Boston Overflight Noise Study
BOS/TAC Meeting

MEETING SUMMARY

January 12, 2005

Attendance:

BOS/TAC Members:
Gail Lattrell (FAA Airports), Joe Davies (FAA Air Traffic), Toni Dusseault (FAA Air Traffic), Gary Hufnagle (FAA Air Traffic), Terry Flieger (FAA Air Traffic), Barbara Travers-Wright (FAA Congressional Liaison), Bob D'Amico (City of Boston Mayor's Office), Flavio Leo (Massport), Betty Desvosiers (Massport), Dick Morrison (Chelsea), Ron Fama (Weymouth), Ralph Dormitzer (Cohasset), Sandra Kunz (Braintree), Rod Hobson (Cohasset), Steve Lathrop (Hull), Jerry Falbo (Winthrop), John Stewart (South Boston), Dovi Abbey (Roxbury)

PC Team:
Greg Wellman (Ricondo & Associates, Inc.), Dennis Burke (Ricondo & Associates, Inc.), Stephen Smith (Ricondo & Associates, Inc.), Bill Albee (Wyle Laboratories), Roger Odegard (Wyle Laboratories)

IC Team:
Jon Woodward (Landrum & Brown, Inc.), Berta Fernandez (Landrum & Brown, Inc.), Bud Riebel (Landrum & Brown, Inc.), Stan Matthews (Crown Consulting, Inc.), Nancy Timmerman (Nancy S. Timmerman, PE)

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1. Introductions

- G. Lattrell noted that this was the first meeting related to the technical areas of the study. F. Leo emphasized G. Lattrell's comments. R. Dormitzer reiterated the study's objective, which is to change flight paths to improve environment for communities, and he hopes the project is productive and brings about changes that reduce noise impacts experienced by surrounding communities.
- All participants introduced themselves.
- G. Wellman reviewed the meetings agenda and objectives. Meeting protocols were also addressed including dialog and decision-making guidelines. Dialog should not be a debate. The goal is to understand everyone's concerns, understand what the assumptions are, and look for common ground. He also reminded the group to focus on ideas, not personalities or personal issues. He stated that decision-making would follow group discussions and that some decisions will consensus based while others will need to be finalized by a single entity. Wellman also noted that Phase 1 would set framework for Phase 2.

2. Work Program/Schedule Overview (G. Wellman)

- *Completed work tasks*: Inventory and Air Traffic Baseline Conditions.
- *Tasks in progress*: Land Use, Alternative Screening, Noise Baseline, and Community Outreach.

Community Outreach progression includes two online websites: a public website, www.bostonoverflightnoisestudy.com and an information sharing website for BOS/TAC members and consultant team, www.BOSTAC.com. Discussion on this topic focused on the interest to allow individuals to place comments and opinions related to the project. Much discussion followed on this issue with various concerns and issues raised. **A consensus was reached that the PC will provide a public folder for CAC BOS/TAC to share information.** There was also interest in a shorten public website domain name. (Not specifically addressed.)

- G. Wellman noted that the Air Traffic Baseline task was over budget due to additional information requested and recommended to revise the public outreach task to address this budget shortfall. The BOS/TAC discussed this issue. Several members expressed concerns and suggested finding ways to gain efficiencies in Task 5.2 as well as to provide more detail regarding this issue.
- Project focus for the next 90 days include two key areas of work:
  - Conduct preliminary screening of alternatives and noise baseline.
  - Noise Baseline
    - Determine metrics
    - Establish baseline conditions

3. Air Traffic Baseline Conditions (D. Burke)

- D. Burke introduced the Air Traffic Base Conditions discussion topic.
- G. Wellman requested that comments related to document be provide in writing, such as email.
- It was requested that a revision control procedure be put in place to ensure good tracking of revision. G. Wellman noted Appendix F was the only change since the December 10th revision but that they would establish such a procedure for future documents. It was also requested that a hard copy be provided to the CAC members in the future.
- D. Burke emphasized cooperation with FAA and IC to complete this effort. He then briefly discussed the baseline efforts conducted and timeline. He then proceeded to review each of the runway use configurations and looking for consensus of the BOS/TAC that this was representative of existing operations.
- BOS/TAC approved the Runway 4/9 configuration with the following comments:

  A discussion was held about whether the report indicates a percentage of time or percentage of operations. It was concluded that report indicates percentage of time the airspace is configured for Runway 4/9 procedures.
- BOS/TAC approved the Runway 27/22 configurations and 22/22 configuration.
- BOS/TAC approved the Runway 33/27 configuration. Concern was raised related to the accuracy of radar track data and geographic layers used. It was requested that the consultants prepare information regarding radar data processing and GIS layer procedures.

- BOS/TAC approved the Runway 27/33 configuration.
- Changes are to be made to Runway 33/32/27 prior to BOS/TAC approval. J. Davies recommends use of a "paint-brush" approach in drawing the proposed route to 33 representing dispersion similar to existing Runway 32 arrivals, commenting that the bold line was too narrow to accurately reflect the potential impact. It was also mentioned that an extension to the downwind needed to be made and that routes from the south should show dispersion further east as traffic avoids 32 approaches. There was also concern raised to ensure that proposed route depicted on the exhibit is consistent with routes proposed in the Airside EIS. Another member requested to see the wind coverage and weather associated with triggering the use of this configuration. It was suggested to include the use of 10-knot (NW heading) threshold so it would be clear when the configuration was in use.
- Changes are to be made to Runway 27/32/33 prior to BOS/TAC approval. The Runway 33 final approach needs to show a straight-in segment aligned with the runway centerline. The approach to Runway 32 from the south was also questioned as to whether it should be straight in, instead of a dogleg as depicted in the slide/handout. J. Davies responded that yes it should be straight in.
- Changes are to be made to 4/9/14 prior to BOS/TAC approval. Comments made were similar to those for 33/32/27.
- Changes are to be made to 15/9/14 prior to BOS/TAC approval. Comments made were similar to those for 33/32/27.
- Final Consensus: The Air Traffic Baseline working paper provides adequate general representation of where aircraft fly yet greater details must be evaluated as we progress into the noise baseline and alternatives assessment.

4. Study Area Boundary Review (S. Smith)

- S. Smith presented general criteria used to select proposed boundary.
- Concerns were raised over the extent of the boundary and with the inclusion of communities to the north that do not have a significant impact. Discussion focused on how to limit the size of the boundary. Upon further discuss and review of the radar data slides, the final consensus was **to use the existing 20-mile radius from the airport for the initial data collection and public outreach**. Once the alternatives are reached, a decision will be made regarding the level of detail that each community needs. The study area boundary will also be used to identify those communities that will receive a project notification letter. As alternative details are determined, a more specific study area will be identified to support the public outreach program.

5. Survey Results (J. Woodward)

- Purpose of survey was to identify measures used by airports and the means to evaluate success. J. Woodward discussed the survey design and general findings. Information

presented was preliminary. A final report will be developed once the survey has been completed.

- Responses: 30 large domestic airports have responded. Quality of responses varied.
- Preliminary Findings:
  - Noise Abatement Actions – most procedures were instrument departure procedures dependent upon availability of compatible land use. Charted visual approach procedures for noise are of limited utility. No airports reported noise abatement for environmental justice.
  - Noise Metrics – reliance on DNL or CNEL for legal decisions. Some used supplemental metrics to support decisions guided by DNL or CNEL findings. International, use numerous types of cumulative metrics.
- Next Steps:
  - Summary matrix, summary report highlighting findings regarding target issues of noise abatement actions, management techniques, and metrics.
- Questions/Discussion:

  A question was raised about charted visuals and why they were limited in utility. J. Woodward stated that the airports did not provide such information, but his theory is that aircraft operating into major airports use instrument procedures due to simplicity and control. Concerns were also raised about the navigational equipment available in aircraft today and making sure we take advantage of existing navigation technology.

  A recommendation was made to add John Wayne Airport to the survey.

6. Introduction to Supplemental Noise Metrics (R. Odegard, B. Albee)

- R. Odegard offered some background regarding the shortcomings of DNL for the public. presented supplemental metrics examples used by airports to expand and support the traditional use of DNL. B. Albee talked about the flight path movement maps. Corridors for future flight tracks can be mirrored off of the existing tracks using this tool.

  Concern was mentioned that 65 DNL should not be a threshold in this study because it does not reflect what people experience. B. Albee emphasized that via supplemental metrics, the publics' expectations can be managed. Such supplemental information may include other DNL levels. J. Davies emphasized the importance of DNL on a legal basis for Phase 2, and also noted that the FAA would use the 65 DNL to determine impact.

  Concern was raised that both consultants needed to understand the CAC's issues before developing metrics. G. Wellman suggested that the PC and IC could attend a CAC meeting to discuss metrics. R. Dormitzer agrees that CAC qualitatively identify the issues and PC quantifies the issues via selected metrics. ***A meeting would be set after the BOS/TAC meeting***.

7. Alternative Definition (G. Wellman)

- G. Wellman provided an overview of the process for developing alternatives and conducting preliminary screen. He noted that the definitions should focus on understanding the intent of the alternative. Preliminary screening is intended to sort the alternatives in three groups: (1) Discarded alternatives due to fatal flaws based on operational issues; (2) Phase 1 alternatives that meet FAA CATEX requirements and (3) Phase 2 alternatives that do not meet FAA CATEX requirements. He also noted that runway use alternatives and well as those related to ground movement would be addressed in Phase 2, as outlined in the study design.

  He was asked to clarify why runway use alternatives are not considered in Phase 1 since a new runway will be online in the near future. G. Wellman described that the original intent of BOS/TAC was to identify noise abatement procedures that could be implemented as soon as possible. Runway use changes require an Environmental Assessment. Phase 1 is a fast track process, so runway use changes alternatives are not included. F. Leo also emphasized that PRAS and ground noise will be evaluated in Phase 2.

  Another member stated that screening metrics should be in place before the CAC tries to identify alternatives. As part of the alternative discussion the topic of "benefit" has come up in CAC meetings. Without metrics, discussions about alternative details and benefits had been difficult.

- Goal of the session was for BOS/TAC to reach a consensus related to the alternative list and intent of each alternative. G. Wellman requested that if new ideas arise, they get forwarded to consultant team as soon as possible. J. Woodward emphasized that the list of alternatives are not endorsed by CAC, except two. The list of alternatives and accompanying power point slides will be put on the website. The objective of this discussion is to understand the intent of each alternative. Judgments related to alternatives should be withheld for this discussion.
- Alternative 1A: 4R/L Departure RNAV/FMS - intent understood by BOS/TAC
  - Intent is to avoid the north shore and Nahunt.
  - An additional alternative is a RNAV overlay of existing 4R/L departure procedure.
  - Raise westbound departure altitudes over the shore.
  - Provide flexibility via teardrop departure procedure
- Alternative 1B: 9 Departure RNAV/FMS - intent understood by BOS/TAC
- Alternative 1C: 15 Departure RNAV/FMS - intent understood by BOS/TAC
- Alternative 1D: 22R/L Departure RNAV/FMS- intent understood by BOS/TAC
- Alternative 1D-2 (South Shore Proposal) - intent understood by BOS/TAC
  - Intent is similar to 1D, put more aircraft over water.
  - Higher altitudes at the shoreline.
  - Cut down number of aircraft over Hull High School.

- It was noted that more specifics ideas for Runway 27 departures were needed, such as consider rapid initial climb off of 27.

- Alternative 1E- intent understood by BOS/TAC
- Alternative 3/4/8 – Fanning Departures – further information required
  - More detail is needed to understand intent (J. Stewart).
  - Provide specific headings if possible. J. Woodward emphasized the need for land use data to determine more details, and also include environmental justice issues in determining headings.
  - Options may include headings over Masspike and river.
- Alternative 5A: 22R/L Arrival RNAV/FMS - intent understood by BOS/TAC
  - Intent is to narrow the existing arrival tracks
  - Specific altitudes and profile descent controls
  - Keeps aircraft over ocean/water as long as possible.
- Alternative 5A-1: Runway 22R/L RNAV Approach – intent understood by BOS/TAC
  - Allow for GARDNER STAR flights to follow STAR to full extent of procedure
  - Includes controlled altitude descents
  - Keeps arrivals from south over ocean as much as possible
- Alternative 5B - intent understood by BOS/TAC
- Alternative 5C: 33Arrival RNAV needs additional definition details - intent understood
  - Idea is to conduct a “visual” type of approach and intercept the localizer/glide slope.
  - Intended to maximize flight over to 33.
- Alternative 5C-1A (South Shore Proposal) – intent understood by BOS/TAC
  - Avoid Hull
  - It was requested that this be made an RNAV. The response was yes.
- Alternative 5C-1B (South Shore Proposal) – intent understood by BOS/TAC
  - Avoid Hull
- Alternative 6A: 4L/R Arrival RNAV – additional information required
  - Add an alternative that moves the GARDNER south to join PVD traffic to minimize the east downwind and base turn to 4R/L ILS.
- Alternative 10A: Raise Altitudes for ILS – intent understood by BOS/TAC
  - Would affect length of trombones
- Alternative 10B: Raise Glide Slope – intent understood by BOS/TAC
- Alternative 11: Cockpit Alternatives – Departures (4,9,27&33) – intent understood by BOS/TAC

- Close in departure profile for 4,9,27&33
- Distant profiles for 22 & 15 and possibly 9
- J. Woodward provided a brief description of the effect of thrust adjusted climb profiles by further discussing power reduction which reduces noise closer to the airport but is a trade off for noise further out.

