

INCIDENT REPORT: NEAR MISS IN A THERMAL

Date of Incident: June 9, 2023

Time: 13:49 hours

Surface Wind: 6 knots at 190 degrees

Active Runway: 18

The Minnesota Soaring Club (MSC) fosters a culture of safety by encouraging pilots to report their aviation mistakes. To foster this attitude the MSC replicates NASA's Aviation Safety Reporting System by 1. Concealing, in incident reports, the identify of pilots who report errors, and 2. Not disciplining pilots who report errors unless the error was deliberate or criminal. This non-discipline stand does not preclude actions to improve pilot skills and knowledge by recommending additional flight instruction.

The pilot flying the single-seater glider will be designated as Pilot 1 in this report. This pilot's glider will be referred to as private glider.

The pilot who flew the ASK 21 B will be designated as Pilot 2

CONTACTS & INTERVIEWS

06/12/2022 Review of emails from Pilot 1

06/17/2023 Interview of Pilot 1

07/26/2023 Interview of Pilot 2

08/13/2023 Follow up emails with Pilot 1

08/14/2023 Second phone interview with Pilot 2

08/14/2023 Second phone interview with Pilot 1

INFORMATION REVIEWED

Review of IGC file of Pilot 1's flight

Review of FlightAware trace of both pilot's flights

Aeronautical Information Manual Chapter 7, Section 6. Safety, Accident, and Hazard Reports

Federal Aviation Regulations, §91.113 Right-of-way rules: except water operations

THE INCIDENT

Pilot 1 stated he was flying over the eastern shore of Lake Byllesby when the ASK 21 B approached from the right and flew 100 feet directly overhead. Pilot 1 stated that the first time he saw the ASK 21 B was when it was nearly directly overhead. Pilot 1 does not know who was in the thermal first. Pilot 1 believes he was at an altitude of approximately 5,400' when the ASK 21 B overflew him. Pilot 1 further states that both gliders circled in the thermal for three minutes, before Pilot 1 departed.

Pilot 2 stated that he was thermalling over the eastern shore of Lake Byllesby and saw the private glider several hundred feet beneath him. Pilot 2 stated, "I never recall us being that close together."

The FlightAware aircraft traces show that both gliders turned in the same direction (right turns) in accordance with thermalling protocol.

