

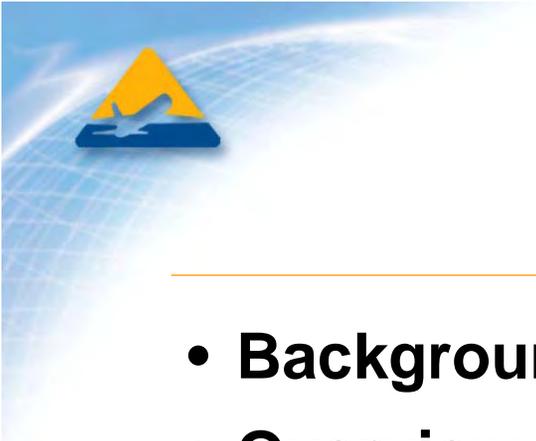


CENTER FOR ADVANCED AVIATION SYSTEM DEVELOPMENT (CAASD)

BOS Runway 27 Compliance Update

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Christopher Guidice
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March 2007



Outline

- **Background**
- **Overview of the Analysis Process**
- **Compilation of Results**
- **Comparison of Results to Previous Analyses**
- **Analysis of Bad Performers**
- **Analysis of Miss Distance**
- **Conclusions**



Background

- **Prior to July 2005, Massport (MPA) had been compiling information on Runway 27 jet departures**
- **The Runway 27 Advisory Committee asked FAA to do their own independent assessment**
- **FAA tasked the Air Traffic Airspace Lab (ATA Lab) to perform analysis**
- **ATA Lab analyzed nine months of radar data (July 2005 – March 2006)**
 - **Labor-intensive manual processing**
 - **ATA Lab showed better compliance than earlier MPA analysis**
- **The MITRE Corporation's Center for Advanced Aviation System Development (CAASD), as the FAA's Federally Funded Research and Development Center (FFRDC) was assigned two tasks:**
 - **Perform an independent Offload analysis to confirm ATA Lab findings**
 - **Develop an automated system for ongoing reporting**



The CAASD Difference

- **The MITRE Corporation has helped the FAA address the nation's most critical aviation issues since the company's creation in 1958**
- **In 1990, the FAA designated MITRE's aviation program as an FFRDC and created CAASD**
 - **We work in the public interest, operating as FAA's strategic partner**
 - **We are organized as an independent, not-for-profit entity with limitations and restrictions to ensure the highest levels of objectivity**
 - **We have a degree of access and a long-term perspective not shared by commercial contractors**
- **Our mission is to advance the safety, security, effectiveness, and efficiency of aviation in the United States and around the world**



Overview of the Analysis Process



Offload Data

- **Currently, the National Offload Program Archive includes radar data from 77 Terminal Radar Approach Controls (TRACONs) and 20 Air Route Traffic Control Centers (ARTCCs)**
- **Data compiled from Automated Radar Terminal System IIIA (ARTS IIIA), Common ARTS, and Standard Terminal Automation Replacement System (STARS) facilities**
- **Flight tracks from multiple radars and facilities can be easily linked**
- **Offload at Boston TRACON (A90)**
 - **Logan's primary radar is an Airport Surveillance Radar Model 9 (ASR-9)**
 - **A90 is a STARS facility**
 - **Five-second radar hits with automated post-processing to link points to form tracks**



Alignment Between Runways and Arrivals Demonstrates Data Accuracy



Source: National Offload Program Archive, Selected Arrivals from Nov 2006 through Jan 2007.

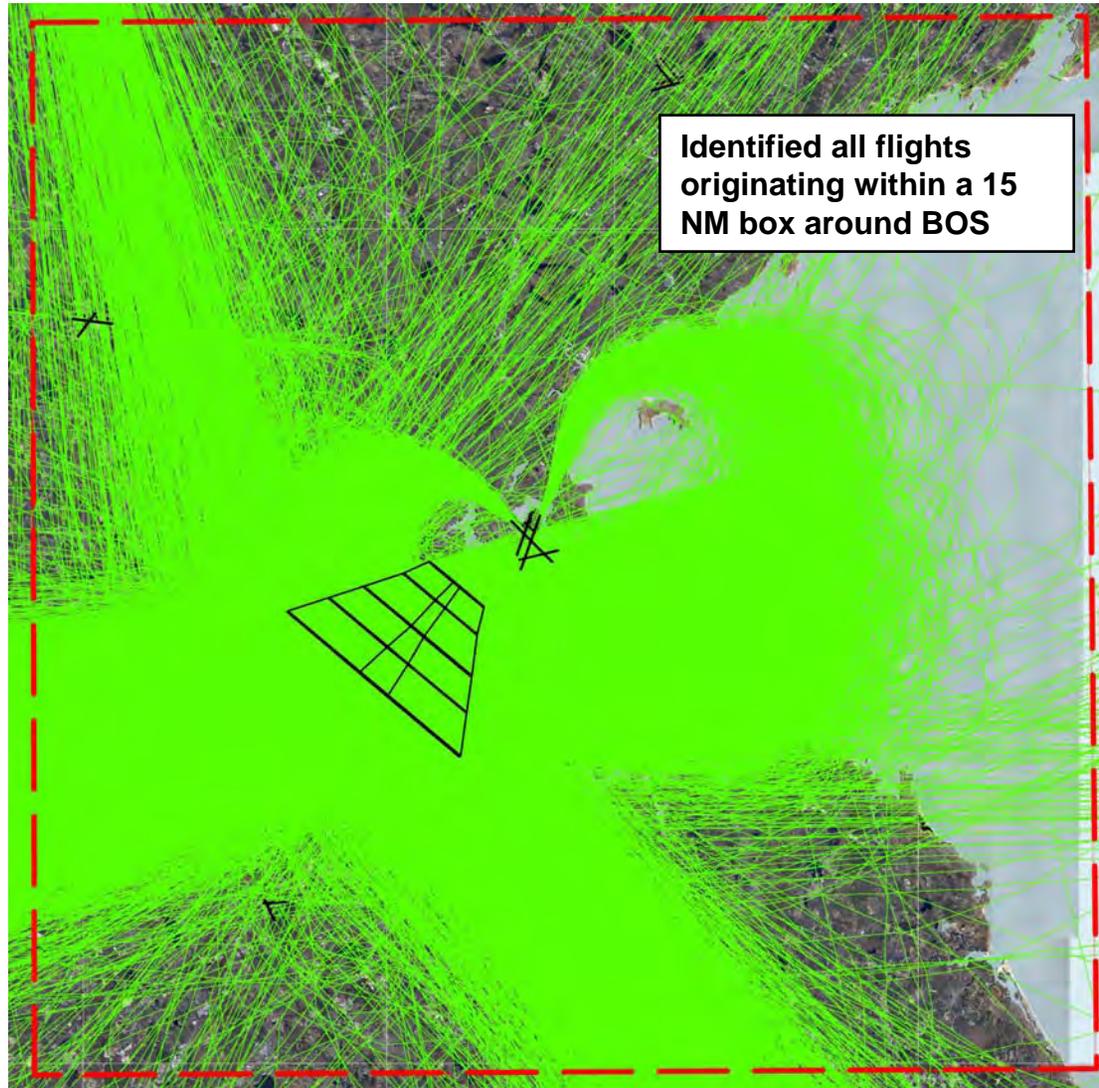


Analysis Process

- **Step 1: Identify BOS departures**
- **Step 2: Eliminate Turboprops, Props, Helicopters, and flights with no equipment type**
- **Step 3: Identify gate crossings and eliminate departures from other runways**
- **Step 4: Categorize flights based on gate crossing combinations**
- **Step 5: Eliminate “Late Pickups” and “Early Drops”**
- **Step 6: Visual inspection and re-categorization as necessary**



Step 1: Identify BOS Departures





Step 2: Eliminate Non-Jet Aircraft Types

- **Aircraft Type Categories**

J - Known jets

T - Turboprops

P - Props

H - Helicopters

? - Unknown aircraft types

Null - Null aircraft type or new aircraft type that has not yet been categorized

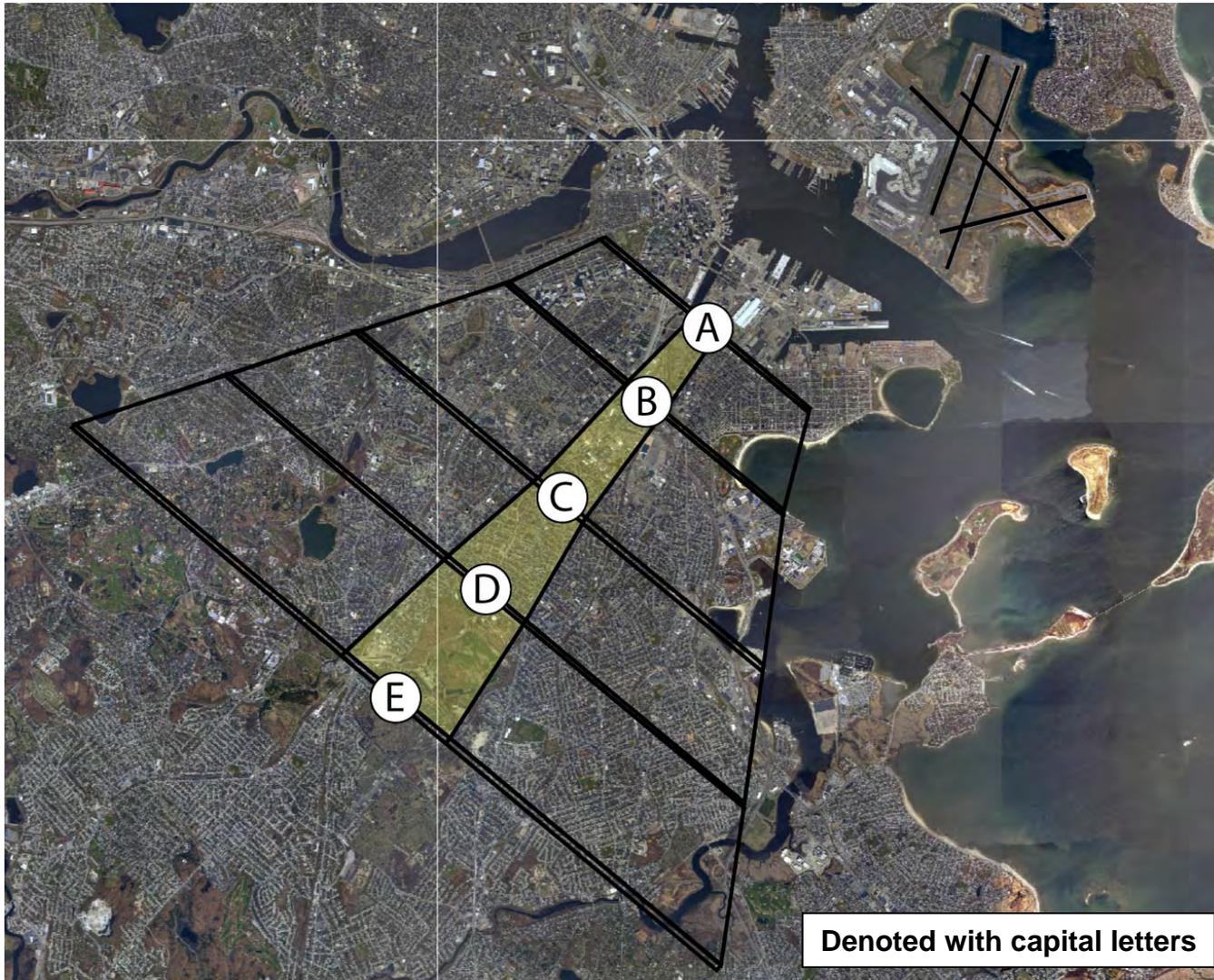


Step 3: Identify Gate Crossings

- **Different types of gates were created**
 - **Gates along the Runway 27 departure corridor to identify corridor compliance**
 - **Gates off each runway end to eliminate flights from other runways**
 - **A supplemental gate for separating Runway 22R departures from Runway 27 departures**
- **For each radar track, gate crossings were identified and flagged**
 - **For the gates off each runway end, crossings below 5,000 feet were identified**
 - **For the Runway 27 gates and the supplemental gate, crossings below 12,000 feet were identified**



Runway 27 Corridor Center Gates



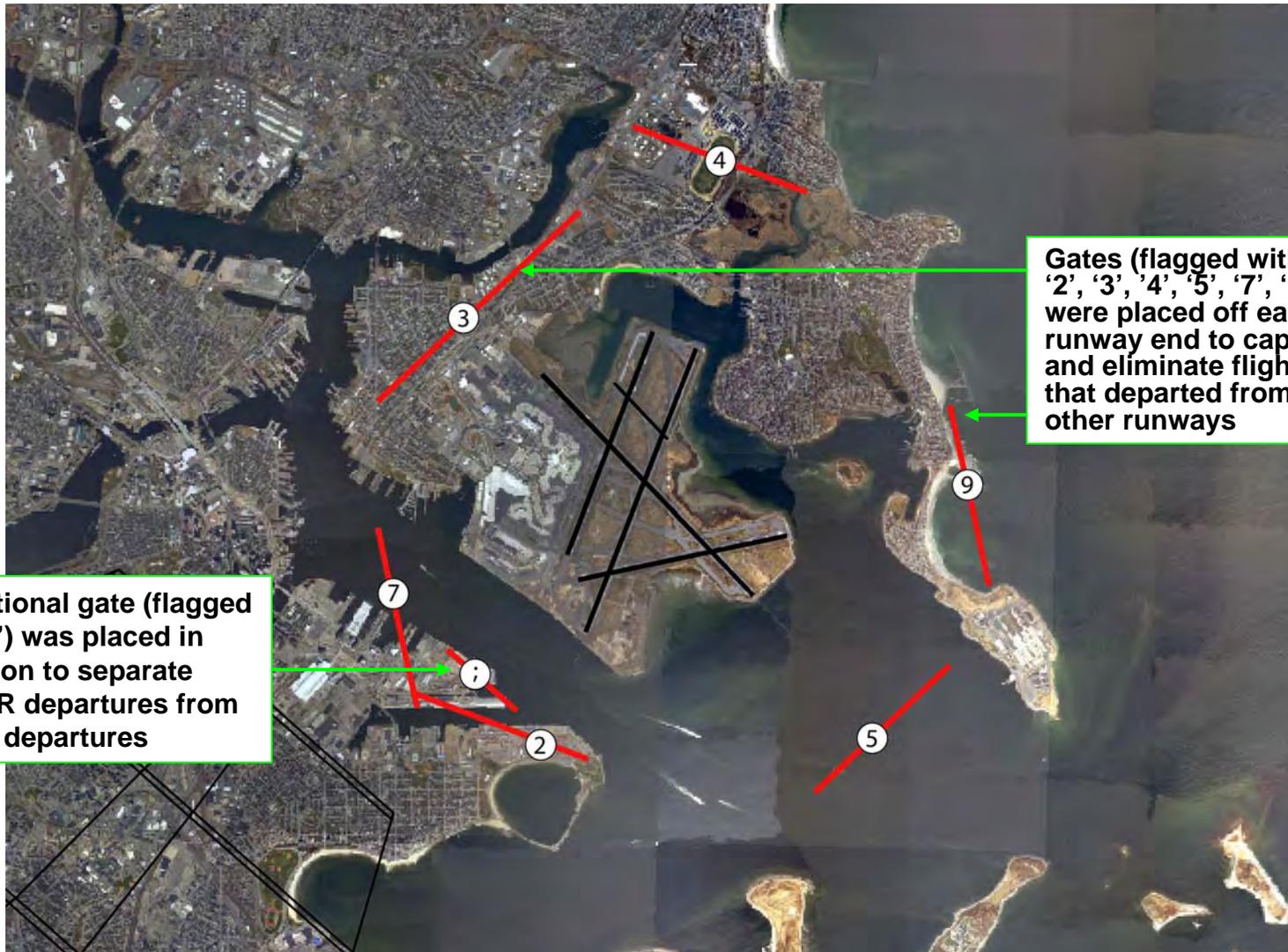


Runway 27 Corridor Left and Right Gates





Additional Runway and Supplemental Gates



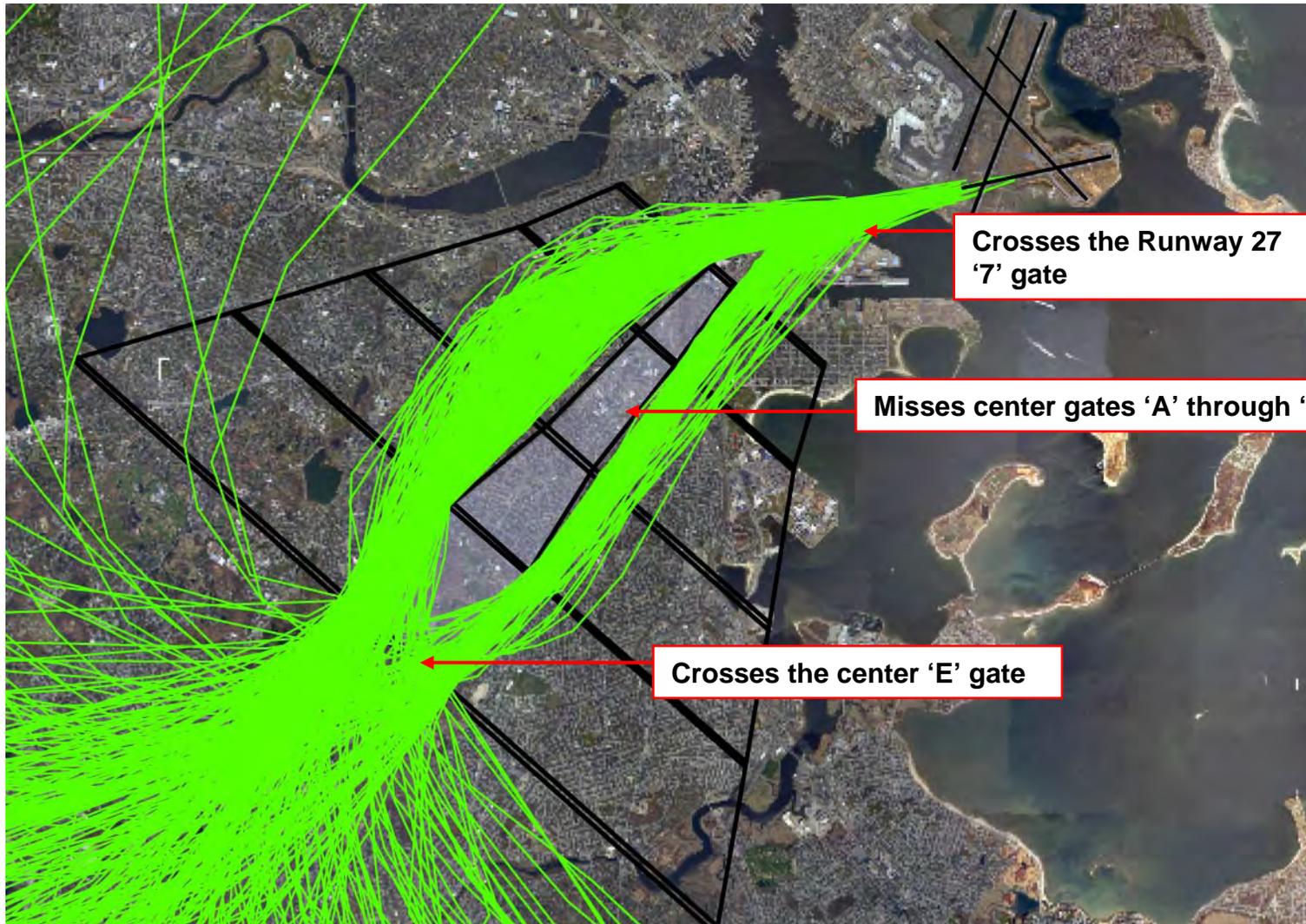
Gates (flagged with '2', '3', '4', '5', '7', '9') were placed off each runway end to capture and eliminate flights that departed from other runways

An additional gate (flagged with a ';') was placed in this region to separate RWY 22R departures from RWY 27 departures



Naming Convention Example

Gate Crossing Combination “7E_abcd”

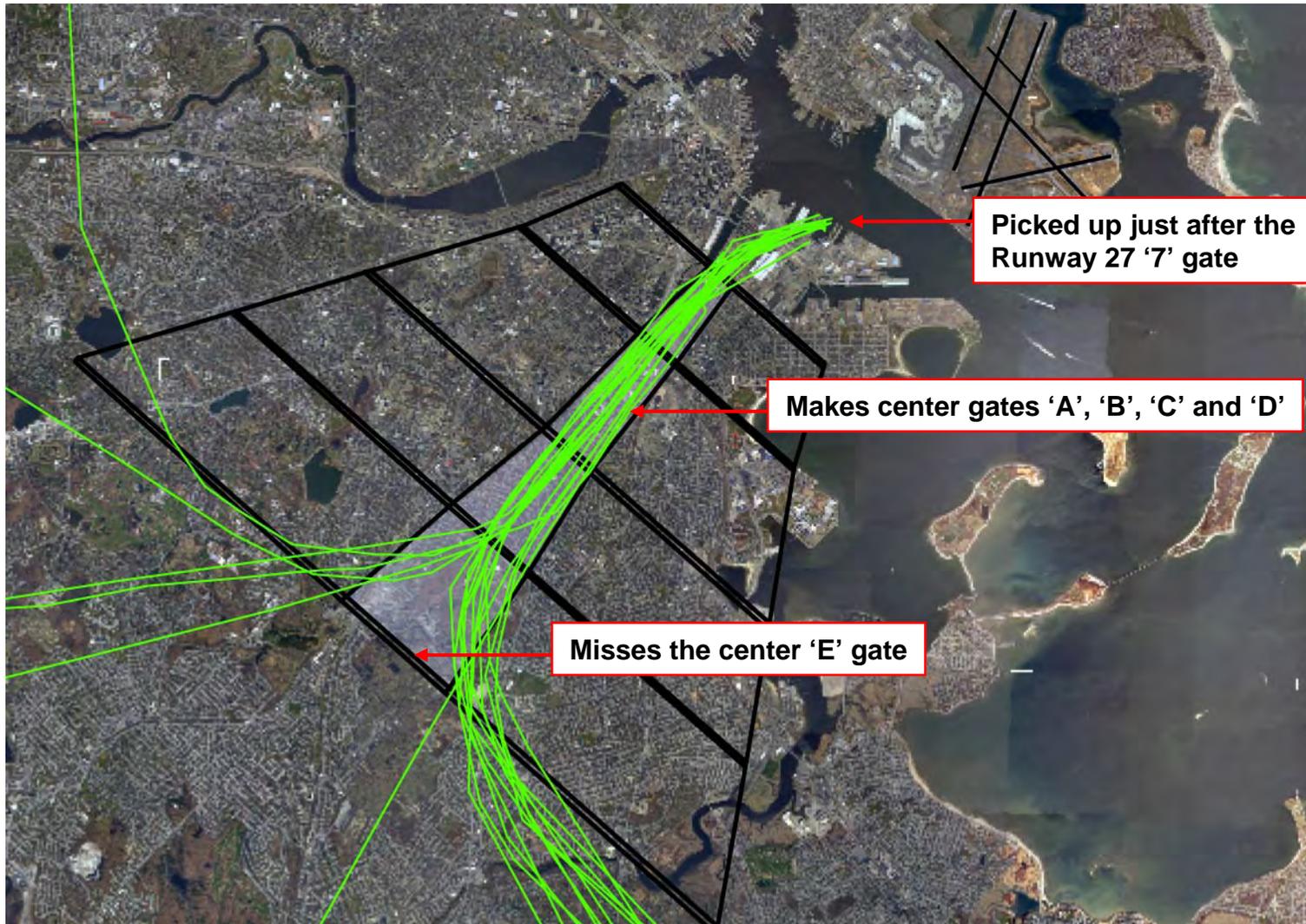


Source: National Offload Program Archive, July 2005 through December 2006.



Naming Convention Example

Gate Crossing Combination “ABCD_e”



Source: National Offload Program Archive, July 2005 through December 2006.



