

**SPORT**

April 2018

# **Aerobatics**

OFFICIAL MAGAZINE of the INTERNATIONAL AEROBATIC CLUB



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Under Pressure**  
What would you do?



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50 minutes.  
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## COVER

Pablo Branco is in firm control of his One Design during a roll. Photo by Pablo Branco.



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## Welcome Quad Graphics to the IAC

Does something seem different? You may notice a change in paper, or a new delivery date.

With this issue of *Sport Aerobatics*, we have moved to a new printing facility, locally based in Wisconsin. Quad Graphics ([www.qg.com](http://www.qg.com)) is a powerhouse of commercial printing, producing literally millions of copies of periodicals per month. Through their many plants, they produce everything from books to retail packaging.

Due to production and mailing schedules, *Sport Aerobatics* will arrive approximately one week later in the month than you may be used to. However, that date will be much more consistent.

We look forward to improving our quality, home delivery, and special options for you, our members, through the top-notch services of Quad Graphics.



**SUBMISSIONS:** Photos, articles, news, and letters to the editor intended for publication should be e-mailed to [editor@iac.org](mailto:editor@iac.org). Please include your IAC number, city, and state/country. Letters should be concise, polite, and to the point. All letters are subject to editing for clarity and length.

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# President's Page

## The Heartbeat of IAC

ROBERT ARMSTRONG, IAC 6712



Mike Heuer's decision to step down from the position of IAC president was a surprise to all of us on the board of directors and one that I, in particular, have given many hours of consideration to since it affects me, the vice president, as next in line. Mike has taken on a huge yoke of responsibility over the last few years, and this shift is one I have decided not to assume lightly.

During the 2017 IAC elections, I returned to the board as vice president with no aspirations to move to the presidency; I simply wanted to work with the board and executive committee on projects to further the IAC's goals. Filling the position as the IAC leader has required no small effort, as the tasks that follow are all consuming. Upon Mike's announcement, I conferred with board members and others to determine that my accepting the role of president for the remainder of Mike's term would be supported. I do not assume this to be an interim role; I am also committed to running for the full term during the next cycle of elections in 2018.

Many of you know me from a meeting sometime in the past 38 years of my membership in the IAC. My first aerobatic family is IAC Chapter 3 in Atlanta. As with many members who were active in IAC 30-plus years ago, I was a builder of airplanes in addition to a competition pilot. My first introduction to contest flying occurred at Fond du Lac County Airport, coinciding with the location and time that the annual meeting for IAC members was held. When I arrived at the airfield I knew no one. I did recognize faces and names from *Sport Aerobatics*, and in short time I had been greeted by several people. Bob Davis, a founding member, offered a ride to my hotel. Mike Heuer was a much younger president, and by week's end Jim Lacey had allowed me, a new and unknown pilot, to fly his serial No. 1 Pitts S-1T. The abundance of the welcome was enough to make the choice of returning for the next contest the only correct answer. Since that time I trained for, competed for, and won a place on the U.S. Unlimited Aerobatic Team. I was a member of that team from 1992 to 1996 and 2000 to 2013. I competed in Spain, Hungary,

France, the United Kingdom, and the United States in my own homebuilt Pitts, my Abernathy Streaker, Pitts S-1-11B, and CAP 231/232.

This is not a personal brag but only to show that our IAC is and has been, since its inception, a great organization to be a proud member of, and to show what can be accomplished in both the builder arena and the competition arena.

In the weeks leading up to the vice presidency to presidency succession, I called people who have been around IAC for many years, and one common thread was this is not fun anymore. My opinion, and I'll bet it's your opinion, too, is that this needs to be turned around and quickly! To borrow a term from Budd Davisson, the population in the IAC is "graying out," and not from pulling g's. We need to find the fun again, and to do this we need to replenish the membership roll with new people with the same passion that we all have for flying special airplanes in special ways. Over the years the membership has had cyclic numbers for various reasons. Nowadays, it may be economic or due to lack of recruiting, but I intend to address this.

The membership is the heartbeat of any organization, and we are privileged to have many who give their precious time to volunteer as committee members and chair so many programs. Without them our club cannot function, as well we know. I encourage you to get involved in programs and activities, whether regional or national. To make this club grow and succeed, we all need to be more involved. I hope you have some time to give and will say yes when the call comes!

And the most important thing to remember, besides keeping ourselves and others safe, is if we cannot have fun, then we need to do something else. **IAC**

Please send your comments, questions, or suggestions to [president@iac.org](mailto:president@iac.org).

## Aerobatics and Your ADS-B Track

By Bruce Ballew, IAC 26969

IAC Government Relations Chairman

You have equipped your aerobatic airplane with an ADS-B “out” system and have gone through the process to demonstrate it is compliant. Then you notice online that your latest flight track shows a green line from the airport to your favorite practice area, your aerobatic practice looks like a bowl of red spaghetti, followed by another pretty green line back to the airport. This is due to the technical limitations of the current ADS-B equipment and its inability to keep up with the rapid heading, altitude, and airspeed changes that we normally experience with aerobatic flight. Most, if not all, of these flights end up implying that the ADS-B equipment is not performing properly and may generate a non-performing equipment (NPE) report within the FAA, which it may or may not choose to act upon.

Officials at the FAA tell me that when they physically look at an NPE report from an aerobatic flight it is obvious what is going on and they leave it alone. They have promised us that there will be no enforcement actions for aerobatic flights. However, with the increasing number of “real” noncompliant aircraft, aerobatic flights get caught up with the rest of the aviation community and automated processes. Those processes may trigger certified letters to the registered owners of the aircraft.

Believe me, I get it; nobody wants to get a certified letter from the FAA to talk about their last flight. I plan to write a more detailed article for *Sport Aerobatics* on the topic very soon. However, for now, my advice should you receive communication from the FAA about an aerobatic flight and the performance of your ADS-B “out” equipment, is to respond to their inquiry and be done with it. No need to call your attorney or read more into it than it is.

## Call for IAC Rule Proposals

As an IAC member, you are encouraged to submit rules proposals to the IAC Rules Committee. July 1, 2018, is the deadline to submit proposed contest rules or changes for the 2019 contest year. The rules committee will meet after this deadline and publish its recommendations to the membership for comment. The IAC board of directors will then vote on each proposal at the fall IAC board meeting. Submit your proposals at [www.IAC.org/propose-rule-change](http://www.IAC.org/propose-rule-change) and send a copy to the rules committee chairman at [BK@newattaero.com](mailto:BK@newattaero.com).

## Shaun Brautigan Awarded L. Paul Soucy Trophy

IAC extends its congratulations to Shaun Brautigan, IAC 439211, the recipient of the 2017 L. Paul Soucy Trophy, which is given to the competition pilot who achieves the most percentage points during the contest season. To be eligible for the award, a pilot must compete in three or more season contests, one of which must be the U.S. National Aerobatic Championships. In the 2017 contest season, Shaun flew in a staggering nine contests. He placed first in Sportsman at the 2017 U.S. National Aerobatic Championships in his beautiful silver and red Extra 330LX N341LX. For the season, he finished with an overall average of 84.91 percent.

The trophy will be presented to Shaun during the IAC Gathering of Members dinner on July 27, at the Nature Center during EAA AirVenture Oshkosh 2018.

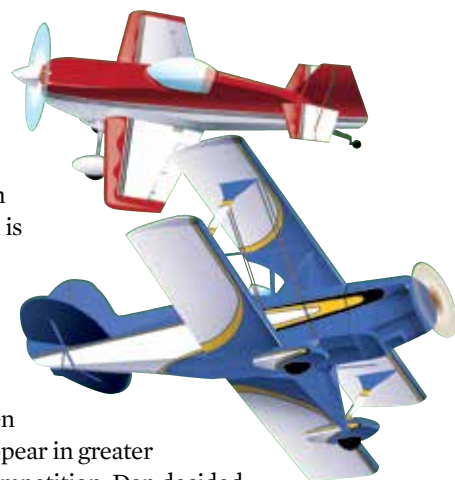
## Celebrate with IAC at EAA AirVenture

2018 is 25th anniversary of DR-107 One Design,  
45th anniversary of Acro Sport

The Rihn DR-107 One Design is an American aerobatic homebuilt aircraft that was designed by Dan Rihn and first flown in 1993. The One Design is a single-seat aerobatic monoplane specifically designed for aerobatics (recreational and competition). The DR-107 came about when monoplanes began to appear in greater numbers in aerobatic competition. Dan decided to design a new aircraft to create a new class for the IAC. From there, the One Design was born, an aircraft that the pilot could build at a relatively low cost to fly competition aerobatics. The DR-107 One Design soon began proving itself with its high-horsepower engine, fast roll rate, and ability to sustain very high g-loads. For this role it is stressed to +/-10g.

IAC will feature the history and the development of the One Design in its pavilion on the EAA AirVenture Oshkosh grounds. Six exhibit panels will tell the story of this iconic aerobatic aircraft and the pilots who flew it. Dan will present a forum on the One Design that will be held at the IAC Pavilion on Wednesday, July 25, from 10 to 11:15 a.m.

On Wednesday from 7 to 8:30 p.m., prior to the night air





show, Dan will host a gathering of One Design pilots and builders at the IAC Pavilion.

The Acro Sport is a single-seat aerobatic light-sport airplane designed by EAA founder Paul Poberezny in the early 1970s for homebuilding. It was designed to meet the demand for aerobatic competition aircraft that could be built easily and had gentle, docile handling characteristics. It was one of several designs that Poberezny created over the years for the sport aviation community.

The Acro Sport offers performance and excellent aerobatic capability in the Sportsman and Intermediate categories. Purposely uncomplicated and straightforward, the Acro Sport design has been chosen by hundreds of schools for Project SchoolFlight programs. It has a wide landing gear that provides superb ground handling and easy landing qualities.

The Acro Sport is a short-span biplane of conventional taildragger configuration, typically built with an open cockpit and spatted main undercarriage. Its structure is a fabric-covered, steel tube fuselage and tail group, with a wood wing structure.