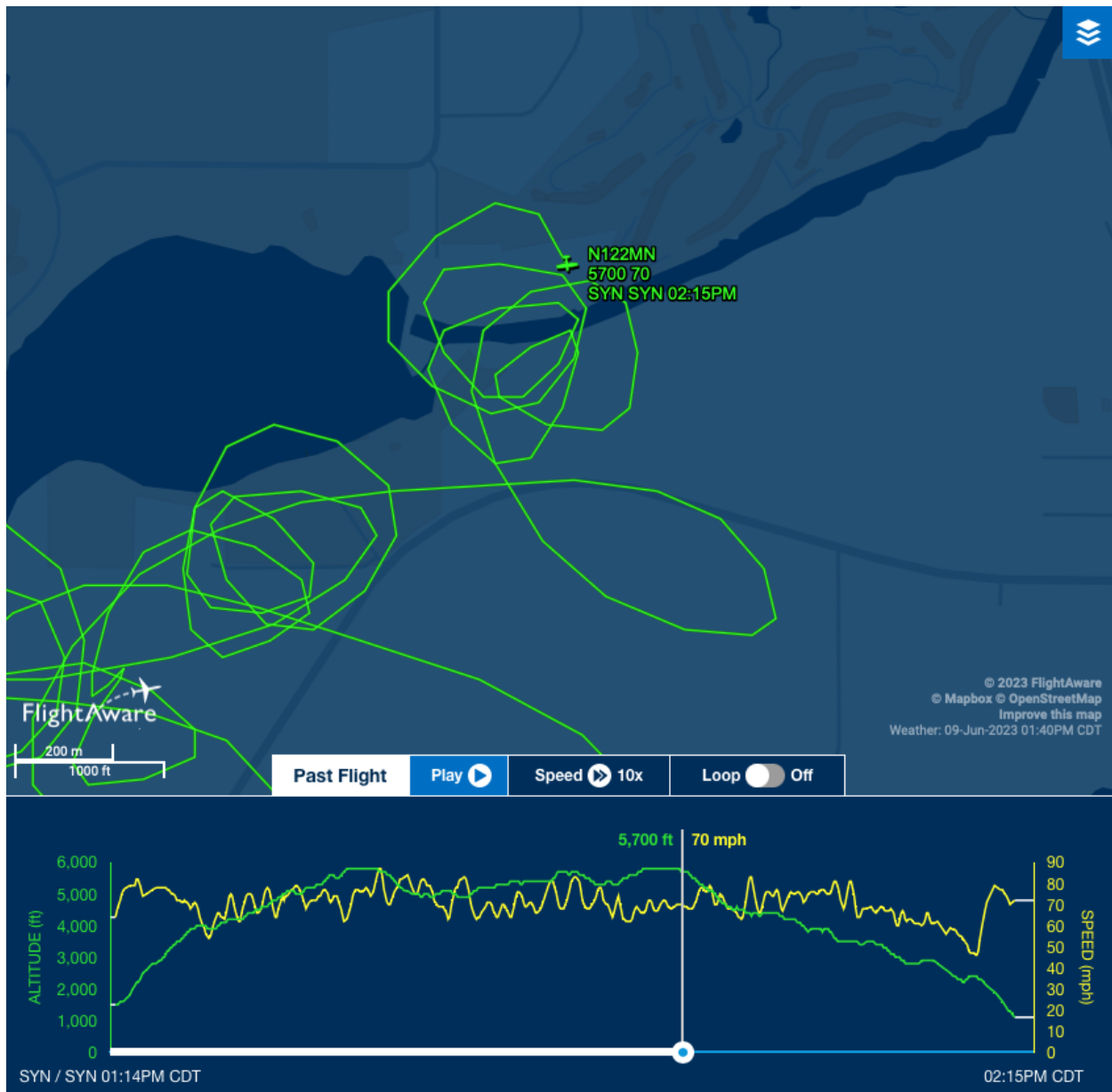
The private glider had a Trig TT22 mode-S transponder which provides Automatic Dependent Surveillance-Broadcast Out (ADS-B Out). It also had a flight computer which received input from PowerFLARM which displayed ADS-B and FLARM traffic. There is an audio warning of nearing traffic which specifies flight level and position. Pilot 1 said that he heard no proximity announcement from the flight computer. However, he noted that the volume of the unit was weak, and he may have not heard it.

The ASK 21 B has ADS-B Out. It does not have ADS-B In, and therefore would have no proximity alerting system.

Both pilots' flight traces in the area over the eastern shore of Lake Byllesby are below.



Pilot 1's flight trace during the period the near miss occurred.



Pilot 2’s flight trace during the period when the near miss occurred.

LIMITS OF VISIBILITY IN A GLIDER COCKPIT

A glider is always descending relative to its airmass.

