Flight Path Frequency Analysis

Question

For a given geographic area, how frequently are aircraft passing overhead (the time between one aircraft and the next aircraft)? Has this frequency changed?

Data Source

3D radar data from the KHPN ANOMS system. This data records a 3D data stream for every aircraft arriving and departing from KHPN.

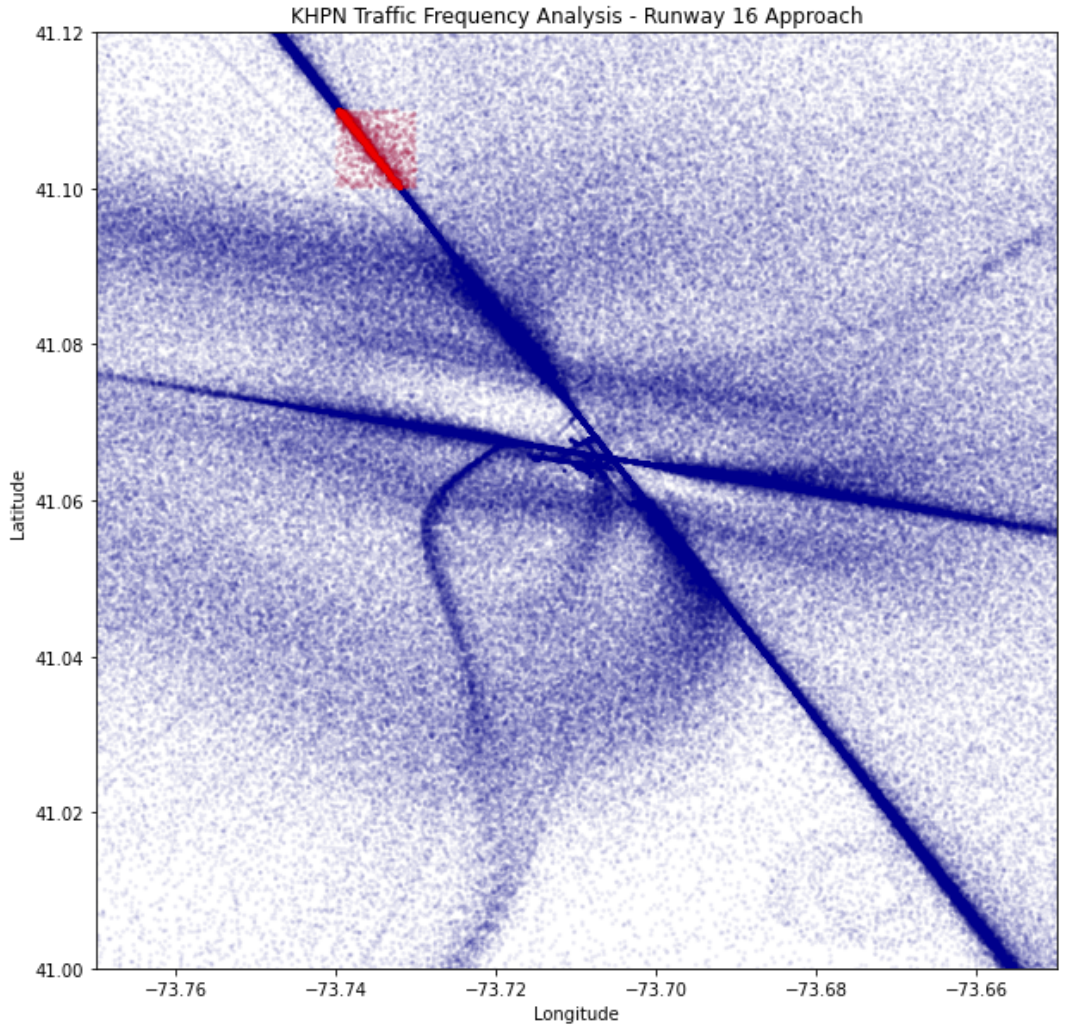
Analysis

1. Define a geo-fenced box within the data
2. Determine all aircraft passing through this box below a defined altitude (3,500 ft MSL used in this analysis)
3. 3. Calculate the elapsed time in seconds between each aircraft and the next aircraft passing through the box. Use 900 seconds (15 minutes) as the max time recorded for each interval (for simplifying the histograms in step 4)
4. Create histograms for these time distributions and calculate the 25/50/75th percentiles

