SEA Runway 16C/34C Construction

May 1-October 27, 2015

Analysis and Impacts

Date: March 11, 2015

Federal Aviation Administration

Introduction

- Airport/Project Information
- Historical Weather Information
- Historical Runway Usage
- Traffic Trends
- Delay Modeling and Results
- Conclusions

Airport/Project Information

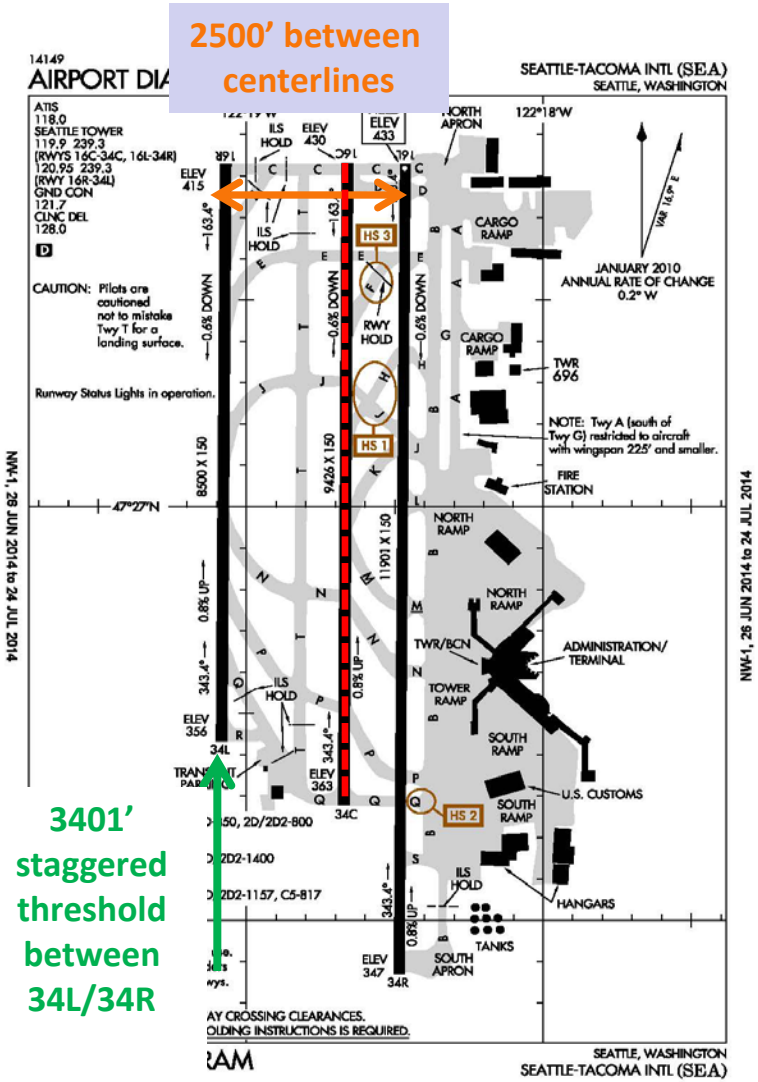
SEA Runway Layout

During the closure--2,500' between centerlines (simultaneous dependent arrivals)

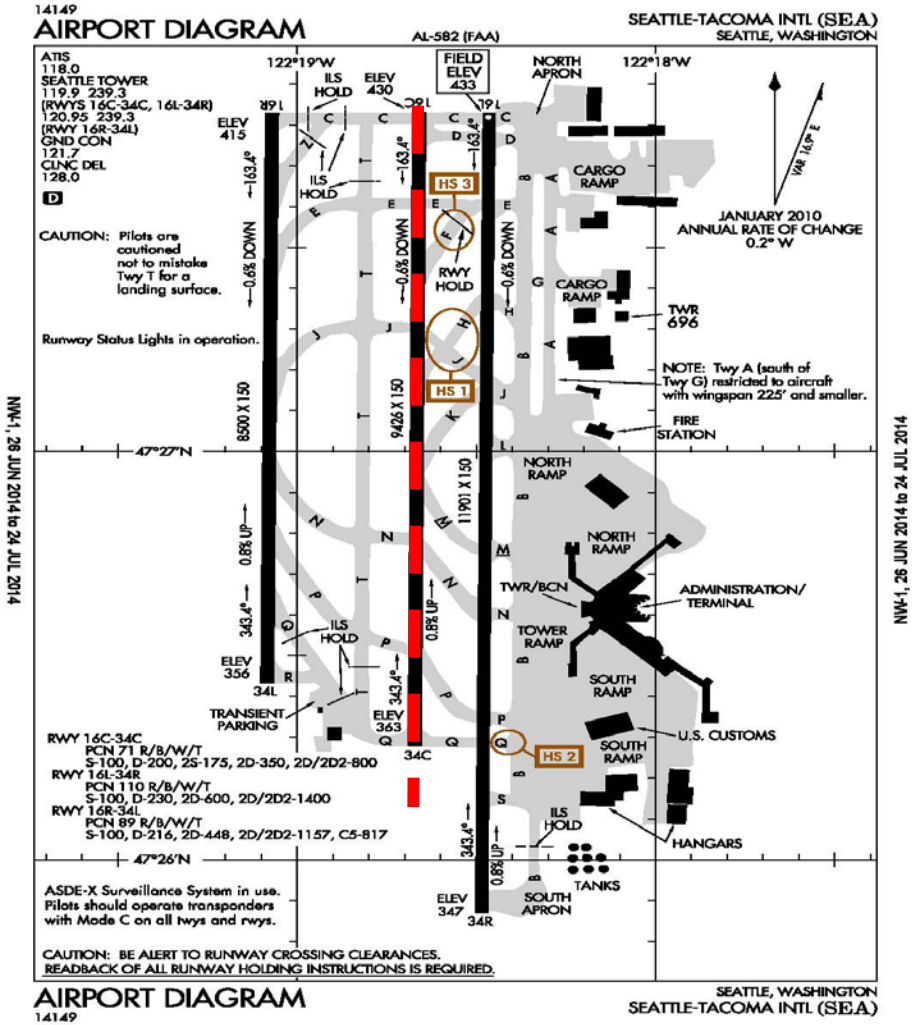
Staggered thresholds in north flow will be 3,401' apart---about 15 seconds flying time

Jet departures on runway 16R/34L are not permitted, so no ability to favor departures

Some arrival types (B757, B767, A330) will need to land on the departure runway due to runway length



