PASCO

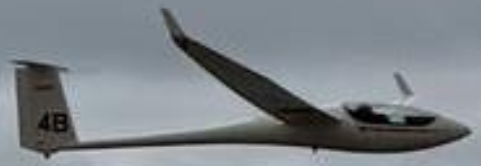
PASCO

SOARING

Pacific Soaring Council, Inc.

A non-profit volunteer organization serving glider pilots in Northern California and Nevada

# Airspace Awareness and Safety
# "SFO Class Bravo"



Dan Colton
President, PASCO
March 2025

Credit to Zach Yamauchi
for some of the materials
in this presentation

# PASCO

The Pacific Soaring Council (PASCO) represents glider pilots in the Soaring Society of America's Region 11, covering Northern California and Nevada.

PASCO responsibilities include monitoring of FAA airspace and procedures that affect glider operations in the PASCO region, protecting glider usage airspace, and providing safety training.

This presentation is a safety training focused on glider operations over and around the SFO Class Bravo airspace, specifically the congested airspace in and around Byron and Hollister, California.

# Objective

Key learnings that I hope you take away from this presentation:

1. Learn the “hot spots” where glider traffic and high-density commercial and/or private general aviation (GA) air traffic intersect
2. Considerations and tips for flying in, and near, restricted and high-density airspace
3. How glider flights can impact Class Bravo Air Traffic Control (ATC) operations
4. New skills regarding monitoring and interacting with ATC

# You Are Not Alone

FlightRadar24 Real Time Aircraft Display

https://www.flightradar24.com/37.50,-121.92/9

# See and Avoid

**Scan Zones and Converging Speeds**

- What percentage of time do you spend scanning for other aircraft?
  - Outside scan
  - Instrument scan
- Where are you looking during your scan for other aircraft?
  - 90-degree scan - ahead
  - 180-degree scan - ahead and side-to-side
  - 360-degree scan – ahead, side-to-side, and behind
- Air speed limits at different altitudes?
  - NLT 2,500’ AGL and up to 10,000’ MSL (FAR §91.117)
    - NMT 250 knots
  - Above 10,000’ MSL
    - Typically, ~450-550 knots

Consider this:  How fast is that jet behind you closing in on your glider?

# 2006 Hawker Mid Air with Glider

LOCATION: South end of Pine Nuts at ~16,000’ MSL
PROBABLE CAUSE: "The failure of the glider pilot to utilize his transponder and the high closure rate of the two aircraft, which limited each pilot's opportunity to see and avoid the other aircraft.“
(link to NTSB report in appendix of this presentation)

# Air Traffic Control (ATC)

**FAA Policy Document**
**AKA "The ATC Bible"**
**JO 7110.65W**
**Section 2-1-1**

The primary purpose of ATC is to prevent a collision involving aircraft operating in the system

In addition to its primary purpose, the ATC system also provides a safe, orderly, and expeditious flow of air traffic

# Airspace and Traffic Control

FAA Air Traffic Controllers are required to comply with instructions contained in a 729-page long manual that “prescribes air traffic control procedures and phraseology for use by personnel providing air traffic control services”. This is the ATC Bible and provides standards for all controllers across the country.

Reading this manual will give you a small sense of the scope of the job that ATC does and the complexity of the services they provide.

One example, covering ATC aircraft separation requirements is explained in a YouTube video posted in Aviation Diaries:
https://www.youtube.com/watch?v=lscVTYpwIXI

Let’s watch the first 2 minutes to see how this works.

# Airspace and Traffic Control

**The ATC Manual and Gliders:**

Among the 729 pages of the Traffic Control Manual, “Gliders” are only given a one paragraph footnote.

**Per Section 5-2-9, Note 3:**

“Gliders not in contact with an ATC facility should squawk 1202 in lieu of 1200. Gliders operate under some flight and maneuvering limitations. They may go from essentially stationary targets while climbing and thermaling to moving targets very quickly. They can be expected to make radical changes in flight direction to find lift and cannot hold altitude in a response to an ATC request. Gliders may congregate together for short periods of time to climb together in thermals and may cruise together in loose formations while traveling between thermals.”

# ATC Considerations

It should be recognized by all pilots flying in congested airspace that air traffic controllers are operating in a new world:

1. There have been multiple aircraft Loss-of-Separation (LOS) events in early 2025 in congested airspace across the country involving both injuries and fatalities
2. Air Traffic controllers are under heightened workloads, due to understaffing, to the point they are no longer able to even provide outreach safety training to the pilot community
3. Air traffic controllers are likely new to interacting with, and understanding, gliders due to high turnover rates in recent years

# The ATC Catch-All Regulations

The following are the FAA's general catch-all regulations that they can use for regulatory enforcement actions on any pilot if they observe us operating in what appears to be an unsafe manner.

FAR §91.13 Careless or reckless operation:

> *Aircraft operations for the purpose of air navigation.* No person may operate an aircraft in a careless or reckless manner so as to endanger the life or property of another.

FAR §91.103 Preflight action:

> *Aircraft operations other than for the purpose of air navigation.* Each pilot in command shall, before beginning a flight, become familiar with all available information concerning that flight.

# Airspace and Traffic Control

Radar displays are both imprecise and quite busy. This further confounds the difficulty of ATC to ensure the minimum required separation.

Primary Radar:
- 2D location only
- No Altitude
- No Identification
- Sensitivity

Mode C:
- Altitude

Mode S:
- Altitude
- Identification

# Airspace and Traffic Control

**Radar vs. GPS:**

The FAA Aviation Safety Brief titled, “Avoiding Pilot Deviations” (see reference in the appendix of this presentation) **recommends maintaining a minimum 1 mile horizontal, and 500’ vertical, distance from restricted airspace** (for example SFO Class Bravo and SJC Class Charlie) due to limitations with radar used by ATC to provide aircraft separation.

