# AIRSPACE 101 Virtual Workshop

The Oakland Airport-Community Noise Management Forum June 5, 2025



# **| Agenda**

- Introduction
- National Airspace System History
- OAK History
- Airspace Classifications
- Air Traffic Control
- Conventional vs. RNAV PBN
- Noise Issues related to NextGen / RNAV PBN





# Introduction

# National Airspace System (NAS)

- Encompasses over 29 million square miles of airspace
- Categorized into different classes, each with its own rules and requirements
- Includes thousands of airports, numerous control facilities, and a sophisticated network of radar, communication, and navigation systems
- Federal Aviation Administration (FAA) oversees the NAS



# National Airspace System: A short history

Air Commerce Act (1926): First Federal Law to regulate Aviation. Established rules for pilot licensing and air traffic safety.

**FAA Established (1958):** Federal Aviation Agency (later Administration) created to oversee airspace safety. Unified rules for all U.S. Airports.

NextGen Program (2000s-Present): Modernizes NAS with GPS and digital communication. Enhances efficiency, reducing delays and environmental impact. **Early Days (1903-1920s):** Wright Brothers first flight (1903) sparks growth. Unregulated skies lead to safety concerns as air traffic increases

**Creation of Air Traffic Control (1930s):** First air traffic control towers formed to manage growing air travel. Oakland's airport begins operations (1927), becoming key west coast hub.

Radar Revolution (1960s-1970s): Radar systems improve tracking, reducing collision risks. Oakland adopts advanced navigation tech for smother operations.

# History of OAK

**1927: Airport Opening.** Oakland Municipal Airport opened with a 7,020-foot runway, the world's longest at the time, built in just 21 days for the Dole Air Race to Hawaii.

**1927: Airport Dedication.** Charles Lindbergh, the aviation icon, officially dedicated the airport marking its significance.

**1928-1937: Historic Flights Launched.** OAK was the starting point for pioneering flights, including Charles Kingsford Smith's 1928 U.S.-Australia trip and Amelia Earhart's 1937 global circumnavigation attempt.

**1927: Early Commercial Aviation.** Boeing Air Transport (predecessor to United Airlines) began scheduled flights followed by TWA in 1932.

**1929: Boeing School of Aeronautics.** Trained thousands of pilots and mechanics, expanding during the 1939 Civilian Pilot Training Program.

**Local Impact:** The airport's early success put Oakland on the global aviation map, fostering economic growth in the East Bay.



# History of OAK

**1943: WWII Military Role.** OAK became Naval Air Station Oakland, serving as a Pacific airlift base; commercial flights moved to San Francisco.

**1946: Post-War Recovery.** Airlines like Western, American, and PSA returned; OAK became a hub for supplemental carriers like World

Airways. **1962-63: Jet Age Expansion.** Terminal 1 and 10,000-foot runway enabled jet operations, with TWA flying OAK's first scheduled jet to Chicago.

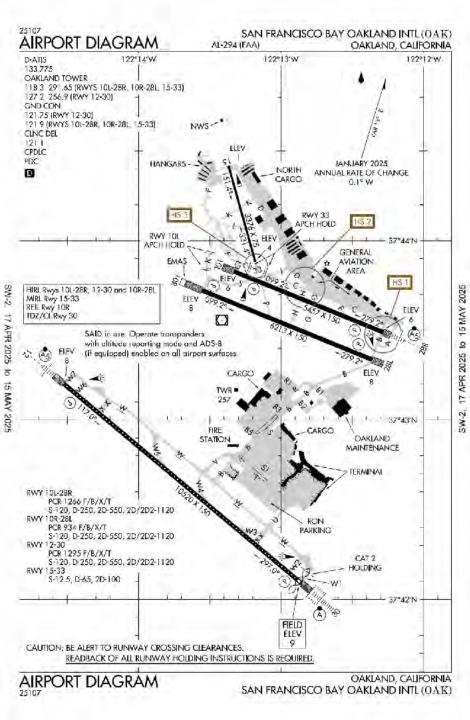
**1980s: Deregulation Boom.** Post-1978 airline deregulation spurred low-fare carriers, leading to the Lionel J. Wilson Terminal 2 for PSA and AirCal.

**1987-89: Concorde Visits.** British Airways and Air France Concordes offered supersonic flights from OAK, showcasing its global reach.

**1988: Cargo Hub Growth.** FedEx opened a major air cargo base, now one of the busiest in the U.S., boosting local jobs.

