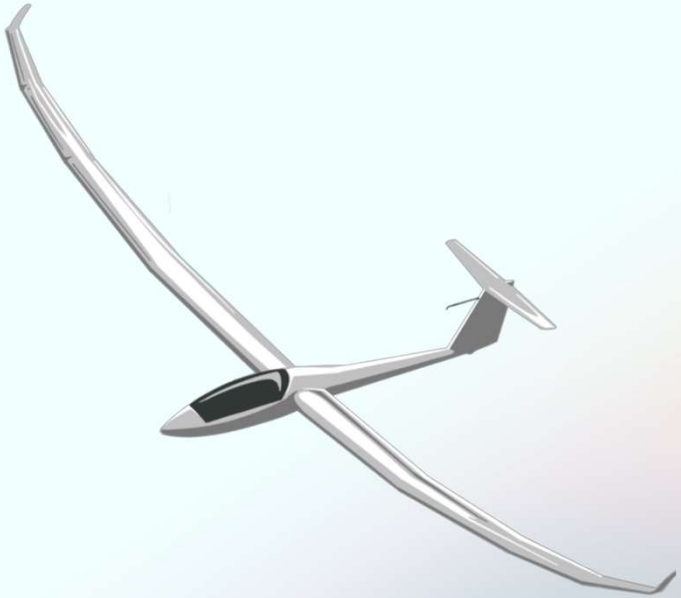


Collision Avoidance

FLARM and ADSB

Tim Bromhead

ADSB

What is ADSB?

- Transponder + GPS source + antenna.
- ADSB-Out.
- Broadcasts your location OUT only.
- Expensive.
- Trig is the smallest certified available.
- Required to fly in controlled airspace in New Zealand

ADSB

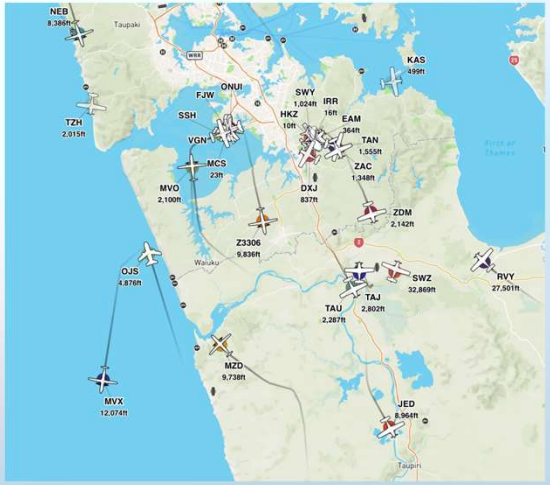
What is a transponder NOT?

- No ADSB-IN
- No display of other aircraft
- No collision warning

ADSB-IN

How to see other aircraft?

- SkyEcho -> Phone/Tablet
- Garmin glass panel
- LX9000
- FLARM
- TCAS
- Ground based receivers
  - PureTrack, FlightRadar24 etc



Collision Alerting

- FLARM
- TCAS
- TAS (traffic alerting system) e.g. Garmin
- Portable ADSB-IN? To some extent.
- Waving arms frantically

FLARM

- Small display or big.
- Portable versions available.
- Separate device .
- LX9000s.

FLARM vs ADSB

They are overlapping technologies that can work together.

- FLARM can see ADSB equipped aircraft (if you pay for it).
- ADSB-IN can't see FLARM equipped aircraft.
- FLARM can be your ADSB traffic alerting system.
- Designed to handle close proximity flying that gliders do.

PowerFLARM Fusion

- Both FLARM In/Out and ADSB-IN
- Works with many apps including:
  - Air Navigation Pro, SkyDemon, ForeFlight, EasyVFR, iPilot and XC Soar
- Best option for GA aircraft.
- ~$2800

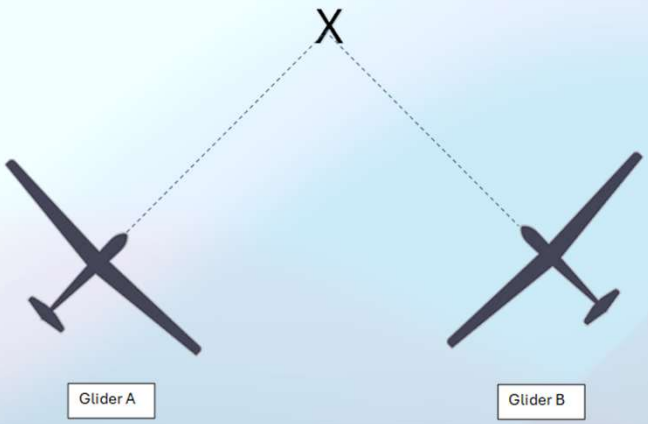
FLARM Petal Displays

- Optional: indicate direction to nearest with orange dot.
- Red flashing dot for threat with beeping.
- Flashing rate increases as it becomes more urgent.
- Will only alert when on collision course.
- Often the time from alert to collision is <10 seconds.

