

Seattle-Tacoma International Airport



Aircraft Arrivals Analysis: Progress Update



January 24, 2018



Aircraft Arrivals Analysis: Progress Update

- Purpose of the analysis – To determine whether changes to aircraft arrivals to SEA have occurred over the last five years
- Basis of the analysis –
 - Radar flight track data sets for the months of July and December 2013, 2015, and 2017
 - Apples-to-apples comparison of aircraft arrivals to SEA for these time periods
- Analysis details –
 - Radar flight tracks will be analyzed to evaluate changes in fleet mix, runway usage, and average aircraft altitudes at six nautical miles from SEA

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- Questions –
 - Has there been a notable increase in the number of arrivals between 2013, 2015, and 2017?
 - Has there been a notable change in traffic flow (north flow, south flow) between 2013, 2015, and 2017?
 - Has there been a notable difference in runway use by arriving aircraft between 2013, 2015, and 2017?
 - Has the fleet mix serving SEA changed during this time period?
 - Have there been notable changes in arrival altitudes between 2013, 2015, and 2017?

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- Question – Since 2013 has there been an increase in the number of arrivals to SEA?
- Answer - Yes.
 - As the economy has continued to rebound from the 2008 financial crisis, there has been a steady increase in air traffic.

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Number of Arrivals – July and December 2013, 2015, and 2017

Year	July	December
2013	13,418	12,958
2015	18,437	15,880
2017	19,870	17,390

- 48% increase in arrivals between July 2013 and 2017
- 34% increase between December 2013 and December 2017

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- Question – Has there been a notable change in traffic flow (north flow, south flow) between 2013, 2015, and 2017?
- Answer - No.
 - SEA operates in South Flow about 65% of the year. Analysis of the data for December and July of 2013 and 2015 demonstrate consistency with this percentage. The 2017 data shows a slightly lower percentage of South Flow arrivals for December and July.

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Difference in Traffic Flow – July and December 2013, 2015, and 2017

	South Flow	North Flow		South Flow	North Flow
December 2013	84%	15%	July 2013	45%	55%
December 2015	88%	12%	July 2015	40%	60%
December 2017	74%	26%	July 2017	39%	61%

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- Question – Has there been a notable difference in arrival runway use between 2013, 2015, and 2017?
- Answer - Yes.
 - Between December 2013 and 2017, arrivals to Runways 16C and 34C have declined and arrivals to Runways 16R and 34L have increased.

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Runway Usage - Arrivals – December 2013, 2015, and 2017

Runway End	December 2013	December 2015	December 2017
16L	2,579	2,436	1,920
16C	2,426	53	99
16R	5,837	11,438	10,755
34L	643	1,526	3,839
34C	841	300	79
34R	503	127	636

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Runway Usage - Arrivals – July 2013, 2015, and 2017

Runway End	July 2013	July 2015	July 2017
16L	1,609	6,194	1,436
16C	566	1,193	45
16R	3,825	8,951	7,410
34L	4,284	9,648	11,619
34C	858	0	303
34R	2,201	2,099	2,239

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- Question – Has the narrow body fleet mix serving SEA changed during this time period?
- Answer - Yes.
 - The most frequently used aircraft at SEA are turboprop aircraft like the Dash 8, and narrow body jets like the 737-700, 737-800, 737-900.
 - Excluding the introduction of the Embraer 175 between 2015 and 2017, the other narrow body aircraft types have remained relatively the same.
 - However, the frequency of use of some aircraft types has changed (e.g., an increase in use of the 737-900 and decrease in use of the 737-700.)

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Change in Narrow Body Aircraft Types Arriving at SEA July 2013, 2015, and 2017

Aircraft Type	July 2013	Aircraft Type	July 2015	Aircraft Type	July 2017	Change in Aircraft Use (2013-2017)
(B752) 757-200	836	(B752) 757-200	295	(B752) 757-200	671	-20%
(B737) 737-700	1,500	(B737) 737-700	1,519	(B737) 737-700	1,549	3%
A320	1,015	A320	877	A320	1,053	4%
(DH8D) Dash 8	3,054	(DH8D) Dash 8	3,624	(DH8D) Dash 8	3,845	26%
(B738) 737-800	2,498	(B738) 737-800	3,668	(B738) 737-800	3,937	58%
-	-	-	-	(E75L) Embraer 175	1,665	100%
-	-	(E170) Embraer 170	974	(E170) Embraer 170	3	100%
(B739) 737-900	958	(B739) 737-900	2,683	(B739) 737-900	4,652	386%
(CRJ7) CRJ-700	202	(CRJ7) CRJ-700	1,383	(CRJ7) CRJ-700	987	389%