**2014: NextGen Flight Paths.** NextGen flights paths and procedures begin implementation.





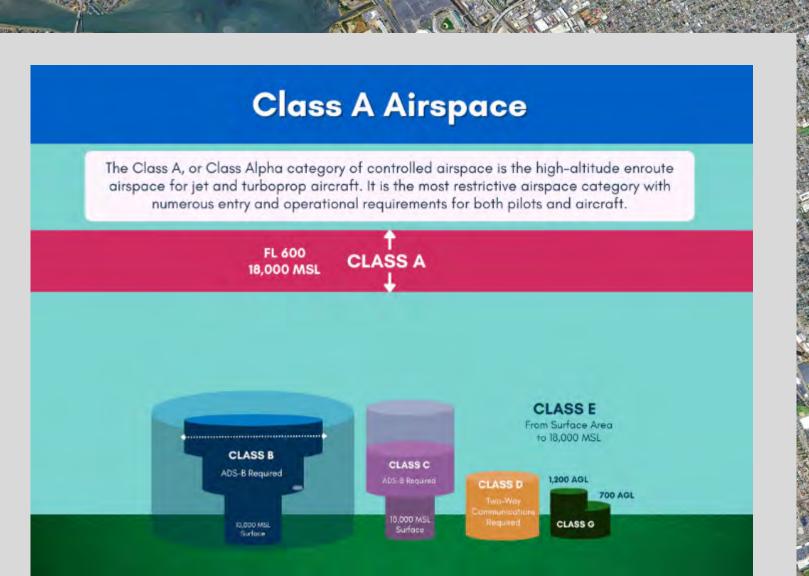


# **Airspace Classifications**





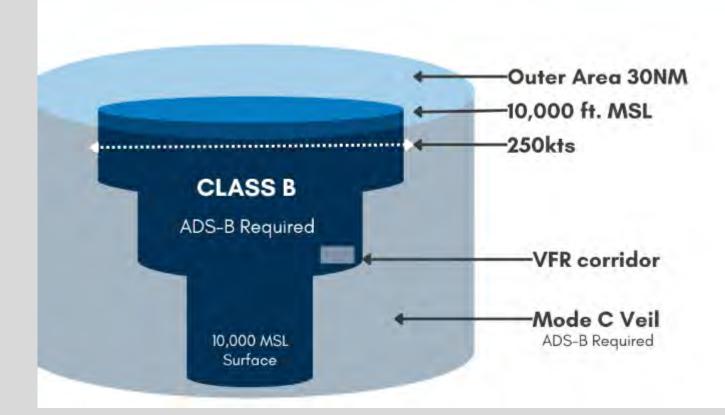
Class A Airspace





# Class B Airspace

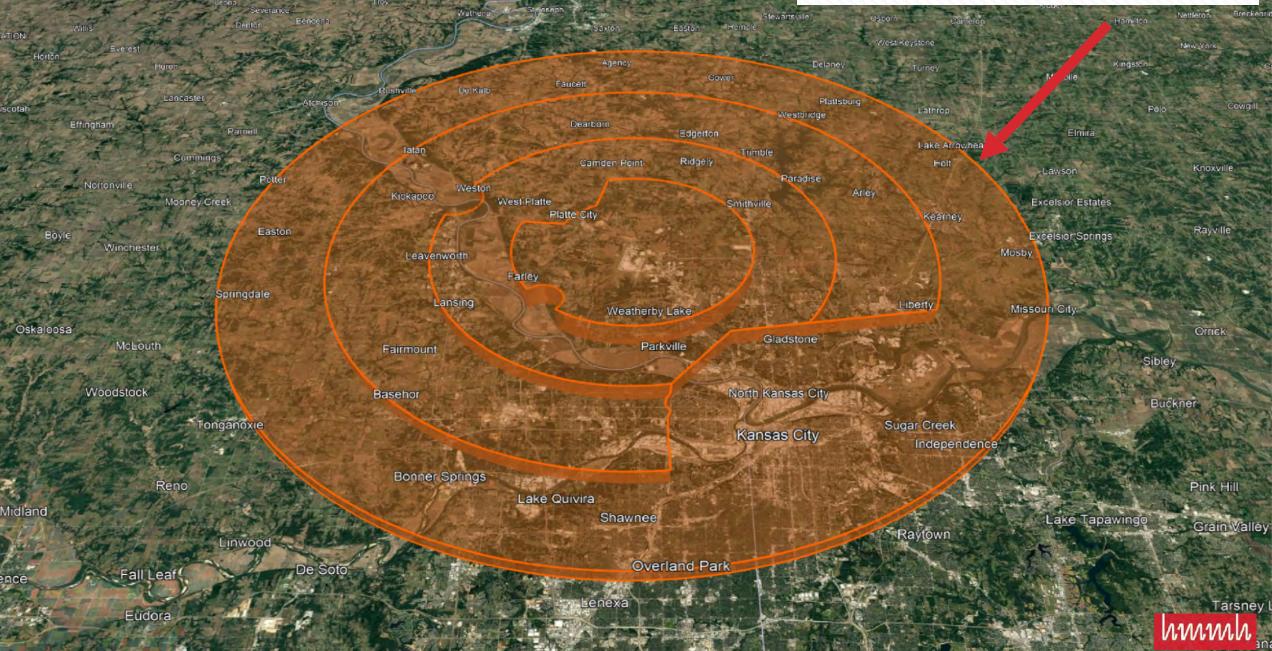






#### Kansas City Class B Boundary

Lee's Summit

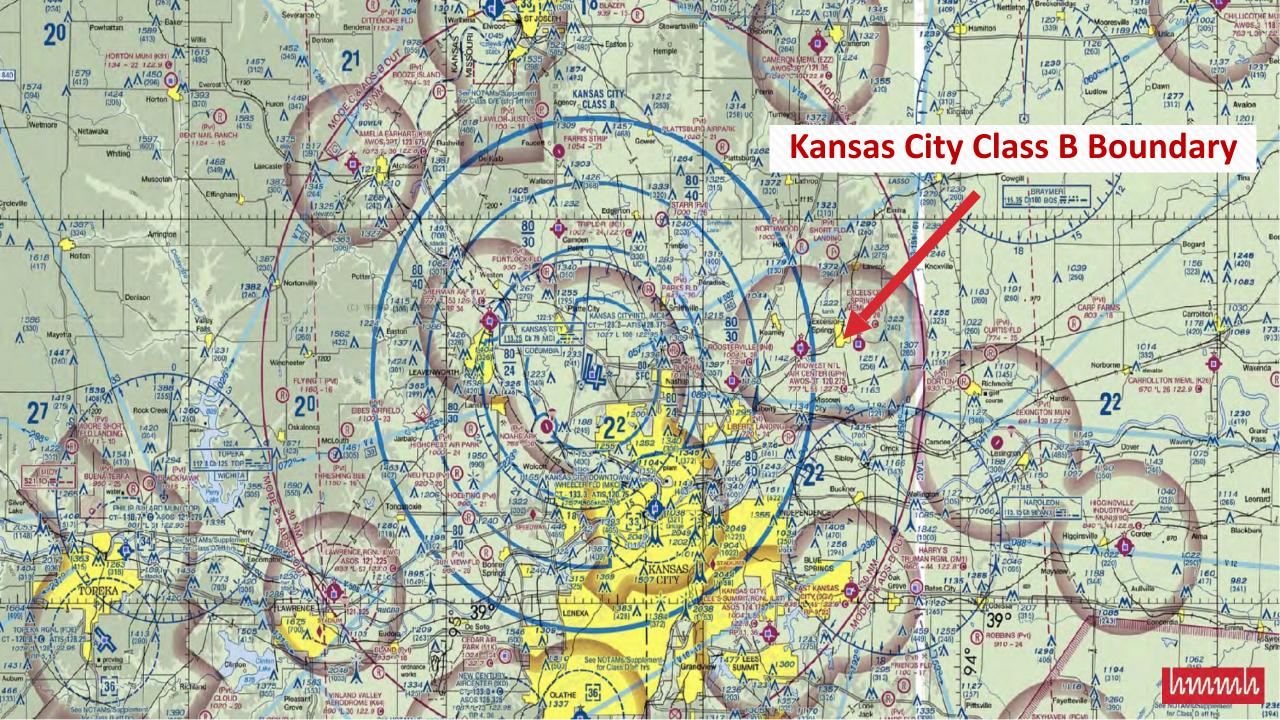


Avenue Cr

Clarksdale

Country Club

Highlan



## SFO Class B Boundary

Alum Roo

Sierra Azul Open Space Preserve

Mendenhall Springs

Farallon Islands

odega Bay

ont Reves National Seashore

Berkeley San Francisco OAK Daly City

Richmond

South San Francisco Pacifica San Bruno

San Mateo Bair Island Half Moon Bay

Rohneit Park

San Gregorio

Pescadero

Big Basin Redwoods State Park

Redwood City East Palo Alto

Palo Alto

Woodside Stanford

Portola Valley

Martinez

Concord

Castro Valley

Hayward

Union City

San Ramon

Newark

Mountain View

