Minneapolis-St. Paul International Airport
Monthly Runway Use System Report

March 2017

Environment Department, Noise Program Office

Metropolitan Airports Commission

6040 28th Avenue South, Minneapolis, MN 55450

MetroAirports.org

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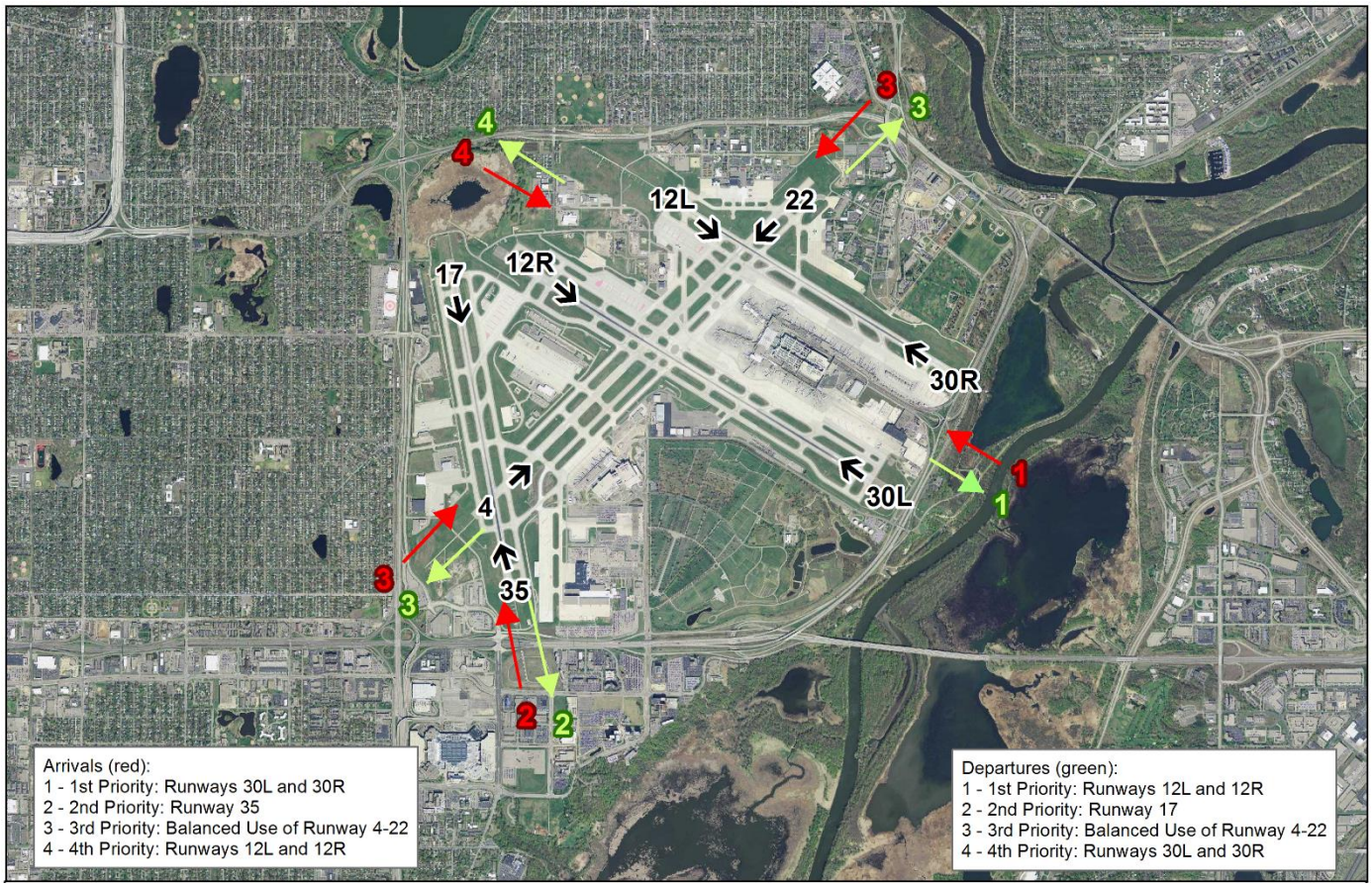
Runway Use System Report - March 2017

Selecting which runways to use for aircraft departures and arrivals at Minneapolis-St. Paul International Airport (MSP) is a complex task. Decisions about airport configuration and runway use at MSP are made carefully on a continuous basis by the Federal Aviation Administration (FAA) Air Traffic Control (ATC). ATC takes into consideration numerous factors, including: safety, efficiency, wind direction and wind speed (on the surface and aloft), air traffic demand, aircraft weight, the number of inbound and scheduled outbound aircraft, noise abatement, and many other variables when selecting an airport configuration.

At MSP the most frequently used runways are the parallel runways, Runway 12R-30L and Runway 12L-30R. These runways are used every day unless construction or unusual meteorological conditions do not allow their use. Runway 17 is used for departures in a southerly direction. Runway 35 is used for arrivals from the south. Runway 4-22 is used for arrivals and/or departures of heavy aircraft that require longer runway distances for landings or takeoffs.

The Runway Use System (RUS) prioritizes arrival and departure runways to promote flight activity over less-populated residential areas as much as possible.

Figure A – MSP Airport Layout and Runway Use System



Departure Prioritization (see green arrows depicted on Figure A):

1. **Runways 12L and 12R** (parallel runways) are the first priority for departures since aircraft overfly industrial use areas to the southeast immediately after takeoff from MSP. These runways are used when wind speed and direction promote a south flow at MSP. In addition, there are times when these runways are used if winds are light enough, regardless of the wind direction, and when airspace demand is light enough to allow discretion in runway configuration.
2. **Runway 17** is used for departures to the south to augment the flow of air traffic using the parallel runways, and when wind speed and direction promote a south flow at MSP.
3. **Balanced Use of Runway 4-22** occurs when strong northeasterly or southwesterly winds (crosswinds) prevent use of the parallel runways, or when an aircraft requires a longer runway for takeoff.
4. **Runways 30L and 30R** (parallel runways) are the lowest priority for departures since aircraft consequently take off to the northwest over densely-populated residential areas. These runways are used during heavy air traffic demand periods and when wind conditions and other factors do not allow use of Runways 12L and 12R.

Arrival Prioritization (see red arrows depicted on Figure A):

1. **Runways 30L and 30R** (parallel runways) are the first priority for arrivals since aircraft approach MSP from the southeast over industrial use areas. These runways are used when flight factors promote a north flow at MSP and during heavy air traffic demand periods.
2. **Runway 35** is used for arrivals from the south when wind speed and direction promote a north flow at MSP and during peak air traffic periods to augment the use of the parallel runways.
3. **Balanced Use of Runway 4-22** occurs when strong northeasterly or southwesterly crosswinds prevent use of the parallel runways, or when an aircraft requires a longer runway for landing.
4. **Runways 12L and 12R** are the lowest priority for arrivals from the northwest since aircraft approach MSP over densely-populated residential areas. These runways are used when wind speed and direction promote a south flow at MSP.

Five primary airport runway configuration options exist at MSP: north-flow, south-flow, opposite-direction, and two mixed flows. A north-flow configuration offers three runways for arriving aircraft, which makes it the most efficient, due to the airspace requirements of arriving aircraft. During a north-flow configuration (N) aircraft arrivals are on Runways 30L, 30R and 35 and departures are on Runways 30L and 30R, as shown in Figure B. There are times when the wind characteristics do not allow for arrivals on Runway 35 during a north-flow configuration. This results in all arrivals and departures on Runways 30L and 30R. For the purposes of this report, this configuration is denoted as straight north-flow (N*), as shown in Figure C.

Figure B – North-Flow (N)

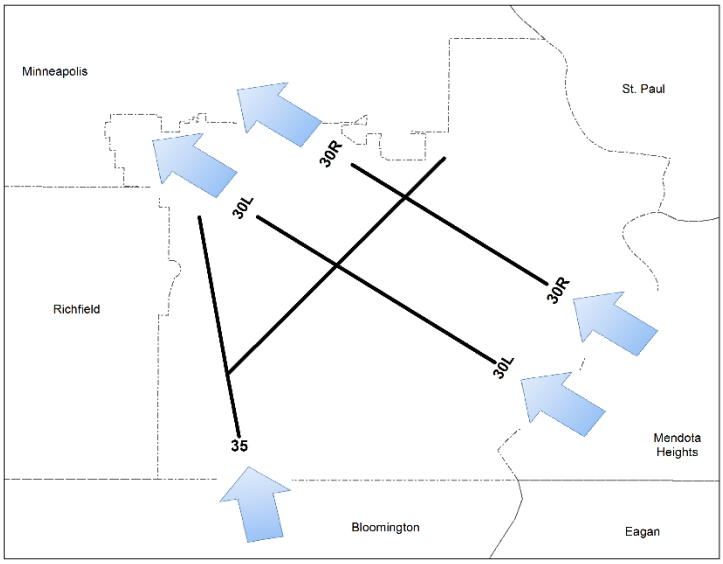
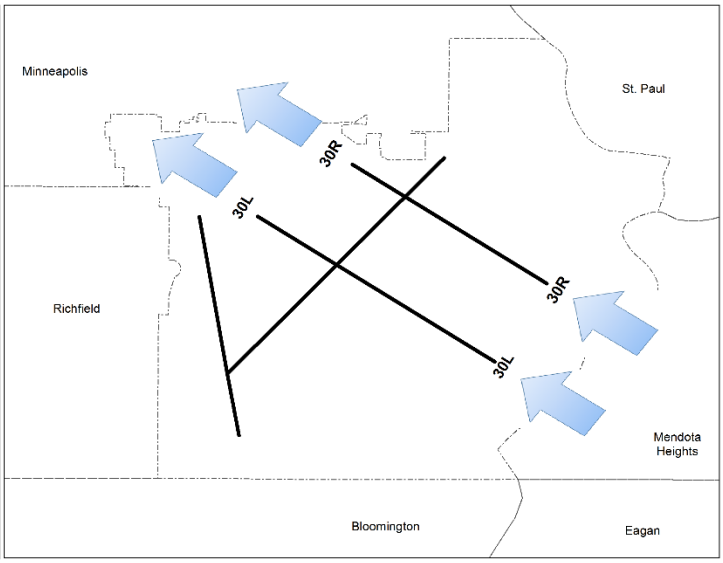


Figure C – Straight North-Flow (N*)



During a south-flow configuration aircraft arrivals are on Runways 12L and 12R and departures are on Runways 12L, 12R and 17, as shown in Figure D. Conversely to the north-flow configuration, the south-flow configuration (S) offers three departure runways. There are times when the wind characteristics do not allow for departures on Runway 17 during a south-flow configuration. This results in all aircraft arrivals and departures on Runways 12L and 12R. For the purposes of this report, this configuration is denoted as straight south-flow (S*), as shown in Figure E.

