# Can Open Glider Network (OGN) data improve U.S. Glider accident statistics?

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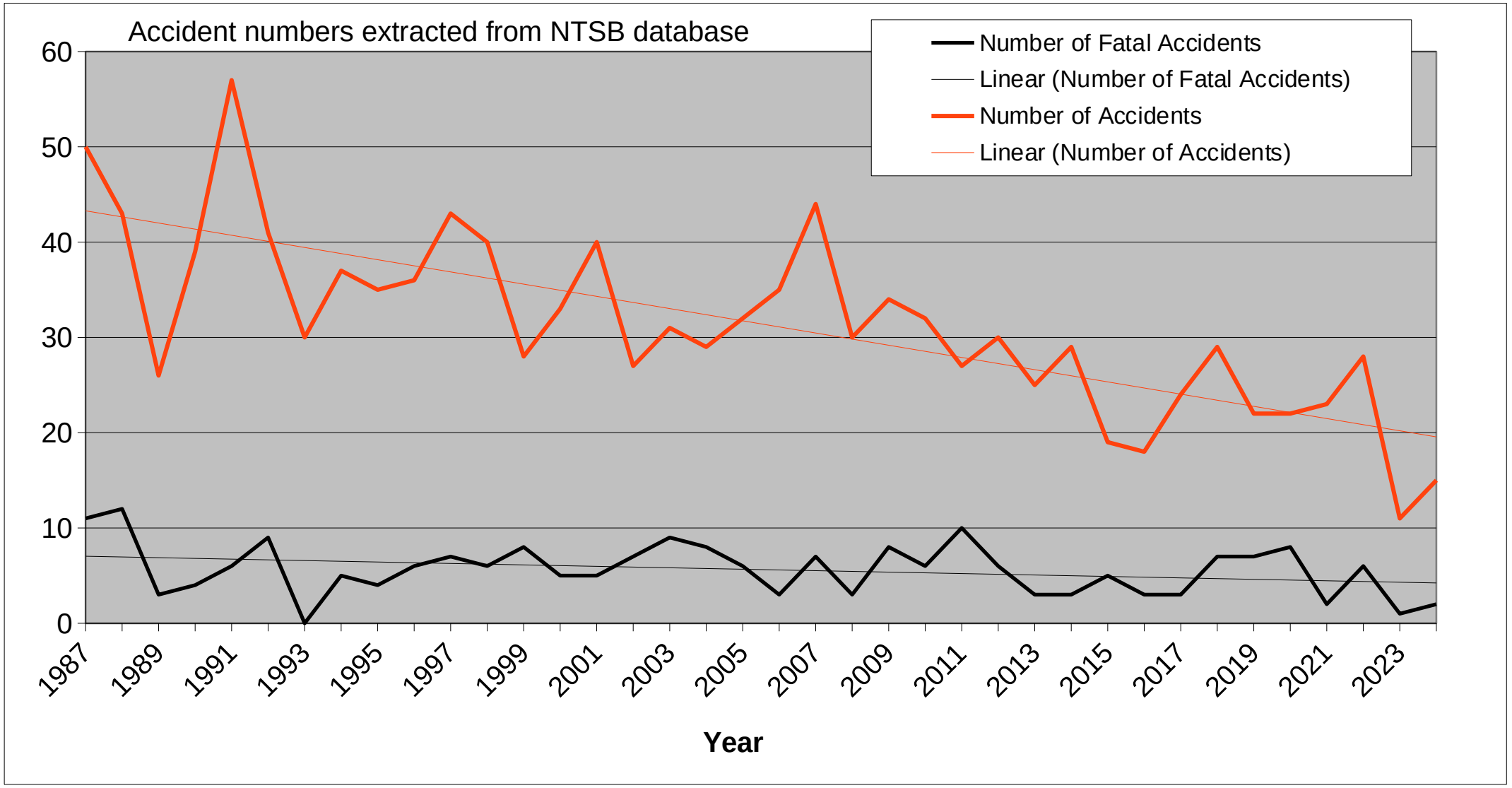
SSF Chairman
Oct 25, 2024

# Spoilers

- What is the accident rate for the US Glider community?
  - Flight hours and launch data historically comes from FAA annual surveys results in unknown reporting rate
  - Additional flight hours and launches comes from SSF annual surveys results in 30% reporting rate
  - Experiment with obtaining flight hours and launches using OGN data
    - 67% - 92% of the launches
    - 72% – 93% of the hours
  - Questions remain
    - Percentage of gliders reporting OGN data
    - U.S. coverage of OGN base stations