Data source: KHPN ANOMS radar data; Code at https://github.com/nthartman/KHPN_Traffic_Frequency

PRELIMINARY DRAFT

Analysis 1: Runway 16 Approach

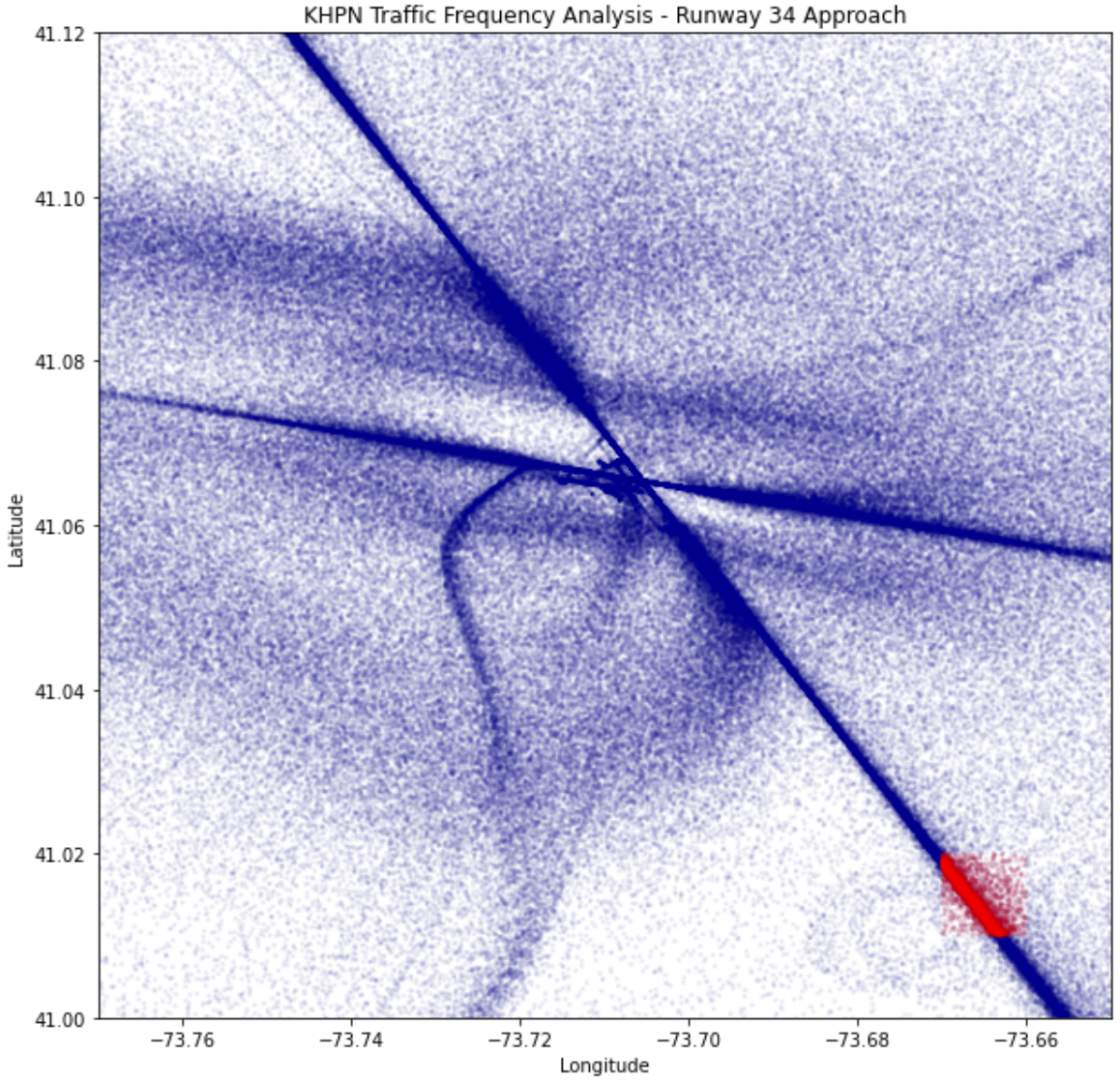


Analysis for August of each year; time in seconds (max is 900)

	2005	2010	2015	2018
count	3681.000000	2570.000000	2273.000000	2996.000000
mean	335.323825	356.792996	375.622965	349.065087
std	275.264551	281.312017	296.934791	280.184619
min	5.000000	4.000000	0.000000	3.000000
25%	129.000000	139.000000	134.000000	137.000000
50%	208.000000	231.000000	248.000000	214.000000
75%	475.000000	512.000000	596.000000	505.750000
max	900.000000	900.000000	900.000000	900.000000

Data source: KHPN ANOMS radar data; Code at https://github.com/nthartman/KHPN_Traffic_Frequency