- Alternative 12: Cockpit Alternatives – Delay Gear Deployment Delay – intent understood by BOS/TAC
- Alternative 13: Opportunity for Implementation of Procedures in Off-Peak Hours – intent understood by BOS/TAC
- Alternative 14: Seek Voluntary Agreement with Night Operators – intent understood by BOS/TAC
- Alternative 15: Major Power Reduction for Takeoffs on Runways 9, 27 &33 – intent understood by BOS/TAC
  - Involves extensive thrust cutbacks
  - Similar to John Wayne procedure
  - F. Leo noted need to look at procedures for props and also included 22R departures over Quincy. Need to look at specific request for Runway 33 departures, which was included in fanning alternatives.
- Alternative 37: Visual Approach to 22R/L & 33L – Circle to Land Runway 22R/L & 33L from 27 ILS – intent understood and accepted by BOS/TAC
  - Intent is to keep arrivals over water as much as possible.
- The consultants were asked to evaluate additional options for arrivals on Runway 4L/R.

8. Preliminary Screening Approach (G. Wellman)

- Fatal Flaw Review

  G. Wellman acknowledged difficulty in using "orderly and efficient" as a fatal flaw. J. Davies emphasized the importance of expeditious in FAA mission. This issue was discussed extensively by the BOS/TAC. G. Wellman stated that the fatal flaw review is an operational issue that would ultimately be decided by the FAA. It will be the consultant teams job to strike a balance with the intent of the alternatives and the FAA's mission. R. Dormitzer proposes to make safety the first fatal flaw criteria and when more data becomes available in Phase 1, apply efficiency criteria. To include efficiency will require additional work. Clarification was also made regarding the FAA air traffic procedure team and the consultants' involvement with this team. J. Davies emphasized that internal meetings of the FAA will be held to review alternatives
- After further discussion, G. Wellman proposed a process via the Airspace Technical Committee to review fatal flaw screening, including the following steps:

  1. Clean up the list of alternatives. ***January 20th on website***

2. FAA and Consultants review list of alternatives based (*approximately 6 weeks*)
3. Airspace Technical Committee Meeting. ***Tentative date March 9th***

   This would be a technically focused meeting not intended to make ANY final determinations but to identify issues, concerns and ways to further enhance alternatives
4. BOS/TAC Meeting Regarding Alternative Discussions. ***March 24th***

- G. Wellman recommended a similar process for environmental screening. T. Flieger emphasized the need for detailed alternative information to conduct environmental screening. G. Wellman recommended that more information be put together detailing environmental screening steps. T. Flieger recommended that the categorical exclusion information form and lists of procedure types be placed on the website so members have them available for the definition of alternatives.
- A member requested a map depicting the Runway 32 centerline out to the Hull Peninsula. The concern was regarding the EDR's depiction (page 18 of executive summary) of Runway 32 and the inconsistency of alternatives. He believes that the EDR does not provide for straight in approaches.

Massport
Federal Aviation Administration
Community Advisory Committee

Community Advisory Committee

Potential Flight Track Alternatives

Boston Logan International Airport

Alternative 1A

RNAV/FMS Early Right Turn Procedure from Runway 4R/L to Increase Altitudes Over Land and Avoid Nahant

- Establish a fly-over takeoff waypoint at 2, 3 or 4-DME
- Successive fly over waypoint to route aircraft north of Winthrop/ south of Nahant
- Aircraft climb eastbound until reaching sufficient altitude to cross shoreline above 12,000 feet MSL (e.g., 8 mile DME approximating 8,000 - 10,000 MSL)
- May route aircraft back over airport above 12,000 feet MSL

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Alternative 1B

RNAV/FMS or DME Departure Procedure from Runway 9 to to Increase Altitudes Over Land

- Fly runway heading to a point that allows aircraft to be cross shoreline above 12,000 feet MSL (e.g., 8 mile DME approximating 8,000 - 10,000 MSL)
- Aircraft could be routed back over the airport by maneuvering over water

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Alternative 1C

RNAV/FMS or DME Departure Procedure from Runway 15 to Increase Altitudes Over Land

- Establish a left turn with a fly-by waypoint at the departure end of the runway to an easterly heading
- Aircraft climb eastbound along a 100 heading until reaching sufficient altitude to cross shoreline above 12,000 feet MSL (e.g., 8 mile DME approximating 8,000 to 10,000 MSL)
- Aircraft could be routed back over the airport by maneuvering over water

Alternative 1D

RNAV/FMS or GPS Departure Procedure from Runway 22R/L to Increase Altitude Over Land

- Establish a left turn at the departure end of the runway with fly-over waypoint(s) along an easterly heading
- Aircraft climb eastbound until reaching sufficient altitude to cross shoreline above 12,000 feet MSL
- Aircraft could be routed over the airport by maneuvering over water

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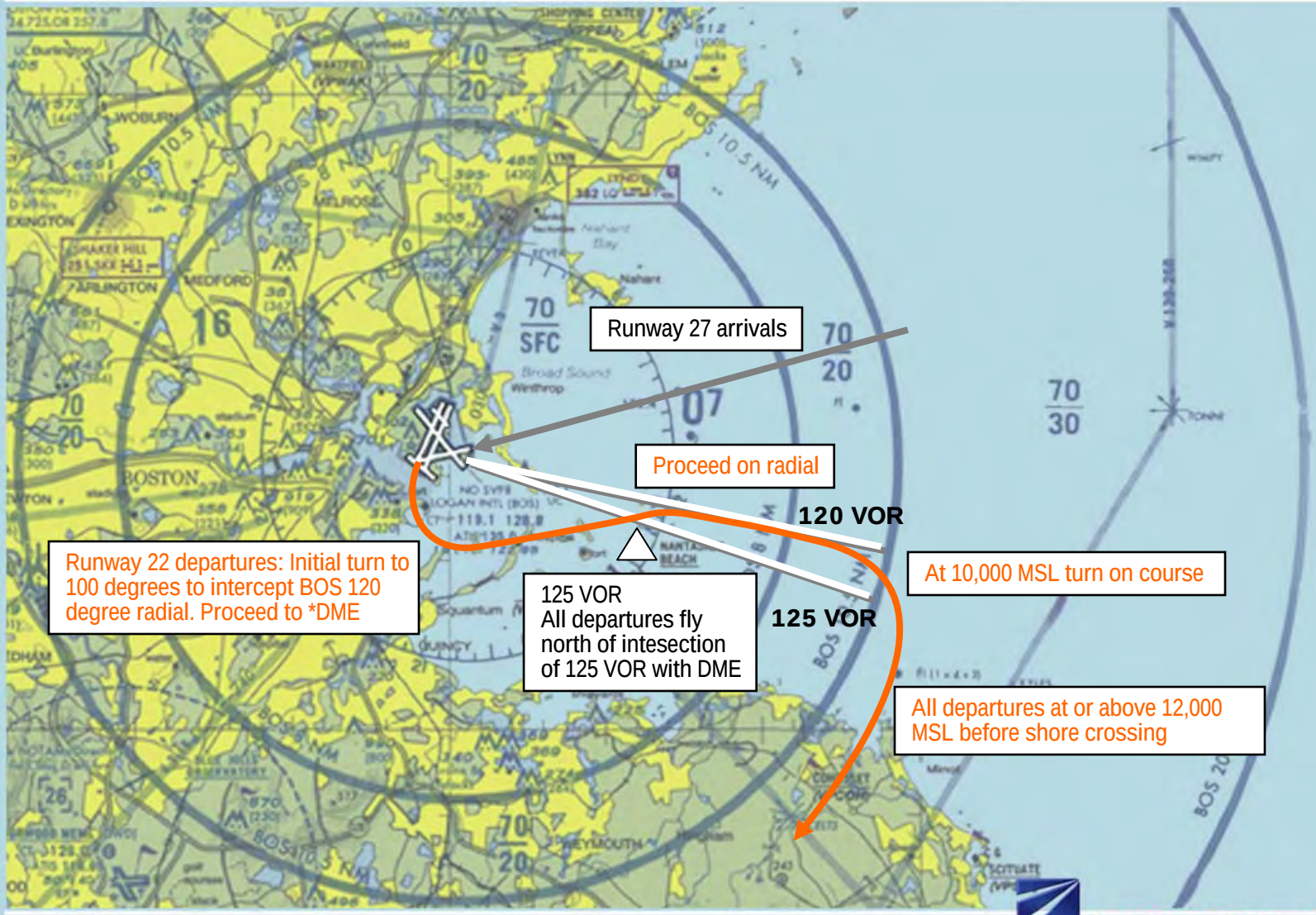
Alternative 1D-2

Example - South Shore Proposal to Accomplish Alternative 1D



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Alternative 1E

RNAV/FMS or DME Departure Procedure from Runway 14 to Increase Altitudes Over Land

- Establish a left turn with a fly-by waypoint at the departure end of the runway to an easterly heading
- Aircraft climb eastbound until reaching sufficient altitude to cross shoreline above 12,000 feet MSL (e.g., 8 mile DME approximating 8,000 to 10,000 MSL)
- Aircraft could be routed over the airport by maneuvering over water

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Alternative 2A Develop Classic Early Right Turn Procedure from Runway 4R/L non-FMS/GPS-Equipped Aircraft

- Mirrors **Alternative 1A**
- Modify **Logan Two Departure** by changing 4 DME restriction to approximate RNAV/FMS waypoint of **Alternative 1A**
- Aircraft would be required to climb on an easterly heading until reaching sufficient altitude to cross the shoreline or over the airport at 12,000 feet MSL or higher
- ATC vectoring technique should retain aircraft within footprint of FMS/GPS routing

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Alternative 2B Develop Classic Procedure for non-FMS/GPS Equipped Aircraft to Increase Altitudes Over Land when Departing Runway 9

- Mirrors **Alternative 1B**
- Retain existing **Logan Two Departure** initial runway heading to a point that allows aircraft to cross shoreline above 12,000 feet MSL
- Aircraft could be routed over the airport above 12,000 feet MSL
- ATC vectoring technique should preclude excessively wide turns that could place the aircraft over a shoreline community below the desired altitude

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Alternative 2C Develop Classic Procedure for non-FMS/GPS Equipped Aircraft To Increase Altitudes Over Land When Departing Runway 15

- Mirrors **Alternative 1C**
- Retain existing **LOGAN TWO DEPARTURE** initial runway heading to one DME
- At one DME turn left heading 100, continuing on this heading until reaching sufficient altitude to cross the shoreline or loop back over the airport above 12,000 feet MSL
- ATC vectoring technique should preclude excessively wide turns that could place the aircraft over a shoreline community below the desired altitude

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Alternative 2D Develop Classic Procedure for non-FMS/GPS Equipped Aircraft To Increase Altitudes Over Land When Departing Runway 22R/L

- Mirrors **Alternative 1D**
- Modify the LOGAN TWO DEPARTURE to require departing aircraft to turn left to heading of 100 degrees
- Continue climb on the heading until sufficient altitude is reached to cross the shoreline or loop back over the airport above 12,000 feet MSL
- ATC vectoring technique should preclude excessively wide turns that could place the aircraft over a shoreline community below the desired altitude

Alternative 2E Develop Classic Procedure for non-FMS/GPS Equipped Aircraft To Increase Altitudes Over Land When Departing Runway 14

- Mirrors **Alternative 1E**
- Modify LOGAN TWO DEPARTURE by adding Runway 14
- Departure aircraft fly runway heading until 2 DME, then turn left to a heading of 100 degrees
- Climb on the assigned heading until sufficient altitude is reached to cross the shoreline of loop back over the airport above 12,000 feet MSL
- ATC vectoring technique should preclude excessively wide turns that could place the aircraft over a shoreline community below the desired altitude

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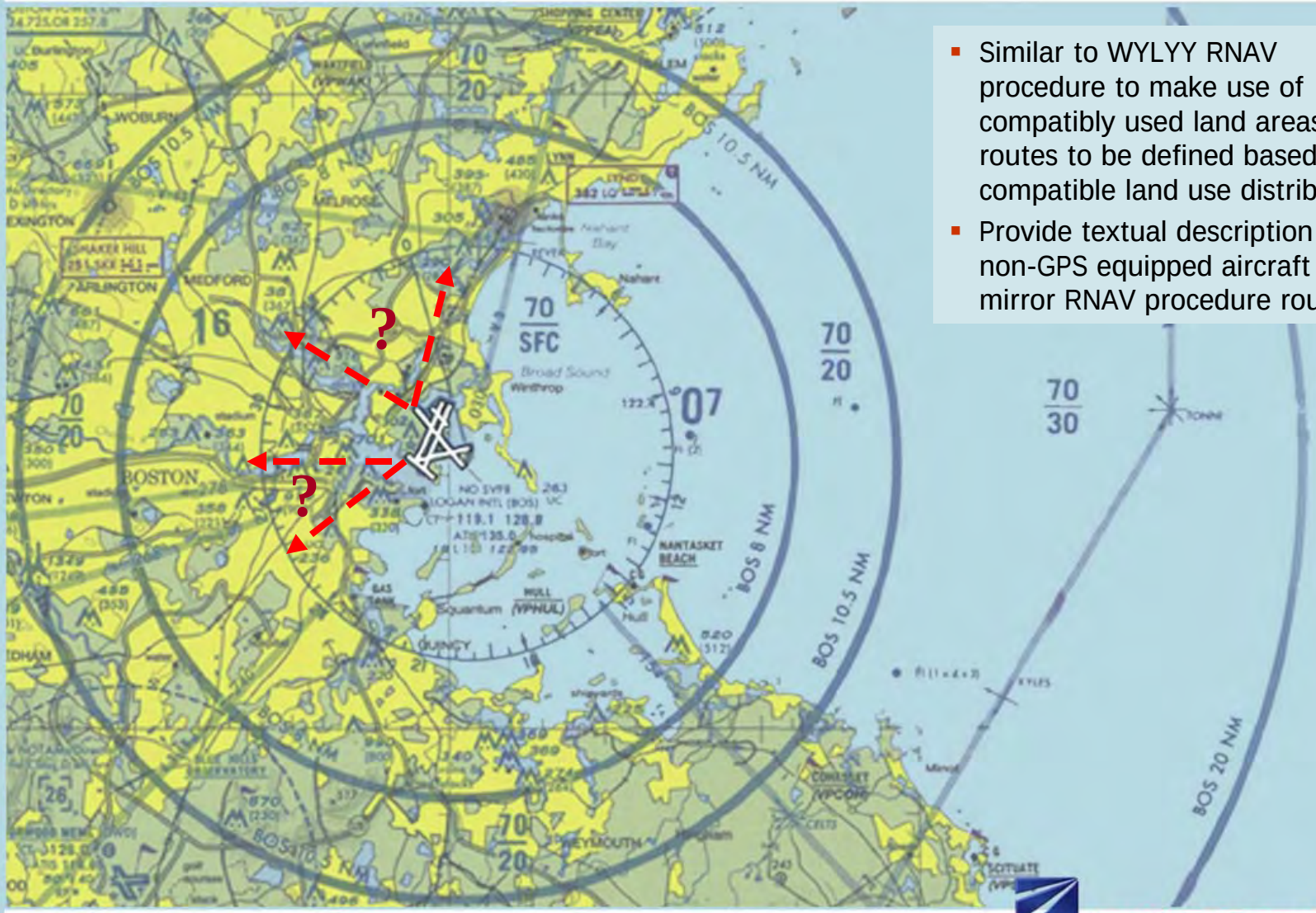
Alternatives 3 & 4 & 8