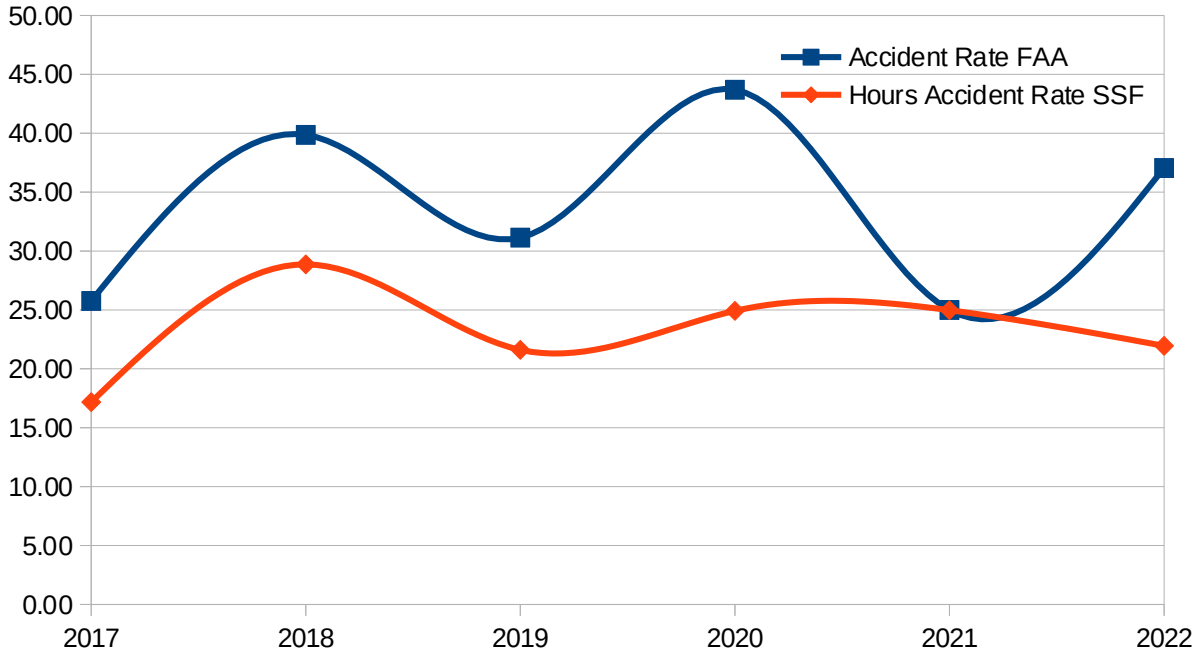
# Number of Soaring Accidents



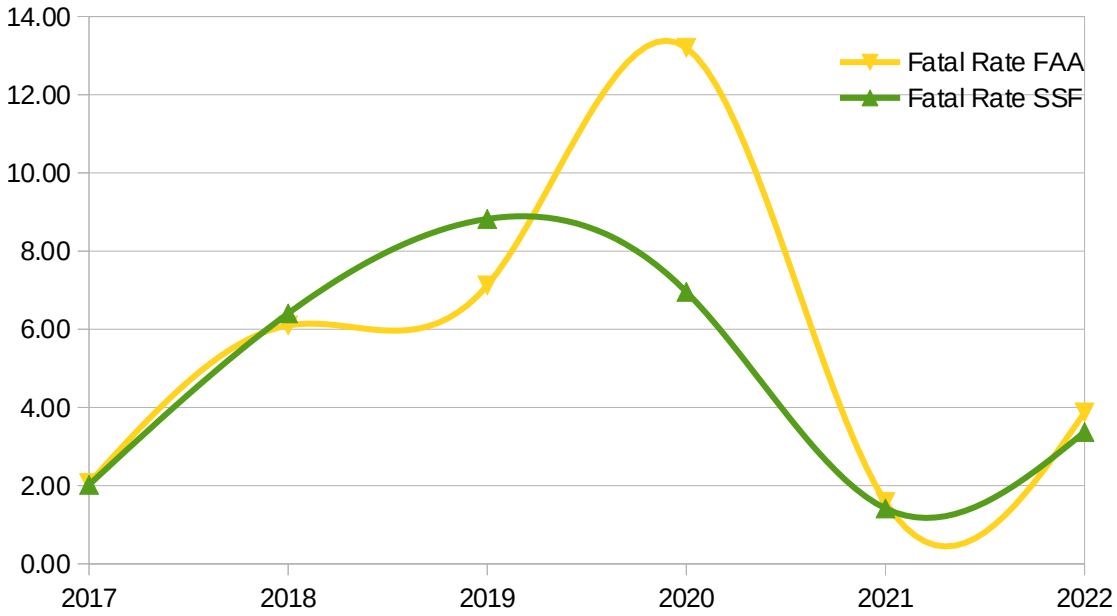
# FAA's Glider Population Data

| | Aircraft Population Size | Estimated Number Active | Percent Standard Error | Estimated Percent Active | Estimated Total Hours Flown | Percent Standard Error | Estimated Average Hours | Percent Standard Error |
|---|---|---|---|---|---|---|---|---|
| 2022 | 2,603 | 1,628 | 1.5 | 62.5 | 75,574 | 7.8 | 46.4 | 4.9 |
| 2021 | 2,636 | 1,717 | 1.4 | 65.1 | 92,002 | 12.9 | 53.6 | 8.4 |
| 2020 | 2,685 | 1,519 | 2.0 | 56.6 | 50,352 | 8.7 | 33.1 | 4.9 |
| 2019 | 2,734 | 1,517 | 2.1 | 55.5 | 70,645 | 8.3 | 46.6 | 4.6 |
| 2018 | 2,751 | 1,772 | 1.7 | 64.4 | 72,758 | 6.3 | 41.1 | 4.1 |
| | | | | | | | | |
| 2000 | 3,043 | 2,041 | 2.2 | 67.1 | 157,384 | 10.0 | 77.1 | 6.7 |
| 1999 | 2,975 | 2,041 | 1.5 | 68.6 | 154,680 | 8.2 | 75.8 | 5.6 |

# What is the Glider Accident Rate?

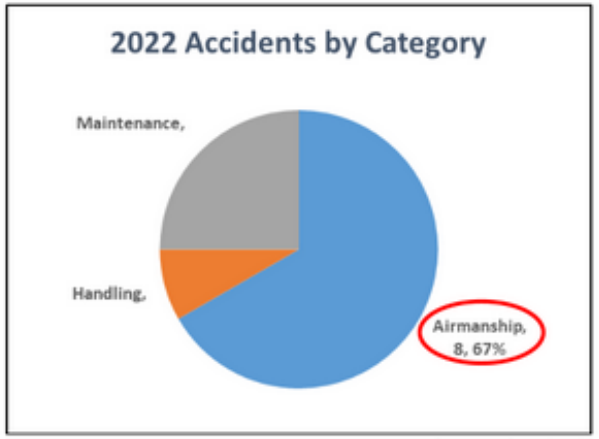


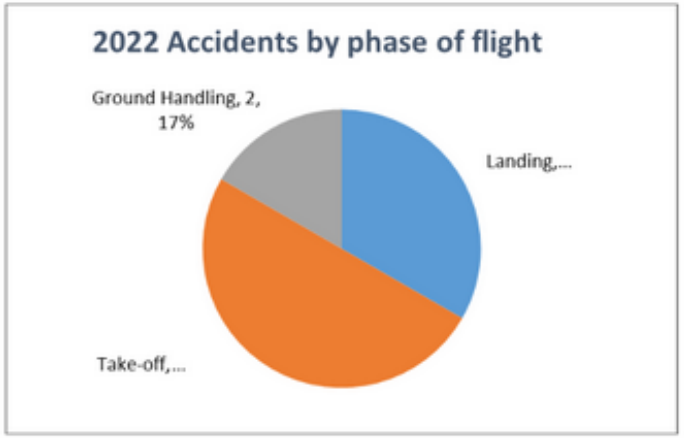

| | FAA Hours | SSF Hours | FAA Launches | SSF Launches |
|---|---|---|---|---|
| 2017 | 93,158 | 139,734 | 145,342 | 148,440 |
| 2018 | 72,758 | 100,452 | 114,808 | 109,269 |
| 2019 | 70,645 | 101,821 | 98,293 | 79,338 |
| 2020 | 50,352 | 88,269 | 60,601 | 114,960 |
| 2021 | 92,002 | 92,072 | 126,552 | 141,172 |
| 2022 | 75,574 | 127,589 | 155,001 | 177,918 |



# Canada Data

## The Numbers




**18 (75%) Clubs Reporting**

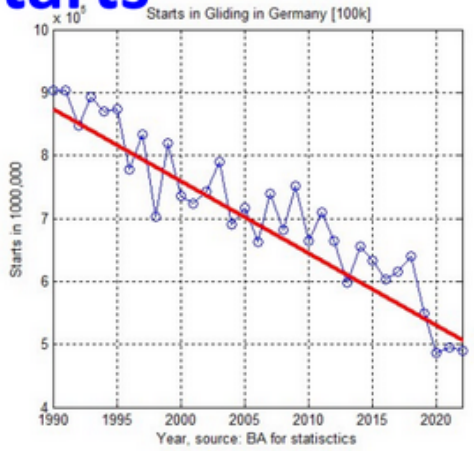
Launches: 13,160 (12,446)
Accidents: 12 (10)
Incidents: 183 (173)