As stated in the safety advisory, “GPS is usually more precise than ATC radar. Using your GPS to fly up to and along the line of the airspace you are trying to avoid could result in a pilot deviation because ATC radar may show you within the restricted airspace.”

This is compounded by the fact that **ATC must also provide a 5nm safety bubble around aircraft**, as shown in the Aviation Diaries video.

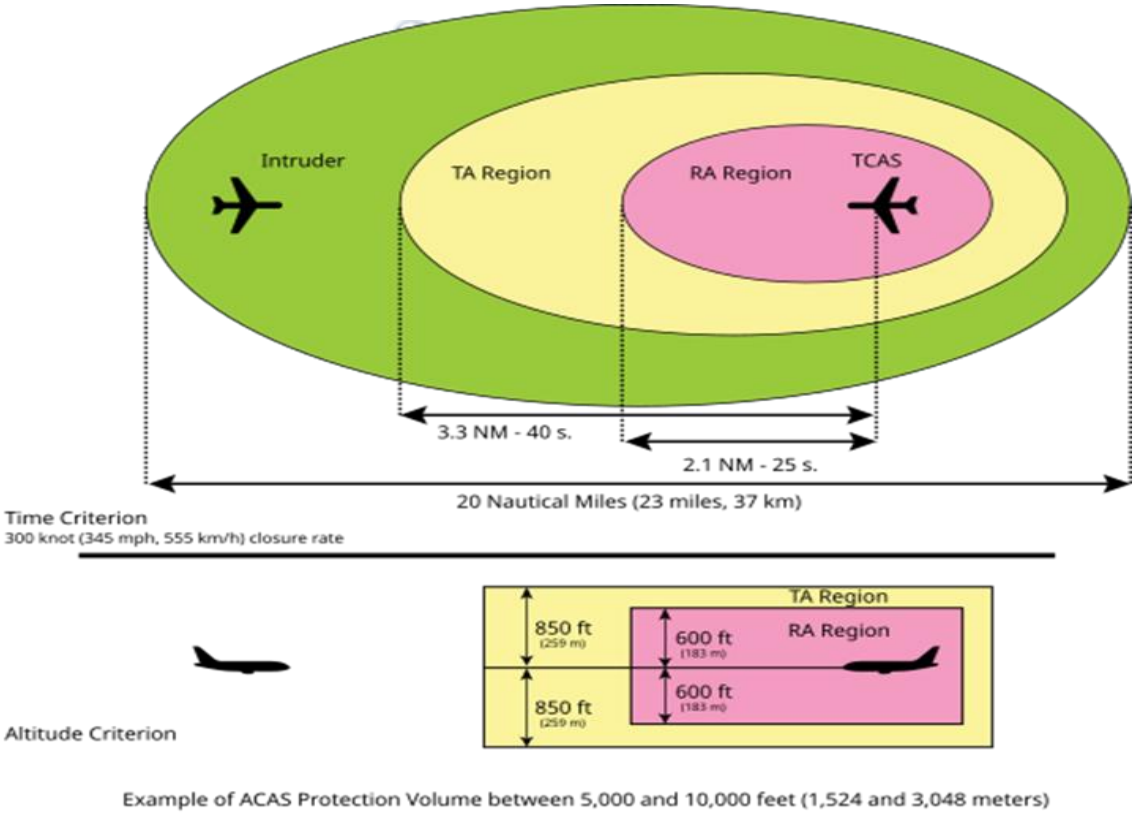
# TCAS: TA and RA

It is worth getting a basic understanding of Traffic Collision Avoidance System (TCAS) and how it generates Traffic Advisory (TA), and Resolution Advisory (RA) notifications.

For details on how the system works, see FAA Booklet, *Introduction to TCAS 7.1* (see reference in the appendix of this presentation).

**NOTE: Your glider must have a transponder to be visible to GA/Commercial aircraft equipped with TCAS.** When an aircraft gets a TCAS RA it is about 25 seconds from a collision, depending upon the TCAS sensitivity setting and aircraft speeds, and is instructed by the TCAS system to immediately “Climb” or “Descend”, to avoid the collision. This is considered an emergency condition and overrides any ATC clearances/instructions.

# TCAS TA and RA




Example of ACAS Protection Volume between 5,000 and 10,000 feet (1,524 and 3,048 meters)

The following video shows, using a flight simulator, how TCAS functions and how the pilot and crew must react: https://youtu.be/0LmVp6LCW8o

# Common Altitudes

When wave and/or convective conditions exist, gliders can soar up to just clear of the floor of Class Alpha airspace. The most common convective altitudes are between 3,000' and 8,000' MSL. And when a wave sets up, altitudes of between 8,000' to 17,500' are commonly achieved.