Figure D – South-Flow (S)

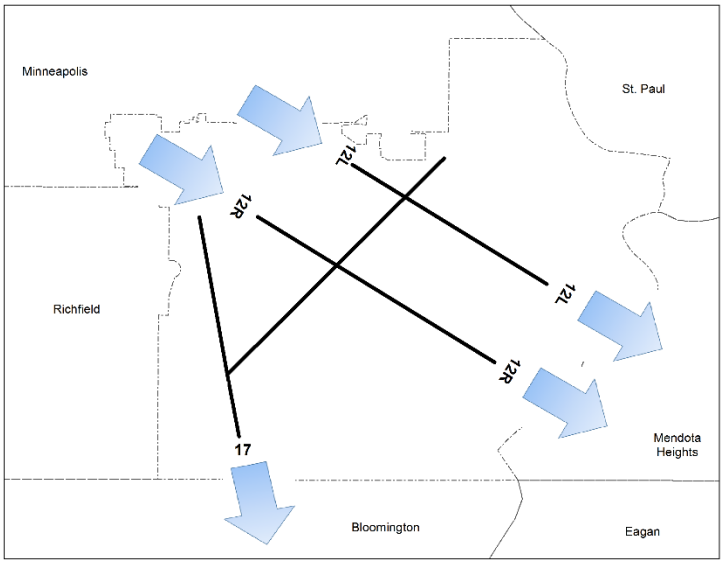
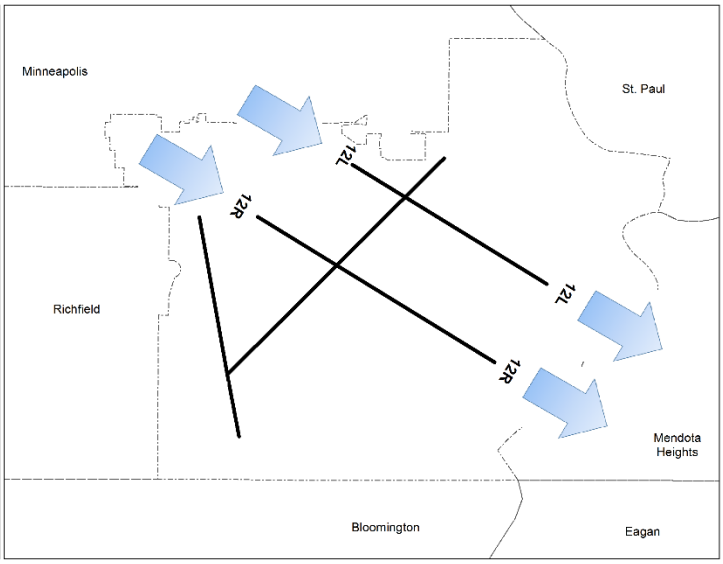
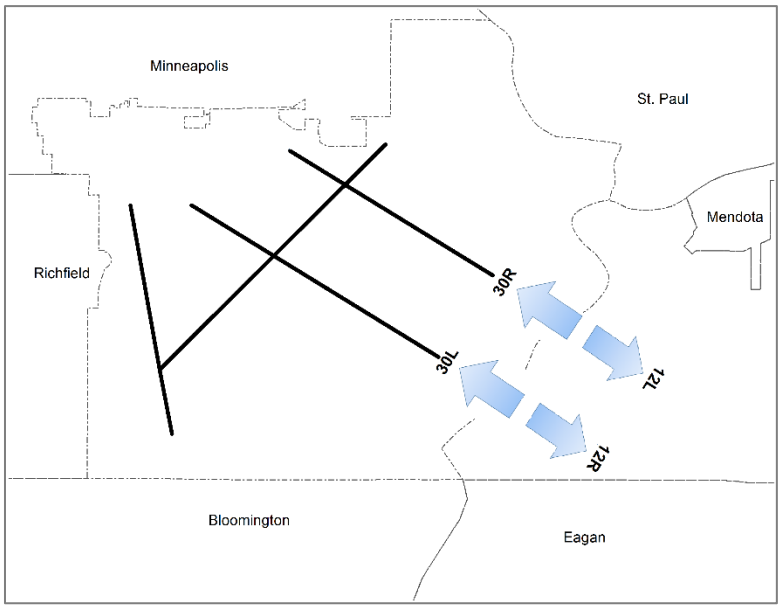


Figure E – Straight South-Flow (S*)



As part of the RUS, head-to-head, or opposite-direction operations (O), are sometimes conducted to the southeast of MSP. This configuration, shown in Figure F, utilizes the most preferred arrival and departure runways according to the RUS; however, it requires at least 15 miles of separation between arrival and departure operations and can be used only during low aircraft traffic demand periods with light winds present.

Figure F – Opposite Direction (O)



According to the FAA, mixed-flow configurations that maximize the RUS are most feasible during nighttime and during transitions into, and out of, high aircraft traffic demand periods. These transitions typically occur between 6:00 a.m. and 7:30 a.m. and 9:00 p.m. and 10:30 p.m. One example of a mixed flow configuration (MA) is where aircraft arrive on Runways 30L and 30R and depart on Runway 17 with reduced departure operations on Runways 30L and 30R, as shown in Figure G. In another mixed flow configuration (MB) aircraft arrivals occur on Runway 35 with departures on Runways 12L and 12R, as shown in Figure H.

Figure G – Mixed Flow A (MA)

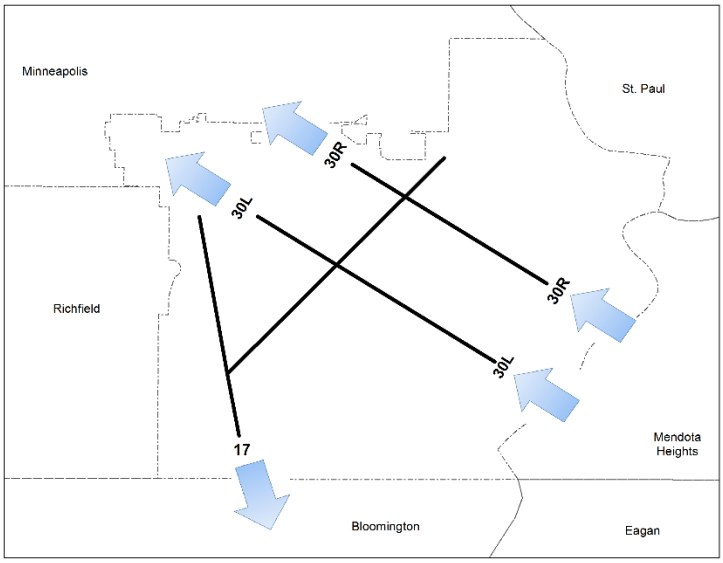
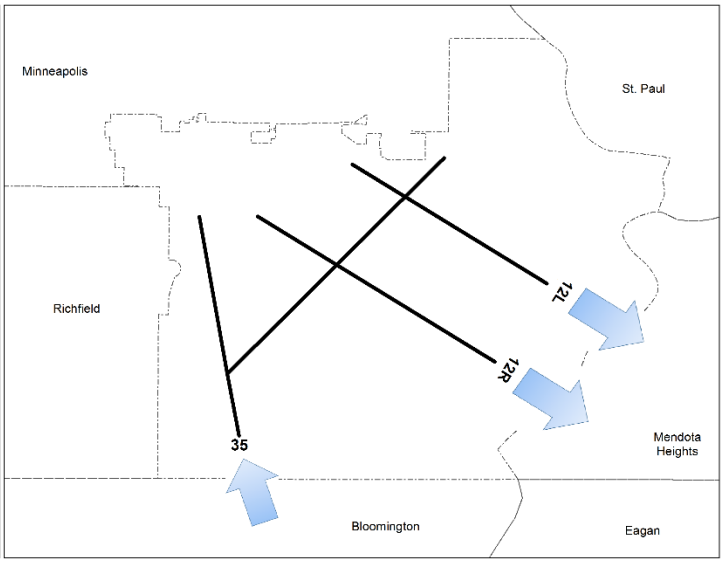


Figure H – Mixed Flow B (MB)



A summary of runway use for March 2017 is provided in Table 1 for total operations, nighttime operations, and the morning transition and evening transition periods; these transition periods provide the greatest opportunity for ATC to utilize the most beneficial aspects of the RUS for noise mitigation when wind conditions and other factors allow.

