SPORT Aerobatics

JULY 2020

OFFICIAL MAGAZINE OF THE INTERNATIONAL AEROBATIC CLUB

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Vol. 49 No. 7 / **JULY 2020** *A PUBLICATION OF THE INTERNATIONAL AEROBATIC CLUB*

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Photo by of Mike Shore, IAC 437866.

ABOVE: Sunset at the U.S. Nationals.
Photo by Laurie Zaleski, IAC 433563.

SPORT Aerobatics
OFFICIAL MAGAZINE OF THE INTERNATIONAL AEROBATIC CLUB

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Dealing With the Unexpected

BY ROBERT ARMSTRONG, IAC 6712

GREETINGS, all aerobatic enthusiasts!

I write this at the end of May and in the midst of what is the longest interruption in our normal way of life and leisure in our recent history. Today, restrictions on gatherings are being phased back into the day-to-day social and business routines as we slowly ease in. I know I join everyone in saying that we hope for a resolution to the pandemic and that there will be a bright future for us all very soon.

As all know by now, EAA made the difficult decision to cancel AirVenture for 2020, which affects all divisions across the board. We all are struggling to gain a foothold, and at the forefront of the struggle are the inevitable losses we will sustain in revenue. The IAC treasurer, Jordan Ashley, and the finance committee had projected us to be in the black for 2020, and now we know we will be fortunate to minimize losses as best we can. The belt tightens.

Our inability to gather in Oshkosh has created a number of other issues, which I have been discussing with guidance from many — in particular our treasurer, Jordan, and previous treasurer Bob Hart. One of the significant concerns is the selling of IAC branded merchandise destined for the IAC Pavilion. Our executive director, Steve Kurtzahn, finally is able to return to work in his Oshkosh office and will have our online store up and in working order as you read this. Our *Sport Aerobatics* editor, Lorrie Penner, will feature merchandise on our website and in the pages of our magazine, so I encourage you to take a look and reward yourself with some 50th anniversary pieces.

In this issue is a wonderful view back on our past that many of our members who joined us in the last decade or two may not have had the pleasure of experiencing. Reading the article on the Grogan Belt will give you insight into an award that was cherished in a different way than you normally expect. The Grogan Belt was a hand-tooled leather belt created by Tom Grogan that was presented to the last-place finisher in Sportsman. While I did not ever earn one in my aerobatic career, the Grogan Belt has been awarded to some rather well-known IAC members over the years, and it gave encouragement to pilots who were having a plain old bad day. We all can sympathize.

Additional features explain that a new, high-power airplane is not necessary to enjoy many hours of aerobatics. I can recall watching a brand-new Decathlon perform in a local air show years ago and admired the fantastic performance it had. I later had the pleasure of flying a Decathlon after having taught myself aerobatics in a Stearman, and the differences and similarities between the two made my learning in both types of aircraft eye-opening and enjoyable. In the end, this step into the Decathlon was the motivation to build my Pitts so I could afford my new addiction.

Like all of you, my IAC friends, it is with tremendous hope that the "new normal" on the horizon will allow for the basic aerobatic activities we have enjoyed for 50-plus years and not change in a negative way. As always, let me know what you think, fly safe, and I hope all get to enjoy the summer with a loop and a roll. IAC

LIKE ALL OF YOU, MY IAC FRIENDS, IT IS WITH TREMENDOUS HOPE THAT THE "NEW NORMAL" ON THE HORIZON WILL ALLOW FOR THE BASIC AEROBATIC ACTIVITIES WE HAVE ENJOYED FOR 50-PLUS YEARS AND NOT CHANGE IN A NEGATIVE WAY.

Please send your comments, questions, or suggestions to president@iac.org.

IAC 50th Anniversary Memories

BY LORRIE PENNER, IAC 431036

I HOPE YOU ENJOY THE RICH HISTORY OF THE IAC AND CAN TAKE AWAY A LESSON THAT YOU CAN STICK IN YOUR BAG OF AVIATION TOOLS.

THINGS I THOUGHT I KNEW and things I never knew have been creeping around my mind the past few weeks as the many volumes of *Sport Aerobatics* were being reviewed in preparation for this special 50th anniversary edition of the magazine. One great example was the Grogan Belt. I had a visceral sense that someone had hand-tooled the leather belt with all the Sportsman figures on it, but who was Grogan and why did he feel the need to spend so much time producing the belt for so many years and so many different contests? I won't spoil it for you if you don't already know. Thanks to Don MacDonald, who sent me photos and some memories of "earning" his Grogan Belt in the 1980s. (Check out the IAC 50th Anniversary Spotlight sidebar on Page 31.)