Step 4: Gate Category Definitions

- Each gate crossing combination was assigned to one of 7 gate categories
 - **Y** All are clearly 27 departures
 - **N** All are clearly not 27 departures
 - **+** Likely 27 departures
 - Most flights are 27 departures
 - **-** Unlikely 27 departures
 - Very few flights are 27 departures
 - **?** Unknown
 - Gate combination is not useful for identifying 27 departures
 - **A** Ambiguous
 - Difficult to determine if flights departed from 27 or from 22R
 - **Null**
 - Gate combination sample size too small to determine appropriate gate category through automation



Distribution of Tracks by Gate Category

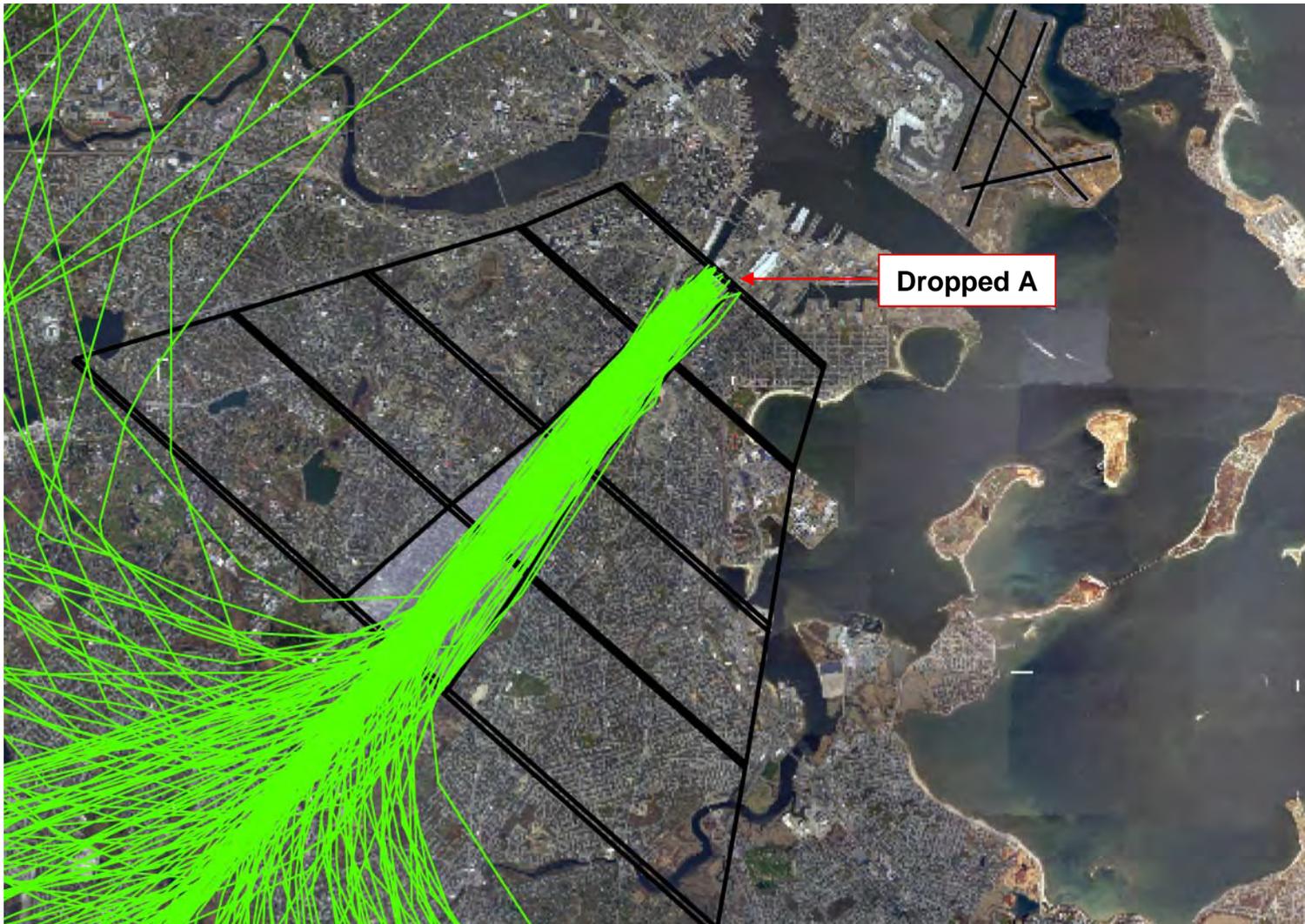
- By automating the identification and categorization process, the manual review is focused on the flight tracks that require human intervention

Gate Category	Flight Count	Percentage
Y	32,888	93.5%
+	1,700	4.8%
-	226	0.6%
null	213	0.6%
?	91	0.3%
A	72	0.2%
Grand Total	35,190	100.0%

Source: Offload, July 2005 through February 2007.



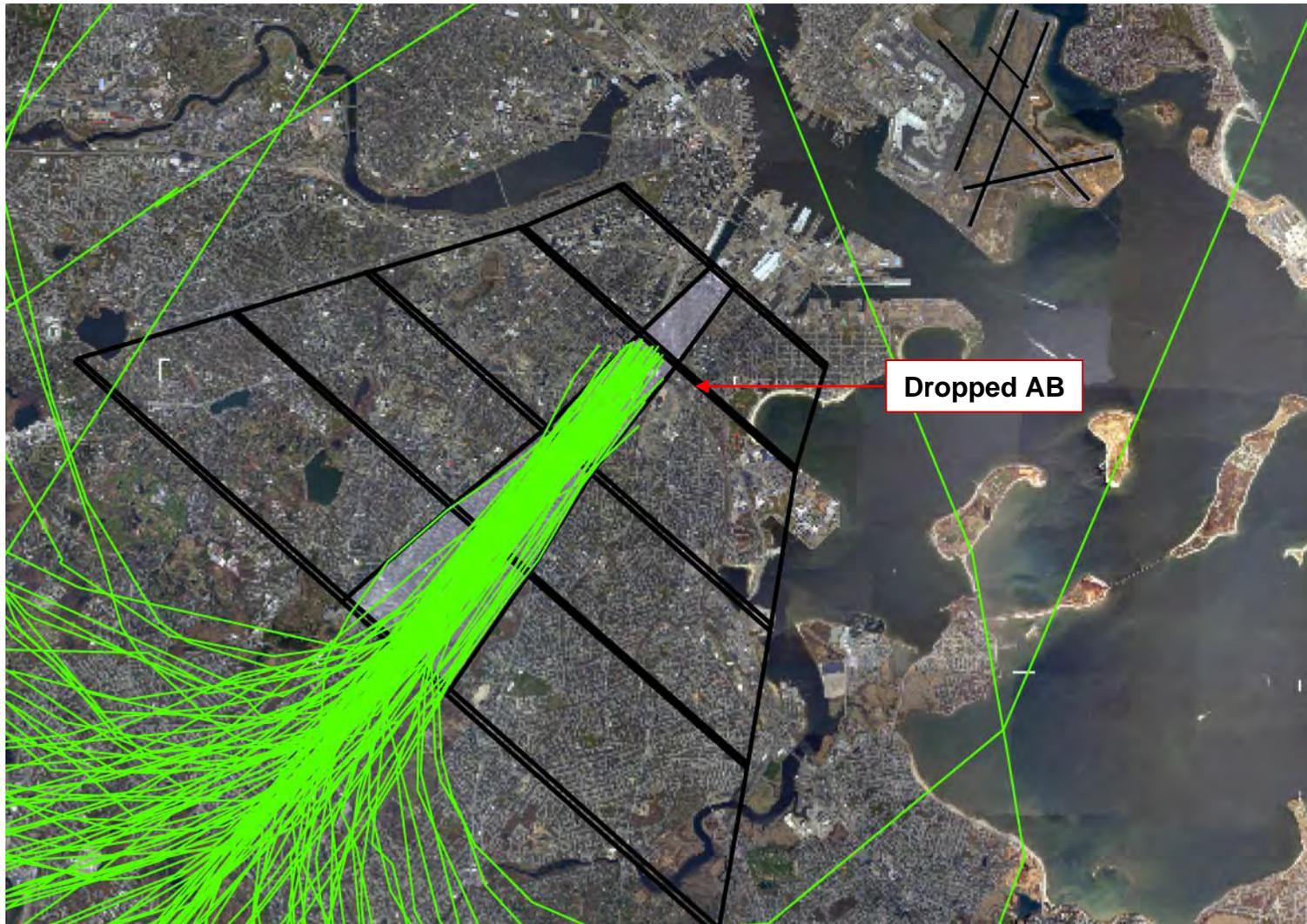
Step 5: Eliminate Late Pickups and Early Drops



Source: National Offload Program Archive, July 2005 through December 2006.



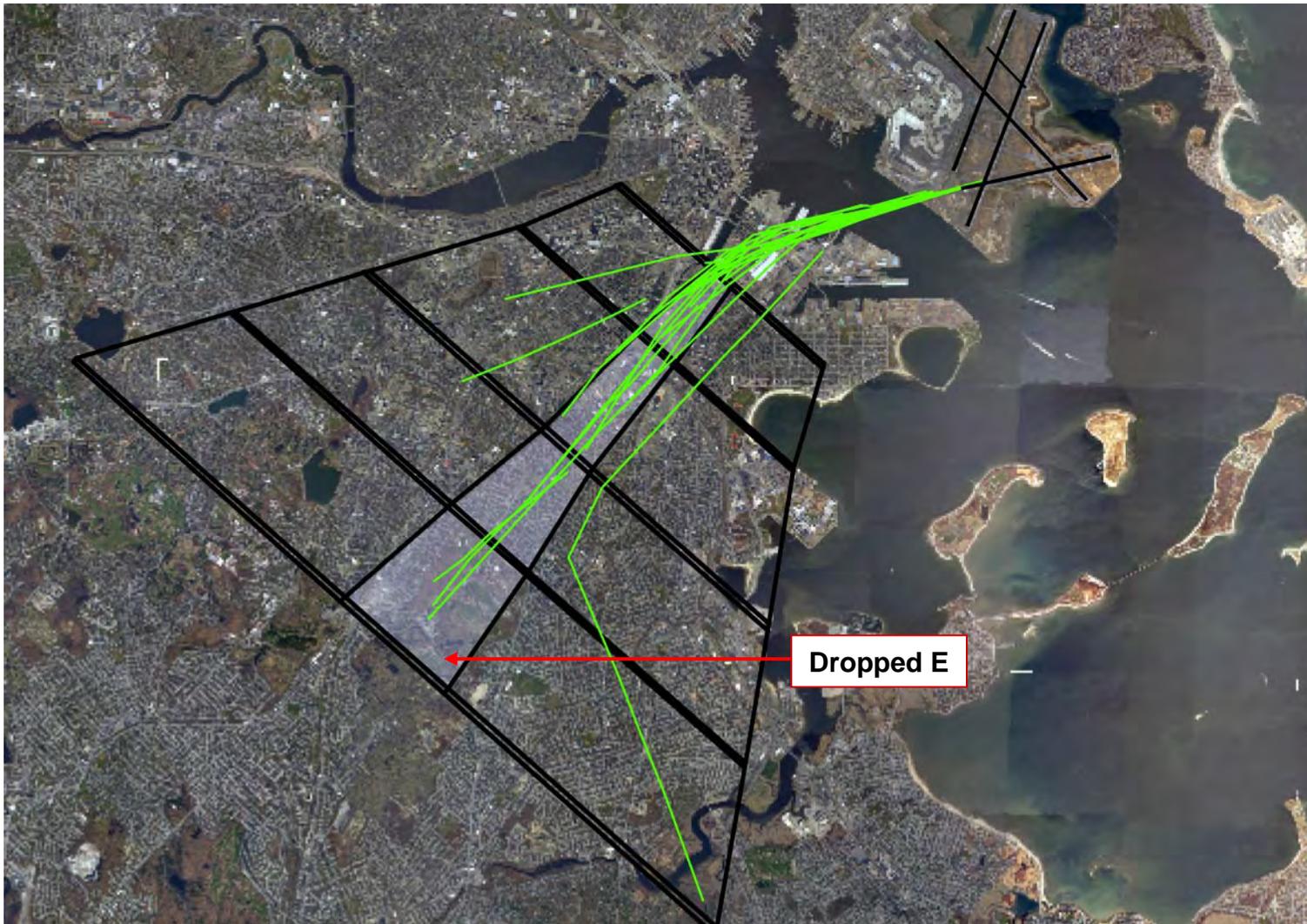
Another Late Pickup Example



Source: National Offload Program Archive, July 2005 through December 2006.



An Early Drop Example



Source: National Offload Program Archive, July 2005 through December 2006.



Distribution of Tracks After Removal of Late Pickups and Early Drops

- The sample is reduced by eliminating tracks where compliance cannot be determined because tracks started after the 'A' or 'a' gate or ended before the 'E' or 'e' gate

Gate Category	Flight Count	Drops Removed	Complete Tracks
Y	32,888	292	32,596
+	1,700	131	1,569
-	226	54	172
null	213	32	181
?	91	29	62
A	72	16	56
Grand Total	35,190	554	34,636

Source: Offload, July 2005 through February 2007.

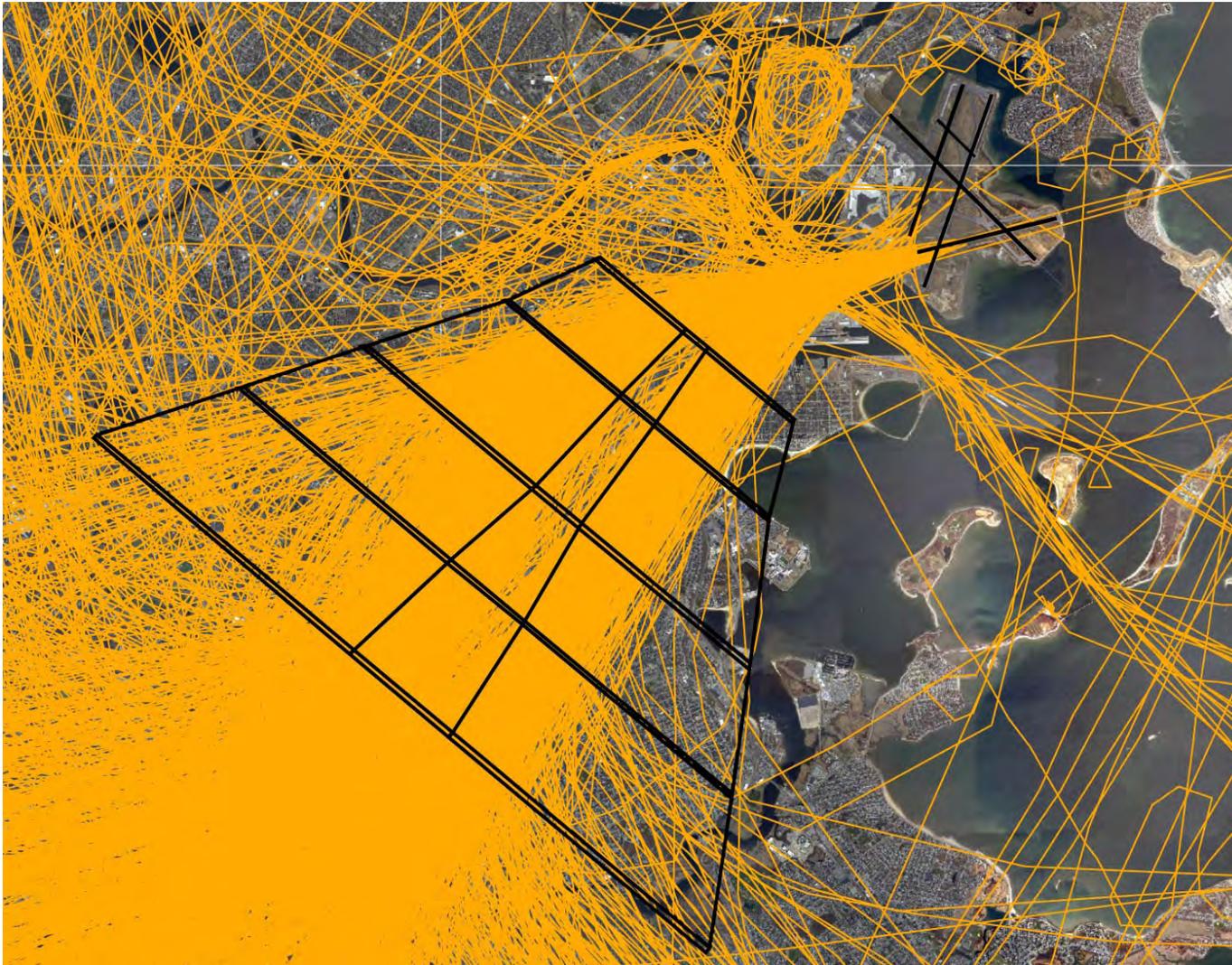


Step 6: Visual Inspection and Manual Sorting

- After late pickups and early drops were eliminated, each gate category was inspected visually
- Flights that were not Runway 27 jet departures were identified
- All data was retained
- The resulting Runway 27 jet departures were carried through the compliance analysis



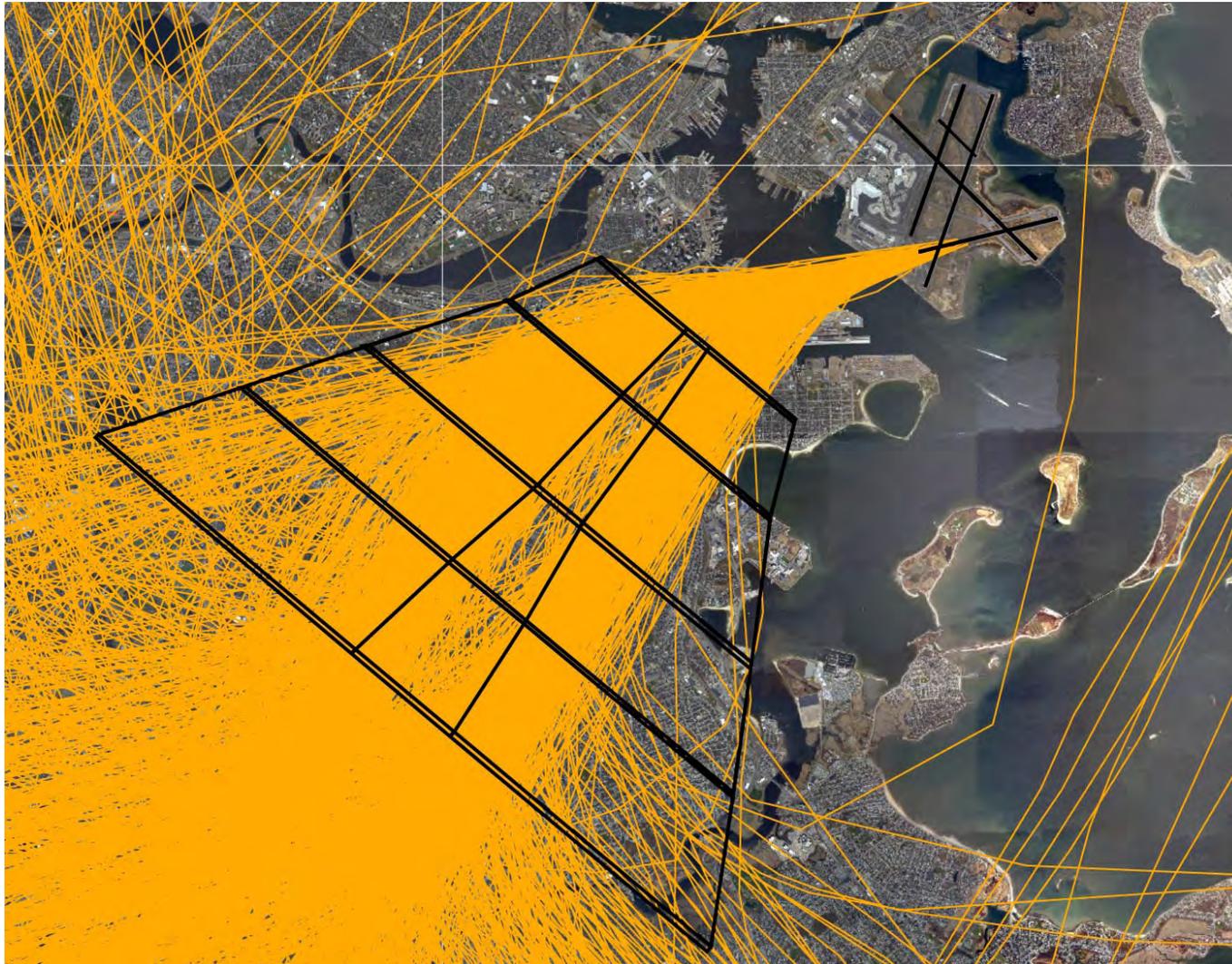
Likely Tracks Prior to Manual Sorting



Source: National Offload Program Archive, July 2005 through December 2006. Includes early drops and late pickups.



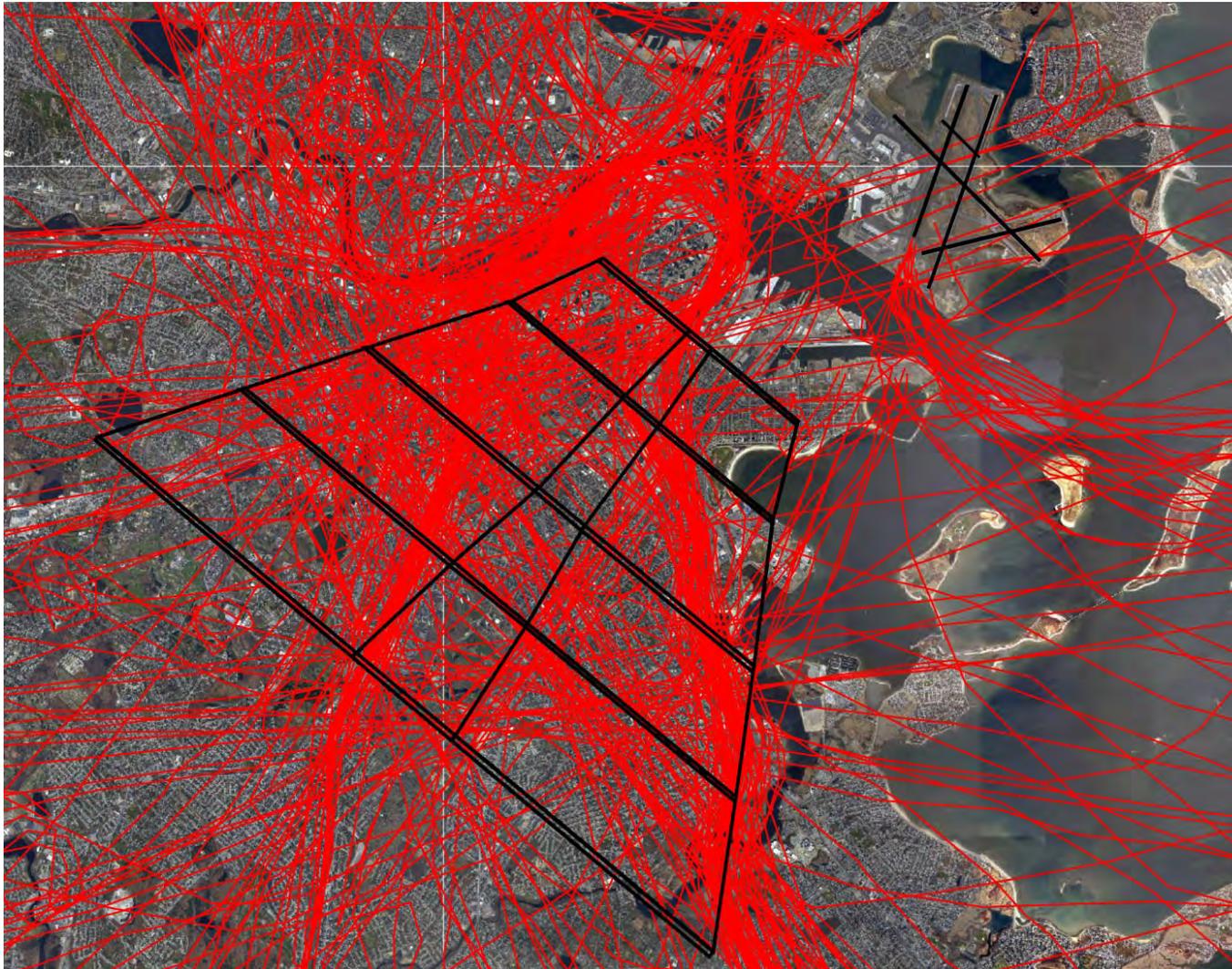
Likely Tracks Identified as Runway 27 Jet Departures



Source: National Offload Program Archive, July 2005 through December 2006.



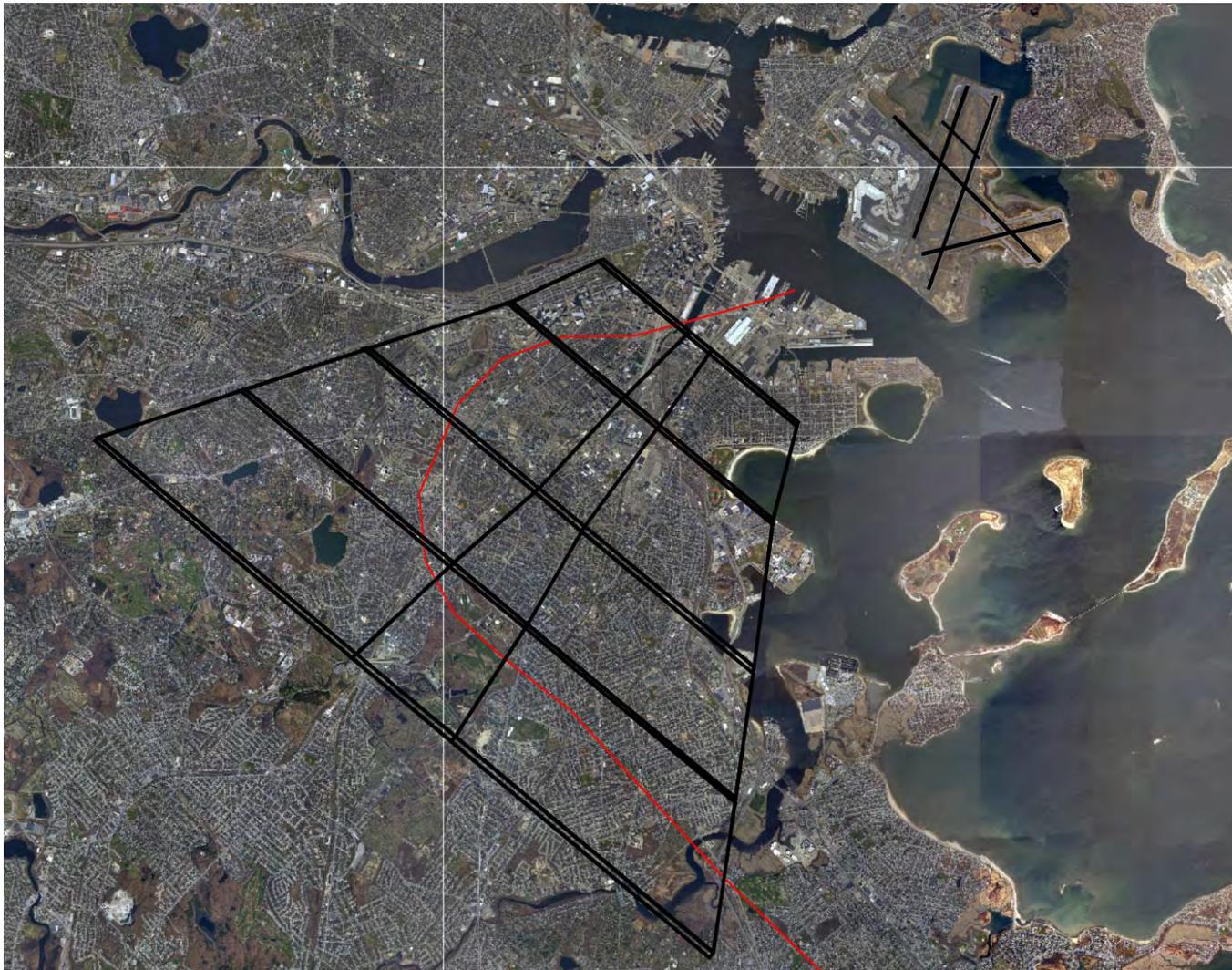
Unlikely Tracks Prior to Manual Sorting



Source: National Offload Program Archive, July 2005 through December 2006. Includes early drops and late pickups.