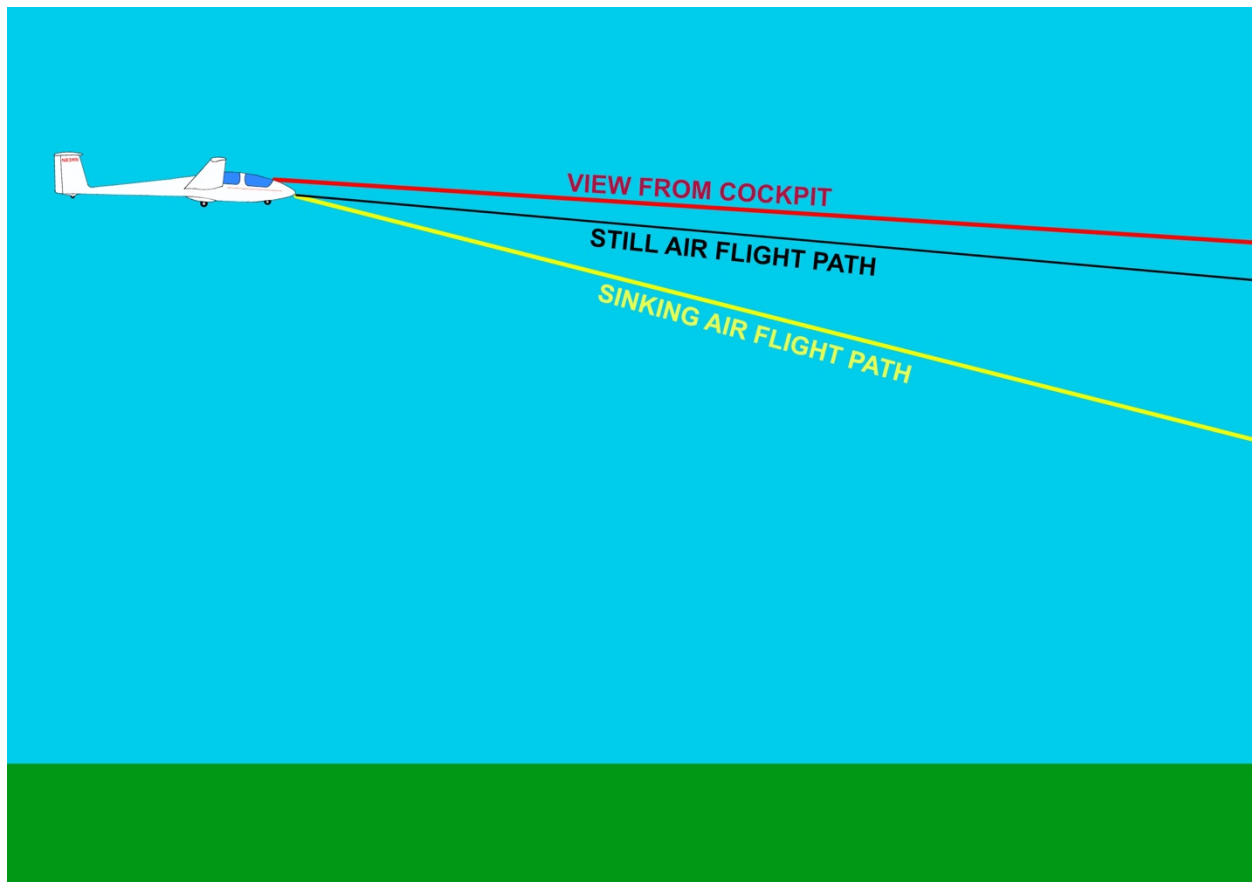
There are structures in every glider that obscure a pilot’s vision. For example, the floor, instrument panel, and forward portion of the glider obscure the airspace ahead-and-below the pilot. That means, that the area into which the glider is flying in still or sinking air is likely obscured in straight and level flight.

Or to say it more plainly: There is a large chunk of airspace that is invisible to a glider pilot, and it is often the airspace the pilot flies into.

When the nose is dropped for increased airspeed, the pilot sees further ahead, but simultaneously increases the sink rate.



View from the pilot's seat. Note what can't be seen.



Comparison of sink rate versus limits of cockpit view.

DEFINITION OF NEAR MISS

The FAA defines a near miss as “an incident associated with the operation of an aircraft in which a possibility of collision occurs as a result of proximity of less than 500 feet to another aircraft,” (AIM 7-6-3 b).

Gliders regularly fly within less than 500’ of each other. For example, while on tow the glider and tow plane are 230’ apart. Gliders’ slower speeds, especially while thermalling, allow for safe flight at closer distances than does power aircraft.

A practical definition of a near miss: When two aircraft fly in close-enough proximity that they might have insufficient time and distance to maneuver away from a midair collision—assuming at least one pilot sees the other aircraft.

RIGHT-OF-WAY RULES

This is the most important right-of-way rule of part §91.113, Right-of-way rules:

. . . vigilance shall be maintained by each person operating an aircraft so as to see and avoid other aircraft.