## Robert Armstrong Appointed New IAC President

IAC president Mike Heuer, IAC 4, submitted his resignation at the IAC's board of directors meeting on March 17, 2018, as previously planned. The board appointed Robert Armstrong, IAC 6712, as the new IAC president for the remainder of Mike's term, which runs until July 2018. Robert was elected as the IAC's vice president in July 2017. The board will consider and appoint a replacement to fill that officer position in early April.

Robert has been a member of the IAC for the past 37 years, has previously served as a director from 2006 to 2012, and was inducted into the International Aerobatic Hall of Fame in 2016. He has built and flown many different aerobatic aircraft, and rose through the skill categories to become a member of the U.S. Unlimited Aerobatic Team from 1992 to 1996 and 2000 to 2013. He currently flies a CAP 231EX in the Unlimited category.



Mike Heuer and Robert Armstrong.

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WHAT  
WOULD  
YOU DO?

# Unusual Indications

BY JOHN HOUSLEY, IAC 433114



The Citabria is a great aerobatic trainer that many of us have enjoyed flying. Even starting with half-full tanks, you can still expect roughly three hours of flying thanks to the efficient (and small) engine. Although the wing fuel tanks (no fuselage tank) are interconnected via two separate manifolds, it's not uncommon for them to feed unevenly, developing up to a quarter-tank of fuel imbalance with the left side feeding faster. Last year, after practicing aerobatics and landings for about 45 minutes, I noticed that the right fuel gauge showed empty while the left still showed almost a half tank. My first thought was denial — the gauge must be wrong. We are taught not to trust fuel gauges, and this one appeared to be stuck hard on empty — no bouncing around. The engine

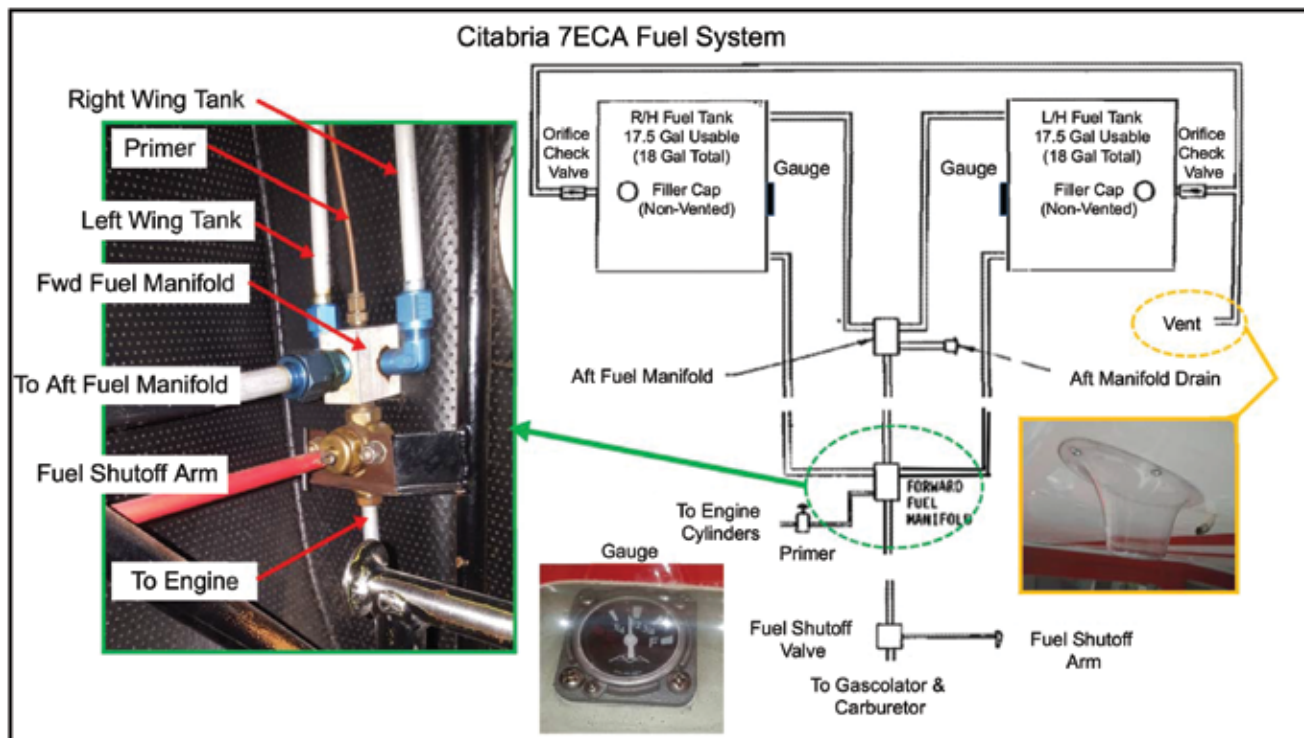
couldn't have possibly used that much fuel in so short a time. There are no tank valves to switch or pumps to turn on in this aircraft, it's a beautiful evening, the engine is still running great, and there's plenty of fuel left

in the left tank — maybe I should just keep on flying and troubleshoot the faulty tank reading afterward.

Thinking about the fuel system, what else could cause this besides a defective gauge?







Visual indicators ensure proper fit.

It seemed like a remote possibility, but what if the orifice check valve was completely blocked on the left tank? Could both forward and aft manifolds have become blocked so that fuel transfer between the wing tanks was no longer possible? Could the right tank have cracked and allowed the fuel to escape into the wing (with the left still connected to it)? Could the right fuel cap have come off (with the left able to cross feed into it)? There weren't any visible signs that fuel

had escaped the tank (drips or trails). Maybe I should head back now and figure out what's going on.

As soon as I stepped out of the airplane, one discrepancy was apparent. The *left* fuel cap was missing. When I refueled the right tank, which was indeed empty, the gauge indicated properly. My conclusion was that the cap came off sometime during flight (I checked during preflight, of course), and the difference in vent pressure between the left and right sides caused

the fuel to transfer from the right to the left side. The cap was tight to install and might not have been rotated fully, even though it felt secure. A paint stripe on both the front and rear of the fuel cap has since been added to align with a mark on the wing surface when the cap is fully tightened.

I learned several lessons from this experience:

1. Avoid rationalizing problem indications as insignificant just to keep flying.
2. Problem indications may be misleading (right tank empty, but left tank cap missing).
3. Understanding aircraft systems can be helpful in making go/no-go decisions.
4. Adding visual indicators to verify proper part alignment can ensure correct assembly.

**IAC**

WHAT  
WOULD  
YOU DO?

# Is It Really Clear Ahead?

BY JOHN HOUSLEY, IAC 433114

A lot of aerobatic aircraft have “conventional” landing gear (tail wheels), and the pilot’s ground forward visibility can range from very good in a Citabria to nonexistent in a Pitts. The Pitts ground visibility challenge can be easily seen from this photo of my Pitts S-2C. The combination of the fuselage height and width totally obscures the view forward while on the ground (and it’s not much better in the air). The way we deal with this on the ground is by making S-turns while taxiing. At a towered field, such as the one I fly from, there is additional oversight from the ground controller, but I always make sure that I visually clear both directions before entering a taxiway and then again before each intersection, at a minimum. If there is traffic ahead, I’ll S-turn continuously. Sounds like a plan that should work, right?

Recently, I was sharing a ground run pad with this new, sharp-looking SubSonex jet, about 650 feet from the end of the runway, while warming up my engine. The SubSonex is comparatively small (relative to a Cessna 172 or PA-28), sits close to the ground, and doesn’t present much of a profile when viewed from the rear. He finished his checks and taxied past me, toward the runway for a high-speed run. It took me several more minutes to warm up, and then I got my clearance, visually cleared all the way to the end of the runway, and started to taxi. Since there are three taxiways that converge at the end of the runway, I stopped short and made what I thought was an unnecessary but



prudent final check to be sure no other aircraft were approaching (a NORDO using light gun signals possibly) and was surprised to see the SubSonex!

How could I have missed him earlier when I visually cleared from the pad to the end of the runway? I just had a thorough eye exam and everything checked great, so it wasn’t a physical deficiency. Was it because of his size or profile? Was it because I was expecting it to be clear and therefore saw what I was expecting? Was I looking for a larger Cessna, Piper, or Beechcraft aircraft? I do know that if I hadn’t made that final check and had instead kept going toward the hold short line, I

would have hit him.

My recommendation from this experience is to increase vigilance for all types of aircraft and remember that there are small, low-profile aircraft as well as “standard” size planes to watch for. Performing S-turns more frequently, even after the taxiway has been cleared visually, will also reduce the risk of missing an aircraft. And for those pilots who know they are being followed by a conventional gear aircraft with poor visibility, be ready with an escape plan (taxi into the grass, for example) should it appear that the aircraft following you is not going to stop.

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WHAT  
WOULD  
YOU DO?

# The Tow Bar Fubar

BY BILL BANCROFT, IAC 12187

There was nothing unusual about my takeoff. As I turned downwind and eastbound, I anticipated a change of frequency call from the tower. As I departed the Fullerton Municipal Airport's Class D airspace and climbed through 2,500 feet, I was not surprised to hear the frequency change approved call, but I was stunned to hear, "Be advised, a local pilot reports that he thinks he saw you take off with your tow bar attached!"

Disbelief reigned over the cacophony of my conflicting thoughts. Was this possible? Did I forget to remove the tow bar? Was this just a horrible dream from which I could awake if I just tried hard enough? Or was I being punked by the tower?

As I replied, I remembered reading the memoir of a famous test pilot.

His response to any emergency was to count

backward from 10 before keying up. I counted, then mashed the mic button and said, "Roger that, thank you." Then I immediately changed frequencies. No more conversation was necessary.

The hot potato was in my lap, and I needed to deal with it. Clearly, no help was to be had from the tower or any other ground-based information source. This was my problem — and it was monumental.

I thought back to my preflight. As I pulled my Cessna 172 out of its hangar, sharp shadows appeared on the tarmac. They reminded me of a conversation I had many years ago with my flight instructor. His words that day left me with a question that had never been fully answered. I was again fascinated, and it drew my attention. The discussion centered on taxiing and trying to judge how close I was to a building or other obstruction, like an airplane wing. I thought he said, "If it appears your shadow won't intersect with the other object's shadow,

you'll be clear." Did he really say that or was my recall faulty? And what about the height of the other thing, the time of day, and length of the shadows? Had we considered that, years ago? I couldn't remember for sure, but I had contemplated it often, and I wanted to get closure once and for all.