Dublin

Fremont

Pleasanton

Sunol

Cupertino

Saratoga

Milpitas

Campbell

San Jose

Los Gatos

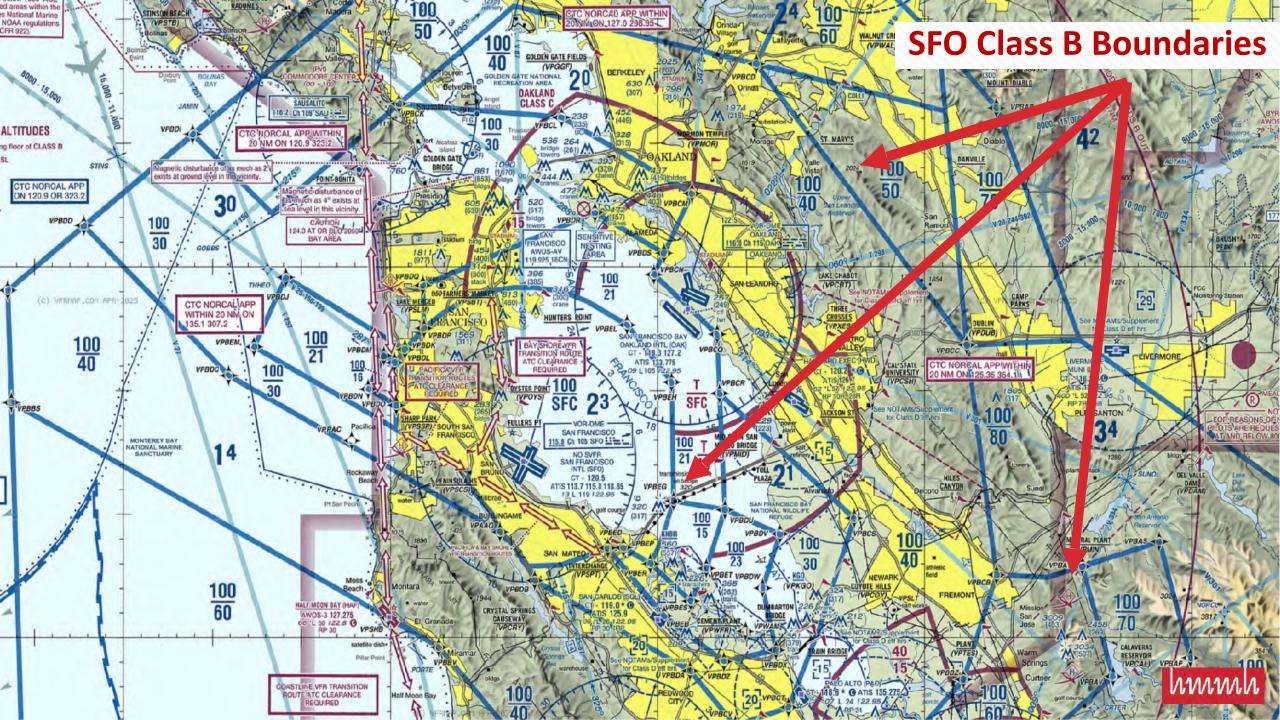
Boulder Creek

Ben Lomond

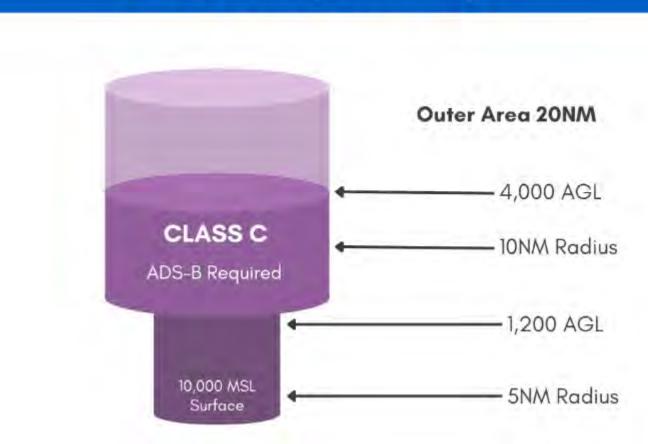
hmmh Scotts Valley The Forest of Nisene Marks State

Mt Hamilto

Swanton



## **Class C Airspace Shape**



# Class C Airspace



### **Charleston Class C Boundary**

Tarry Town al Forest Francis Marion Nat Old Joe de Awake Woodland Sangaree Summerville COLLEGE PARK WOODLAND HEIGHTS Lincolnville EST GREENVIEW ACRES Wood Oak Park Ladson Goose Creek White Church Place Avenue of Oaks Cooke Crossroads WINDSOR HILL PLANTATION Hanahan Woodville Yellow House Landing ARCHDALE JOINT BASE CHARLESTON North Charleston Whitehall Terrace DANIEL ISLAND oone Hall Plantation & Gardens CHARLESTON HEIGHTS I'ON WEST ASHLEY Isle o Mt Pleasant AVONDALE RANTOWLES Charleston Stono River Sullivan's Island Fort Sumter National Monument STILES POINT