SEA RWY 16C/34C Closure, May 1-October 27, 2015



Project could be moved forward to begin as early as April 15

<u>Arrival Rates</u>

VFR: 34-42 depending on flow and whether favoring arrivals

IFR: 28-32 depending on flow and whether favoring arrivals

Maximum Sustainable Throughput will be 70-72 operations per hour

Potential TMIs: Time-Based Metering with airborne holding, ground delay programs, miles-in-trail

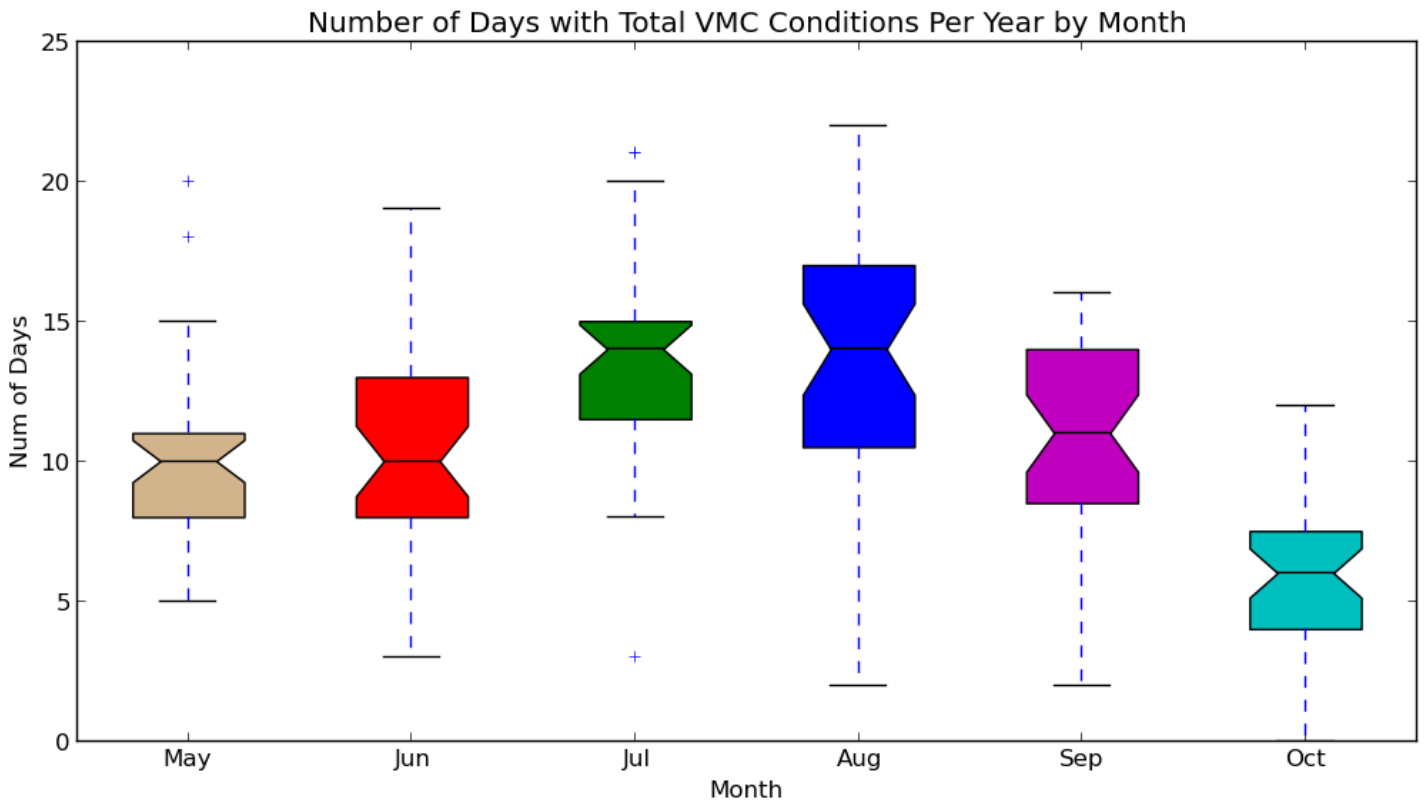
A detailed System Impact Report will be published for this activity

Weather Analysis

Weather Analysis: Dataset/Methodology

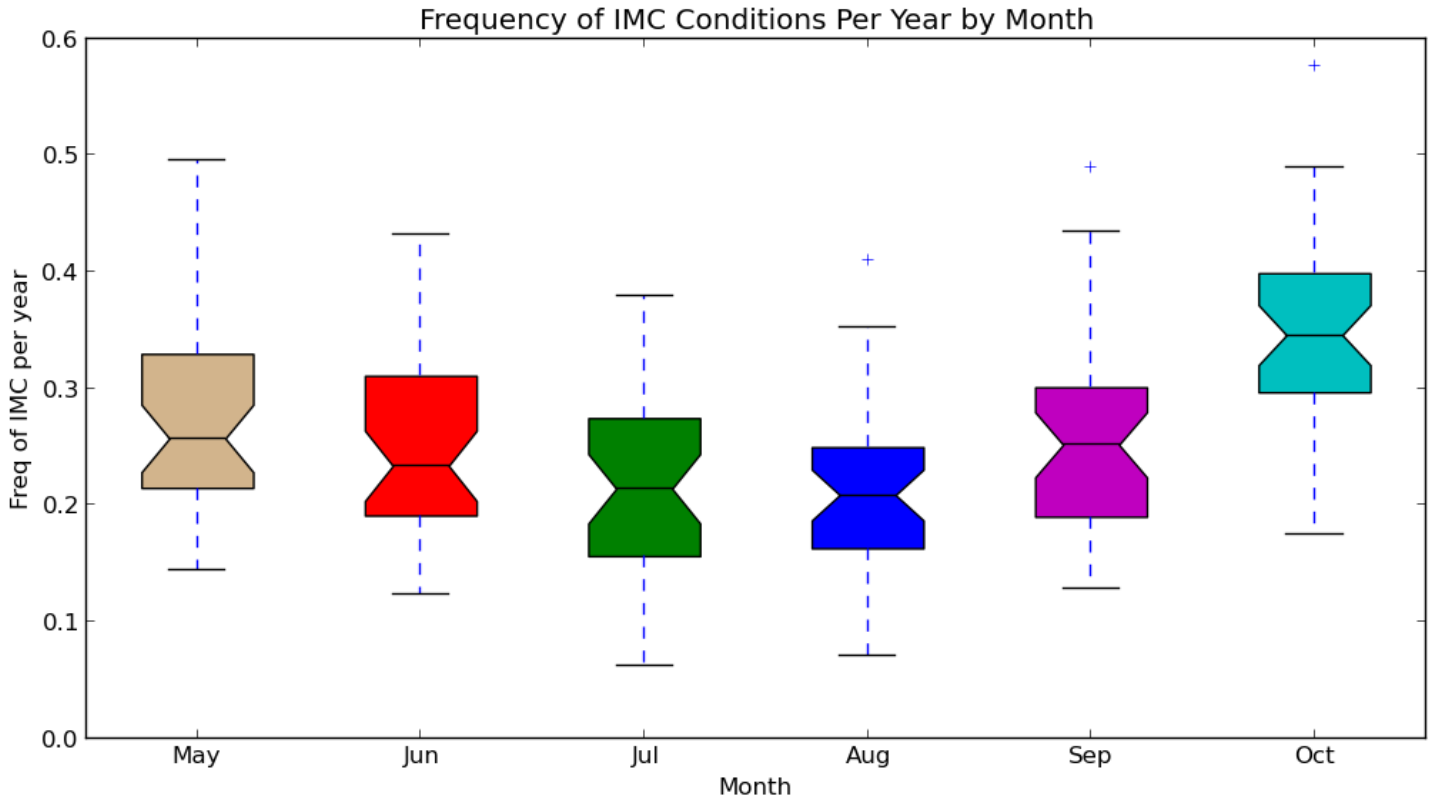
- **Analysis provided by Aviation Weather Center (Kansas City, MO)**
- **Data from May-October, 1976-2014**
- **For the purpose of this analysis, IMC = <4,000' ceilings or <3 miles visibility**
- **Weather scenarios different than LAX**
  - No noticeable changes during 1976-2014
  - Higher frequency of rainy events