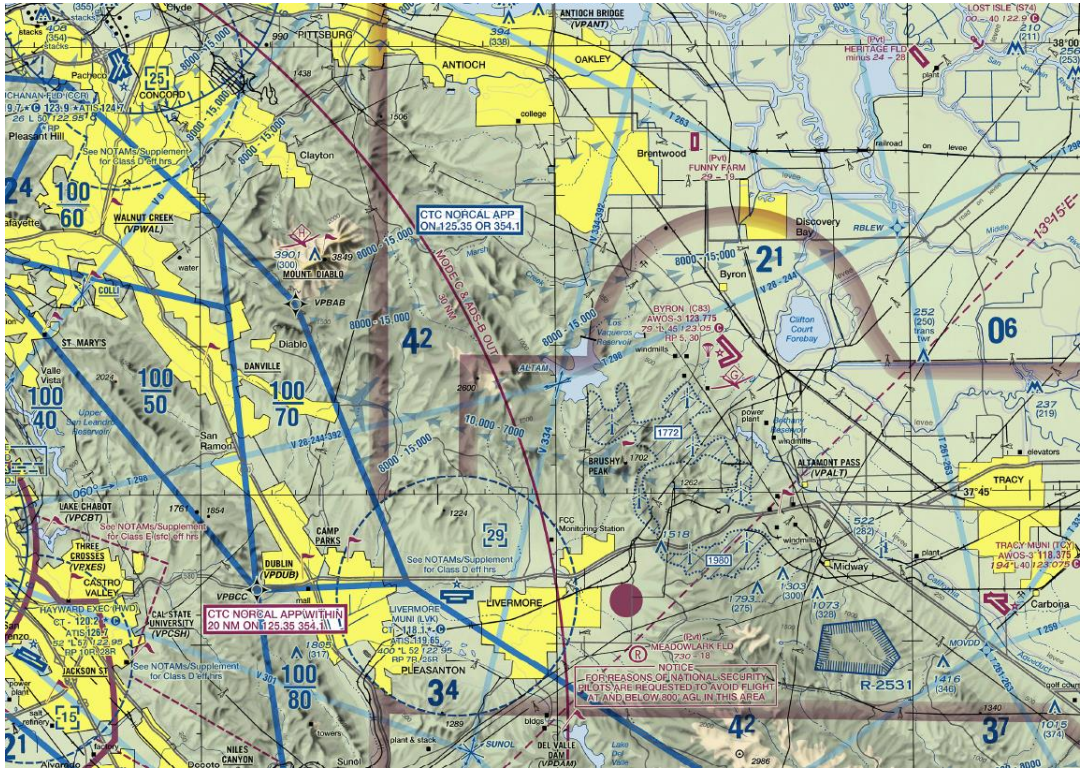
Coincidentally, these are the same altitudes used by GA and commercial aircraft in our convergence and wave areas of lift.

The frequency of commercial aircraft operations, as shown below, makes this a prime area of concern.

- SFO: 1,009 flights per day
- OAK: 443 flights per day
- SJC: 396 flights per day

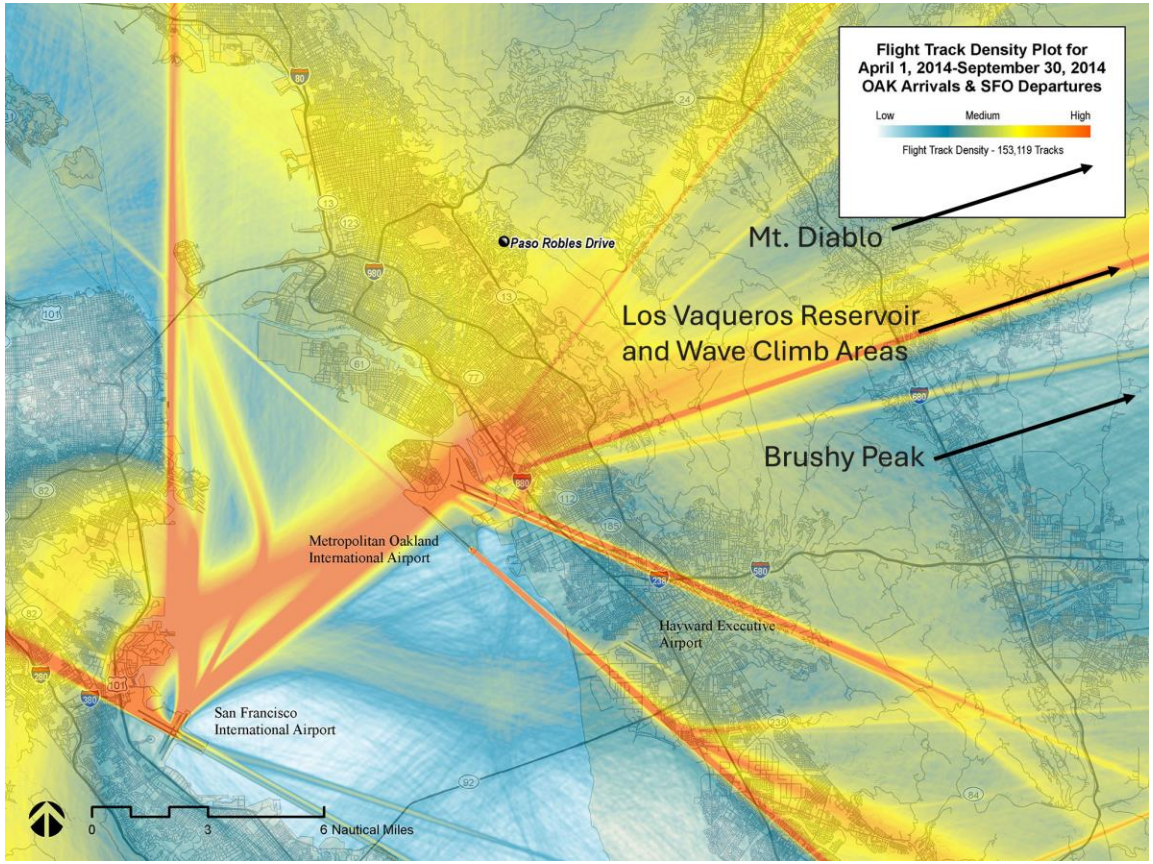
# Class Bravo

The current Class Bravo airspace boundaries are shown in this screen shot from the San Francisco sectional chart. Note the boundaries, floor and ceiling of the Class Bravo airspace are designated in the blue polygons on the Sectional. Also, noted are the frequencies for monitoring or contacting ATC.