# German Data

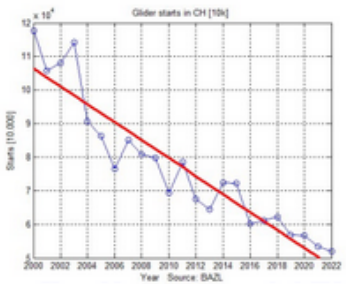
www.fly-top.de

## Number of Starts

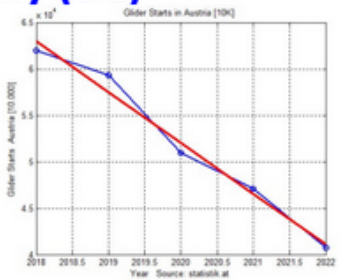
- Primary Example Germany (DE)
- Largest population of pilots / gliders /clubs and starts
- data of Switzerland (CH) / Austria (AT) show the same effects
- Avaliable on demand (if you ask for it)
- Observation:
- 900,000 starts in 1990 (DE)
- 500,000 starts in 2022 (DE)




Germany (DE)




Switzerland (CH)




Austria (AT)

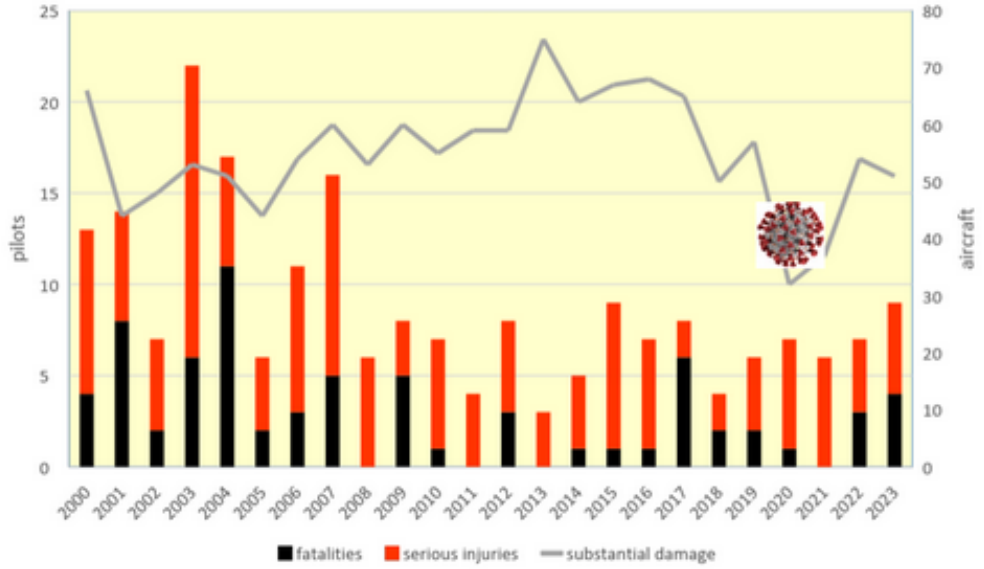
**Conclusion:**

**Number of starts is decreasing up to 50%**

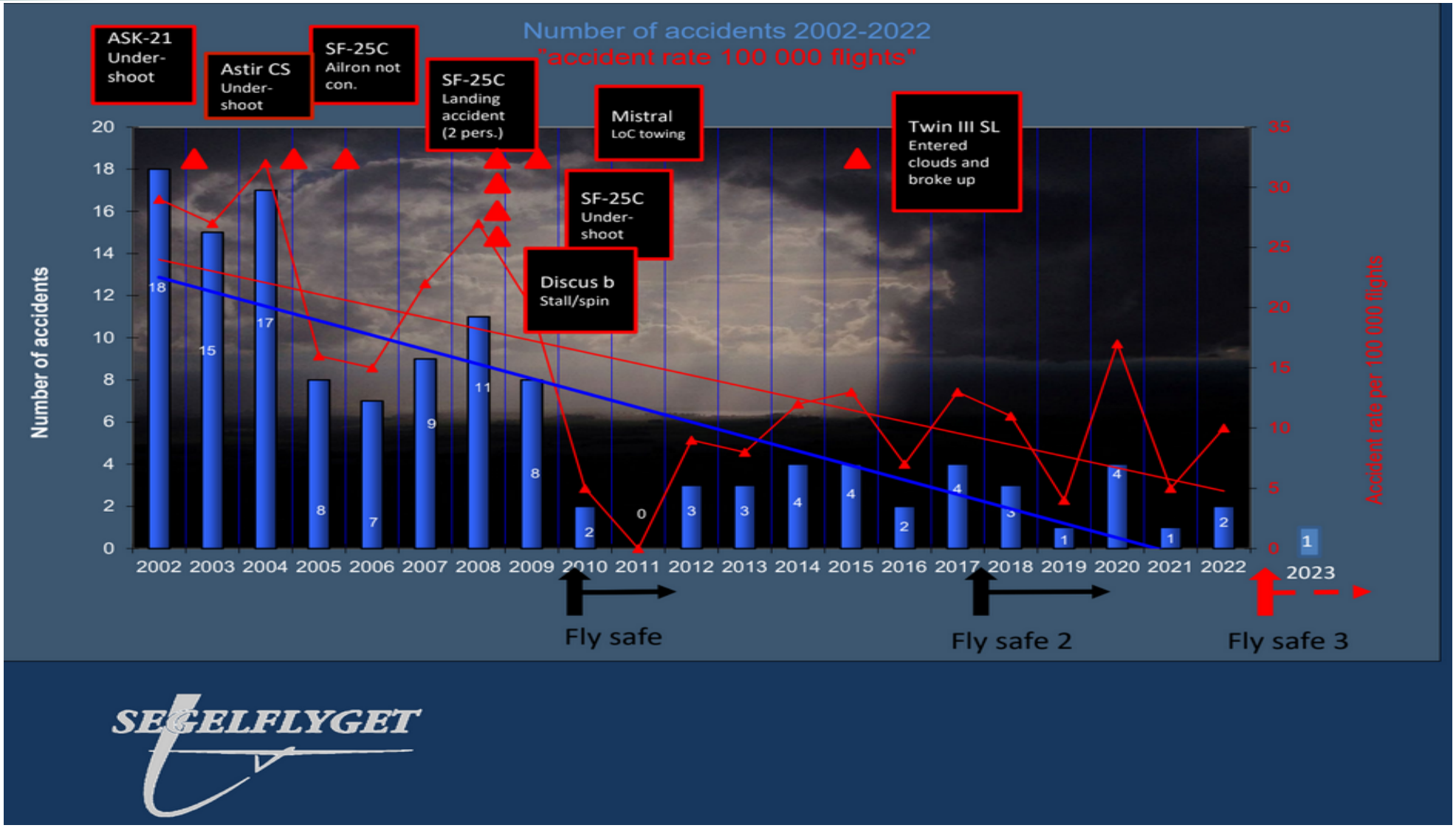
# United Kingdom Data

## UK gliding accidents 2000-2023

- significant reduction in injuries
- substantial damage continues



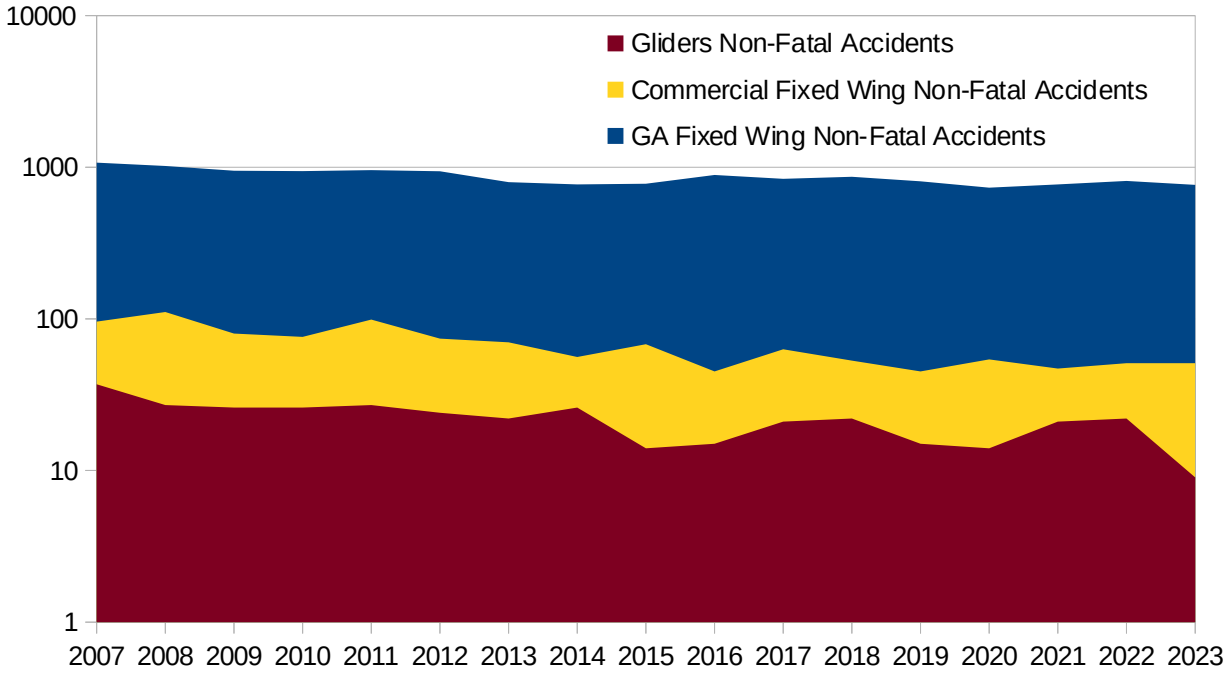
# Sweden Data

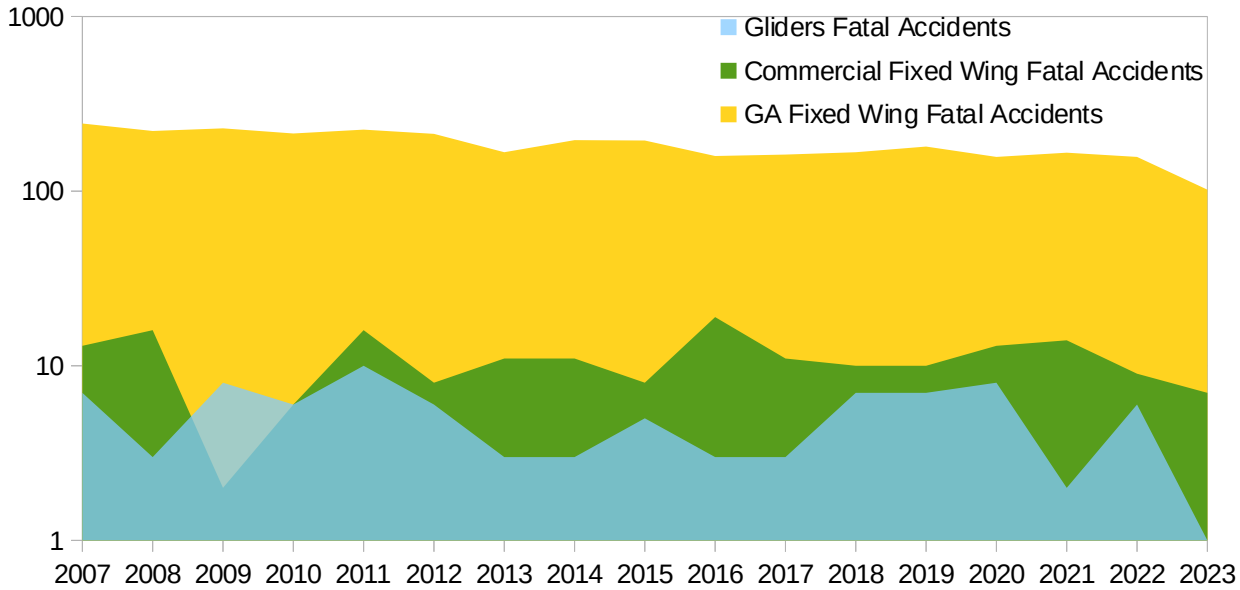

Number of accidents 2002-2022
"accident rate 100 000 flights"
ASK-21 Under-shoot