Figure I – Airport Layout

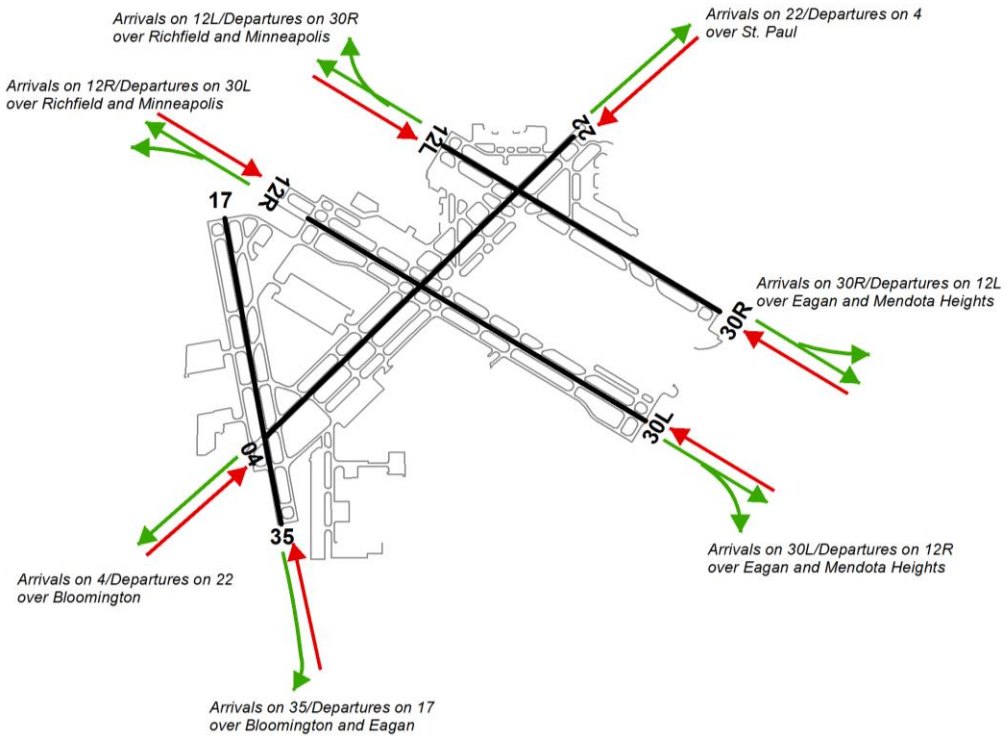


Table 1 – Summary of Runway Use: March 2017

RWY	Arrival/ Departure	Total Operations Count	Nighttime Count (10:30 p.m. -6:00 a.m.)	Morning Transition Count (6:00 a.m. - 7:30 a.m.)	Evening Transition Count (9:00 p.m. - 10:30 p.m.)	Total Operations Percent	Nighttime Percent (10:30 p.m. - 6:00 a.m.)	Morning Transition Percent (6:00 a.m. - 7:30 a.m.)	Evening Transition Percent (9:00 p.m. - 10:30 p.m.)
4	Arrivals	0	0	0	0	0.00%	0.00%	0.00%	0.00%
12L	Arrivals	4,075	291	110	185	22.50%	1.61%	0.61%	1.02%
12R	Arrivals	4,897	636	70	262	27.04%	3.51%	0.39%	1.45%
17	Arrivals	0	0	0	0	0.00%	0.00%	0.00%	0.00%
22	Arrivals	0	0	0	0	0.00%	0.00%	0.00%	0.00%
30L	Arrivals	4,237	654	133	234	23.39%	3.61%	0.73%	1.29%
30R	Arrivals	3,722	244	149	164	20.55%	1.35%	0.82%	0.91%
35	Arrivals	1,181	0	2	0	6.52%	0.00%	0.01%	0.00%
Total Monthly Arrivals		**18,112**	**1,825**	**464**	**845**	**100.00%**	**10.08%**	**2.56%**	**4.67%**
4	Departures	1	0	0	0	0.01%	0.00%	0.00%	0.00%
12L	Departures	2529	143	181	298	13.95%	0.79%	1.00%	1.64%
12R	Departures	1464	192	225	276	8.08%	1.06%	1.24%	1.52%
17	Departures	5223	0	264	45	28.82%	0.00%	1.46%	0.25%
22	Departures	3	0	0	0	0.02%	0.00%	0.00%	0.00%
30L	Departures	5380	154	613	301	29.69%	0.85%	3.38%	1.66%
30R	Departures	3523	127	335	267	19.44%	0.70%	1.85%	1.47%
35	Departures	0	0	0	0	0.00%	0.00%	0%	0.00%
Total Monthly Departures		**18,123**	**616**	**1,618**	**1,187**	**100.00%**	**3.40%**	**8.93%**	**6.55%**
Total Monthly Operations		**36,235**	**2,441**	**2,082**	**2,032**				

The purpose of the RUS is to establish priorities of arrival and departure runways to promote flights over less-populated areas. According to the RUS, the arrival runway priorities are Runways 30L, 30R and 35 and the departure runway priorities are Runways 12R, 12L and 17. A monthly summary of the activity on the RUS high-priority runways is provided in Table 2.

Table 2 – Use of RUS High-Priority Runways: March 2017

	Count	Percent
Use of RUS High-Priority Runways	**18,356**	**50.66%**
Arrivals 30L, 30R, 35	9,140	25.22%
Departures 12L, 12R, 17	9,216	25.43%
Total Monthly Operations	36,235	100.00%

The appendix contains an hourly breakout of airport operations, airport runway configuration changes, surface winds and winds aloft information by day. Airport traffic demand levels, surface winds and winds aloft are the greatest determining factors in runway configuration at MSP. When the traffic demand and wind conditions are not determining factors, ATC has more discretion in determining the runway configuration and, therefore, a greater opportunity to utilize the RUS.

In addition to the significant issues of airport traffic demand levels and wind conditions, there are a number of variables that may affect the runway configuration. These include, among others: aircraft separation minimums, runway conditions and closures, meteorological conditions, visibility, navigational equipment maintenance, aircraft emergencies, pilot requests, aircraft weight and performance characteristics and aircraft de-icing activity. The individual and cumulative synergistic effects of these variables add significant complexity to the airport runway use configuration at MSP at any given time.

Appendix
Hourly Breakout of Airport Operations and Weather by Day

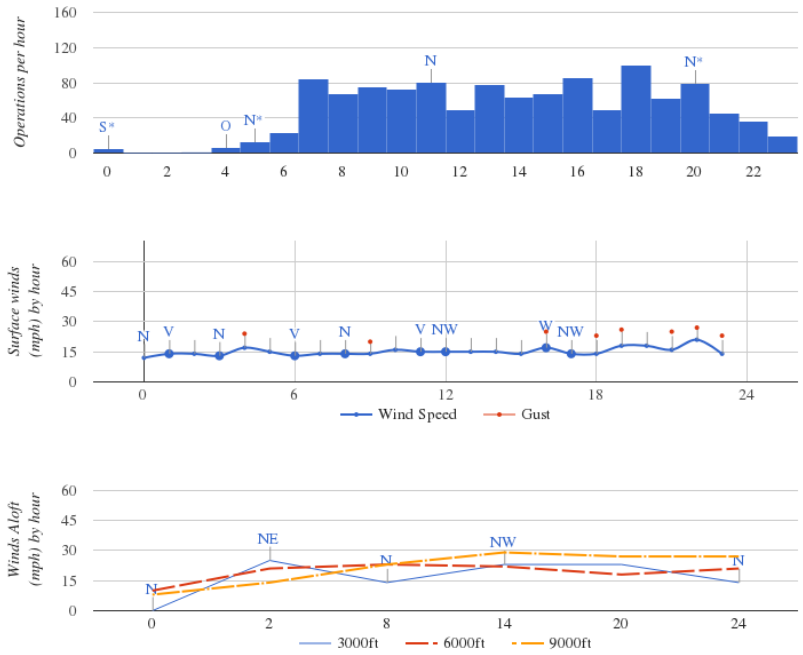
March 2017

Wednesday, March 01 2017

Runway Configuration Labels

N: North Flow · **N***: Straight North Flow · **S**: South Flow · **S***: Straight South Flow
MA: Mixed Flow A · **MB**: Mixed Flow B · **O**: Opposite Direction · **U**: Unusual

Note: Runway configuration and wind directions are labeled only where changes occur. Variable winds are labeled "V".



Thursday, March 02 2017

Runway Configuration Labels

N: North Flow · **N***: Straight North Flow · **S**: South Flow · **S***: Straight South Flow
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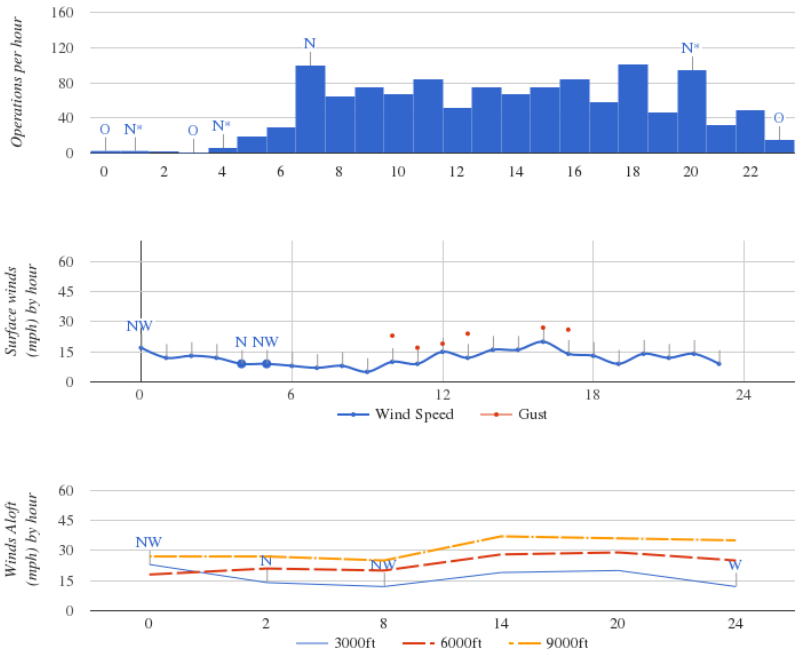
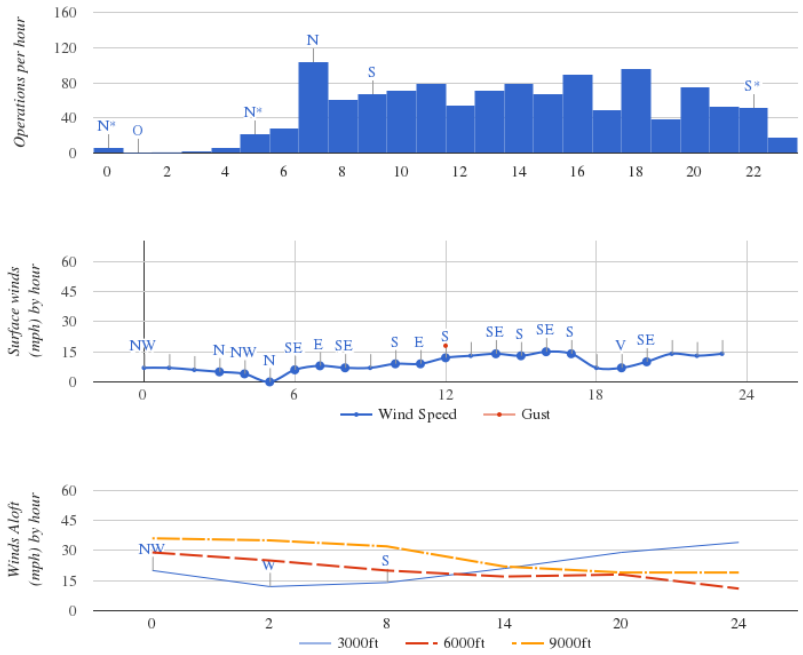


Friday, March 03 2017

Runway Configuration Labels

N: North Flow · **N***: Straight North Flow · **S**: South Flow · **S***: Straight South Flow
MA: Mixed Flow A · **MB**: Mixed Flow B · **O**: Opposite Direction · **U**: Unusual

Note: Runway configuration and wind directions are labeled only where changes occur. Variable winds are labeled "V".

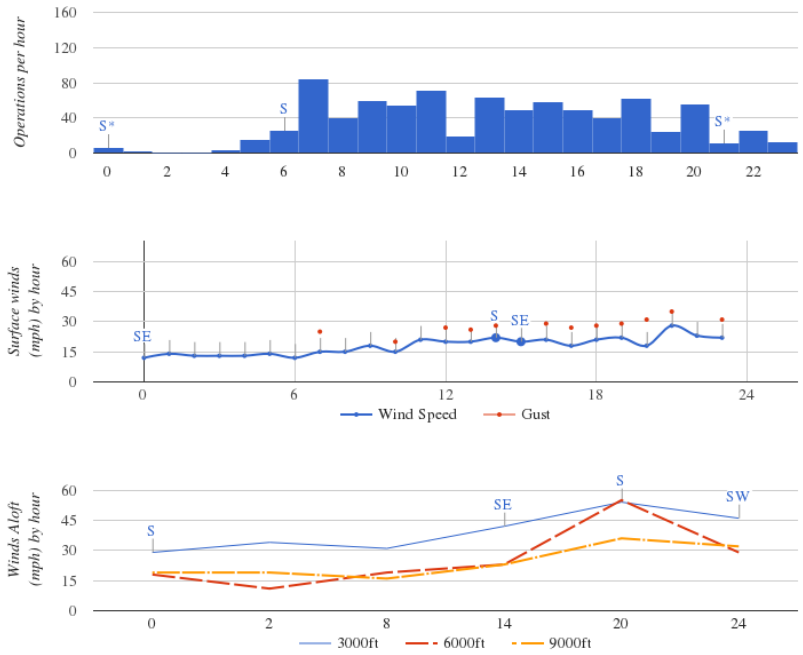


Saturday, March 04 2017

Runway Configuration Labels

N: North Flow · **N***: Straight North Flow · **S**: South Flow · **S***: Straight South Flow
MA: Mixed Flow A · **MB**: Mixed Flow B · **O**: Opposite Direction · **U**: Unusual

Note: Runway configuration and wind directions are labeled only where changes occur. Variable winds are labeled "V".