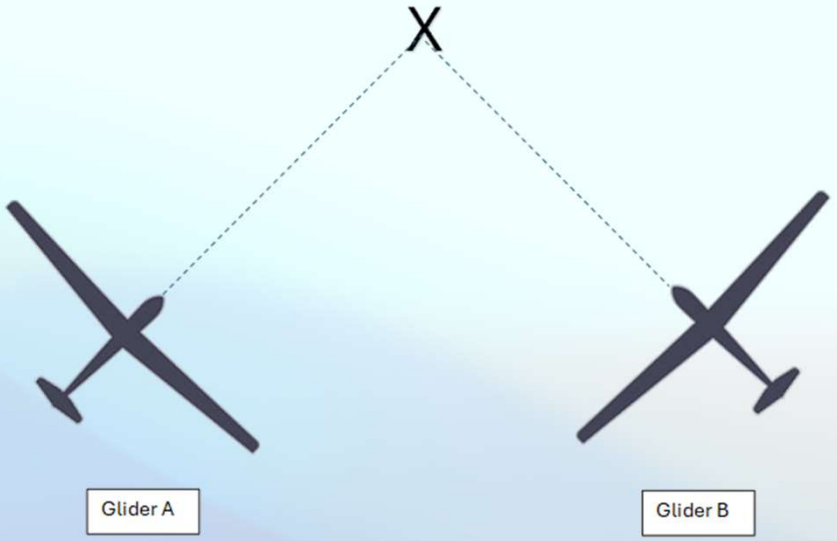
FLARM Petal Displays

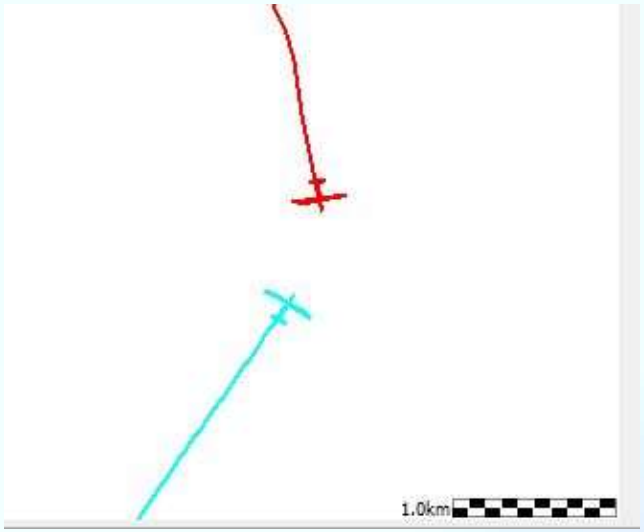
How to use

- If it alarms, glance at it briefly to see direction and if it is above or below you.
- Get eyes outside as quick as you can to try and spot the target.
- If you can't see anything, probably turn right.
- If both pilots don't do anything, you will likely collide!
- Be warned: If you have a glider in sight, it might NOT be the threat. There could be another you haven't seen.