Astir CS Under-shoot
SF-25C Ailron not con.
SF-25C Landing accident (2 pers.)
Mistral LoC towing
SF-25C Under-shoot
Discus b Stall/spin
Twin III SL Entered clouds and broke up
Number of accidents
Accident rate per 100 000 flights
18 15 17 8 7 9 11 8 2 0 3 3 4 4 2 4 3 1 4 1 2 1
2002 2003 2004 2005 2006 2007 2008 2009 2010 2011 2012 2013 2014 2015 2016 2017 2018 2019 2020 2021 2022 2023
Fly safe
Fly safe 2
Fly safe 3
SEGELFLYGET

# GA/Glider Total Accident Comparison

| | GA Fixed Wing | | Commercial Fixed Wing | | Gliders | |
|---|---|---|---|---|---|---|
| **Year** | **Accidents** | **Fatal Accidents** | **Accidents** | **Fatal Accidents** | **Accidents** | **Fatal Accidents** |
| 2018 | 865 | 167 | 53 | 10 | 22 | 7 |
| 2019 | 808 | 179 | 45 | 10 | 15 | 7 |
| 2020 | 733 | 157 | 54 | 13 | 14 | 8 |
| 2021 | 770 | 165 | 47 | 14 | 21 | 2 |
| 2022 | 812 | 158 | 52 | 9 | 22 | 6 |
| 2023 | 767 | 157 | 51 | 12 | 10 | 1 |