This rule goes on:

When a rule of this section gives another aircraft the right-of-way, the pilot shall give way to that aircraft and may not pass over, under, or ahead of it unless well clear.

While there are no rules specifically for entering an established thermal, the rules for overtaking apply:

Each aircraft that is being overtaken has the right-of-way and each pilot of an overtaking aircraft shall alter course to the right to pass we clear.

It is reasonable to state that gliders entering an occupied thermal are overtaking the thermalling glider. Altering course to the right has no utility when joining an established thermal, but passing well clear is applicable.

ANALYSIS

Despite an extensive review of the FlightAware maps, charts, and tables, I was unable to determine the moment the ASK 21 B overflowed the private glider. However, the data shows that the two gliders were flying in proximity with the private glider starting a couple hundred feet below the ASK 21 B and then out-climbing the ASK 21 B, for around four minutes starting approximately at 13:45 hours.

Thermalling glider pilots tend to focus their attention on: 1. Other gliders in the thermal; 2. Airspeed, angle-of-bank, and yaw control; and 3. Rate-of-climb. That's a lot to pay attention to, especially in the turbulent air of a thermal. But glider pilots must also scan the airspace outside the thermal for approaching gliders and aircraft passing through.

A glider that is 3,000 feet away is so small to the viewer, that a pea held at arm's length would hide the glider. A glider flying at 60 knots covers 3,000 feet in 31 seconds. Two gliders approaching each other, each flying 60 knots travel 3,000 feet in 15 seconds. Fifteen seconds to have a spot the size of a pea become a midair-hazard. Dangers occur rapidly in the air.

It is possible, perhaps likely, that Pilot 2 failed to see the private glider when it was 100 feet below him because it was beneath the ASK 21 B's instrument panel and fuselage.

The Rule of Unintended Consequences states that there are unforeseen drawbacks to the devices and technology invented to improve safety. While ADS-B systems generally advise approaching

aircraft of the direction and altitude of the other aircraft in time to allow a pilot to change course—sometimes, as was evidenced by this incident, the system failed either due to pilot inattention or error or the system failing to provide a sufficient and clear warning. Pilot 1 stated that he has installed hardware to significantly increase the volume of his device. I commend him for this prudent action. ADS-B In, properly used, provides eyes-out-of-the-cockpit warnings that are of significant potential benefit to the pilot. A prudent pilot rigorously scans the airspace despite the safety hardware installed in the glider.

The most salient question is how one glider pilot failed to notice flying over a glider 100 feet directly below, and another did not see a glider until it was 100 feet directly overhead. I believe that it was a cascade of errors by both pilot that simply can be reduced to: failure to keep adequate lookout.

The solution is to build as many habits and practices into safe flight as possible, and then practice and use them assiduously.

One way to maximize safety, in addition to maintaining a vigilant and frequent lookout, is to build a mental map of all gliders flying in the vicinity and request occasional updates of these gliders' positions on frequency 123.30. Further, when entering the busier airspace from a cross-country away from Stanton Airfield is to announce one's position and altitude on 123.30 and ask for position reports from gliders in the vicinity. Note: neither glider pilot reported radioing the other glider pilot despite thermalling in proximity for several minutes.

My thanks to both pilots for their helpful and candid discussions of their flights. We are a safer club for their willingness to look at how they could become better pilots.

RECOMMENDATIONS

1. Pilots remind themselves of the structures in any glider they fly that obscures their lookout.
2. Pilots flying straight and level in still or sinking air make occasional mild banks or yaw to see the area ahead and below their flight path.
3. Pilots keep a mental map of all aircraft flying in their vicinity.
4. Pilots thermalling near each other maintain radio contact on frequency 123.30.
5. The Minnesota Soaring Club strongly consider installing an ADS-B In system in the club gliders.

Respectfully submitted,

A handwritten signature in blue ink that reads "SC Nesser". The signature is written in a cursive style with a long horizontal stroke at the end.

Stephen Nesser, CFI-G
Chief Flight Instructor
Minnesota Soaring Club

August 15, 2023