James Island

FENWICK HILLS Johns Island

bhouse Crossroads

Ravenel

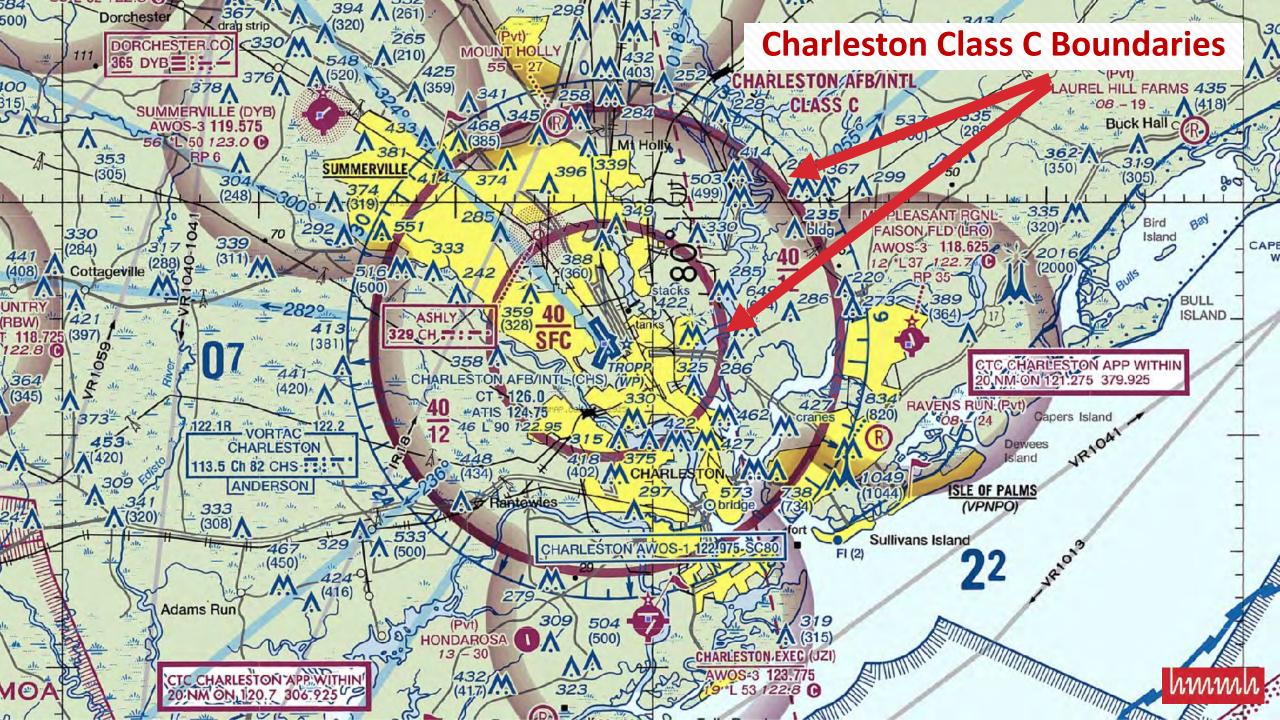
Hollywood

Meggett

Morris Island

hmmh

Johns Island



## OAK Class C Boundaries

O Mt Diablo

San Ramon

Blackhawk

KOMANDORSKI VILLAGE

Clayte

San Rafael Corte Madèra Mill Valley

Lucas Malley-Marinwo

Voodacre

Sausalito

San Francisco

Daly City Brisbane

South San Francisco WESTBOROUGH San Bruno

Milibrae

Burlingame

San Mateo

Berkeley Emeryville Oakland Alameda

America

and Naval Communication Station

Richmond

2

El Cerrito

Foster City

Belmont

OAK

San Leandro

Martine<sub>2</sub>

Lafayette

Moraga

Castro Valley San Lorenzo Fairview Hayward

Walnut Creek

HARDER-TENNYSON GLEN EDEN

Alamo

Union City

ARDENWOOD

Fremont

111111111

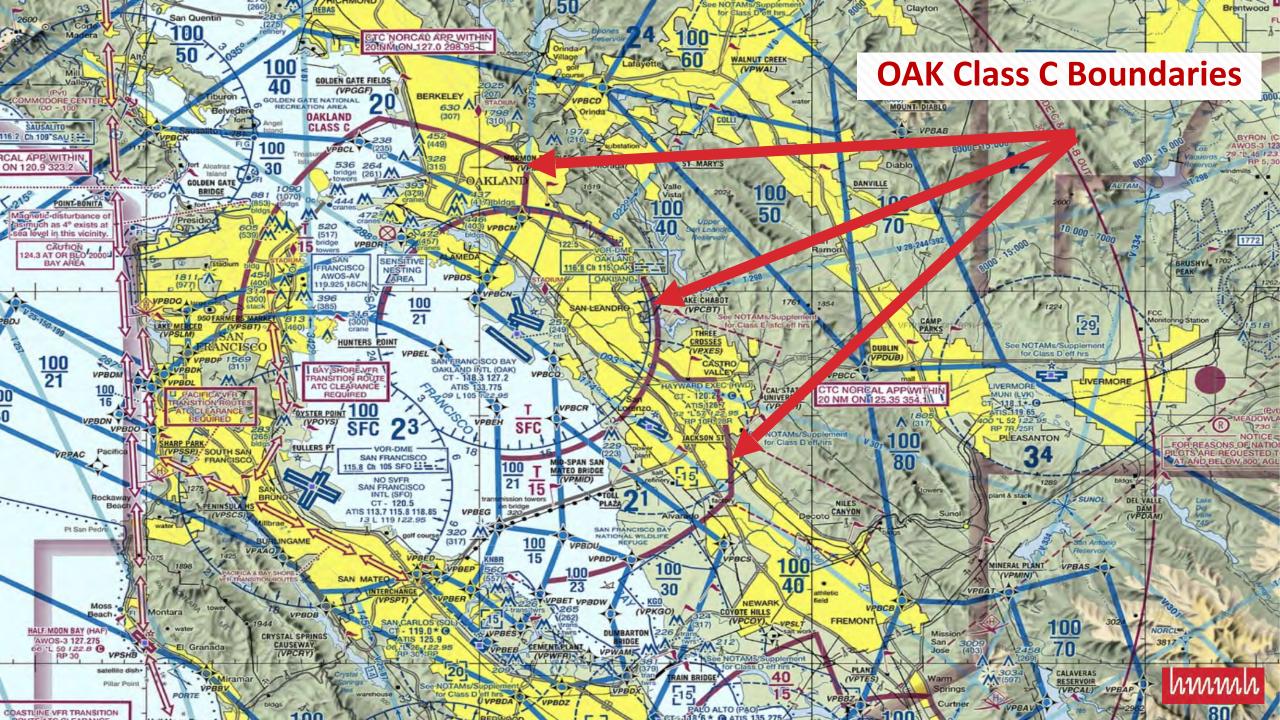
NILES

Dublin WEST