But that was then and this was now. I tried to picture my current dilemma. How much space existed between my tow bar and my prop? How much pitch change would it take to pivot that tow bar up and into the 2300-rpm whirling maw? I pictured it in graphic detail. At first, I would hear a little ticking sound as the tow bar began to encroach upon the propeller's arc. An instant later, first one blade then the second would smack it, and in the blink of an eye the inevitable crescendo would begin as my prop first bit, then chewed the tow bar from its mounts sending its mangled mass spinning into space only to fall into a schoolyard full of unsuspecting innocent children or through the windshield of a pregnant housewife as she drove to the grocery store. The cinema graphics were horrifying and endless, only to be followed, again, by the almost palpable fog of disbelief. If this nightmare was reality, why

had what seemed almost inevitable not happened already? Yes, my pitch changes had been small and, luckily, smooth, but how long would it be before a rogue gust of wind changed all that? And what could I do? I knew from reading that I could never pull the power back quickly enough to keep the now horribly out of balance prop from convincing the engine to rip itself from its mounts and — enough of that. I needed to focus and explore my options, at least, as long as I had options.

Should I switch back to the tower frequency, fess up, declare an emergency, carefully reverse course, and attempt a landing at my home base? How embarrassing would that be even if I were successful?

On the other hand, Corona Municipal Airport, a nontowered field, lay only a few miles ahead. This time of day there would be few, if any, witnesses as I attempted the almost impossible task of putting this

potential disaster back on the ground.

And, what about French Valley Airport? It was a few miles farther southeast but with a longer and wider runway. But, the longer I was airborne the greater were the risks of that fatal pitch change and the likelihood of a whirling end to my aviation career.

Perhaps I should take my chances and continue my flight to my destination airport: the Borrego Air Ranch. I knew there was a good chance that no one would see my pathetic attempt at somehow gently touching down on a short, narrow uphill runway, likely buffeted by the ever-present desert turbulence. No. Borrego was clearly out, and the jeopardy of staying in the air any longer than absolutely necessary ruled French Valley out, too. Corona would be my destiny.

Now came the big question. What would be the best technique to allow airmanship to triumph over stupidity?

Fortunately, the Corona pattern was empty. I skipped the standard 45-degree entry and drove straight to the downwind. Very gentle turns to base and final set me up for a long, flat final approach and the hope of gently kissing the asphalt, all the while hoping to avoid a last second bounce that would likely not be fatal, but would be costly.

Crossing the threshold I wiggled my fingers and toes, trying desperately to relax and break my death grip on a slimy yoke.

It all worked! I taxied to the end of the runway, pulled onto a taxiway, and shut down. Half hoping the tow bar would be absent but terrified that it might have departed in flight, I climbed out of the cockpit and looked. There it was, firmly attached.

After nearly a half-century of flight this was another lesson learned, and, more's the pity, I had no copilot upon whom to bestow the mantle of blame.

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# Surviving a Pitts Engine Failure

BY CHAD BARBER, IAC 437405



Chad Barber



## WHAT WOULD YOU DO?



Engine out. 2,500 feet. 30 kias.

survived an engine failure during aerobatics in a Pitts Special.

Before I go into detail on how I handled the situation during my engine outage, let me briefly go over why aircraft engines typically quit due to pilot error.

Pilots usually induce the problems that they incur, but anyone can control and prevent problems as a pilot. If an engine failure is caused by other factors unattributed to pilot error, then we do our best to manage the situation at hand. That was the case I was faced with: I had to manage my plane's attitude.

There are a number of ways a pilot can cause an engine failure. First and foremost, pilots forget to turn on the fuel or to switch tanks in flight. They get distracted or neglect to go over their aircraft procedures checklist. These problems are more common than you would think. Fortunately, these were not my problems, but fuel and a negative attitude were. My fuel valve was open, and I dealt with a single tank. No switching of tanks was necessary, and fuel was flowing until my attitude changed.

Additionally, pilots should know that oil is the blood of the engine, and without it the engine will literally seize up. Just as fuel keeps engines quenched, oil keeps engines lubricated and the parts moving effortlessly. Always keep the proper quantity of clean oil in the engine because a serious engine failure could

occur accompanied by an unsuccessful restart and permanent engine damage. Again, this was not my issue, but it can easily be overlooked by a pilot in a hurry.

Finally, pilots can neglect basic maintenance and even overlook or extend the legal requirements of an annual, periodic, or conditional inspection. If a pilot cannot maintain an aircraft's airworthiness, how can they expect to maintain flight? There is absolutely no reason to neglect or put off maintenance, especially when the maintenance is related to lift, weight, thrust, and drag — all of which are critical to flight. When it comes to thrust, I learned just how important it was after losing it.

On my first flight of the day, early in the morning, I had flown the Pitts for about 45 minutes. After the flight, I took a break, drank a pint of water, inspected the airplane, and checked the fuel. I had consumed 6 gallons of a 19-usable gallon tank leaving me with 13 gallons for my second practice flight heading out of Pompano, Florida. I calculated that it was enough fuel for another 45 minutes of practice, leaving me with about 5 gallons at the end of the flight. My calculations ended up being correct, but I had missed some important aerobatic factors that a typical pilot would not have to consider.

I usually perform aerobatics with 6-19 gallons of fuel. Anything less than 6 gallons can be dangerous because the flop tube that scavenges fuel in the

tank may find air to draw rather than fuel during aerobatic maneuvers. The flop tube won't draw air if the plane is right side up, but it might when it is upside down, in knife-edge flight, or in an unusual attitude. Pilots know that engines need a combustible mixture of fuel and air to burn, but air alone will not get the job done. When an engine draws air, it hiccups or sputters and can cause pilots to wet their pants, but aerobatic pilots might stain them.

About 30 minutes into my second flight of the day and nearing the end of my aerobatic sequence, a beam of reality hit me, and in an instant my life flashed before my eyes.

I pulled through a negatively entered figure and ended it with a 4-point roll to the right. Almost immediately, I began my next figure pulling to a vertical line and holding it for a few seconds. My engine hiccups while I start pushing through the figure with almost no indicated airspeed at 2,500 feet AGL. Initially, I wasn't concerned because it had happened before during negative maneuvers with less than a full tank of fuel. A quick unloading would get the plane back into a positive-g environment, helping fuel flow. This time, not only did the hiccups stop but so did my engine.

A second or so after realizing my engine had completely quit, I knew I had to gain speed and toggle my auxiliary fuel pump on at 2,000 feet to attempt



a restart. I have seen flat rocks that fly better than a Pitts without power. I dove and picked up speed trying to get the prop to turn over aerodynamically to restart the engine. This had no hope with the short, three-blade, wooden prop. It would not swing!

While diving and reciting my ABCs, I spotted a gravel path below to land on and started praying. I had no doubt that even if I couldn't get the engine started, I would live, but the Pitts would not. The thought of a ruined Pitts and a hold on my aerobatic career shattered my dreams.

Making my way toward the gravel path where I was planning to crash-land, thought after thought ran through my mind. At this point I was about 500 feet off the ground, then suddenly it seemed that God spoke to me and said, "This is your life, this is what you do, this is why I created you — control it!"

I attempted my last restart with my Sky-Tec electric starter, and after three cranks I still had no luck. I was persistent, though, and on the sixth stroke, it fired at about 30 feet off the ground! I let out a huge sigh of relief.

Just after restart, a drone operator radioed to let me know I had infiltrated his zone at a low altitude, but shortly after he quickly bit his tongue. I had lost more than 2,400 feet of altitude in about 45 seconds from the time my engine quit to the time of restart. This was no walk in the park.

The bottom line was that the flop tube was unable to pick up fuel while the Pitts was in a negative attitude with 7 gallons left in the tank, which led to fuel starvation. I will no longer fly negatively loaded maneuvers with less than 10 gallons in my tank. The risk is not worth avoiding 50 extra pounds of fuel or saving a five-minute trip to the pump.

Today, I know my life is in the hands of God and there is no denying it. I can't thank Sky-Tec enough for its electric starter; without it the Pitts and I would be a mess. It's a small investment but a big benefit down the runway to be able to restart an engine during failure.

I leave this experience a humbled pilot, even hungrier to fly, but to do so with reverence, passion, and with a commitment to safety. All is well that ends well, so go fly!

**IAC**

First Frame: Flying the figures. T-15 seconds.

Second Frame: T+3s. Aux fuel pump on. Attempt restart. Attempt aerodynamic start. 2,400 feet.

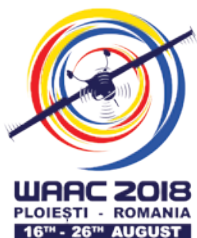
Third Frame: T+12s. Find a suitable landing target. Manage the descent. 1,300 feet.

Fourth Frame: T+41s. Line up. Final attempt to start. 220 feet.

Fifth Frame: T+45s. Engine turns over after six cranks. 120 feet.

**Chad Barber** is a first-generation commercial aerobatic pilot and aviation entrepreneur born in Fond du Lac, Wisconsin, and residing in Palm Beach, Florida. At age 25, he has been an active pilot for more than six years and owns Barber Aviation, a small company providing aircraft delivery, aerobatic training, aerial photography, and aviation management services.





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## **The Bear Creek Bunch**

IAC Chapter 3, Atlanta, Georgia, (Southeast) members and friends at the 2017 U.S. Nationals. L-R: Shaun Brautigan, Paul Funk, Mark Fullerton, John Wacker, Stan Moye, Charlie Sikes, Jeff Baxter, Marty Flournoy, Robert Armstrong. Front: Jon Elam and "Mighty Mutt."





# Well, that Escalated Quickly



Surprise! You just flew a crossover spin.

by Michael Lents, IAC 434331

Losing control of your machine is a curious thing. I distinctly recall two instances when a faulty stick-actuator (namely, myself) unintentionally departed controlled flight. What follows is an account of one of those instances.

## Maybe the Perfect Plane

I may have experienced an inverted spin in training ... once.