# GA/Glider Total Accident Comparison



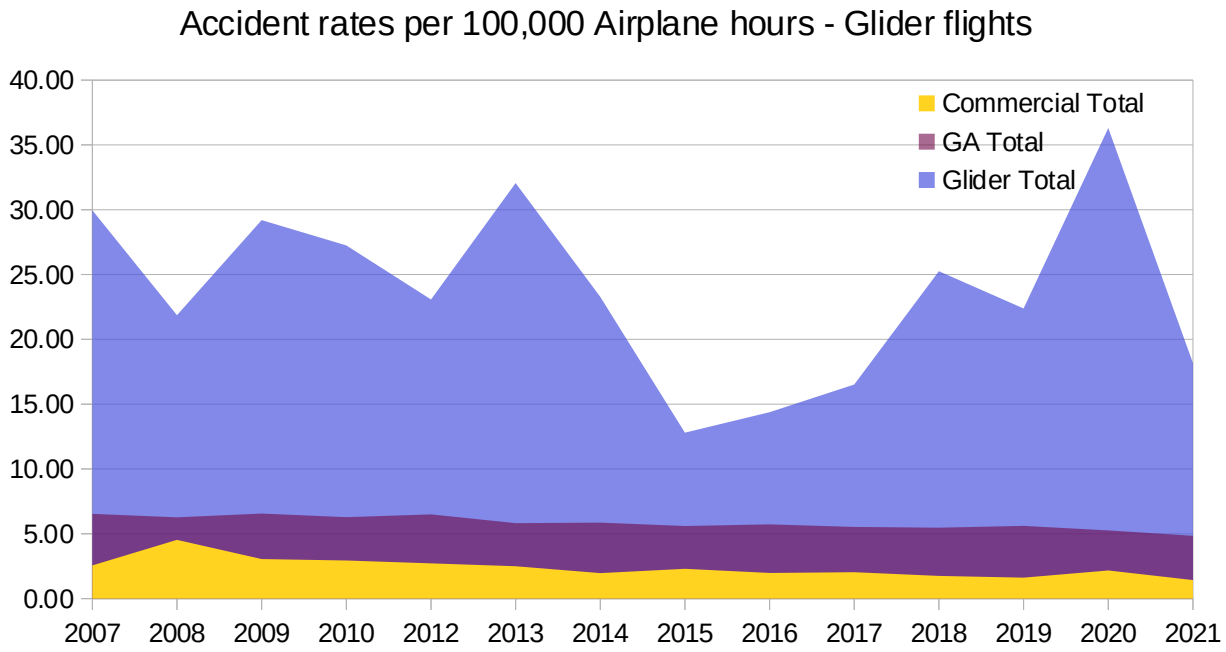



# GA/Glider Fatal Accident Comparison

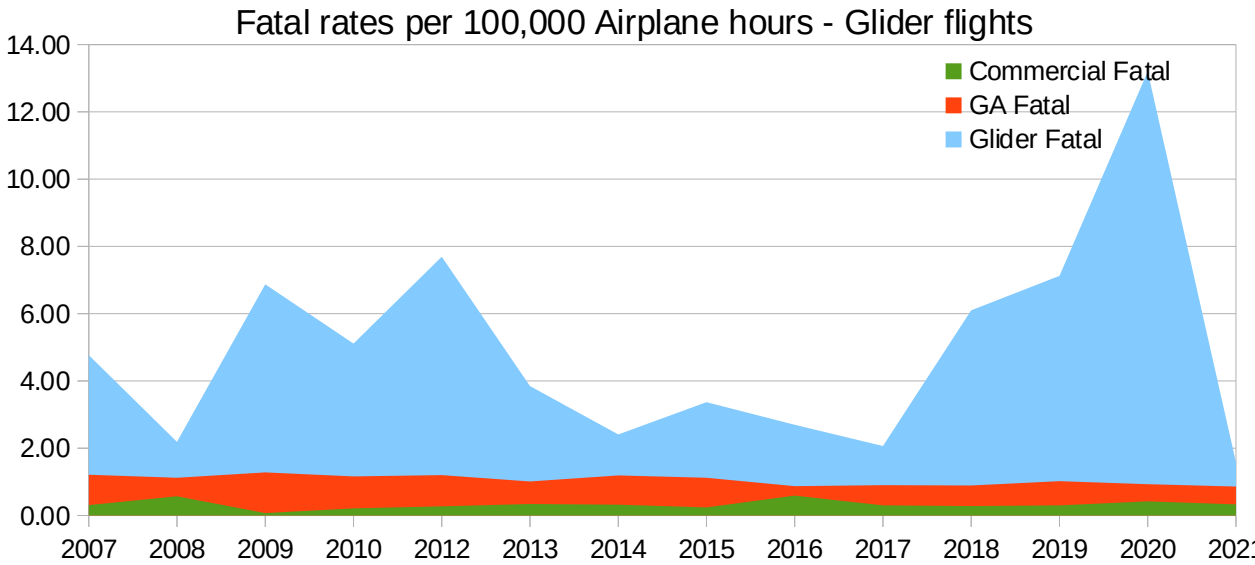
| | GA Fixed Wing | | Commercial Fixed Wing | | Gliders | |
|---|---|---|---|---|---|---|
| **Year** | **Accident Rate** | **Fatal Accident Rate** | **Accident Rate** | **Fatal Accident Rate** | **Accident Rate** | **Fatal Accident Rate** |
| 2016 | 5.73 | 0.87 | 1.98 | 0.59 | 14.38 | 2.70 |
| 2017 | 5.53 | 0.90 | 2.04 | 0.30 | 16.51 | 2.06 |
| 2018 | 5.47 | 0.89 | 1.75 | 0.28 | 25.26 | 6.10 |
| 2019 | 5.61 | 1.02 | 1.62 | 0.30 | 22.38 | 7.12 |
| 2020 | 5.27 | 0.93 | 2.17 | 0.42 | 36.30 | 13.20 |
| 2021 | 4.87 | 0.86 | 1.43 | 0.33 | 18.20 | 1.58 |

Rates based on 100,000 Airplane Flight Hours and 100,000 Glider Flights with data extracted from FAA Annual Survey information

# GA/Glider Fatal Accident Comparison




Number of Airplane Flight Hours and Glider Flights extracted from FAA Survey Data