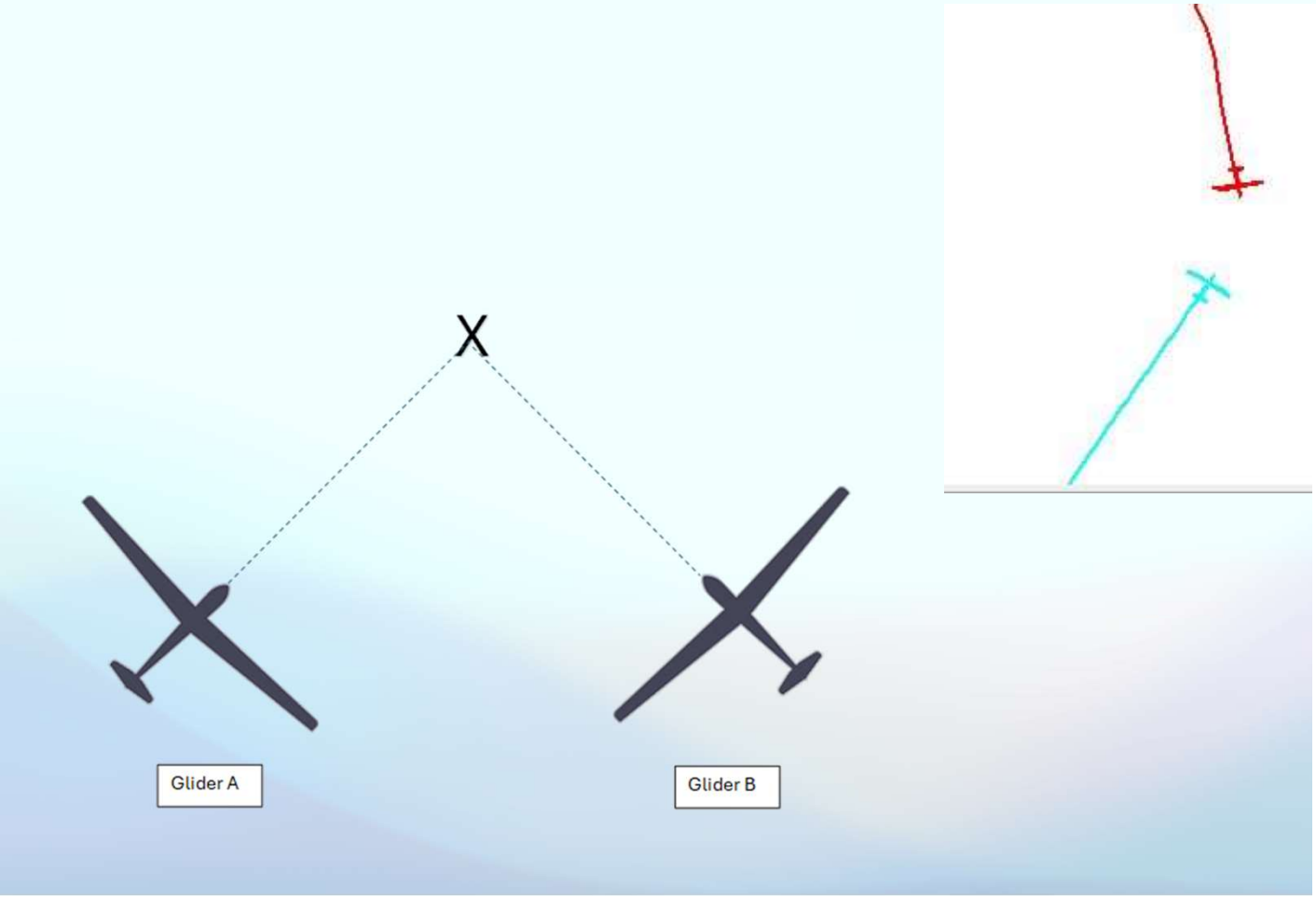


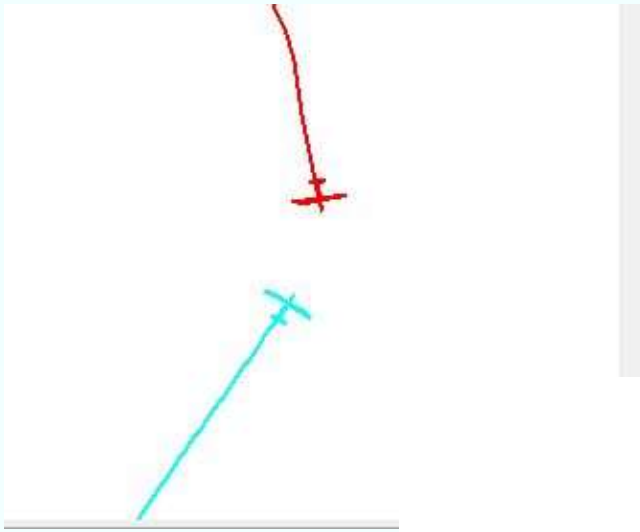
Collision Course - what would you do?