Total VMC Days Frequency



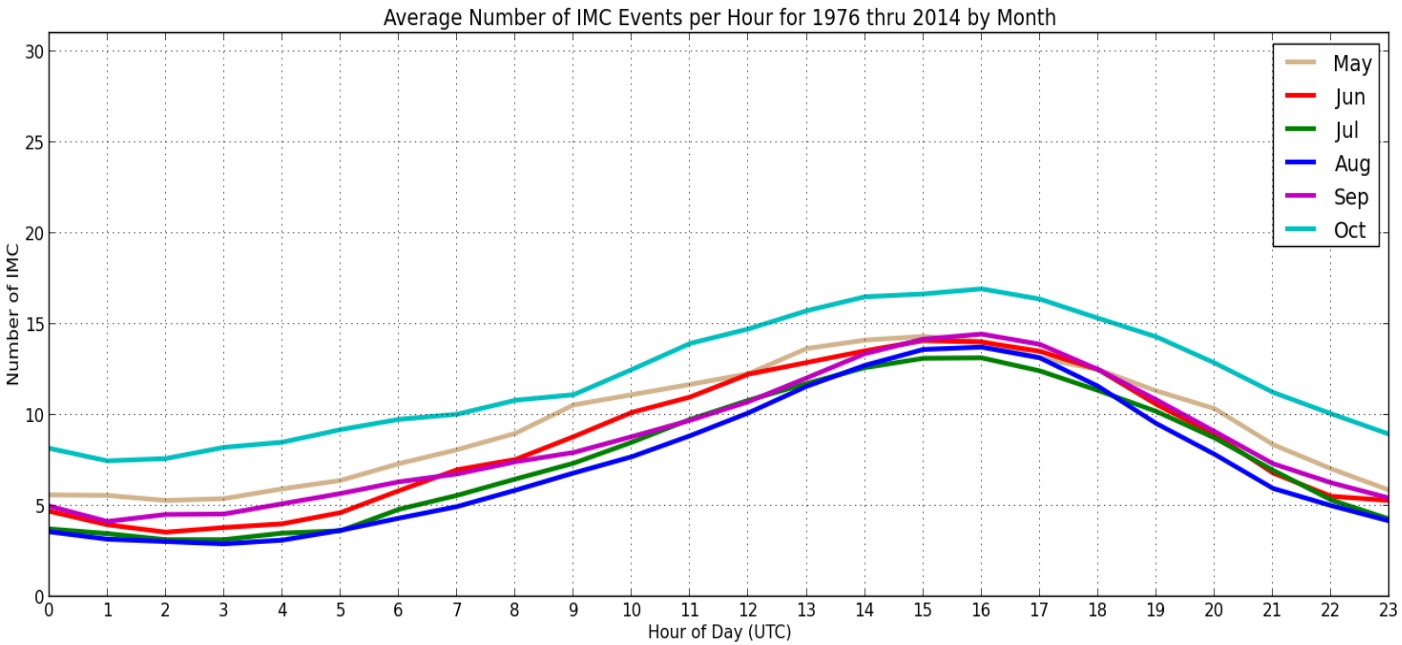
July and August have the highest occurrence of total VMC days, October has a significant decrease in VMC days