Unlikely Track Identified as Runway 27 Jet Departure



Source: National Offload Program Archive, July 2005 through December 2006.



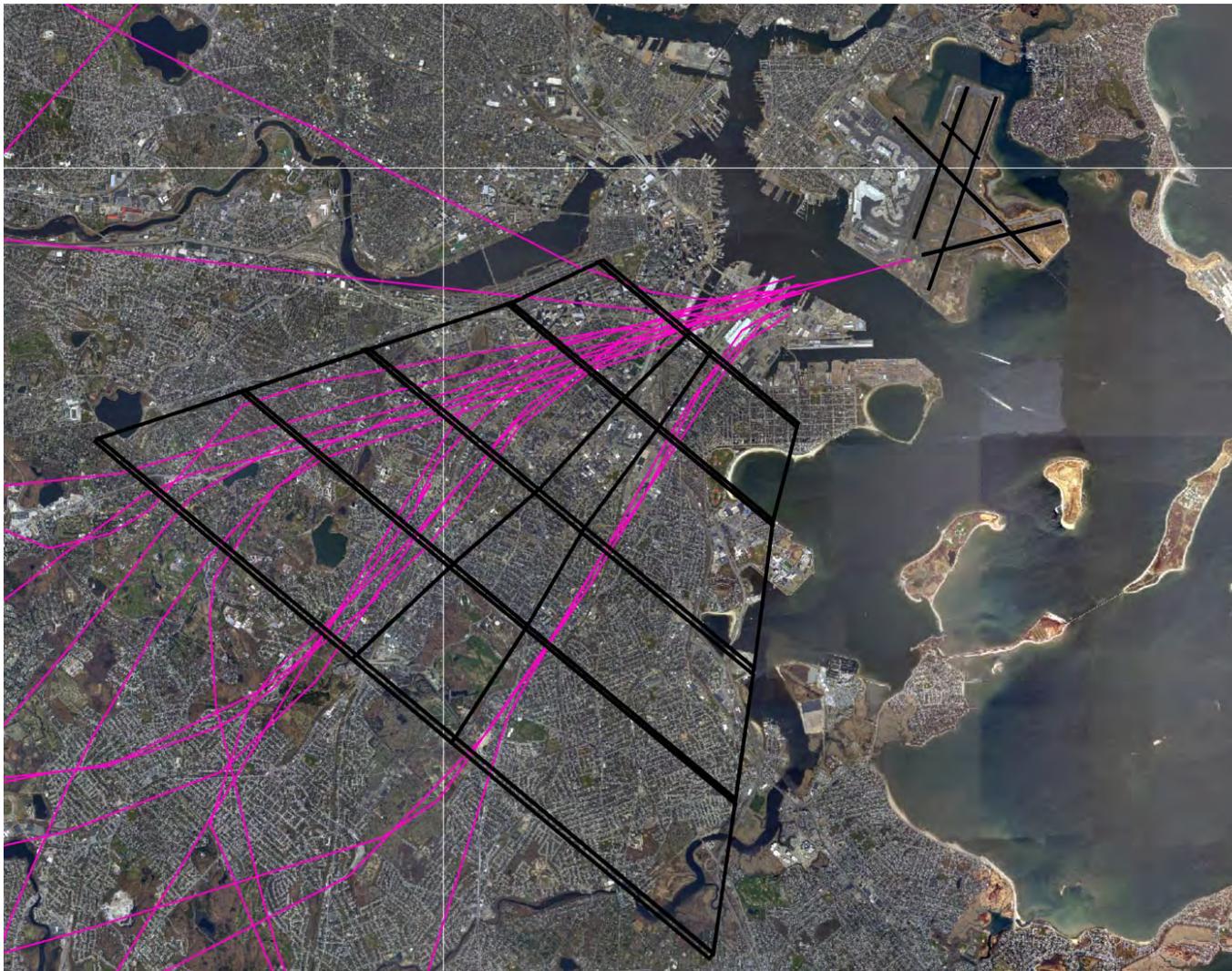
Unknown Tracks Prior to Manual Sorting



Source: National Offload Program Archive, July 2005 through December 2006. Includes early drops and late pickups.



Unknown Tracks Identified as Runway 27 Jet Departures



Source: National Offload Program Archive, July 2005 through December 2006.



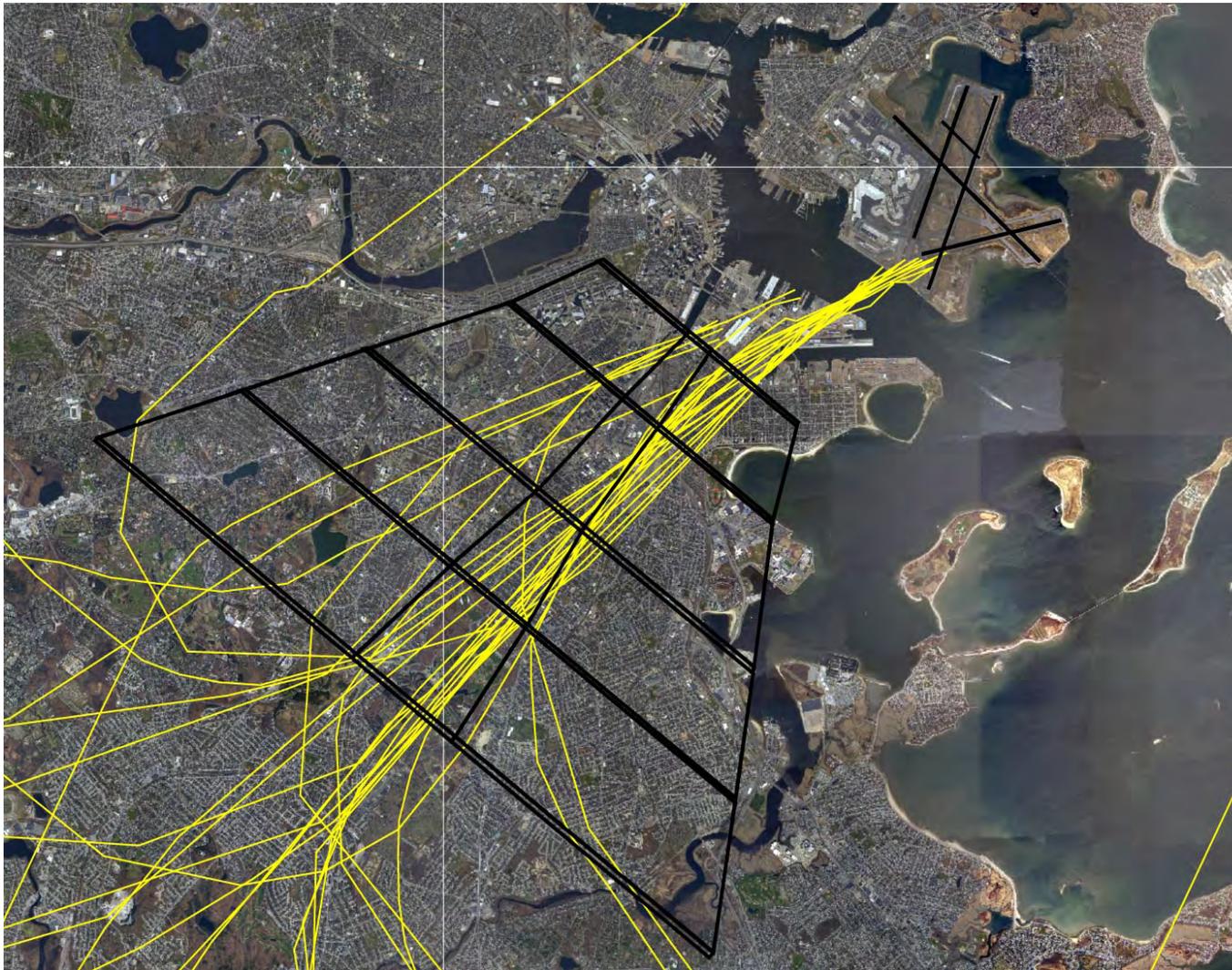
Ambiguous Tracks Prior to Manual Sorting



Source: National Offload Program Archive, July 2005 through December 2006. Includes early drops and late pickups.



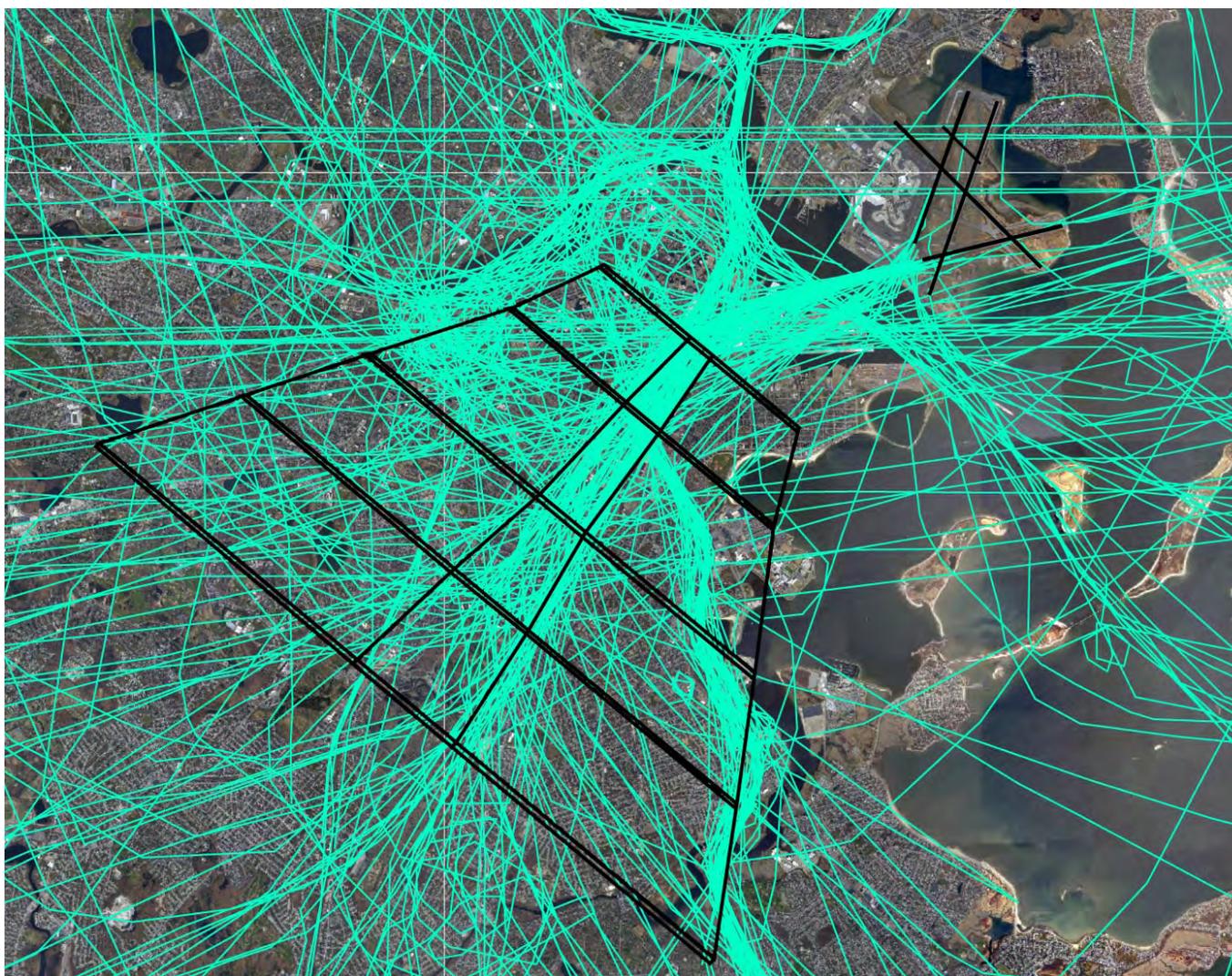
Ambiguous Tracks Identified as Runway 27 Jet Departures



Source: National Offload Program Archive, July 2005 through December 2006.



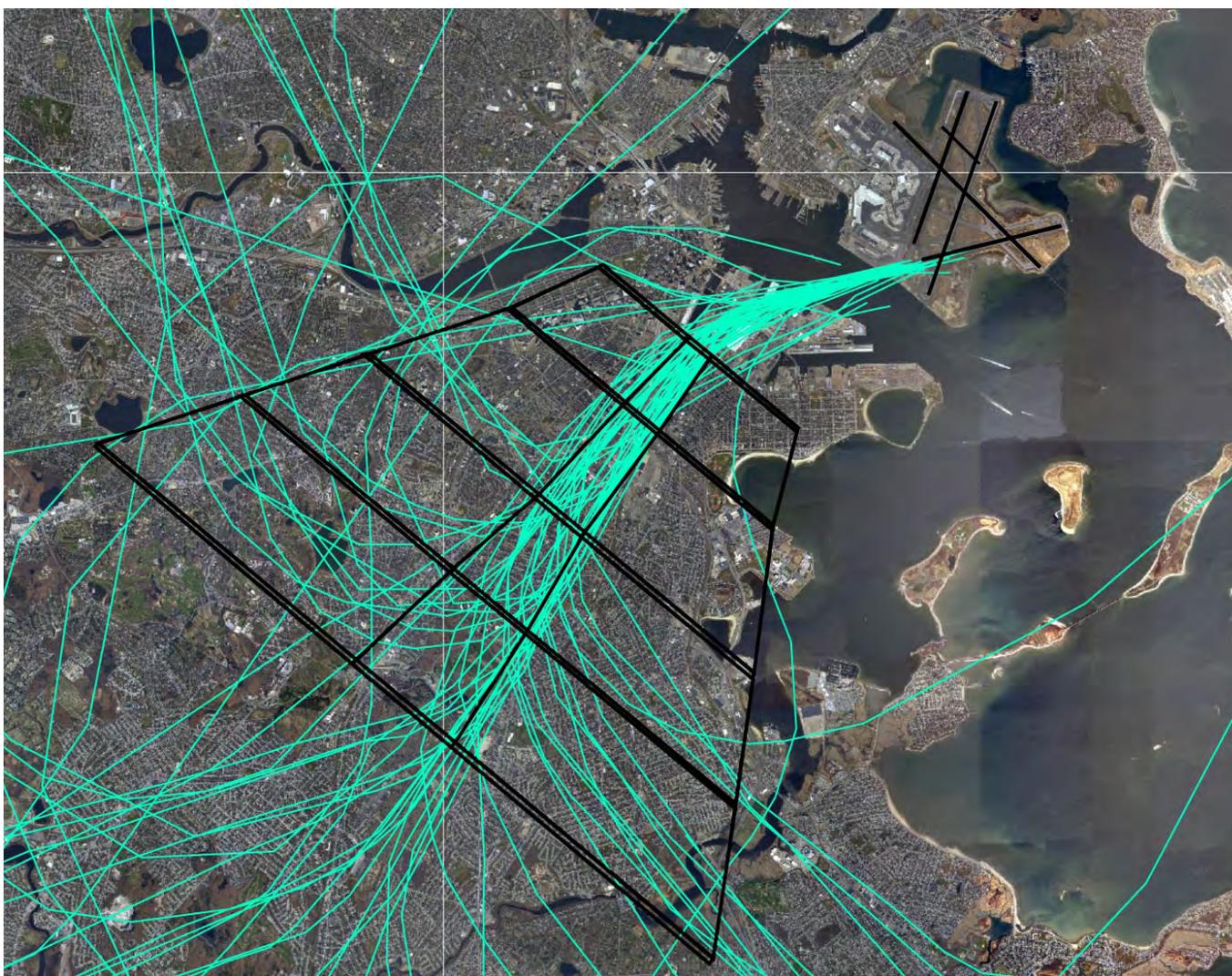
Null Tracks Prior to Manual Sorting



Source: National Offload Program Archive, July 2005 through December 2006. Includes early drops and late pickups.



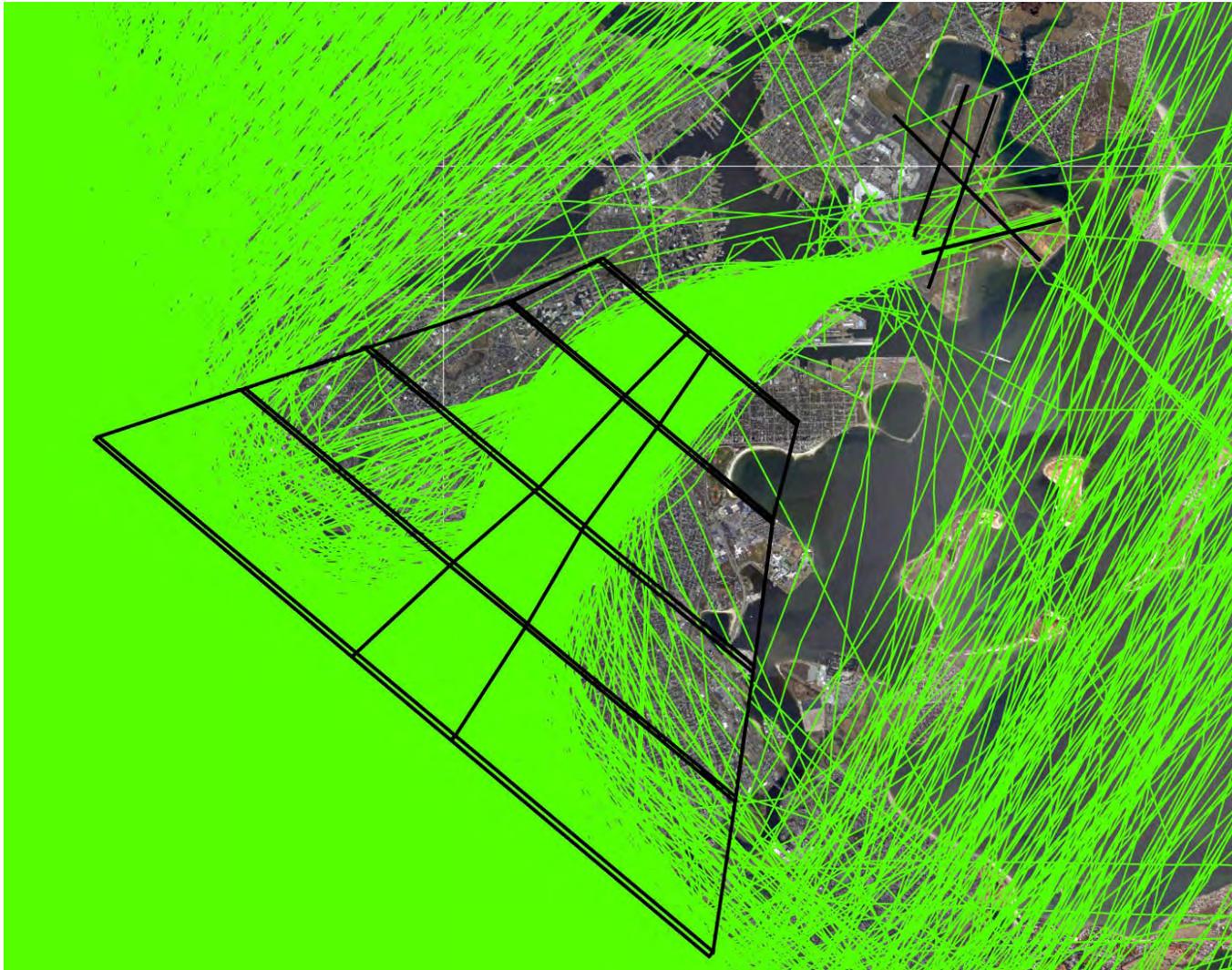
Null Tracks Identified as Runway 27 Jet Departures



Source: National Offload Program Archive, July 2005 through December 2006.



Yes Tracks Required No Manual Sorting



Source: National Offload Program Archive, July 2005 through December 2006. Includes early drops and late pickups.



Distribution of Tracks After Visual Inspection and Manual Sorting

- After manual sorting, 34,195 flight tracks were identified that represented Runway 27 jet departures with sufficient data for determining compliance

Gate Category	Flight Count	Drops Removed	Manual Sorting	Runway 27 Jet Departures
Y	32,888	292	0	32,596
+	1,700	131	83	1,486
-	226	54	169	3
null	213	32	116	65
?	91	29	45	17
A	72	16	28	28
Grand Total	35,190	554	441	34,195

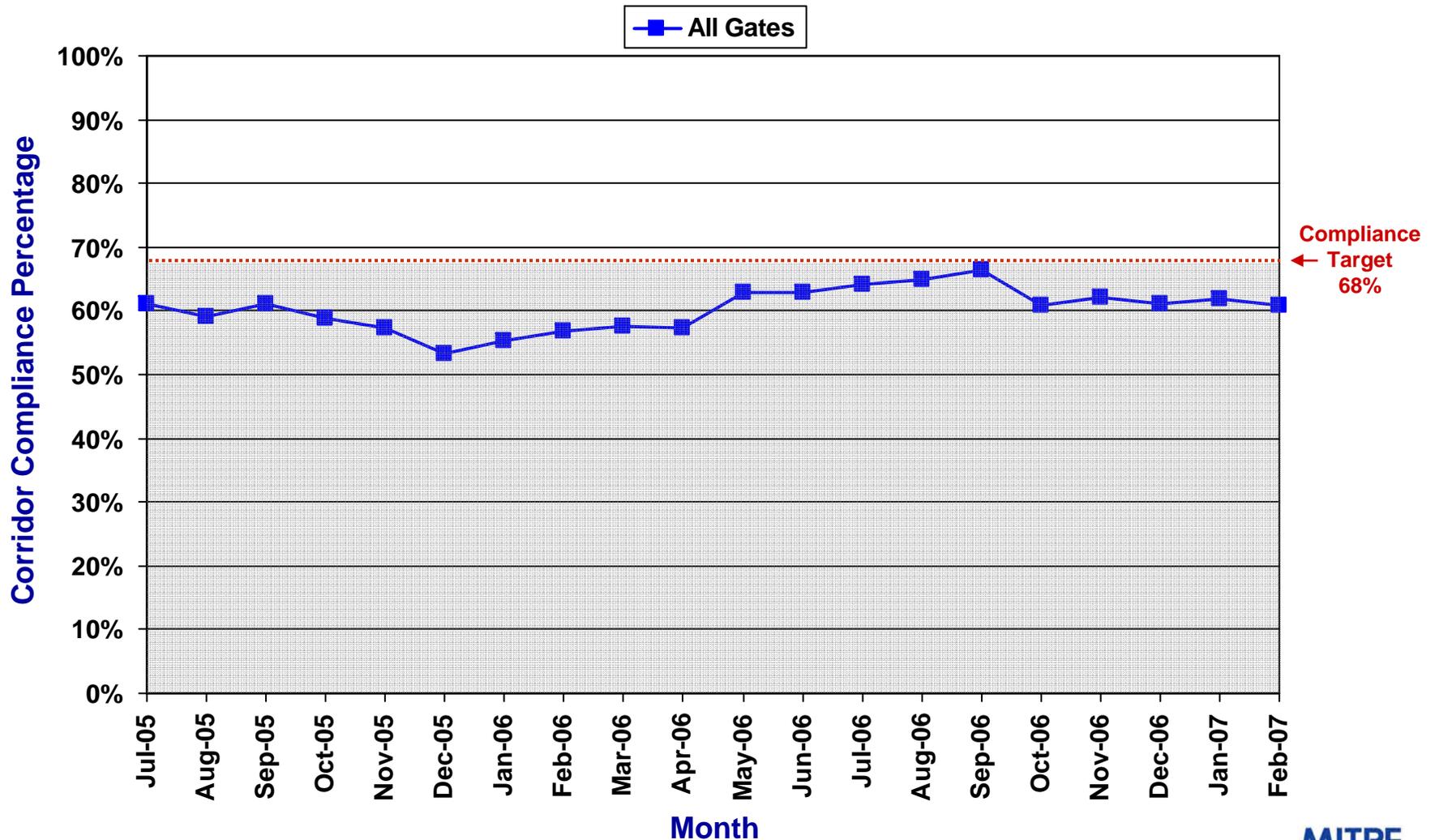
Source: Offload, July 2005 through February 2007.