Analysis 3: Runway 34 Approach

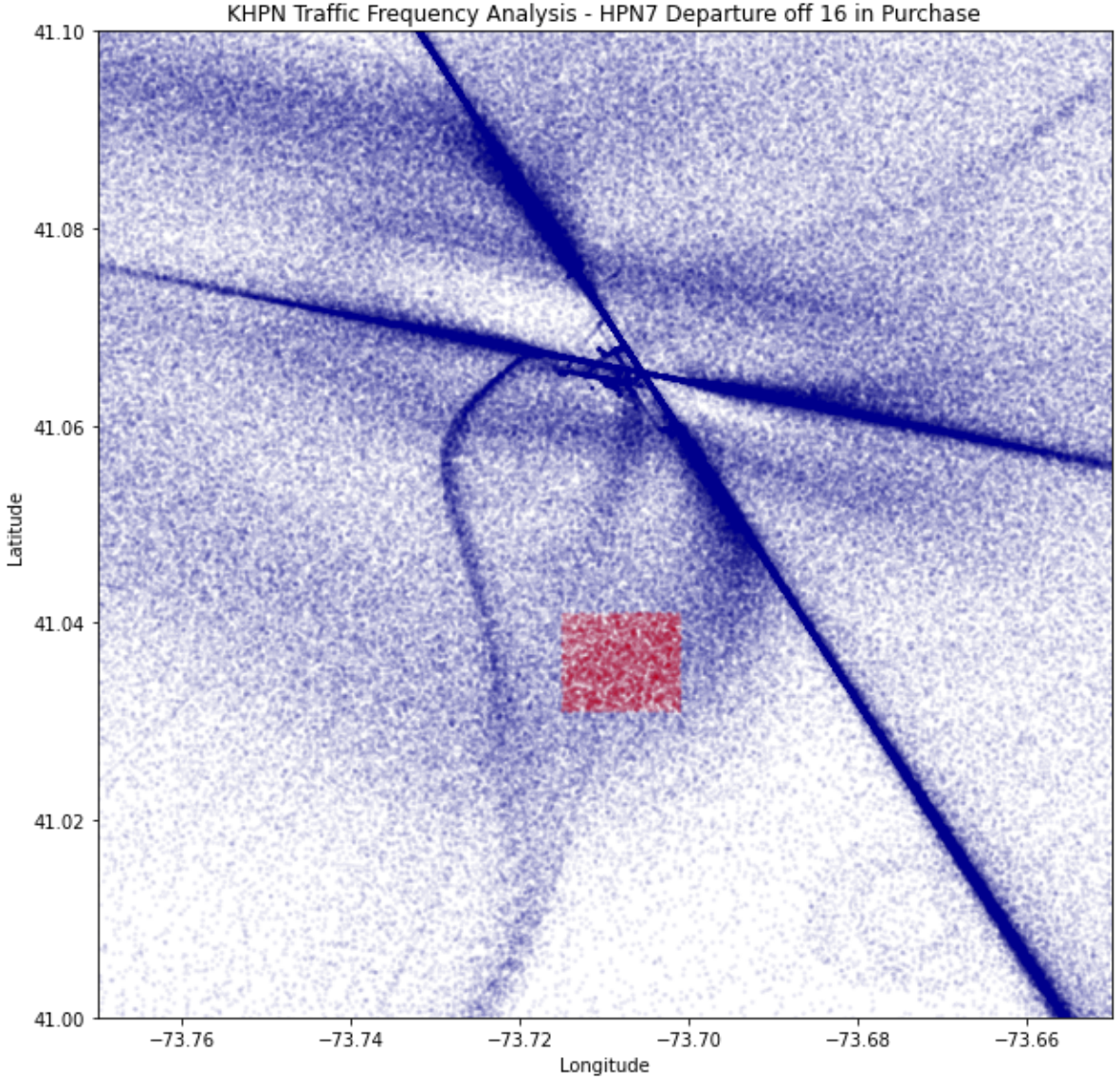


Analysis for August of each year; time in seconds (max is 900)

	2005	2010	2015	2018
count	2060.000000	2118.000000	1824.000000	2022.000000
mean	341.709223	377.585458	450.600877	386.765084
std	276.385440	284.993606	308.603738	292.597989
min	18.000000	9.000000	0.000000	28.000000
25%	133.000000	143.000000	163.000000	144.000000
50%	212.000000	254.000000	364.000000	260.000000
75%	475.250000	585.000000	799.000000	605.000000
max	900.000000	900.000000	900.000000	900.000000

Data source: KHPN ANOMS radar data; Code at https://github.com/nthartman/KHPN_Traffic_Frequency

Analysis 3: Runway 16 Departure (HPN 7 Departure near Purchase St. and Anderson Hill Rd)