Percentage of Month in IMC Conditions



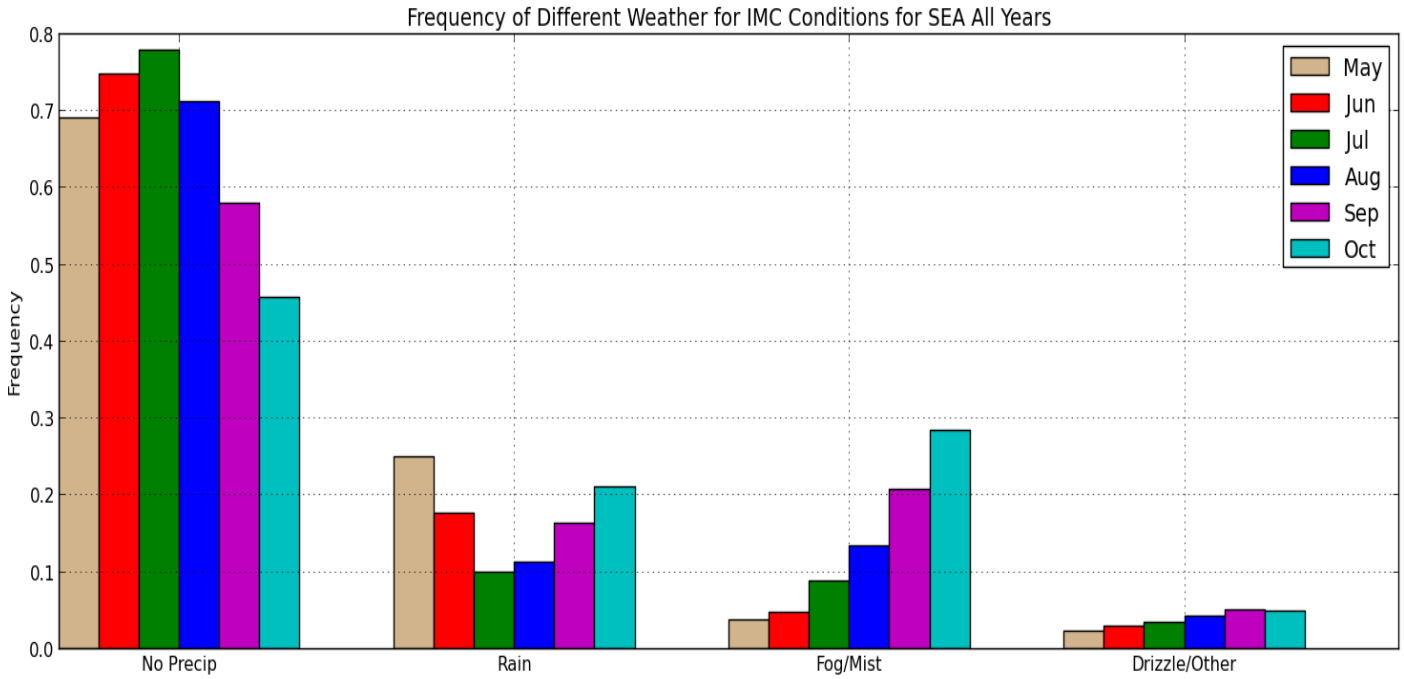
July and August have the least IMC conditions per year on average compared to the other months, there is a significant increase in October of IMC conditions

IMC Conditions by Hour



Peak of IMC Conditions are found in the morning hours (7am-10am LT) with a relative minimum in the evening (6pm-9pm LT). May and October generally have more occurrence of IMC due to higher frequency of precipitation.

Different Weather Types from May-Oct



The majority of IMC reports in the study were due mainly to clouds only ('No Precip'), however, rain has a strong signal in May and October, and fog occurrence ramps up in Aug, Sept, and Oct.