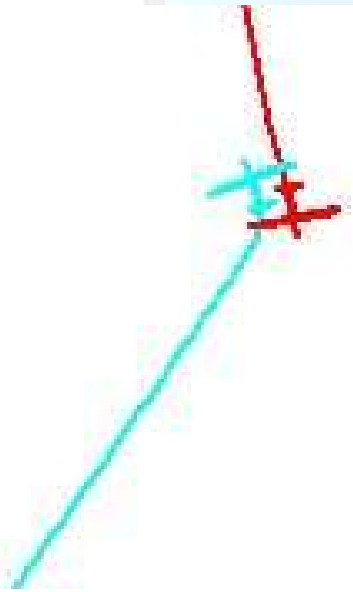


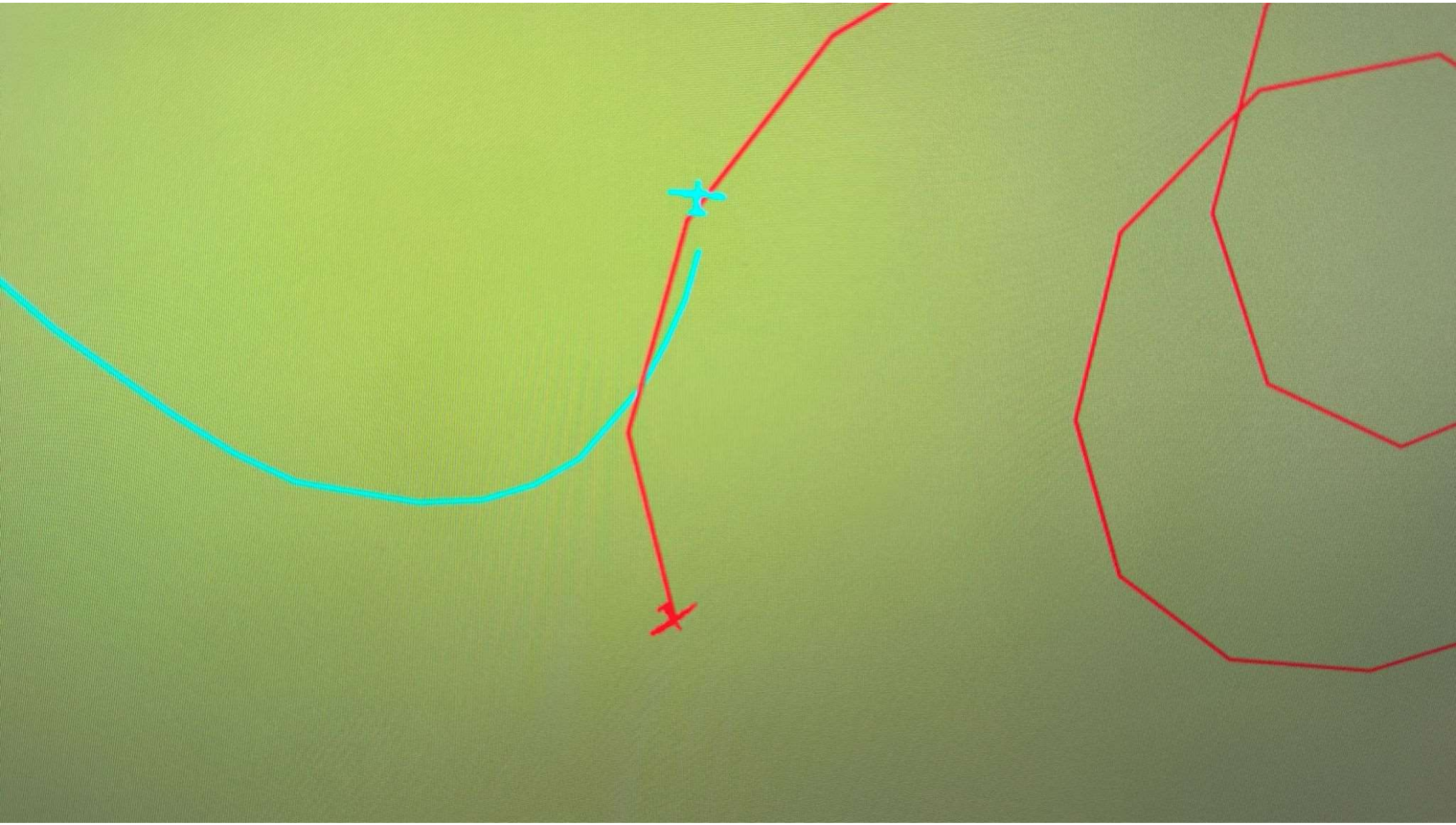


Collision Course

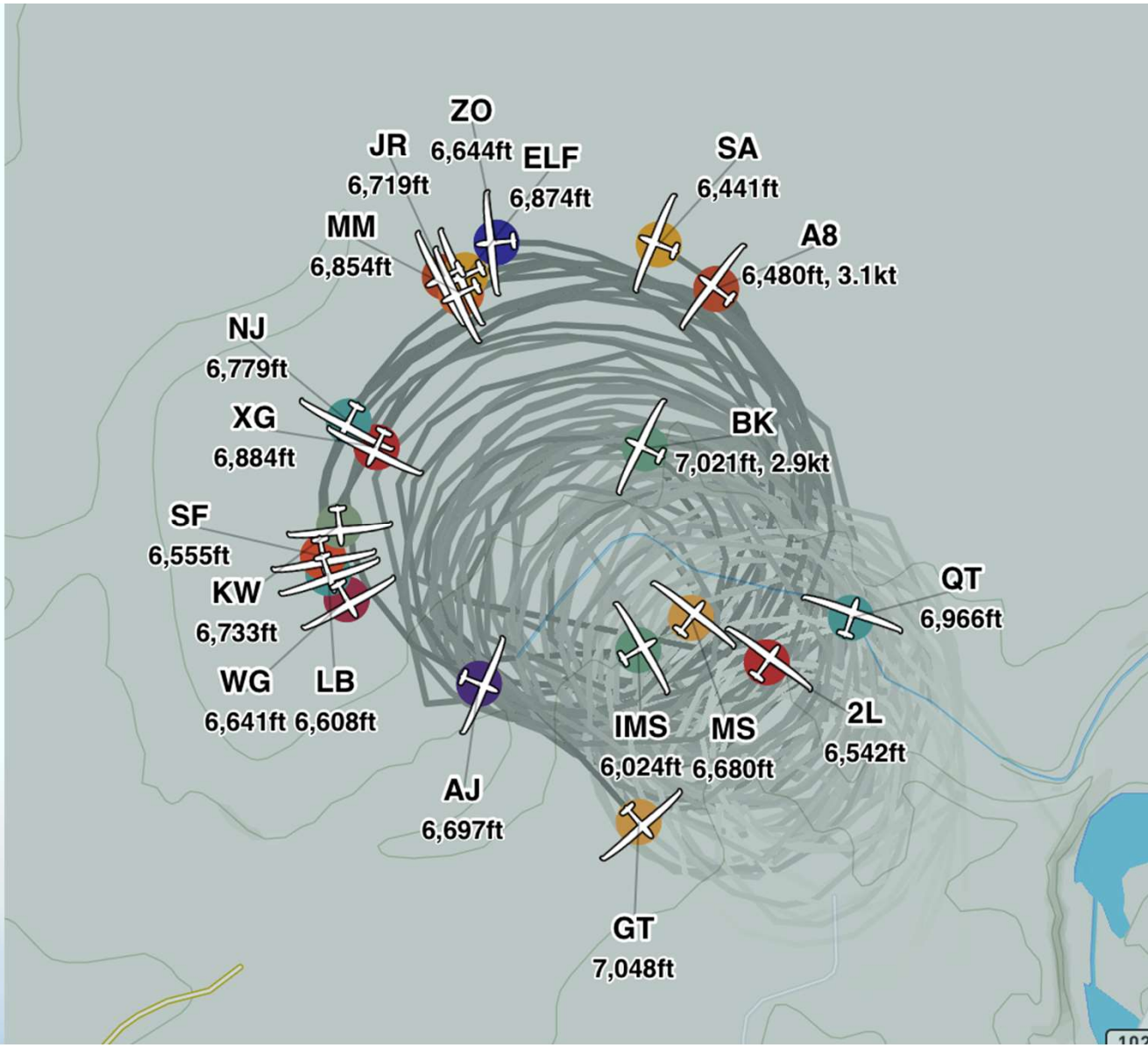








Gaggles


ZO
6,644ft
JR
6,719ft
ELF
6,874ft
SA
6,441ft
MM
6,854ft
A8
6,480ft, 3.1kt
NJ
6,779ft
XG
6,884ft
BK
7,021ft, 2.9kt
SF
6,555ft
KW
6,733ft
QT
6,966ft
WG
6,641ft
LB
6,608ft
IMS
6,024ft
MS
6,680ft
2L
6,542ft
AJ
6,697ft
GT
7,048ft

FLARM Petal Displays

Threats behind you

- Avoid following too close to people. If it's triggering the FLARM, it is too close.
- Don't do anything drastic. Gentle turns.
- Check on radio if aircraft has you in sight (if you know who it is)
- Not a lot you can do other than trust they can see you.

