

MEMORANDUM
Ricondo & Associates, Inc.

Via E-Mail

Date: December 14, 2007
To: Sandra Kunz, CAC
From: Chris Jones, R&A _____
Subject: Additional Question Regarding Fanned Departure Procedures

On November 11, 2007, CAC member Will Lyman asked this additional question of the FAA:

“Please investigate the success of fanning departure procedures recommended or flown at Dallas, Las Vegas and Atlanta airports. What were the results of population DNL increases, and did the public support those procedures once implemented? If not, what were the reasons.”

Additional information collected indicates that fanned departure heading are not utilized at Dallas-Fort Worth International Airport, Las Vegas McCarran International Airport, or Hartsfield-Jackson Atlanta International Airport. However, the preferred alternative in the Draft F.A.R. Part 150 Update prepared for Hartsfield-Jackson Atlanta International Airport and currently being reviewed by the FAA does include fanned departure headings. Each airport and the departure procedures utilized are discussed in greater detail below.

Dallas Fort Worth International Airport (DFW): DFW currently operates seven runways; Runway 17C/35C, Runway 17R/35L, Runway 18L/36R, Runway 18R/36L, Runway 13R/31L, Runway 13L/31R, and Runway 17L/35R. DFW does not use fanned departure headings off any of its runways. As described in the prior memorandum on this topic, fanned departure headings require assignment of headings off the runway that are 15 degrees left or right of the headings issued to the previously departing aircraft. Runways 17R/35L and 18L/36R are the preferred runways for jet aircraft departures at DFW, handling a combined 97 percent of total jet departures in 2006. Measures implemented to mitigate potential noise impacts to the surrounding community require all departing jet aircraft to maintain a runway heading for at least five nautical miles (nm) before turning. **Exhibit 1** shows flight tracks off Runways 17R/35L for both jet and propeller aircraft. As can be seen from the figure, departing jet aircraft head straight out from the runways prior to turning at some distance from the airport.

Departing propeller aircraft may turn to divergent headings once they have reached a minimum safe altitude. Under FAA regulations, minimum safe altitude varies based upon the type of environment, but is generally no less than 500 feet above ground in a sparsely populated environment or 1,000 feet

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above ground in a heavily populated environment.¹ Currently, BOS also provides divergent headings for propeller aircraft, similar to those issued at DFW.

According to the results of a noise analysis conducted in 1992, the 65 DNL contour is generally limited to airport property; therefore, the use of fanned departure headings as noise mitigation measures would not be necessary.² Based on the 1992 noise contours produced at DFW, it can be surmised that the intended purpose of the above described noise abatement measure is to limit, as much as possible, the 65 DNL contour to DFW property.

Las Vegas McCarran International Airport (LAS): LAS currently operates four runways; Runway 7L/25R, Runway 7R/25L, Runway 1R/19L, and Runway 1L/19R. LAS does not use fanned departure headings off any of its runways. On limited occasions, northbound, non-RNAV departures off Runway 1R will be provided an early left turn vector to the west should the subsequent departure be an eastbound departure. However, this procedure is not what is generally considered a fanned departure heading whereby departing aircraft are given divergent headings 15 degrees left or right of the previously departing aircraft following clearance for takeoff. In addition, the northbound departure operation is not predominant during the year, representing only 10 to 20 percent of departures.

In general, aircraft using the other runways at LAS, representing 80 to 90 percent of departure operations, follow runway headings upon departure. Aircraft departing Runway 25R continue on course for four to six miles before turning north, for northeast bound RNAV departures, or south, for southeast, southwest, and northwest departures. Southbound departures off Runway 25R cross at the ROPPR waypoint, located approximately ten nm southwest of LAS. Aircraft departing off Runway 19L (and the occasional departure off Runway 19R) all follow a common path south for approximately five nm, before turning west-southwest for another five to six miles, passing over the ROPPR waypoint, then turning northwest, southwest, or southeast. **Exhibit 2** depicts the generalized departure flight tracks for LAS as of 2004.