Develop RNAV and Classic Departures for Fanning From Runways 27 and 33



- Similar to WYLYY RNAV procedure to make use of compatibly used land areas – routes to be defined based on compatible land use distributions
- Provide textual description for non-GPS equipped aircraft to mirror RNAV procedure routes

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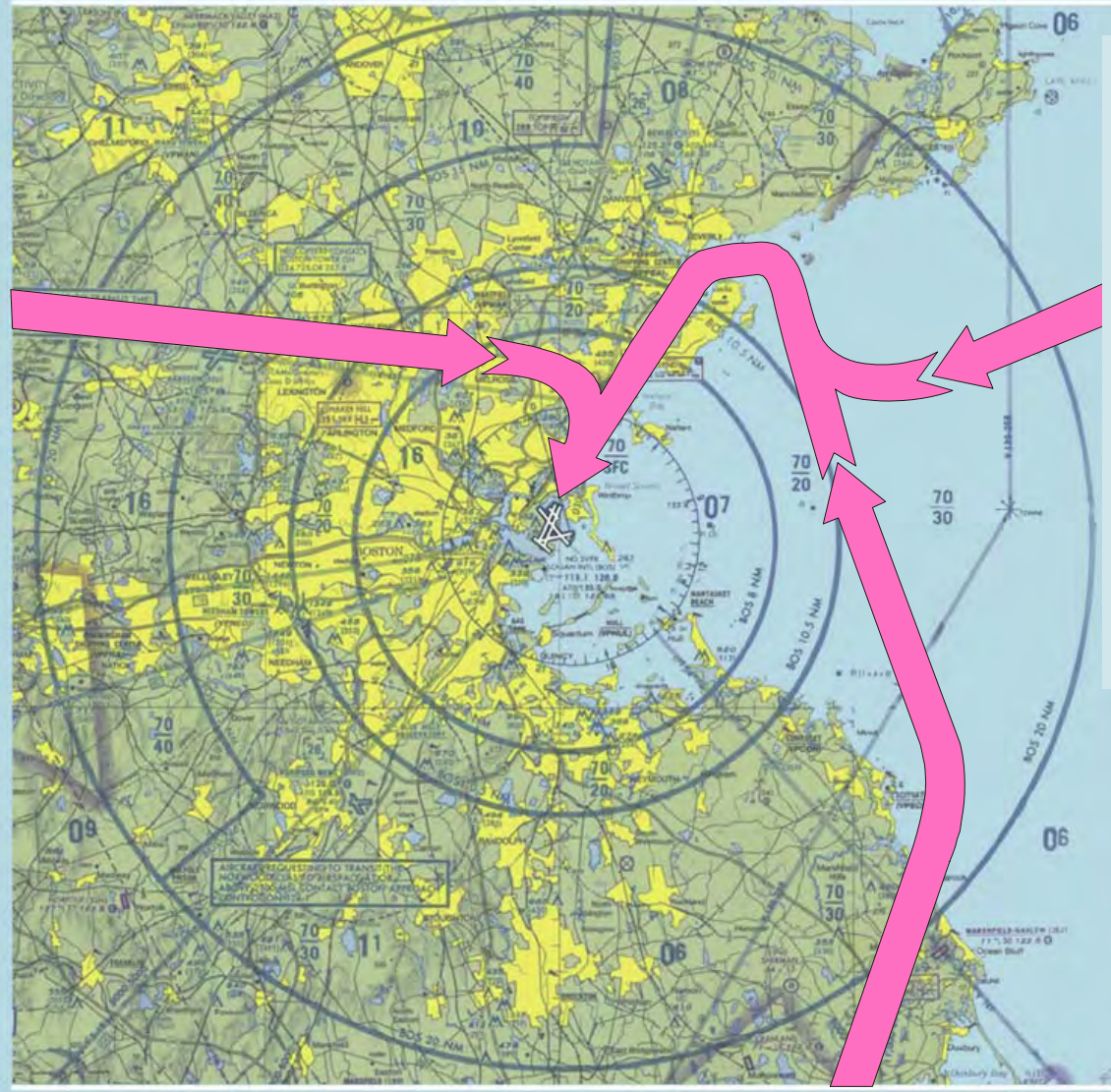
Alternative 5A Develop RNAV Approach Procedure to Runway 22R/L that Maximizes Flight Over Water



- Procedure currently available
- Develop RNAV STAR from Gardner VOR (Gardner Arrival)
- Develop RNAV STAR from Providence VOR (Norwich Arrival)
- Develop RNAV STAR from Marconi VOR (Scupp Arrival)
- Procedures should provide vertical guidance for constant descent (power off) while keeping aircraft as high as possible until over water

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Alternative 5A-1 Develop RNAV Approach Procedure to Runway 22R/L that Maximizes Flight Over Wat

- Procedure currently available
- Develop RNAV STAR from Gardner VOR (Gardner Arrival)
- Develop RNAV STAR from Providence VOR (Norwich Arrival)
- Develop RNAV STAR from Marconi VOR (Scupp Arrival)
- Procedures should provide vertical guidance for constant descent (power off) while keeping aircraft as high as possible until over water

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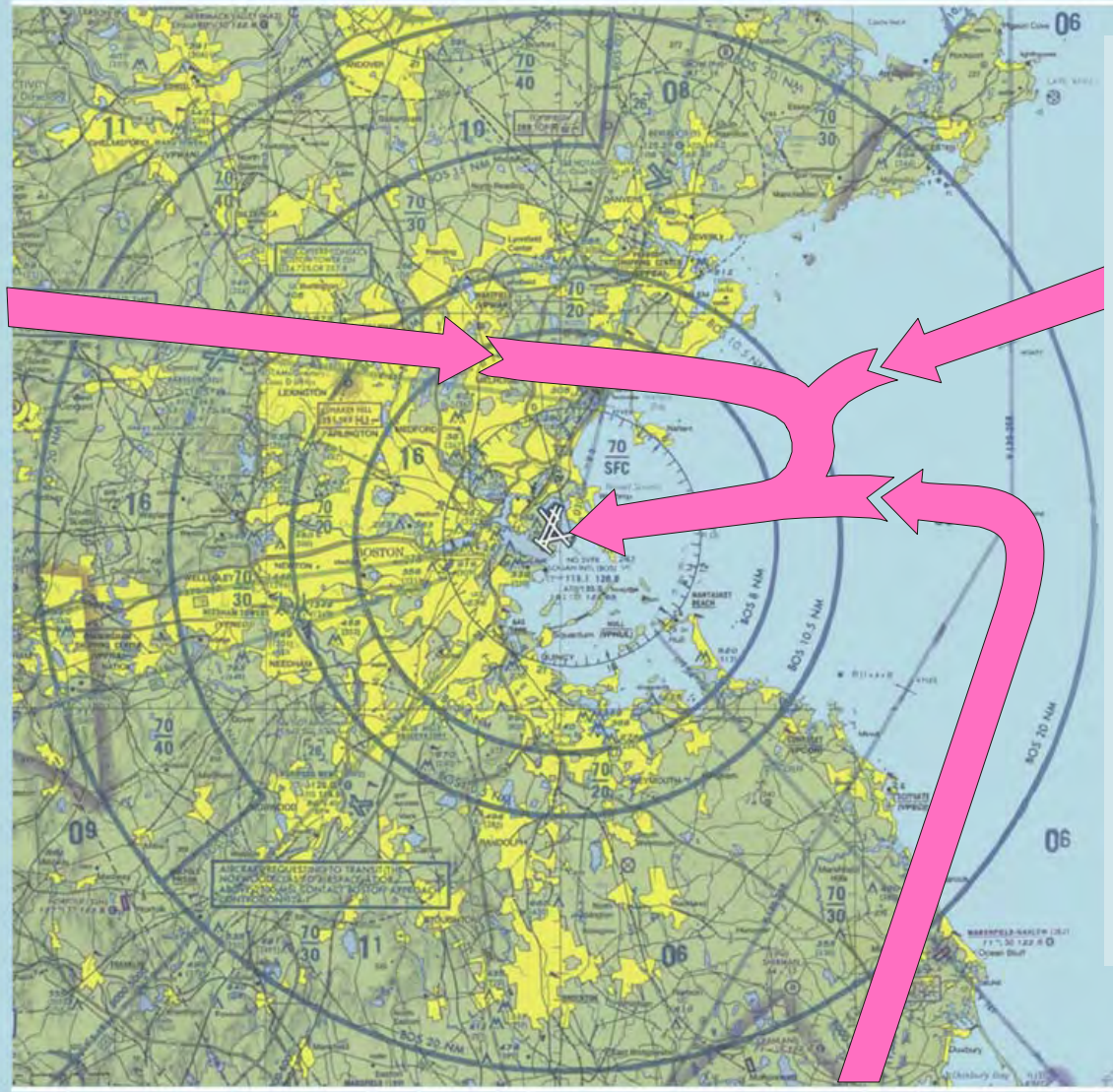
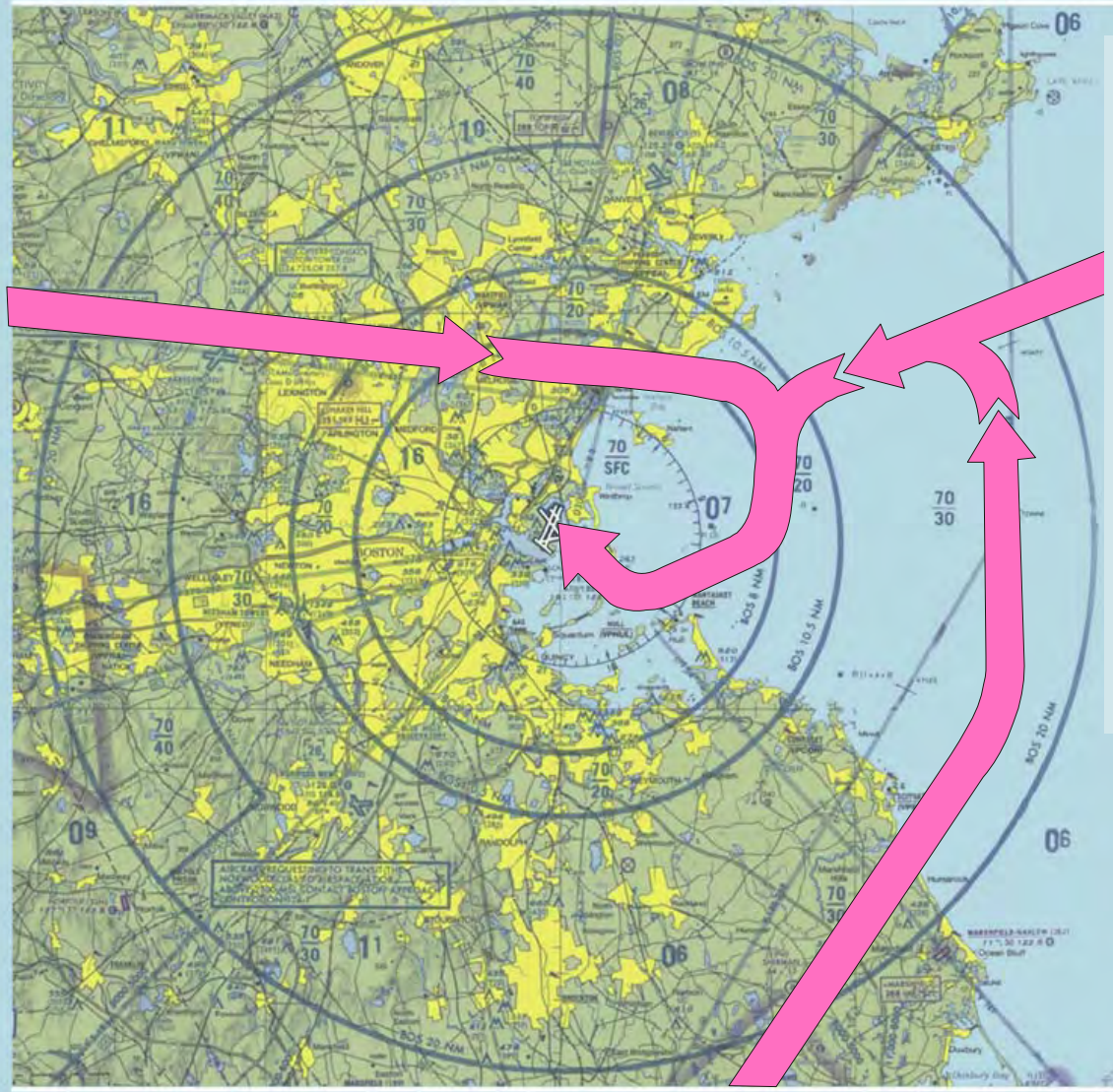
Alternative 5B Develop RNAV Approach Procedure to Runway 27 That Maximizes Flight Over Water