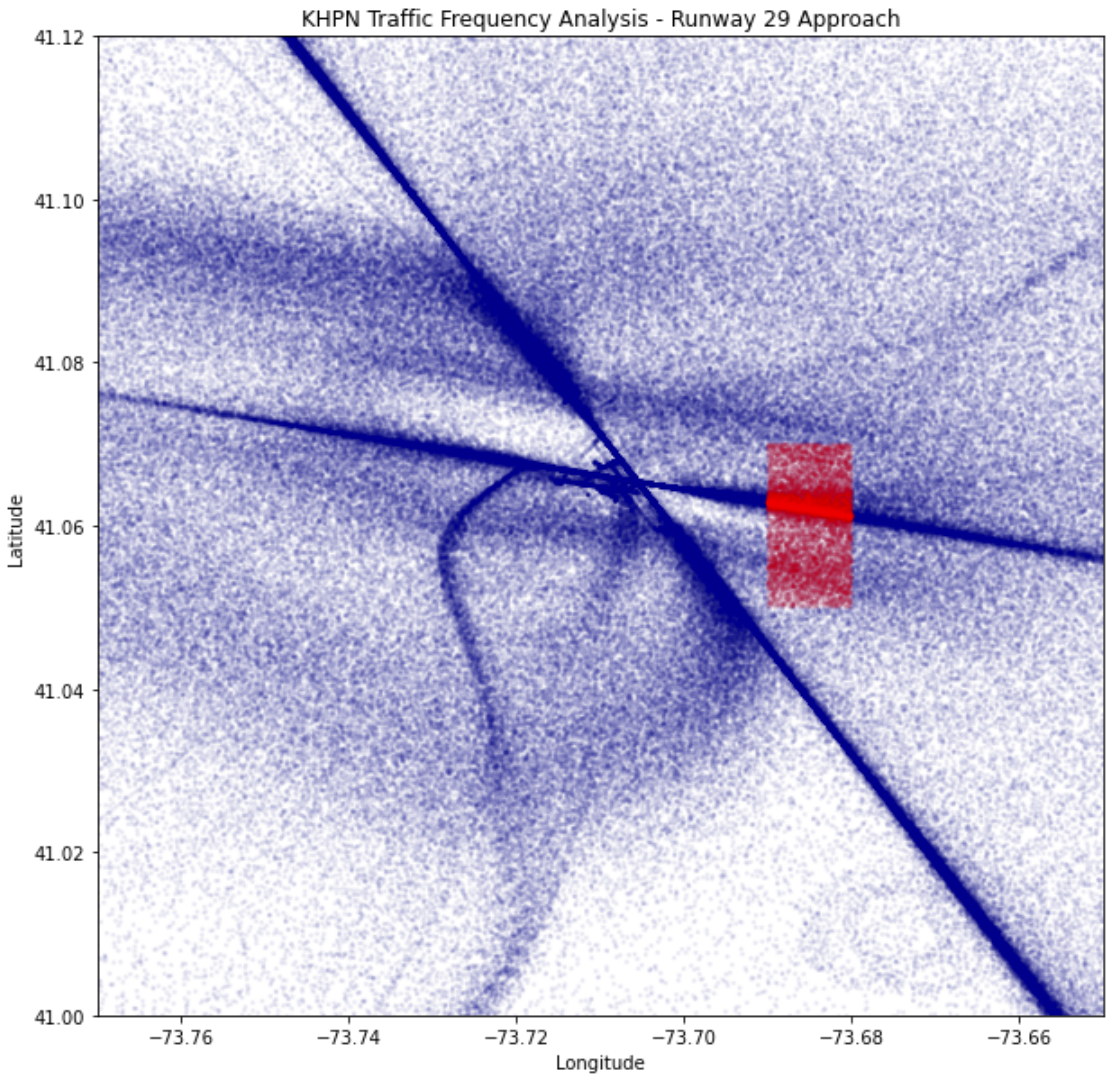


Analysis for August of each year; time in seconds (max is 900)

	2005	2010	2015	2018
count	1794.000000	1328.000000	942.000000	1490.000000
mean	491.846711	531.516566	627.123142	539.377181
std	315.156453	314.446150	309.397305	310.337599
min	9.000000	33.000000	0.000000	4.000000
25%	189.250000	221.000000	319.500000	236.500000
50%	420.000000	485.000000	821.000000	516.500000
75%	900.000000	900.000000	900.000000	900.000000
max	900.000000	900.000000	900.000000	900.000000

Data source: KHPN ANOMS radar data; Code at https://github.com/nthartman/KHPN_Traffic_Frequency