The noise exposure maps produced for the 2006 F.A.R. Part 150 noise study update at LAS show that as of 2004 the highest noise levels produced at the airport result from departures off Runways 25R and 19L. Noise resulting from these operations is concentrated within the west and south lobes of the airport's noise exposure contours and is generally concentrated over wide areas of vacant land, with some land zoned for industrial and commercial purposes. Approximately 539 residences are located within these areas of the 65+ DNL contour.

Hartfield-Jackson Atlanta International Airport (ATL): ATL currently operates five runways; Runway 9L/27R, Runway 8R/26L, Runway 9R/27L, Runway 8L/26R, and Runway 10/28.

¹ F.A.R. Part 91, Sec. 91.119.

² Dallas/Fort Worth International Airport Noise Compatibility/Community Commitments VFR2030 – Airside Charrette, November 16, 2007.

Currently, ATL does not use fanned departure headings off any of its runways. However, the City of Atlanta Department of Aviation is currently conducting a F.A.R. Part 150 noise study for ATL that proposes the use of two departure headings each off two different runways as the preferred noise abatement procedure alternative. The FAA has not yet approved the noise abatement procedure and it is not currently in effect.

The preferred noise abatement departure procedure, ADH-5, proposes two departure headings of 90 and 105 degrees off Runway 9L for eastbound flights and 270 and 295 degrees off Runway 26L for westbound flights during non-peak hours. These procedures would be utilized during daytime hours only (7:00 a.m. to 10:00 p.m.) and only when Runway 10/28 is not in operation. The noise abatement procedure would be used solely during conditions when two runways are in operation, with single headings issued for departures during conditions when all three runways are operational during peak operational hours. **Exhibit 3** depicts the departure headings included in the preferred alternative.

This noise abatement procedure alternative was determined to be the best method of achieving “a balance between airfield flexibility for departure use and the desired reduction in incompatible land uses with aircraft noise exposure.”³ Table 1 shows the results of the noise analysis conducted for these procedures. Analysis indicates that the two-departure heading measure would result in an approximate 10 percent reduction in the number of households, general population, and low-income population impacted by noise. In addition, the noise abatement procedure would result in an 11 percent reduction in the minority population impacted by noise.⁴ All other runway ends will still have single departure headings due to the wide compatible areas the existing route overflies presently.

Table 1
 Population Impact Comparison: 2010 Baseline vs. 2010 Preferred Alternative

| Scenario | Number of | | | |
|---------------------------------------------|------------|------------|---------------------|-----------------------|
| | Households | Population | Minority Population | Low-Income Population |
| 2010 Baseline | 9,343 | 24,092 | 22,439 | 4,926 |
| 2010 Preferred Alternative (ADH-5) | 8,428 | 21,589 | 19,993 | 4,440 |
| Change With Preferred Alternative (ADH-5) | -915 | -2,503 | -2,446 | -486 |
| % Change With Preferred Alternative (ADH-5) | -9.8 | -10.4 | -10.9 | -9.9 |

Source: PEQ, Hartfield-Jackson Atlanta International Airport, F.A.R. Part 150 Draft Noise Study, 2006
 Prepared by: Ricondo & Associates, Inc.