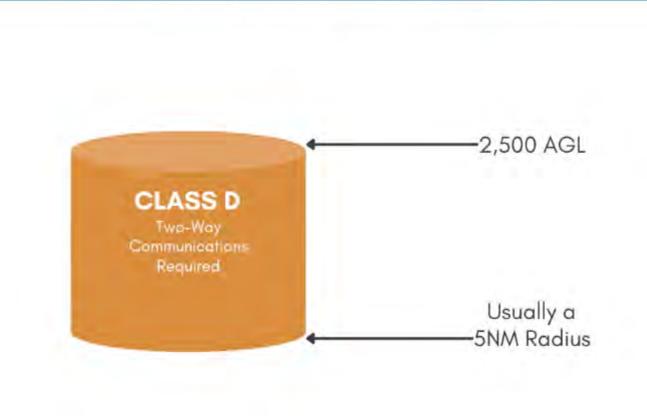
Newark

Bair Island

Data CSUMB SFML, CA OPC



# Class D Airspace



**Class D Airspace Shape** 



### Livermore Class D Boundary

Altamont

WHEN FROM FROM

KOMANDORSKI VILLAGE WESTPORT VILLAGE

Blackhawk

Diablo

San Ramon

RESSER

Nortonville Stewarty

Camino Tassajara

Marsh Creek Springs

Pleasanton

Verona

KILKARE WOODS

BRIGHTSIDE

Image Landsat / Copernicus

BRENTWOOD LAKE DEERFRIDGE SOUNTRY GLUB VINEVARDS AT MARSH CREEK

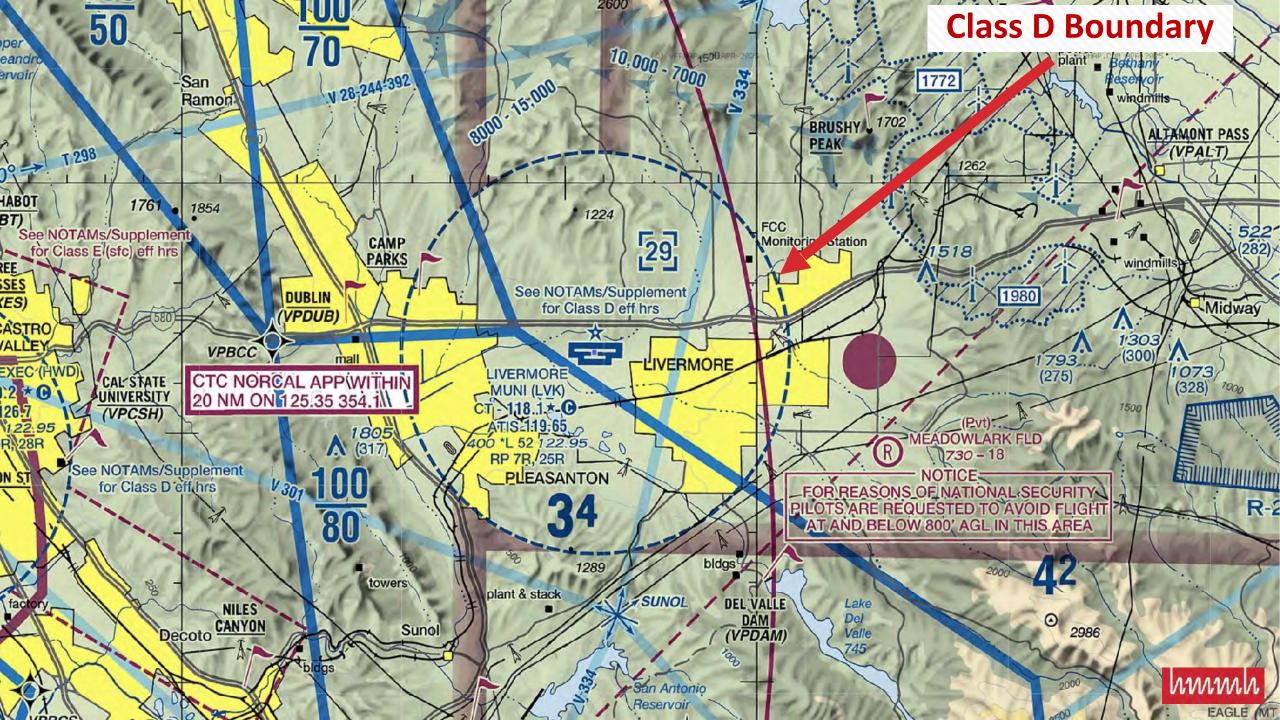
PORCELLANO WAY

SPRINGTOWN

Livermore



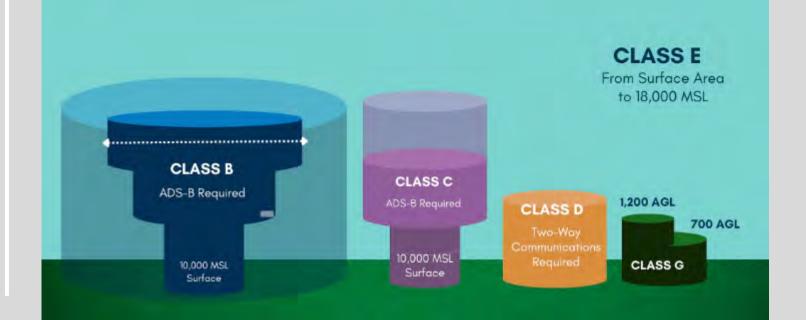
OUESTA VILLAGE. Mountain House



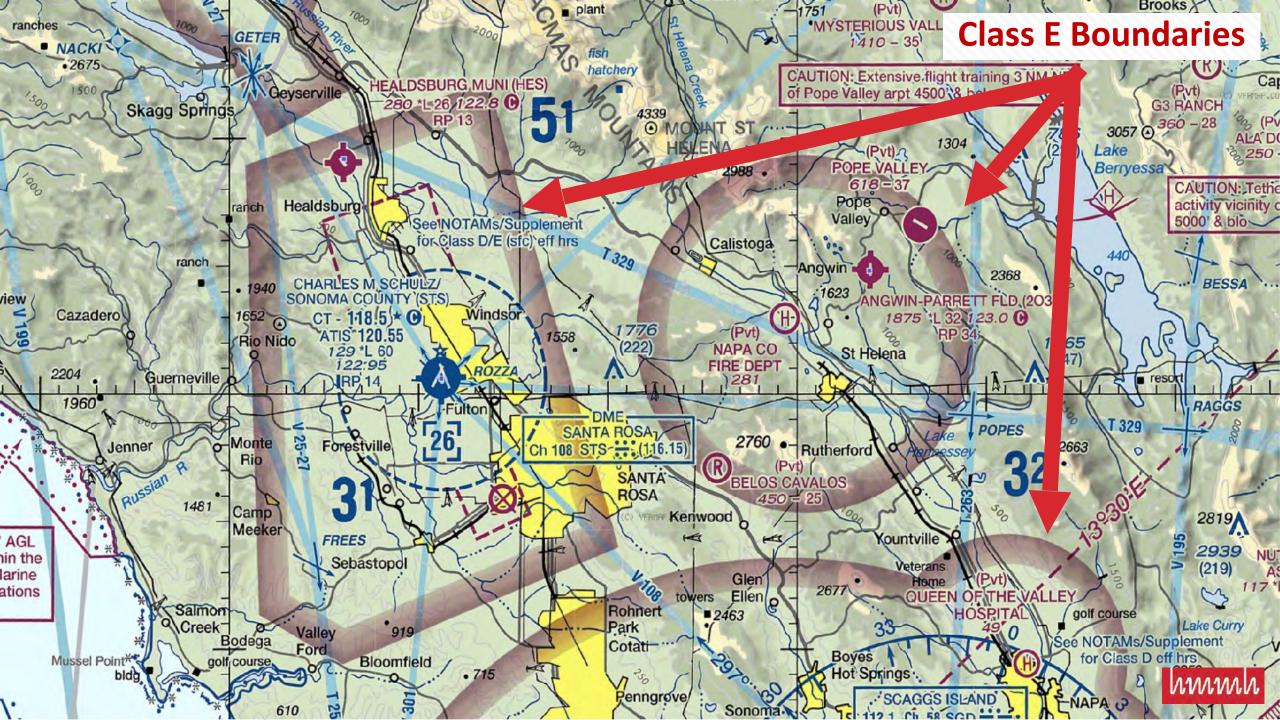
# Class E Airspace

#### **Class E Airspace**

Class E Surface Area starts at the surface. The upper limit is the height of the surrounding Class E floor.