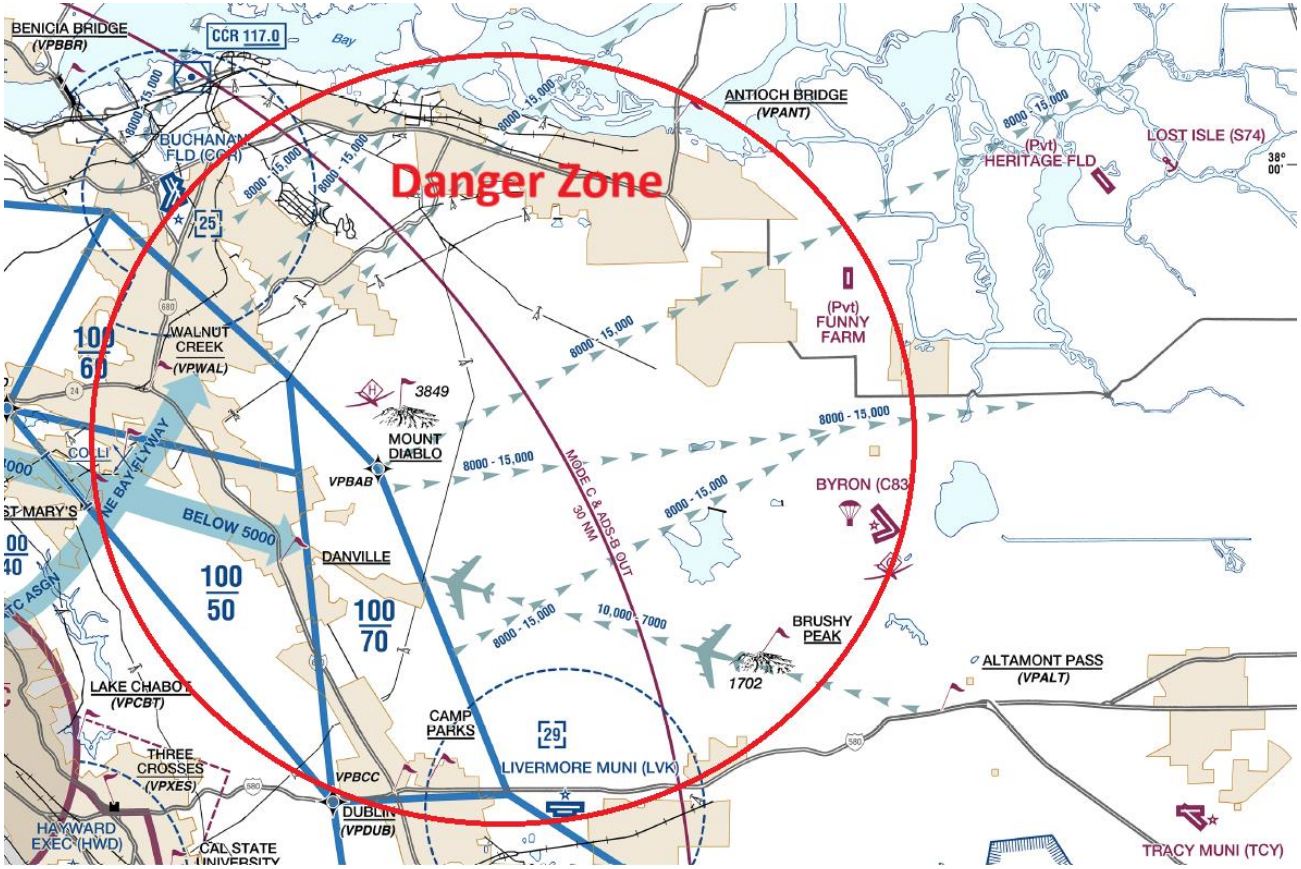
# Class Bravo Traffic Density

The Byron Wave waypoints, and our training area at the Los Vaqueros reservoir, are coincidentally (not intentionally) located right in a **High-Density** commercial air traffic route.