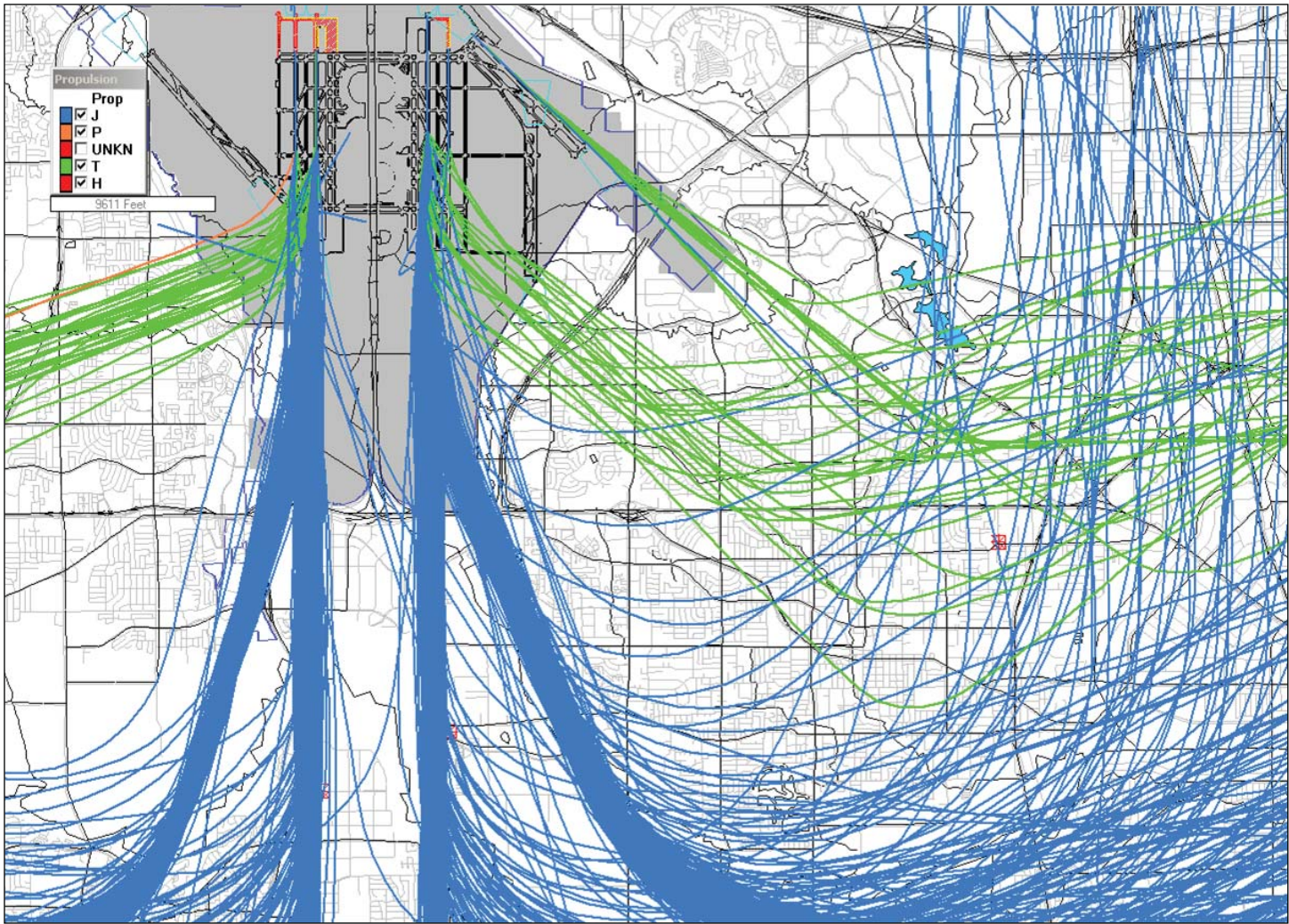
³ Hartfield-Jackson Atlanta International Airport, F.A.R. Part 150 Draft Noise Study, Pg. 5-5, 2006.

⁴ Id., Pg. 5-6.

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Currently, ATL has single departure headings for each runway in order to direct flights over compatible areas. In 2005, RNAV procedures were implemented to ensure that aircraft remain within a relatively narrow corridor upon departing the airport. DFW and LAS also extensively use RNAV procedures. In comparison, fanned departure headings seek to more broadly disperse aircraft over a wider area. Currently, there does not appear to be an efficient technical means of utilizing both divergent runway headings and RNAV procedures from the same runway at the same time. Unlike the environment in which BOS is situated, wide swathes of area surrounding ATL are dominated by noise compatible land uses. The use of RNAV procedures helps to concentrate both overflights and resultant noise in these areas, minimizing noise impacts to non-compatible land uses in other areas. **Exhibit 4** depicts flight tracks both before and after implementation of RNAV procedures, demonstrating the narrowed corridors resulting from use of RNAV procedures.