Compliance Results

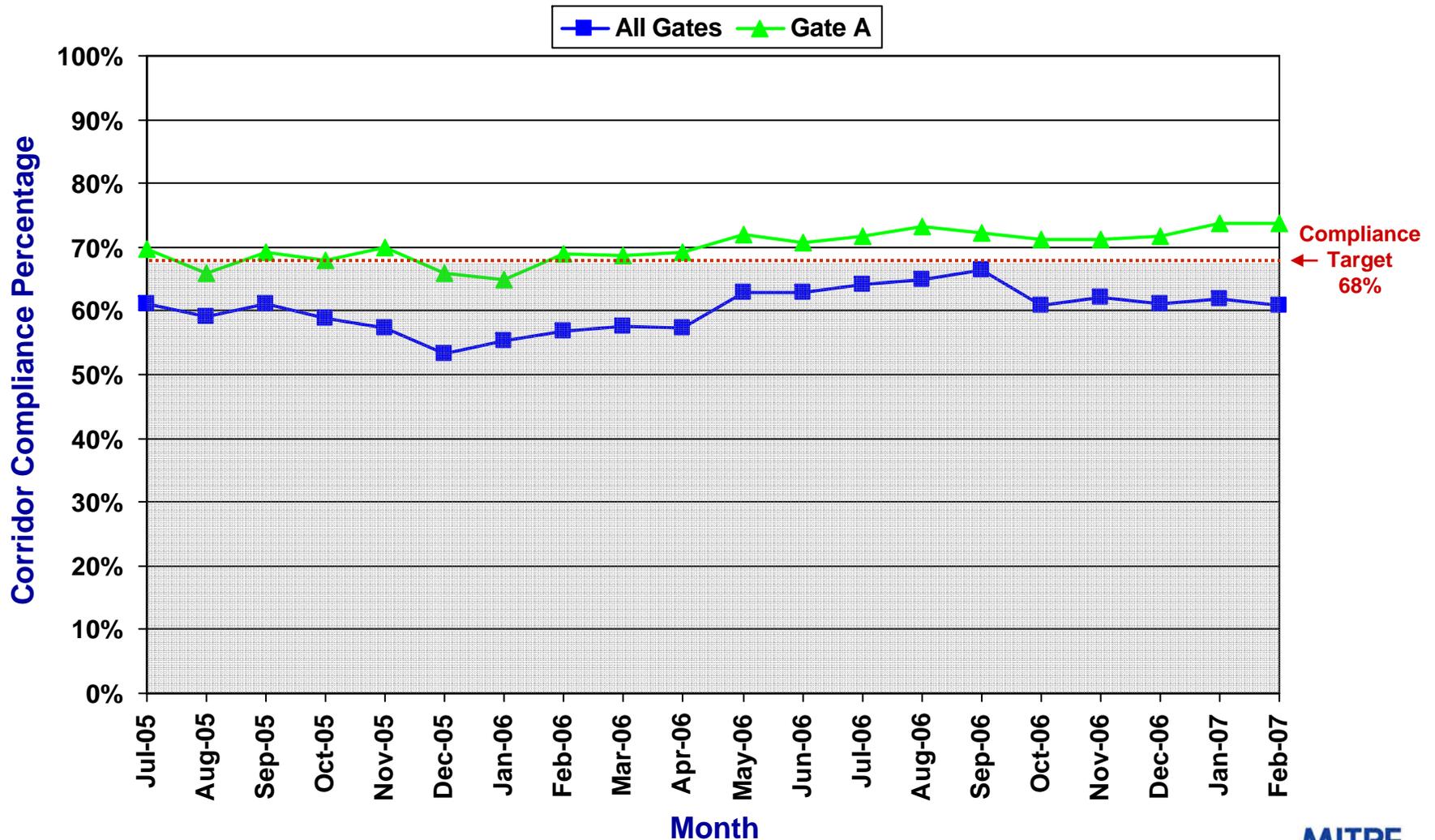


Summary of Monthly Compliance All Gates



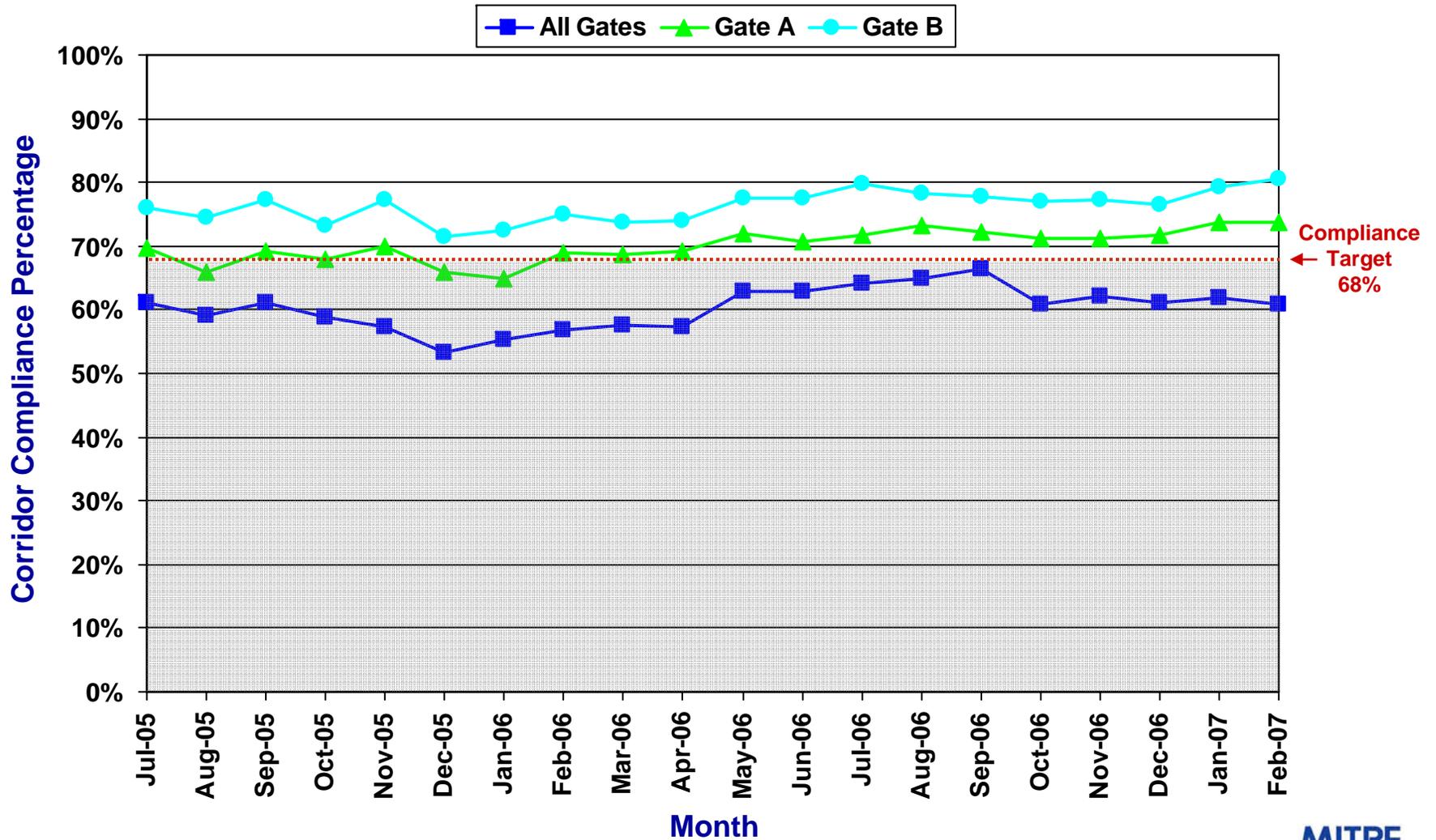


Summary of Monthly Compliance Gate A



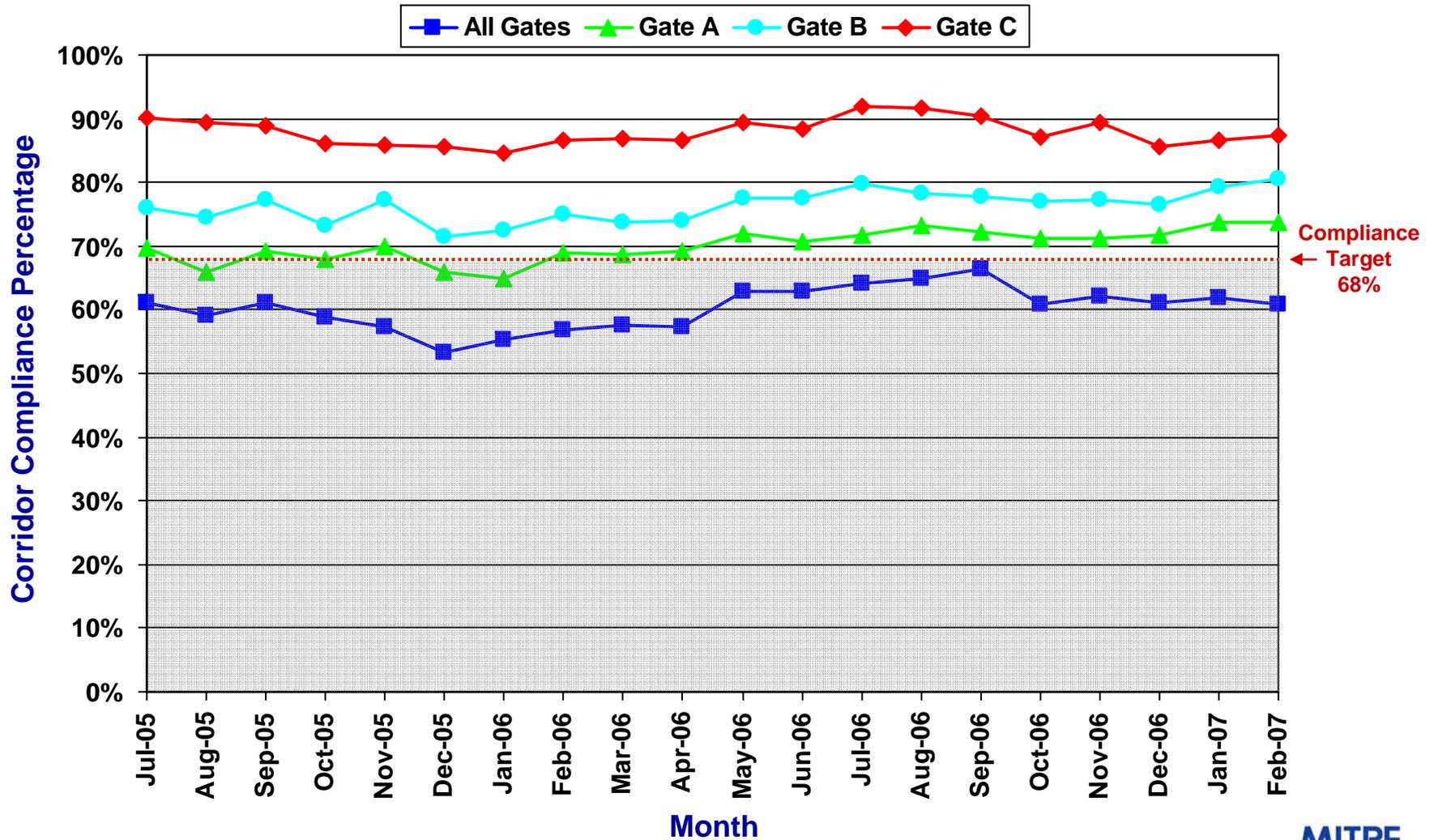


Summary of Monthly Compliance Gate B



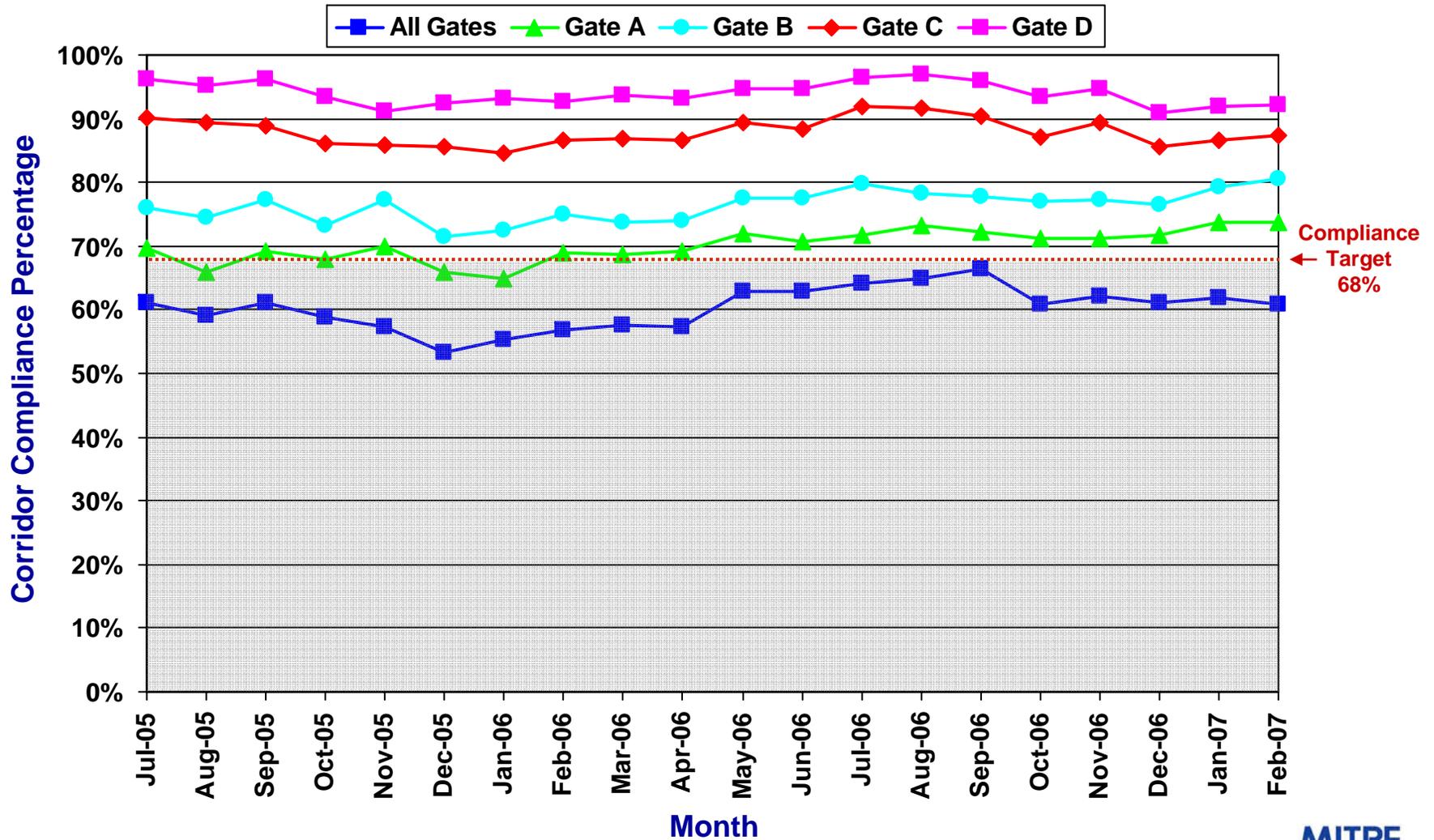


Summary of Monthly Compliance Gate C



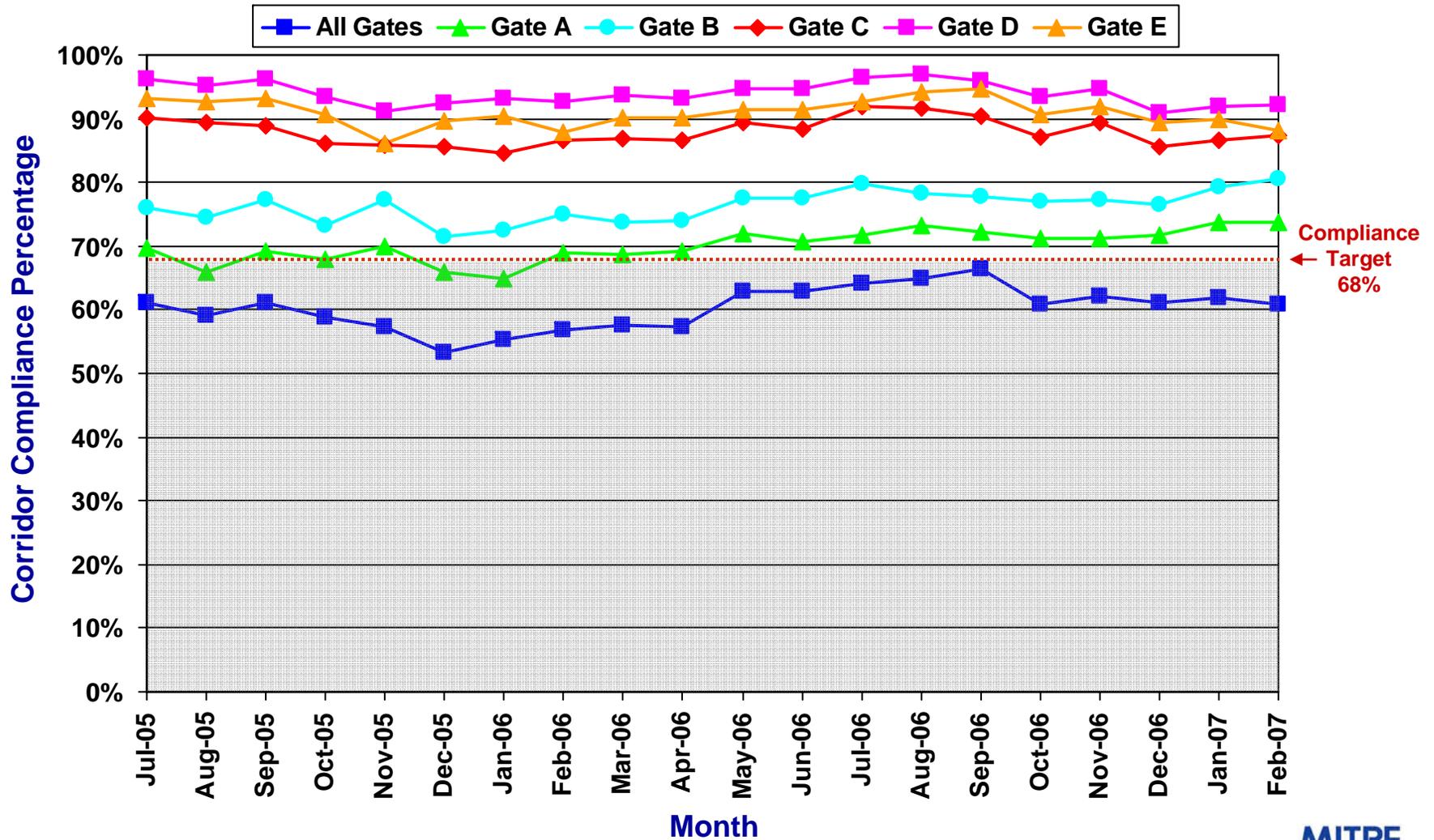


Summary of Monthly Compliance Gate D



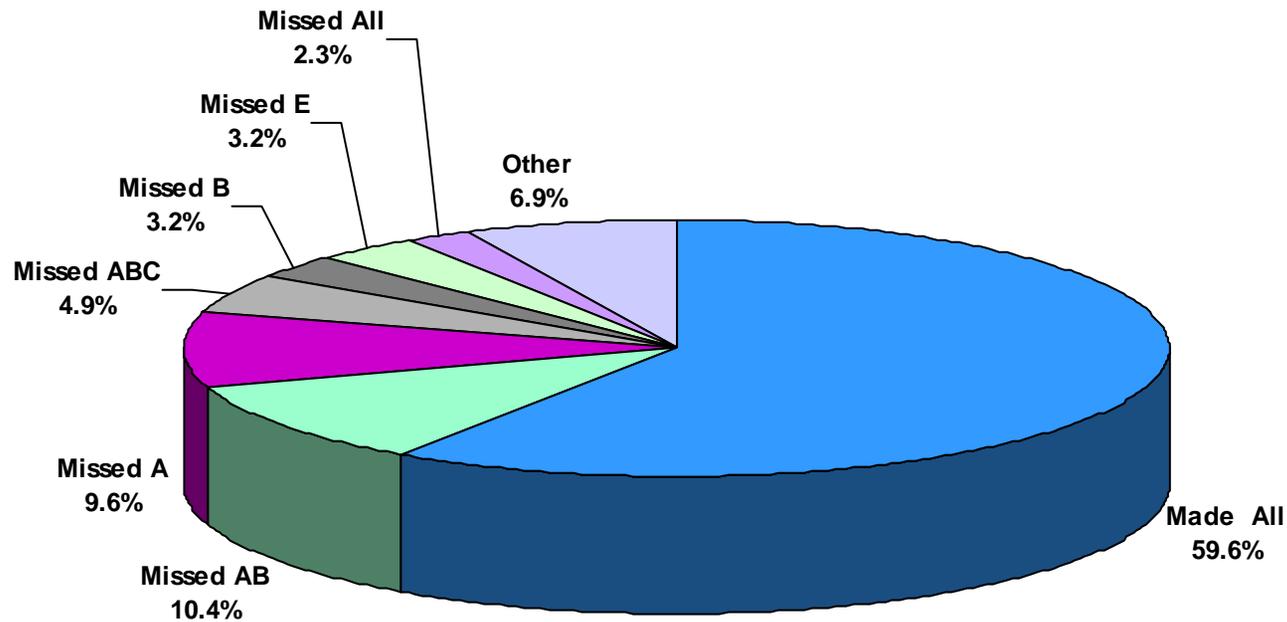


Summary of Monthly Compliance Gate E





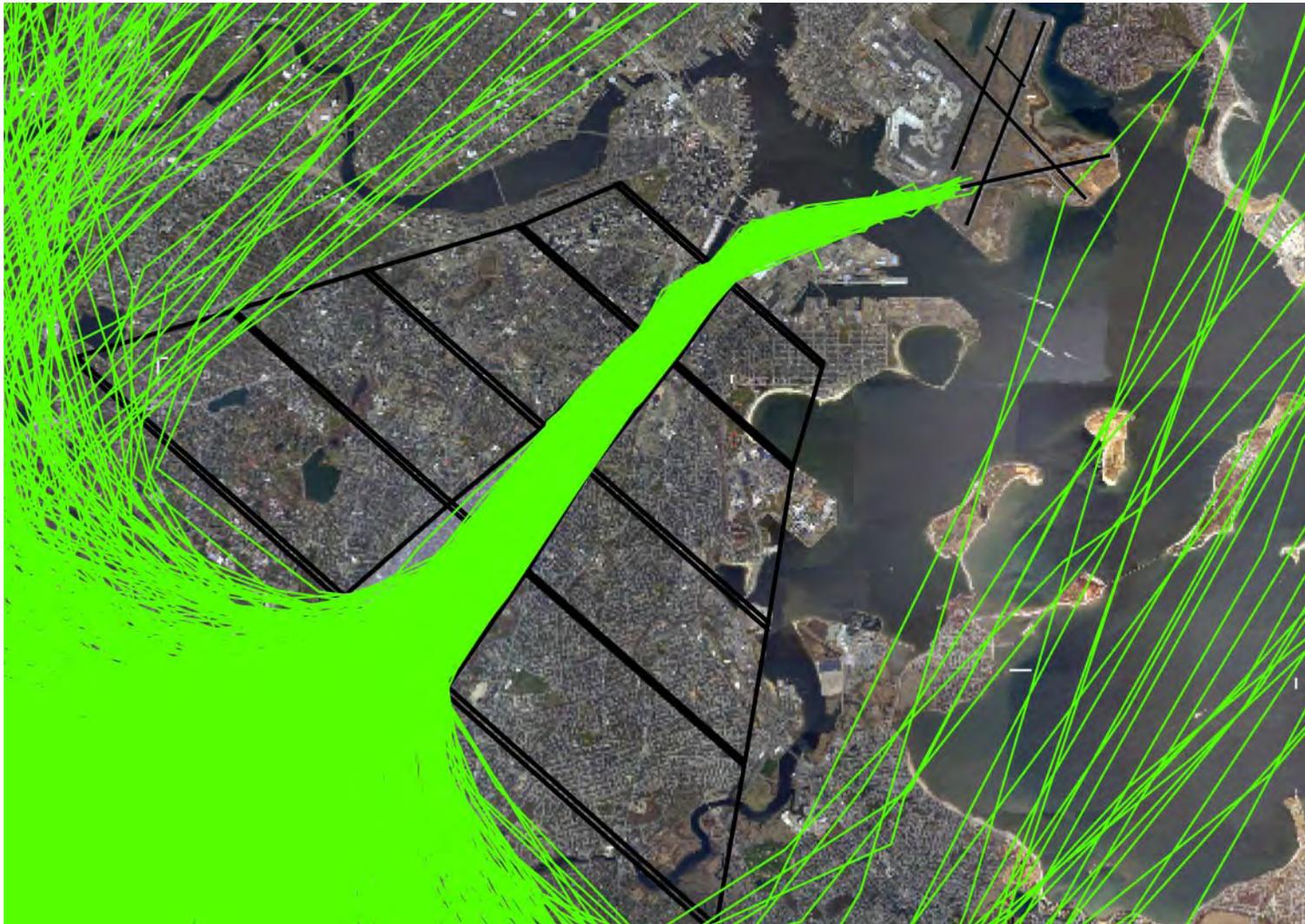
Distribution of the Top Seven Gate Categories



Source: National Offload Program Archive, July 2005 through February 2007.