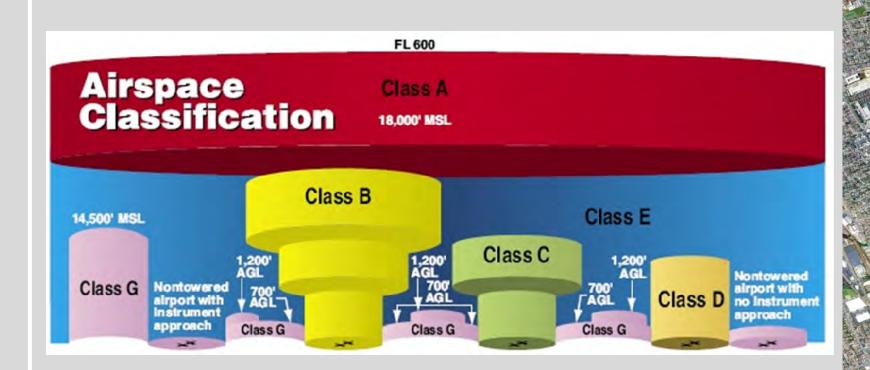


Data SIO, NOAA, U.S. Navy, NGA Data LDEO-Columbia, NSF, NOAA Data MBARI

Los Gato

30 mi

# Class G Airspace





## Special Use Airspace (SUA)

# Restricted Areas

Alert Areas Other Areas

Warning

Areas



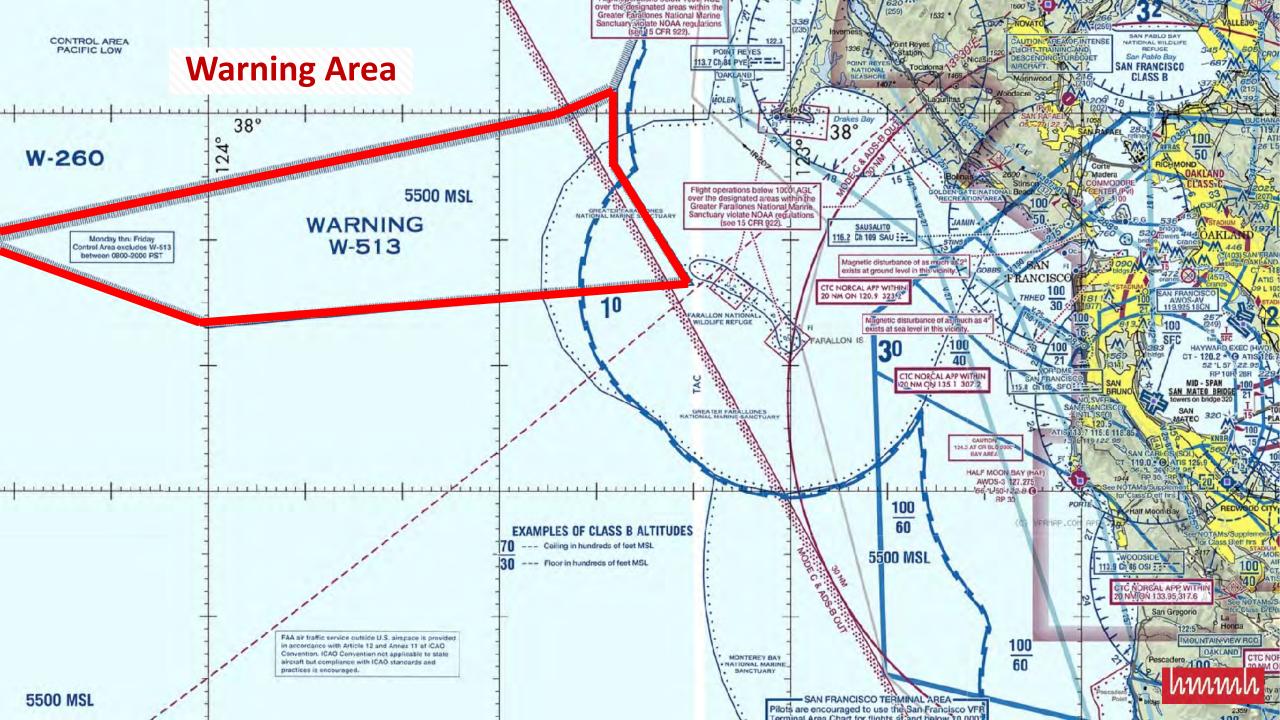
## R-2531 Restricted Area

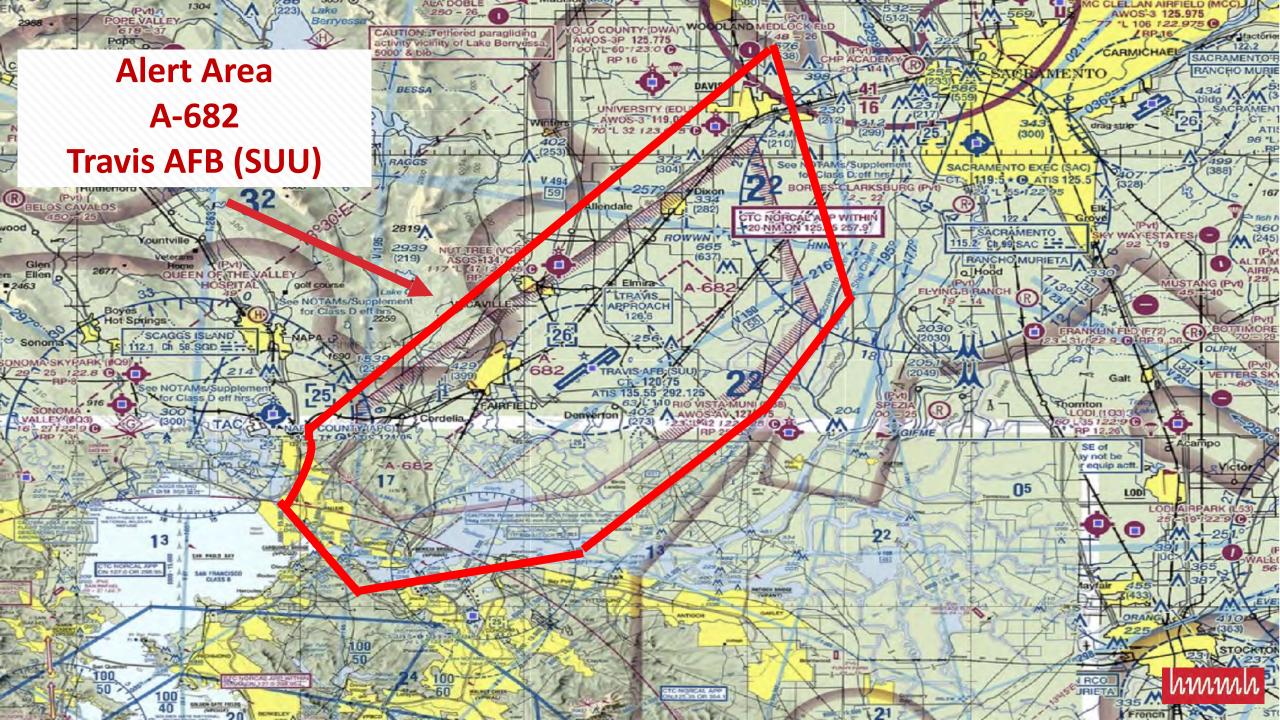
OUESTA VILLAGE Mountain House

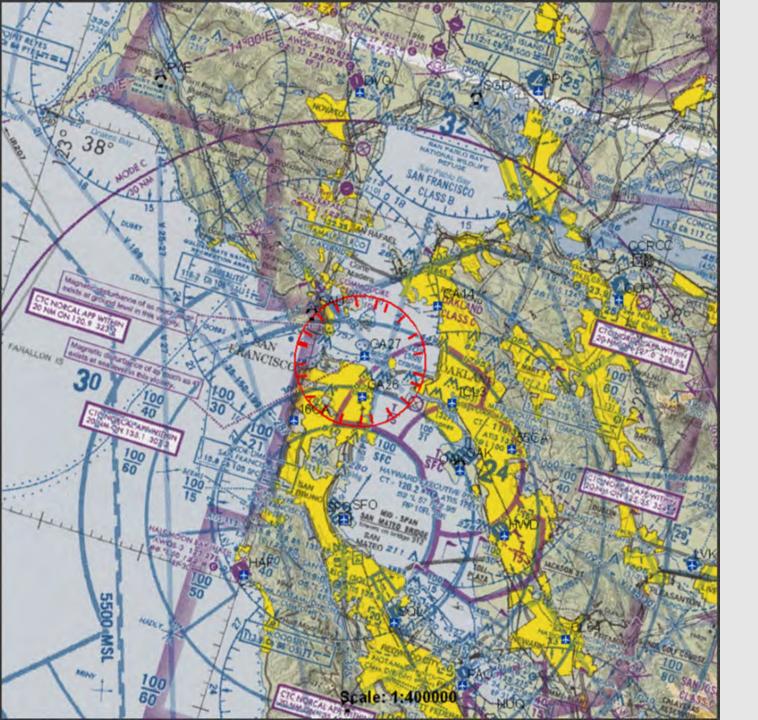
Carbona

C.S.





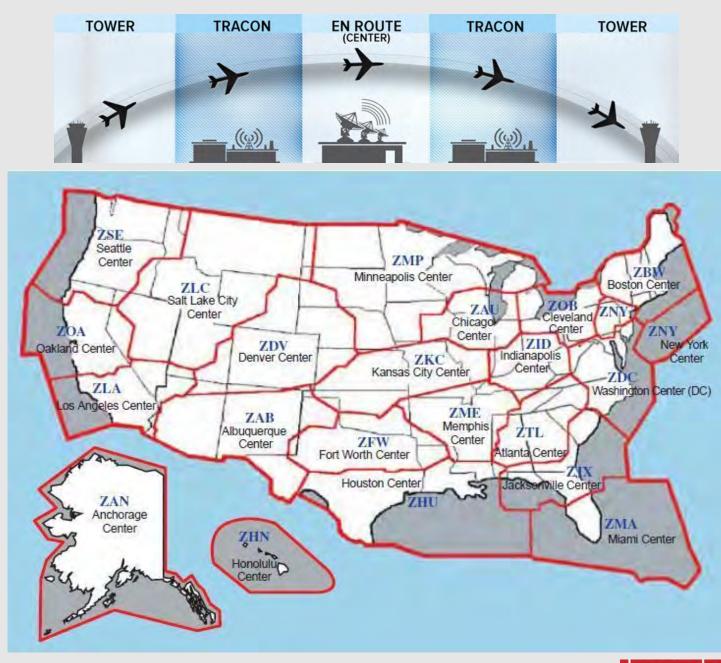




## Temporary Flight Restriction (TFR)

- Temporary Flight Restrictions (TFRs) are short-term airspace restrictions imposed by the FAA to ensure safety during specific events or hazards.
- Purpose: Protect aircraft and people by limiting flights over areas with high activity, like air shows, disasters, or VIP movements.