cc: Terry English, FAA
Jerry Falbo, CAC
Will Lyman, CAC
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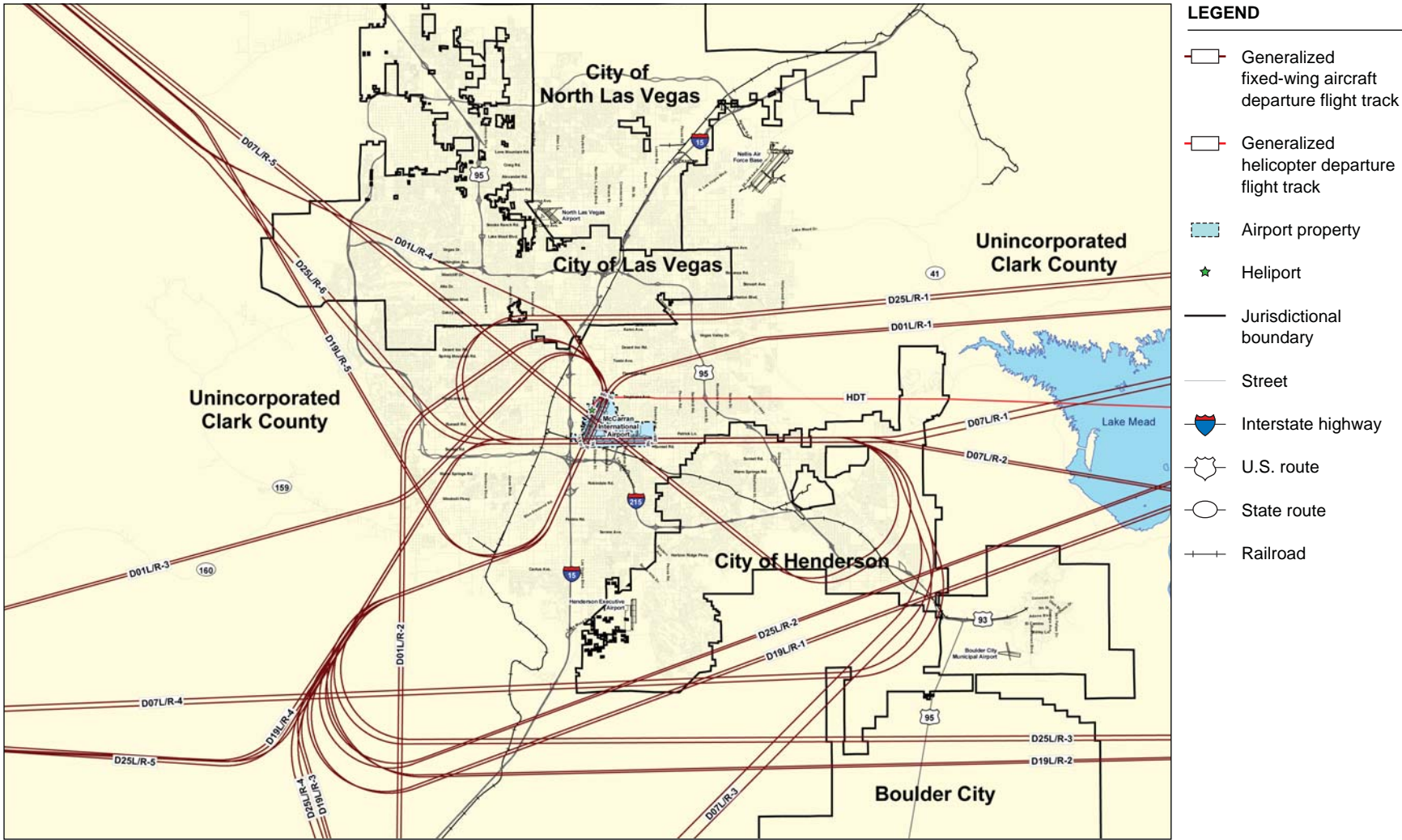


Note:
Runway 17L approved
departure path
(not typically used)

Source: Dallas/Forth Worth International Airport Noise Compatibility/Community Commitments VFR2030 - Airside Charrette, November 16, 2007
Prepared by: Ricondo & Associates, Inc.