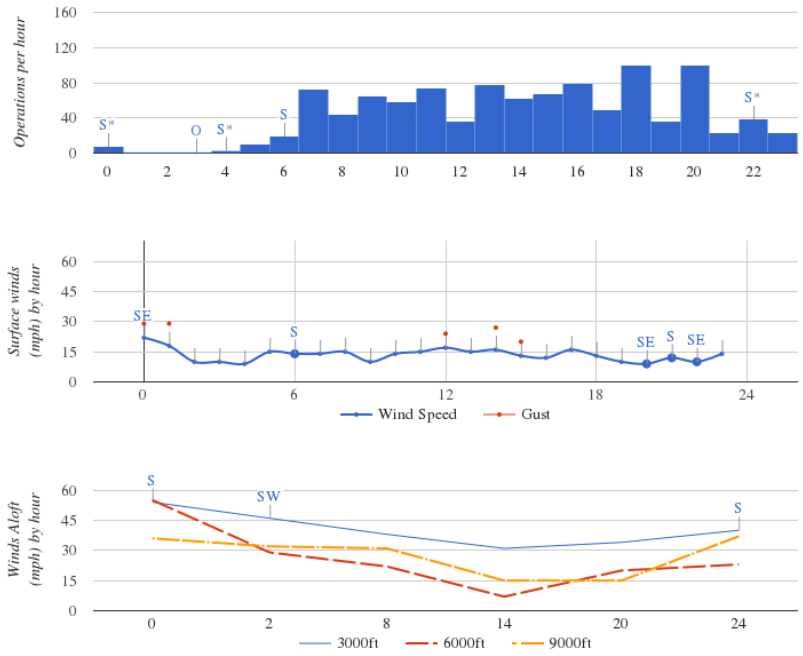


Sunday, March 05 2017

Runway Configuration Labels

N: North Flow · **N***: Straight North Flow · **S**: South Flow · **S***: Straight South Flow
MA: Mixed Flow A · **MB**: Mixed Flow B · **O**: Opposite Direction · **U**: Unusual

Note: Runway configuration and wind directions are labeled only where changes occur. Variable winds are labeled "V".

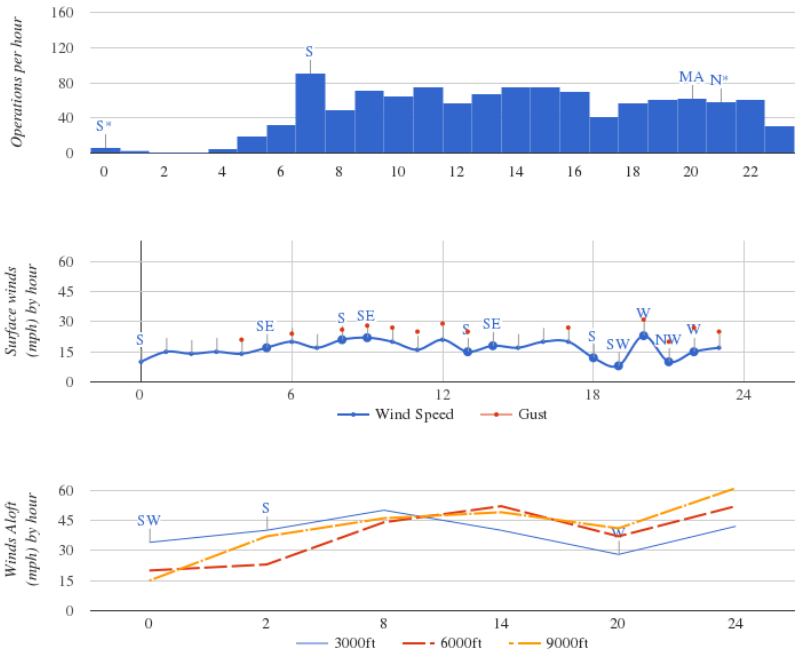


Monday, March 06 2017

Runway Configuration Labels

N: North Flow · **N***: Straight North Flow · **S**: South Flow · **S***: Straight South Flow
MA: Mixed Flow A · **MB**: Mixed Flow B · **O**: Opposite Direction · **U**: Unusual

Note: Runway configuration and wind directions are labeled only where changes occur. Variable winds are labeled "V".

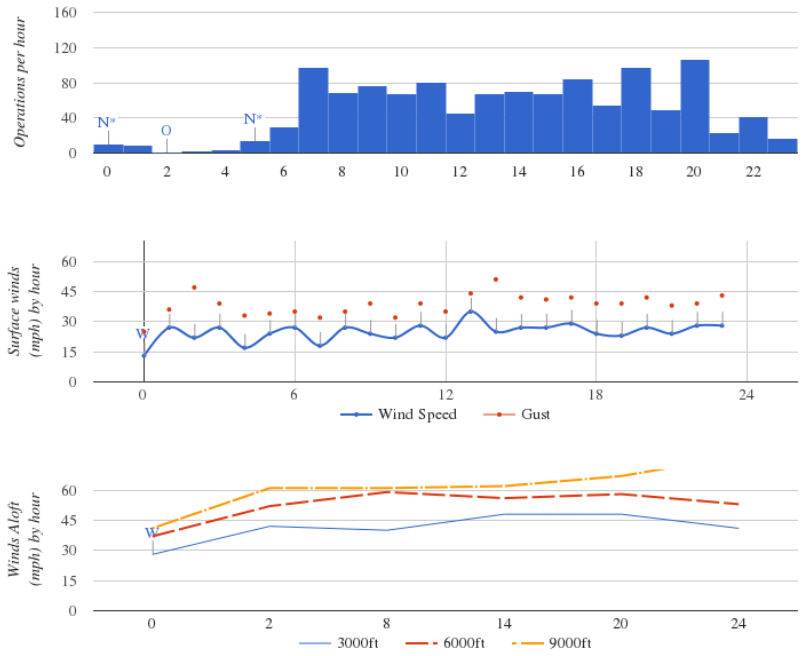


Tuesday, March 07 2017

Runway Configuration Labels

N: North Flow · **N***: Straight North Flow · **S**: South Flow · **S***: Straight South Flow
MA: Mixed Flow A · **MB**: Mixed Flow B · **O**: Opposite Direction · **U**: Unusual

Note: Runway configuration and wind directions are labeled only where changes occur. Variable winds are labeled "V".

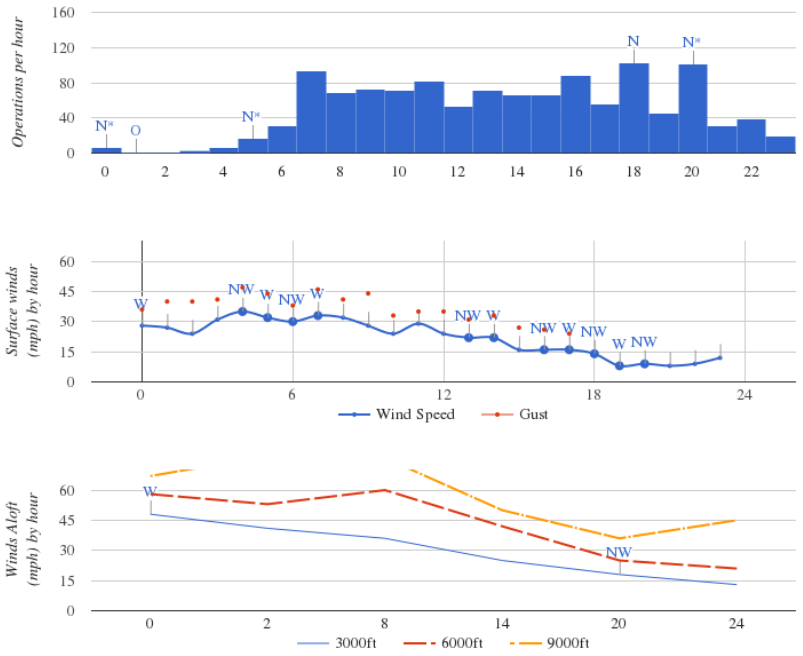


Wednesday, March 08 2017

Runway Configuration Labels

N: North Flow · **N***: Straight North Flow · **S**: South Flow · **S***: Straight South Flow
MA: Mixed Flow A · **MB**: Mixed Flow B · **O**: Opposite Direction · **U**: Unusual

Note: Runway configuration and wind directions are labeled only where changes occur. Variable winds are labeled "V".

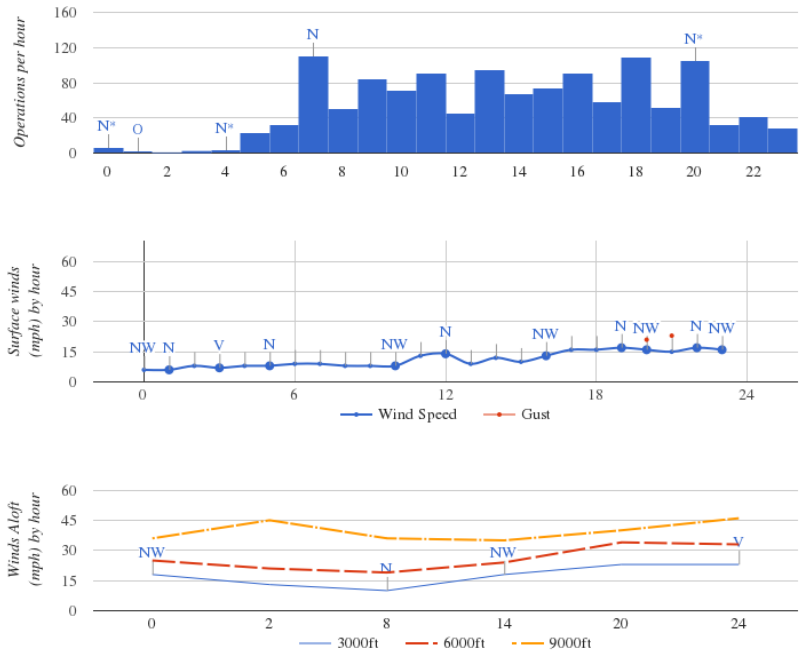


Thursday, March 09 2017

Runway Configuration Labels

N: North Flow · **N***: Straight North Flow · **S**: South Flow · **S***: Straight South Flow
MA: Mixed Flow A · **MB**: Mixed Flow B · **O**: Opposite Direction · **U**: Unusual

Note: Runway configuration and wind directions are labeled only where changes occur. Variable winds are labeled "V".