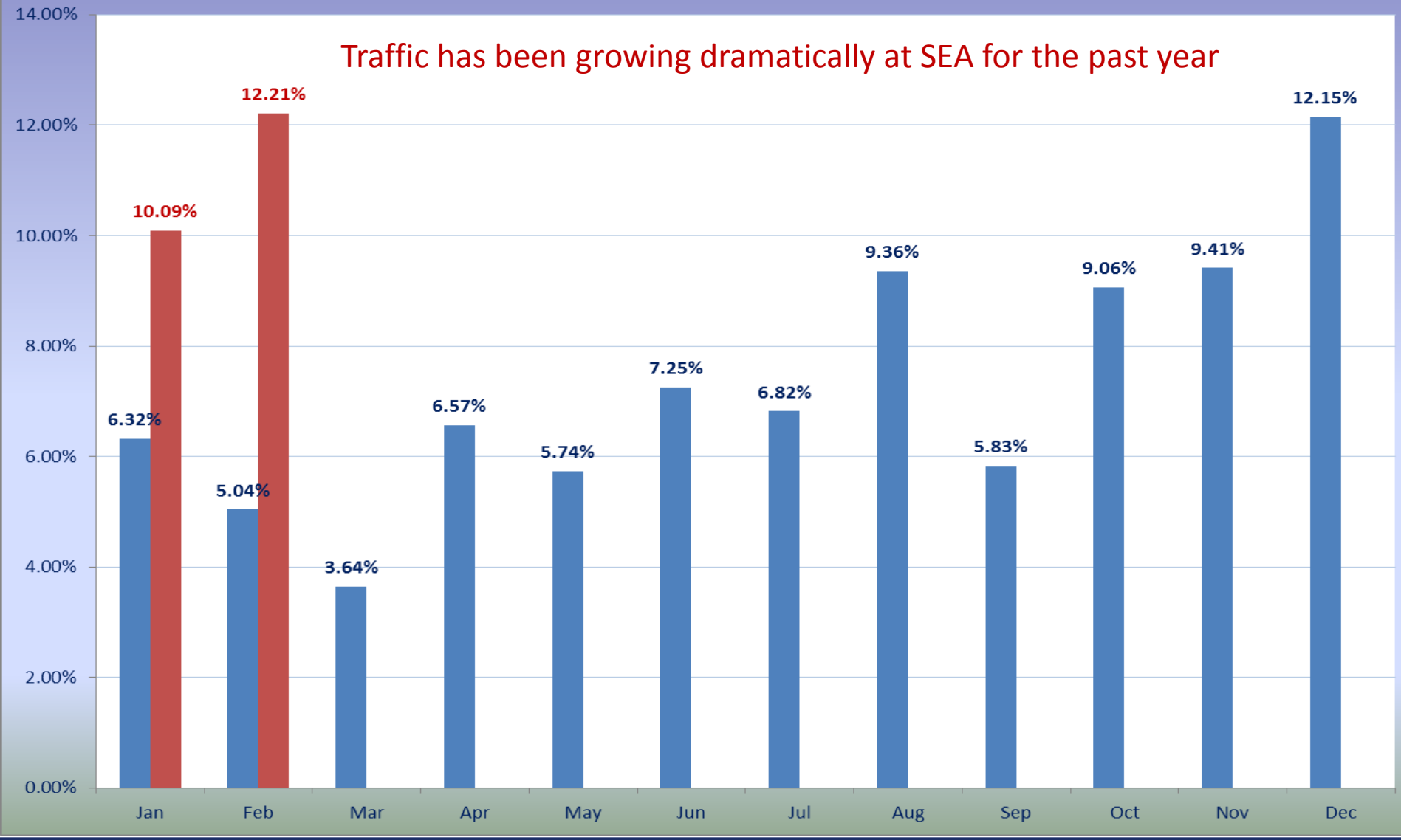
SEA Traffic Trends

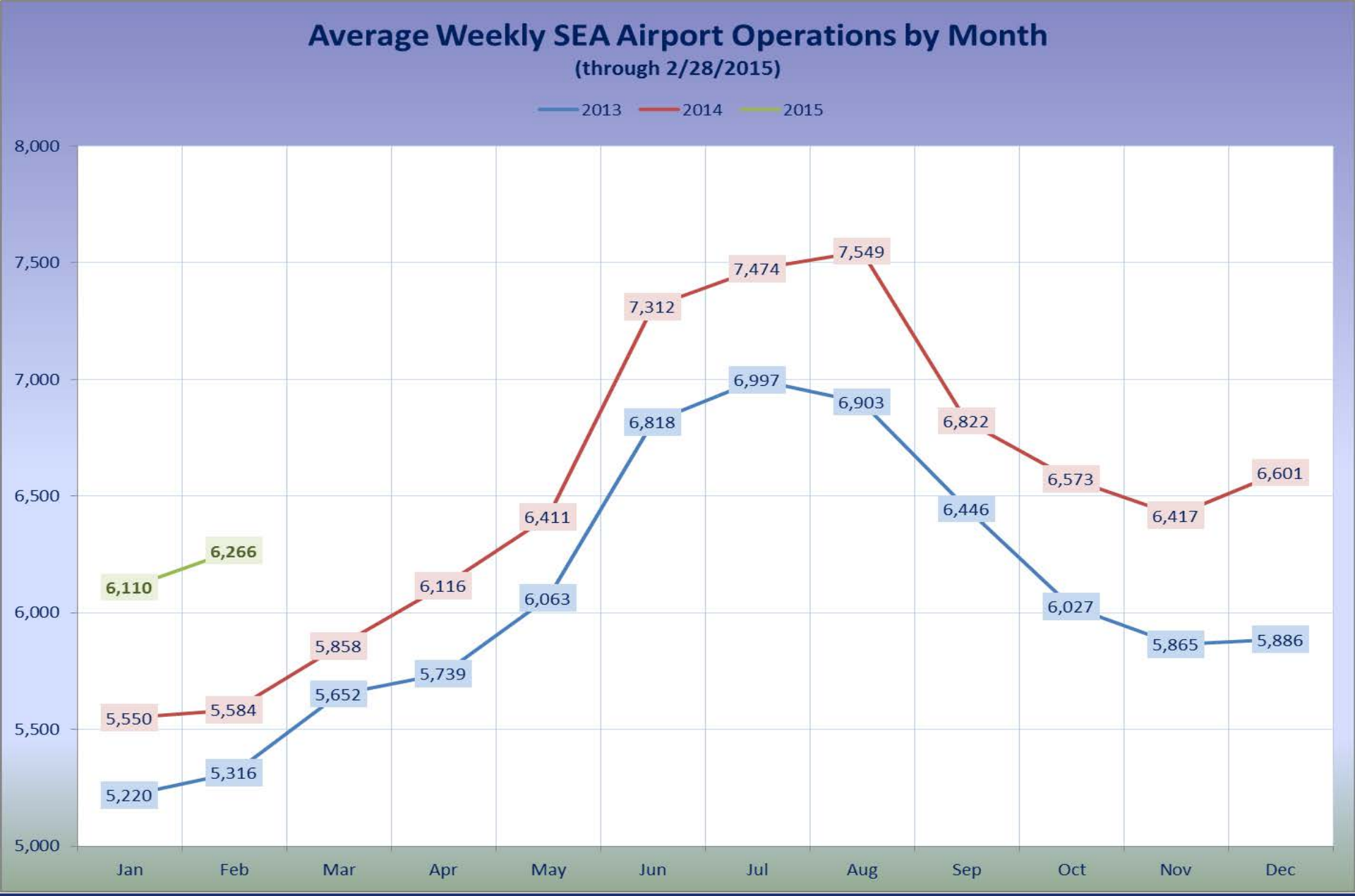
Percent of SEA Operations by Flow/Month, 2010-2014

(0600-2359 local time)

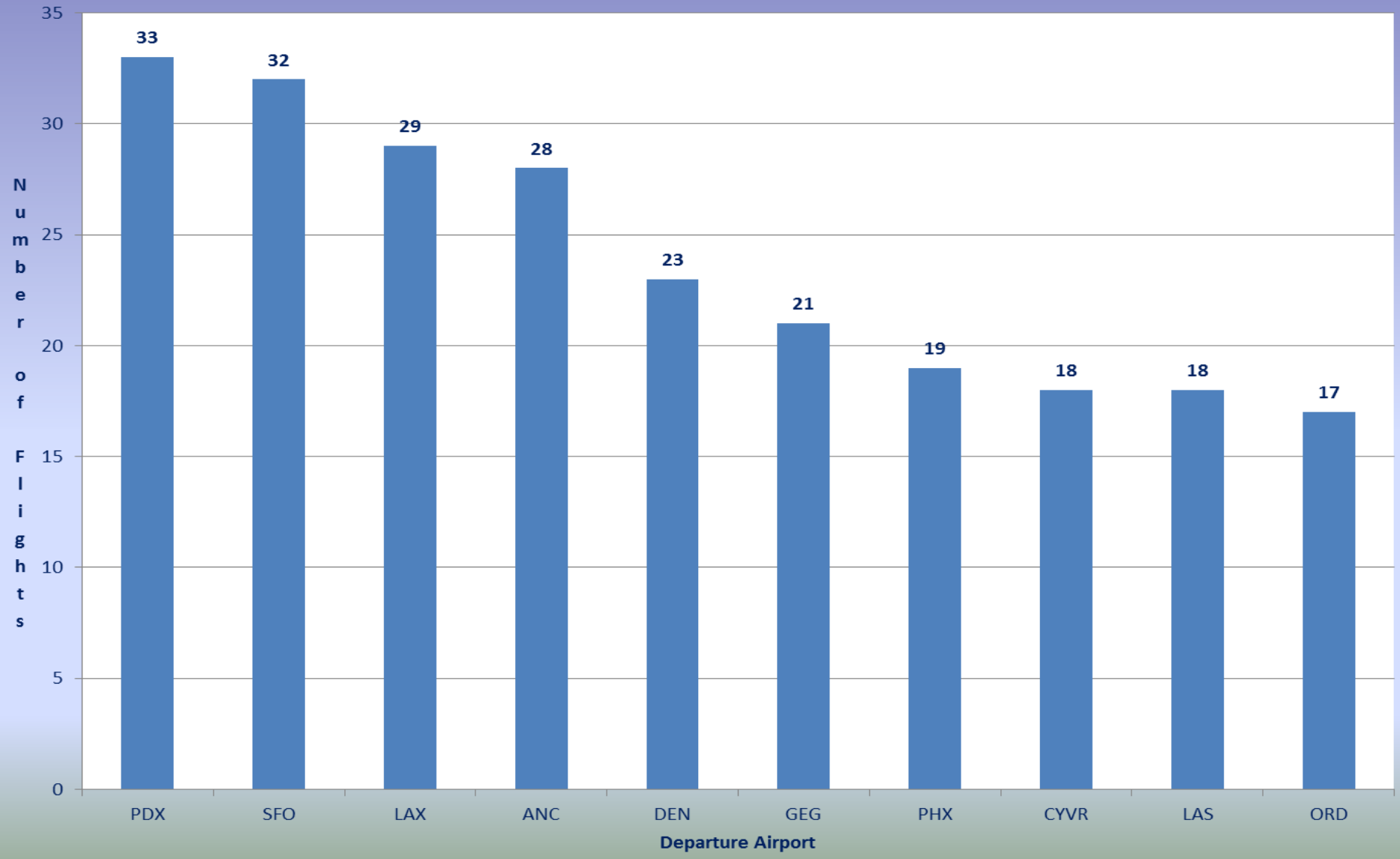
Percentage Increase in Airport Traffic Count, SEA