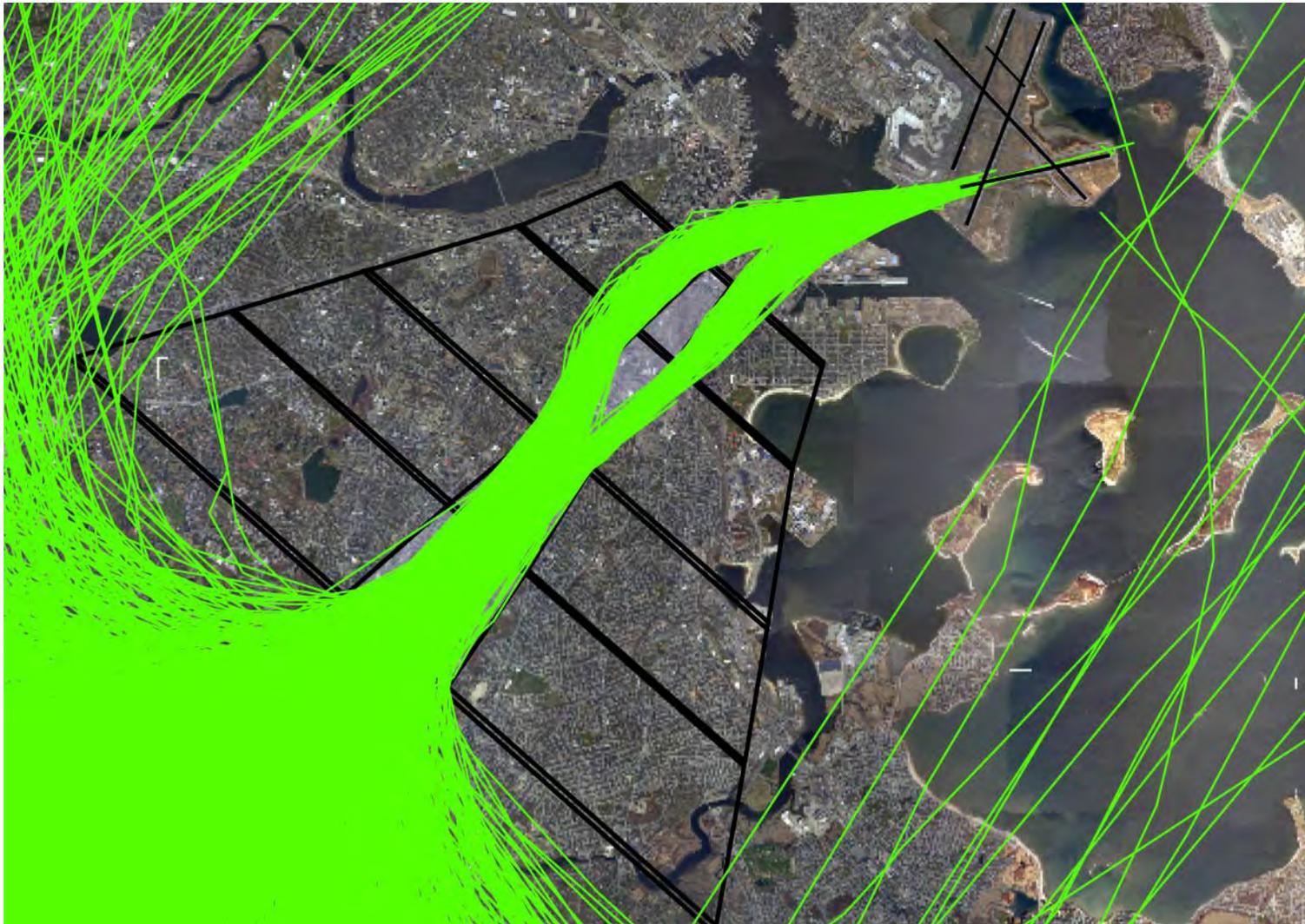
“Made All” 59.6% of Flight Tracks



Source: National Offload Program Archive, July 2005 through December 2006.



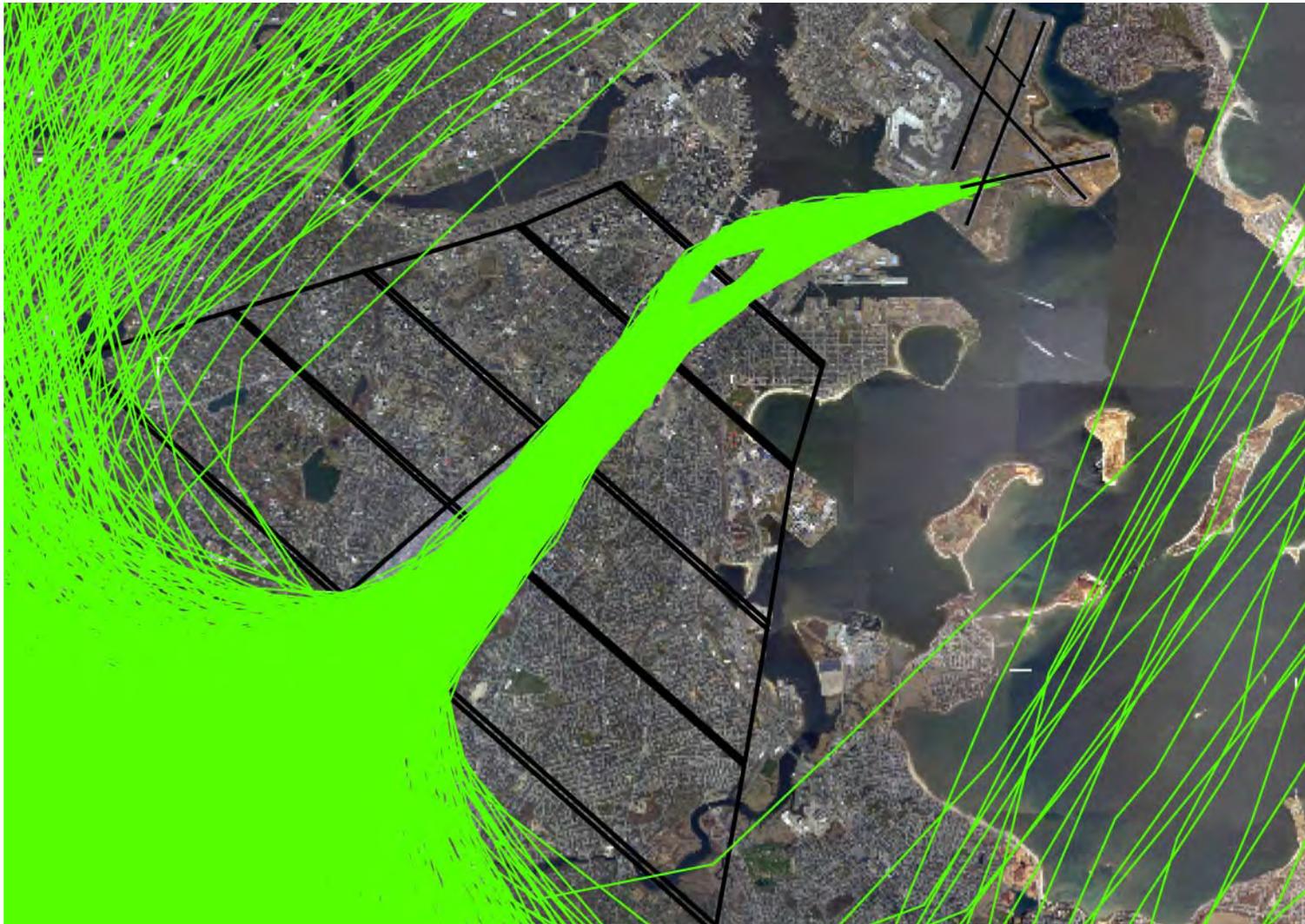
“Missed AB” 10.4% of Flight Tracks



Source: National Offload Program Archive, July 2005 through December 2006.



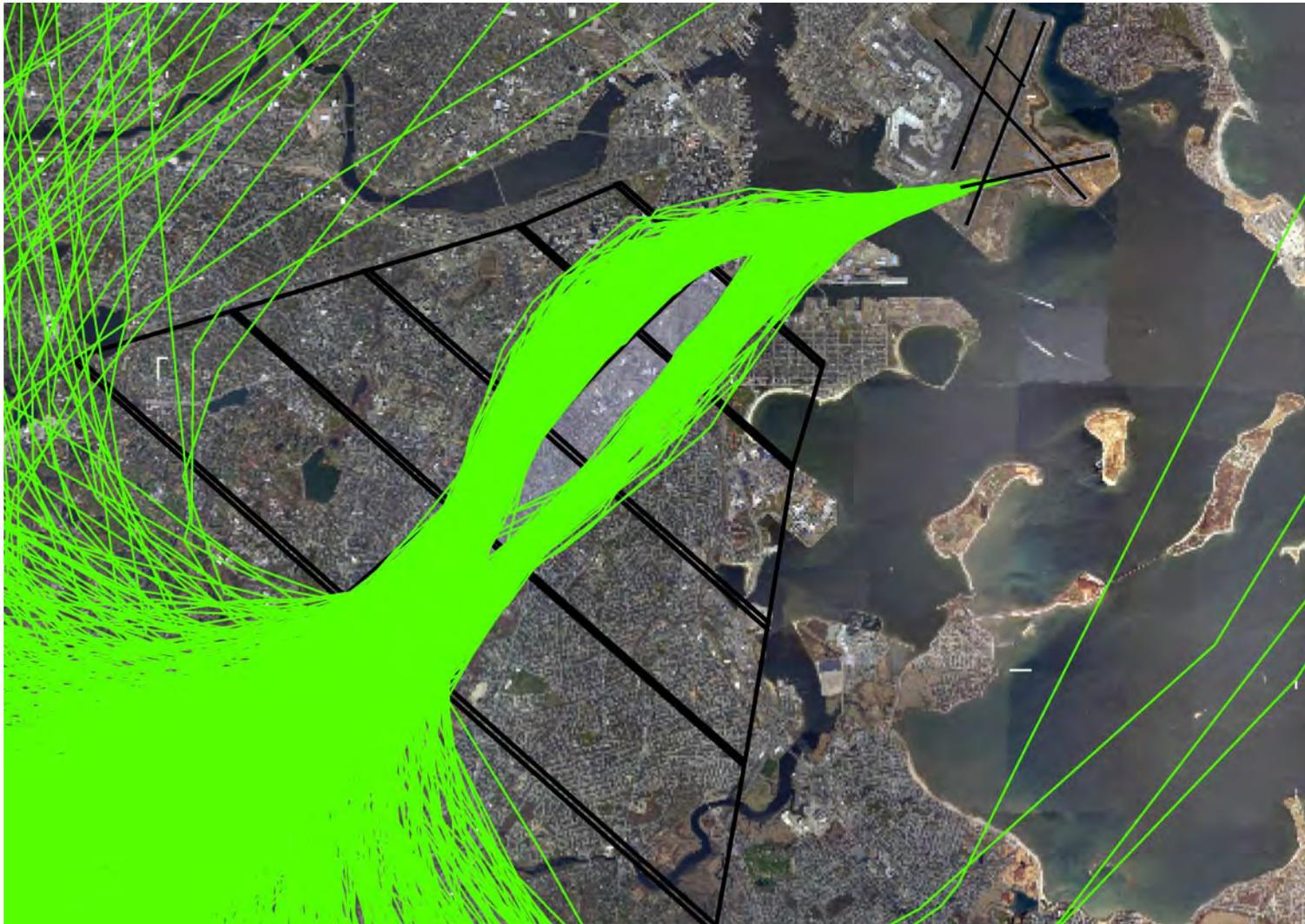
“Missed A” 9.6% of Flight Tracks



Source: National Offload Program Archive, July 2005 through December 2006.



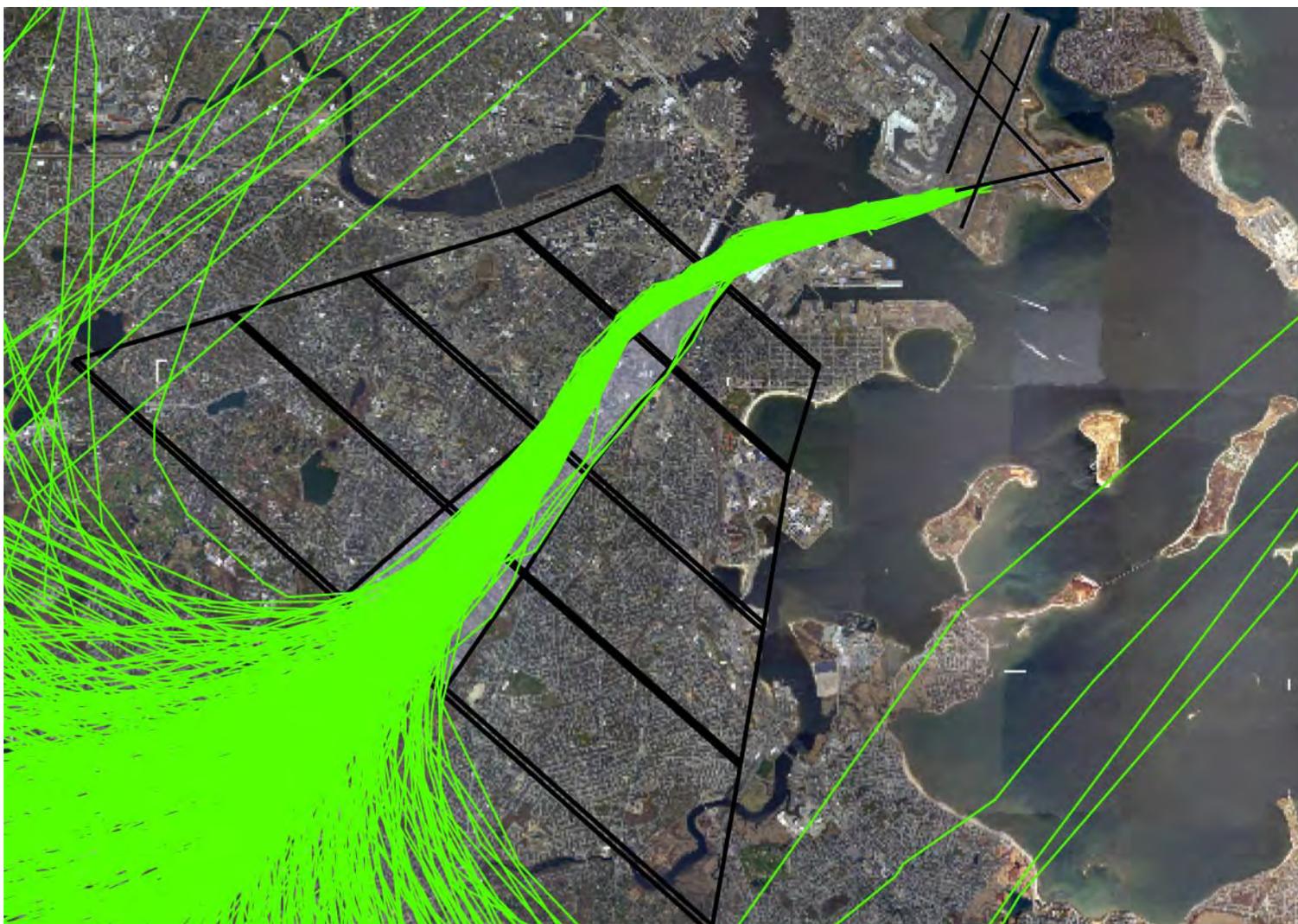
“Missed ABC” 4.9% of Flight Tracks



Source: National Offload Program Archive, July 2005 through December 2006.



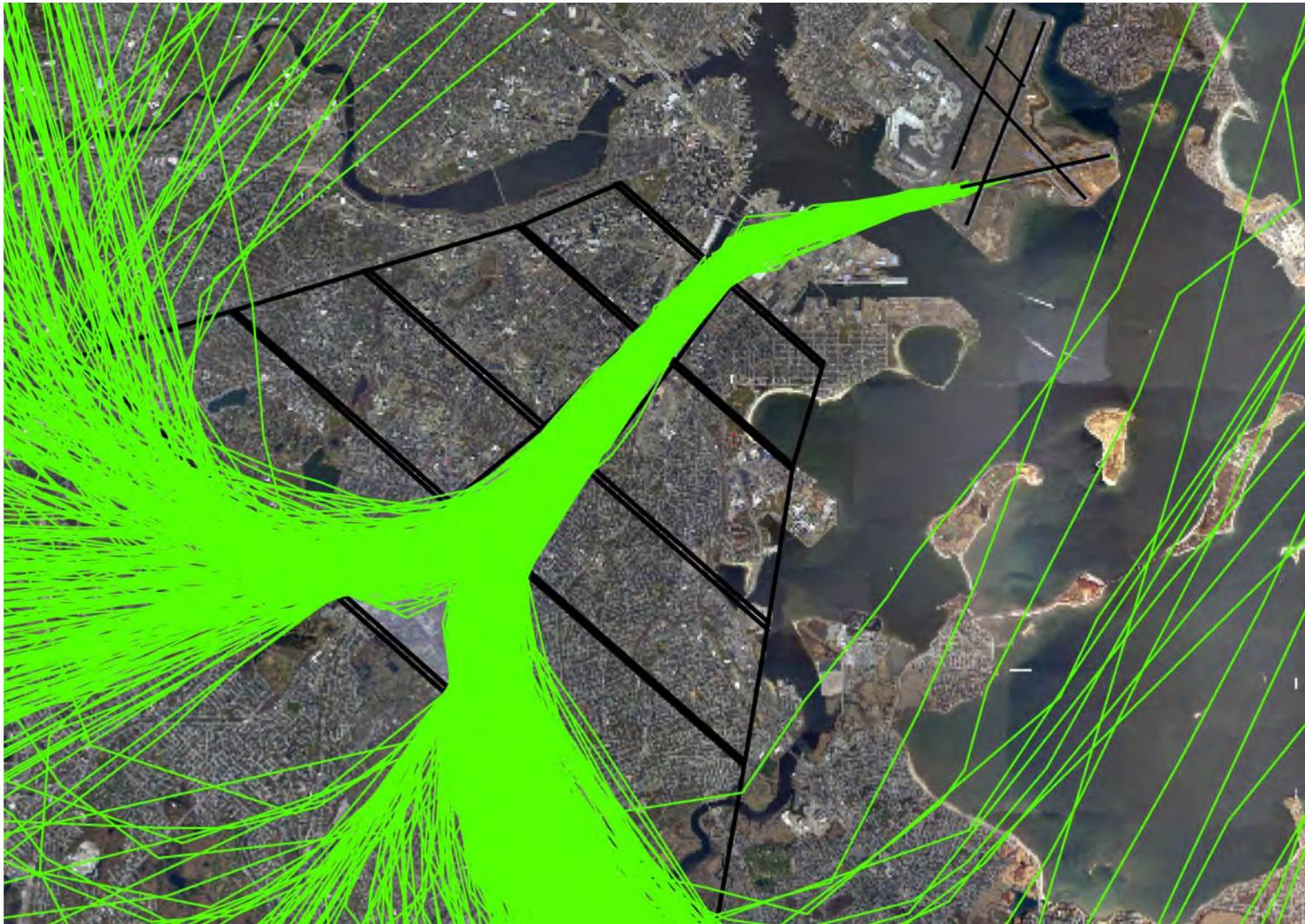
“Missed B” 3.2% of Flight Tracks



Source: National Offload Program Archive, July 2005 through December 2006.



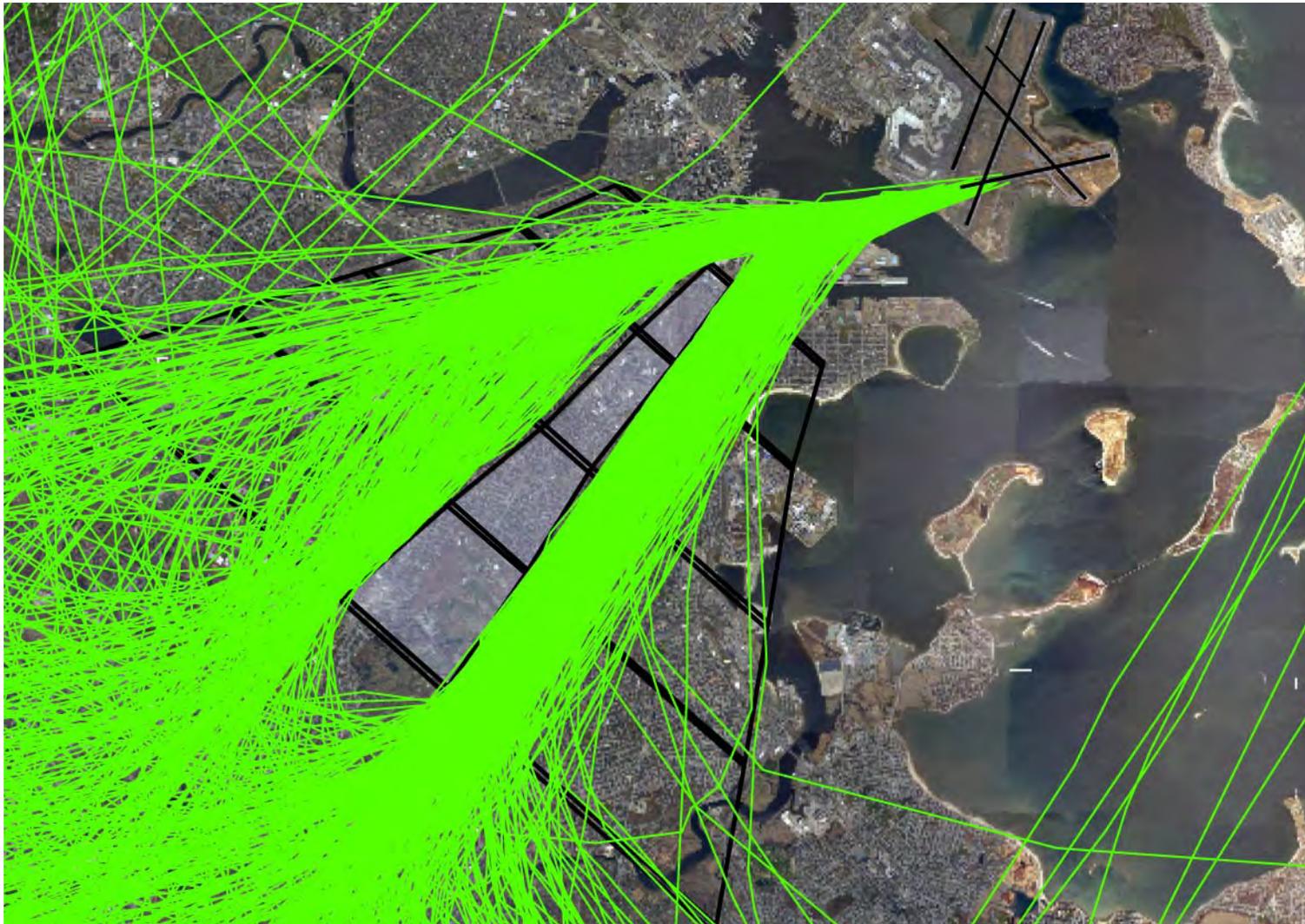
“Missed E” 3.2% of Flight Tracks



Source: National Offload Program Archive, July 2005 through December 2006.



“Missed All” 2.3% of Flight Tracks



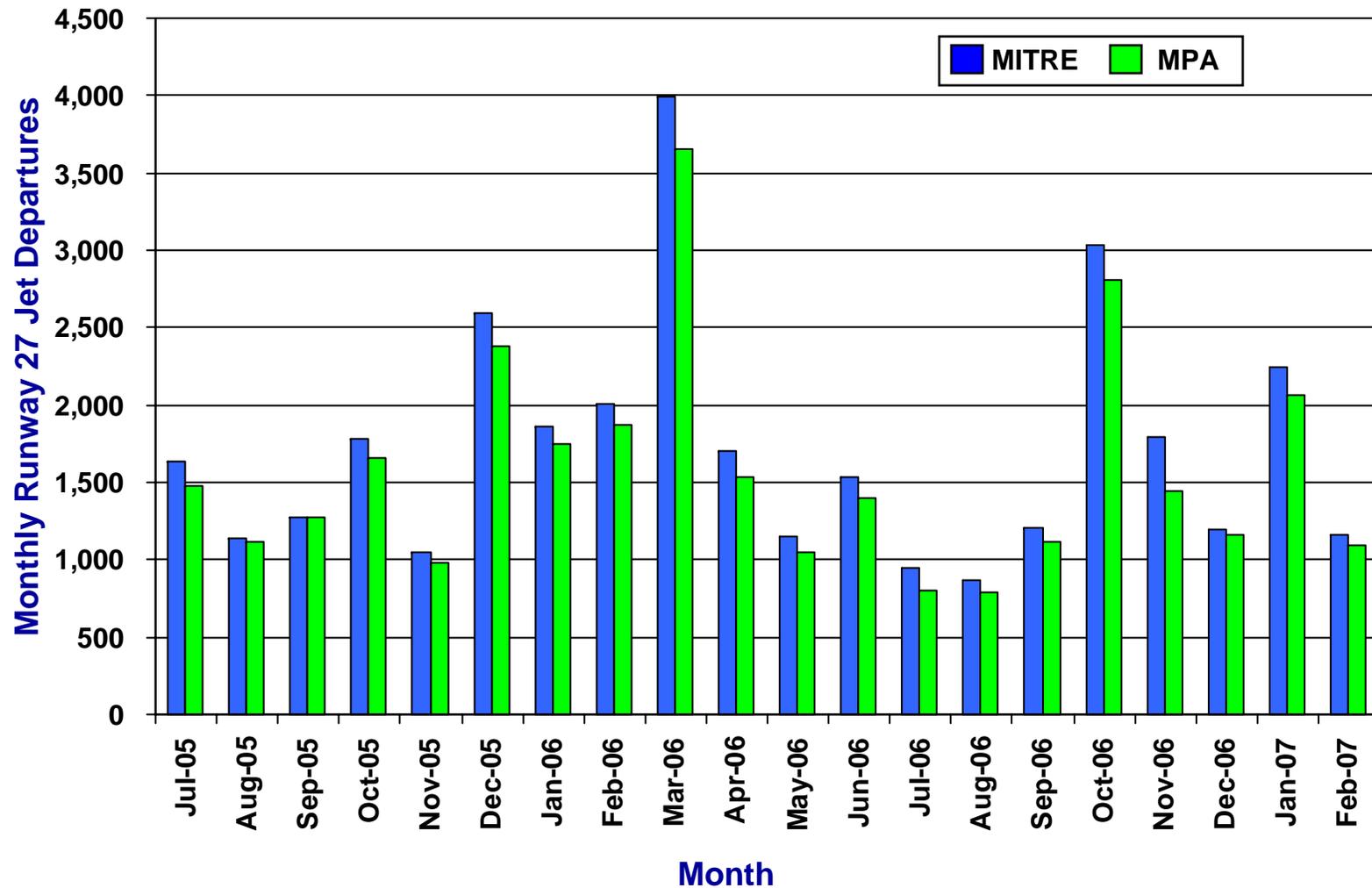
Source: National Offload Program Archive, July 2005 through December 2006.