Stories abound about certain maneuvers easily causing departure from controlled flight. The Hammer-spin and the Immel-spin certainly exist, but my experience with the Super Decathlon had always been docile. Instead of spinning in these regimes, the Decathlon generally “flops.” If the pilot doesn’t panic-pull, the nose aligns with gravity, and a smooth recovery back to level — with a chuckle, giggle, or more colorful interjection — usually follows.

Someone once said, “The best airplane in the world is the one you’re flying.” Close to the top of the list is the Super Decathlon. Its strength lies not with blistering speed or roll or vertical, but its balance and lack of those things. It has a relatively open cabin with room to spare for actual baggage, a functioning heater, fuel capacity to give it legs, a bushplane background, and it’s sporty enough to compete well; the Decathlon doesn’t really do anything spectacularly, and that’s its perfection. It builds aerobatic pilots.

A pilot must work for each maneuver, but the machine forgives faulty technique by usually pointing you at the ground. Upset recoveries following Rich Stowell’s method work

## The student had completed hours of briefings on stalls and spins.

great. In the Super D, I’ve shortened it to push, roll, and recover. For anything lighter (Pitts S-1) or higher powered (Extra 300), cutting power is a critical first step, but the Decathlon flies happily. It competes well with its large rectangular wing demonstrating every nuanced maneuver for the judges. Impeccably honest, any errors by the pilot also present well to the judges. A Decathlon will give you an honest score to build from, for better or worse.

With these characteristics in mind, a trust grew between instructor and plane. And while teaching spins with plenty of altitude to spare, complacency slowly edged its way into how I guarded the controls.

## Too Much Recovery

The student had completed hours of briefings on stalls and spins. Nervous and excited, a few more steps remained. After more than an hour of pre-briefing and discussing the spin flight objectives — the sights, sounds,

and sensations of the spin, recognition of direction of spin, control inputs, and differences between different aircraft — and after addressing any concerns about stalls and spins, which at this point was more excitement to experience the unknown, the weather turned and our flight was canceled. We rescheduled during a small window in my plans the next day.

We made the pre-brief short this time. “What’s the recovery?” I asked. With rote precision, the reply was fast and accurate. It was also based on the Piper single-engine aircraft. “Remember, we have a good elevator; don’t go full-forward on the stick,” I reminded my student. Maybe I just thought I said that, and remembered the discrepancy from yesterday.

After a climb-out that was full of wonder at the swift and nimble response of the Super Decathlon’s controls, especially compared to the other trainers in the fleet, we were ready for some spins. I demonstrated a power-off spin entry. “Power, aileron, rudder, elevator, neutralize rudder, and recover,” filled the intercom timed to recover at one rotation and climb. Now it was my student’s turn. “You have the flight controls,” I said, and after verbal confirmation and a wiggle on the stick, I repeated my statement and pulled my hands back.

Verbally, I guided the student through left rudder application, then into the stall with elevator. The Decathlon entered smooth with the wing dropping and rotation began. Verbally, I initiated the recovery mantra: “Power, aileron,



rudder, eleva ....” Before completing the last verbal cue, I watched as the control stick slammed full forward. With motion momentarily suspended, the voice of Waylon Jennings mentally queued up with something about the Duke boys and we departed the upright spin into something more exciting.

Full right rudder combined with full forward elevator precisely at the half-turn, a point where the aircraft normally inverts while still experiencing positive g, a sharp negative 2g pushed us toward the canopy while eventually stabilizing at about negative 1.5g.

“Well, that was fun. Do you want to recover, now?” I chuckled but got only a confused silence from my student.

“Opposite rudder, stick back.” I replied, but quickly realized this may not be in our best interest. “I’ll take it.”

“You have the flight controls,” my student said.

Left rudder, elevator to neutral, rotation stops, rudder neutral, pull out of the dive, and add power for the climb.

“What happened?” my student inquired.

“You recovered into an inverted spin,” I said.

## **Anatomy of a Crossover Spin**

The crossover spin occurs when an upright spin transitions into an inverted one. If a pilot applies recovery inputs with extreme gusto, the wing transitions from a normal stall to an inverted one. At the same time, the recovery rudder will now transition to pro-spin. As seen from above, this places the aircraft in the same rotation, but now in an inverted attitude with opposite yaw from the original departure.

When looking at the rotation point on the ground, it will appear as if nothing has changed and that the plane is not responding. The roll component appears to carry on as normal. Please don’t look at this reference point. In the Super Decathlon, the framing in the cockpit and high wings block enough view that looking up is not generally the first reaction. In canopy-type aircraft, significant disorientation can follow. At any point in a spin, look

off the nose.

John Morrissey teaches a simple method: Look over the cowling, the ground will move toward a shoulder, push that foot. Gene Beggs has also written to push rudder to “catch up with the ground.” Because yaw is the driving factor in a spin, the rudder is needed to counteract yaw. Ignore the rolling component. Yaw and roll are aerodynamically coupled in the spin, including the inverted spin. Due to perception when strapped in an inverted aircraft, however, roll appears to reverse compared to yaw.

Once the correct recovery rudder is applied opposite the yawing component, get the stick “off the firewall.” Once the elevator moves toward neutral, the Decathlon will recover.

## **Avoiding the Transition**

Properly avoiding the transition involves two key elements from the pilot. The first rule is simple: Be aware of full-control deflections. Full aft will achieve and maintain a stall; full forward will also achieve and maintain a stall. The second: Feel the plane. During the recovery from a spin, if 0g is experienced, the wing cannot be stalled. With the airplane in a ballistic trajectory, rotation stops, airspeed will increase rapidly, and a recovery from the ensuing dive can commence. With no lift being produced at 0g, there is very little angle of attack. With almost no angle of attack, very minimal adverse pressure gradient can be generated to cause the separated airflow that is the stall.

In most aerobatic aircraft, once proper rudder is applied against the spin rotation, placing the elevator close to the neutral position will usually lead to recovery. There are a few caveats that can be explored, preferably in the dual instructional setting. If only rudder is applied, often the elevator is partially blanketing this surface. The rotation may not stop and often does not slow until the elevator moves forward. On some occasions, this action can reverse the spin rotation and re-enter the spin going the opposite direction, but this is less

common. Conversely, if only forward elevator is applied, the rotation will increase as gyroscopic precession on the airframe amplifies the rolling component. Using the incorrect order for the recovery prolongs the spin and will cost altitude.

Know your aircraft. In the Super Decathlon, the Beggs-Mueller method does work, but takes significant altitude and time compared to a more proactive approach. From an inverted spin, the Beggs-Mueller method may not work from a right-footed inverted spin. In this case, I’ve watched the stick lock itself in the pro-spin corner until the pilot takes action. Unfortunately, this was the type of spin we ended up in. In either case, reduce power, keep the ailerons neutral, apply full and opposite rudder to the direction of yaw, and briskly move the elevator away from the control stop. If upright, this means elevator forward to neutral. If inverted, it means elevator back toward neutral. Once pointed earthward, neutralize the rudder and recover from the dive.

## **Aftermath**

After this occurrence, my student and I continued the flight and completed a series of successful spin entries and recoveries. With the aircraft under control and confidence restored in plane and pilot, the lesson was complete. The student went on to have a very successful instructing and professional piloting career.

As the adage often goes, the instructor learned just as much that day from the student. I learned to guard the forward edges of the elevator range and increased confidence in the maneuvering and recovery capabilities of the Super Decathlon. Any time I am working with an instructor who is planning to teach in the Super Decathlon, I’ll demonstrate and have them recover from an inverted spin. While the general piloting population and introductory aerobatic students avoid the big pushes in the beginning, an instructor needs to be aware of and confident in the complete operating envelope of the aircraft.

**IAAC**



# SAFETY Fundamentals

by CHRIS KEEGAN, IAC 431962

You may be thinking, “Yes, I’ve heard all this before,” but safety fundamentals should be thought about and practiced over and over.

Legendary UCLA basketball coach John Wooden was a fanatic about fundamentals. He still holds the record of 11 NCAA National Championships. Wooden received the top high school recruits in the country at UCLA who would arrive wanting to show Wooden how they could light up the basket from 25 feet out. Wooden would comment that that was cute, but then he wanted to see 200 layups. The recruit would protest that he could do a layup. Wooden would respond, yes, and you will practice this fundamental over and over so that at the key and crucial moments in a game, the layup will be made.

After the 200 layups were completed, the recruits would want to go back to impressing Wooden with ball handling and outside shooting. Wooden then instructed them to complete 200 more layups from the other side of the basket and then shoot 300 free throws.

So, we’ve heard it all before, but it bears repeating: Practice the fundamentals of safety. Safety begins before you even leave for the airport. Have you had enough rest? Are you nourished properly, neither too much nor too little? Are you properly hydrated? Are you overly stressed, preoccupied, or tired? If so, why not give yourself a day to recover and think about it again tomorrow.

I know there have been times when

I have been preoccupied with a work or business problem or issue, then went out to fly aerobatics when my mind was just not in it. That’s when it is time to break it off and go home, or turn that flight into a sightseeing affair with a few barrel rolls thrown in for variety. Aerobatics is essentially an athletic endeavor, and our bodies must have proper rest, nutrition, and hydration and be relatively free from stress to function at their peak.

Do not rush things. This sets up a stress response, which diminishes your thinking capacity. I’ve tried to rush a flight in between appointments and court hearings, for example, only to forget to put the oil dipstick back into the engine or forget to latch the safety belt, which goes over the main belts. Be slow, relaxed, and deliberate. Your brain will work better and your safety will be improved.

Next, assuming you are physically ready to go, are you mentally prepared? Have a plan for what you want to accomplish in your flight. It would be dangerous to get in the air, slap on a new sequence for the category you’re flying, and fly it cold without rehearsing the individual parts. Think it through beforehand on the ground, paying particular attention to the various altitude losses and gains and where you might end up after each maneuver in the sequence.

Once you are mentally and physically ready, how is your equipment? Parachute? What’s the mechanical condition of your airplane? Do a thorough preflight of your airplane

with particular attention to the attach points on all of the control systems. Are the stick and rudder completely free in all directions of travel? If something looks or sounds funny, stop, get out, and investigate until you are satisfied a safety problem is not at hand.