- Procedure currently available
- Develop RNAV STAR from Gardner VOR (Gardner Arrival)
- Develop RNAV STAR from Providence VOR (Norwich Arrival)
- Develop RNAV STAR from Marconi VOR (Scupp Arrival)
- Procedures should provide vertical guidance for constant descent (power off) while keeping aircraft as high as possible until over water
- Entry to final approach should be moved far enough to the east to allow takeoffs to climb unrestricted over the top of Runway 27 arrivals

Alternative 5C Develop RNAV Approach Procedure to Runways 33 That Maximizes Flight Over Water



- Procedure currently available
- Develop RNAV STAR from Gardner VOR (Gardner Arrival)
- Develop RNAV STAR from Providence VOR (Norwich Arrival)
- Develop RNAV STAR from Marconi VOR (Scupp Arrival)
- Procedures should provide vertical guidance for constant descent (power off) while keeping aircraft as high as possible until over water

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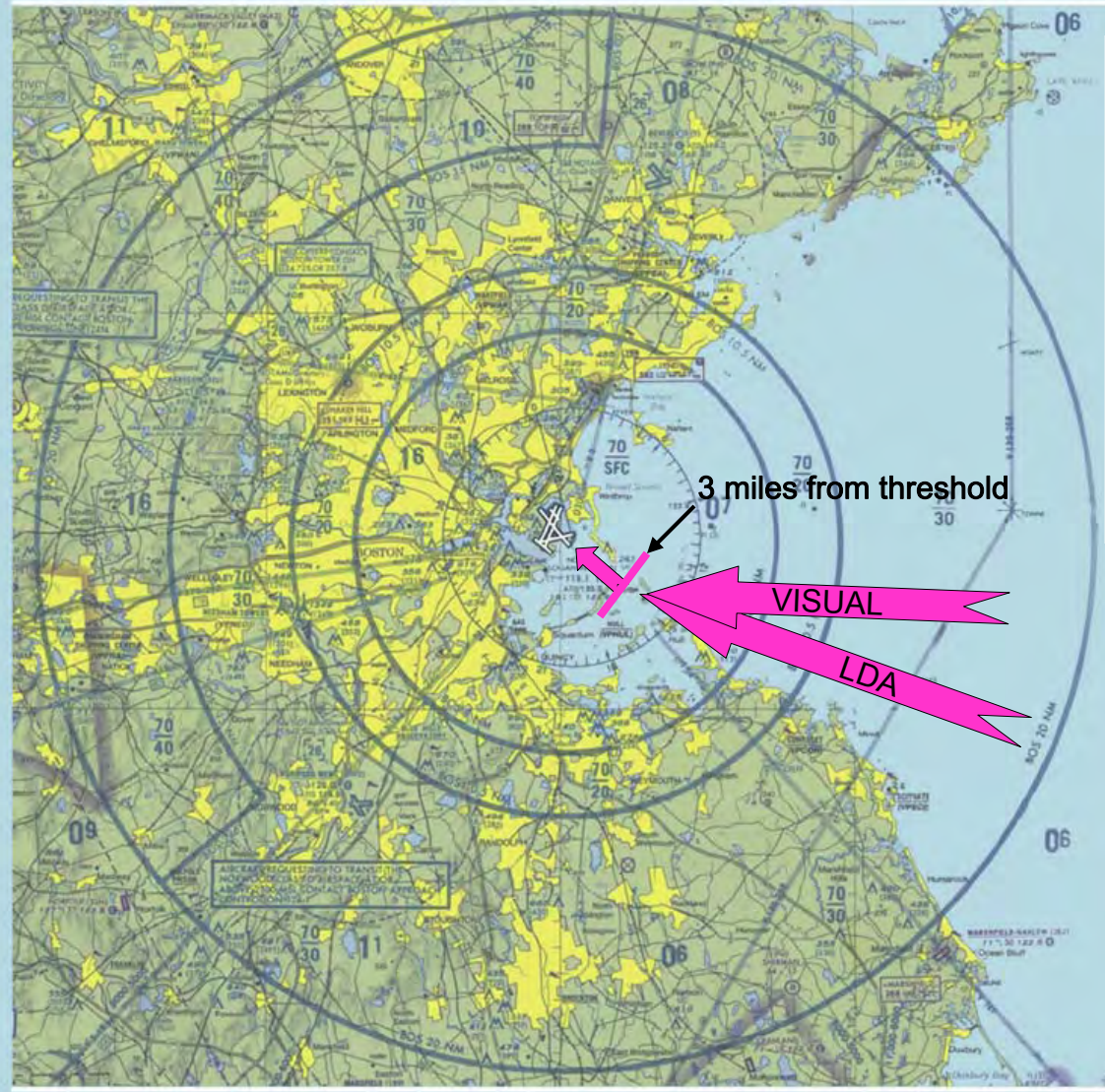
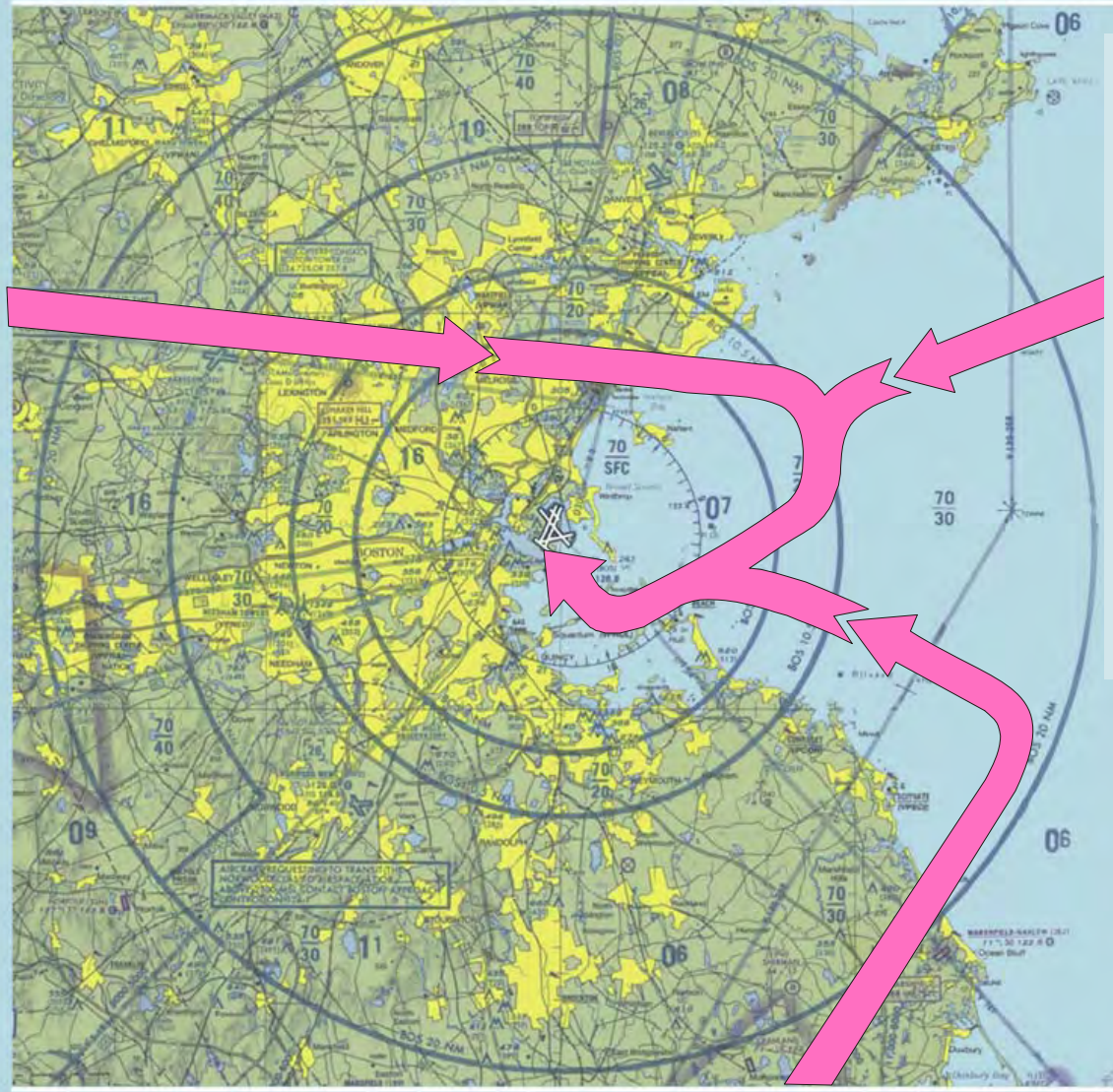
Alternative 5C-1 (Alternative 24)

Develop Visual or LDA Approach Procedure to Runways 33 and 32 That Reduces Flight Over Land



- Establish visual approach to Runways 33R/L and 32 that moves overland approaches to over water courses
- or
- LDA instrument approach to Runways 33 R/L and 32 that moves long overland approach above Cohasset and Scituate to over water course

Alternative 5D Develop RNAV Approach Procedure to Runway 32 That Maximizes Flight Over Water



- Develop RNAV STAR from Gardner VOR (Gardner Arrival)
- Develop RNAV STAR from Providence VOR (Norwich Arrival)
- Develop RNAV STAR from Marconi VOR (Scupp Arrival)
- Procedures should provide vertical guidance for constant descent (power off) while keeping aircraft as high as possible until over water

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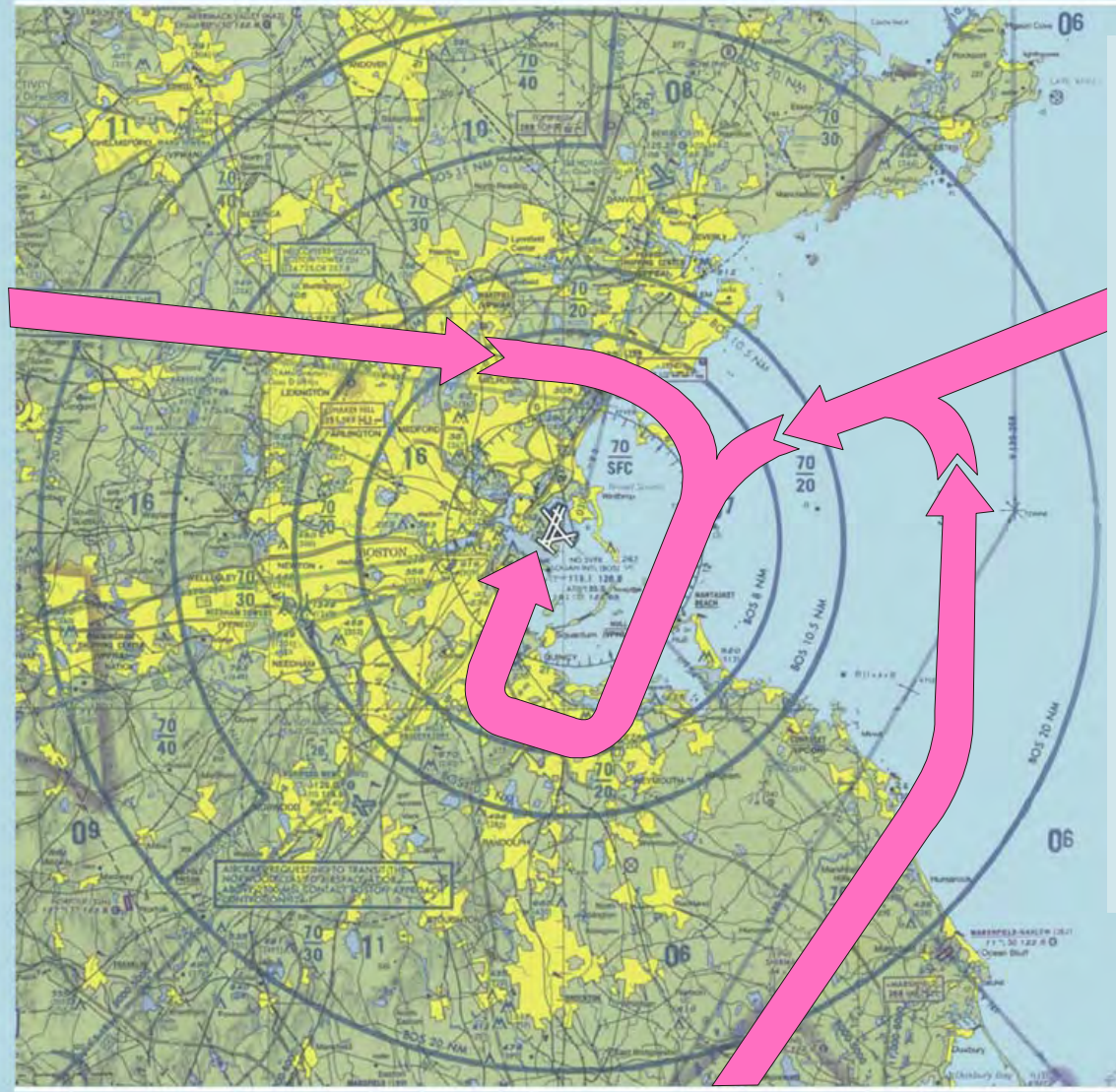
Alternatives 6A Develop RNAV Arrival Procedure for Runway 4L/R To Take Advantage of Water or Compatible Land Use



