

# How are runway decisions made?

Airport operations, and specifically where aircraft fly in relation to the surrounding community, depend upon the layout of the runways at an airport as well as on wind direction.

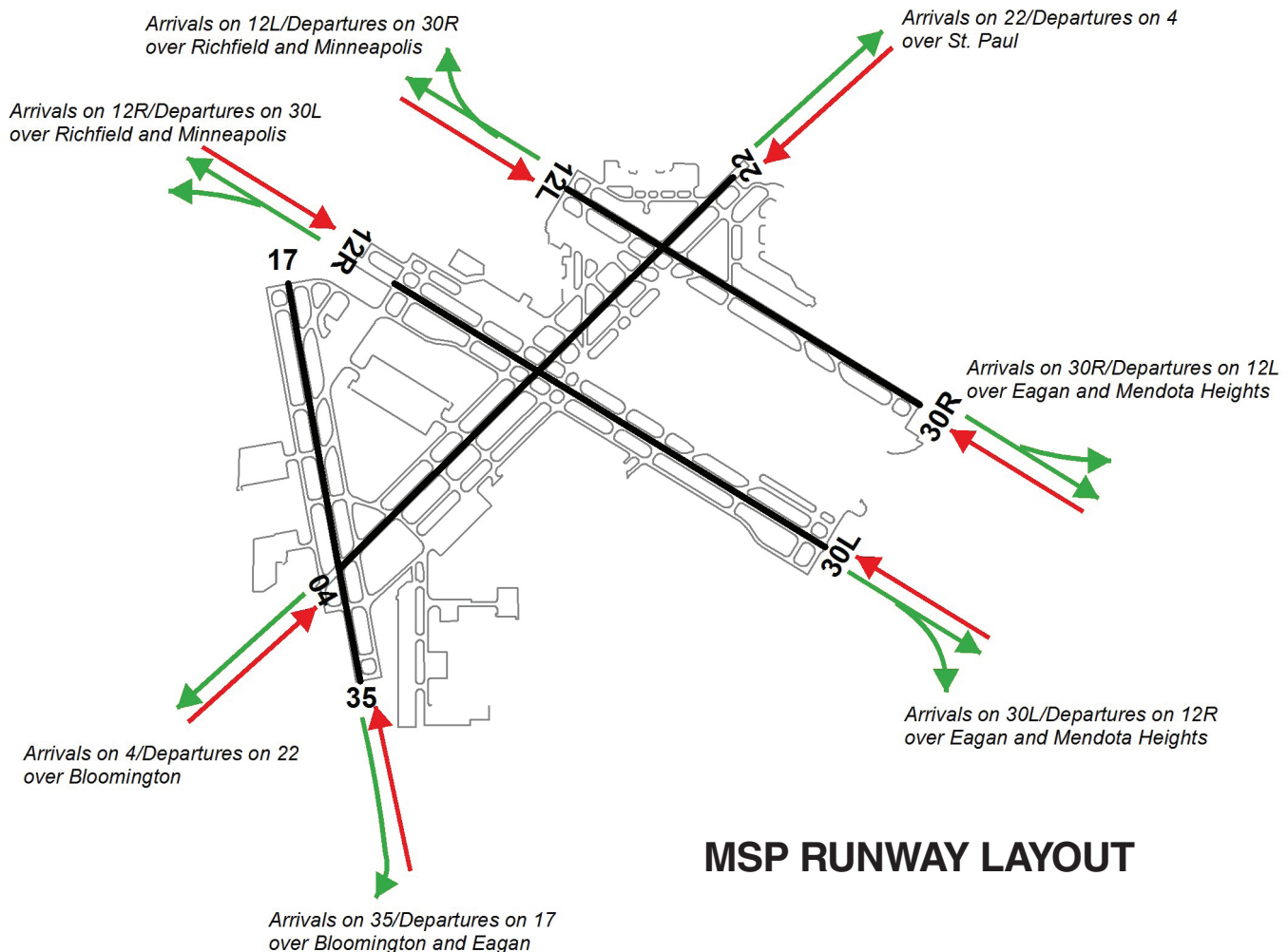
General runway identification is based on the compass heading the aircraft is facing as it is landing or taking off. For example, Runway 17/35 is facing approximately  $170^\circ$  in one direction and  $350^\circ$  in the opposite direction. Even though a runway is a single strip of concrete, it is essentially treated as two separate runways by pilots and controllers. Parallel runways have the same compass readings, and therefore are further designated with L (Left) or R (Right) at the end of the runway number.

Runways are built to align with historical wind patterns specific to each airport because aircraft land and take off into the wind. At the Minneapolis-St. Paul International Airport (MSP), two parallel runways are oriented northwest to southeast to align with prevailing winds experienced in

the Upper Midwest. These parallel runways serve as MSP's primary runways.