(vs. same month in previous year)



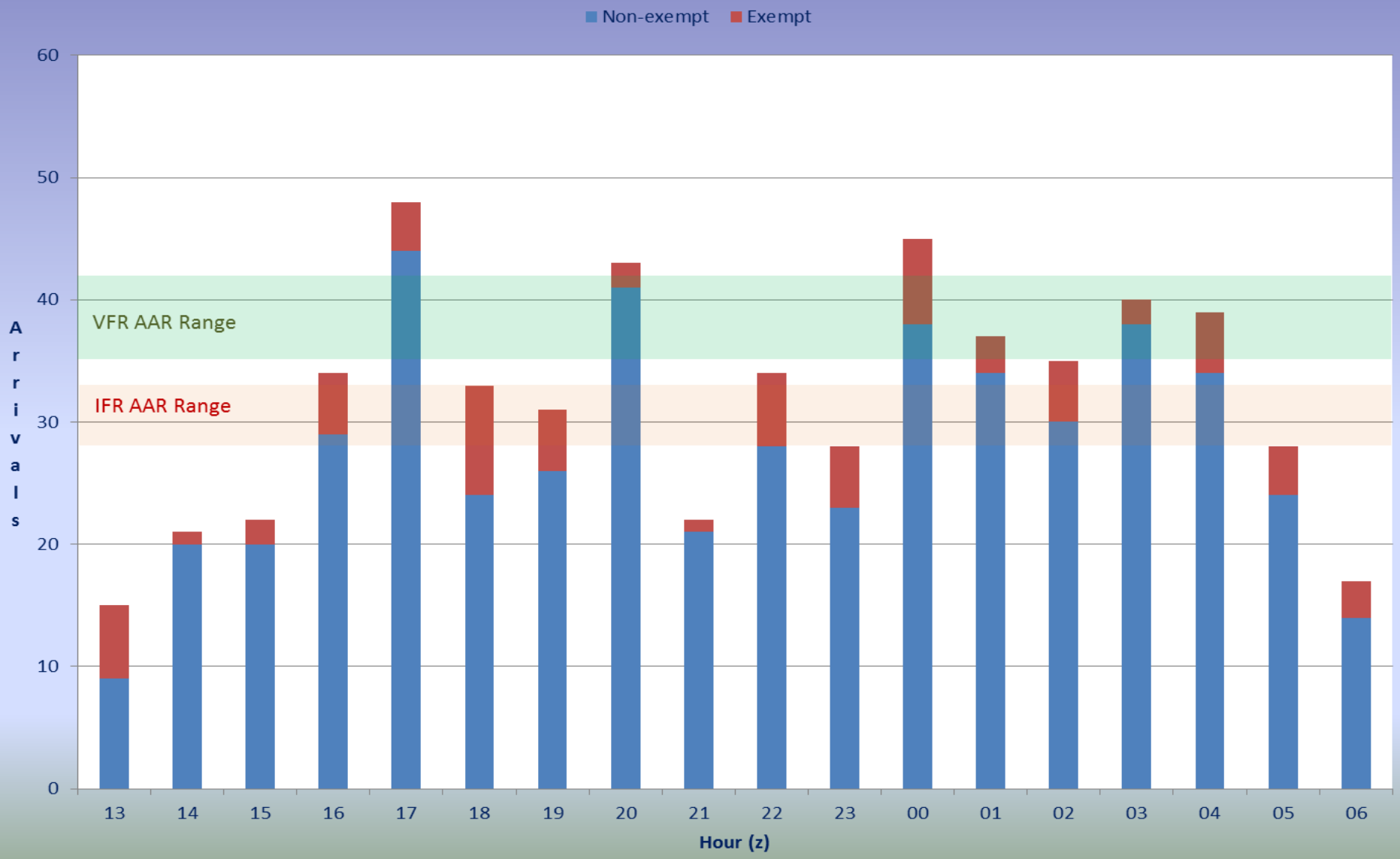

Average Weekly SEA Airport Operations by Month
(through 2/28/2015)
2013
2014
2015
8,000
7,500
7,000
6,500
6,000
5,500
5,000
Jan
Feb
Mar
Apr
May
Jun
Jul
Aug
Sep
Oct
Nov
Dec
6,110
6,266
5,550
5,584
5,858
6,116
6,411
7,312
7,474
7,549
6,822
6,573
6,417
6,601
5,220
5,316
5,652
5,739
6,063
6,818
6,997
6,903
6,446
6,027
5,865
5,886

SEA-bound Flights by Originating Airport (projected 8/13/15 schedule)