FLARM Petal Displays

Thermals

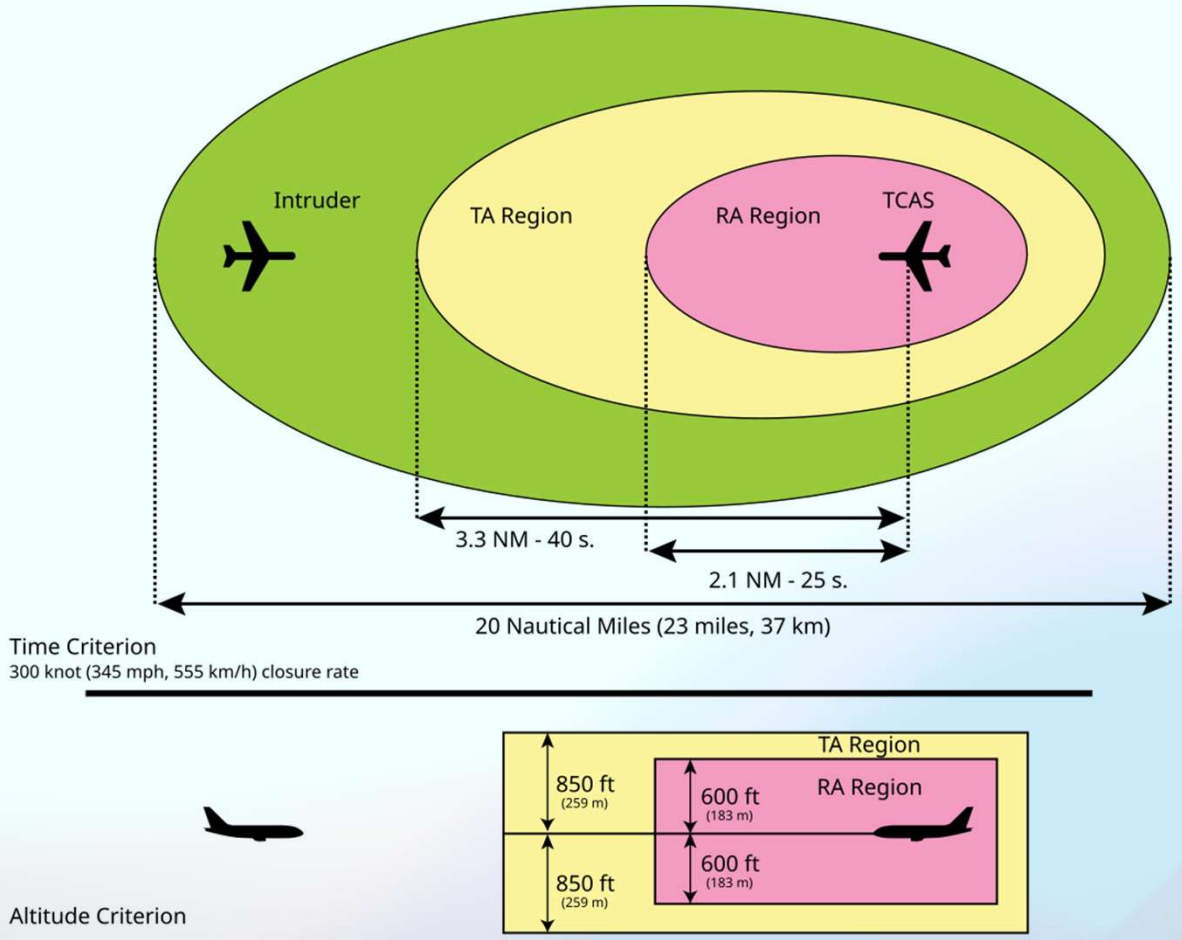
- People thermalling or joining thermals often trigger FLARM alarms.
- Remember they will only alarm if on a collision course. Which may be brief.
- If you're joining, and your alarm goes off abandon the join and stay outside the thermal, then join again with more space. Don't worry you'll be in sink and below the threat shortly!

Evasive Manœuvres

- Not recommended unless you can identify the threat.
- Slow and predictable will help others avoid you.
- Dive an option as an emergency. e.g. about to plow into back of someone.
- Front on threats, turn right.

TCAS

- Alerts to collision risk
- Gives instructions what to do to avoid
- Designed for larger aircraft with big buffers
- Works with Mode C transponders (ADSB not required)