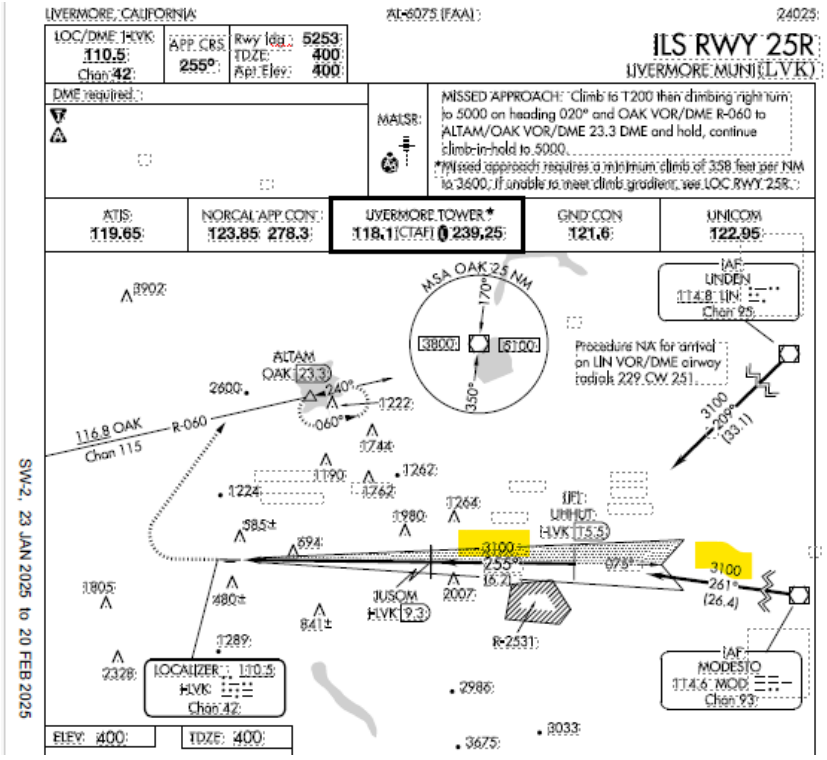
# Byron High-Altitude Danger

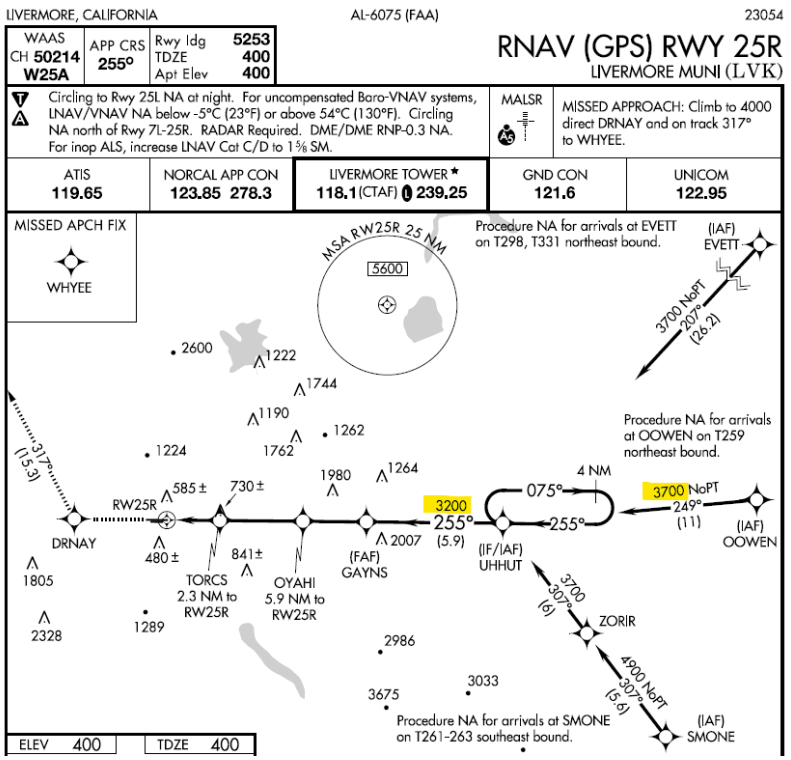
As designated on the SFO Terminal Area Chart (TAC), commercial jet arrivals and departures may be anywhere between 7,000’ and 15,000’ MSL.



# Byron Low-Altitude Danger

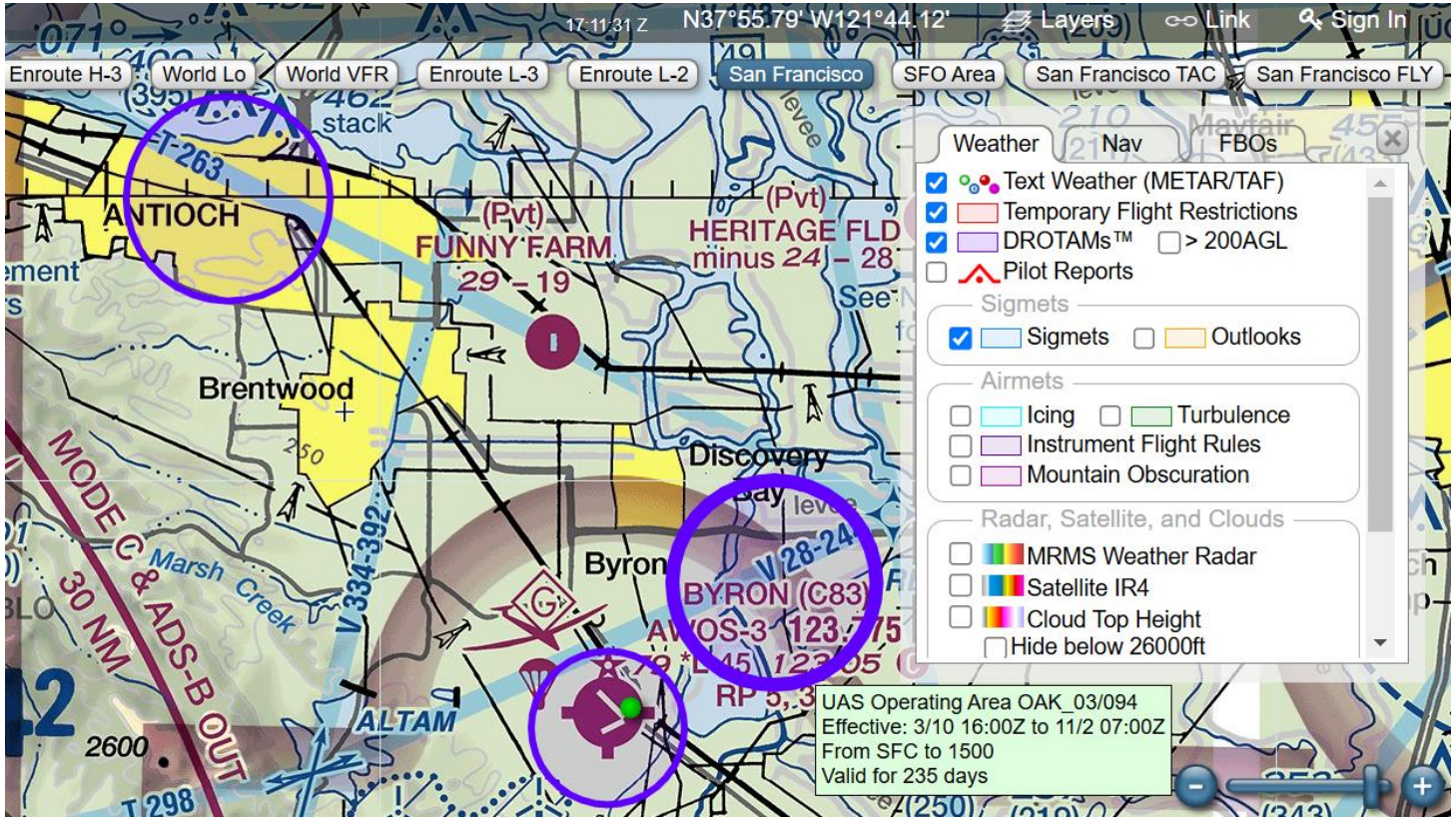
As designated on the Livermore airport ILS and RNAV approach plates obtained using SkyVector, arriving GA traffic will be between 3,100’ and 3,200’ MSL as they cross the hills between Byron/Tracy toward Livermore. Gliders commonly fly between 3,000’ and 5,000’ in this area on good soaring days.



