

Airport capacity profile estimates were created using a standard set of performance characteristics and do not take into account non-runway constraints, unless otherwise noted. The capacity estimates developed for this report are not intended to replace the results of any detailed analysis that would precede an environmental, investment, or policy decision.

The list of Future Improvements and their expected effects on capacity does not imply FAA commitment to, or approval of, any item on the list.

DEFINITION

- The capacity profile shows the hourly throughput that an airport is able to sustain during periods of high demand, represented as the range between the model-estimated capacity and the ATC facility reported rate (called rate). Each weather condition has a unique capacity rate range.
- The following charts compare actual hourly traffic with the estimated capacity curves for SFO. Some hourly traffic points fall outside the estimated capacity curves, especially in instrument conditions. There are many reasons why this may occur without affecting operational safety. Also, actual weather may have been better for part of the hour, due to lifting morning fog for instance, than that recorded for the hour, allowing more efficient ATC procedures than were modeled.

RECENT CAPACITY IMPROVEMENTS AT SFO

- The Simultaneous Offset Instrument Approach (SOIA) procedure at SFO may be used when weather is below visual approach minima, down to 2100 feet ceiling and 4 miles visibility. Two aircraft can fly instrument approaches offset by 3 degrees, with high accuracy surveillance by a Precision Runway Monitor (PRM), until clear of the clouds, and then complete visual approaches to Runways 28L and 28R.
- Implementation of Traffic Management Advisor (TMA) helps to improve the flow of arrivals to the runways.

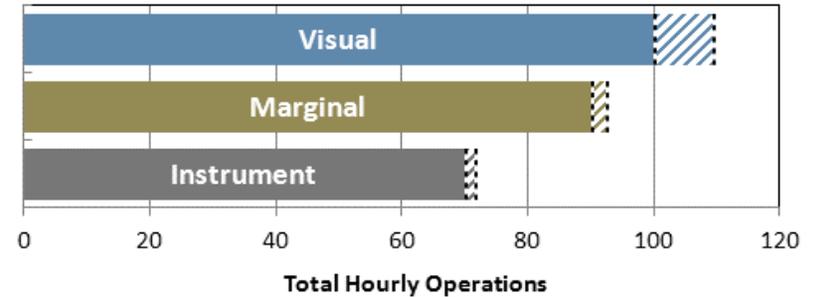
FUTURE IMPROVEMENTS AT SFO

- *Improved Runway Delivery Accuracy:* The combined effects of several new capabilities, including ADS-B Out, CDTI, and TBM in the terminal area, will improve the ability of controllers by 2020 to deliver aircraft to the runway with the desired separation from the preceding aircraft. This will reduce the average spacing between arrivals and boost arrival capacity.
- *Wake Turbulence Mitigation for Departures (WTMD)* is anticipated to be available at SFO by 2020 for Runways 1L and 1R. WTMD will eliminate the need for wake vortex separation behind a B757 or Heavy aircraft departing on the adjacent runway when specific wind conditions exist that reduce the vortex hazard.
- *Wake Turbulence Mitigation for Arrivals – System (WTMA-S)* is anticipated to be available at SFO by 2020. WTMA-S will employ a wind forecasting algorithm to allow reduced separation between closely-spaced parallel arrivals to Runways 28L and 28R under specific wind conditions. However it was not modeled for the profiled configuration in Marginal conditions because the use of SOIA offers higher arrival capacity above specified weather minimums.
- Additional information on these improvements may be found in this report under “Future Operation Assumptions.”

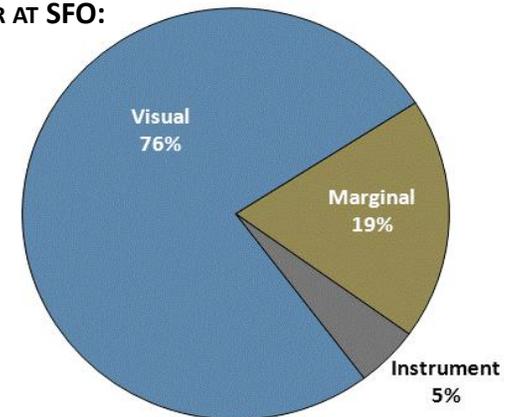
DATA SOURCES

- Actual hourly SFO operations, weather and configuration data were obtained from the FAA ASPM database, and represent operational hours from 7am to 11pm local time for all of Fiscal Years 2009 and 2010. Actual configuration usage is determined by multiple operational factors, including weather conditions.
- Facility reported rates were provided by ATC personnel at SFO.
- Model-estimated rates are derived from operational information provided by ATC.