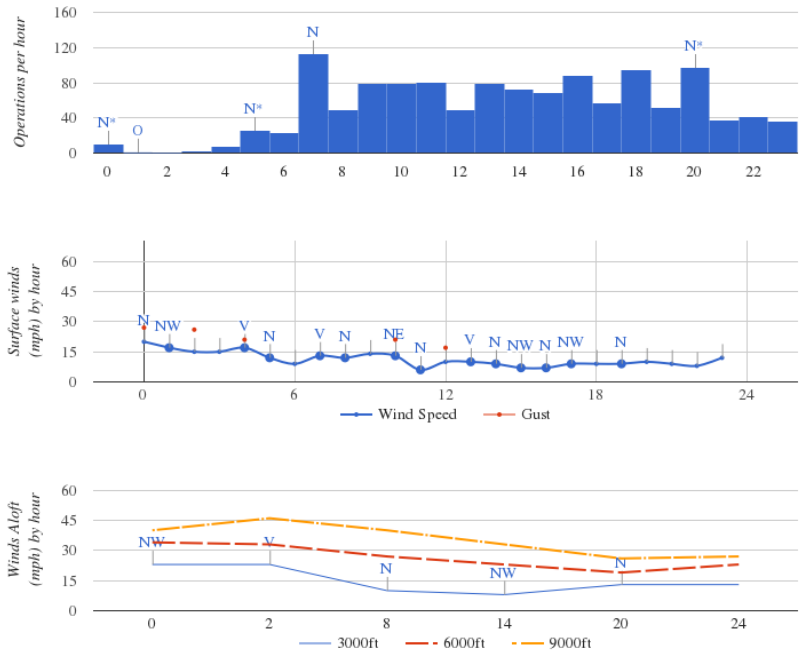


Friday, March 10 2017

Runway Configuration Labels

N: North Flow · **N***: Straight North Flow · **S**: South Flow · **S***: Straight South Flow
MA: Mixed Flow A · **MB**: Mixed Flow B · **O**: Opposite Direction · **U**: Unusual

Note: Runway configuration and wind directions are labeled only where changes occur. Variable winds are labeled "V".

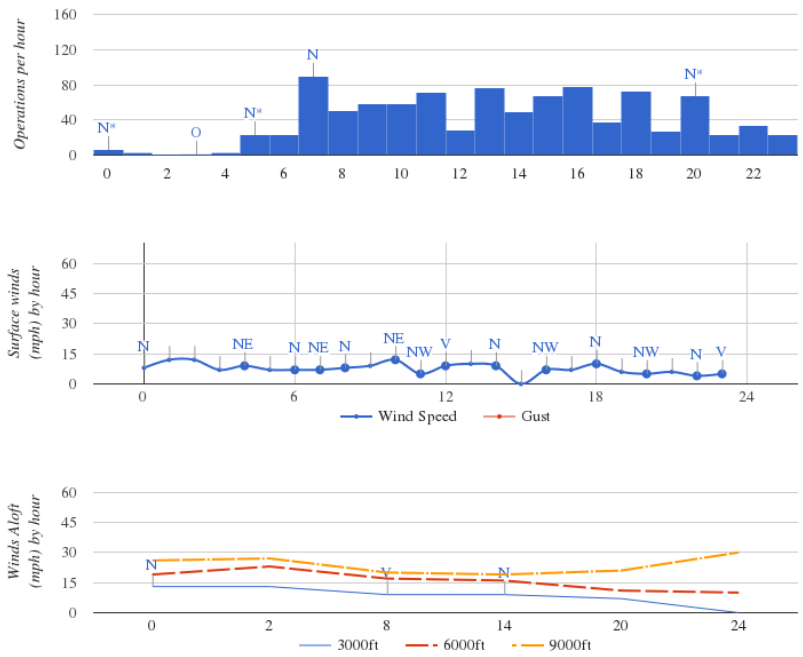


Saturday, March 11 2017

Runway Configuration Labels

N: North Flow · **N***: Straight North Flow · **S**: South Flow · **S***: Straight South Flow
MA: Mixed Flow A · **MB**: Mixed Flow B · **O**: Opposite Direction · **U**: Unusual

Note: Runway configuration and wind directions are labeled only where changes occur. Variable winds are labeled "V".

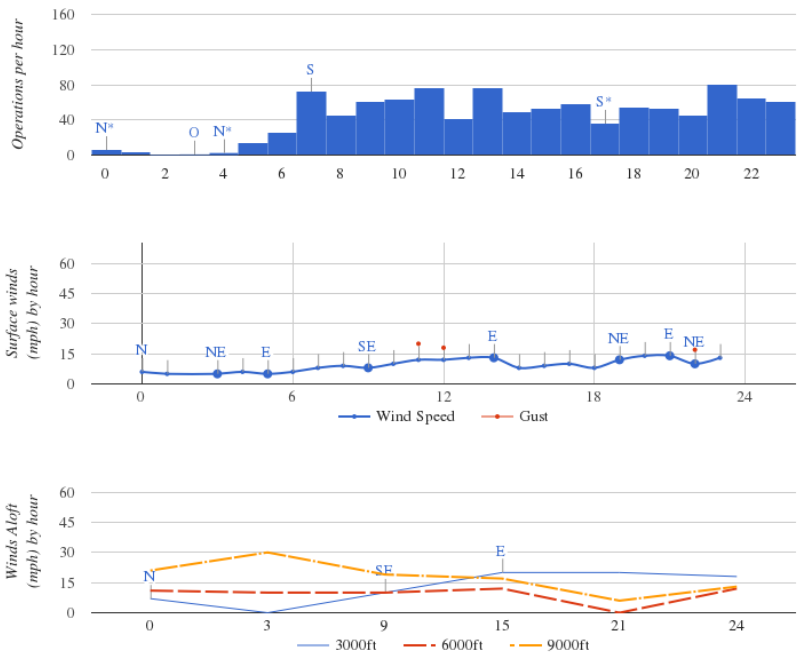


Sunday, March 12 2017

Runway Configuration Labels

N: North Flow · **N***: Straight North Flow · **S**: South Flow · **S***: Straight South Flow
MA: Mixed Flow A · **MB**: Mixed Flow B · **O**: Opposite Direction · **U**: Unusual

Note: Runway configuration and wind directions are labeled only where changes occur. Variable winds are labeled "V".

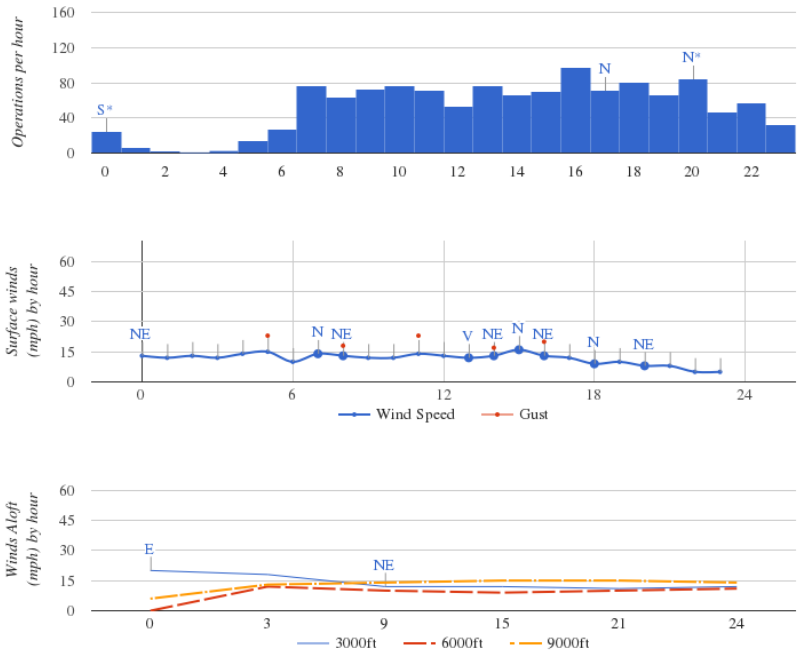


Monday, March 13 2017

Runway Configuration Labels

N: North Flow · **N***: Straight North Flow · **S**: South Flow · **S***: Straight South Flow
MA: Mixed Flow A · **MB**: Mixed Flow B · **O**: Opposite Direction · **U**: Unusual

Note: Runway configuration and wind directions are labeled only where changes occur. Variable winds are labeled "V".

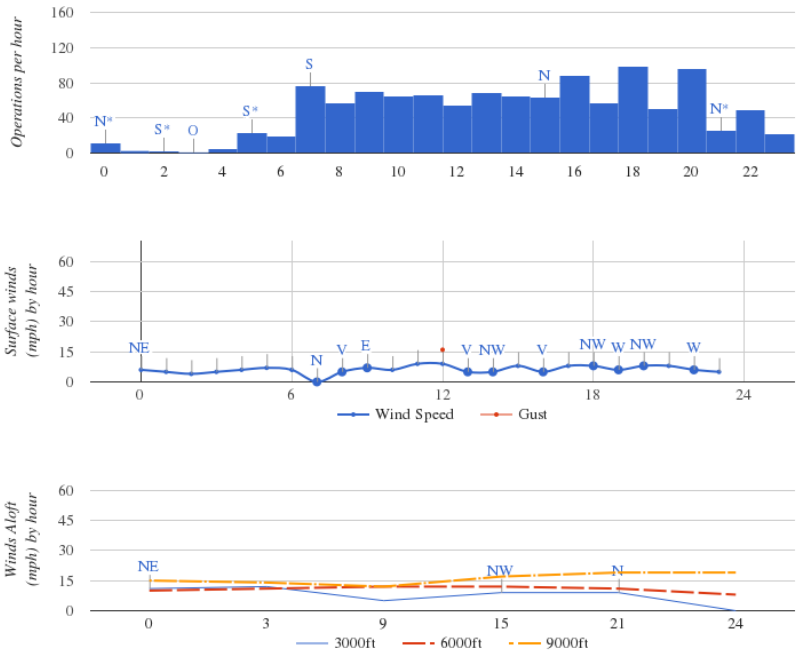


Tuesday, March 14 2017

Runway Configuration Labels

N: North Flow · **N***: Straight North Flow · **S**: South Flow · **S***: Straight South Flow
MA: Mixed Flow A · **MB**: Mixed Flow B · **O**: Opposite Direction · **U**: Unusual

Note: Runway configuration and wind directions are labeled only where changes occur. Variable winds are labeled "V".