# Byron Low-Altitude Danger

A useful feature of SkyVector is the “Layer” called DROTAMs. It displays areas of drone activity and provides detailed information about the horizontal and vertical boundaries and dates/times of activity.



# A Few Words on UAV & UAS

**Drones come in two flavors**

**Unmanned Aireal Vehicle (UAV):**
A UAV, also known as a drone, is an aircraft that doesn't have any human pilot or passengers on board. These vehicles can be controlled remotely, fly autonomously, or a combination of both.

**Uncrewed Aircraft System (UAS):**
A UAS is a term that encompasses not only the UAV but also all the software, hardware, payload, pilot and communication systems required to operate the vehicle, including ground control stations and data links

Essentially, a UAV is simply the aircraft or drone itself, while a UAS includes the entire system that supports and controls the UAV.

# UAV Detect and Avoid

**Unmanned Aireal Vehicle (UAV):**

Low level, FAR Part 107 UAV operate below 400’ AGL and do not exceed 55 lbs. total gross weight. The UAV being tested in the North bay by Zipline are VTOL aircraft approximately 6’ x 6’. They operate under a waiver that permits an observer to monitor the airspace if the drone is beyond line-of-site.

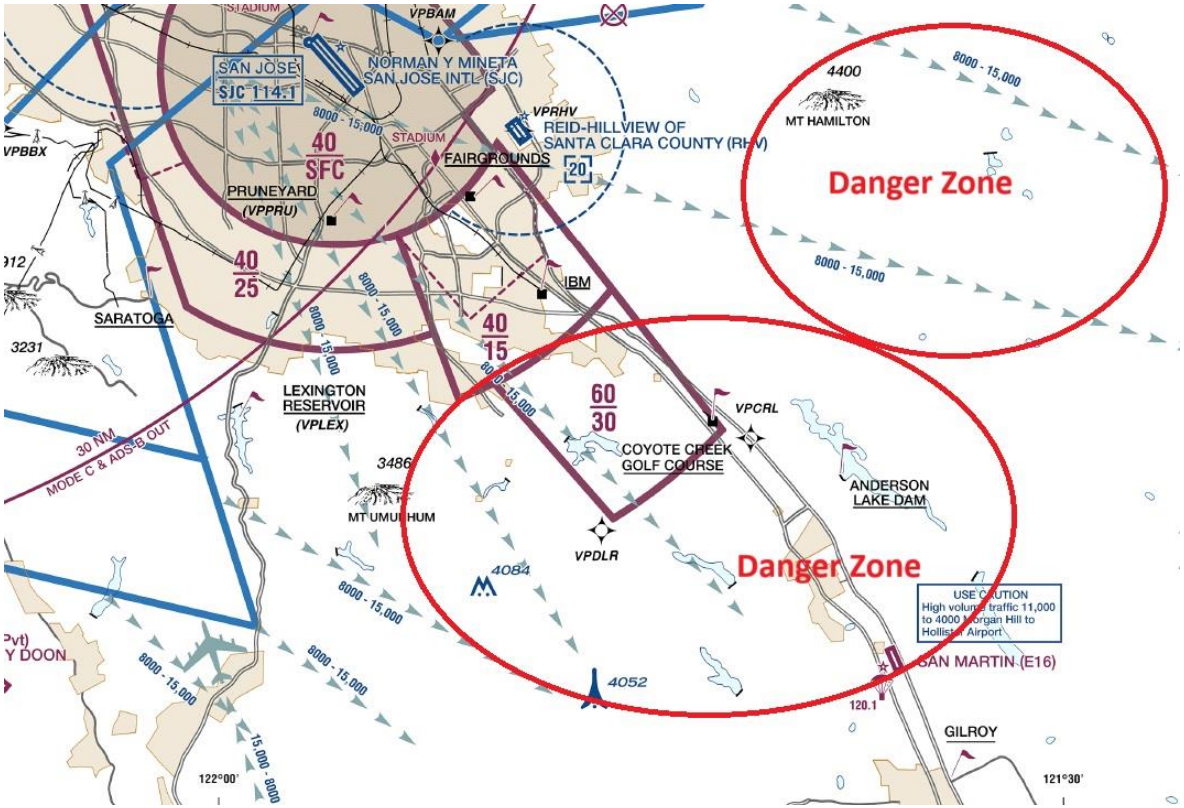
The systems Zipline drones use for detect and avoid include:

- ADSB-IN
- Cameras that are being trained to detect different type of aircraft
- Onboard microphones that give a vector for detected traffic based on the timing of sound waves arriving at the various microphones

These systems will typically not be in the same airspace as commercial/GA aircraft and gliders. However, we do need to be aware of airspace designated by DROTAM.