Analysis 4: Runway 29 Approach

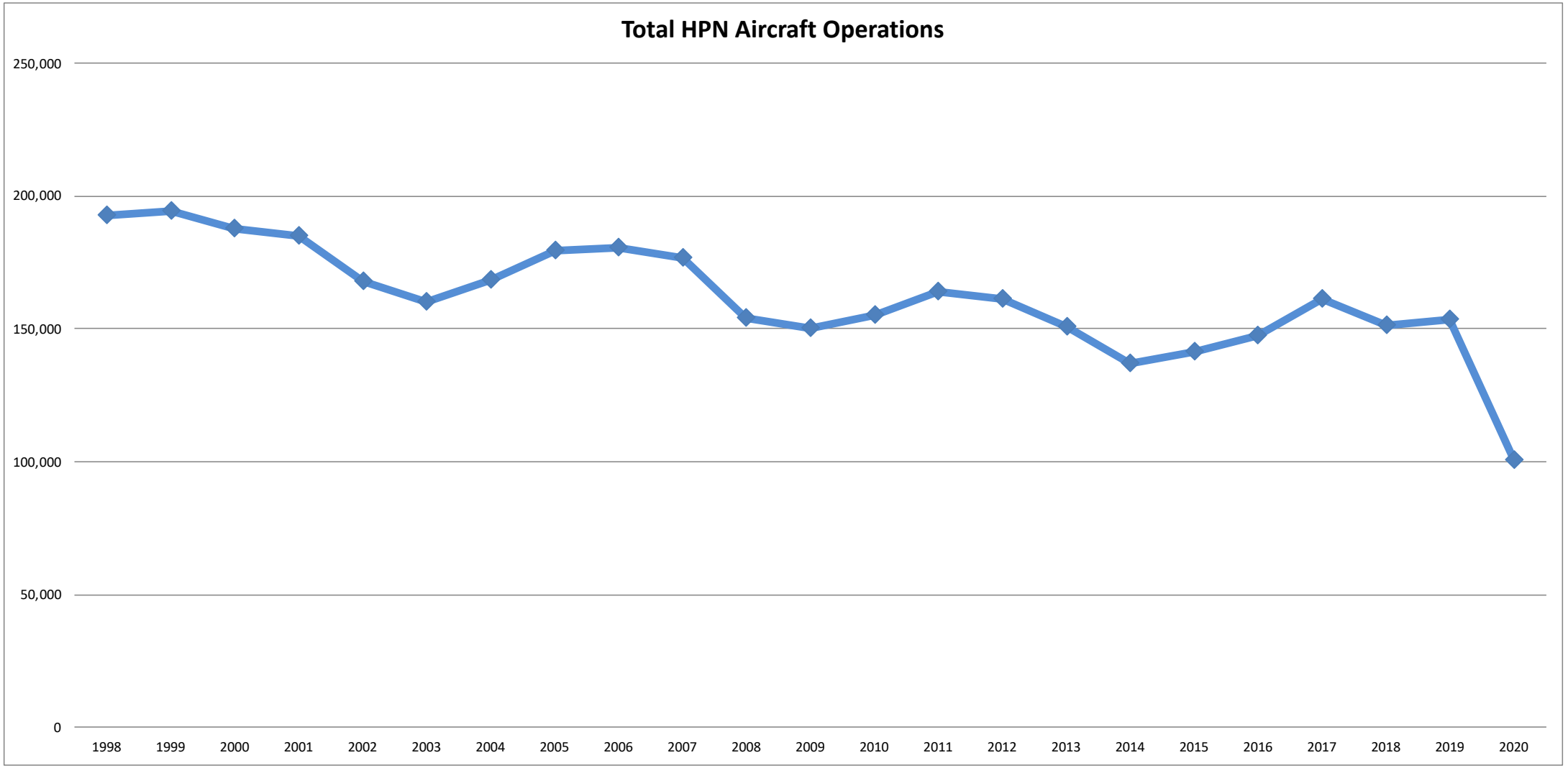


Analysis for August of each year; time in seconds (max is 900)

	2005	2010	2015	2018
count	1954.000000	1792.000000	1625.000000	2004.000000
mean	437.931423	472.191964	536.942769	444.537924
std	311.503779	316.884367	316.435189	312.576413
min	0.000000	0.000000	0.000000	0.000000
25%	171.000000	187.250000	240.000000	166.000000
50%	341.000000	392.000000	529.000000	355.000000
75%	792.000000	900.000000	900.000000	809.500000
max	900.000000	900.000000	900.000000	900.000000

Data source: KHPN ANOMS radar data; Code at https://github.com/nthartman/KHPN_Traffic_Frequency

Appendix: KHPN Total Aircraft Operations



Data source: KHPN ANOMS radar data; Code at https://github.com/nthartman/KHPN_Traffic_Frequency