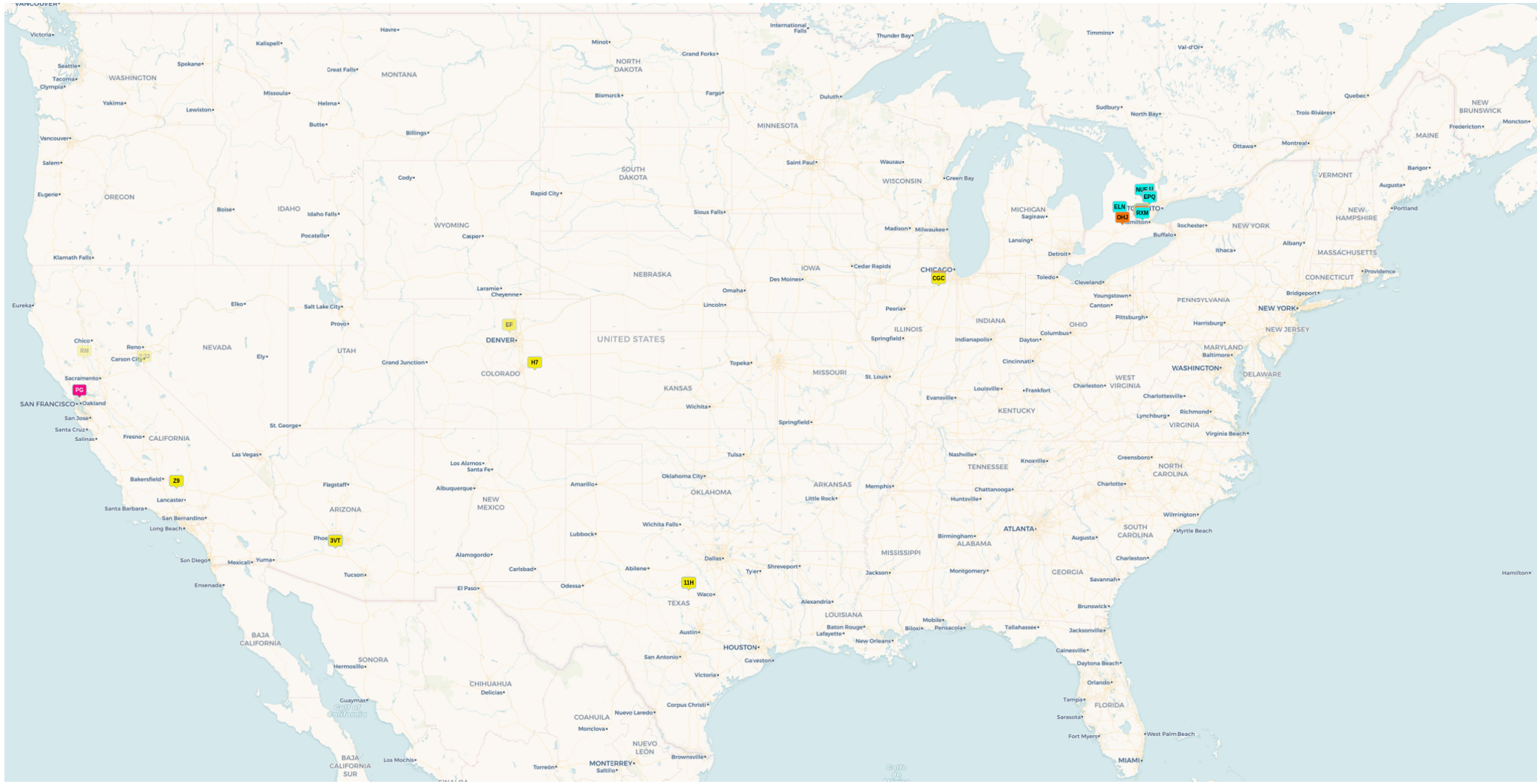
# Can we get better Data?

- Ways to get better utilization data
  - Get more clubs to respond to the anonymous SSF annual survey
  - Get more glider owners to respond to the FAA's annual survey
  - Automatically collect and process Open Glider Network (OGN) data

# Open Glider Network

- System of base stations
  - Base stations setup and operated by clubs or individuals
  - SSA has/had a fund to promote the installation of based stations
  - Base stations upload data over the internet to OGN collection server
- Airborne transmitters
  - Multiple types FLARM, OGN, ADS-B, some Oudie
  - Broadcast 3D location at regular time intervals
  - Data format is well know and describe
- Numerous programs extract data from the collection servers to provide real-time tracking of OGN equipped gliders
  - See Andy Blackburn's "Glider Tracking, Explained" article in the January 2024 issue of SOARING for a primer to OGN
- Some clubs use OGN data instead of manual recording for billing and logging

# Open Glider Network On-line tracking



# OGN Experiment

- Identified 2 clubs willing to share paper records
  - Flight hours for club and/or private gliders
  - Number of aerotow launches
  - Clubs had an operational OGN base station
- From the OGN developers web site obtained
  - Perl script to extract data from OGN collector server
  - Limited data capture to radius of 15 Km around each club's home field
  - Data collection started and stopped daily
- Created perl script to parse OGN data to extract
  - Number of launches
  - Number of gliders
  - Total hours flown
- Created spreadsheet to compare OGN and Paper data

# Clubs involved in Experiment

- Club 1 Operates all year (weather permitting)
  - Approximately 90 members
  - Approximately 50 gliders on the field
  - 3 of 5 (60%) club gliders supplied OGN data
  - 14 of 26 (54%) of the private gliders supplied OGN data
  - Club captures all aerotow launches and flight hours
- Club 2 Operates April – November
  - Approximately 88 members
  - Approximately 20 gliders on the field
  - 4 of 4 (100%) of the club gliders supplied OGN data
  - 14 of 15 (93%) of the private glider supplied OGN data
  - Club captures all aeroto launches and club flight hours
  - Club does not capture self-launches or private flight hours

# OGN Data

- Sample OGN data records
  - ADS-B record
    - ICAxxxxxx>ONADSB,qAS,BBBBBBBB:/152732hLA44.58N/LO22.88W'163/056/A=002250 !W00! id05xxxxxx +0fpm +0.0rot 0.0dB 0e +0.0kHz gps2x3
      - Identifier: ICAO identity
      - Transmitter type: (ADS-B)
      - Base station ID: assigned by operator
      - Time stamp: 15:27:32 UTC
      - Current Position: Lat/Long
      - Heading and Ground Speed
      - Altitude
      - ID 05: indicated glider (09 indicated towplane)
      - Other data
  - FLARM record
    - ICAyyyyyy>OGFLR,qAS,BBB:/152841hLA45.18N/LO20.83W'137/063/A=000847 !W38! id05yyyyyyy +871fpm -0.3rot 45.2dB -13.5kHz gps2x3

# Sample Daily Report

- On 8, Sep, 2024 Glider Club1 (AC), started: '141301' (A=002500) ended: '152838' (A=001800) with Flight Time = 76 minutes
- On 8, Sep, 2024 Glider Club2 (AC), started: '142508' (A=002075) ended: '143919' (A=001700) with Flight Time = 14 minutes
- On 8, Sep, 2024 Glider Club2 (AC), started: '151230' (A=001700) ended: '153638' (A=001675) with Flight Time = 24 minutes
- On 8, Sep, 2024 Glider Club1 (AC), started: '154535' (A=001725) ended: '155701' (A=001600) with Flight Time = 11 minutes
- On 8, Sep, 2024 Glider Private1 (A0), started: '155236' (A=000558) ended: '161157' (A=000574) with Flight Time = 19 minutes
- On 8, Sep, 2024 Glider Private2  (AB), started: '161552' (A=002225) ended: '182153' (A=001925) with Flight Time = 126 minutes
- On 8, Sep, 2024 Glider Club1 (AC), started: '162505' (A=001675) ended: '165537' (A=001725) with Flight Time = 31 minutes
- On 8, Sep, 2024 Glider Club2 (AC), started: '163427' (A=001675) ended: '165558' (A=001625) with Flight Time = 22 minutes
- On 8, Sep, 2024 Glider Private3 (A0), started: '170002' (A=000561) ended: '210037' (A=000564) with Flight Time = 241 minutes
- On 8, Sep, 2024 Glider Private4 (A1), started: '171350' (A=000587) ended: '205314' (A=000561) with Flight Time = 219 minutes
- On 8, Sep, 2024 Glider Private5 (AC), started: '173703' (A=000561) ended: '194752' (A=000558) with Flight Time = 131 minutes
- On 8, Sep, 2024 Glider Private6 (A1), started: '174919' (A=000541) ended: '183653' (A=001400) with Flight Time = 48 minutes
- On 8, Sep, 2024 Glider CLub1 (AC), started: '181015' (A=001725) ended: '184444' (A=001775) with Flight Time = 34 minutes
- On 8, Sep, 2024 Glider Private7 (A0), started: '181909' (A=000564) ended: '201154' (A=000541) with Flight Time = 113 minutes
- On 8, Sep, 2024 Glider Club1 (AC), started: '183147' (A=002275) ended: '183526' (A=001500) with Flight Time = 4 minutes
- On 8, Sep, 2024 Glider Club2 (AC), started: '191114' (A=001925) ended: '193859' (A=001800) with Flight Time = 28 minutes
- On 8, Sep, 2024 Glider Club2 (AC), started: '192153' (A=002000) ended: '194154' (A=001700) with Flight Time = 20 minutes
- On 8, Sep, 2024 Glider Club2 (AC), started: '200309' (A=001875) ended: '203514' (A=001675) with Flight Time = 32 minutes
- On 8, Sep, 2024 Glider Club1 (AC), started: '201718' (A=001700) ended: '211811' (A=001725) with Flight Time = 61 minutes
- Total flights = 19 by 8 gliders, Total time = 21.30 hours (includes 24 extra minutes) collected on 8, Sep, 2024

