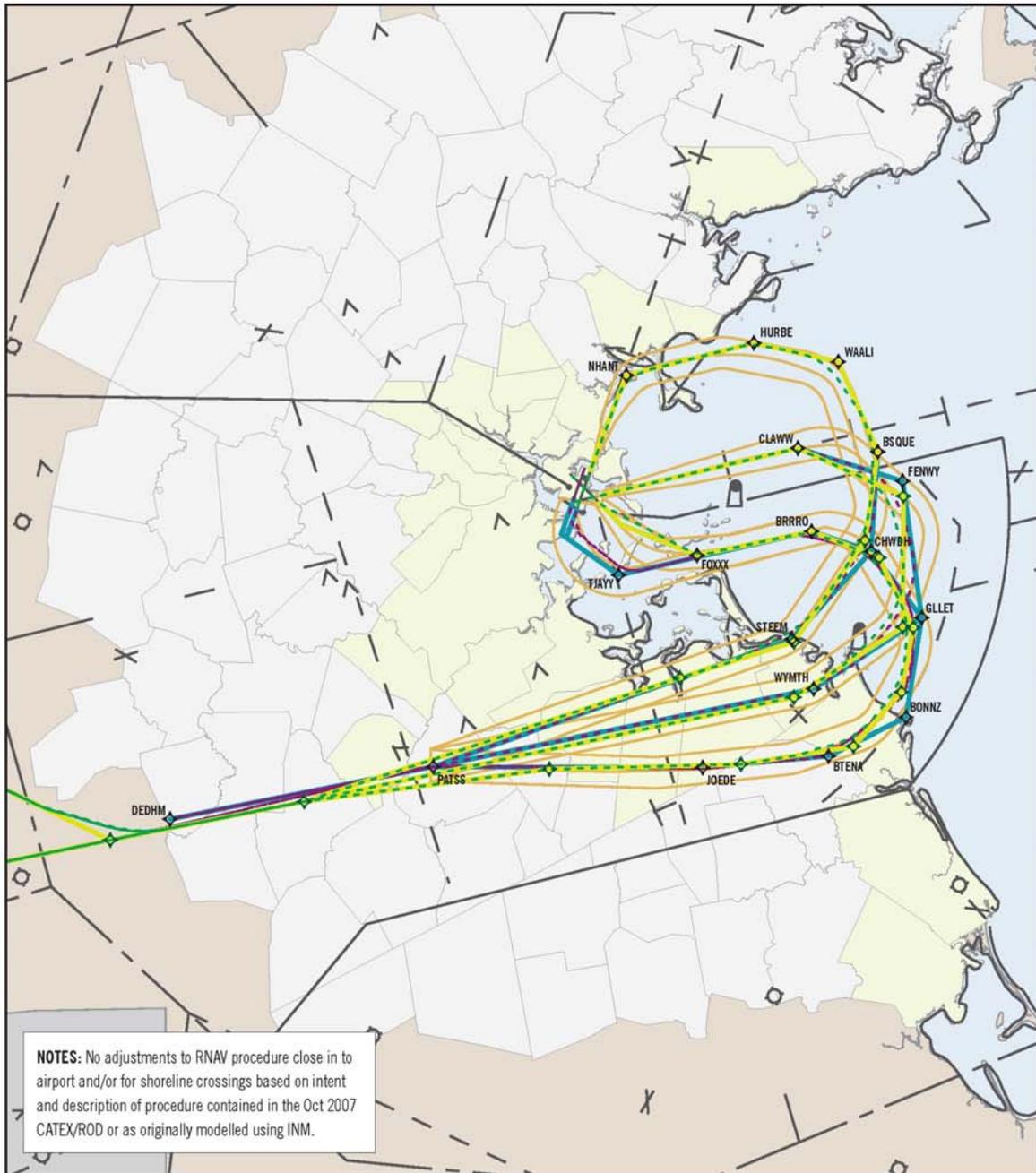
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Source: FAA, January 2009, May 2009 (RNAV Routes); MassGIS, Extracted January 2009 (State and Community Boundaries); Ricondo & Associates, Inc., April 2006 (Phase 1 RNAV Design Corridors).
 Prepared by: Ricondo & Associates, Inc., May 2009.



