

Collision Avoidance at TSA

by Bob Gibbons

This has been a difficult year for soaring in the USA in terms of accidents due to air collisions. There have been six lives lost in the past 12 months.

On November 28, 2009, about 1115 Pacific Standard Time, a Piper PA-25-235 airplane, N7023Z, and a Schleicher ASW-27 glider, N127AL, collided during the landing approach at Crazy Creek Private Gliderport, Middletown, California. The private pilot onboard the glider, and the commercial pilot onboard the airplane, were killed. Both aircraft were destroyed during the accident sequence.



On February 6, 2010, at 1327 Mountain Standard Time, N825BC, a Cirrus Design Corporation SR20 airplane, collided with N8718L, a Piper PA-25-235 airplane, while the Piper was conducting glider tow operations with N2472W, a Schweizer SGS 2-32 glider, near Boulder, Colorado. Mile High Gliding, Inc was operating both the Piper and the Schweizer. The commercial pilot aboard the Piper and the private pilot and passenger aboard the Cirrus were all fatally injured. The commercial pilot and two passengers aboard the Schweizer were not injured.



On June 15, 2010, at 1533 mountain daylight time, a Schleicher Alexander GMBD ASH 26E glider, N455S, and a Schempp-Hirth Ventus 2CT glider, N514TW, were involved in a mid-air collision about 75 miles northeast of Parowan, Utah. Neither pilot was injured. Both pilots were the sole occupants of their respective gliders. The ASH 26E sustained substantial damage, and the Ventus 2CT sustained minor damage.



On August 4, 2010, approximately 1820 central daylight time, N7470C, a Schempp-Hirth Ventus-2B glider, collided with N8829A, an Alexander Schleicher GmbH & Company ASW 27-18 glider, while both were competing in a soaring competition near Batesville, Texas. The commercial glider pilot on board the Schempp-Hirth Ventus-2B was fatally injured. The private glider pilot on board the Alexander Schleicher GmbH & Company ASW 27-18 was not injured. Both gliders were air towed from Garner Field Airport (KUYA), Uvalde, Texas. According to a verbal statement taken from the pilot of the Alexander Schleicher GmbH & Company ASW 27-18, he was in straight and level flight, south bound, when the Schempp-Hirth Ventus-2B appeared in front of him. The glider passed over the top of his glider canopy and impacted the tail of his glider. The pilot of the Alexander Schleicher GmbH & Company ASW 27-18 was able to continue flying the glider and landed without further incident in a nearby field. Witnesses in the area observed the Schempp-Hirth Ventus-2B glider "tumbling" in the sky, towards the ground. The glider impacted terrain in a nose low attitude and came to rest inverted.

Four mid-air glider-related collision accidents in less than a year; six lives lost.

Is there a solution?

YES!

PowerFlarm

Over the past decade, the Swiss firm, Flarm Technology GmbH, has been developing collision avoidance technology specifically designed for sailplanes. They currently have over 13,000 units deployed throughout Europe and the rest of the world.

These basic Flarm units have not been available in the US, for several reasons, one being incompatibility with US FCC frequency allocations and another regarding US liability. Flarm has finally been convinced to enter the US market, and they have developed a new, expanded capability unit for the US, PowerFlarm.

PowerFLARM combines:

- The FLARM collision-avoidance system
- An 1090-ADS-B receiver
- A transponder detector
- An IGC certified logger suitable for badges, contests and OLC
- An optional ENL (engine noise sensor) for use with motorgliders
- A serial output, which can provide traffic enriched GPS data for a flight computer, PDA or transponder.

The PowerFLARM, shown below, is a single small unit that can run on either internal "AA" batteries or from external 12V aircraft power. There will also be a "behind the panel," or

PowerFLARM



so-called "brick" version of PowerFLARM that will not have the "AA" battery feature; however, all other features are the same. The "behind the panel" unit allows for direct connection with various flight computers, e.g., the ClearNav, SN-10 or LX-8000. Several external displays are available as well.



PowerFlarm External Display

The external display, shown above, is designed to fit in a 57mm instrument hole, or can be mounted with Velcro or double-sided foam tape.