Shown in the graphic below, MSP has four runways: two parallel runways (12L/30R and 12R/30L), a north/south runway (17/35) and a crosswind runway (4/22). Each runway has unique characteristics.

- Due to runway layout and prevailing winds, the parallel runways are the most frequently used. They are used every day unless construction or unusual weather conditions disallow their use
- Due to the layout of the runways, Runway 17 is generally used only for departures in a southerly direction
- Similarly, Runway 35 is generally used only for arrivals from the south
- Because Runway 4/22, MSP's longest runway, intersects the primary runways at MSP, it is used only when wind conditions demand it or for large international flights that require its extra length



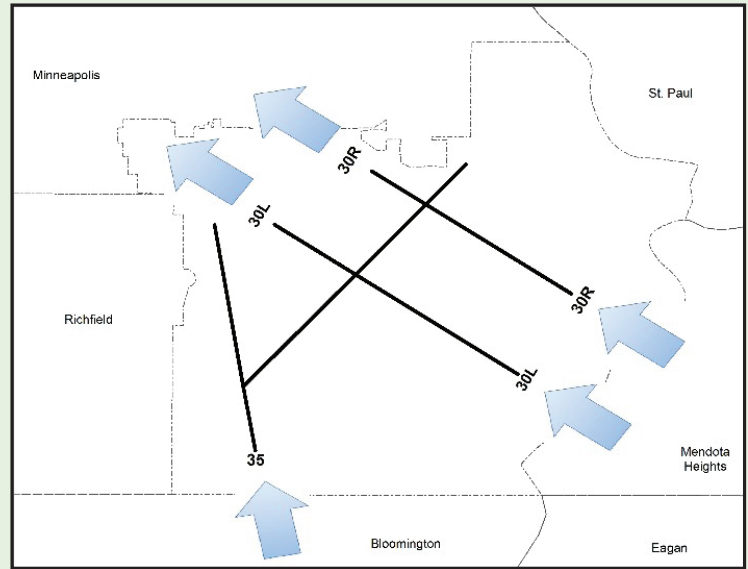
## MSP Runway Configurations

Air traffic controllers rely on a combination of runways, or runway configurations, to efficiently and safely direct the landing and departure of aircraft. There are several airport runway configuration options at MSP, including:

### NORTH FLOW:

Arrivals on Runways 30L, 30R and 35 over areas to the south and southeast of the airport with departures on Runways 30L and 30R over areas to the northwest of the airport. This configuration is the most efficient for air traffic controllers because it provides three runways for landing. Aircraft arrivals require more space to maintain separation from other arriving flights as compared to departures.

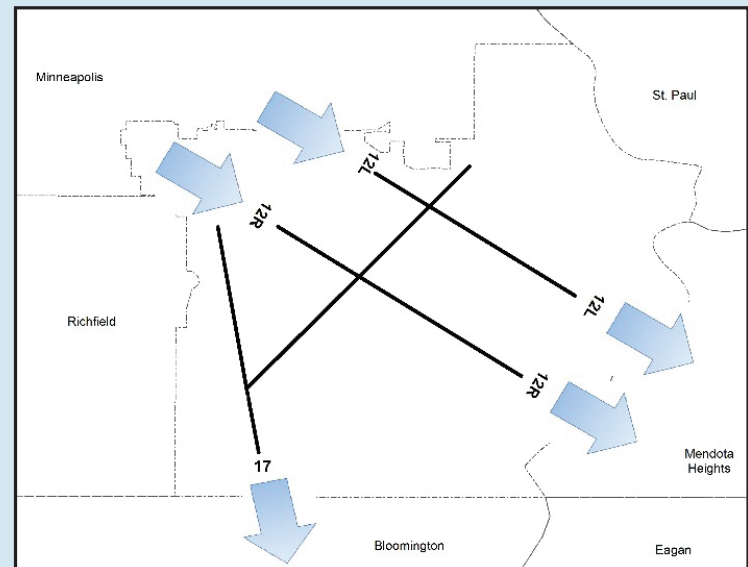
There are times when construction or weather conditions do not allow for arrivals on Runway 35 during a North Flow configuration. This results in all arrivals and departures on Runways 30L and 30R, termed Straight North Flow.



### SOUTH FLOW:

Arrivals on Runways 12L and 12R over areas to the northwest of the airport with departures on Runways 12L, 12R and 17 over areas to the south and southeast of the airport.