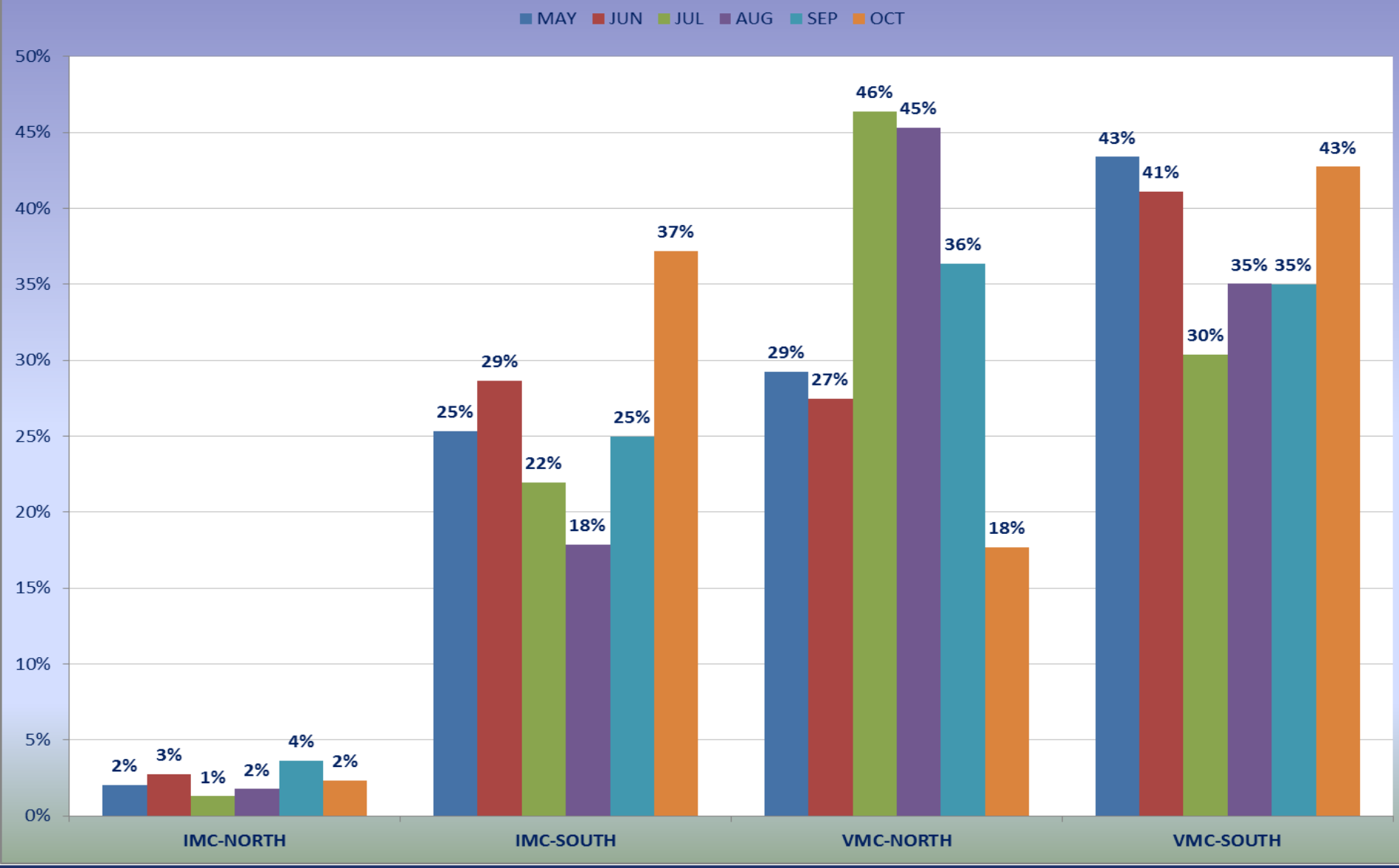
Delay Modeling & Projections

SEA Projected Hourly Arrival Demand, 8/13/2015



Projected Maximum/Average Delay by AAR
SEA, 8/13/2015

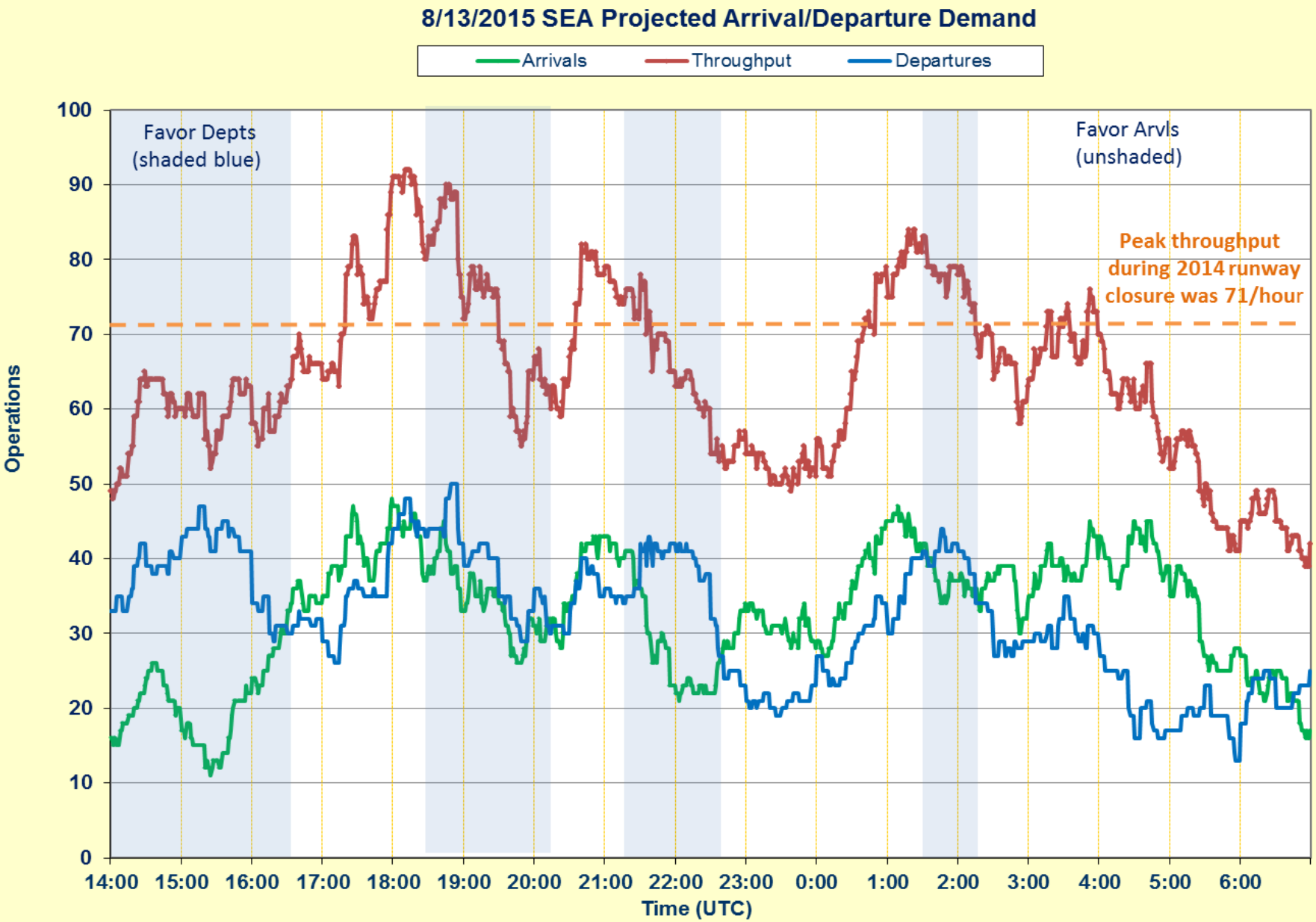
SEA Weather/Flow Frequencies, May-Oct, 2010-2014