The dimensions of the basic PowerFLARM are:

- Width: 96 mm/3.8 inches
- Height: 46 mm/1.8 inches
- Depth: 94 mm/3.7 inches

The "brick" dimensions are:

- Width: 102 mm/4 inches
- Height: 19 mm/0.75 inch
- Depth: 76 mm/3 inches

Power consumption (for the "brick" model with an external display) is 110 milliamps. The base unit includes space for six AA batteries, though TSA expects to hook the units to ship power.

The best source of information on PowerFlarm is at;

<http://www.gliderpilot.org/FlarmHome>

PowerFLARM provides a comprehensive collision-avoidance system. It understands the flight characteristics of gliders and includes warnings for potential collisions with aircraft that have mode C or S transponders or 1090ES ADS-B-Out systems.

Why should TSA choose PowerFlarm? This is a valid question. What are our alternatives?

Transponder detector (PCAS)

OK, but will only detect other transponders, also not tuned for close-in sailplane usage (thermallings, aerotow).

Transponder

Not a collision avoidance system. Would require installation of transponders in

all our aircraft, with attendant complications of power, annual certification, cost, etc.

ADS-B receiver

Not a collision avoidance system. Units not currently available, probably 5-10 years out from commercial units suitable for sailplane installation.

PowerFlarm

Will be available in spring 2010 for under \$1500, will detect both Flarm, transponders and some variants of ADS-B, and is a true collision avoidance system, with years of proven use in European soaring environments.

A number of our contest pilots flying in European contests this year have installed and flown with Flarm. Here is just one of these testimonials, from John Cochrane, who flew in 2010 WGC in Szeged, Hungary:

Throughout the Worlds we were flying in big and often not very disciplined gaggles. The Flarm unit and its connection to my Clearnav display was a lifesaver. Sure, it sometimes beeps about nearby gliders that you already see. That's not so bad, as it reminds you to really keep track of those gliders. But it also tells you about gliders you might have missed. It tells you about gliders you can't possibly see. It tells you about that idiot who pulled in behind you and is now 10 feet under you—don't push over! It tells you about the glider following 20 feet behind and just outside—don't roll out now! Most of my Flarm warnings were in fact about gliders behind or below.

It's helpful in cruise as well. You may think you're all alone, but if there is someone dangerously close above or behind where you can't see them, the Flarm will warn you. If there is traffic coming down that cloudstreet in the wispies 501 feet below cloudbase just like you, you'll hear about it.

A typical response from Europeans is "Flarm made me aware of how much traffic was around me that I had not realized was there." The vast majority of gliders at the WGC and high-level European championships carry Flarms.

For those still skeptical, there are numerous testimonials from pilots who have used Flarm at <http://www.gliderpilot.org/Flarm-Testimonials>.

An interesting simulation of the Parawon accident is available at: <http://www.gliderpilot.org/Flarm-ParowanMidairSimulation>. This recreation shows what each of the pilots involved in the collision would have seen if they would have had Flarm units in their cockpit. The simulation was done by simply feeding the GPS coordinates from their log files into two Flarm units (seen in the foreground of the video).

Our board has examined the alternatives, and come to some conclusions.

- A key issue for FLARM collision prevention is that all ships must be equipped to prevent collisions.
- We can no longer wait for the FAA to deploy ADS-B

- We need to encourage FLARM installation across the US sailplane fleet.
- TSA is arguably the preeminent soaring club in the USA.
- As such, TSA needs to take a leadership position in FLARM installation.

We have 13 ships that need FLARM

- 3 K-21s
- 3 PW-5s
- 2 1-26s
- 1 Duo Discus
- 1 LS-4
- 3 Pawnee towplanes

The board has voted to install PowerFlarm on all our ships, including towplanes. The units will be available in spring of 2011.

Now for the hard part—How much will it cost?

The issue of cost gets complicated. The unit's basic sales price is anticipated to be \$1495. However, the US distributor is offering substantial discounts for early adopters and clubs which reach 30% penetration into the club fleet.

The TSA board has unanimously agreed that this sort of collision avoidance system is long overdue, and sorely needed. As an early adopter, TSA has been offered a price of \$1196 per unit.

Total club costs will therefore be approximately \$15,550 for 13 units. This represents a reduction of almost \$5000 over the basic sales price. This early adopter price has been extended to private owners who have