- Procedure currently available
- Develop RNAV STAR from Gardner VOR (Gardner Arrival)
- Develop RNAV STAR from Providence VOR (Norwich Arrival)
- Develop RNAV STAR from Marconi VOR (Scupp Arrival)
- Procedures should provide vertical guidance for constant descent (power off) while keeping aircraft as high as possible until over water
- Definitive preferred over-land courses will be dependent upon land use compatibility mapping

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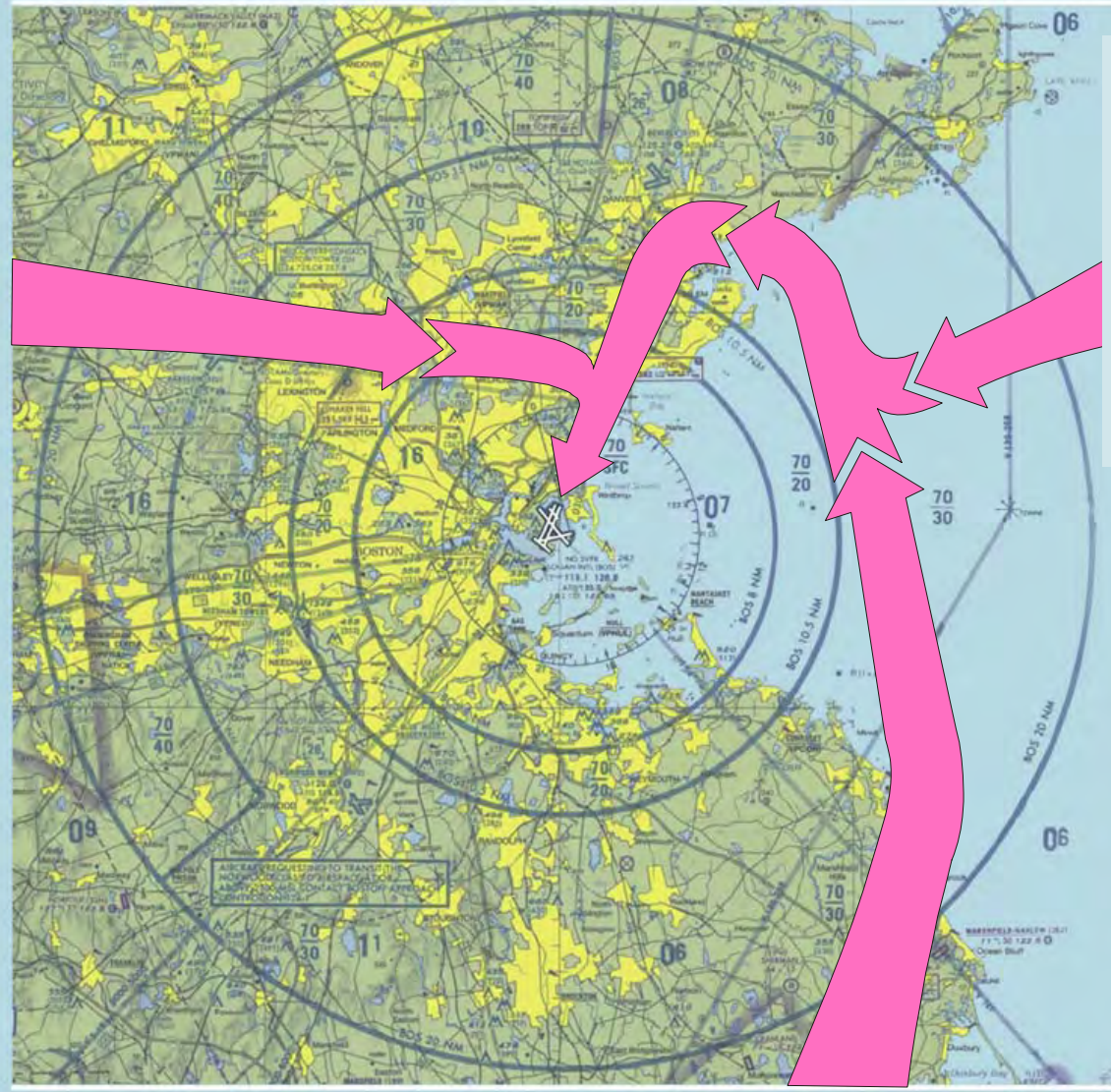
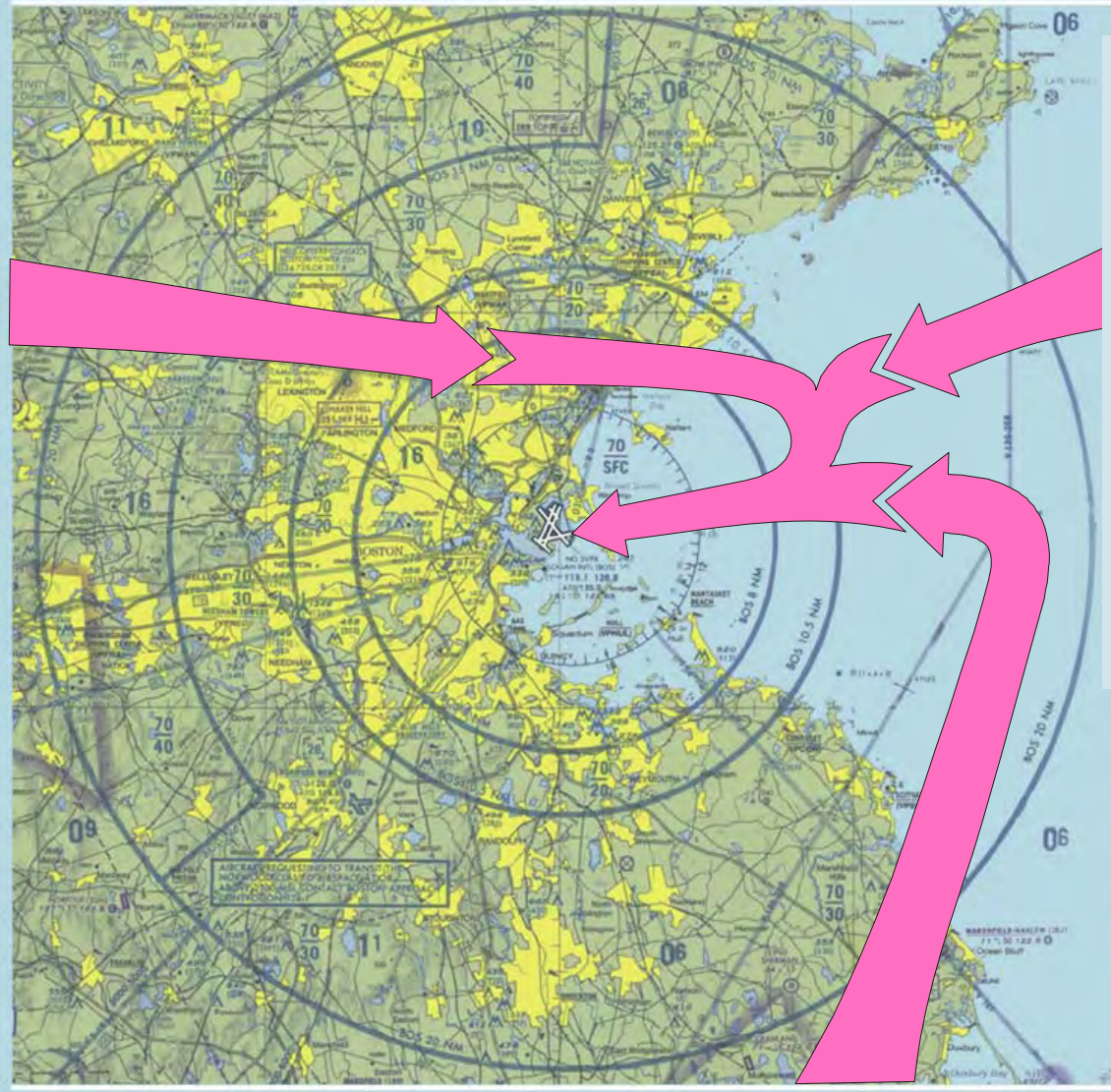
Alternative 7A Develop Classic Arrival Procedures to Mirror RNAV Arrival Procedures to Runway 22R/L



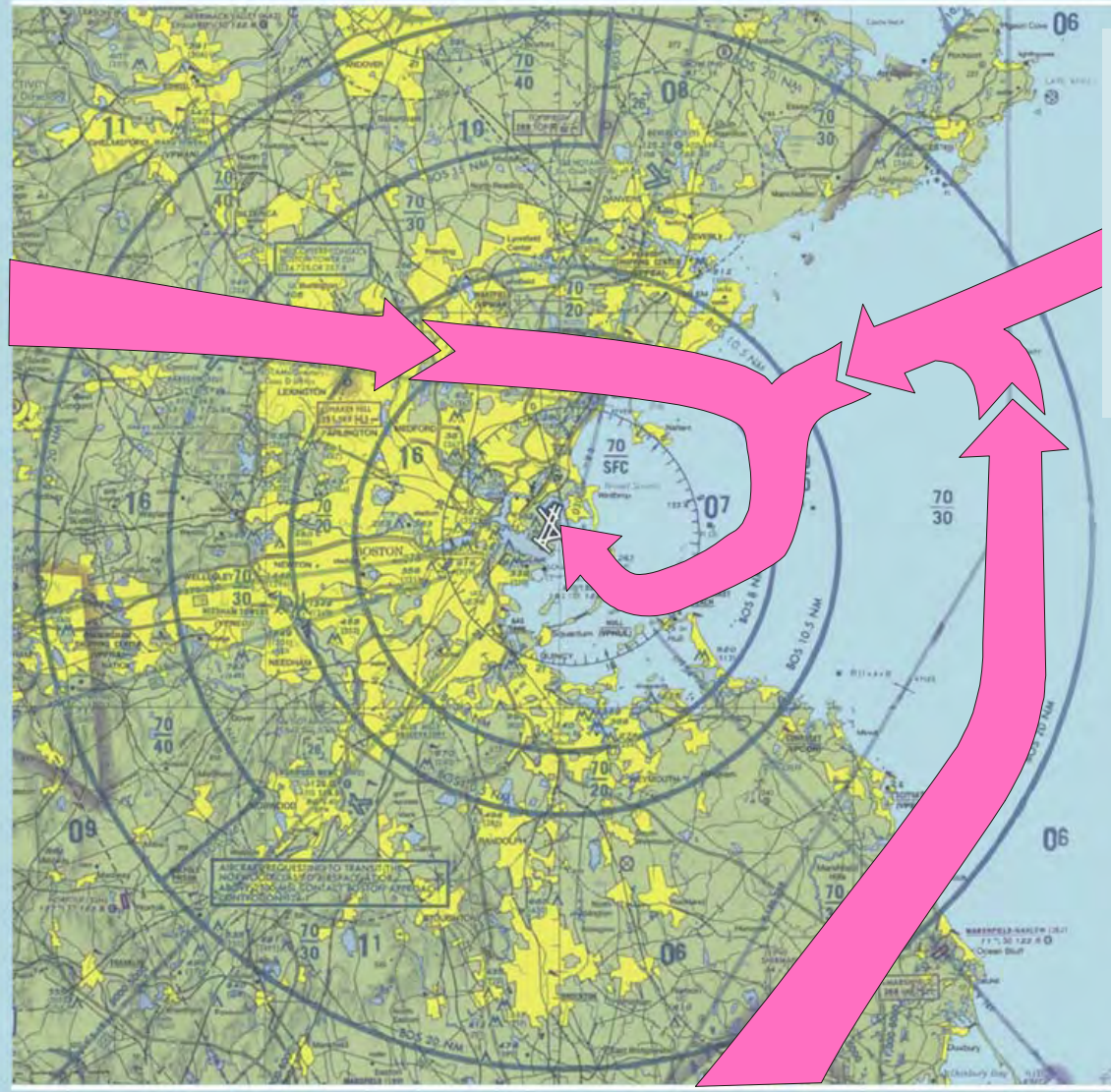
- Mirrors **Alternatives 5A/5A-1**
- Vertical guidance/crossing restrictions to mirror RNAV procedure
- Boston TRACON vector technique should conform to RNAV route width

Alternative 7B Develop Classic Arrival Procedures to Mirror RNAV Arrival Procedures to Runway 27



- Mirrors **Alternative 5B**
- Vertical guidance/crossing restrictions to mirror RNAV procedure
- Boston TRACON vector technique should conform to RNAV route width
- Entry to final approach should be moved far enough to the east to allow takeoffs to climb unrestricted over the top of Runway 27 arrivals

Alternative 7C Develop Classic Arrival Procedures to Mirror RNAV Arrival Procedures to Runway 33



- Mirrors **Alternative 5C**
- Vertical guidance/crossing restrictions to mirror RNAV procedure
- Boston TRACON vector technique should conform to RNAV route width