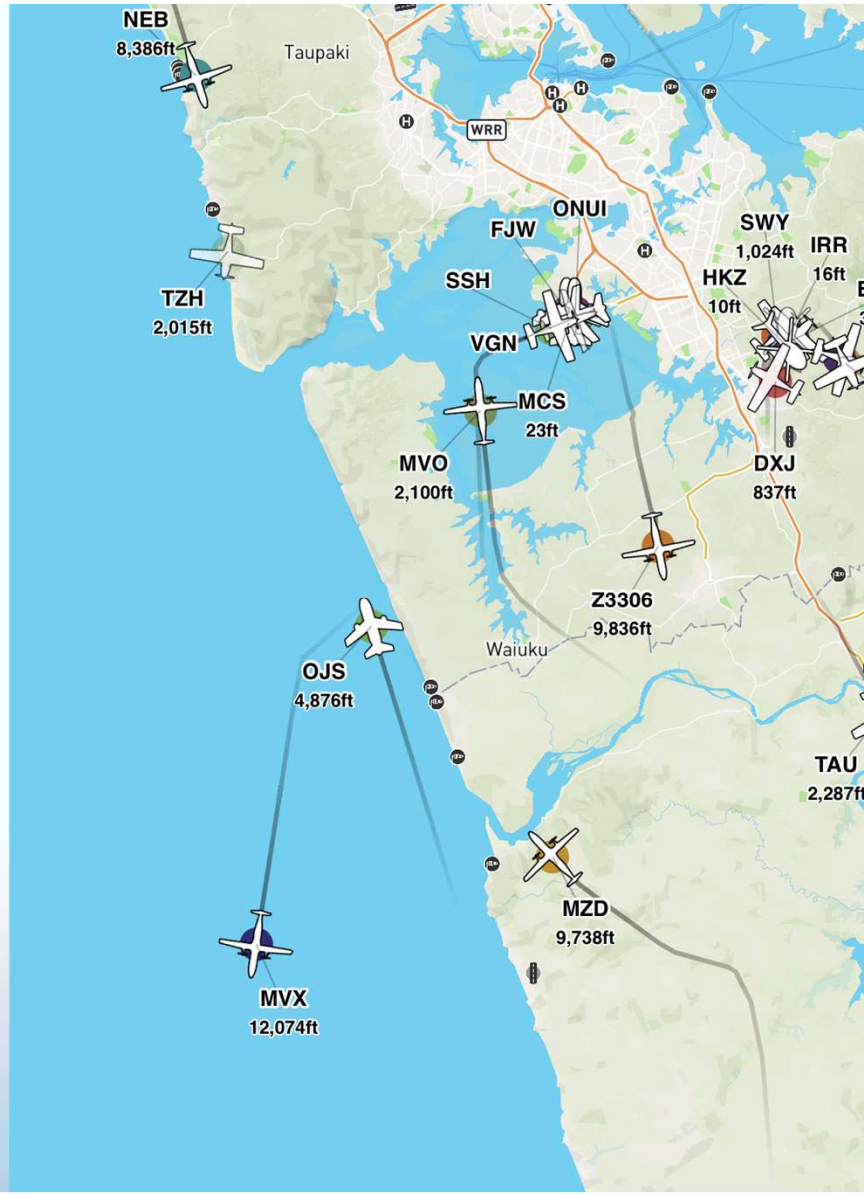


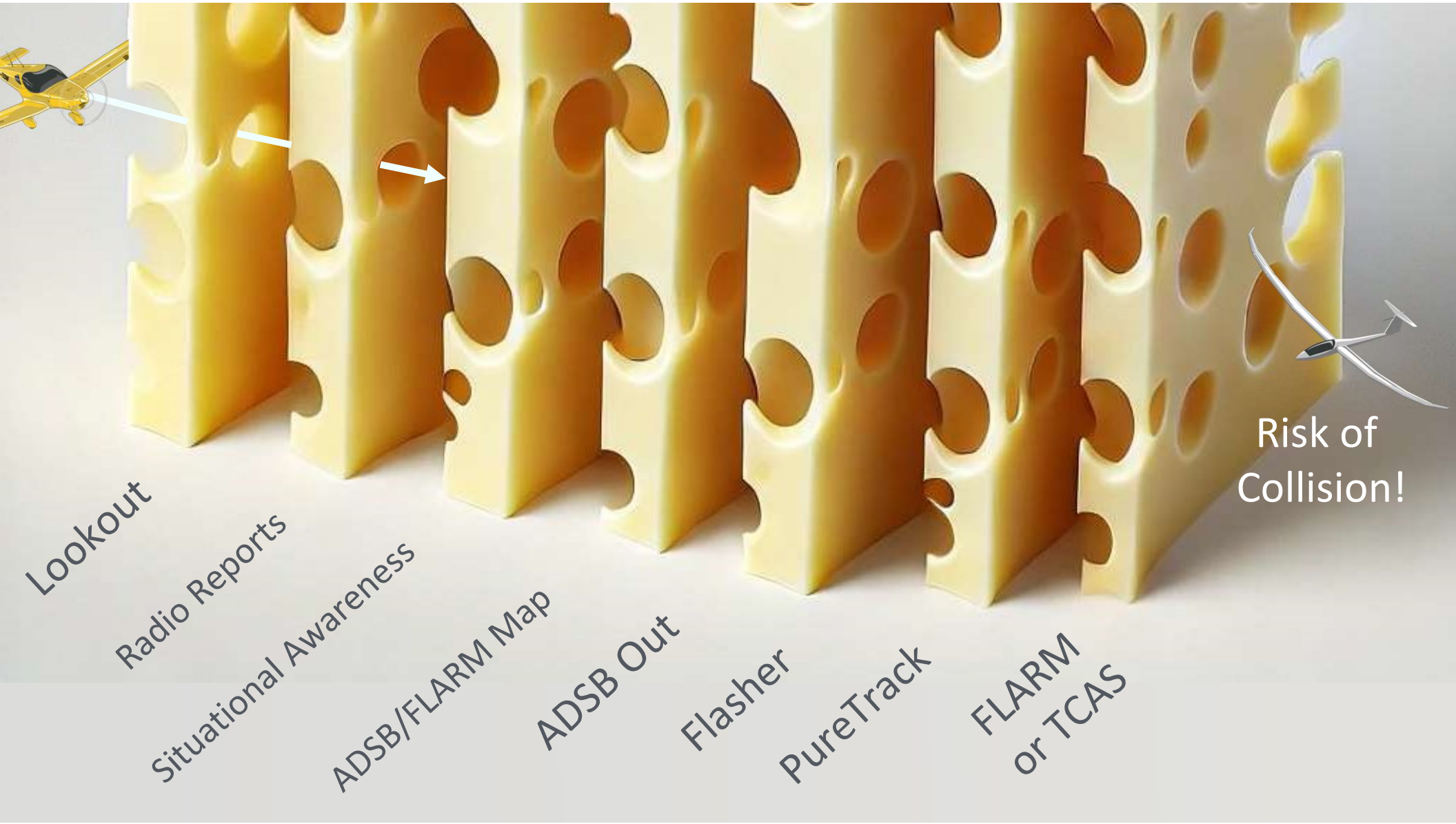
Example of ACAS Protection Volume between 5,000 and 10,000 feet (1,524 and 3,048 meters)