I like to have a more knowledgeable set of eyes look over my airplane at least a couple of times a year in addition to the annual. I could change my own oil, but I don’t because I want my mechanic at the field to pull the cowl and, yes, change the oil, but more importantly to look over the airplane for any issues his much more experienced eyes might see.

Once you’re in the air, check out your inverted oil and fuel systems and check yourself out again physically for how you feel with some warm up exercises, some inverted pushes, and some hearty pulls to see how your g-tolerance is that day. I know that my g-tolerance can vary from day to day and I will vary my flight accordingly.

Fly high. An aerobatic pilot’s best friend is that cushion of air between him or her and the ground. Once you’re at altitude, do you have a safe landing area should the engine quit functioning? Are there some decent, lengthy fields within gliding distance? A forest won’t do. Keep an eye on oil temperature, pressure, remaining fuel, fuel flow, and any other engine instruments you may have that tell you how your powerplant is doing. If you’re going to try a new maneuver, say an inverted spin, get way up there. We don’t always know what we don’t know. Give yourself time and

altitude to recover.

Before you take your flight, ask yourself, "Am I prepared to bail out if necessary today?" If you are not, you had better rethink flying on this day. You can mentally rehearse, while stretched out on the couch at home, under what conditions you may be forced to bail out, at what altitude, and what you will do. Psychologists tell us that the human mind cannot tell the difference between an actual experience and one that has been vividly imagined and rehearsed in the mind's eye.

Can you mentally rehearse a control jam? What would you do? Roll inverted and push? How about rudder failure or jam? Could you reach down and operate the cables with your hand? Would adjusting trim overcome a partial elevator jam enough to allow you to land safely? How would you get out in a fire? Can you think these things through at home while relaxed so that your first experience is not an actual emergency?

We can't physically practice an actual bailout (well I guess you could, but it would be very costly after about the second time), but we can practice bailout procedures on the ground. Can you find your belt releases without looking? Do you know very intimately your canopy ejection system? So much so that under extreme stress and in an emergency you can find the belt releases and canopy ejection and get out of the airplane? These can be practiced on the ground every time you exit the airplane after a flight. Practice that and build in muscle memory just like you would for a snap roll in the air.

Always avoid the temptation to show off for anyone on the ground or in the plane with you. If you haven't completely and safely flown a maneuver many times by yourself, don't start practicing now. It just is not worth it. If you ever hear yourself saying or thinking anything like "hey, watch this," stop immediately, grab yourself but the shirt collar, and slap yourself upside the head, get a grip

on yourself and wise up. Ninety-nine percent of the folks with you for a ride or on the ground have no idea what you are doing. They don't know whether it is hard or easy, or what risk you are taking, and they really couldn't care less (unless they are in the plane in which case they don't want the risk). Why even think about taking such a risk?

I have received countless hours of enjoyment through my aerobatic flying and have made many friends and hope to enjoy and improve my flying for years to come. But when you boil it all down, at its essence, this is nothing but a very expensive and time-consuming hobby (albeit one we have all decided is worth the expense).

Those of us who fly aerobatics know that the risks involved are well worth taking in proportion to the enjoyment and benefit received. And the risks can be lessened by careful planning, practice, and thoughtful attention to what you are doing. Practice the fundamentals. **IAC**

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# An Ode to Checklists



## And to not busting your butt

BY GORDON PENNER, IAC 429704

FAA GOLD SEAL CFI, THREE-TIME MCFI-AEROBATIC, B-767 CAPTAIN

Aircraft, environment, personalities — so many distractions!

In my aerobatic, tailwheel, and glider flying worlds, as opposed to my airline world, I have found varied kinds of individuals. In addition, those individuals are usually flying aircraft that have less in the way of checklists or procedures. Add into the mix the fact that aerobatic, tailwheel, or glider flying is usually a hobby. Now throw in work, life, and ground distractions and you have a strong recipe for missing something critical while flying.

All of these elements scream for the creation of some kind of checklist or procedure, whether printed or not, and for the discipline to always use them. No matter what kind of flying you do, no matter what is going on in your ground life, or what kind of personality you have, *your life depends on getting the safety details of flight right.*

Getting ready for an aerobatic practice, competition, or even just a regular flight provides a whole bucketful of things that can distract a pilot from the basic flying of the aircraft. For example, in the Extra, many pilots have gone into the

competition or practice box having forgotten to switch to the aerobatic fuel tank, which caused the engine to quit when the airplane departed level flight. Even thinking about the sequence is a distraction!

Having printed checklists or procedures in lighter, less “official” airplanes is usually unlikely, especially if the aircraft is experimental or if it is older. In their place, should you use a *mnemonic* (covered below) checklist or do you make up a printed checklist of your own? What you do is up to you, but all the safety commentary from 100-plus years of flight suggests that you must have *something*.

In the April 2009 issue of *Flying*, magazine columnist Tom Benenson wrote a great article called “Making a List, Checking It Twice” in his Airwork column. He was giving a flight review to none other than Richard Collins. He commented that being able to find something to correct in supreme aviation pooh-bah Collins was “as likely as my winning the Red Bull Air Race tour.”

He did, however, notice that Jedi master Collins was not using a

printed checklist and commented on it. “Richard was not chagrined,” Tom wrote. “He responded by saying something like, ‘You’re absolutely right. It is important to use a checklist. But you’re wrong that I’m not using one.’ ‘Huh?’ Turned out Richard used his panel itself as the checklist. Starting at the lower left corner he touched each item as he moved across the panel and down the pedestal checking them off.”

Richard was using what some call the “touch” system checklist, which has been used by fighter pilots and others since the ’30s. Notice that it is systematic, repeatable, and reliable.

We must also note the difference between the “doing” action and the “checking” action. Doing is the physical action of moving the knob, looking at the indicator, or flipping the switch. The checking action is verification that a particular action has been completed. Most people combine both actions and make the checklist a do list, but they can be split, which is a system we now use in the airlines.

In this split system, once a pilot is experienced with an aircraft they can “flow” their hands through the cockpit

in a predetermined order and flip the switches to the correct positions. The checking action is done after the flow, it must be done systematically, in order, and the same way every time.

The flows can be an easily remembered pattern, like left to right, top to bottom, a backward letter “C,” etc. There is a particular flow for each phase of flight. The airlines have gone so far as to make memorizing the flows mandatory. Also, the flow for a particular phase of flight might have eight items, but the printed checklist, or mnemonic checklist, may just cover some of those.

If an item has not been completed while doing the checking function, don’t go past it until that item can be completed. The chances of a human remembering to come back to the skipped item are abysmally low.

So, was Richard using the panel touch system as checklist, checking his work after the switch-flipping was done, or was he using the panel touch system as a do list? It doesn’t matter. Either way is fine as long as it is done the same way *every* time.

The preflight can be done in a similar way. Tom does what I do for the preflight, which is using the aircraft itself as the checklist. I always start in the same place and end in the same place. I always go the same direction around the aircraft every time. Also, I break up the airplane into five major areas for the preflight: the cockpit, each wing, the nose, and the tail. If I am interrupted or distracted in the middle of a major area, I start again at the beginning of that area to make sure I didn’t miss anything.

A *mnemonic checklist* is one that uses the letters in a common word as checklist items. Mnemonic checklists are just as good as a printed checklist as long as the letters are done in the order of the word used. In light planes at Stewart’s Aircraft Service in Ohio I was taught to use the CIGAR checklist (controls and carb heat, instruments, gas, airplane general, and run-up) for my before-takeoff checklist, and GUMPSSS (gas, undercarriage, mixture, prop control, seatbelts,

shoulder harnesses, and switches) for my before-landing checklist.

When doing the letter G for gas I’m checking four things: fuel lever on, fuel quantity, mixture rich (or optimized), and fuel primer in and locked. Controls includes the trim control.

For the simpler airplanes these mnemonic checklists work just fine. We have similar things in the glider world, like ABBCCCDDE for the before-takeoff checklist and USTALL for the before-landing checklist. But, again, they must be done *every* time and in the order of the letters in the word used.

If I’m doing multiple takeoffs without shutting the engine off, since I don’t have to do the run-up again, I will do the CG mnemonic checklist as my before-takeoff checklist on the second and any subsequent takeoffs. CG is the controls, carb heat, and gas items from the CIGAR checklist described above, plus CG is easy to remember. Lack of fuel is still the number one reason people crash airplanes, so I check the fuel level and fuel system elements *before every takeoff*.

The owner of the first flight school where I was a CFI killed himself and his wife because he took off in a hurry with his controls locked. I *never* take the runway for takeoff without “stirring the pot,” i.e. moving all three flight controls to ensure they are free and setting the trim. That is the letter C. If I do five takeoffs in an hour, I stir the pot five times, set trim five times, and check that the carb heat is *off* five times.

Also, what about emergencies? Is there something from the manufacturer — like maybe a manual? Is it user-friendly? Is it accessible in flight? Should you make a printed card or cards? Can you reprint just the checklist portions of the manual? Is it something you can stick on the panel? There are a lot of ways to handle this area, but make sure that you give it some thought.

As a final comment on the need for some type of checklist, flow, mnemonic, or procedure, I submit the following: After retiring from NASA in 1982, Mercury 7 astronaut, Apollo/Soyuz astronaut, and later chief astronaut

Donald K. “Deke” Slayton got into air racing in the Formula One class. He raced at about three races a year, including Reno, from 1982 until 1991.

Deke’s autobiography, *Deke!*, which was written right before his death in 1993, contained many “other voices.” The following comments are excerpts from John “Dusty” Dowd, who raced with Deke in Formula One.

“Another time I gave him hell because he wouldn’t put a checklist in the aircraft,” Dusty said in the book. “So there was a time in Cleveland when he and Bobbie (his wife) had come in late and someone else had checked out the airplane. He took off and got about halfway down the runway and realized he’d forgotten to turn the fuel on. With his reflexes, he was able to get it on and keep flying, and proceeded to qualify.

“When he got back to the hangar, he came up to me and asked if I had any tape. ‘What for?’ ‘Thought I’d make a g\_d checklist.’”