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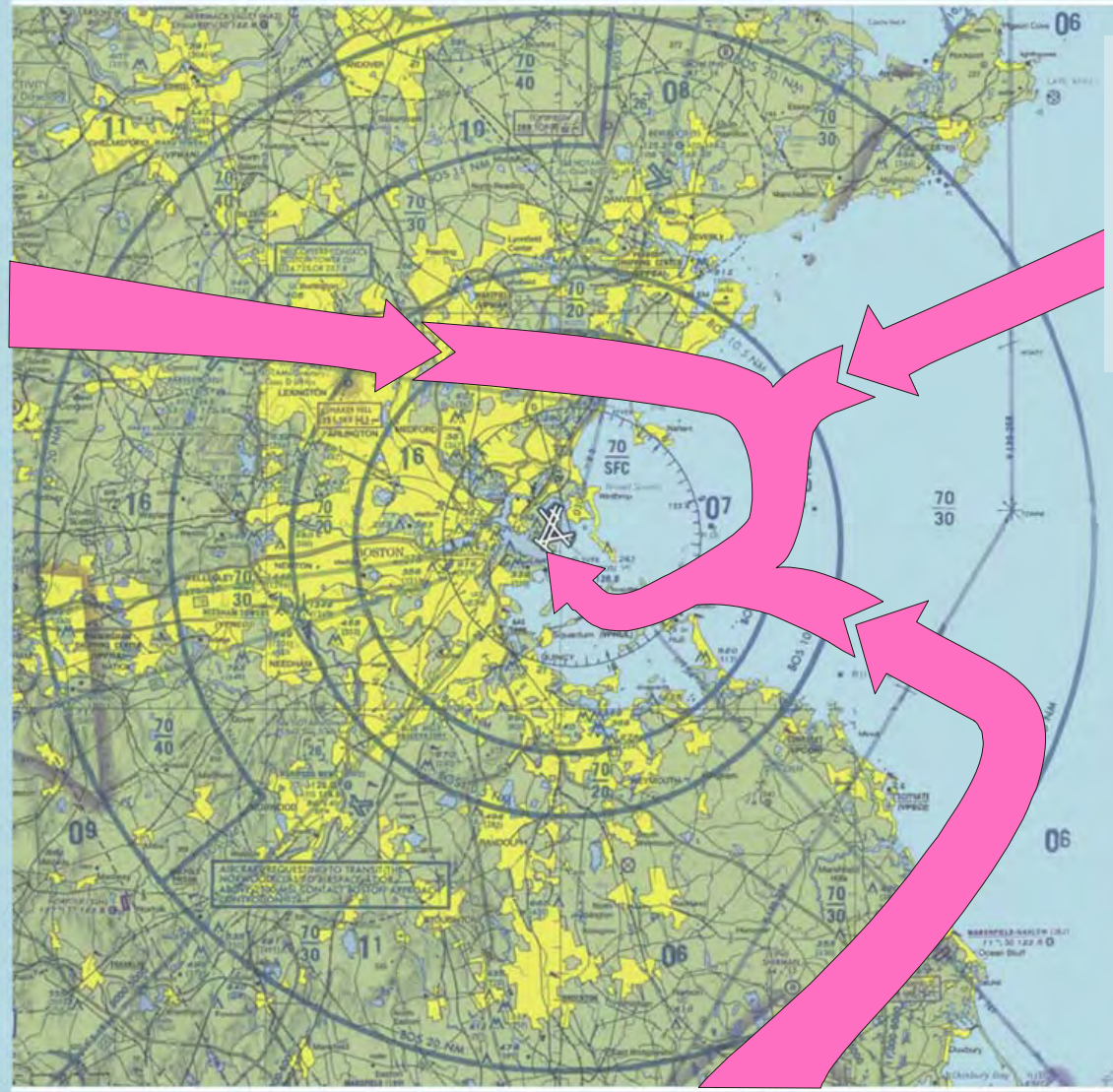
Alternative 7D Develop Classic Arrival Procedures to Mirror RNAV Arrival Procedures to Runway 32



- Mirrors **Alternative 5D**
- Vertical guidance/crossing restrictions to mirror RNAV procedure
- Boston TRACON vector technique should conform to RNAV route width

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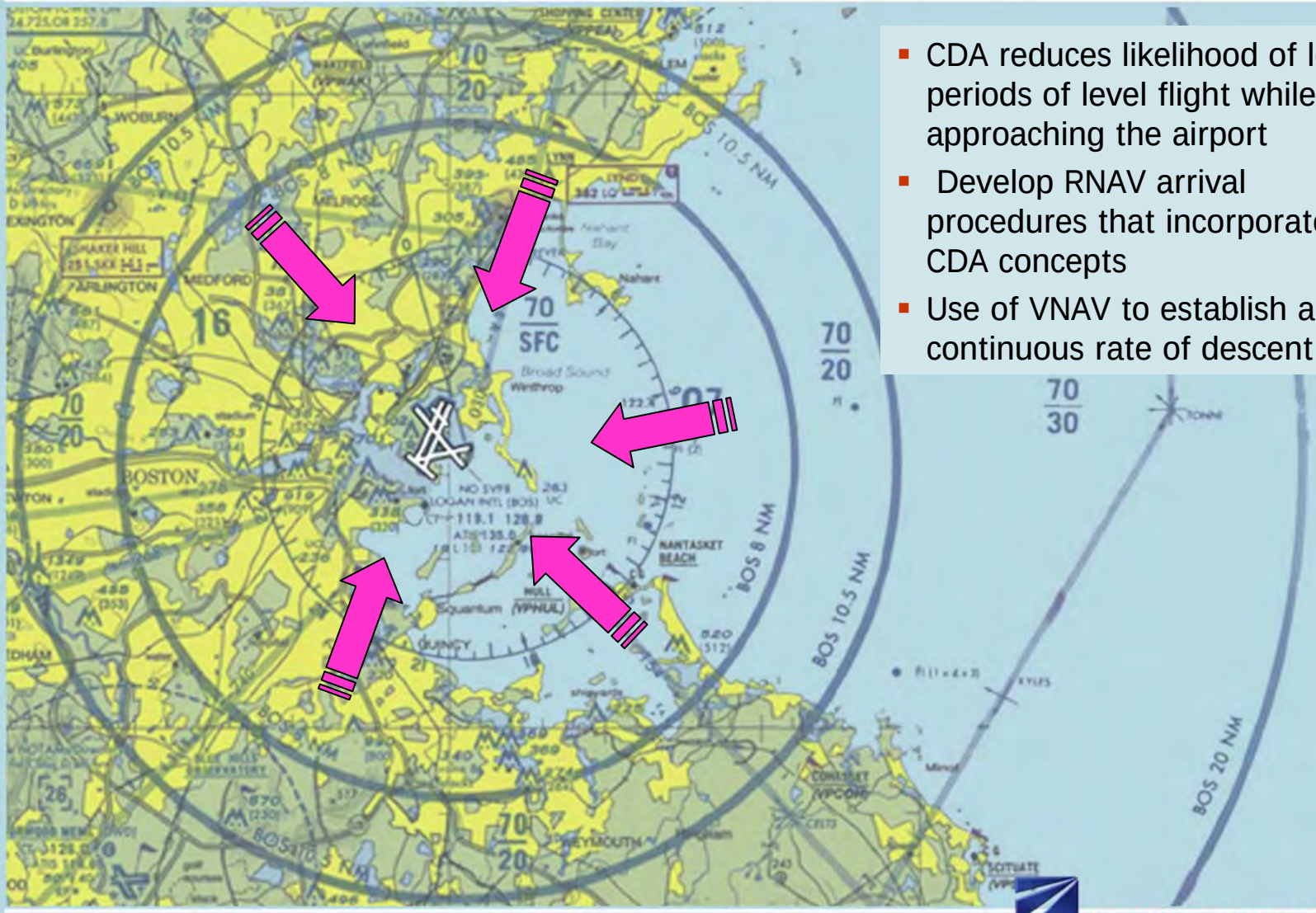
Alternative 9

Continuous Descent Approach (CDA) to All Runways



- CDA reduces likelihood of long periods of level flight while approaching the airport
- Develop RNAV arrival procedures that incorporate CDA concepts
- Use of VNAV to establish a continuous rate of descent

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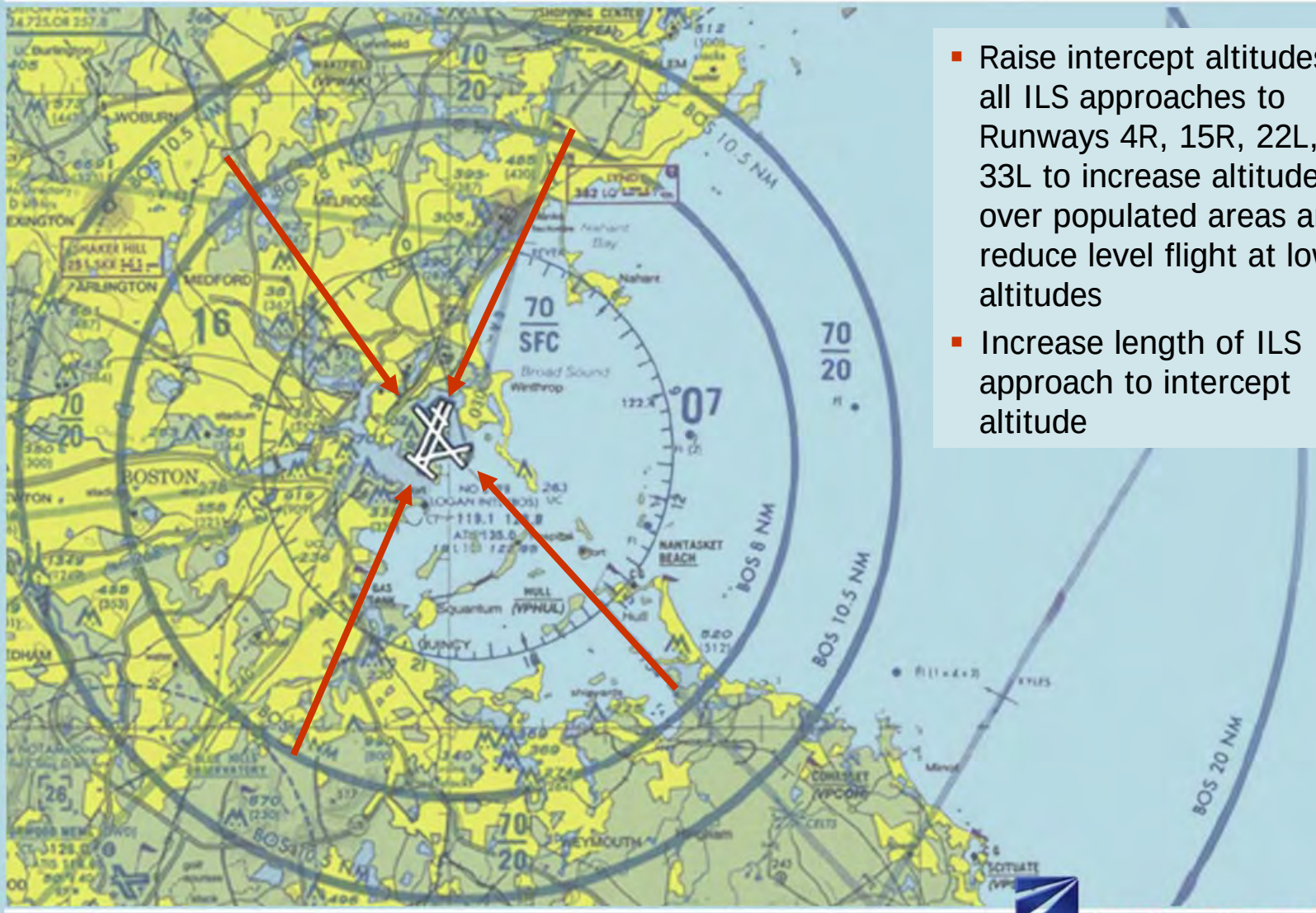
Alternative 10A

Raise Intercept Altitudes for ILS



- Raise intercept altitudes to all ILS approaches to Runways 4R, 15R, 22L, and 33L to increase altitude over populated areas and reduce level flight at low altitudes
- Increase length of ILS approach to intercept altitude

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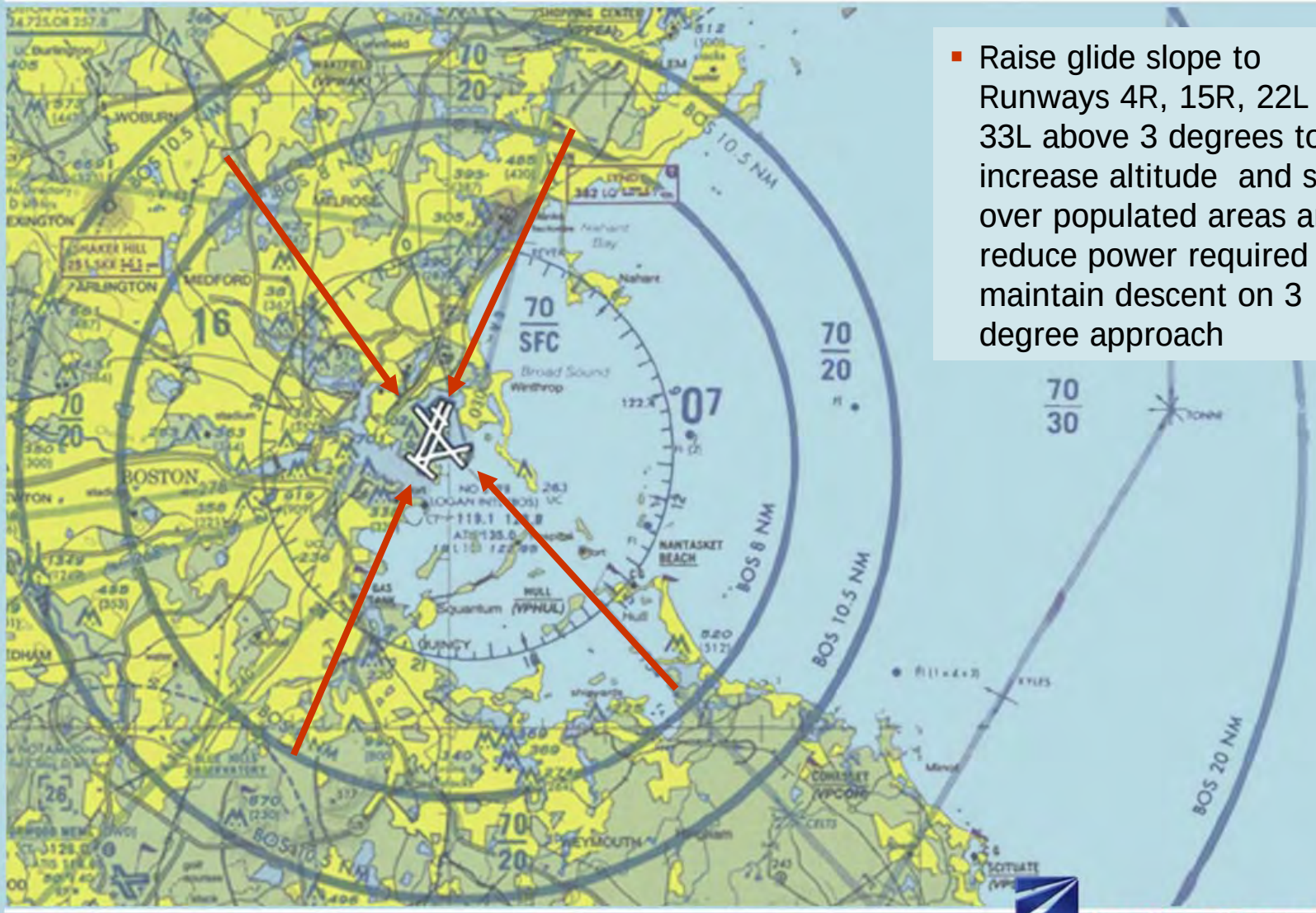
Alternative 10B