Comparison of Results to Previous Analyses

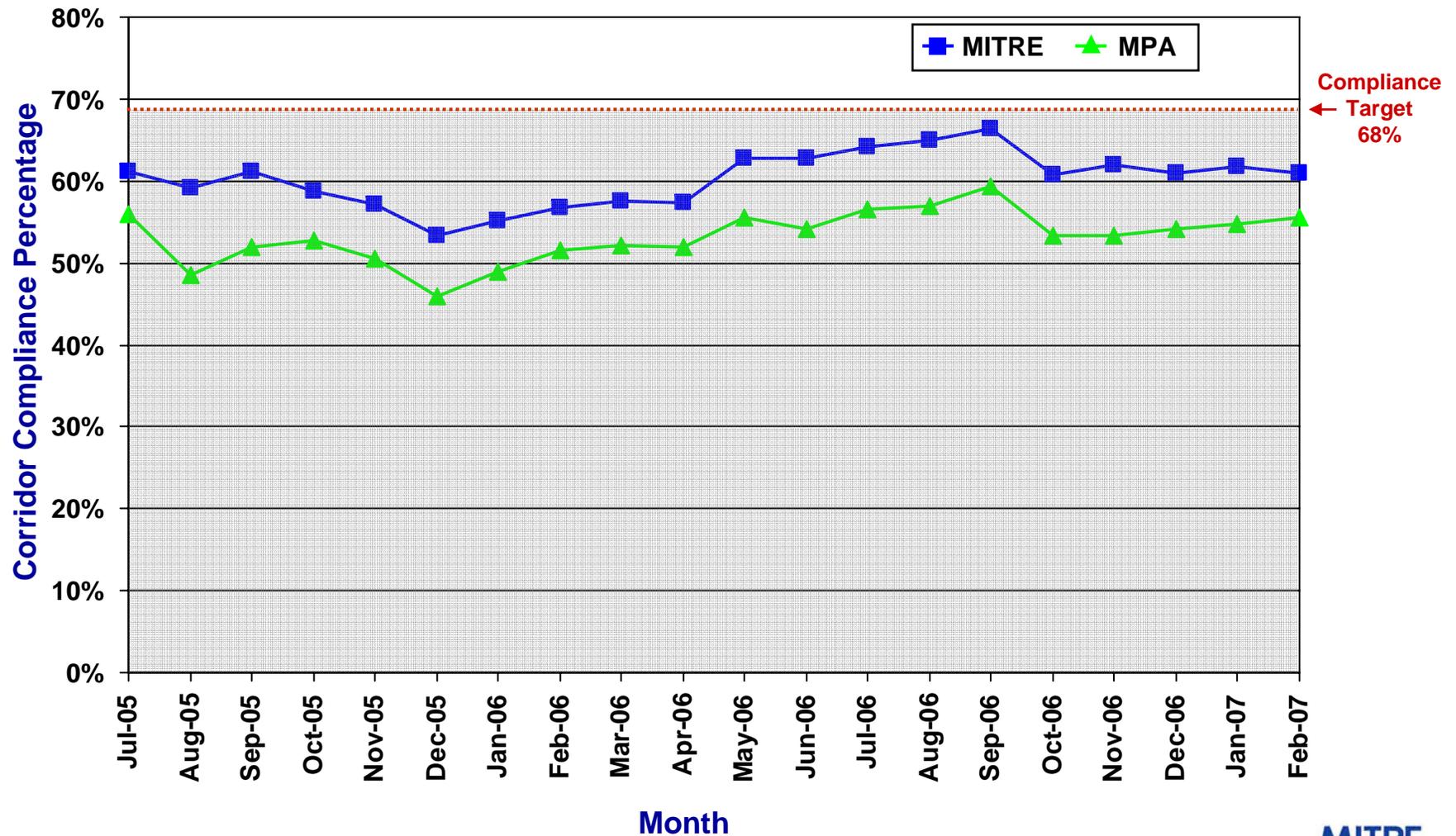


Monthly Runway 27 Jet Departures MITRE vs. MPA



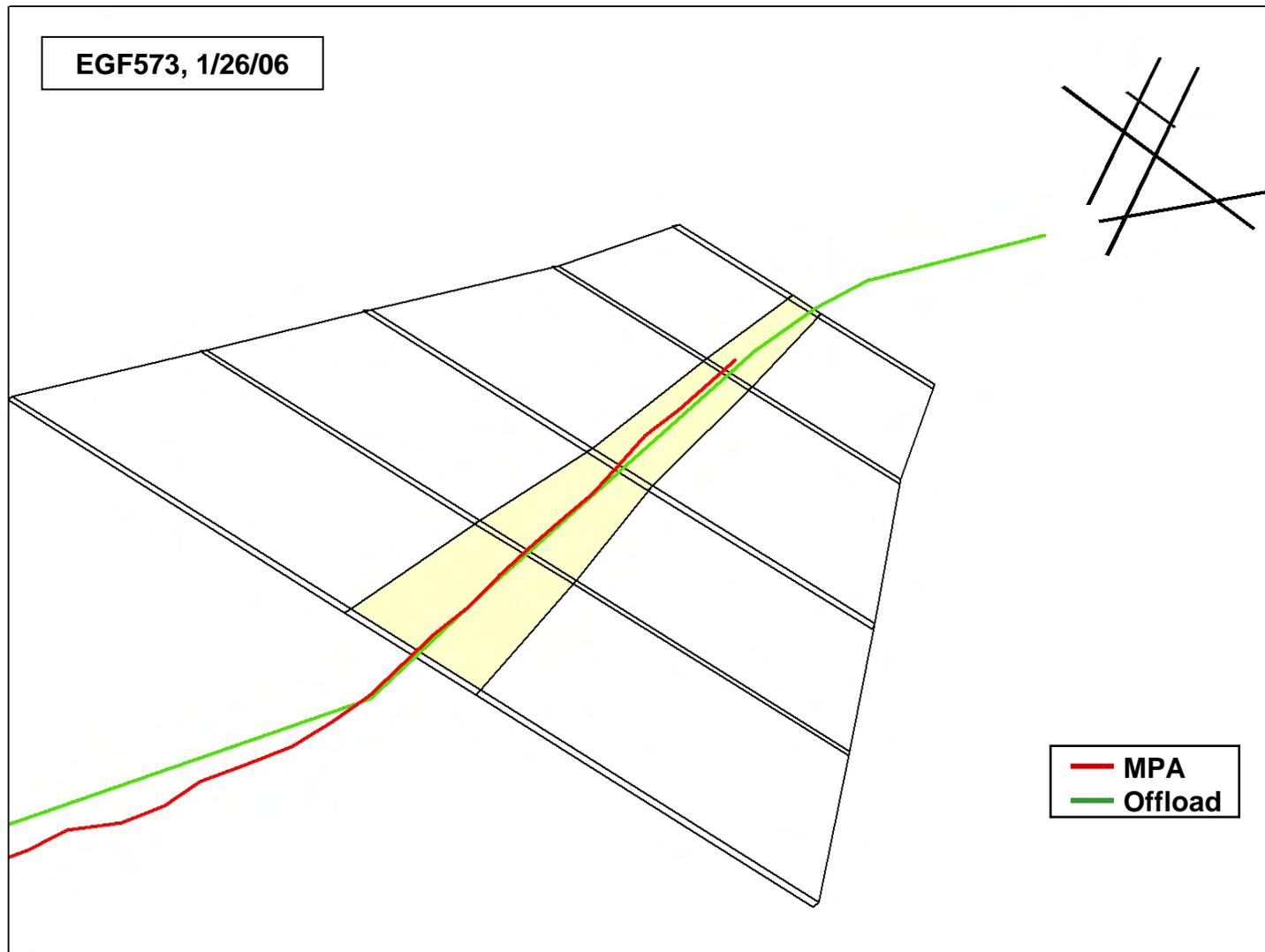


Monthly Corridor Compliance MITRE vs. MPA



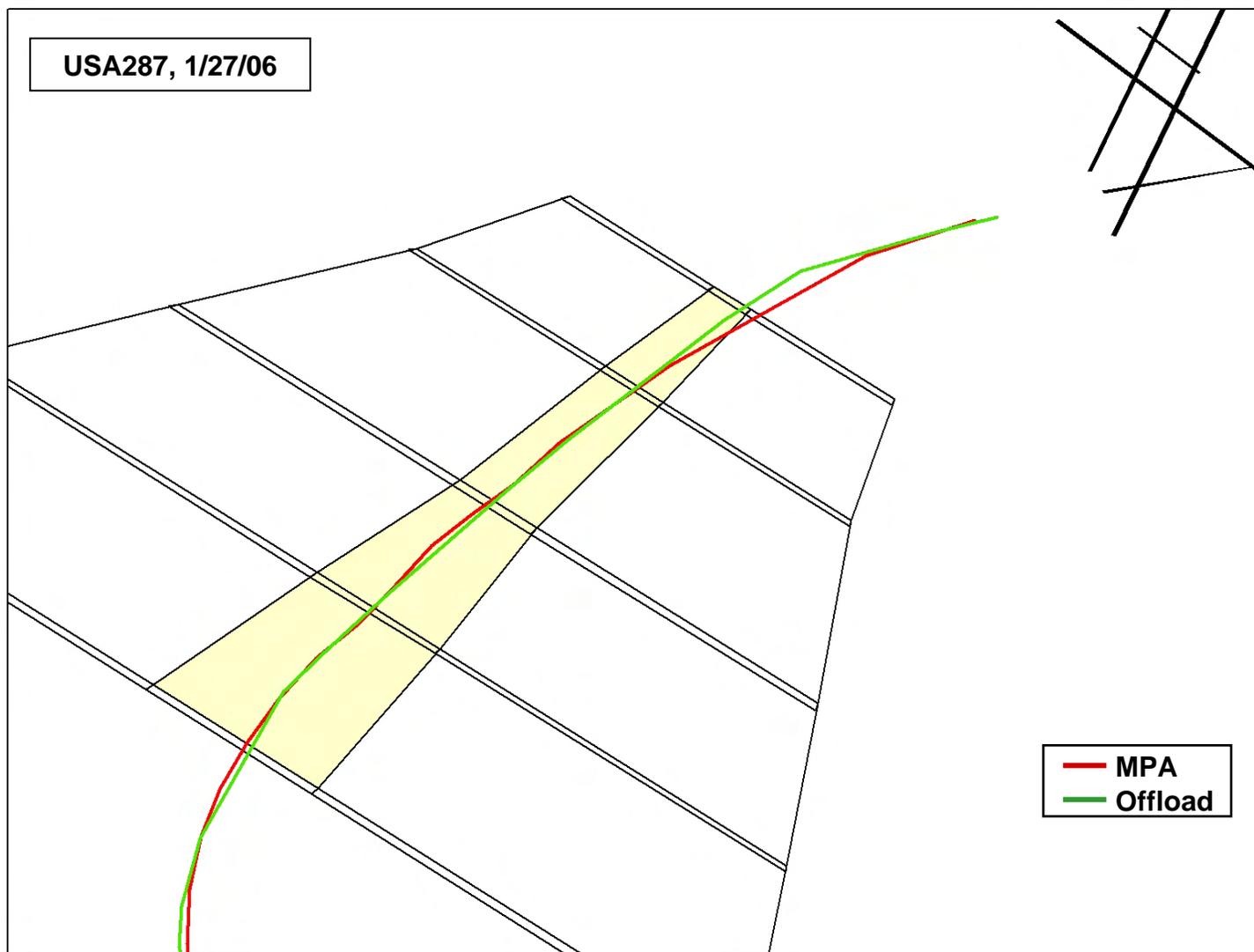


MPA Non-Compliant Tracks Identified as Compliant Using Offload



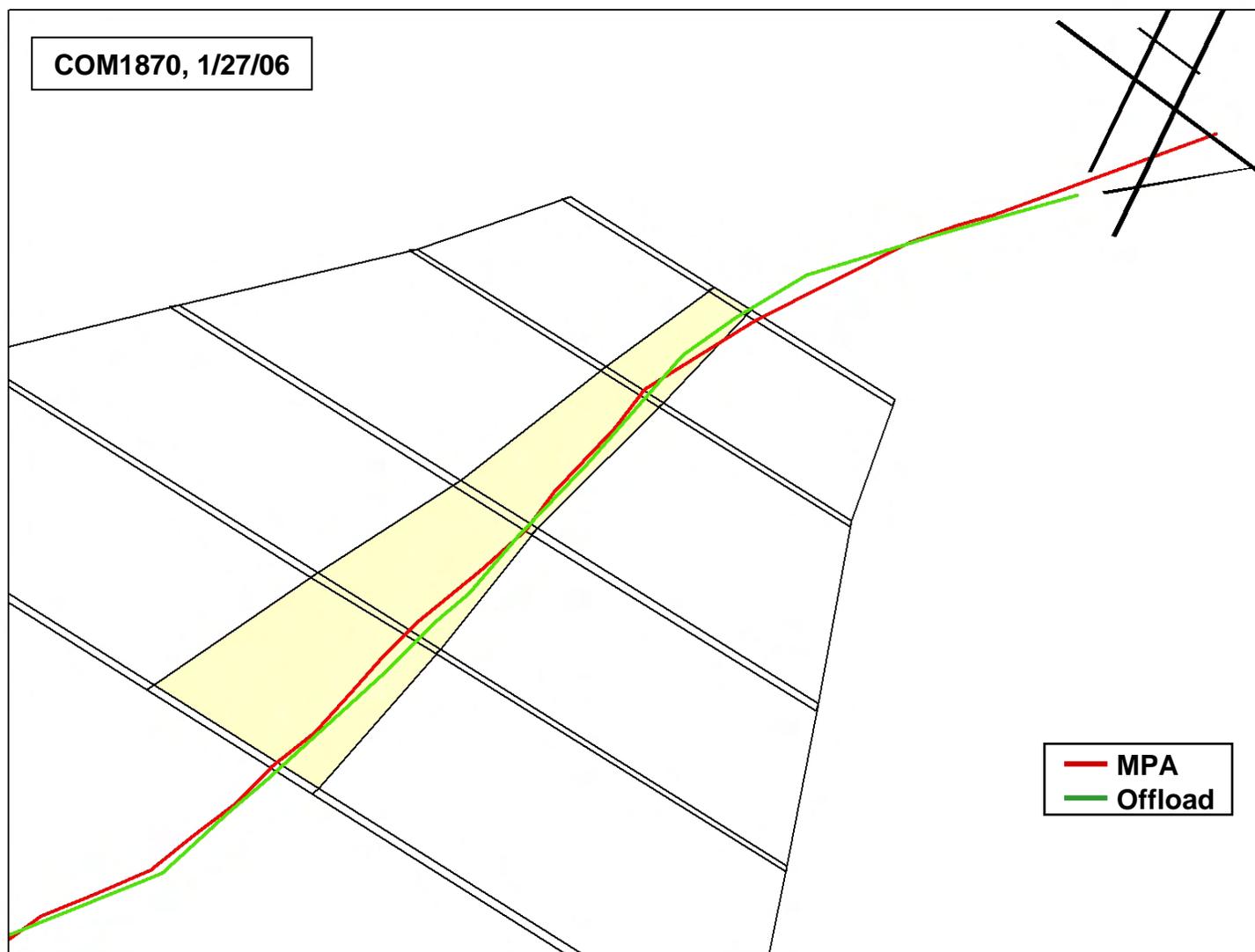


MPA Non-Compliant Tracks Identified as Compliant Using Offload (*continued*)



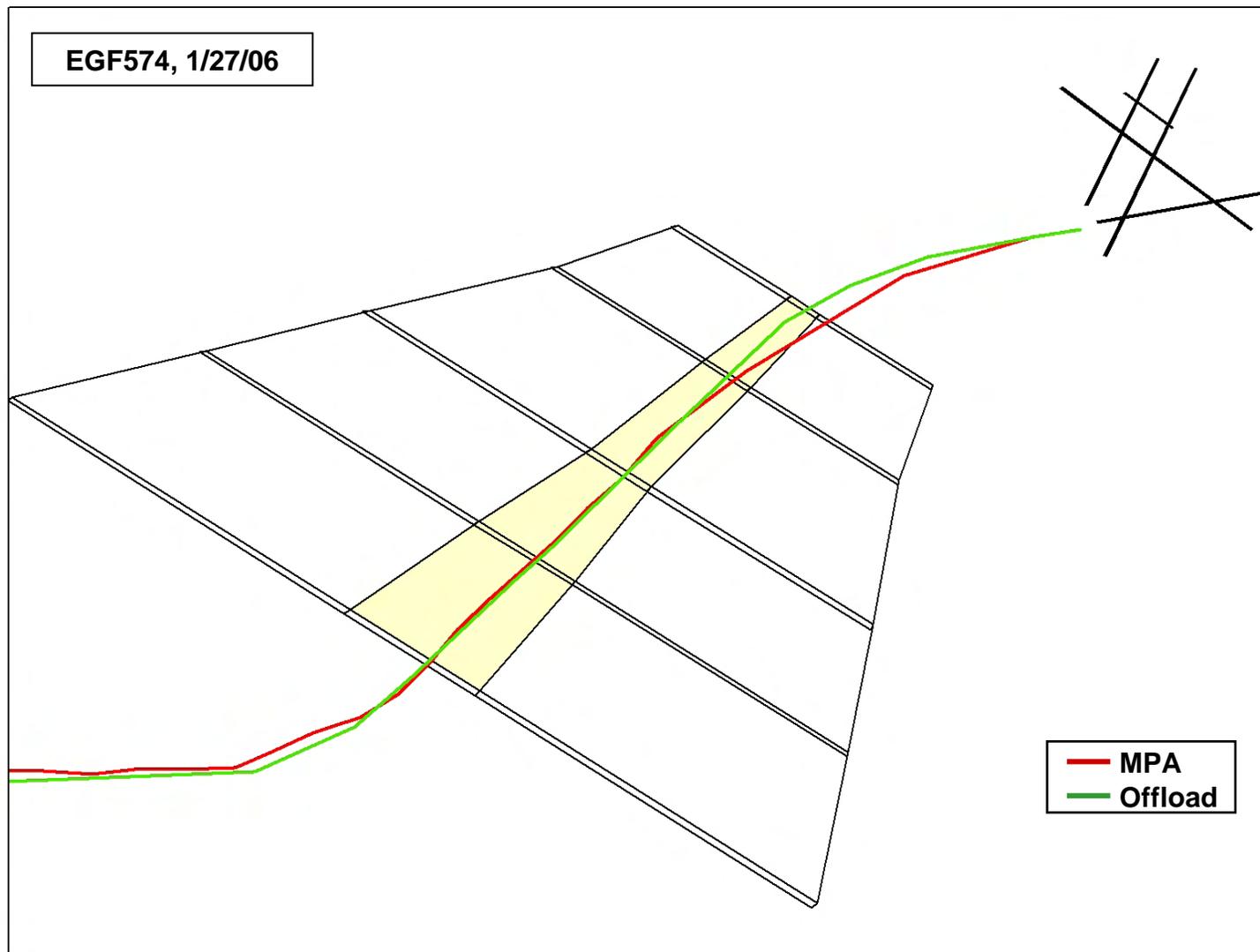


MPA Non-Compliant Tracks Identified as Compliant Using Offload (*continued*)



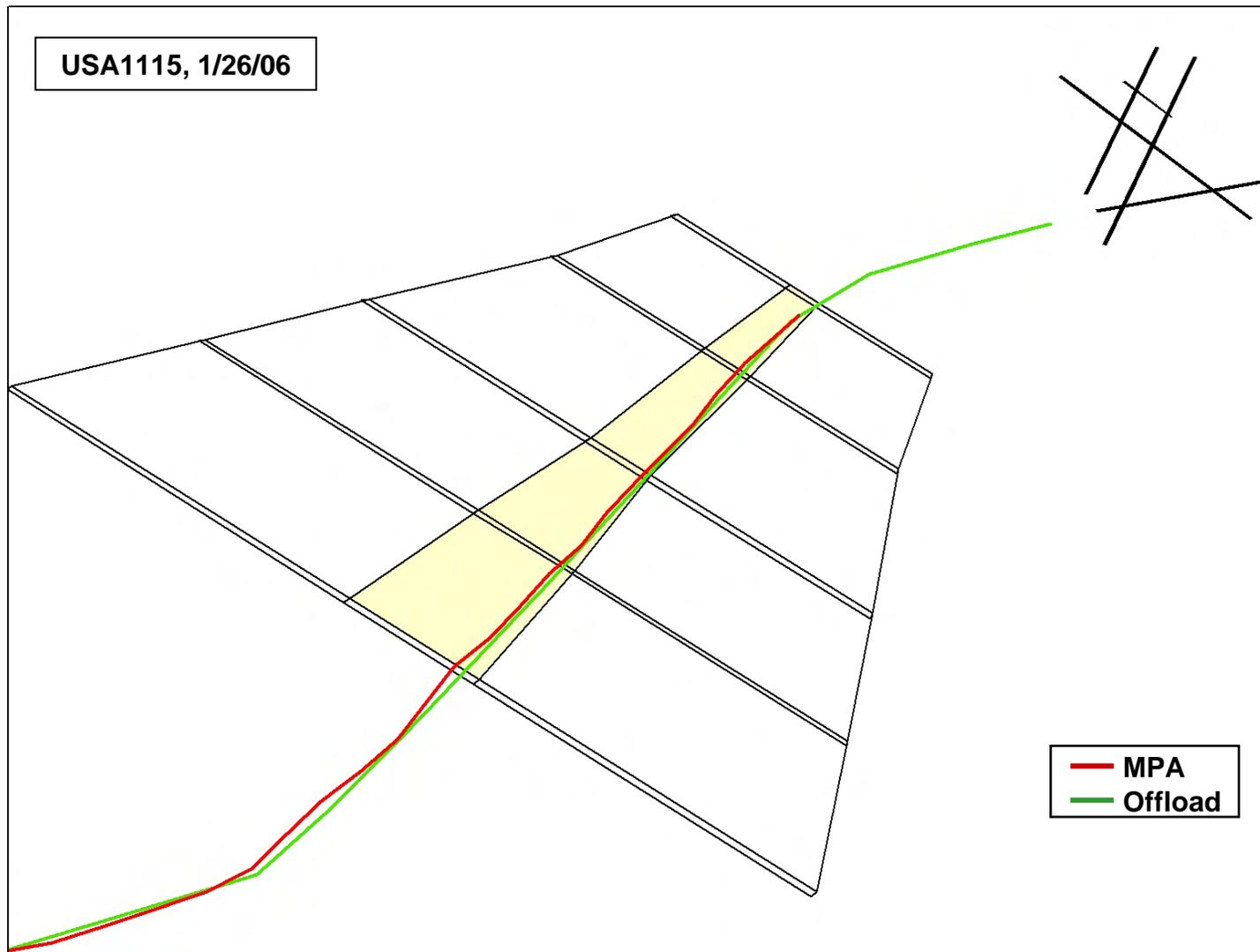


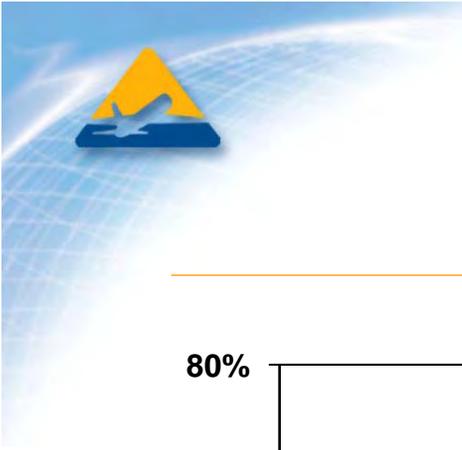
MPA Non-Compliant Tracks Identified as Compliant Using Offload (continued)