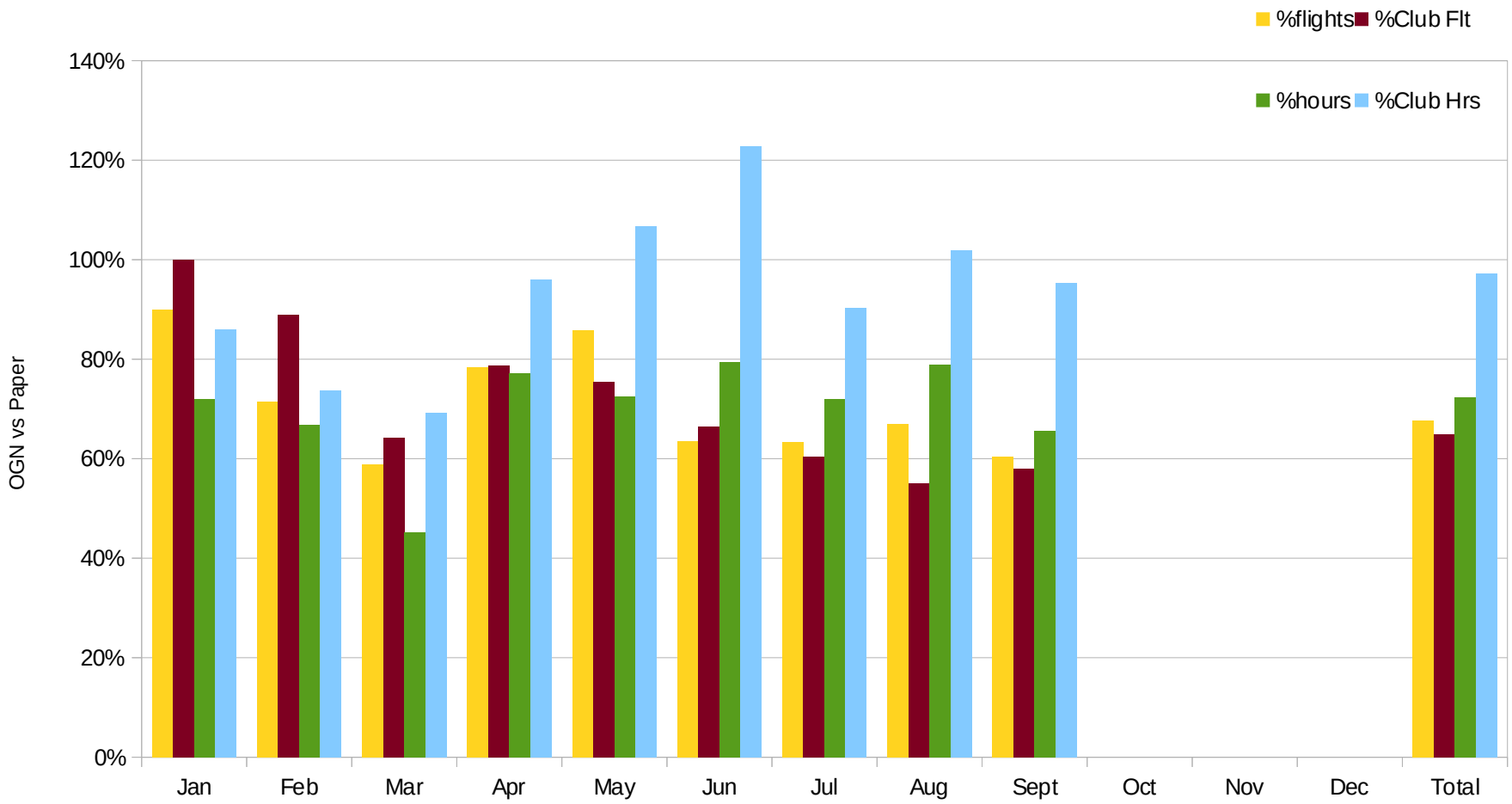
# Club1 Observations

- Data from club gliders comes from ADS-B Tabs instrument
  - FAA's ADS-B ground station picks glider up about 1000 ft AGL
  - Flight ends when ground speed approaches 0 and near the ground or no further records found
  - Initial OGN collection data shows 1 flight per day per glider
  - Club's paper data shows multiple flights per day per glider
- Private gliders have a variety of transmitters
  - FLARM
  - Oudie
  - ADS-B
- Some gliders have multiple transmitters, duplicating data in OGN database
- Only 54% of the private gliders report OGN data
  - Significant differences in flight times 392.6 hrs (OGN) vs 668.8 hrs (paper) 41% missing
  - Less of a difference in launches 217 (OGN) vs 288 (Paper) 25% missing

# Club 1 OGN vs Paper data

| | OGN | | | | | | Club | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | Flights | Hours | Club Flights | Club Hours | Pvt Flights | Pvt Hours | Flights | Hours | Club Flights | Club Hours | Pvt Flights | Pvt Hours |
| Jan | 18 | 5.10 | 16 | 3.48 | 2 | 1.62 | 20 | 7.1 | 16 | 4.05 | 4 | 3.03 |
| Feb | 35 | 21.97 | 24 | 9.05 | 11 | 12.92 | 49 | 32.9 | 27 | 12.28 | 22 | 20.60 |
| Mar | 33 | 21.25 | 27 | 13.08 | 6 | 8.17 | 56 | 47.0 | 42 | 18.92 | 14 | 28.08 |
| Apr | 76 | 96.22 | 48 | 35.67 | 28 | 60.55 | 97 | 124.6 | 61 | 37.17 | 36 | 87.43 |
| May | 91 | 99.08 | 49 | 25.80 | 42 | 73.28 | 106 | 136.8 | 65 | 24.18 | 41 | 112.62 |
| Jun | 92 | 115.90 | 73 | 66.70 | 19 | 49.20 | 145 | 145.85 | 110 | 54.33 | 35 | 91.52 |
| Jul | 186 | 199.23 | 140 | 103.43 | 46 | 95.80 | 294 | 276.87 | 232 | 114.49 | 62 | 162.4 |
| Aug | 99 | 101.83 | 60 | 45.70 | 39 | 56.13 | 148 | 129.05 | 109 | 44.82 | 39 | 84.2 |
| Sept | 90 | 88.70 | 66 | 53.83 | 24 | 34.88 | 149 | 135.4 | 114 | 56.5 | 35 | 78.9 |
| Total | 720 | 749.28 | 503 | 356.75 | 217 | 392.55 | 1064 | 1035.54 | 776 | 366.74 | 288 | 668.80 |