Exhibit 1

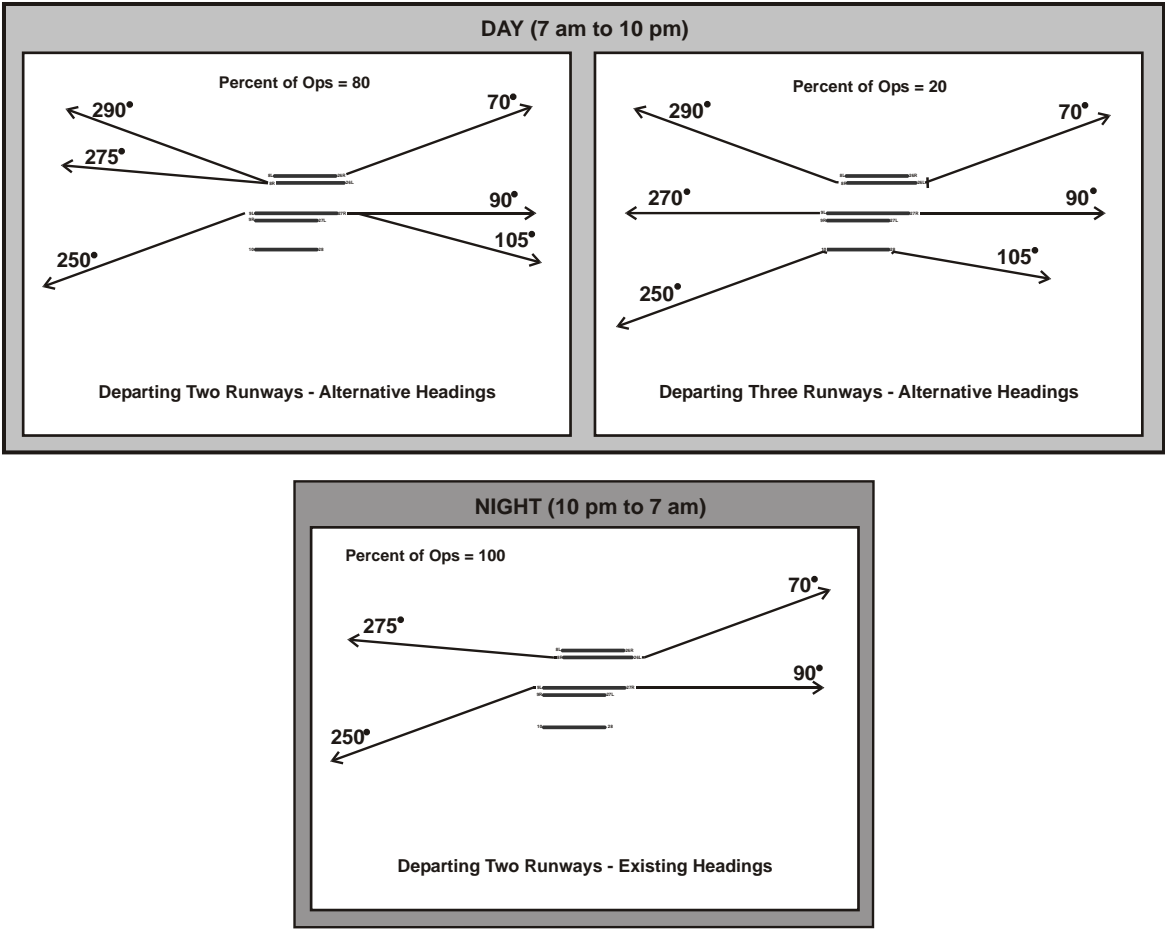
DFW Departure Flight Tracks off Runway 17L/35R – 2007



Source: Base map: Clark County GIS Management Office; Generalized flight tracks: Brown-Buntin Associates, Inc.
Prepared by: Ricondo & Associates, Inc.

Exhibit 2

LAS Generalized Departure Flight Tracks – 2004



Source: Hartfield-Jackson Atlanta International Airport, Draft F.A.R. Part 150 Noise Study, 2006
Prepared by: Ricondo & Associates, Inc.