CURRENT OPERATIONS CAPACITY RATE RANGE



ANNUAL WEATHER AT SFO:



VISUAL CONDITIONS:

- Ceiling and visibility allow for visual approaches: at least 5000 feet ceiling and 8 miles visibility

MARGINAL CONDITIONS:

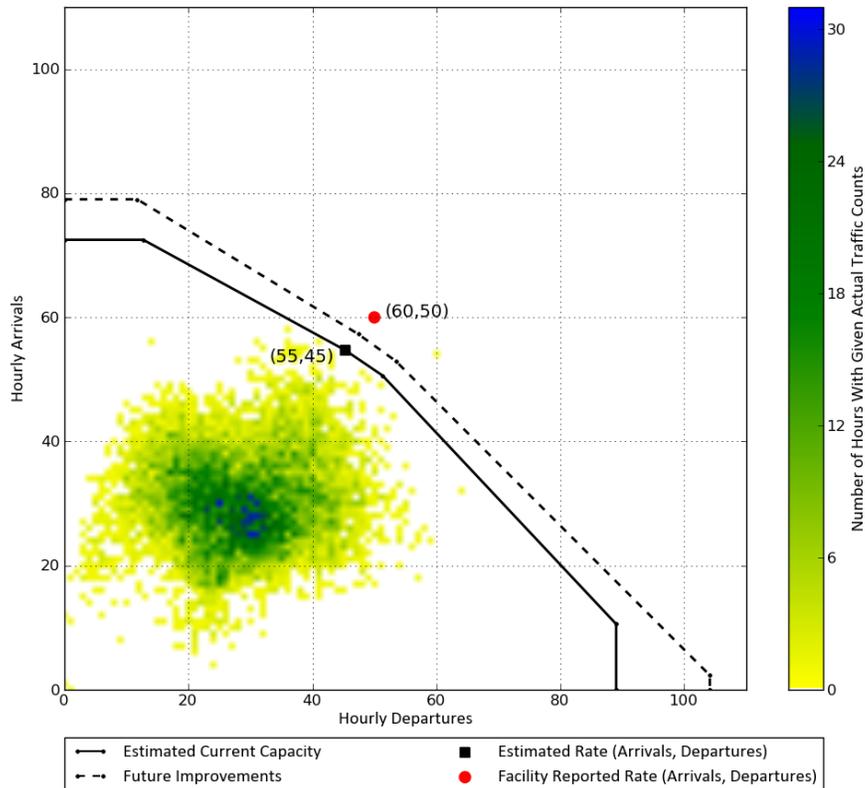
- Ceiling and visibility below visual approach minima but better than Instrument conditions

INSTRUMENT CONDITIONS:

- Ceiling and visibility below 1000 feet ceiling or 3 miles visibility

SFO Scenario	Arrival Runways	Departure Runways	Procedures	Hourly Rate	
				ATC Facility Reported	Model-Estimated
CURRENT OPERATIONS	28R, 28L	1L, 1R, 28L	Paired Visual Approaches, Visual Separation	110	100
FUTURE IMPROVEMENTS Improved Runway Delivery Accuracy WTMD	28R, 28L	1L, 1R, 28L		N/A	104

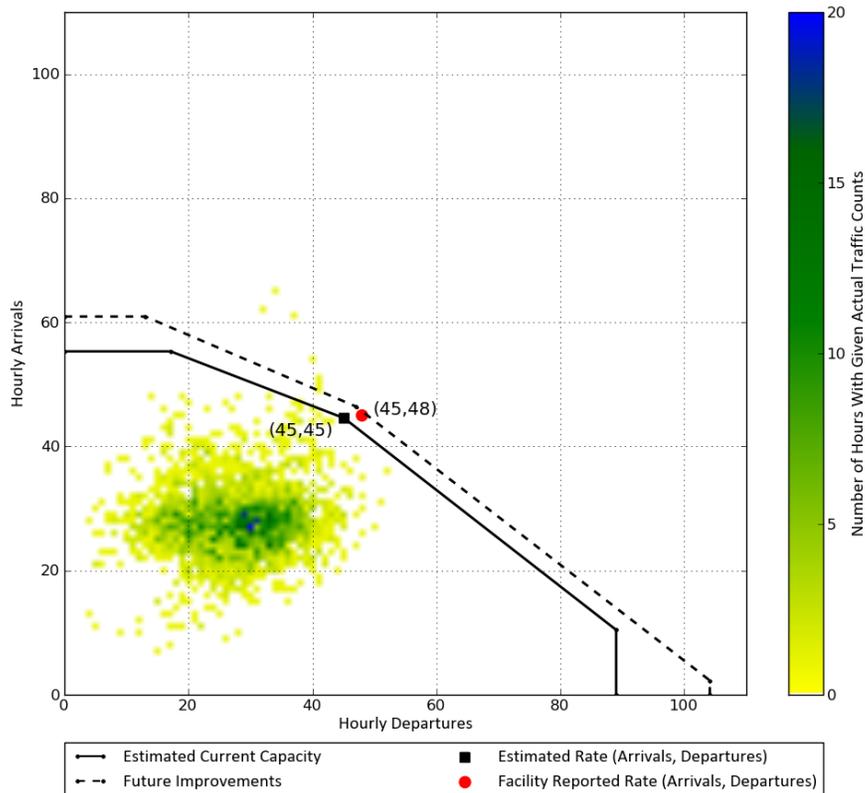
VISUAL WEATHER CONDITIONS



- The capacity rate range in Visual conditions is currently 100-110 operations per hour.
- This is SFO's dominant configuration. The airport operates in variations of this configuration approximately 72% of the time in Visual weather conditions (totaling 55% annually). A recent FAA waiver increased crosswind and tailwind limits at SFO, which will likely allow greater use of this configuration in the future.
- In Visual weather, SFO pairs its arrivals and departures for maximum efficiency. However some international departures require the use of Runway 28L or 28R for runway length.
- This profile does not take into consideration operating configurations at nearby airports such as OAK.