**SSOXS RNAV
Full Extent**

Boston Logan International Airport



NOTES: No adjustments to RNAV procedure close in to airport and/or for shoreline crossings based on intent and description of procedure contained in the Oct 2007 CATEX/ROD or as originally modelled using INM.

*APR 09 updates were conducted in accordance with FAA April 15th Flight Technologies and Procedures Division Memo entitled: Performance Based Navigation Instrument Procedure Division Memo Segment Length Standard.

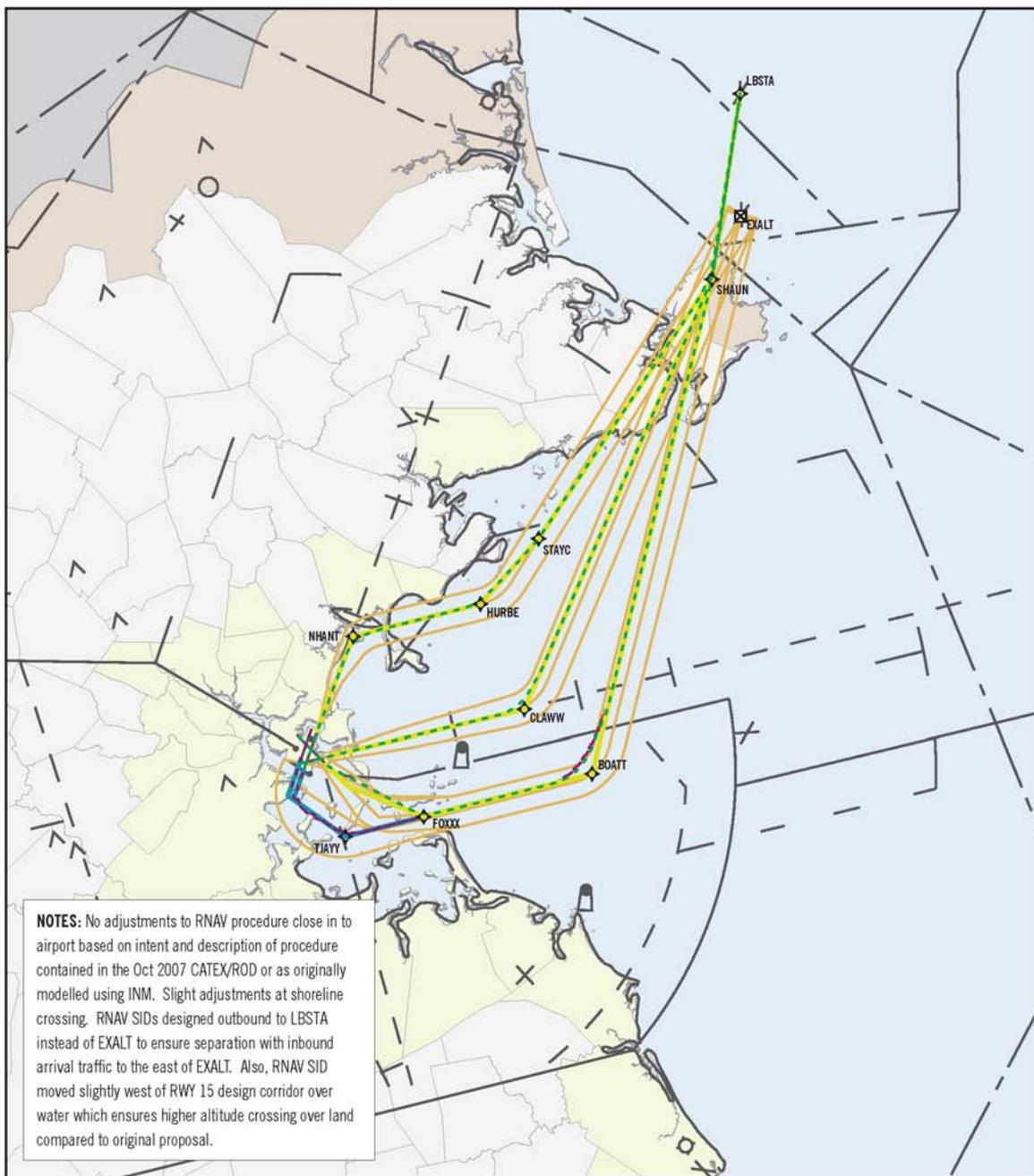
- Legend**
- RNAV Route - APR 09
 - Flyability Route - APR 09
 - ◆ Waypoint - APR 09
 - Phase 1 RNAV Design Corridor
 - CAC Communities
 - RNAV Route - JAN 09
 - Flyability Route - JAN 09
 - ◆ Waypoint - JAN 09
 - Other Study Area Communities
 - Massachusetts State