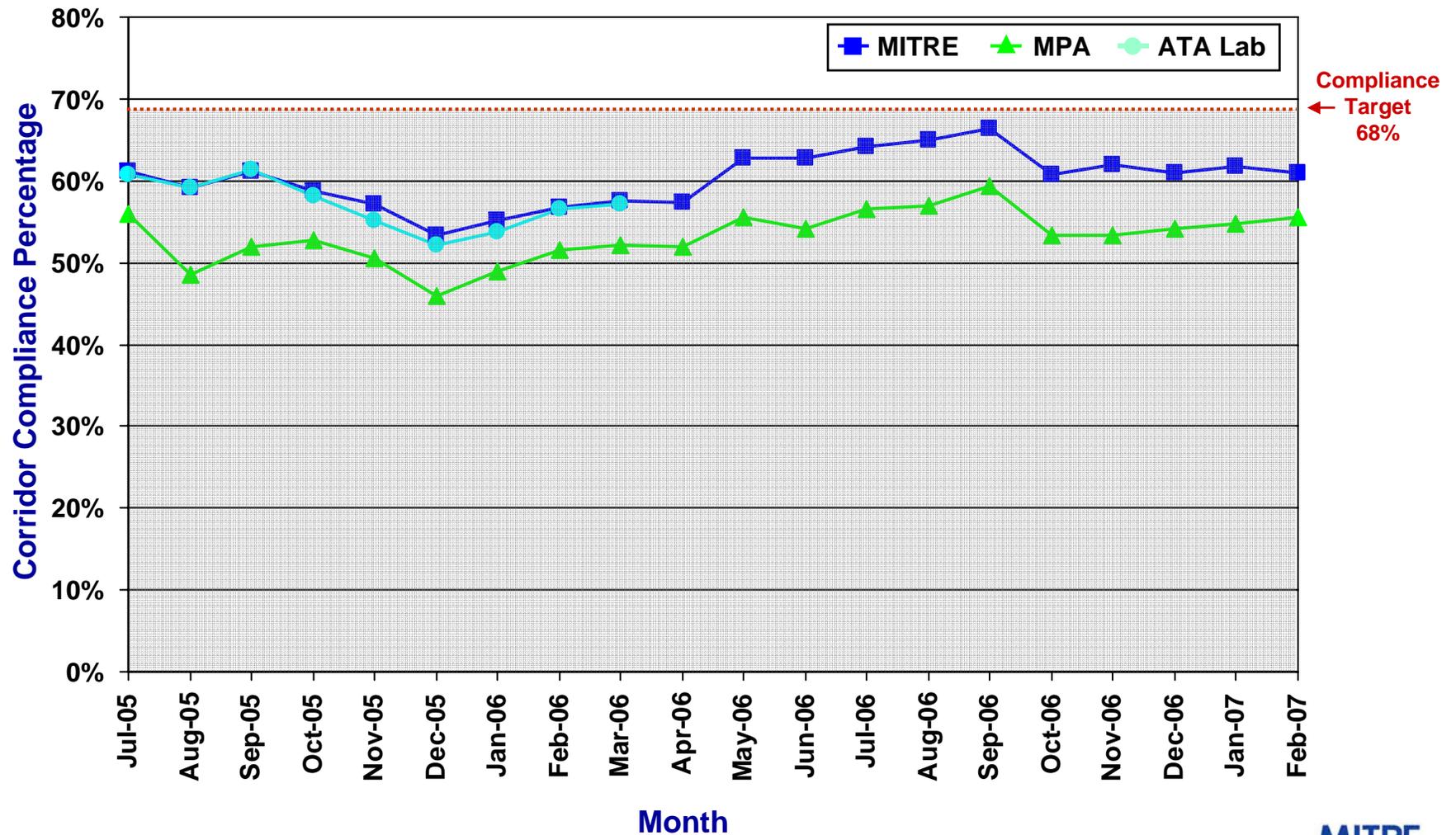


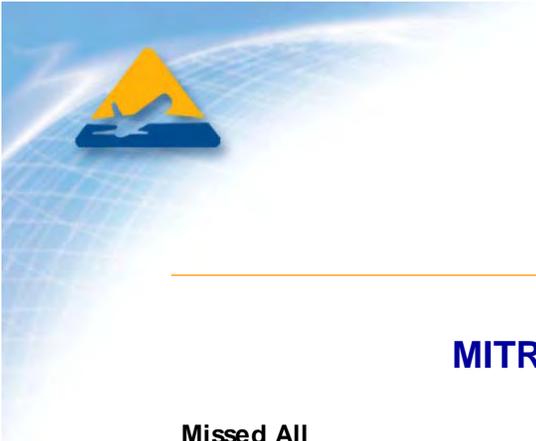
MPA Non-Compliant Tracks Identified as Compliant Using Offload (*concluded*)





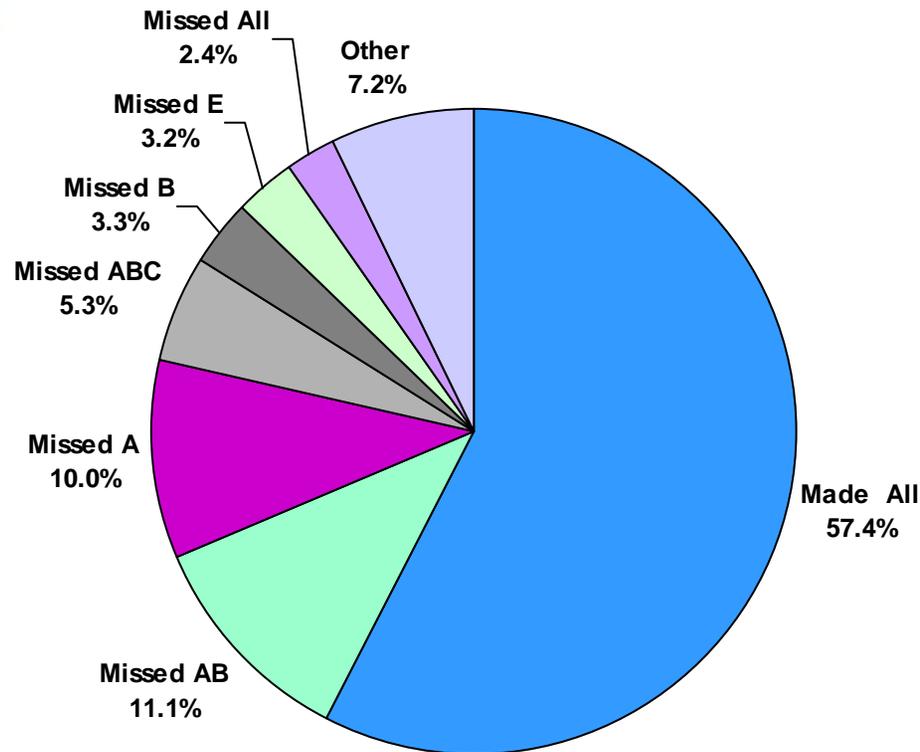
Monthly Corridor Compliance MITRE vs. MPA vs. ATA Lab



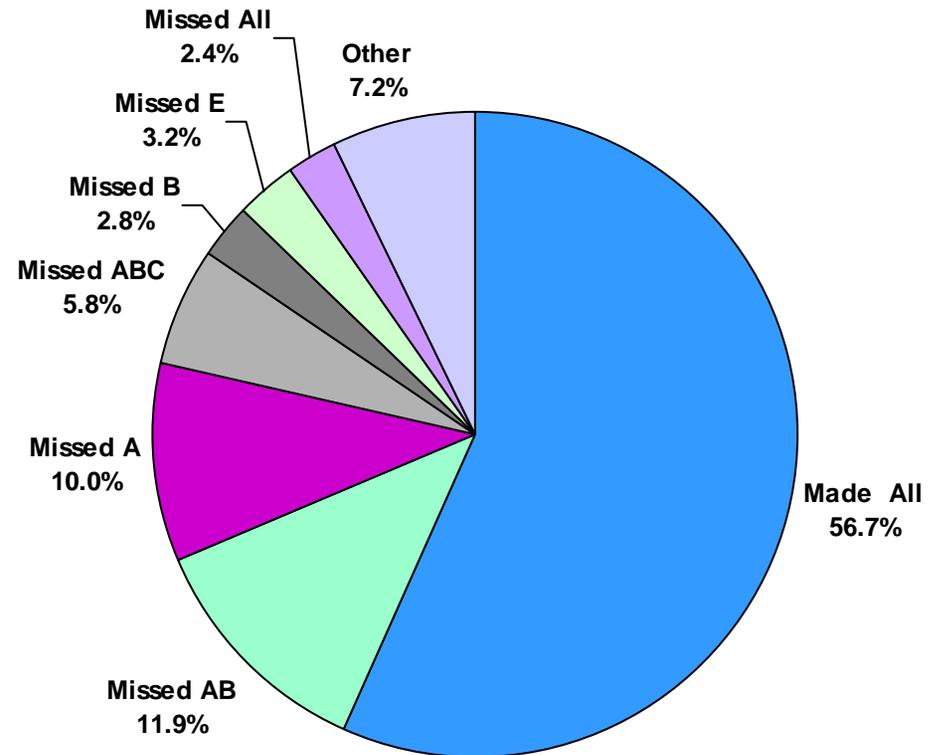


Top Seven Categories MITRE vs. ATA Lab

MITRE



ATA Lab



Source: Offload Analysis, July 2005 through March 2006.



MITRE and ATA Lab Comparison of Selected Aircraft Types

Aircraft Type	July 05 - Mar 06 Count		July 05 - Mar 06 Compliant Count		July 05 - Mar 06 Compliance Pct		
	MITRE	ATA Lab	MITRE	ATA Lab	MITRE	ATA Lab	
Most Common Good Performers	E135	2,331	2,160	1,675	1,548	71.9%	71.7%
	A319	2,060	1,890	1,349	1,196	65.5%	63.3%
	CRJ2	1,501	1,366	915	847	61.0%	62.0%
Most Common Bad Performers	B752	2,339	2,188	780	696	33.3%	31.8%
	CRJ1	900	798	396	349	44.0%	43.7%
	MD88	608	581	204	190	33.6%	32.7%

Source: Offload Analysis, July 2005 through March 2006.

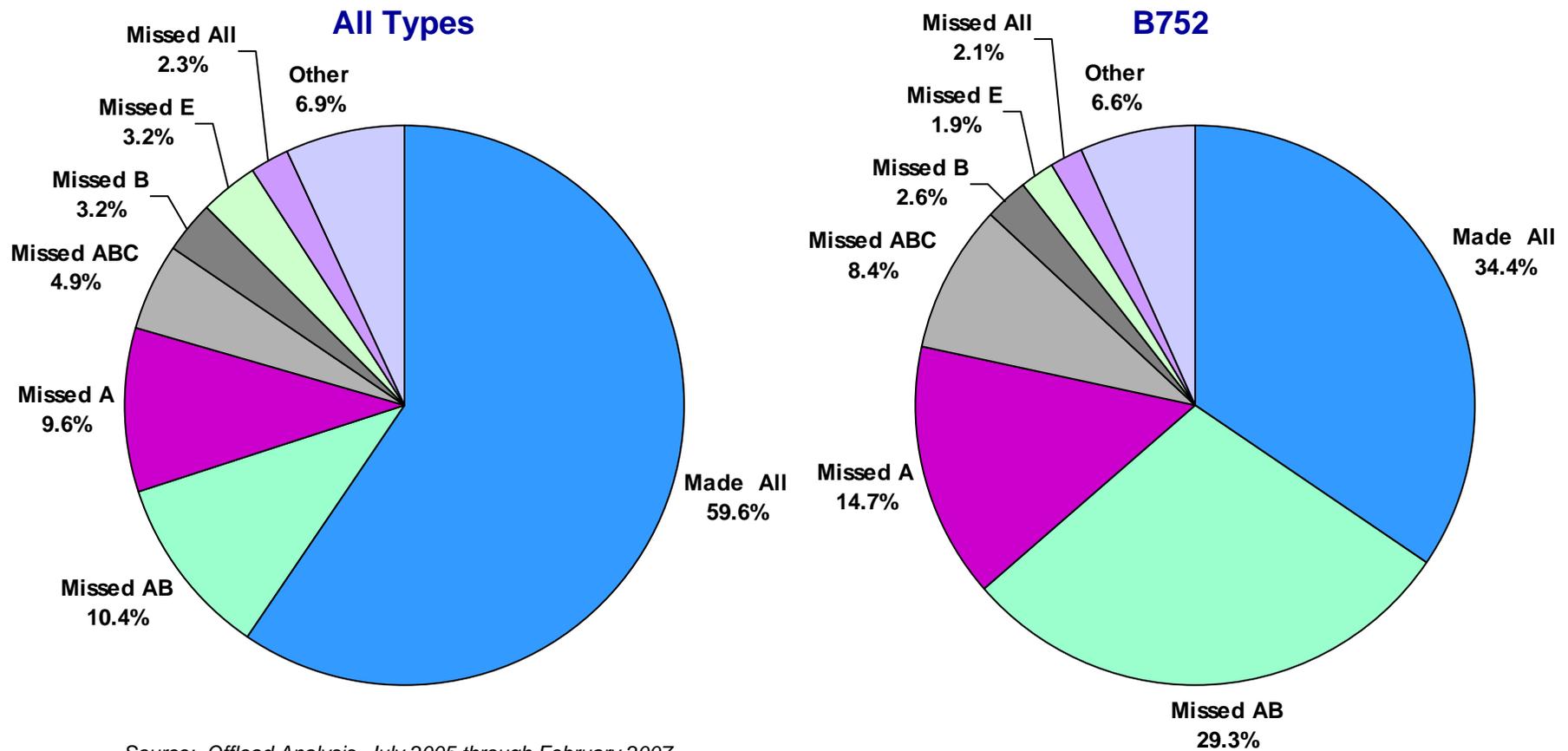


Analysis of Bad Performers



Top Seven Categories All Types vs. B752

- **B752s miss the first two gates much more frequently than other aircraft types**

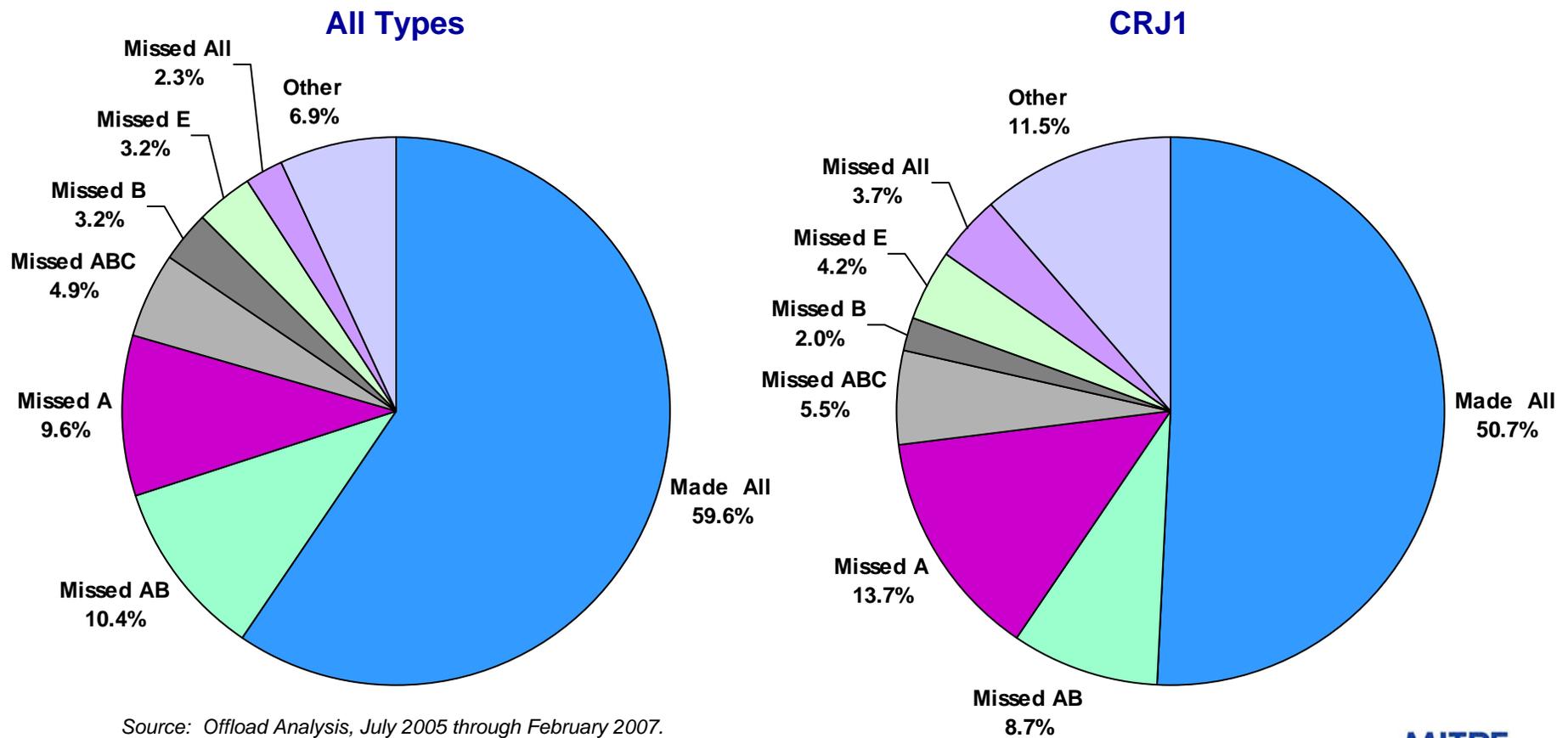


Source: Offload Analysis, July 2005 through February 2007.

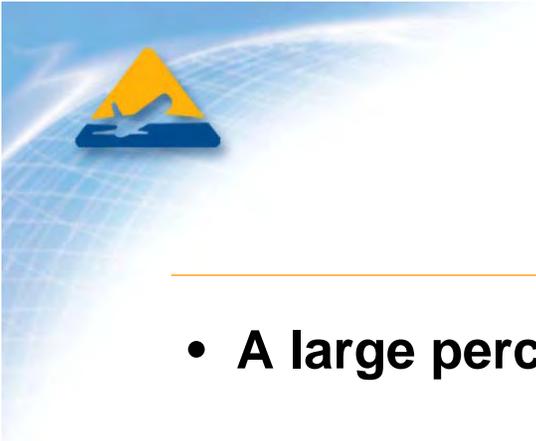


Top Seven Categories All Types vs. CRJ1

- The large percentage of other misses is due primarily to CRJ1s that made Gate E only or that missed Gates C, D, and E

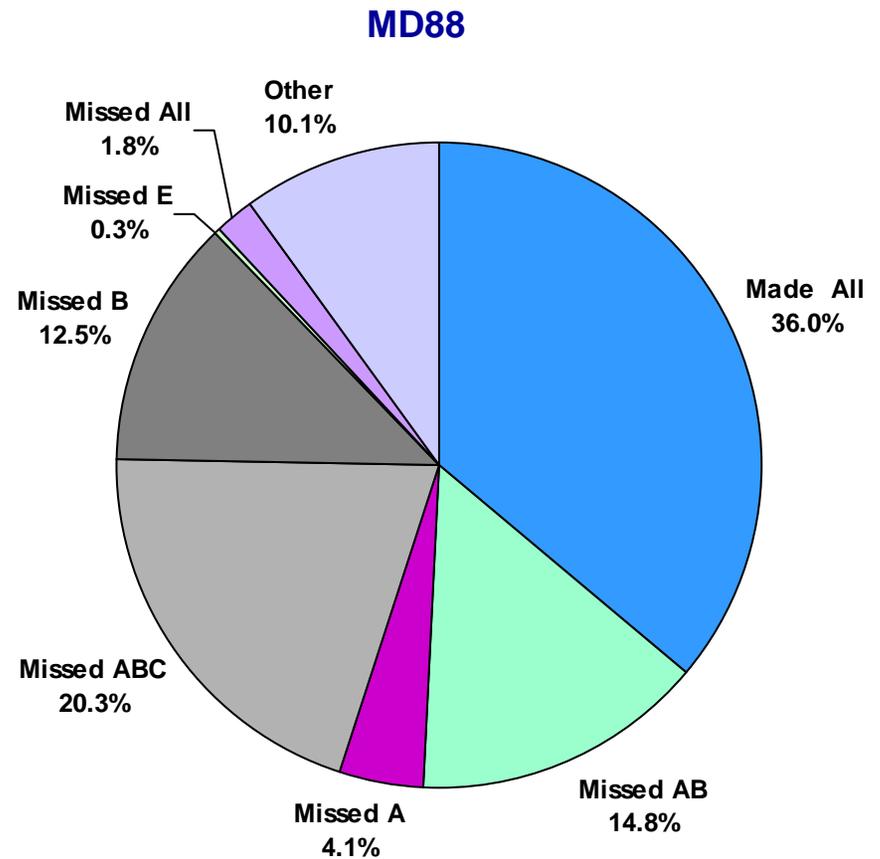
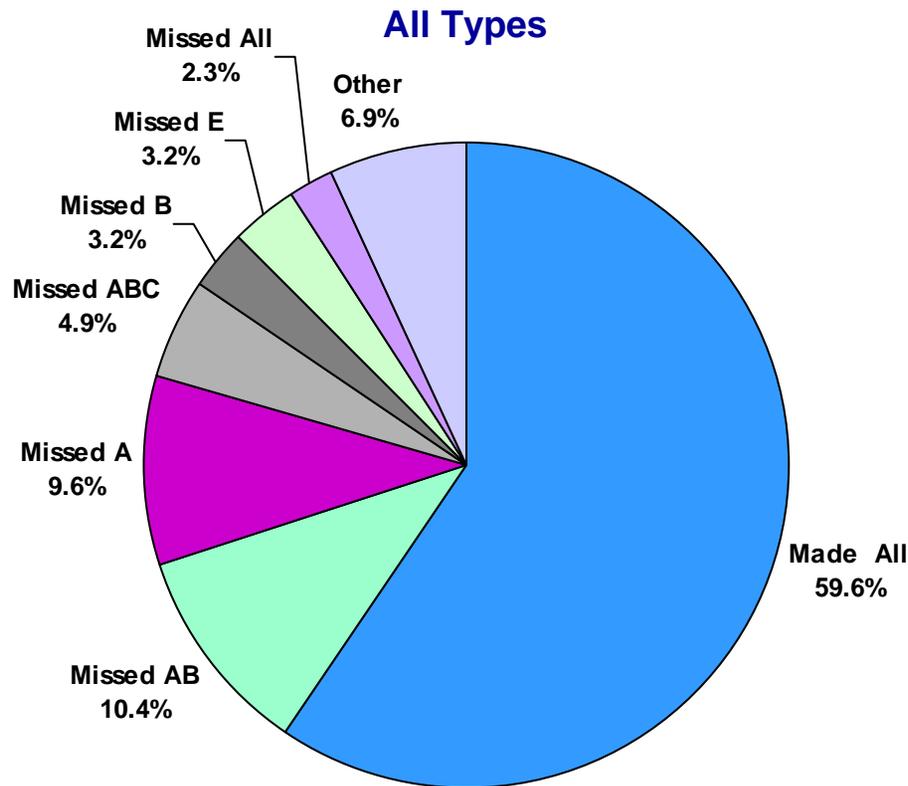


Source: Offload Analysis, July 2005 through February 2007.

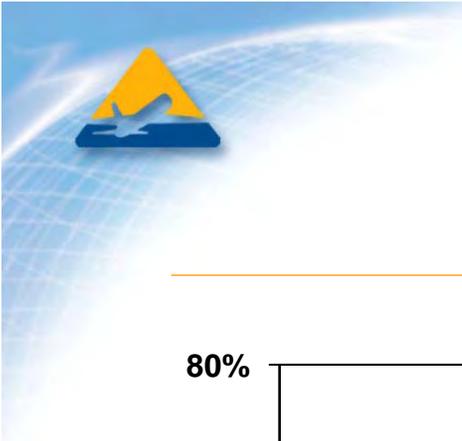


Top Seven Categories All Types vs. MD88

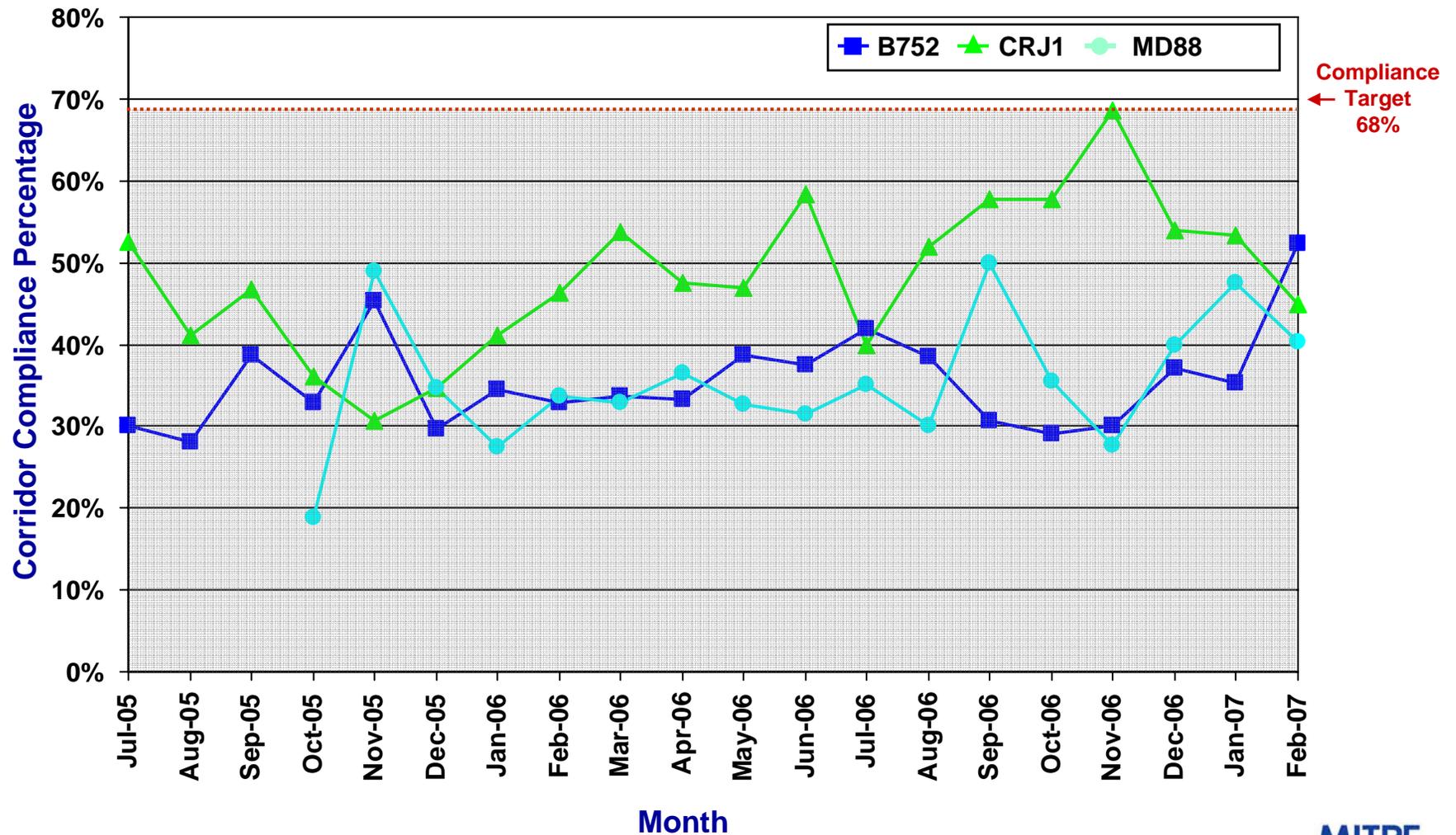
- A large percentage of MD88s miss Gates A, B, and C



Source: Offload Analysis, July 2005 through February 2007.