SFO Scenario	Arrival Runways	Departure Runways	Procedures	Hourly Rate	
				ATC Facility Reported	Model-Estimated
CURRENT OPERATIONS	28R, 28L	1L, 1R, 28L	Offset Instrument Approaches, Visual Separation	93	90
FUTURE IMPROVEMENTS Improved Runway Delivery Accuracy WTMD	28R, 28L	1L, 1R, 28L		N/A	93

MARGINAL WEATHER CONDITIONS



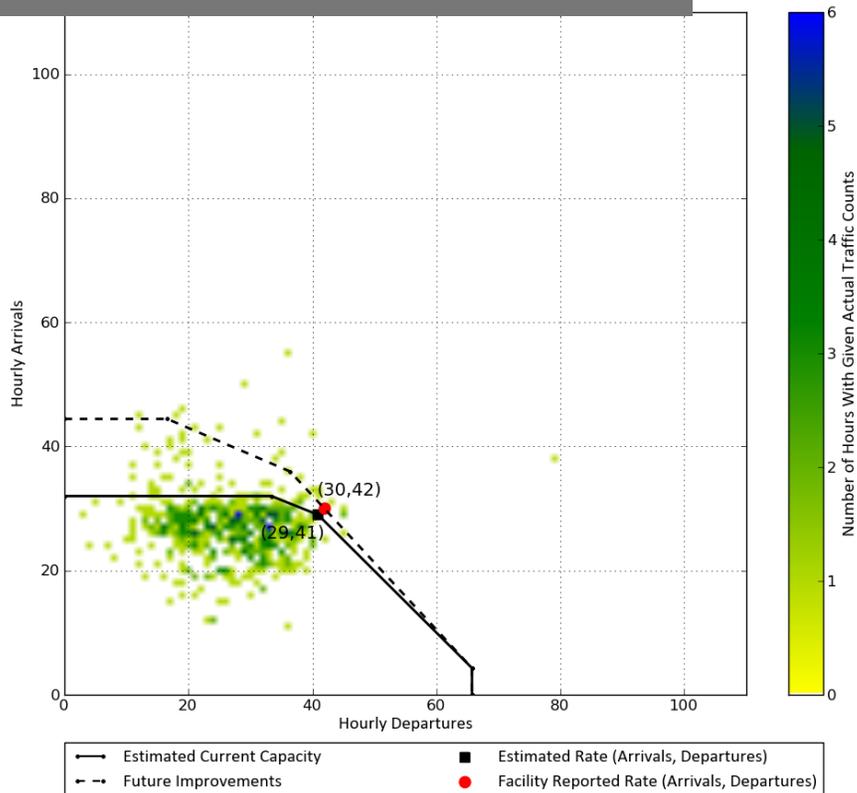
- The capacity rate range in Marginal conditions is currently 90-93 operations per hour.
- SFO operates in variations of this configuration approximately 45% of the time in Marginal weather conditions (totaling 8% annually). A recent FAA waiver increased crosswind and tailwind limits at SFO, which will likely allow greater use of this configuration in the future.
- When weather conditions are below visual approach minima, but above a ceiling of 2100 feet with 4 miles of visibility, SOIA approaches may be flown to Runways 28R and 28L. Departures are still typically paired in marginal conditions to maximize efficiency. Some international departures require the use of Runway 28L or 28R for runway length.
- In the future, if favorable winds exist and weather minimums are below the criteria for SOIA, WTMA-S would enable the use of a second arrival stream.
- This profile does not take into consideration operating configurations at nearby airports such as OAK.

INSTRUMENT

SAN FRANCISCO INTERNATIONAL

SFO Scenario	Arrival Runways	Departure Runways	Procedures	Hourly Rate	
				ATC Facility Reported	Model-Estimated
CURRENT OPERATIONS	28R, 28L	1L, 1R, 28L	Single Stream Instrument Approach, Radar Separation	72	70
FUTURE IMPROVEMENTS Improved Runway Delivery Accuracy WTMA-S	28R, 28L	1L, 1R, 28L	Dependent Instrument Approaches, Radar Separation	N/A	72

INSTRUMENT WEATHER CONDITIONS



- The capacity rate range in Instrument conditions is currently 70-72 operations per hour.
- SFO operates in variations of this configuration approximately 79% of the time in Marginal weather conditions (totaling 4% annually). A recent FAA waiver increased crosswind and tailwind limits at SFO, which will likely allow greater use of this configuration in the future.
- In poor weather conditions, SFO can only operate a single arrival stream because of runway spacing requirements. Arrivals are able to land on either Runway 28R or 28L. Some international departures require the use of Runway 28L or 28R for runway length.
- This profile does not take into consideration operating configurations at nearby airports such as OAK.
- Peak arrival capacity is estimated as future improvements are implemented.