Well, if it’s good enough for Deke. **IAC**

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# Welcome to IAC 2017 New Members



## United States

Members are the heartbeat of IAC, and our heart is beating at a healthy pace. In 2017, IAC membership saw a staggering 657 new members join the ranks of aerobatic competitors, recreational pilots, and enthusiasts around the United States and the world. You will already recognize several of these names from the pages of *Sport Aerobatics*.

In addition, we recognize the six members joining or upgrading to a lifetime membership, demonstrating a commitment to enhancing the safety, education, competition, and enjoyment of aerobatics.

## Lifetime

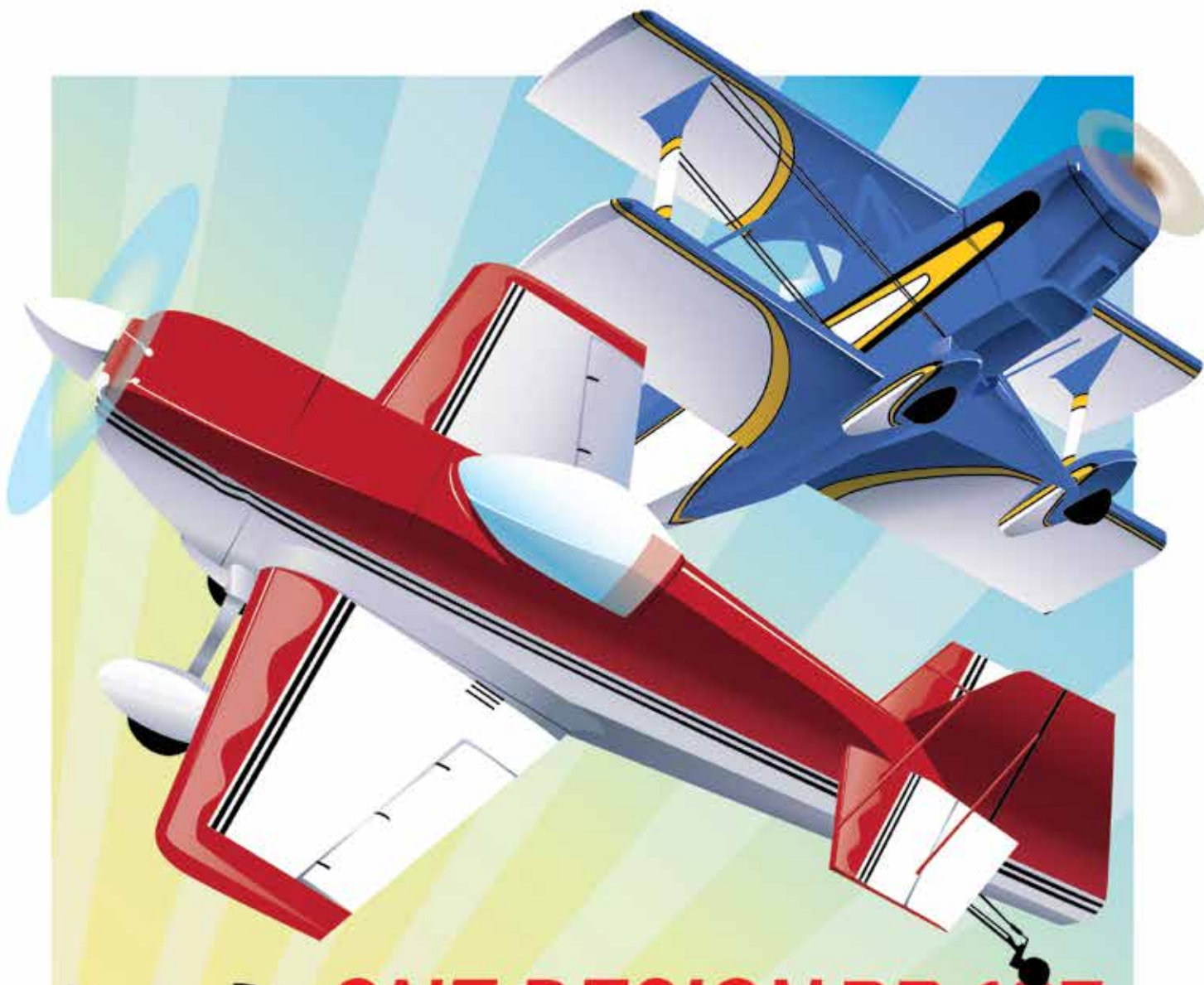
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**Connecticut**  
Douglas Walker  
**Florida**  
David L Bridges  
**North Dakota**  
Michael Lents  
**Texas**  
Kyle Lobpries  
Gary Covington

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Roberto Buonocore  
Cielo Molina  
**Australia**  
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Darren Wilson  
Nicholas Mebberson  
Brett Anderson  
Gary Hill  
Andrew Mason  
Brendan Reidy  
Craig Robinson  
Michael M Vranic  
Nick Sieczkowski  
**Brazil**  
Francis Barros  
William Starostik  
**Canada**  
Richard Amschler  
Amilia Fehr  
James Greig  
Ted Reynolds  
Mark Cunningham  
Russell Herbert  
Andrew Reich  
Thiago Campos Gondim Martin  
Denis Costello  
William MacKay  
Mark Skikavich  
Jim Stanbridge  
Clark Westcott  
Jean-Eric Castonguay  
Francois Marcoux  
Stuart Ritter  
Dave Ward  
**Czech Republic**  
Pavel Mik  
**Denmark**  
Jorgen Andersen  
Martin Jermini  
Kenneth K. Nielsen  
Peter Oeberg  
**Finland**  
Sten Stockmann  
Ari Tamminen  
**Germany**  
Ramin Partovi  
Martin Albrecht  
Johann Anders  
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Andreas Uecker  
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**Hong Kong**  
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**Iceland**  
Samuel J. Samuelsen  
**India**  
Hemraj Duraiswami  
Mohsin Pasha  
**Israel**  
Ariel Zilberstein  
**Italy**  
Francesco Dante  
Luca Perazzoli  
**Japan**  
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**Mexico**  
Eucario Leon  
**New Zealand**  
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Lachlan Falconer  
Lynda Prior  
Colin Winterburn  
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Justin Thomas  
Karsten Saeterdal  
**Poland**  
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**Reunion Island**  
Franck Chevalier  
**Saudi Arabia**  
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**South Africa**  
Iain Fergusson  
**Sweden**  
Oscar Skoogh  
**Turkey**  
Oguzhan Yaranacan  
**Uruguay**  
Mario de los Santos  
**United Arab Emirates**  
Paolo Corace  
**United Kingdom**  
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Richard Sims

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**Alabama**  
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Mike Moore  
Scott Wood  
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Loris Mazzetto  
Magne Nerheim  
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Eric Boyd  
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Antonia David  
Phil Decker  
James Dell  
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Bruce Estes  
Tony Festa  
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Joseph Fruguglietti  
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John House  
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Joshua Hundley  
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Bryan Jones  
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Nayan Kumar  
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Brooks Lemons  
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Miriam Macmillan  
Paul Markovits  
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Douglas Medore  
Craig Meyer  
Brenda Miko  
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Rahul Patel  
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Charlie Rogers  
Colleen Ryan  
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Michael Lewis  
Carlos Lowell  
Mark Lusckie  
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Michael Miller  
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Jack Kell  
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Nathan Kublank  
Joe Morris  
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Jamie Pittman  
Todd Potter  
Tom Randel  
Keith Robinson  
Nicholas Seifreier  
Bradley Scheldt  
James Shownske  
Maya Spence  
Keegan Sponholz  
Jon Stehlik  
Kyle Voltz  
Seth Wallander  
**Wyoming**  
Mark Liggert





2018

# **ONE DESIGN DR-107** **ACRO SPORT**

IAC PAVILION AT AIRVENTURE  
JULY 23-29, 2018

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 **EXTRA AEROBATIC PLANES**

POSTER CREATED BY ACSSA ENGINEERING 2018

# IMPROMPTU LOW-ALTITUDE AEROBATICS

## A blunt discussion

BY RICK DURDEN

It's bitten the very best pilots — the smartest pilots and the ones with the best hands and skills. On track to beat out the Red Baron for most combat victories in World War I, British fighter pilot James McCudden made his rural real estate purchase doing an impromptu bit of low-level aerobatics over an airfield where he'd just refueled. World War II ace Douglas Bader achieved that status while flying with artificial legs. He'd lost his real ones when he snagged a wingtip on the ground during a slow roll shortly after initially refusing to do a "beat up" of the aerodrome and then being called names. At the time he was a member of a Royal Air Force aerobatic team that performed in such tight formation that the airplanes were tied together with ropes on the wing struts. He survived his impromptu decision to do low-level aerobatics and later, as a squadron leader in combat, forbade his pilots from the stupid and often deadly practice of doing a low-level "victory roll" over their home field after shooting down an enemy airplane.

It's a hoary axiom of aerobatics that you don't do anything down low that you haven't done up high. That's a major reason that low-level aerobatics in competitions, air shows, and practice sessions has an extraordinarily low accident rate.

That all changes when the low-level "display" is a spur-of-the-moment thing. It's the "Hey, y'all, watch this!" crash that has been occurring with distressing regularity as far back as there are records.

Of concern is that one reason the impromptu low-level crashes keep happening is that those who look at them and come up with prevention techniques have drawn the wrong

conclusion about prevention. In most cases, the technique has been to tell pilots, "Just don't do it." How would you expect that to work for folks who have self-selected for not just aviation, but also aerobatics because they love turning an airplane inside out?

The result has been about as effective as telling teenagers "just don't do it" when it comes to sex — it's virtually worthless.

Where the "keep 'em ignorant" approach hasn't been used — specifically when instructors talk about and train for low-level aerobatics under controlled conditions — the low-level aerobatics accident rate is tiny.

Accordingly, I think it's time to start talking openly about impromptu low-altitude aerobatics and, while we're at it, the low pass/buzz job that often precedes the aerobatics (or attempted aerobatics). It's time to drag the subject into the open because it's something virtually every aerobatic pilot wants to do. And if there's one thing that has been proven time and time again in aviation, it's that when a pilot tries something new without having either thought long and hard about it or having taken some dual, the odds are staggeringly high that he or she is not going to do it very well.