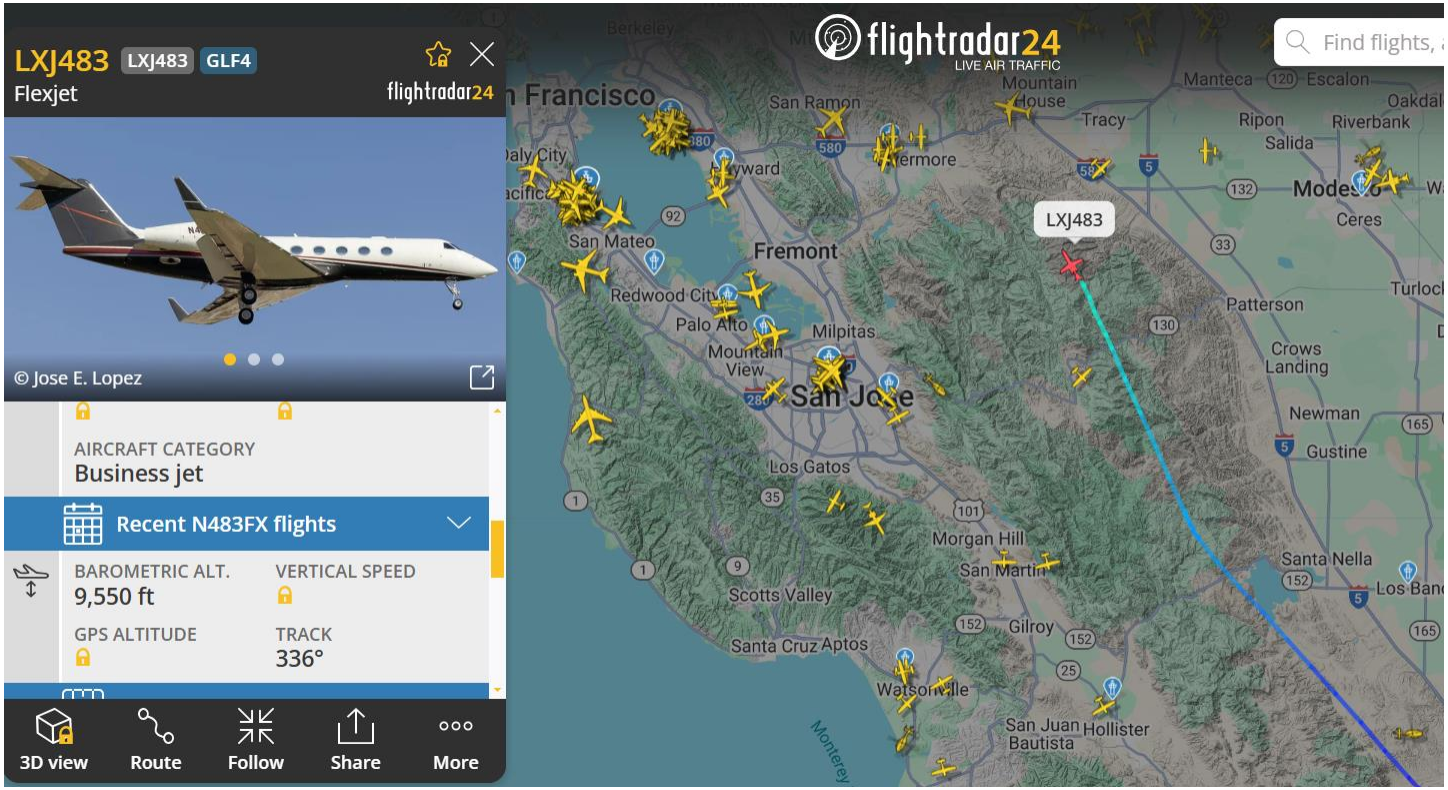
# Hollister Area Danger Zones

Based on the SFO TAC, commercial jet, and GA, traffic may be anywhere between 3,000’ to 15,000’ MSL in the Gilroy convergence and Watsonville wave areas North and West of Hollister and between 8,000’ and 15,000’ in the San Antonio Valley convergence.



# Study Your Environment

For educational purposes you might want to study live aircraft flight paths and altitudes using Flightradar24 (see reference in the appendix of this presentation). Extra credit: How fast is he probably flying?