Preliminary Delay Analysis

(assumes AARs don't change during the day)

Projected Schedule for 8/13/2015				
	IFR North	IFR South	VFR North	VFR South
AAR	28	32	34	42
Delay Minutes	62641	28052	12551	1757
Arrivals	578	578	578	578
Delayed	497	476	366	0
Max Delay	230	109	56	14
Avg Delay	111	51	23	4


8/13/2015 SEA Projected Arrival/Departure Demand
Arrivals
Throughput
Departures
Favor Depts
(shaded blue)
Favor Arvls
(unshaded)
Peak throughput
during 2014 runway
closure was 71/hour
Operations
100
90
80
70
60
50
40
30
20
10
0
14:00
15:00
16:00
17:00
18:00
19:00
20:00
21:00
22:00
23:00
0:00
1:00
2:00
3:00
4:00
5:00
6:00
Time (UTC)

Hourly Projected Average Delay Minutes, 8/13/2015

Conclusions and Challenges

- **GDPs should be expected on any IMC day.**
- **Limited scope GDPs may be necessary regardless of weather during peak summer demand days.**
- **Departure delays are likely during peak departure banks.**
- **14% of arrivals would currently be exempt from GDPs, most of them (62%) from AK**

Questions?

SAN ILS 09 Construction

- Displace the runway 09 landing threshold by 300’
- Relocate the ILS 09 glide slope antenna
- Install new runway 09 PAPI, replace the 27 PAPI
- Relocation of runway 09 MALSR stations
- Impacts: ILS 09 OTS 7/29-8/20
- Runway 09/27 nighttime closures—5/18-7/17, 8/10-20, 8/24-9/23

San Diego International Airport (SAN)

SAN RSA Projects Legend

SAN Initiative Projects

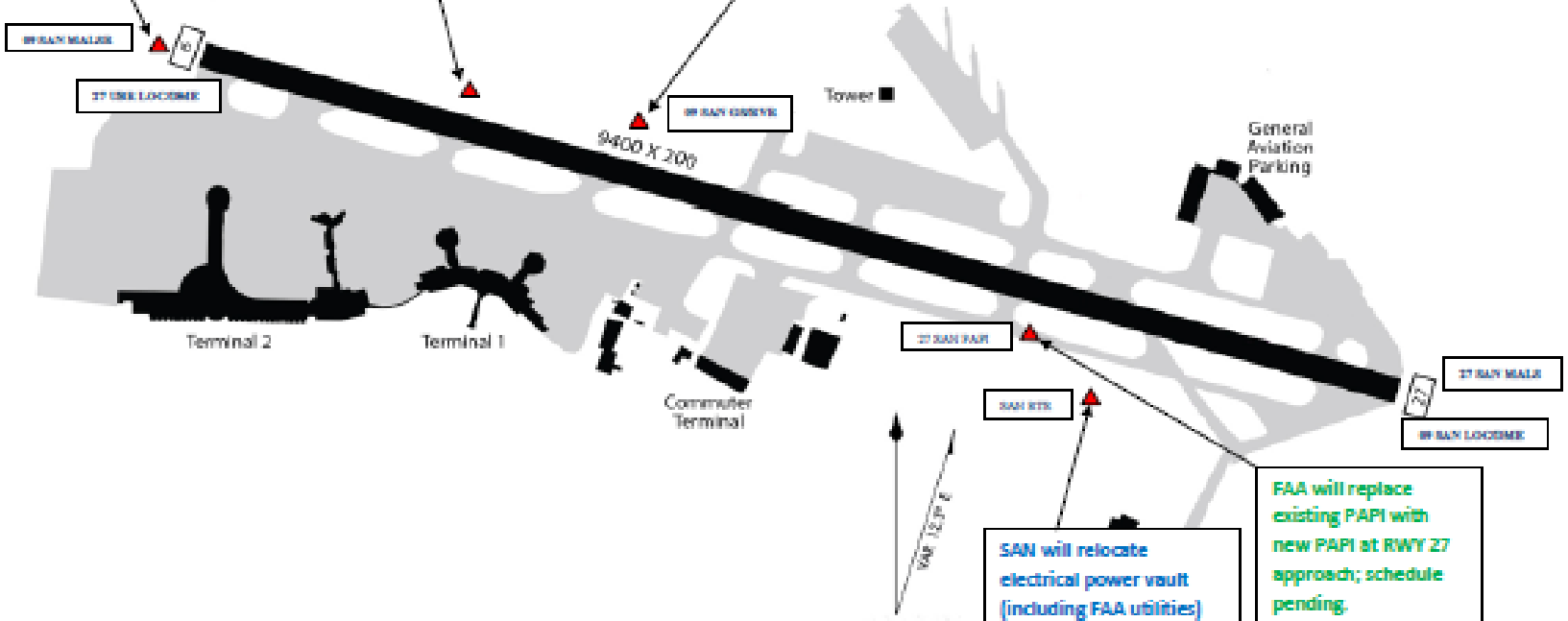
FAA Initiative Projects

August-November 2015: FAA will replace MALSR at RWY 09 approach.

April-November 2015: SAN will relocate RWY 09 landing threshold approximately 300' east of its present location..

May-August 2015: FAA will establish new PAPI at RWY 09 approach.

June–August 2015: FAA will relocate RWY 09 Glide Slope antenna and equipment shelter.



FAA will replace existing PAPI with new PAPI at RWY 27 approach; schedule pending.

SAN will relocate electrical power vault (including FAA utilities) outside RSA; schedule pending.

SAN will relocate SAN RTR to location to be determined; work and schedule undefined.