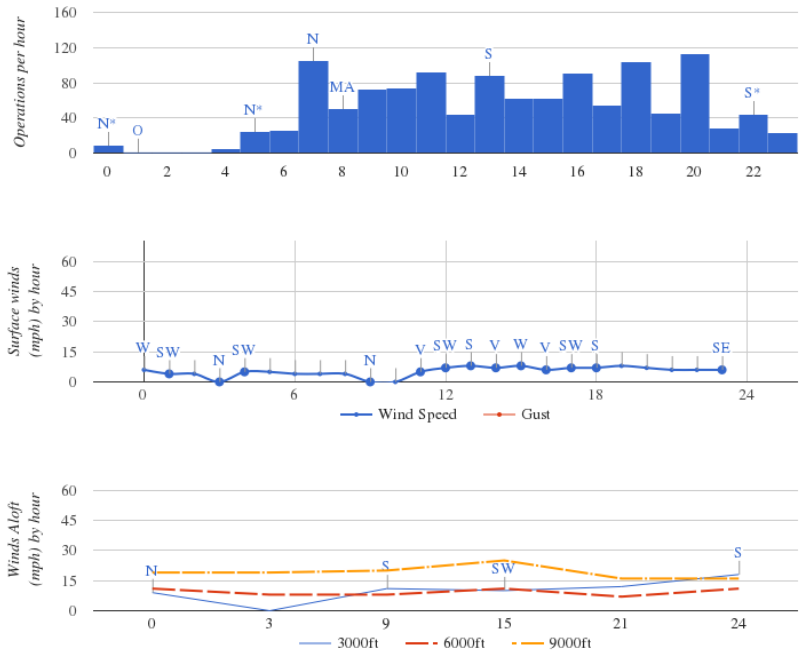


Wednesday, March 15 2017

Runway Configuration Labels

N: North Flow · **N***: Straight North Flow · **S**: South Flow · **S***: Straight South Flow
MA: Mixed Flow A · **MB**: Mixed Flow B · **O**: Opposite Direction · **U**: Unusual

Note: Runway configuration and wind directions are labeled only where changes occur. Variable winds are labeled "V".

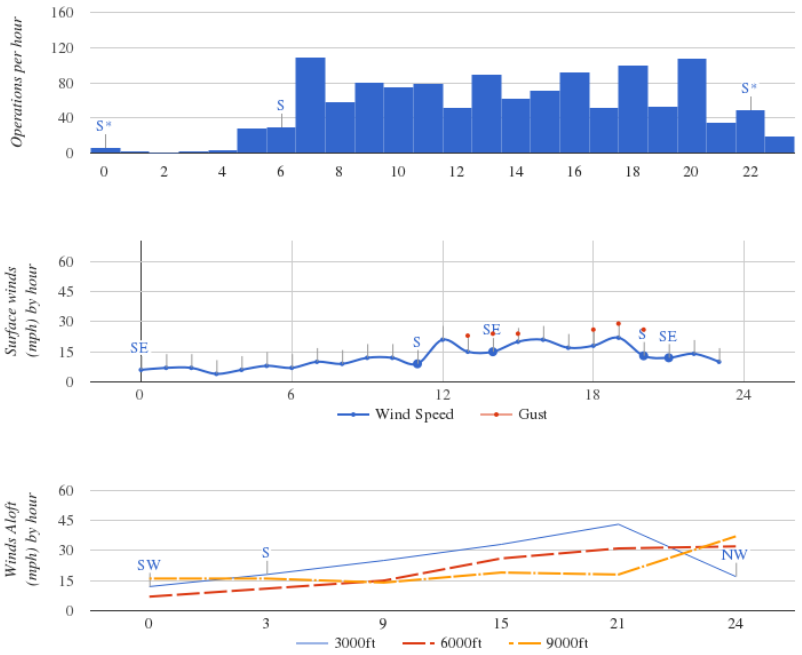


Thursday, March 16 2017

Runway Configuration Labels

N: North Flow · **N***: Straight North Flow · **S**: South Flow · **S***: Straight South Flow
MA: Mixed Flow A · **MB**: Mixed Flow B · **O**: Opposite Direction · **U**: Unusual

Note: Runway configuration and wind directions are labeled only where changes occur. Variable winds are labeled "V".

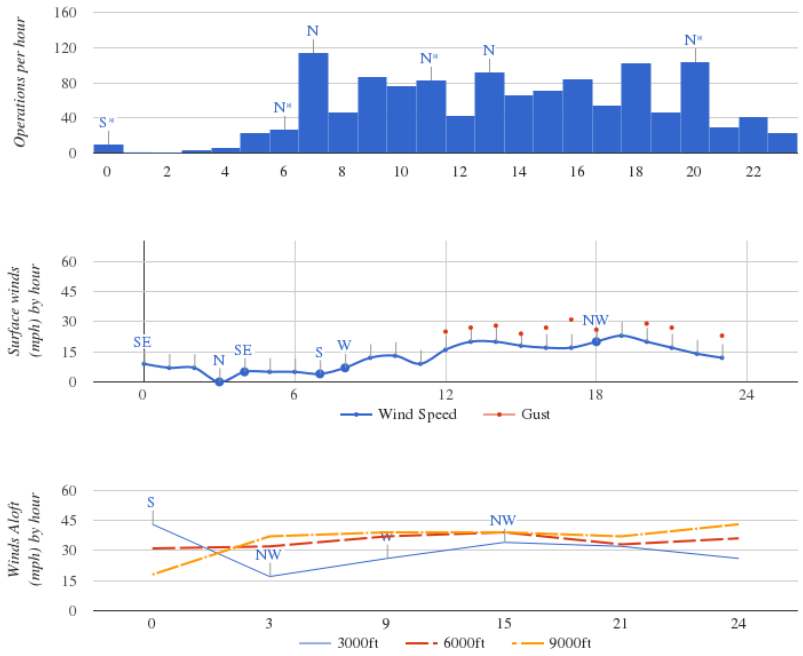


Friday, March 17 2017

Runway Configuration Labels

N: North Flow · **N***: Straight North Flow · **S**: South Flow · **S***: Straight South Flow
MA: Mixed Flow A · **MB**: Mixed Flow B · **O**: Opposite Direction · **U**: Unusual

Note: Runway configuration and wind directions are labeled only where changes occur. Variable winds are labeled "V".

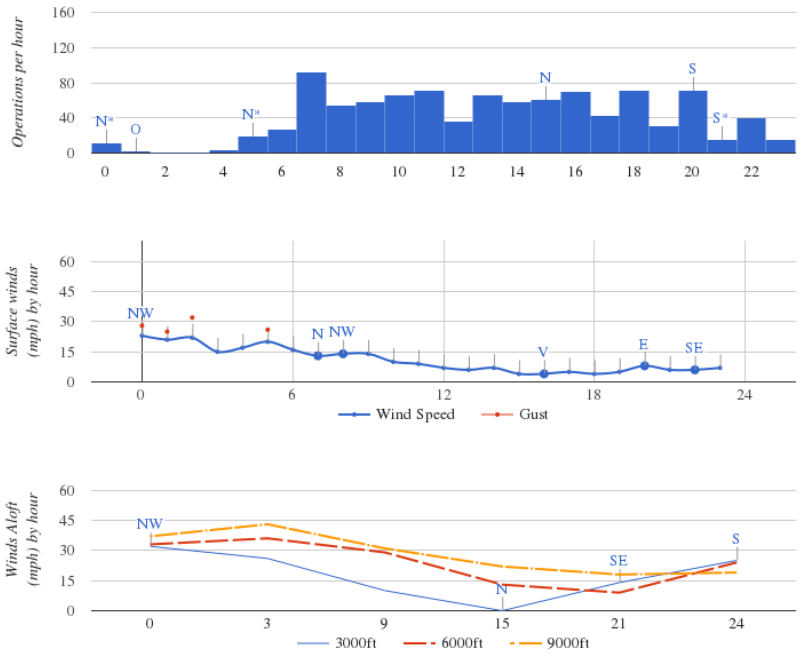


Saturday, March 18 2017

Runway Configuration Labels

N: North Flow · **N***: Straight North Flow · **S**: South Flow · **S***: Straight South Flow
MA: Mixed Flow A · **MB**: Mixed Flow B · **O**: Opposite Direction · **U**: Unusual

Note: Runway configuration and wind directions are labeled only where changes occur. Variable winds are labeled "V".

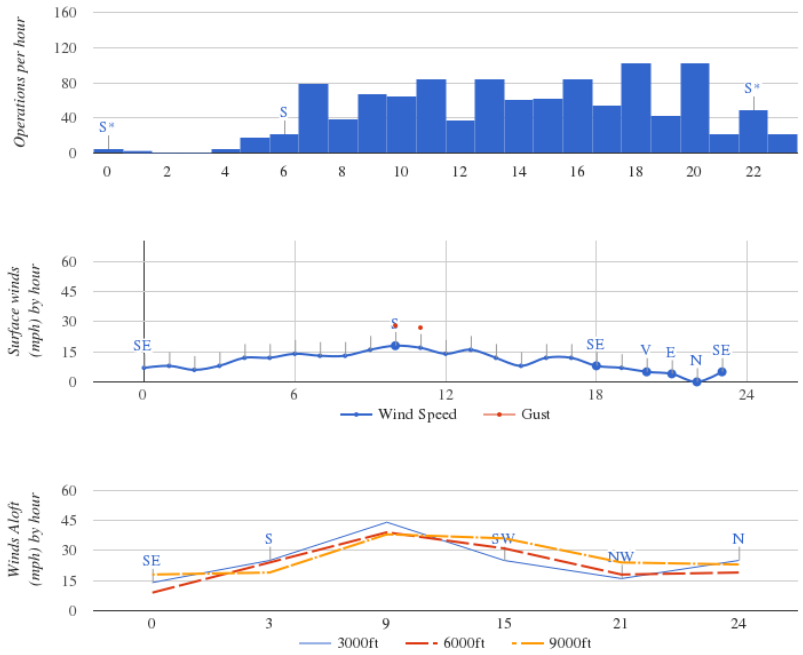


Sunday, March 19 2017

Runway Configuration Labels

N: North Flow · **N***: Straight North Flow · **S**: South Flow · **S***: Straight South Flow
MA: Mixed Flow A · **MB**: Mixed Flow B · **O**: Opposite Direction · **U**: Unusual

Note: Runway configuration and wind directions are labeled only where changes occur. Variable winds are labeled "V".

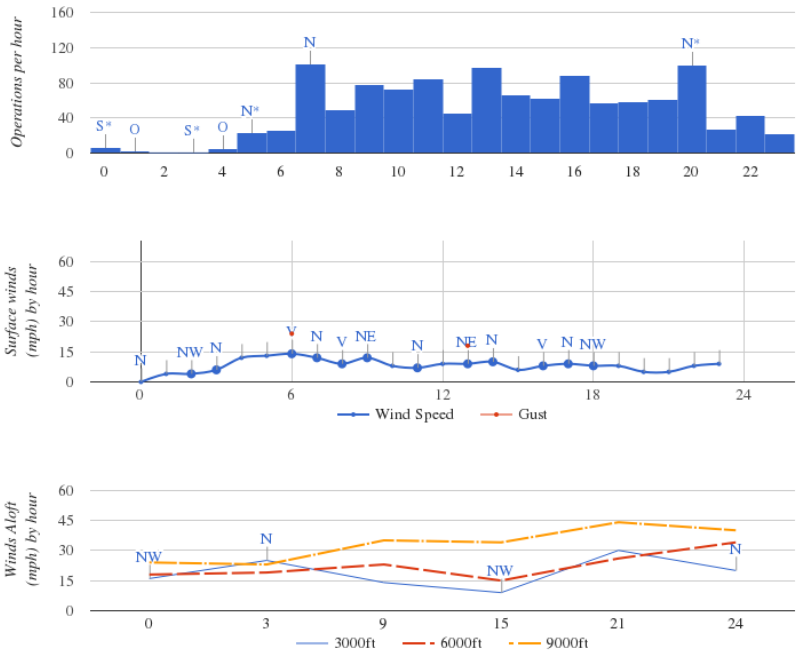


Monday, March 20 2017

Runway Configuration Labels

N: North Flow · **N***: Straight North Flow · **S**: South Flow · **S***: Straight South Flow
MA: Mixed Flow A · **MB**: Mixed Flow B · **O**: Opposite Direction · **U**: Unusual

Note: Runway configuration and wind directions are labeled only where changes occur. Variable winds are labeled "V".