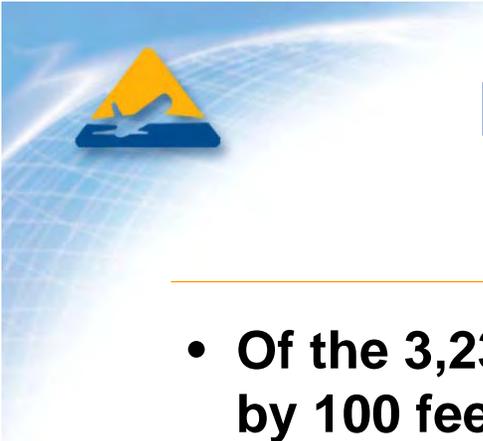


Monthly Corridor Compliance B752, CRJ1, MD88



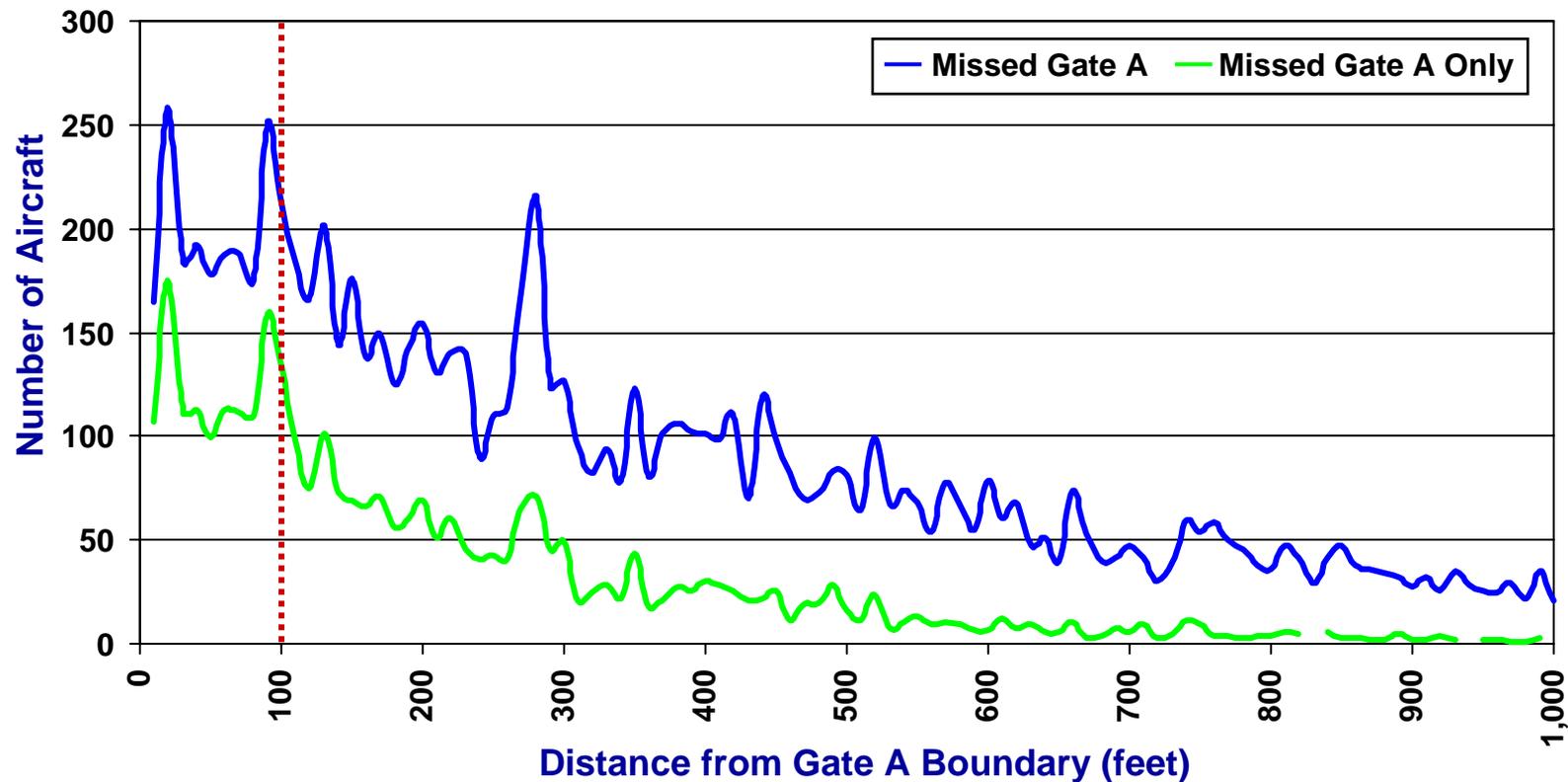


Analysis of Miss Distance



Many Tracks Missed Gate 'A' by less than 100 feet

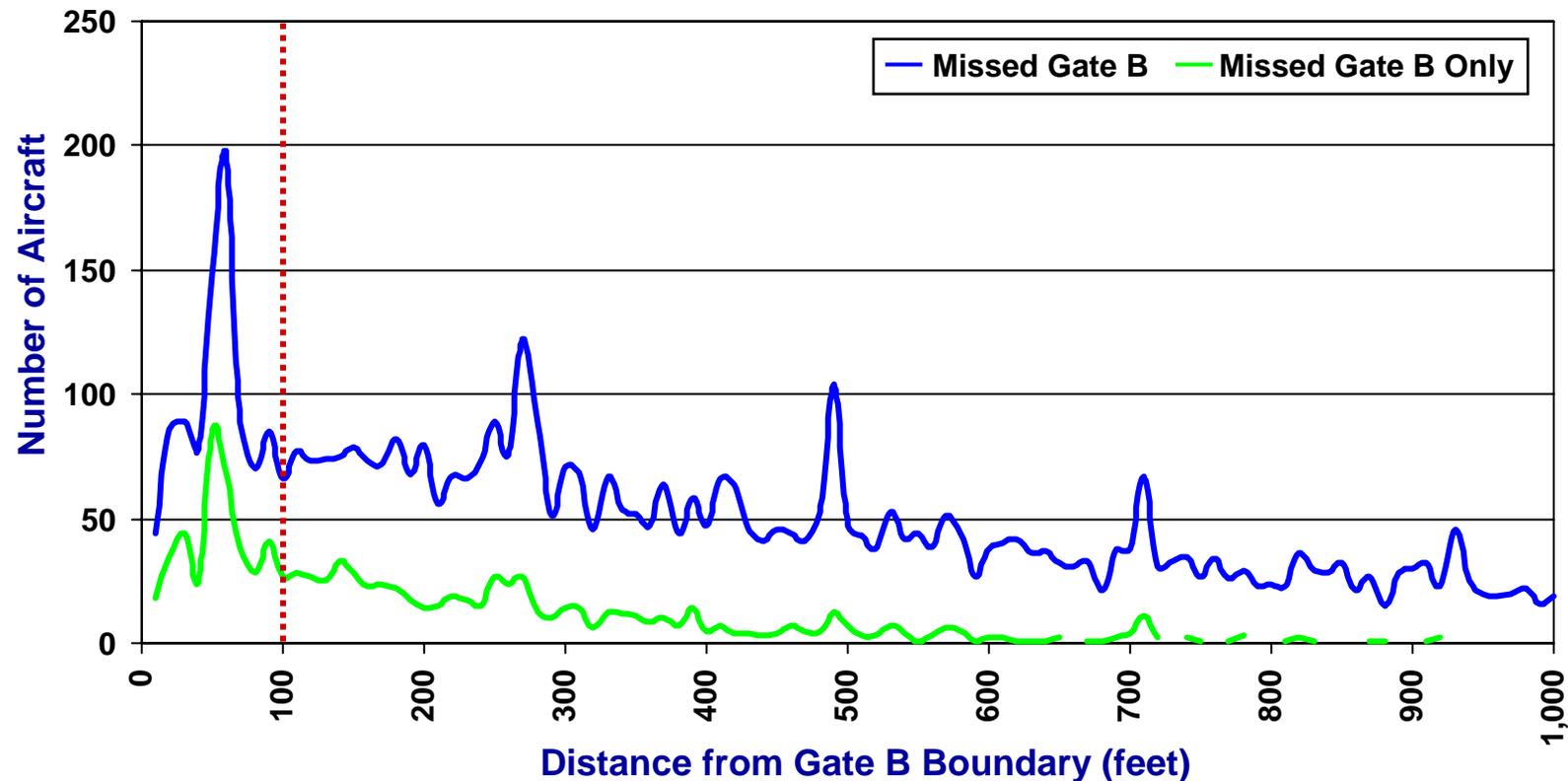
- Of the 3,235 flights that missed Gate 'A' only, 40% missed by 100 feet or less





Many Tracks Missed Gate 'B' by less than 100 feet

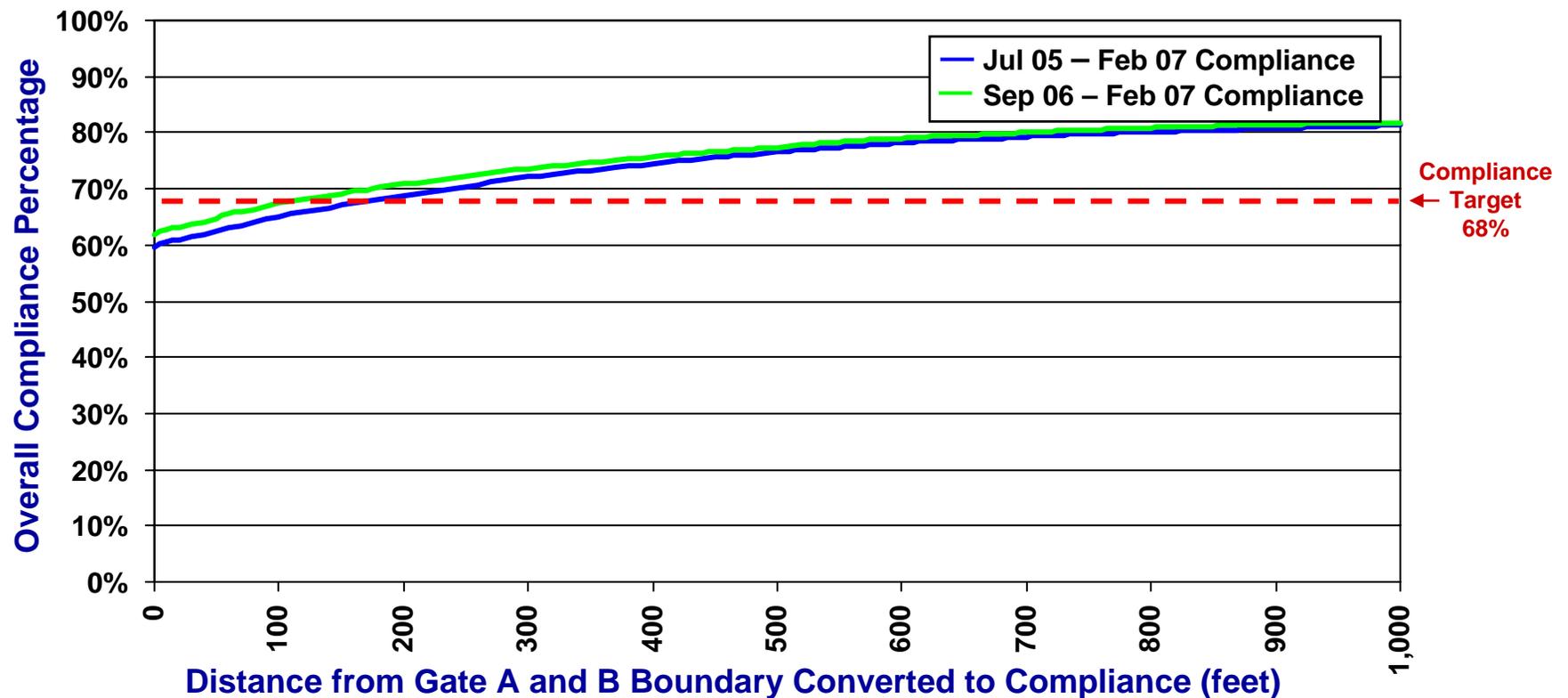
- Of the 1,085 flights that missed Gate 'B' only, 38% missed by 100 feet or less





Small Shifts in Lateral Flight Paths Could Greatly Improve Compliance

- If those flights that missed Gates A and B by 120 feet or less had been compliant, compliance for the past six months would have reached the 68% target
- The wingspan of a B752 is 125 feet





Conclusions



Conclusions

- **The MITRE analysis confirms the findings of the ATA Lab analysis**
 - **Similar overall compliance**
 - **Consistent gate category and aircraft type findings**
- **The MITRE analysis is consistent with the MPA analysis, but the MPA analysis is more conservative**
- **Automated processing will now allow monthly reporting going forward**
- **Overall compliance improved beginning May 2006, and has averaged 62% over the past 6 months**



Technical Appendix



Summary of Monthly Compliance

Year	Month	Total # of Tracks	Total # of Tracks Through All Gates	Percent of Tracks Through All Gates	Numbers of Tracks Through Each Gate					Percent of Tracks Through Each Gate					Average Percent through Each Gate
					Gate A 1,400 ft.*	Gate B 2,200 ft.*	Gate C 2,900 ft.*	Gate D 4,700 ft.*	Gate E 6,300 ft.*	Gate A 1,400 ft.*	Gate B 2,200 ft.*	Gate C 2,900 ft.*	Gate D 4,700 ft.*	Gate E 6,300 ft.*	
2005	July	1,639	1,001	61.1%	1,140	1,244	1,479	1,576	1,529	69.6%	75.9%	90.2%	96.2%	93.3%	85.0%
2005	August	1,141	674	59.1%	752	850	1,020	1,087	1,059	65.9%	74.5%	89.4%	95.3%	92.8%	83.6%
2005	September	1,274	779	61.1%	880	983	1,132	1,224	1,187	69.1%	77.2%	88.9%	96.1%	93.2%	84.9%
2005	October	1,777	1,044	58.8%	1,208	1,302	1,528	1,661	1,611	68.0%	73.3%	86.0%	93.5%	90.7%	82.3%
2005	November	1,046	598	57.2%	732	809	897	953	902	70.0%	77.3%	85.8%	91.1%	86.2%	82.1%
2005	December	2,595	1,382	53.3%	1,713	1,853	2,219	2,396	2,329	66.0%	71.4%	85.5%	92.3%	89.7%	81.0%
2006	January	1,863	1,028	55.2%	1,210	1,350	1,575	1,739	1,686	64.9%	72.5%	84.5%	93.3%	90.5%	81.2%
2006	February	2,013	1,143	56.8%	1,388	1,508	1,743	1,864	1,771	69.0%	74.9%	86.6%	92.6%	88.0%	82.2%
2006	March	3,998	2,297	57.5%	2,749	2,950	3,474	3,752	3,607	68.8%	73.8%	86.9%	93.8%	90.2%	82.7%
2006	April	1,706	978	57.3%	1,178	1,264	1,478	1,588	1,537	69.1%	74.1%	86.6%	93.1%	90.1%	82.6%
2006	May	1,154	725	62.8%	831	896	1,033	1,093	1,054	72.0%	77.6%	89.5%	94.7%	91.3%	85.0%
2006	June	1,533	962	62.8%	1,083	1,187	1,356	1,450	1,402	70.6%	77.4%	88.5%	94.6%	91.5%	84.5%
2006	July	950	609	64.1%	681	757	874	916	880	71.7%	79.7%	92.0%	96.4%	92.6%	86.5%
2006	August	874	568	65.0%	641	684	801	848	823	73.3%	78.3%	91.6%	97.0%	94.2%	86.9%
2006	September	1,202	797	66.3%	869	935	1,088	1,154	1,137	72.3%	77.8%	90.5%	96.0%	94.6%	86.2%
2006	October	3,039	1,848	60.8%	2,161	2,338	2,649	2,839	2,756	71.1%	76.9%	87.2%	93.4%	90.7%	83.9%
2006	November	1,792	1,111	62.0%	1,278	1,384	1,600	1,699	1,645	71.3%	77.2%	89.3%	94.8%	91.8%	84.9%
2006	December	1,191	727	61.0%	855	912	1,019	1,084	1,063	71.8%	76.6%	85.6%	91.0%	89.3%	82.8%
2007	January	2,246	1,388	61.8%	1,657	1,783	1,945	2,063	2,018	73.8%	79.4%	86.6%	91.9%	89.8%	84.3%
2007	February	1,162	708	60.9%	858	936	1,017	1,071	1,025	73.8%	80.6%	87.5%	92.2%	88.2%	84.5%
Total		34,195	20,367	59.6%	23,864	25,925	29,927	32,057	31,021	69.8%	75.8%	87.5%	93.7%	90.7%	83.5%



Summary of Monthly Compliance Top Seven Categories

Year	Month	Total # of Tracks	Top 7 Categories							Other	Total
			Made All	Missed AB	Missed A	Missed ABC	Missed B	Missed E	Missed All		
2005	July	1,639	61.1%	11.3%	10.5%	4.8%	3.3%	2.6%	1.0%	5.4%	100.0%
2005	August	1,141	59.1%	12.2%	11.8%	4.6%	2.7%	2.4%	2.5%	4.7%	100.0%
2005	September	1,274	61.1%	9.5%	11.5%	5.1%	3.2%	2.4%	1.9%	5.3%	100.0%
2005	October	1,777	58.8%	11.0%	8.9%	5.8%	3.2%	2.7%	3.1%	6.6%	100.0%
2005	November	1,046	57.2%	8.3%	10.2%	3.9%	1.9%	6.0%	3.1%	9.4%	100.0%
2005	December	2,595	53.3%	11.8%	10.9%	5.4%	4.5%	2.9%	2.7%	8.6%	100.0%
2006	January	1,863	55.2%	11.6%	10.1%	7.1%	3.0%	3.2%	2.6%	7.1%	100.0%
2006	February	2,013	56.8%	10.5%	9.7%	4.8%	2.9%	4.4%	2.5%	8.4%	100.0%
2006	March	3,998	57.5%	11.5%	8.8%	5.4%	3.7%	3.3%	2.2%	7.7%	100.0%
2006	April	1,706	57.3%	11.3%	9.6%	5.2%	3.6%	3.4%	2.6%	7.0%	100.0%
2006	May	1,154	62.8%	9.5%	8.8%	4.1%	3.2%	3.5%	2.3%	5.8%	100.0%
2006	June	1,533	62.8%	10.1%	9.3%	5.2%	2.2%	2.9%	2.4%	5.2%	100.0%
2006	July	950	64.1%	10.3%	10.4%	3.5%	2.2%	3.3%	1.2%	5.1%	100.0%
2006	August	874	65.0%	10.2%	9.0%	4.5%	3.5%	3.2%	1.5%	3.1%	100.0%
2006	September	1,202	66.3%	10.6%	8.1%	5.3%	2.4%	1.6%	1.4%	4.2%	100.0%
2006	October	3,039	60.8%	9.6%	9.2%	5.1%	2.9%	3.1%	2.4%	7.0%	100.0%
2006	November	1,792	62.0%	10.0%	9.3%	4.5%	3.2%	3.2%	2.1%	5.7%	100.0%
2006	December	1,191	61.0%	9.3%	7.9%	3.9%	2.9%	2.9%	3.8%	8.3%	100.0%
2007	January	2,246	61.8%	7.8%	9.2%	3.8%	3.3%	2.9%	2.5%	8.8%	100.0%
2007	February	1,162	60.9%	7.8%	9.5%	2.4%	3.3%	4.0%	2.7%	9.4%	100.0%
Grand Total		34,195	59.6%	10.4%	9.6%	4.9%	3.2%	3.2%	2.3%	6.9%	100.0%



Some Runway 27 Jet Departures Were Removed Due to Incomplete Tracks

Year	Month	Total Bos RWY 27 departures	Total Flights Removed During Manual Sorting	Removed Flights Due to Early Drop or Late Pickup										Total Removed	Total Bos RWY 27 Jet Departures for Compliance Analysis		
				Dropped A	Dropped AB	Dropped ABC	Dropped ABCD	Dropped E	Dropped BCDE	Dropped CDE	Dropped DE	Dropped ABCE	Dropped AE			Dropped ADE	
2005	July	1,696	29	13	10	3	1				1					28	1,639
2005	August	1,194	19	15	12	2	2				2			1		34	1,141
2005	September	1,343	29	19	10	7	2			2						40	1,274
2005	October	1,834	23	10	10	9	1	1	1	1				1		34	1,777
2005	November	1,077	15	4	5	2	3	1				1				16	1,046
2005	December	2,670	33	13	16	7	3	1			1	1				42	2,595
2006	January	1,917	20	19	9	3	2			1						34	1,863
2006	February	2,053	9	12	11	2	2	3				1				31	2,013
2006	March	4,076	17	22	22	12	1	2	2							61	3,998
2006	April	1,748	12	17	5	7		1								30	1,706
2006	May	1,183	12	8	4		2	3								17	1,154
2006	June	1,577	26	7	4	4	1	1							1	18	1,533
2006	July	1,003	26	12	9	4	1	1								27	950
2006	August	904	15	3	7	2	1	2								15	874
2006	September	1,243	29	4	2	3	2					1				12	1,202
2006	October	3,116	39	19	10	4	1	2	2							38	3,039
2006	November	1,837	21	12	6	4	1					1				24	1,792
2006	December	1,231	22	8	7		1	1			1					18	1,191
2006	January	2,289	22	12	8		1									21	2,246
2006	February	1,199	23	6	5	2	1									14	1,162
Grand Total		35,190	441	235	172	77	29	19	8	6	5	1	1	1	554	34,195	



Summary of Monthly Compliance Massport

Year	Month	Total # of Tracks	Total # of Tracks Through All Gates	Percent of Tracks Through All Gates	Numbers of Tracks Through Each Gate					Percent of Tracks Through Each Gate					Average Percent through Each Gate
					Gate A 1,400 ft.*	Gate B 2,200 ft.*	Gate C 2,900 ft.*	Gate D 4,700 ft.*	Gate E 6,300 ft.*	Gate A 1,400 ft.*	Gate B 2,200 ft.*	Gate C 2,900 ft.*	Gate D 4,700 ft.*	Gate E 6,300 ft.*	
2005	July	1482	830	56.0%	953	1103	1318	1417	1366	64.3%	74.4%	88.9%	95.6%	92.2%	83.1%
2005	August	1122	544	48.5%	634	759	935	1023	992	56.5%	67.6%	83.3%	91.2%	88.4%	77.4%
2005	September	1272	662	52.0%	756	899	1081	1161	1135	59.4%	70.7%	85.0%	91.3%	89.2%	79.1%
2005	October	1659	875	52.7%	1029	1168	1393	1522	1478	62.0%	70.4%	84.0%	91.7%	89.1%	79.4%
2005	November	986	499	50.6%	634	710	823	888	842	64.3%	72.0%	83.5%	90.1%	85.4%	79.0%
2005	December	2382	1096	46.0%	1402	1606	1998	2183	2124	58.9%	67.4%	83.9%	91.6%	89.2%	78.2%
2006	January	1743	854	49.0%	1033	1219	1448	1612	1567	59.3%	69.9%	83.1%	92.5%	89.9%	78.9%
2006	February	1871	963	51.5%	1205	1375	1597	1725	1616	64.4%	73.5%	85.4%	92.2%	86.4%	80.4%
2006	March	3655	1904	52.1%	2304	2621	3129	3436	3298	63.0%	71.7%	85.6%	94.0%	90.2%	80.9%
2006	April	1533	797	52.0%	951	1085	1301	1417	1369	62.0%	70.8%	84.9%	92.4%	89.3%	79.9%
2006	May	1049	583	55.6%	673	775	917	987	957	64.2%	73.9%	87.4%	94.1%	91.2%	82.2%
2006	June	1399	758	54.2%	874	999	1180	1287	1245	62.5%	71.4%	84.3%	92.0%	89.0%	79.8%
2006	July	805	456	56.6%	507	602	700	786	721	63.0%	74.8%	87.0%	97.6%	89.6%	82.4%
2006	August	793	451	56.9%	508	580	695	756	735	64.1%	73.1%	87.6%	95.3%	92.7%	82.6%
2006	September	1122	667	59.4%	747	830	991	1048	1036	66.6%	74.0%	88.3%	93.4%	92.3%	82.9%
2006	October	2810	1501	53.4%	1802	2084	2410	2604	2515	64.1%	74.2%	85.8%	92.7%	89.5%	81.2%
2006	November	1440	767	53.3%	883	1015	1197	1313	1270	61.3%	70.5%	83.1%	91.2%	88.2%	78.9%
2006	December	1166	631	54.1%	744	847	981	1054	1016	63.8%	72.6%	84.1%	90.4%	87.1%	79.6%
2007	January	2062	1130	54.8%	1410	1548	1759	1881	1806	68.4%	75.1%	85.3%	91.2%	87.6%	81.5%
2007	February	1090	606	55.6%	746	831	920	991	942	68.4%	76.2%	84.4%	90.9%	86.4%	81.3%
Total		31,441	16,574	52.7%	19,795	22,656	26,773	29,091	28,030	63.0%	72.1%	85.2%	92.5%	89.2%	80.4%