# Club 1 OGN vs Paper data



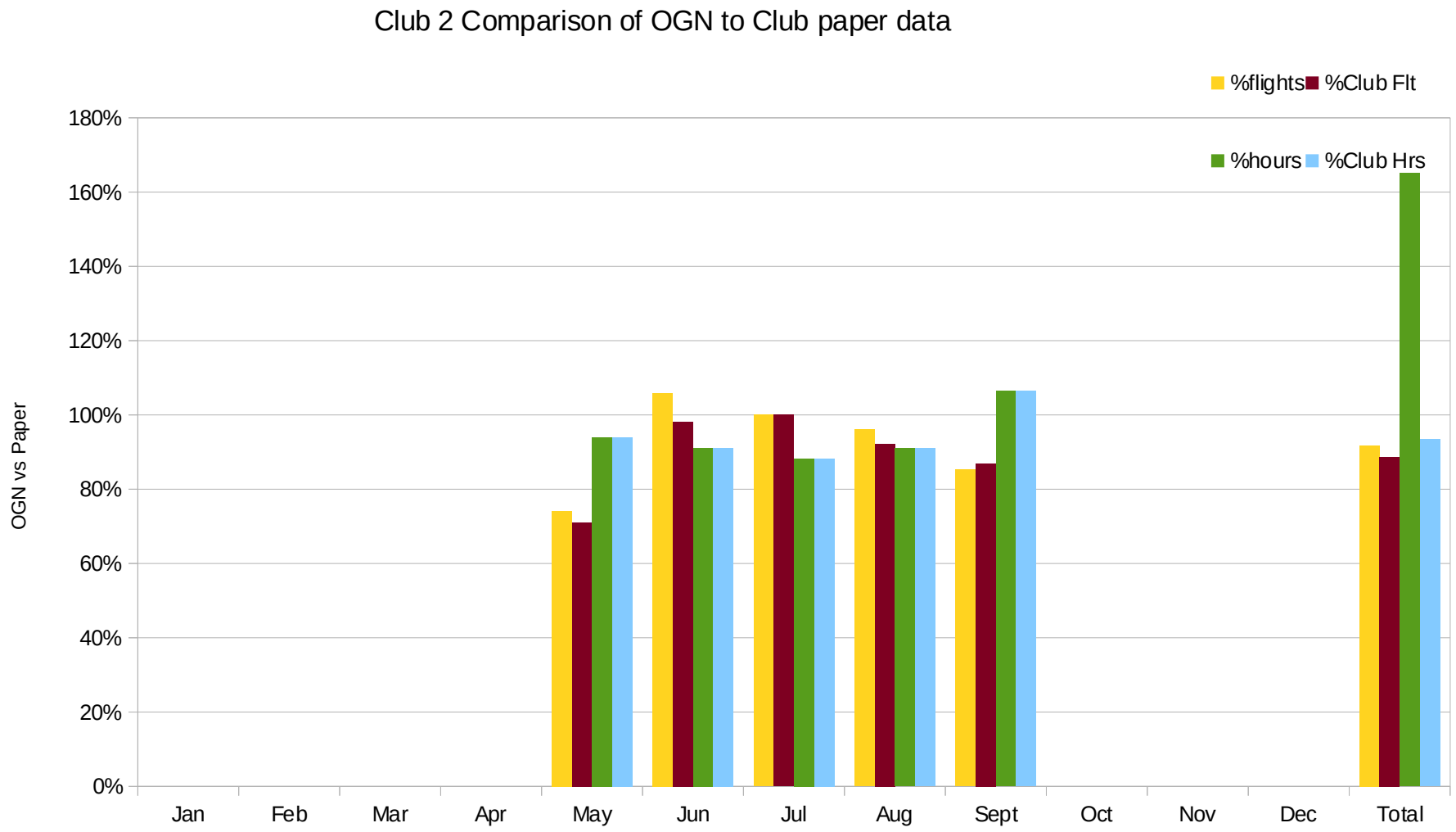
# Club2 Observations

- Data from club gliders comes from FLARM instrument
  - Limited number of OGN base stations caused landout retrieve times to be missed
  - Initial flights in each club glider not recorded (FLARM updates?)
  - Club's paper relies on pilot recording flight time
- Most private gliders have a FLARM instrument
  - Club towpilot records all aerotow launches
  - Several self-launch gliders operate off of the field
  - Total time does not include private glider times
- Some gliders have multiple transmitters, duplicating data in OGN database
- Almost all private gliders report OGN data
  - Significant differences in flight times 277.5 hrs (OGN) vs 168.1 hrs (paper) 165% overage
  - Less of a difference in launches 326 (OGN) vs 355 (Paper) 8% missing

# Club 2 OGN vs Paper data

| | OGN | | | | | | Club | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | Flights | Hours | Club Flights | Club Hours | Pvt Flights | Pvt Hours | Flights | Hours | Club Flights | Club Hours | Pvt Flights | Pvt Hours |
| May | 60 | 45.92 | 54 | 35.45 | 6 | 10.47 | 81 | 37.70 | 76 | 37.70 | 5 | DNC |
| Jun | 72 | 75.13 | 53 | 35.25 | 19 | 39.88 | 68 | 38.70 | 54 | 38.70 | 14 | DNC |
| Jul | 69 | 49.45 | 59 | 28.77 | 10 | 20.68 | 69 | 32.60 | 59 | 32.60 | 10 | DNC |
| Aug | 73 | 54.38 | 59 | 31.22 | 14 | 23.17 | 76 | 34.30 | 64 | 34.30 | 12 | DNC |
| Sept | 52 | 52.60 | 40 | 26.40 | 12 | 26.20 | 61 | 24.80 | 46 | 24.80 | 15 | DNC |
| Total | 326 | 277.48 | 265 | 157.08 | 61 | 120.40 | 355 | 168.10 | 299 | 168.10 | 56 | DNC |

# Club 2 OGN vs Paper data



# Summary of Experiment

- Obtaining flight hours and launches using OGN data resulted in better data than SSF survey
  - 67% - 92% of the launches
  - 72% – 93% of the hours
  - About 30% of the clubs/commercial operators return data
- Questions remain
  - Percentage of gliders reporting OGN data
  - U.S. coverage of OGN base stations

# Conclusions

- OGN appears to be a reasonable method to collect utilization data
- Cross checking with SSF survey data and FAA survey data will help determine error bars
- Better accident rate data should become available

# Next Steps

- OGN appears to be a reasonable way to automatically collect flight hours and launches
- Inform membership that anonymous data will be collected, article in SOARING
- All data results will be anonymized
- Need to keep track of individual gliders to obtain percentage of active glider fleet reporting data
- Need to review base station l
- ocation and coverage with active glider operations
- Expand experiment to part/all of the country starting in 2025