Source: FAA, January 2009, May 2009 (RNAV Routes); MassGIS, Extracted January 2009 (State and Community Boundaries); Ricondo & Associates, Inc., April 2006 (Phase 1 RNAV Design Corridors). Prepared by: Ricondo & Associates, Inc., May 2009.



PATSS RNAV Full Extent

Boston Logan International Airport



NOTES: No adjustments to RNAV procedure close in to airport based on intent and description of procedure contained in the Oct 2007 CATEX/ROD or as originally modelled using INM. Slight adjustments at shoreline crossing. RNAV SIDs designed outbound to LBSTA instead of EXALT to ensure separation with inbound arrival traffic to the east of EXALT. Also, RNAV SID moved slightly west of RWY 15 design corridor over water which ensures higher altitude crossing over land compared to original proposal.

*APR 09 updates were conducted in accordance with FAA April 15th Flight Technologies and Procedures Division Memo entitled: Performance Based Navigation Instrument Procedure Division Memo Segment Length Standard.

Legend

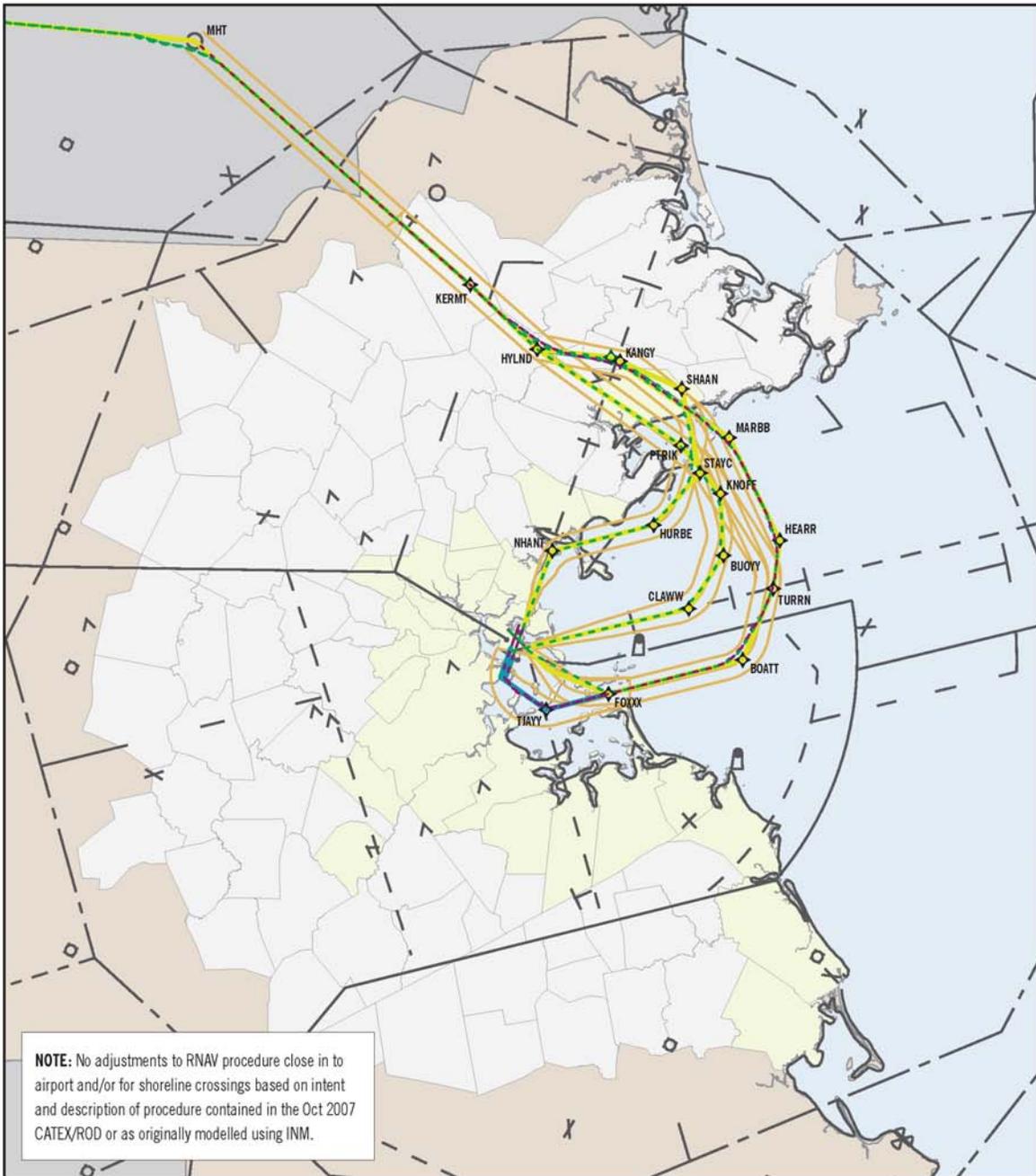
- RNAV Route - APR 09 - - - Flyability Route - APR 09 ◆ Waypoint - APR 09 — Phase 1 RNAV Design Corridor ■ CAC Communities
- RNAV Route - JAN 09 - - - Flyability Route - JAN 09 ◆ Waypoint - JAN 09 □ Other Study Area Communities ■ Massachusetts State