Let's be honest, flying low, within about 200 feet of the ground, is a hell of a lot of fun. Booming along in all the glories of the third dimension, barely above the dirt, is exciting on a level that is hard to imagine without experiencing it. Human desires are forces of nature. For our aviation educators and regulators to fail to talk with pilots openly about what is involved in low passes and low-level aerobatics is to ignore something that is

incredibly attractive. If they think that if they don't talk about it, then pilots won't think about it, they're nuts.

### The Scenario

Let's look at a typical scenario — one that is so popular and has resulted in so many deaths that it is almost a cliché: a very low-altitude fly-past of a friend's house with a roll to show off the airplane and how cool we are.

Let's do it — we'll get a speed fix because we're down low and we've got a decent tailwind. The low-altitude roll will give us a huge rush, and we'll show the world we are too cool for words. I'm in.

Let's take a few seconds before we go whistling off to accomplish the plan to dissect it. First, we want to fly low, probably about 10 feet above the ground. Have we ever flown that low before? Other than landing, maybe — if we've gotten a low-altitude waiver. In reality, whenever we've been at that altitude we've been in airspace that has been cleared of obstructions. Even then, we'll admit that low-altitude flying is a high workload event; we don't have a lot of bandwidth to spare for dealing with other things, such as looking out for and avoiding obstructions. If we haven't flown aerobatics down low, watching the world whiz by at about 140 mph is a new experience — we'll need some time to take it in and adjust. Plus, as experienced aerobatic pilots will tell you, the view is different down low — the horizon seems higher — and you may have to learn new reference points for maneuvers you've been flying for years.

How good are we at holding altitude plus or minus 100 feet? Do we really want to try to maintain 10 feet AGL?

Okay, the speed is bothering us, so we'll pull the power back a little to slow down. But we don't dare look inside at the tachometer, do we? A little flinch and we're on the ground, eh? Can we make a power reduction of the right amount, and then retrim the airplane to compensate for the lower speed, all without diverting our attention from the outside world?

Let's keep adding variables to make this like the real world. At the end of the pass, we're going to pitch up and roll. With the ground zooming by us, we feel as if we're going a million miles per hour, so we'll really pull the nose up to take advantage of that speed in the climb. Although, once we think about it, we're only at cruise airspeed or a little below. Are we going fast enough to roll?

### The Big Pull-Up

What happens when we make a big pull-up while cruising at altitude? We get a nice zoom climb for a short time and then the airspeed rapidly goes away, doesn't it. We've got to get full power in and put the nose down to normal climb attitude to keep from stalling the airplane even if we don't roll. While still pretty low. And probably with the ball out to one side. Without being prepared for the stall.

Let's add the roll to the equation — are we going fast enough for the normal entry speed? If not, what happens when we pitch up enough to establish and maintain an upline through the roll? Will we stall or simply wind up with a sink rate that puts the second wingtip into the ground?

### Obstructions

Now, let's add obstructions. And because real life is always a final exam, any and all obstructions are fair game — whether we can see them or not. Houses may have antennas or satellite dishes on or beside them, trees may or may not have leaves, making them difficult to spot quickly and, as every aerial applicator pilot knows, power lines are often absolutely invisible and get strung in strange places. Have we thought about what happens if we

take a power line with the windshield? How about with the landing gear? Or the prop?

So, there we are, 20 feet above the ground over an area we have not surveyed for obstructions doing our best to hold altitude, which is taking almost all of our concentration, hoping that the power setting is okay, but not daring to look, trying to sort out the pitch trim, which is out of whack because we just dived down to this height and are now decelerating. Do you think we've got a 100 percent chance of spotting and avoiding things that are out there waiting to bring down the airplane?

Even assuming we can spot an obstruction, how much experience have we had judging pull-ups over obstacles while approaching at 140 mph or so, especially downwind? In high school, I had a summer job working as ground crew for a crop duster. I watched professional ag pilots fly with their wheels 6 inches over crops and then judge their pull-ups to avoid hitting power lines and trees. And every so often I watched those professionals hit those power lines and trees as they misjudged a pull-up. It sunk in for me that if the men and women who make their living flying at low altitude sometimes hit things, what are the chances for the amateurs?

I've noticed that aerobatic pilots are intelligent people — it seems to me that if they make the decision to do low-altitude aerobatics, they have a better chance of surviving if that decision was the result of mature reflection, examination of the area from the ground beforehand, and some flight instruction, rather than after just emoting, "Man, that looks like fun," and going for it.

IAC

**Rick Durden**, EAA 304613, is a CFII, holds an airline transport pilot certificate with Cessna Citation and Douglas DC-3 type ratings, and is the author of *The Thinking Pilot's Flight Manual: Or, How to Survive Flying Little Airplanes and Have a Ball Doing It*, Vols. 1 and 2.

**Editor's Note:** This article was written prior to IAC Chapter 27 president Jim Risher's recent fatal accident while flying an agricultural aircraft. The reality of Rick's discussion has hit eerily close to home. Jim was an extraordinary and highly experienced pilot, commanding many different types of aircraft and has attained almost every pilot rating that the FAA allows. He has taught numerous people to fly, many that now have flying careers. Jim has amassed thousands of hours as an agricultural pilot. He was a high-energy and charismatic aerobatic performer, a master of showmanship. Blue skies, Jim.

## 2017 Non-Flying Award Nominations

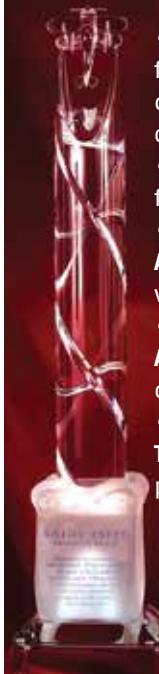
**Deadline June 1, 2018**

She gives countless hours of her personal time for the betterment of IAC; he volunteered many hours mentoring and coaching behind the scenes; she has a firm understanding of all aspects of judging; or his products have made a tremendous difference to aerobatics.

Do these people sound like someone you know and would like to recognize for their contribution to the sport? Nominate him or her for one of IAC's non-flying awards:

- **Frank Price Cup** for outstanding contribution to the sport of aerobatics
- **Robert L. Heuer Award** for judging excellence
- **Kathy Jaffe Volunteer Award** for outstanding volunteerism
- **Harold E. Neumann Award** for outstanding chief judge
- **Curtis Pitts Memorial Trophy** for outstanding product design

Descriptions of the awards and an online nomination form can be found at [www.IAC.org/legacy/non-flying-awards](http://www.IAC.org/legacy/non-flying-awards).





# Closed Structure Inspections

## Dig deeper

BY TY SUNDSTROM

Do you inspect the inside of closed structures?

Recently, two aircraft flew into my shop for their yearly inspection. One an experimental homebuilt Christen Eagle and the other, a factory-built Pitts S-1. Both had been re-covered more than 30 years ago with a modern “lifetime” fabric.

What made these two different from most fabric-covered aircraft was neither aircraft ever had the wings inspected during those three decades of service. No inspection rings were installed at the time of re-cover, so no one ever looked! This issue has become more prevalent with the use of extended-life fabric materials and beautifully finished expensive cover jobs.

We have heard all kinds of excuses for why the wings shouldn’t be opened, or the inspection holes cut out from a “perfectly good” cover job. For example, owners often lament the cost of painting the inspection covers, which have multiple colors if the inspection holes are opened. This speaks well for painting a set of covers at the time of re-cover so colors won’t need to be matched down the road. Of course, nobody likes inspection covers coming loose on aerobatic aircraft, so many builders choose to omit the

inspection rings.

But there are plenty of reasons internally why access holes should be a requirement for the inspection of any aerobatic or non-aerobatic aircraft. Aside from the fact that each flight becomes a blind test flight for the pilot if they are not installed, experience has revealed stretched fittings, loose and missing hardware, and loose and missing rib stitching. One Stearman’s lower wing was found devoid of *all* rib stitching. It seemed as though mice had slipped in through a tiny slit of an opening on the butt end under the root fairing and chewed all the stitching loose to build a cozy nest out in the wingtip! Sadly, it looked perfect from the outside. Broken ribs, cracked spars, and flopping drag/anti-drag wires round out the list on our little horror show.

Speaking of loose drag and anti-drag wires, this is a very common problem with the Christen Eagle design. A small flaw in the original design (since fixed in current production kits) of the compression ribs can allow the drag and anti-drag wires to loosen, compromising structural integrity and requiring repair of the wing. While not singling out the Christen Eagle, its complex paint design also discourages many from wanting to “dig” deeper, so to speak. Many of these aircraft have never been opened since

they were first built back in the ’70s and ’80s.

Many air show performers like Sean D. Tucker have their aircraft re-covered each year between seasons to be sure their aircraft are as safe as can be for continued use.

Both of our subject aircraft, the Eagle and the Pitts, did require major repair and a re-cover after cutting holes to allow for an honest inspection.

Nobody would expect to fly a Cessna, Beechcraft, or Piper that had been in operation for years without someone having taken a look inside the wings to look for a cracked attach fitting or corrosion! Why would anyone want to fly any aircraft, especially an aerobatic aircraft, which has never had the structure inspected?

**IAC**

Ty Sundstrom has been a pilot for more than 45 years (14,500-plus hours of non-commercial time), has been an A&P mechanic with inspection authorization for 40 years, and has restored 57 aircraft, some of which are now in museums in Seattle, Washington; Hood River, Oregon; Tokorozawa, Japan; Sao Carlos, Brazil; the Planes of Fame Museum in Chino, California; the National Museum of the United States Air Force in Dayton, Ohio; and others.