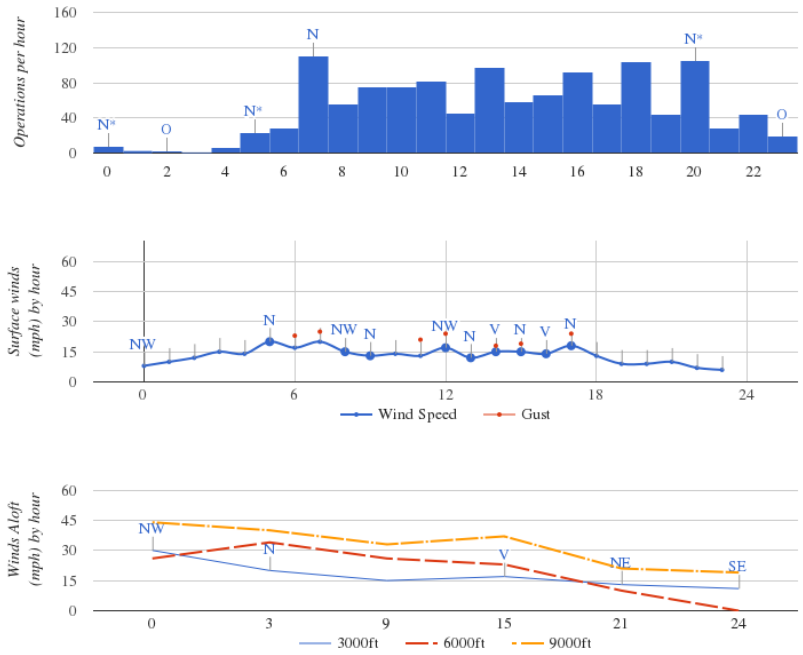


Tuesday, March 21 2017

Runway Configuration Labels

N: North Flow · **N***: Straight North Flow · **S**: South Flow · **S***: Straight South Flow
MA: Mixed Flow A · **MB**: Mixed Flow B · **O**: Opposite Direction · **U**: Unusual

Note: Runway configuration and wind directions are labeled only where changes occur. Variable winds are labeled "V".

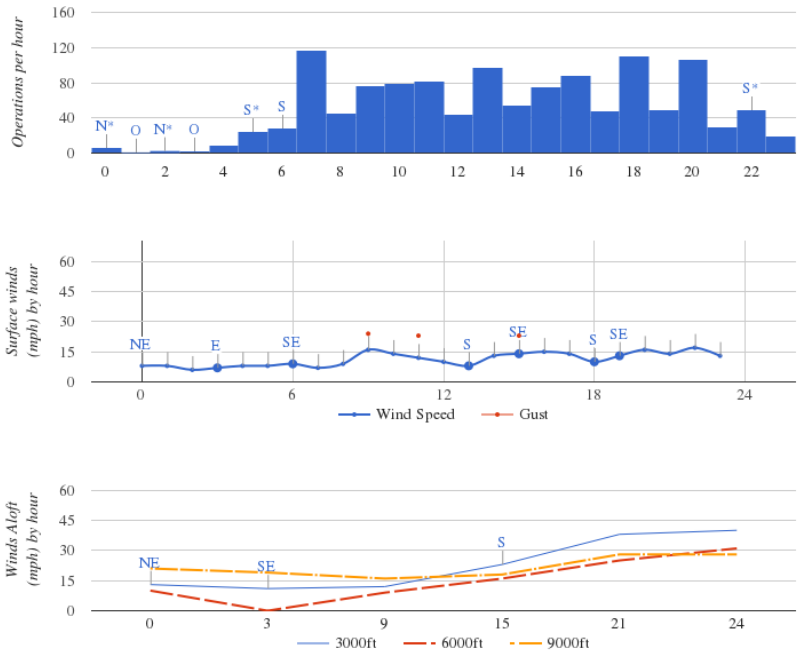


Wednesday, March 22 2017

Runway Configuration Labels

N: North Flow · **N***: Straight North Flow · **S**: South Flow · **S***: Straight South Flow
MA: Mixed Flow A · **MB**: Mixed Flow B · **O**: Opposite Direction · **U**: Unusual

Note: Runway configuration and wind directions are labeled only where changes occur. Variable winds are labeled "V".

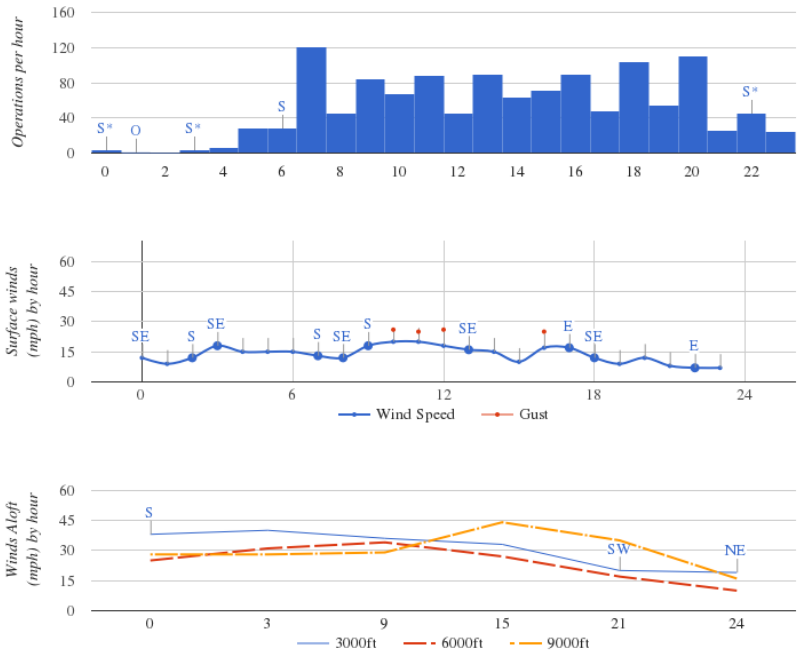


Thursday, March 23 2017

Runway Configuration Labels

N: North Flow · **N***: Straight North Flow · **S**: South Flow · **S***: Straight South Flow
MA: Mixed Flow A · **MB**: Mixed Flow B · **O**: Opposite Direction · **U**: Unusual

Note: Runway configuration and wind directions are labeled only where changes occur. Variable winds are labeled "V".

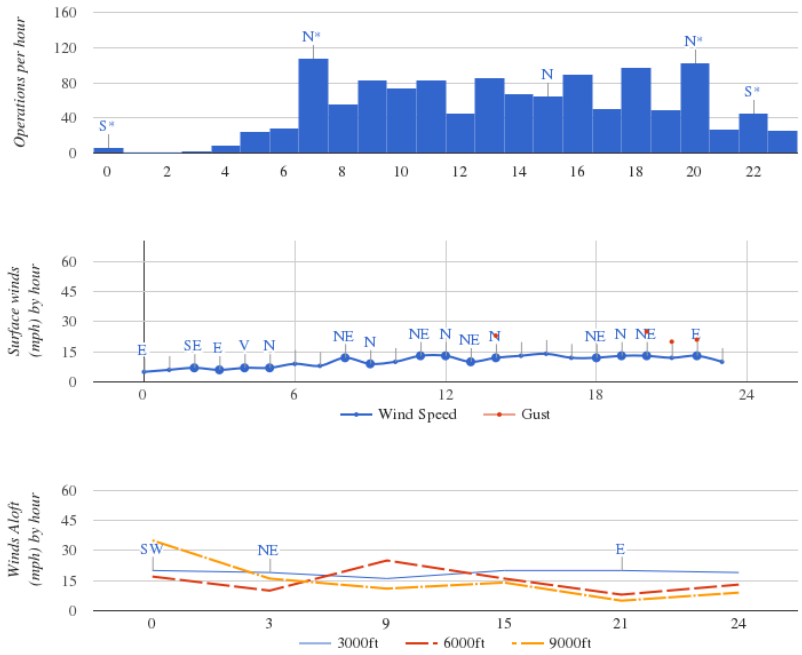


Friday, March 24 2017

Runway Configuration Labels

N: North Flow · **N***: Straight North Flow · **S**: South Flow · **S***: Straight South Flow
MA: Mixed Flow A · **MB**: Mixed Flow B · **O**: Opposite Direction · **U**: Unusual

Note: Runway configuration and wind directions are labeled only where changes occur. Variable winds are labeled "V".

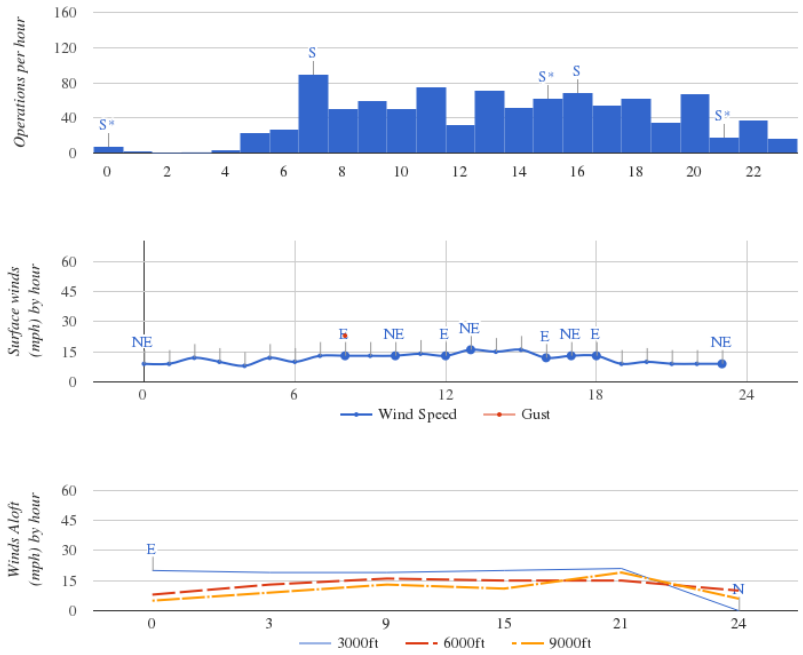


Saturday, March 25 2017

Runway Configuration Labels

N: North Flow · **N***: Straight North Flow · **S**: South Flow · **S***: Straight South Flow
MA: Mixed Flow A · **MB**: Mixed Flow B · **O**: Opposite Direction · **U**: Unusual

Note: Runway configuration and wind directions are labeled only where changes occur. Variable winds are labeled "V".