I chuckled as I read how "expensive" fuel and airplanes were in the 1980s. Fuel was $1.82 a gallon. In his article celebrating the IAC's 10th anniversary, Mike Heuer noted that "costs are simply out of sight today. This sport needs a good aerobatic airplane for under $10,000." I want to take this opportunity to publicly thank Mike for all his guidance and work on the IAC 50th anniversary panels and on all the spotlight articles that have appeared in the magazine. As our IAC historian, he is truly a fountain of knowledge.

Elsewhere in this special edition we have gathered a number of firsthand aviation and aerobatic experiences that can benefit all our members. There's no reason to reinvent the wheel when you can simply learn from others' experiences and model yourself after the successes of those who came before. From Tom Myers' article about not being mentally prepared to fly to Bill Bancroft's story about practicing egress in the event that you have to bail out, we can all learn something about checklists and processes that could save our lives.

Although I don't have my own parachute and will never be called upon to fly the low lines at a contest, I did relate a bit to Andrew Boyd's article "3.5 Things to Work On" when it came to item No. 3. He said, "Flying in general would be a lot easier if there was never any wind." When I was in the first stages of my pilot training I was not good at landing in moderate to heavy wind. I'd get the crab in the approach pretty good, but straightening out and landing wing low into the wind seemed especially tricky. My instructor's solution to this problem was to purposely take me out on windy days so I could really experience what the wind was doing and practice making the necessary corrections.

I hope you enjoy the rich history of the IAC and can take away a lesson that you can stick in your bag of aviation tools.

Happy 50th anniversary, IAC! Let's have fun and continue to fly safe! IAC

SUBMISSIONS: Photos, articles, news, and letters to the editor intended for publication should be emailed to 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.

TOP STORY

Gone West – Tom Adams, IAC 1999

TOM ADAMS learned to fly by training with his father and helped pay for college by dusting crops in a 450 Stearman. He served in the Marine Aviation Cadet program in Pensacola, flying A-4D Skyhawks, and eventually began a 32-year career with Northwest Airlines. Tom retired as a captain on the 747-400 after logging time in more than 100 different aircraft types.

Tom's aerobatic career began with a Pitts S-1C he built for use in regional IAC contests. He earned multiple competition awards, including the ALL TEN award designation for proficiency in aerobatic flight through the IAC Achievement Awards program for proficiency in Primary through Unlimited categories.

Tom was highly regarded as a judge after serving in that role for more than 200 contests. He was the 2010 recipient of the Robert L. Heuer Judges Award, which recognized his outstanding achievements made in competition aerobatics by a judge. He was also the 2015 Kathy Jaffe Volunteer Award winner, which was presented to him in recognition for his coaching, mentoring, new ideas for improving the sport, and encouraging others. Tom also served on the IAC board of directors for more than 28 years and served as a judge at the annual U.S. National Aerobatic Championships for many years.

In 1995, Tom was a member of the first U.S. Advanced Aerobatic Team to compete in the inaugural Advanced World Aerobatic Championships, which was held in Cape Town, South Africa. Tom shipped a Pitts S-1T, tail number N95JC, which was flown by him, Don Rhynalds, and Larry Owen. Other planes the U.S. team was competing against included the Zlin 50 flown by the newly crowned Advanced world champion, Martin Stahalik of the Czech Republic, and the Yak-55 of second- and third-place finishers Svetlana Kapanina and Victor Chmal from Russia. John Morrissey was the top U.S. finisher in ninth place, flying a Pitts S-2B.

Tom Adams was inducted into the IAC Hall of Fame in 2018. He is pictured here with his family members after the EAA Hall of Fame Banquet in Oshkosh, Wisconsin.

Tom remained an Advanced category competitor through 2011 when he switched over to Intermediate, won the category, and retired his competition flying at the Phil Schacht Aerobatic Kickoff in 2012. He flew a Pitts for most of his competition years and flew a Staudacher S300D during the last few years of his participation. Tom was the U.S. Nationals Advanced champion three times in 1986, 1987, and 1992.

Tom Adams earned the respect of the aerobatics community not only because of his abilities as a pilot and a judge, but also through his willingness to share his expertise with fellow aerobatic pilots. He represented the best of aviation because of the way he encouraged all who had shown an interest in competition aerobatics, whether that was at contests, IAC chapter practice sessions, or his own airstrip.

PHOTOGRAPHY BY **EVAN PEERS**

NOTIFICATION IAC ANNUAL MEMBERSHIP MEETING

THE BOARD OF DIRECTORS met by teleconference in a Special Board Meeting on Friday, May 22, 2020, to discuss changing the date of the IAC annual meeting. In previous years the annual meeting was held during the last days of AirVenture; however, with the cancellation of AirVenture 2020, different arrangements were required.

After consulting with EAA's legal advisor, Dave Goelzer, on several points, the proposal to move the annual meeting to **August 1, 2020, to be held at Timmerman Airport in Milwaukee, Wisconsin, at 2 p.m. CDT** was moved, seconded, discussed, and approved. Officers required to attend are the president, treasurer, and secretary, and all others are invited to attend as they wish.