# AERO

# WORLD

APR 05 Snowbird Classic • Chapter 89 • X35: Marion County Airport, Dunnellon, FL  
APR 13 Hammerhead Roundup • Chapter 36 • L08: Borrego Valley Airport, Borrego Springs, CA  
APR 27 Carolina Boogie • Chapter 19 • W03: Wilson Industrial Air Center Airport, Wilson, NC  
APR 27 Early Bird 2018 • Chapter 25 • 26R: Jackson County Airport, Edna, TX  
MAY 03 Sebring 77 • Chapter 23 • SEF: Sebring Regional Airport, Sebring, FL  
MAY 04 Duel in the Desert • Chapter 49 • KAPV: Apple Valley Airport, Apple Valley, CA  
MAY 19 2018 Wildwood Acrobast • Chapter 58 • KWWO: Cape May County Airport, Wildwood, NJ  
JUN 01 Ben Lowell Aerial Confrontation & 2018 IAC West Open Championship  
Chapter 12 • KFMM: Fort Morgan Municipal Airport, Fort Morgan, CO  
JUN 01 Coalinga Western Showdown • Chapter 38 • C80: New Coalinga Municipal Airport, Coalinga, CA  
JUN 08 Bear Creek Bash 2018 • Chapter 3 • KRMG: Richard B. Russell Regional Airport, Rome, GA  
JUN 09 Giles Henderson Memorial Challenge • Chapter 61 • SLO: Salem-Leckrone Airport, Salem, IL

JUN 15 Ohio Aerobatic Open • Chapter 34 • KEDJ: Bellefontaine Regional Airport, Bellefontaine, OH  
JUN 22 Apple Cup • Chapter 67 • KEPH: Ephrata Municipal Airport, Ephrata, WA  
JUN 22 Lone Star Aerobatic Championships • Chapter 24 • KGYI: North Texas Regional Airport, Sherman, TX  
JUL 13 Green Mountain Aerobatics Contest • Chapter 35 • KVSF: Hartness State Airport, Springfield, VT  
JUL 13 High Planes Hotpoxia Fest • Chapter 12 • KSTK: Sterling Municipal Airport, Sterling, CO  
JUL 13 The Corvallis Corkscrew • Chapter 77 • KCVO: Corvallis Municipal Airport, Corvallis, OR  
JUL 14 Michigan Aerobatic Open • Chapter 88 • 3CM: James Clements Municipal Airport, Bay City, MI  
JUL 14 Super D Tango • Chapter 24 • XA68: Akroville Airport, Slidell, TX  
AUG 10 Can-Am Championship • Chapter 67 • KCTB: Cut Bank International Airport, Cut Bank, MT  
AUG 17 Kathy Jaffe Challenge • Chapter 52 • KWAY: South Jersey Regional Airport, Mount Holly, NJ  
AUG 17 Upper Canada Open • AC Chapter 3 • CYHS: Hanover Saugeen Municipal Airport, Hanover, ON Canada  
SEP 01 ¡Viva Santa Maria! • Chapter 26 • KSMX: Santa Maria Public Airport, Santa Maria, CA  
SEP 07 Apple Turnover • Chapter 67 • KEPH: Ephrata Municipal Airport, Ephrata, WA  
SEP 08 ACE's High Aerobatic Contest • Chapter 119 • KEWK: Newton City/County Airport, Newton, KS  
SEP 08 East Coast Aerobatic Contest • Chapter 11 • KHWY: Warrenton-Fauquier Airport, Warrenton, WA  
SEP 22 U.S. National Aerobatic Championships • KOSH: Wittman Regional Airport, Oshkosh, WI  
OCT 06 The Clyde Cable Rocky Mountain Aerobatic Contest • Chapter 5 • KLAA: Lamar Municipal Airport, Lamar, CO  
OCT 19 Akrofest • Chapter 36 • L08: Borrego Valley Airport, Borrego Springs, CA  
OCT 19 Phil Schacht Fly Like Your Hair is on Fire • Chapter 288 • 42J: Keystone Airpark, Keystone Heights, FL  
NOV 01 Sebring 78 • Chapter 23 • SEF: Sebring Regional Airport, Sebring, FL  
NOV 01 The Tequila Cup • Chapter 62 • AVQ: Marana Regional Airport, Marana, AZ

# 2018

## AEROBATIC CONTEST CALENDAR

Roll with us. Join the International Aerobatic Club through your local chapter, or at [www.IAC.org](http://www.IAC.org)  
For the most up-to-date contest listing, visit [www.IAC.org/contests](http://www.IAC.org/contests)

2018 US Advanced Aerobatic Team pilot A.J. Wilder

Poster design and photo by Evan Peers. © Airspace Media & International Aerobatic Club, Inc.





## MEET A MEMBER

by GARY DeBAUN, IAC 4145

### Susan Bell

IAC # 438132

Occupation Web producer

Chapter affiliation IAC Chapter 26

Age Never ask a lady her age!

Social media @susanbellair



#### GD: Susan, how did you get started in aerobatics?

SB: First, I did not grow up around aviation. In fact, I only received my pilot certificate in 2012, which I accomplished in a quick four months while living in Oakland, California. I loved flying in the San Francisco Bay Area, and when I moved to my current position with NASA in Southern California, I wasn't finding as much joy tooling about the skies in a white Cessna over the Los Angeles Basin. I had an inkling of desire to try aerobatics and, wanting to expand my skill set, I phoned CP Aviation in Santa Paula and signed up for their emergency maneuver training course. From the very first spin, I was hooked.

#### GD: You work for NASA — what do you do there?

SB: I'm originally from central Texas where the night sky shimmers with a million stars. From a young age, I was fascinated by space and wanted to be an astronaut. I got sidetracked into communications in college, went to film school, and ended up in Hollywood, where I worked on the producing side of both documentaries and animated television. A few years ago, I managed to combine my interests via a producing position with NASA's Jet Propulsion Laboratory. I work exclusively in Earth science communications (not Mars, not Jupiter). I joke that I'm a science translator, and I tell the stories of the many satellite and airborne missions studying our home planet. This involves not only producing videos, graphics, and printed products, but also planning and executing agency-wide media campaigns and managing multiple Earth-centric social media accounts with more than 12 million followers. But my favorite part of my job is public outreach, which ranges from working with Girls Scouts on their science badges to staffing the NASA exhibit at EAA AirVenture Oshkosh.

#### GD: When and where was your first contest?

##### How did it go?

SB: My first contest was Chapter 36's Hammerhead Roundup in Borrego Springs in April 2016. It turned out to

be a wonderful welcome to the IAC community. A series of unfortunate events almost derailed my participation, and it took numerous people to get me into the air. I had arranged to fly Dave Watson's Super Decathlon, but it had mechanical trouble and then weather prevented most of the Northern California pilots from making it down to Southern California. Luckily, Chapter 38's Mike Eggen did make the trip and graciously offered to let me compete in his Super Decathlon with him as safety pilot. I didn't know anyone, so Chapter 49's Andrew Slatkin introduced me around, and I borrowed a parachute from Layne Lisser. A handful of pilots were preregistered in Primary, but as I was the only one to show up, Jim Bourke offered to fly for a patch in Primary so I could compete. Of course my first flight ever in an actual box was aborted due to the oil door on the cowl popping open as I dove in. We landed, got that pesky door secured, and the rest of the contest flew by. I didn't zero anything, and I came in first of one.

#### GD: You bought John and Kathleen Howell's Mary Kay Special. How did that come about? Are you liking the Extra 300 so far?

SB: I can't believe you called it that! Yes, my new baby is very pink, blue, white, and girly, and I love it. I think the right plane will find you, and that's exactly what happened here. I decided last year I needed to get my own ride if I was going to take competition seriously. I had been looking for a single-seat Pitts for months, but couldn't find one I liked. So when I learned John, Kathy, and their partner Michael Hartenstine — all of whom are in my chapter — were going to put their midwing up for sale, I knew it was the plane for me. I'm having a ball learning how to fly it.

#### GD: Do you have any specific aerobatic goals?

SB: I'd like to make the U.S. Advanced Aerobatic Team eventually, but right now I am focused on flying basic figures in the Extra really well before adding the complexity of lots of rolls and snaps and pushes. I'll

probably compete in Sportsman for a year or two before moving up. I'm not in any rush.

**GD: What is your favorite contest so far?**

SB: All of the contests in the Southwest region are memorable with their own quirks: high density altitude at Apple Valley, changing weather in Borrego, hay rides at Delano, judges line in a cow pasture in Marana, and more cows in Coalinga. One contest memory that does stand out in my mind is of the 2016 Borrego Akrofest. The 4-Minute Free judges gave a tie to Jim Bourke and Hiroyasu Endo (performing to "Mr. Roboto" to everyone's delight), a hacksaw was found during the banquet, and the first place plaque was sawed in half. It was just one of the shenanigans we tend to get into on the West Coast.

**GD: Do you have any pre-aerobatics routine like stretching, yoga, or listening to music?**

SB: I'm usually rushing back from the judges line, so I don't make a big deal of it. I do walk through the sequence multiple times to get it in my head. I consider what the wind is doing and how I'm going to adapt. Then I put on my flying shoes and go. You're supposed to fly contests like a practice flight, right?

**GD: You are relatively new to the IAC. Is there anything you would like to see changed?**

SB: From my perspective as a communications professional, I'd love to see more outreach to the larger aviation community. For this sport to not only survive but also thrive, we shouldn't be seen as an elite group doing something beyond the reach of most pilots. Our message should be, "You, too, can do this!" Encourage emergency maneuver training and upset recovery training, as they are the entry point to aerobatics for many. Offer to present a talk on aerobatics to your EAA or Ninety-Nines chapter. See if that small town air show will let your chapter display planes and have a table with information. If you're active on social media, share your aerobatics flying enthusiasm on Instagram and Twitter, which are the two best platforms for reaching new people via common interests. I think we tend to preach to the IAC choir when we need to become missionaries to the GA community.

**GD: Who in the sport has been an inspiration to you?**

SB: Rather than name some fabulously talented air show pilot I hardly know, I'd like to acknowledge a few IAC members who inspire me through their encouragement, their own successes, and their friendship: Michael for helping me with his old/my new Extra; Tim Just and Stephen De La Cruz for their coaching and accumulated knowledge and wisdom; and Mark King for getting me into all of this insanity. And there are the numerous others, because that's one of the best things about this sport — the people.

**GD: Do you have any interests outside of flying?**

SB: I enjoy hiking in our rugged SoCal mountains and the occasional Malibu beach day. I'm still a member of several Hollywood guilds, so I keep up with film and television when I'm able, but most of my time is split between working and flying. In December, I completed my commercial glider add-on rating, and I look forward to doing more soaring and learning how to tow. I'm planning on getting my CFI certificate this year too and adding a multiengine rating. Work and fly, that's what I do! **IAC**

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