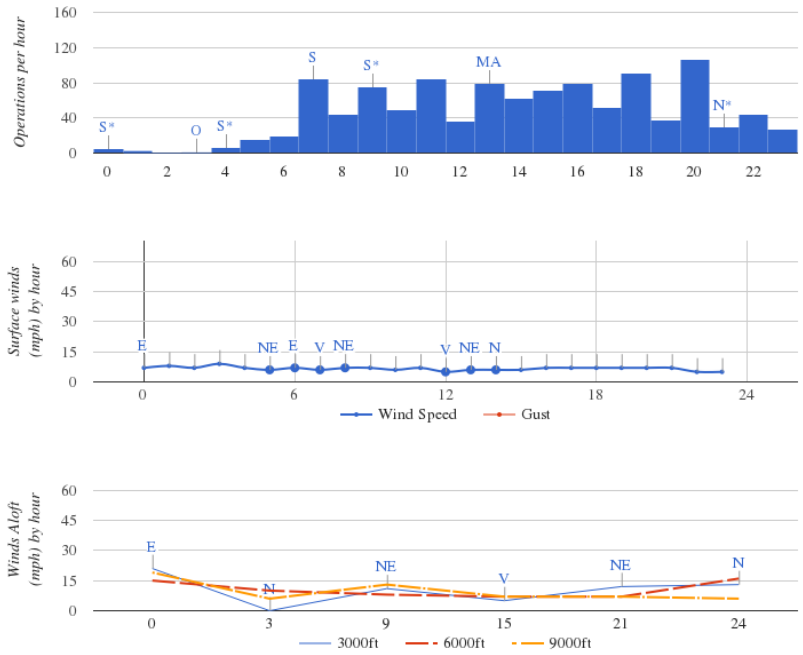


Sunday, March 26 2017

Runway Configuration Labels

N: North Flow · **N***: Straight North Flow · **S**: South Flow · **S***: Straight South Flow
MA: Mixed Flow A · **MB**: Mixed Flow B · **O**: Opposite Direction · **U**: Unusual

Note: Runway configuration and wind directions are labeled only where changes occur. Variable winds are labeled "V".

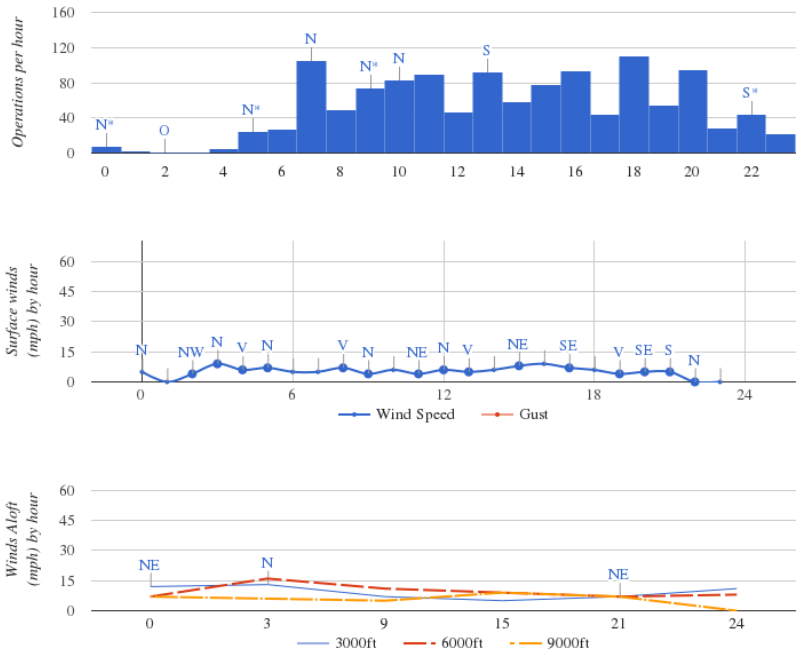


Monday, March 27 2017

Runway Configuration Labels

N: North Flow · **N***: Straight North Flow · **S**: South Flow · **S***: Straight South Flow
MA: Mixed Flow A · **MB**: Mixed Flow B · **O**: Opposite Direction · **U**: Unusual

Note: Runway configuration and wind directions are labeled only where changes occur. Variable winds are labeled "V".

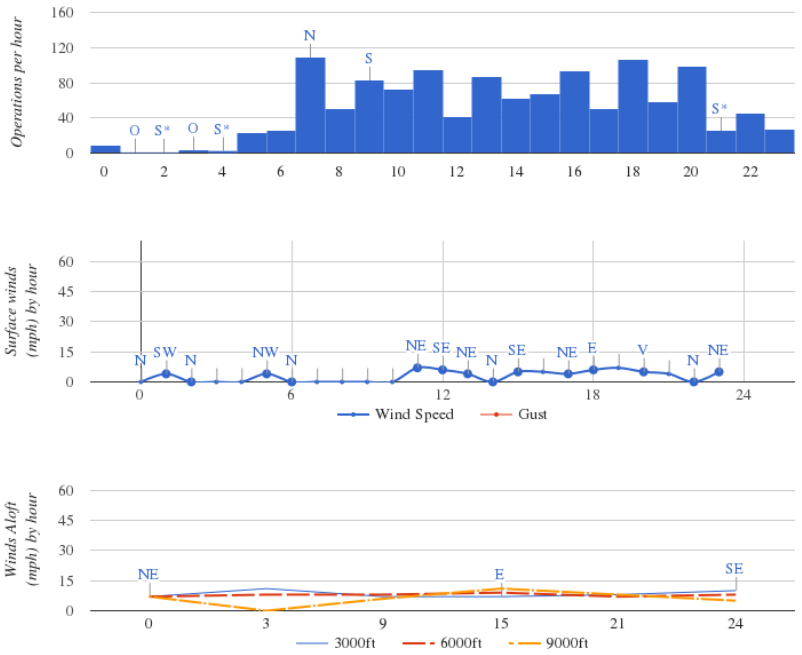


Tuesday, March 28 2017

Runway Configuration Labels

N: North Flow · **N***: Straight North Flow · **S**: South Flow · **S***: Straight South Flow
MA: Mixed Flow A · **MB**: Mixed Flow B · **O**: Opposite Direction · **U**: Unusual

Note: Runway configuration and wind directions are labeled only where changes occur. Variable winds are labeled "V".

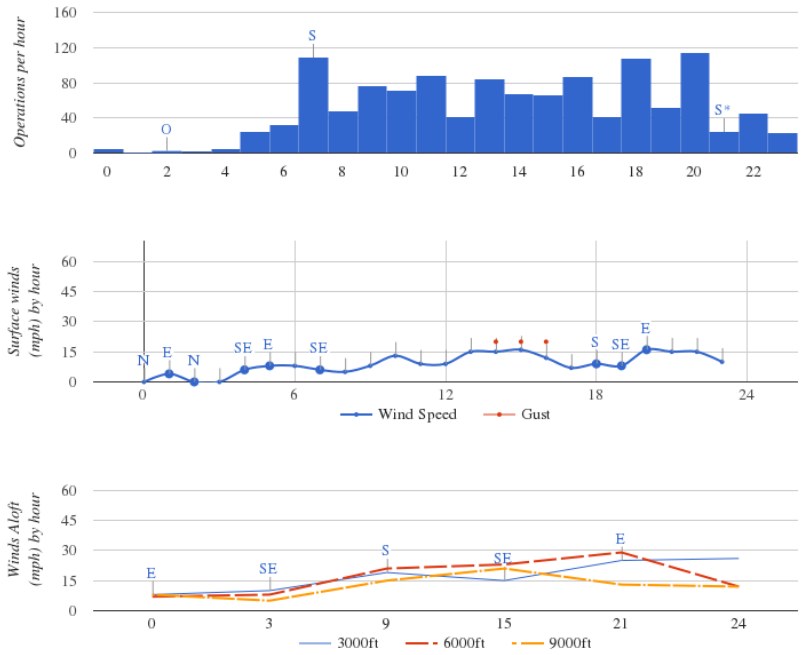


Wednesday, March 29 2017

Runway Configuration Labels

N: North Flow · **N***: Straight North Flow · **S**: South Flow · **S***: Straight South Flow
MA: Mixed Flow A · **MB**: Mixed Flow B · **O**: Opposite Direction · **U**: Unusual

Note: Runway configuration and wind directions are labeled only where changes occur. Variable winds are labeled "V".

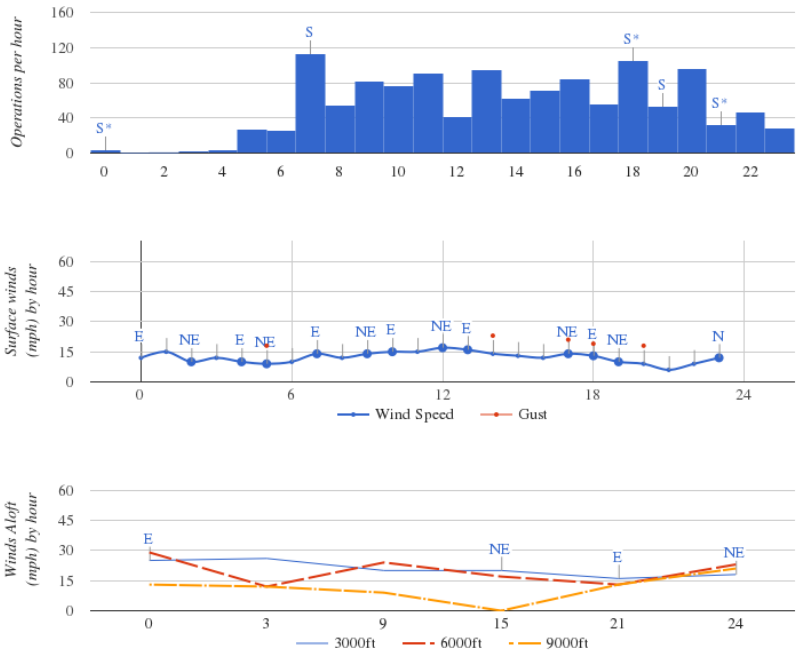


Thursday, March 30 2017

Runway Configuration Labels

N: North Flow · **N***: Straight North Flow · **S**: South Flow · **S***: Straight South Flow
MA: Mixed Flow A · **MB**: Mixed Flow B · **O**: Opposite Direction · **U**: Unusual

Note: Runway configuration and wind directions are labeled only where changes occur. Variable winds are labeled "V".



Friday, March 31 2017

Runway Configuration Labels

N: North Flow · **N***: Straight North Flow · **S**: South Flow · **S***: Straight South Flow
MA: Mixed Flow A · **MB**: Mixed Flow B · **O**: Opposite Direction · **U**: Unusual

Note: Runway configuration and wind directions are labeled only where changes occur.
Variable winds are labeled "V".