Situational Awareness

Way more important!

- Know where traffic is before it is a collision risk.
- Radio calls. MBZs and near airfields.
- ADSB & FLARM map displays.
- PureTrack, FR24 etc may help. But can't rely on them working with internet. So data may be old.
- Eyeballs. Good lookout and scanning technique.

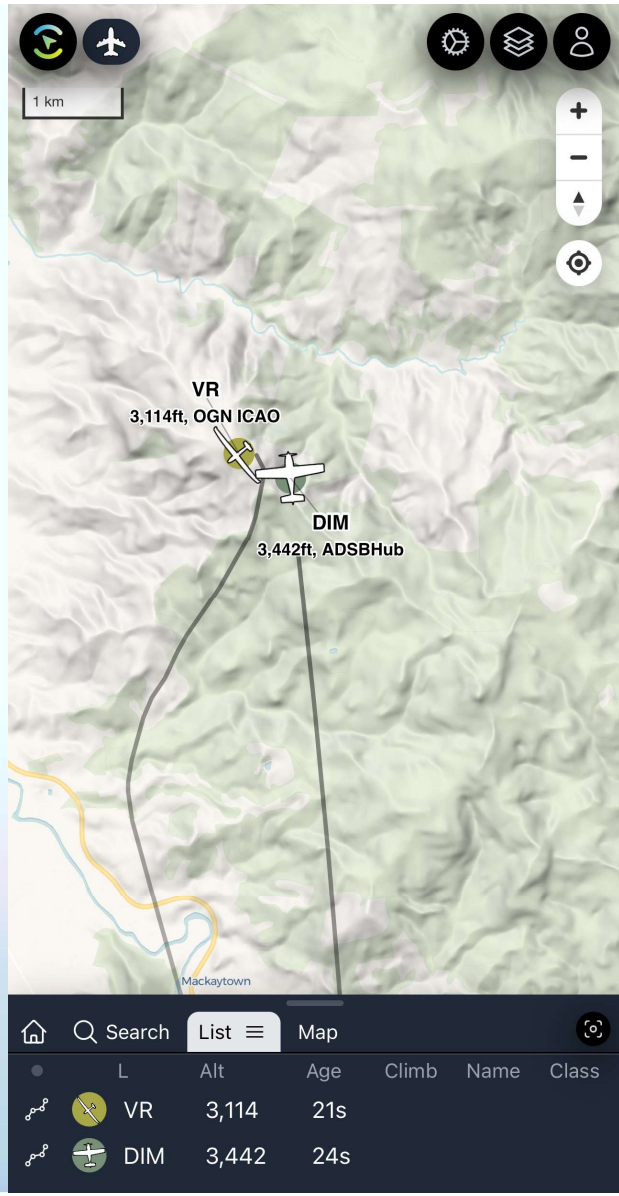



Lookout
Radio Reports
Situational Awareness
ADSB/FLARM Map
ADSB Out
Flasher
PureTrack
FLARM
or TCAS
Risk of
Collision!

Situational Awareness

Way more important!

- Glider on ridge example near Paeroa.
- Plane approaching from behind.
- Glider can't see behind. Plane can't see glider.
- Knowing they are approaching early makes it so much easier to keep spacing.



Advice

- Focus on situational awareness & Lookout
- Listen to radio calls to build mental picture.
- Reinforce with ADSB/FLARM/PureTrack maps.
- Keep transponder on so you can be seen by:
  - GA Pilots with iPads.
  - TCAS in helicopters and big aircraft (e.g. Air NZ).
- Know how to handle FLARM warnings