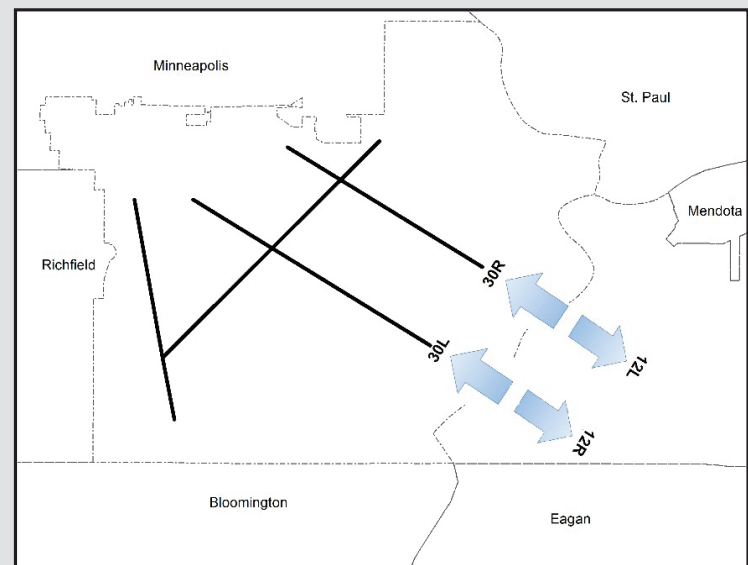
There are times when construction or weather conditions do not allow for departures on Runway 17 during a South Flow configuration. This results in all arrivals and departures occurring on Runways 12L and 12R, termed Straight South Flow.



### OPPOSITE-DIRECTION:

Also referred to as “head-to-head” operations are sometimes conducted to the southeast of the airport.

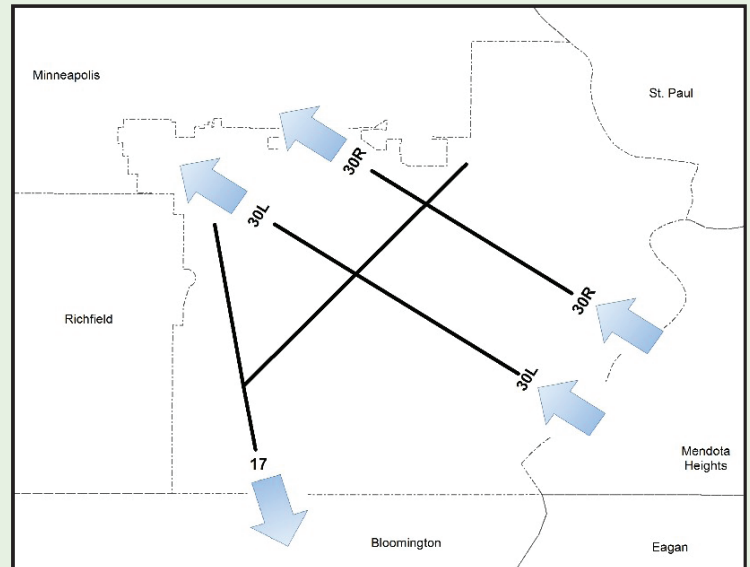
This configuration offers the most preferred arrival and departure runways in terms of reducing residential overflights; however, it requires at least 15 miles of separation between arrival and departure operations and can be used only during low aircraft traffic demand periods with light winds present.



## MIXED FLOW CONFIGURATIONS:

According to the FAA, mixed-flow configurations that maximize the MSP Runway Use System are most feasible at night and during transitions into and out of high demand periods. These transitions typically occur from 6-7:30 AM and 9-10:30 PM.

One of the most common mixed flow configurations occurs when arrivals are on Runways 30L and 30R over areas to the southeast of the airport with departures on Runway 17 to the south and reduced departure operations on Runways 30L and 30R to the northwest. This is referred to as Mixed Flow A.



### Impacts of Weather

Weather is an integral factor in airport operations, aircraft performance and the flight planning process. Factors such as surface winds and winds aloft, cloud type, cloud ceiling levels, precipitation, sea level pressure and temperature all are considered by pilots and air traffic controllers before an airplane begins its journey.

Aircraft land into the wind to slow to a speed capable of a controlled touch-down on the runway. Therefore, the wind direction and speed at an airport is the foundation for a host of operational decisions. While aircraft may operate with limited tail winds (less than seven knots), it is not ideal because higher ground speeds may lead to unsafe

conditions upon landing. As the wind changes, the runways in use and flight paths change accordingly.

Air temperature has an impact on the performance capabilities of jet engines. Colder temperatures lead to better aircraft performance and allow aircraft to climb faster when departing. Additionally, aircraft flight paths may change to be directed around severe weather, such as thunderstorms, tornados, snow storms, icing, turbulence or lighting.

### Runway Use Determination

Selecting which runways to use for aircraft departures and arrivals at 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 Air Traffic Control (ATC). When selecting an airport configuration, ATC takes into consideration numerous factors including:

- Safety
- Efficiency
- Wind direction and wind speed (on the surface and aloft)
- Aircraft weight
- The number of inbound and scheduled outbound aircraft
- Noise abatement
- Where aircraft are going to and coming from (destination and origin airports)



LEARN MORE ABOUT THE MAC'S NOISE ABATEMENT PROGRAMS.  
Visit [macnoise.com](http://macnoise.com) or call 612-726-9411.