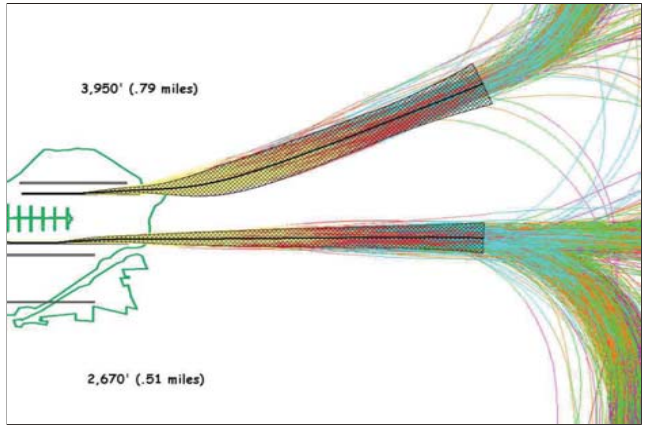
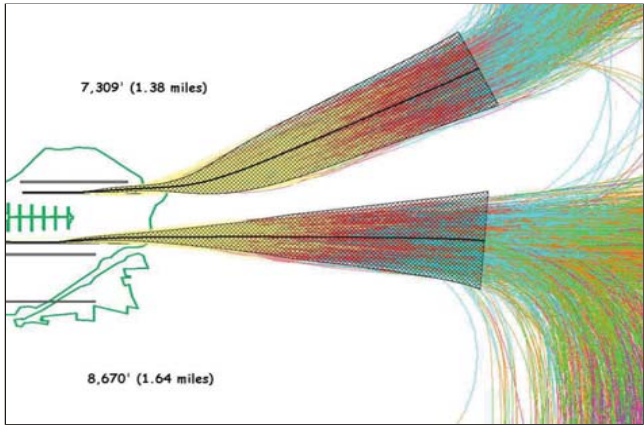
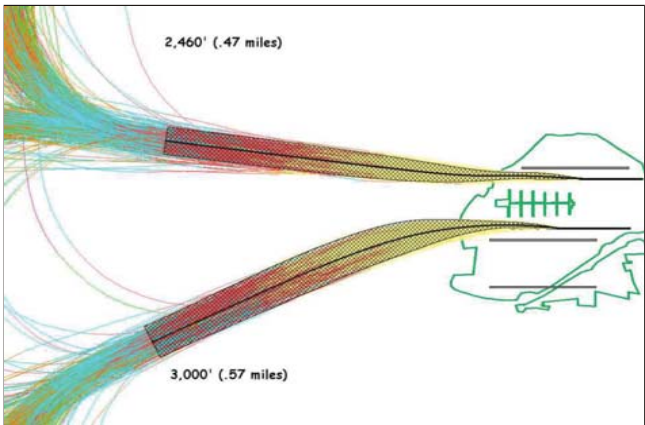
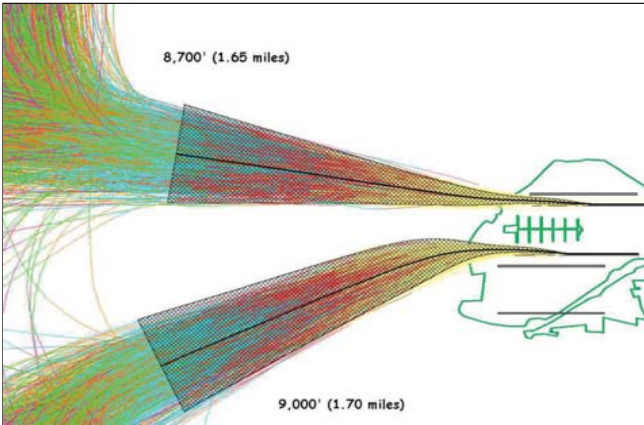
**ATL – Preferred Alternative Departure Headings
2006 Draft FAR Part 150 Noise Study**

Pre-RNAV

Full-RNAV

LEGEND

- 11000 MSL Altitude ft.
- 9000 MSL Altitude ft.
- 7000 MSL Altitude ft.
- 6000 MSL Altitude ft.
- 5000 MSL Altitude ft.
- 4000 MSL Altitude ft.
- 3000 MSL Altitude ft.
- 2000 MSL Altitude ft.



Source: Hartfield-Jackson Atlanta International Airport, Draft F.A.R. Part 150 Noise Study, 2006
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ATL – RNAV Jet Departures