Raise Glide Slope Angle



- Raise glide slope to Runways 4R, 15R, 22L and 33L above 3 degrees to increase altitude and speed over populated areas and reduce power required to maintain descent on 3 degree approach

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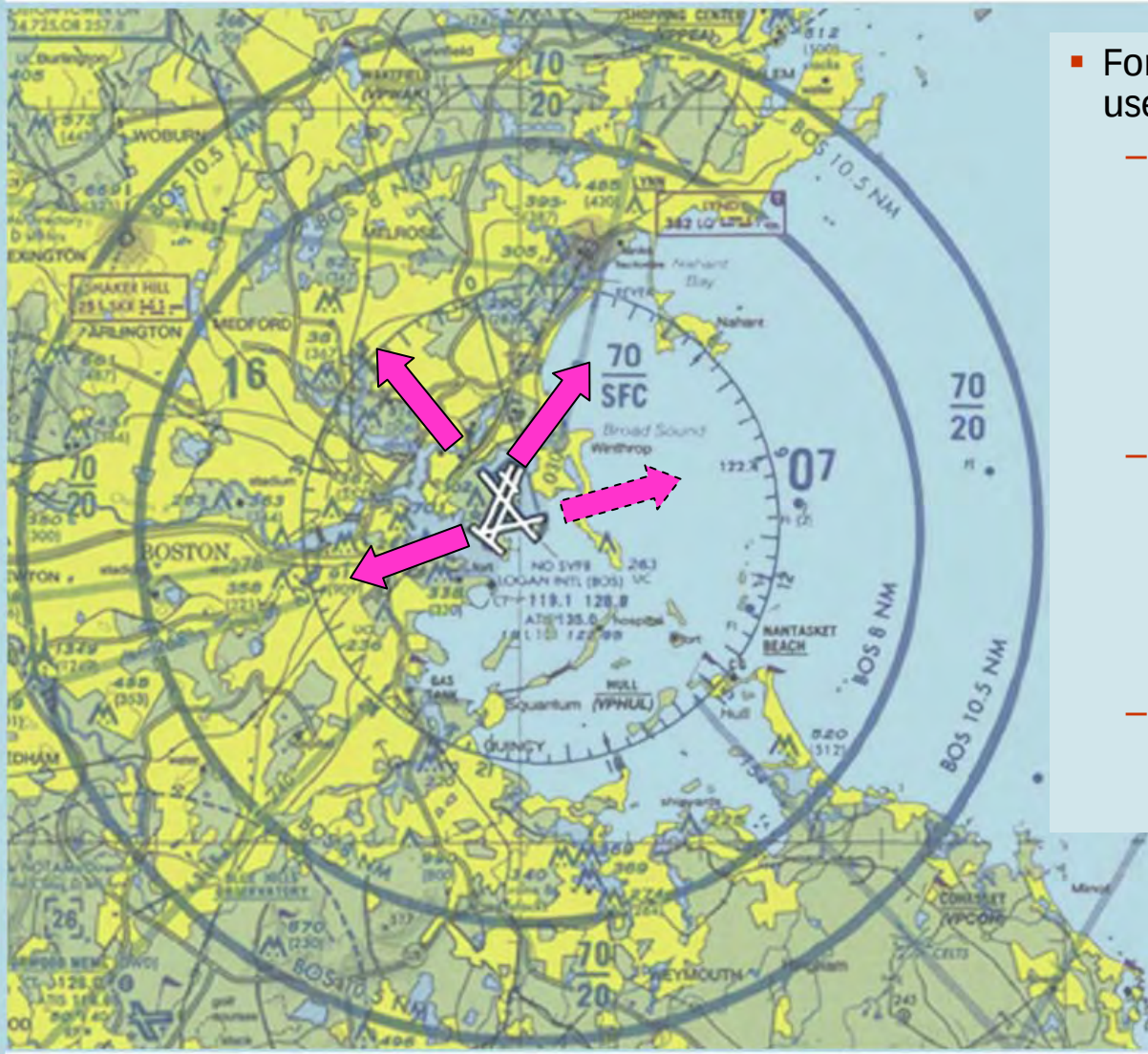
Alternative 11

Cockpit Alternatives – Takeoff Runways 4, 9, 27 & 33



- For Runways 4, 9, 27 & 33 - use close-in NADP
  - Thrust cutback at 800 feet AAE and prior to slat/flap retraction (if radar data indicates takeoffs from 9 are less than 800' over Winthrop, drop 9)
  - Maintain the reduced speed and thrust necessary to comply with engine-out climb gradients until 3,000 feet AAE
  - Maximize use of reduced thrust on takeoff roll

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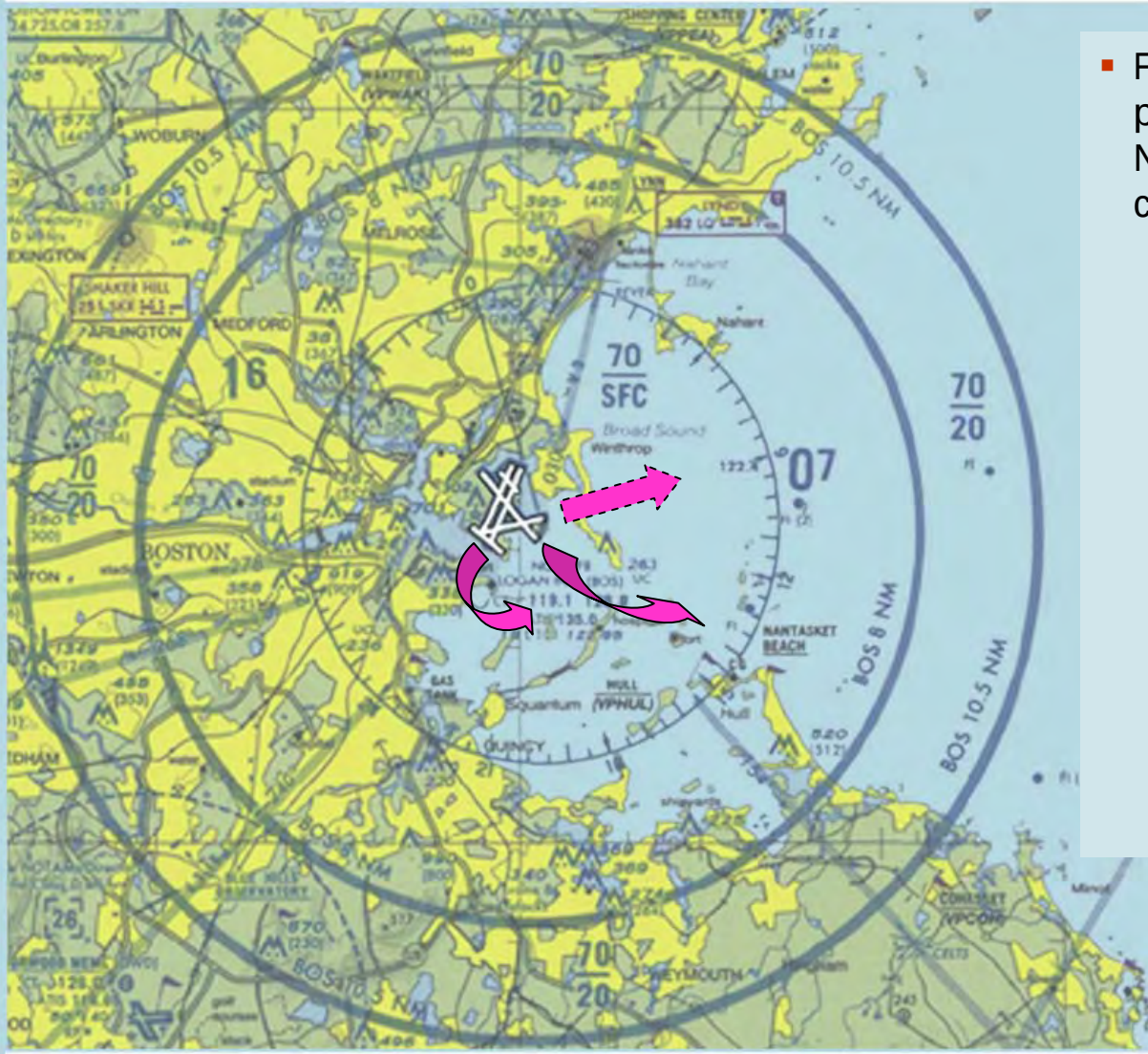
Alternative 11 (continued)

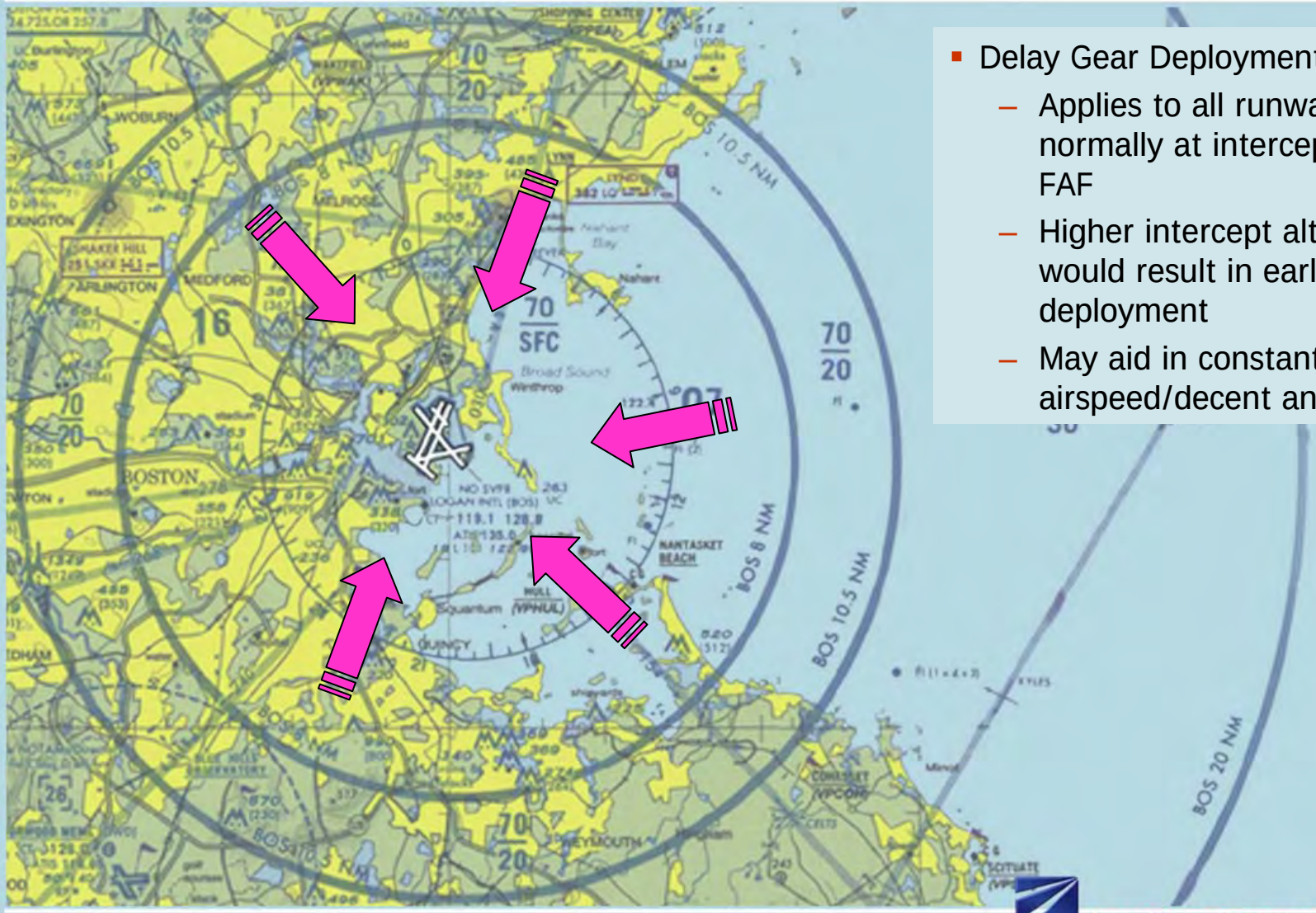
Cockpit Alternatives – Takeoff Runways 22 & 15 (and perhaps 9)