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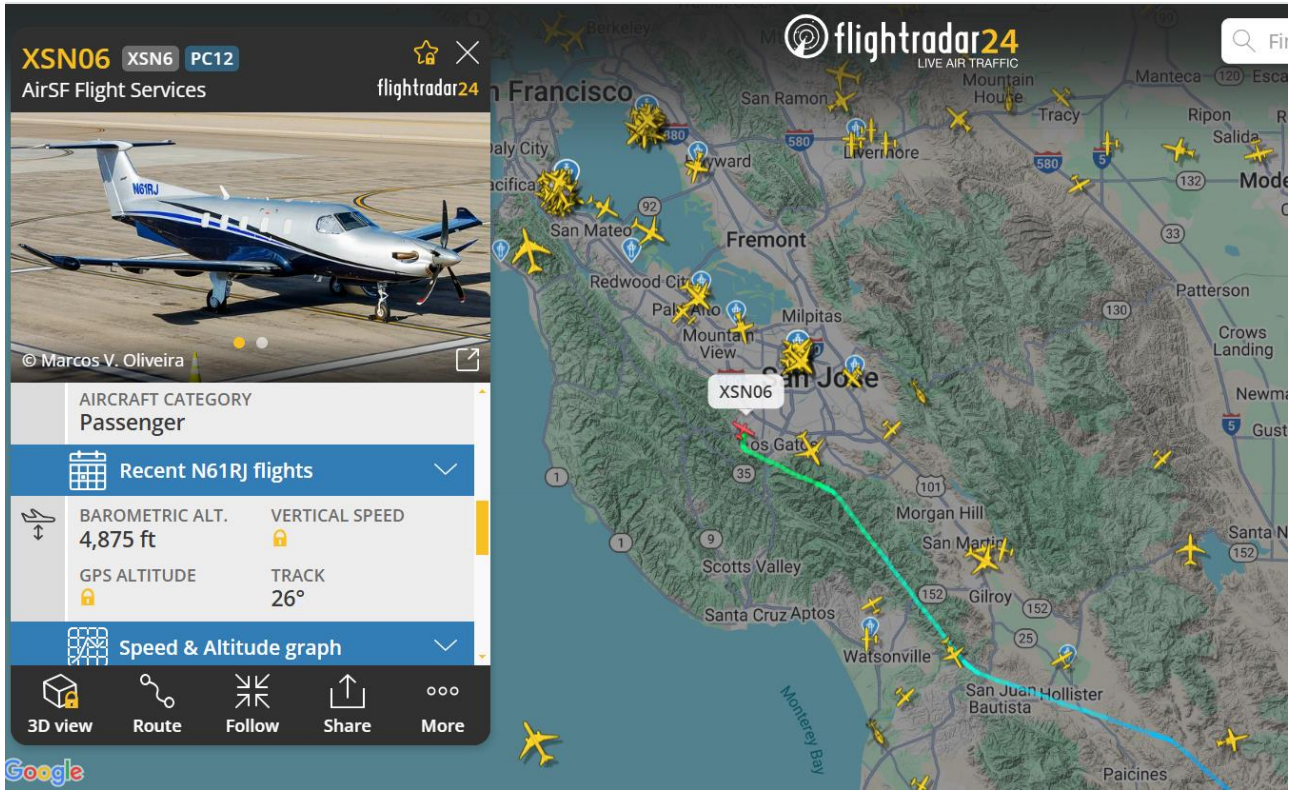

# Communication With ATC

Talking to ATC really isn't that difficult. Just follow these simple guidelines just like when you call any of your local airport controllers:

1. Listen to their frequency first to get a sense of what is going on and the cadence of the conversations
2. Think about what you want to say before calling them
3. Say:
    1. Who you are calling (e.g., NORCAL Approach)
    2. Who you are (e.g., Glider N6514M)
    3. Where you are (e.g., distance and direction from an airport)
    4. What you want, or what your intentions are (be casual)

It goes something like this (Video timestamps 27:00 to 29:00): https://youtu.be/w5Jcqrtl5AA

Also watch Bill Palmer's video on Flight Following linked in the appendix

# Recommended Best Practices

1. Transponder and ADSB Out should be considered required equipment
2. Maintain NLT 1nm horizontal and 500’ vertical clearance from restricted airspace (Refer to FAA Aviation Safety Topic Article, *Avoiding Pilot Deviations*)
3. Monitor ATC frequency when in congested airspace (consider monitoring the frequency using a backup hand-held radio) to maintain situational awareness, and because ATC may be trying to contact you
4. Contact ATC before launch if you plan to loiter in the area for an extended period (e.g., climbing out in wave), or if there are multiple glider launches planned that will tie up the airspace

For a deeper dive into the subject of ATC technology, operations, and gliders, watch Zach Yamauchi’s presentation (link is provided in the appendix)

# Questions/Discussion

**The floor is yours**

**Please share your questions**

# Appendix: Links / References

ATC for Gliders – Zach Yamauchi Presentation: https://youtu.be/ol0xl5_5u3Q

FAR Transponder and ADSB Exemptions: https://www.ecfr.gov/current/title-14/chapter-I/subchapter-F/part-91#p-91.215(e)(2)

SFO Sectional & TAC: https://aeronav.faa.gov/visual/09-05-2024/PDFs/San_Francisco_TAC.pdf

SkyVector NOTAMs and DROTAMs : https://skyvector.com/?ll=38.3121610362229,-121.491837494567&chart=16&zoom=

Livermore Airport ILS/RNAV Charts: https://skyvector.com/airport/LVK/Livermore-Municipal-Airport

FAA Aviation Safety Topic Article, *Avoiding Pilot Deviations*: https://www.faa.gov/sites/faa.gov/files/2022-01/Avoiding%20Pilot%20Deviations.pdf

# Appendix: Links / References

US DOT FAA Air Traffic Organization Policy, Air Traffic Control
https://www.faa.gov/documentlibrary/media/order/atc.pdf

FAA Booklet, Introduction to TCAS 7.1:
https://www.faa.gov/documentlibrary/media/advisory_circular/tcas%20ii%20v7.1%20intro%20booklet.pdf

TCAS RA Video: See TCAS video: https://youtu.be/0LmVp6LCW8o

FlightRadar24 Real Time Aircraft Display:
https://www.flightradar24.com/37.50,-121.92/9

Radar Separation Video, Aviation Diaries:
https://www.youtube.com/watch?v=lscVTYpwIXI

# Appendix: Links / References

Bill Palmer's Video on ATC Flight Following:
https://www.youtube.com/watch?v=3spS6oLBtMM&ab_channel=BillPalmer

1800wxbrief On0Line Weather Briefing:
https://www.1800wxbrief.com/Website/?desktop=true#!/

NTSB Report for Hawker Mid Air: https://data.ntsb.gov/Docket?ProjectID=64423

More Helpful Resources and Videos (See the Airspace & Navigation section:
http://thesoaringpage.com/