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Change in Narrow Body Aircraft Types Arriving to SEA December 2013, 2015, and 2017

Aircraft Type	December 2013	Aircraft Type	December 2015	Aircraft Type	December 2017	Change in Aircraft Use (2013-2017)
(B734) 737-400	725	(B734) 737-400	651	(B734) 737-400	25	-97%
(CRJ7) CRJ-700	271	(CRJ7) CRJ-700	1,054	(CRJ7) CRJ-700	121	-55%
A320	733	A320	603	A320	474	-35%
(B737) 737-700	1,356	(B737) 737-700	1,322	(B737) 737-700	971	-28%
(DH8D) Dash 8	3,246	(DH8D) Dash 8	3,356	(DH8D) Dash 8	2,475	-24%
-	0	(E170) Embraer 170	691	-	0	0%
(B738) 737-800	2,426	(B738) 737-800	2,739	(B738) 737-800	2,961	22%
-	0	-	-	(E75S) Embraer 175	1,255	100%
-	0	-	-	(E75L) Embraer 175	1,385	100%
(B739)737-900	1,334	(B739)737-900	2,712	(B739)737-900	3,785	184%

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- Question – Has the widebody fleet mix serving SEA changed during this time period?
- Answer – Yes.
 - There have also been changes in the use of wide body jets at SEA. For example, between July 2013 and July 2017 there was a 136% increase in the use of the Boeing 747 and a 332% increase in the use of the Boeing 777.

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Change in Wide Body Jets Serving SEA – July 2013, 2015, and 2017

July 2013		July 2015		July 2017		Change in Aircraft Use (2013-2017)
A306	35	A306	25	A306	24	-31%
B747-400	166	B747-400	142	B747-400	246	48%
B747-800	22	B747-800	17	B747-800	52	136%
B777-200	59	B777-200	104	B777-200	59	0%
B777-200LR/F	29	B777-200LR/F	41	B777-200LR/F	52	79%
DC10	27	DC10	48	DC10	41	52%
MD10 (DC10)	4	MD10 (DC10)	0	MD10 (DC10)	0	-100%
MD-11	62	MD-11	67	MD-11	77	24%
B787-800	0	B787-800	0	B787-800	17	100%
B787-900	0	B787-900	1	B787-900	94	100%

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Change in Wide Body Jets Serving SEA – December 2013, 2015, and 2017

December 2013		December 2015		December 2017		Change in Aircraft Use (2013-2017)
A306	35	A306	40	A306	40	14%
B747-400	125	B747-400	137	B747-400	61	-51%
B747-800	6	B747-800	11	B747-800	46	667%
B777-200	63	B777-200	25	B777-200	73	16%
B777-200LR/F	56	B777-200LR/F	32	B777-200LR/F	44	-21%
DC10	44	DC10	69	DC10	98	123%
MD10 (DC10)	11	MD10 (DC10)	27	MD10 (DC10)	2	-82%
MD-11	73	MD-11	169	MD-11	149	104%
B787-800	31	B787-800	54	B787-800	31	0%
B787-900	1	B787-900	4	B787-900	66	6500%

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Comparison between a Boeing 787-900 and 737-900
at an altitude of 2,500' MSL



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- In Summary –
 - There has been a marked increase in the number of arrivals to SEA since 2013
 - Runway use percentage has changed, with a notable decrease in arrivals to the center runways and an increase in arrivals to Runways 16R and 34L
 - Traffic flow direction (i.e., north flow, south flow) remained relatively stable between 2013 and 2015 with an approximate 10 percent shift in 2017 (north flow to south flow)
 - Fleet mix has changed as newer aircraft have entered the fleet, use of some older aircraft has decreased, and large twin-engine wide body aircraft (787s and 777) increased service to long-haul markets

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- Next Steps –
 - Conduct the arrival altitude analysis
 - Port of Seattle to review the results with the FAA
 - Port will present the results at the March 28, 2018 Highline Forum