- Fleet Week TFRs: During San Francisco Fleet Week (Oct. 10–12, 2025), TFRs cover the San Francisco Bay for the Blue Angels air show and Parade of Ships.
- Specific Restrictions: TFRs enforce a "no-fly" zone over the air show box (Golden Gate Bridge to Alcatraz) during performances, typically 12–4 p.m. daily.
- Local Impact: TFRs near Oakland ensure safe operations, minimizing risks from high-speed iets overcrowded Bay Area skies.

# Air Traffic Control



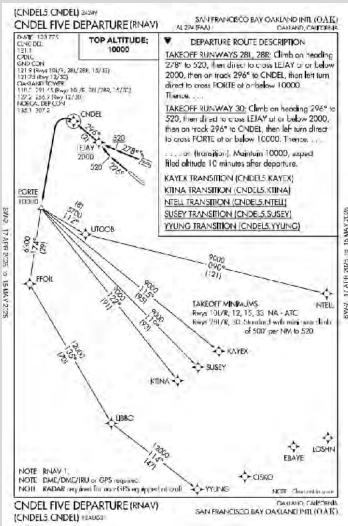


# Terminal Area Contro

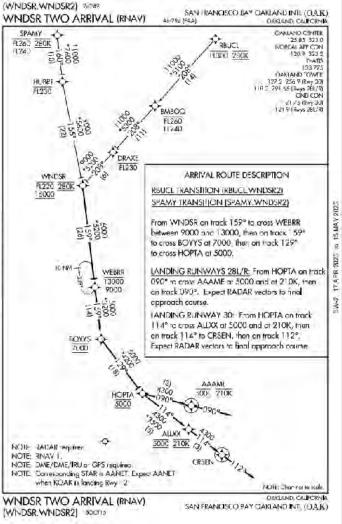
- Standard Instrument Departures (SIDs)
- Standard Terminal Arrivals (STARs)
- Instrument Approach
   Procedures (IAPs)