Source: FAA, January 2009, May 2009 (RNAV Routes); MassGIS, Extracted January 2009 (State and Community Boundaries); Ricondo & Associates, Inc., April 2006 (Phase 1 RNAV Design Corridors).
 Prepared by: Ricondo & Associates, Inc., May 2009.



**LBSTA RNAV
Full Extent**

Boston Logan International Airport



NOTE: No adjustments to RNAV procedure close in to airport and/or for shoreline crossings based on intent and description of procedure contained in the Oct 2007 CATEX/ROD or as originally modelled using INM.

*APR 09 updates were conducted in accordance with FAA April 15th Flight Technologies and Procedures Division Memo entitled: Performance Based Navigation Instrument Procedure Division Memo Segment Length Standard.

Legend

- RNAV Route - APR 09 - - - Flyability Route - APR 09 ◆ Waypoint - APR 09 — Phase 1 RNAV Design Corridor ■ CAC Communities
- RNAV Route - JAN 09 - - - Flyability Route - JAN 09 ◆ Waypoint - JAN 09 □ Other Study Area Communities ■ Massachusetts State

Source: FAA, January 2009, May 2009 (RNAV Routes); MassGIS, Extracted January 2009 (State and Community Boundaries); Ricondo & Associates, Inc., April 2006 (Phase 1 RNAV Design Corridors).
 Prepared by: Ricondo & Associates, Inc., May 2009.



**HYLND RNAV
Full Extent**