- For Runways 22 & 15 (& perhaps 9) use distant NADP or maximum rate of climb
  - Thrust cutback following slat/flap retraction (above 1200' AGL)
  - Maintain the reduced speed and thrust necessary to comply with engine-out climb gradients until 3,000 feet AAE
  - Maximize use of reduced thrust on takeoff roll

Alternative 12

Cockpit Alternatives – Delay Gear Deployment on Arrival



- Delay Gear Deployment
  - Applies to all runways, normally at intercept or FAF
  - Higher intercept altitude would result in earlier deployment
  - May aid in constant airspeed/decent angle

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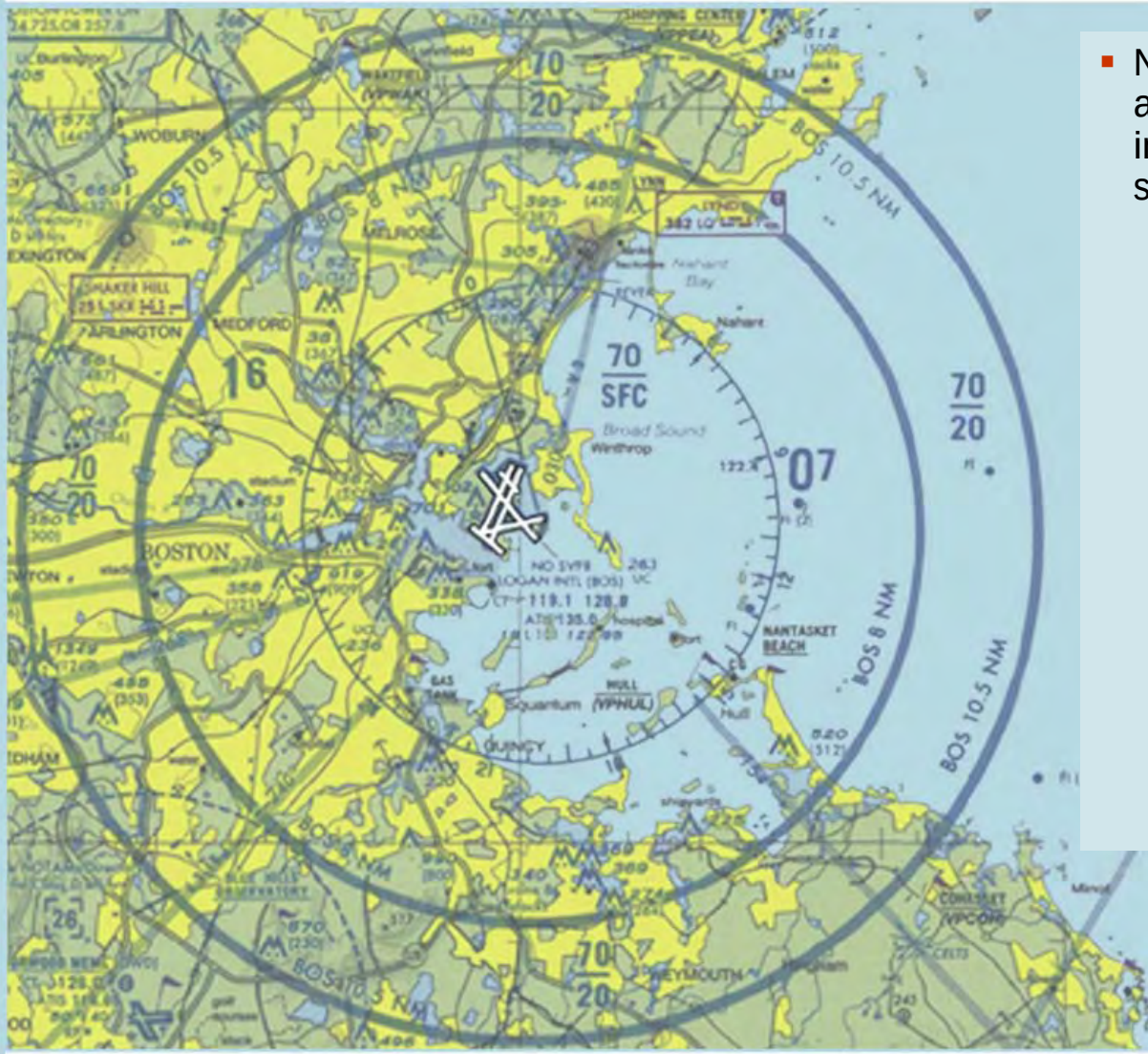
Alternative 13

Seek Opportunity for Implementation of Procedures in Off-Peak Hours



- Numerous examples around the country of implementation during selected hours
  - ORD, LAX, DCA
  - Preferential Runway
  - Preferential Tracks
  - Night time hours generally midnight to 6 a.m. at surveyed domestic airports
  - May require FAA waiver for tailwind components
  - Current utility of Runway 33L for landing and 15R for takeoffs at night

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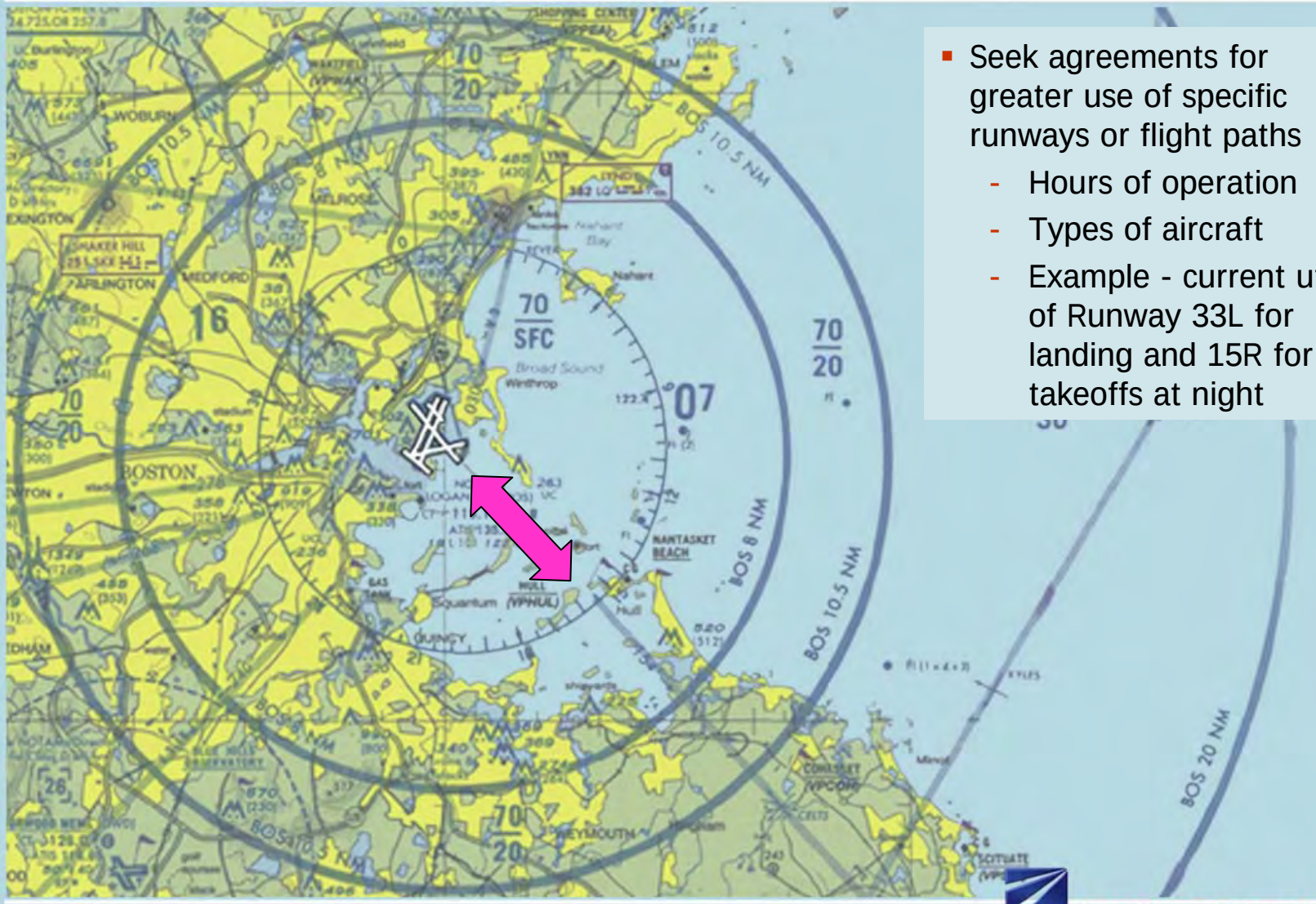
Alternative 14

Seek Voluntary Agreements with Night Operators



- Seek agreements for greater use of specific runways or flight paths
  - Hours of operation
  - Types of aircraft
  - Example - current utility of Runway 33L for landing and 15R for takeoffs at night

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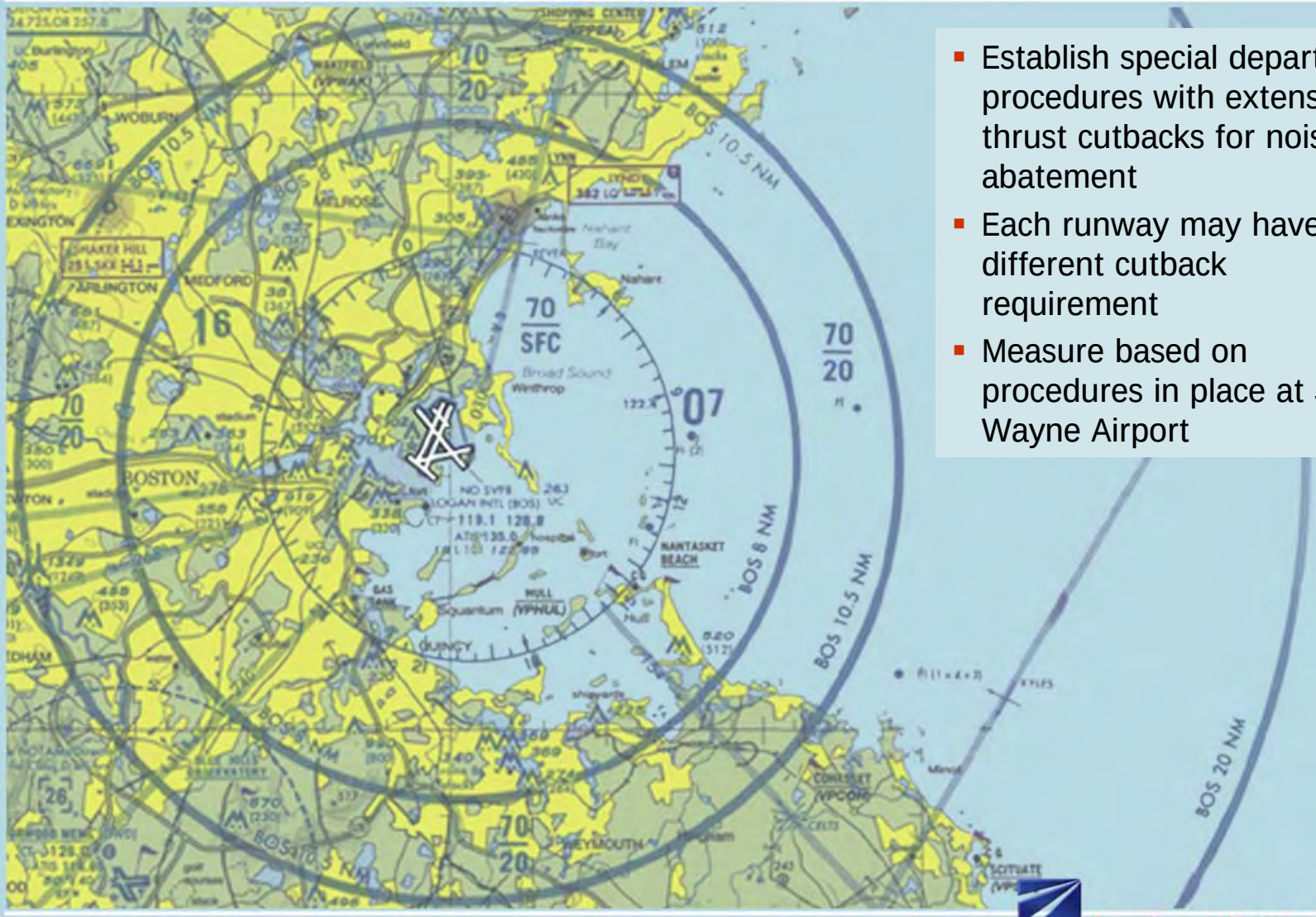
Alternative 15

Implement Major Power Reduction for Takeoffs on Runways 9, 27 & 33



- Establish special departure procedures with extensive thrust cutbacks for noise abatement
- Each runway may have a different cutback requirement
- Measure based on procedures in place at John Wayne Airport

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Alternative 35

Visual Approach to Runways 22 R/L & 33L – Circle to Land Runways 22R/L and 33L

- Using the Runway 27 approach transition procedures, circle to establish Visual Approaches to Runways 22R/L over the neck at Nahant to avoid over flight of populated areas of north shore
- Using the Runway 27 approach transition procedures, circle to establish Visual Approaches to Runways 33L north of Hull to avoid over flight of populated areas of south shore

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