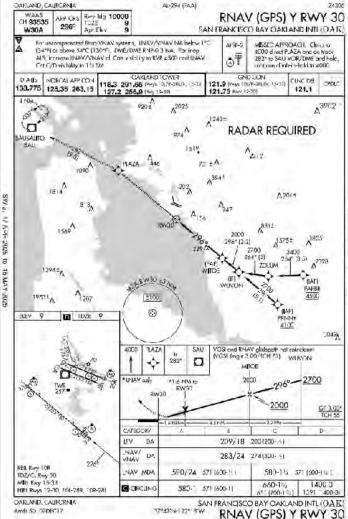
#### SIDs



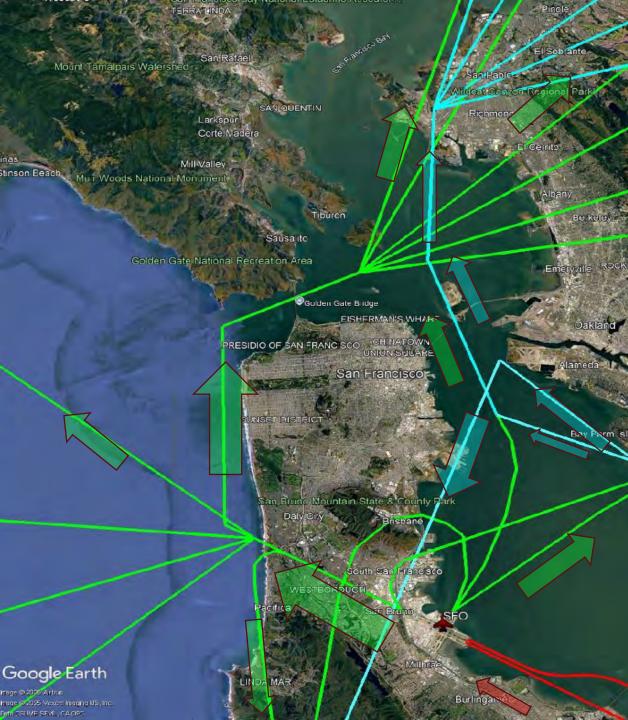
#### **STARs**



#### IAPs







# Pleasant Hill Clayton Sewatville Contra Costa Centre. Clayton Mark Creek Walnut Creek Mark Creek Spring SMOR Clayton Or Dable Jame Dabulle Dabulle Mana Preserve Backhavk

#### WEST PLAN

• Used 95-98%

Las Trampas

Ecen Landing Ecologica Reserved

Regio

ENNYSON - ALQUIRE

akland Zoo

- Based on prevailing winds
- RWY 30 Primary Departure
   & Arrival Runway

OAK Departures in **Blue** SFO Departures in **Green** All Arrivals in **Red** 



Golden Gate National Recreation Area

Colden Gate Bridge

at Canyon Regional Park

Bay Farm Island

Richmond

A.

San Ma

#### SOUTHEAST PLAN

• Used 2-5%

Google Earth

- Based on prevailing winds
- RWY 12 Primary Departure & Arrival Runway

OAK Departures in **Blue** SFO Departures in **Green** All Arrivals in **Red** 

LINDA MAR

Lafayette Orinda Mbraga

Las Trampas Wilderness Regional Preserve

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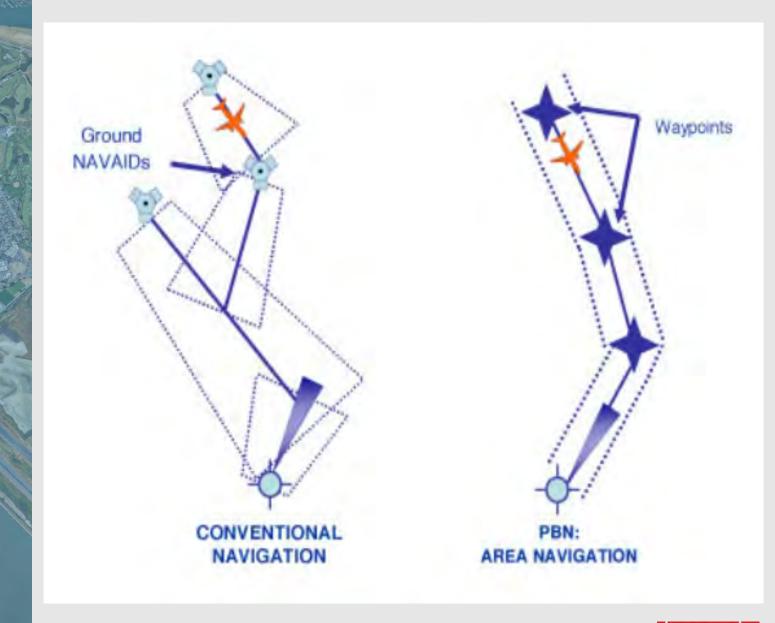
Stewar

Camino Tassar

MANDORSKI LACE PORCELLANO WAY

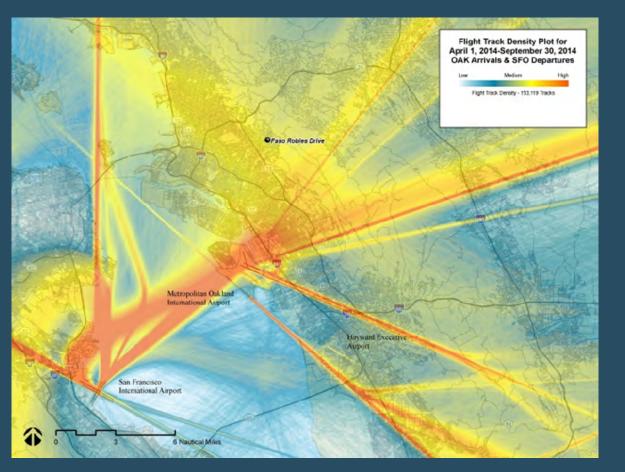
Dualin WESTPORT

# RNAV PBN vs. Conventional Navigation



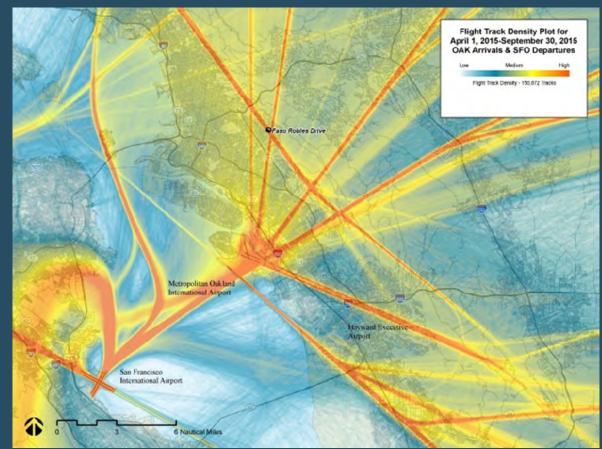


#### Pre Metroplex OAK Arrival Paths

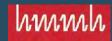


#### April 1 – September 30, 2014

#### Post Metroplex OAK Arrival Paths



#### April 1 – September 30, 2015



# Performance Based Navigation (PBN) Area Navigation (RNAV) Noise Concerns

- RNAV PBN procedures enable precise routing, often resulting in the concentration of flight paths over narrower corridors.
- While this improves air traffic efficiency and reduces overall fuel consumption, it can lead to increased noise exposure for specific communities under these concentrated routes.
- The consolidation of noise over fewer homes can create significant challenges, necessitating careful planning and community engagement.



# **Questions?**