Original dates of voting opening and closing will remain unchanged as June 24, 2020, and July 21, 2020, respectively. Election results will be announced at the end of the annual meeting. Our executive director, Steve Kurtzahn, has made arrangement for a teleconference number that will accommodate up to 150 attendees. Further instructions will be published on the IAC website. For those wishing to attend in person spaces is limited. Please RSVP to *execdir@iac.org*. IAC

Aerobatic Practice Areas

BY BRUCE BALLEW, IAC 26969, GOVERNMENT RELATIONS CHAIR

MANY OF OUR MEMBERS ARE ACTIVE PILOTS who like to perform aerobatics for a variety of reasons — whether the objective is to develop new aerobatic skills, maintain aerobatic proficiency, or practice for an aerobatic competition or air show demonstration. However, there are limitations on where aerobatic flights may be performed. The FAA describes, in 91.303 (a) through (f), where aerobatic flights *cannot* be conducted. The rules include restrictions on the height above ground, ceiling and visibility, proximity to a published federal airway, proximity to persons on the ground, and certain types of airspace. Depending on your or your chapter's objectives, these restrictions may be obstacles to reaching your goals. This is the first of two articles describing how to obtain an aerobatic practice area (APA) that will meet your needs.

First, become familiar with the FAA's guidance for approving APAs. It may be found in 8900.1, Volume 3, Chapter 5 and is an easy read.

WHY PURSUE AN AEROBATIC PRACTICE AREA?

The primary reason to obtain an APA is for enhanced *safety*. You will carefully review the underlying surface area where maneuvers will be performed, plan your flights in advance, issue a NOTAM so that other pilots will be aware of your activity, and coordinate with air traffic control (tower, TRACON, or center) both before and during practice. You will have established boundaries for your maneuvers, and these will be reviewed/approved by the FAA. Secondary benefits include 1) convenience in being able to fly closer to your home field rather than travel to where the constraints of 91.303 are met, 2) the ability to practice at contest altitudes rather than be limited to 1,500 feet, and 3) the ability to be coached/judged from the ground. The three steps prior to submitting application paperwork to the FAA include 1) site selection, 2) attitude check, and 3) stakeholder coordination. Laterally, your APA should be a 1-nm radius from the center of the practice area in order to provide some buffer and, vertically, should extend to the surface when possible. This avoids discussions about being inverted outside of the box, drifting outside of the box, or being too low.

SITE SELECTION

The sites you choose depend on your goals for the aerobatic practice and can affect the difficulty of obtaining FAA approval. If you are simply seeking a convenient location with altitude and possibly airway relief, start with a sectional, your starting airport, and Google Earth/Maps to find a nearby location that is over an unpopulated area (the FAA will never approve an APA over a populated area).

As shown in Figure 1 below ...

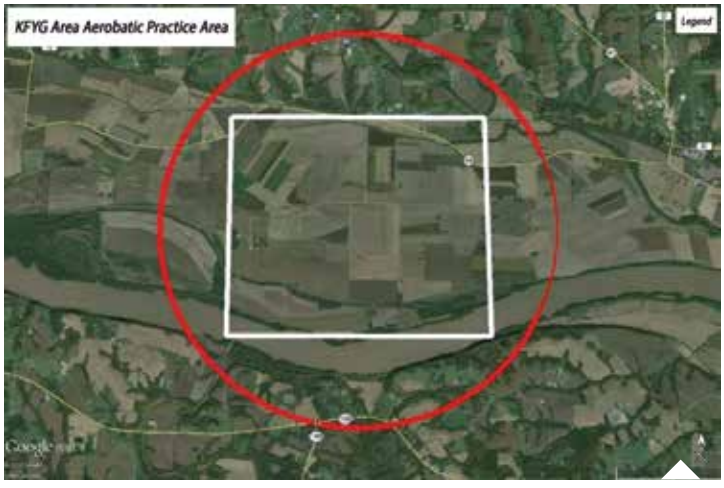


FIGURE 1

... this patch of unpopulated farmland is located in a flood plain just north of the Missouri River. It's about 6 miles from a nontowered airport and has no overlying class B, C, or D airspace. It does encompass a small portion of a federal airway (remember, they are 8 nm wide) and is near an arrival route for St. Louis Lambert International Airport. It is not bordered by heavily populated areas, schools, churches, or hospitals. The terrain is suitable for an off-airport landing or parachute landing and includes orthogonal field boundaries/roads with structures that approximate the limits of a contest box. This might be an excellent location for an APA if a convenient ground/coaching critique is not required. It should be relatively easy to obtain FAA approval and would be suitable for less experienced pilots in terms of the precision required to control altitude and position.

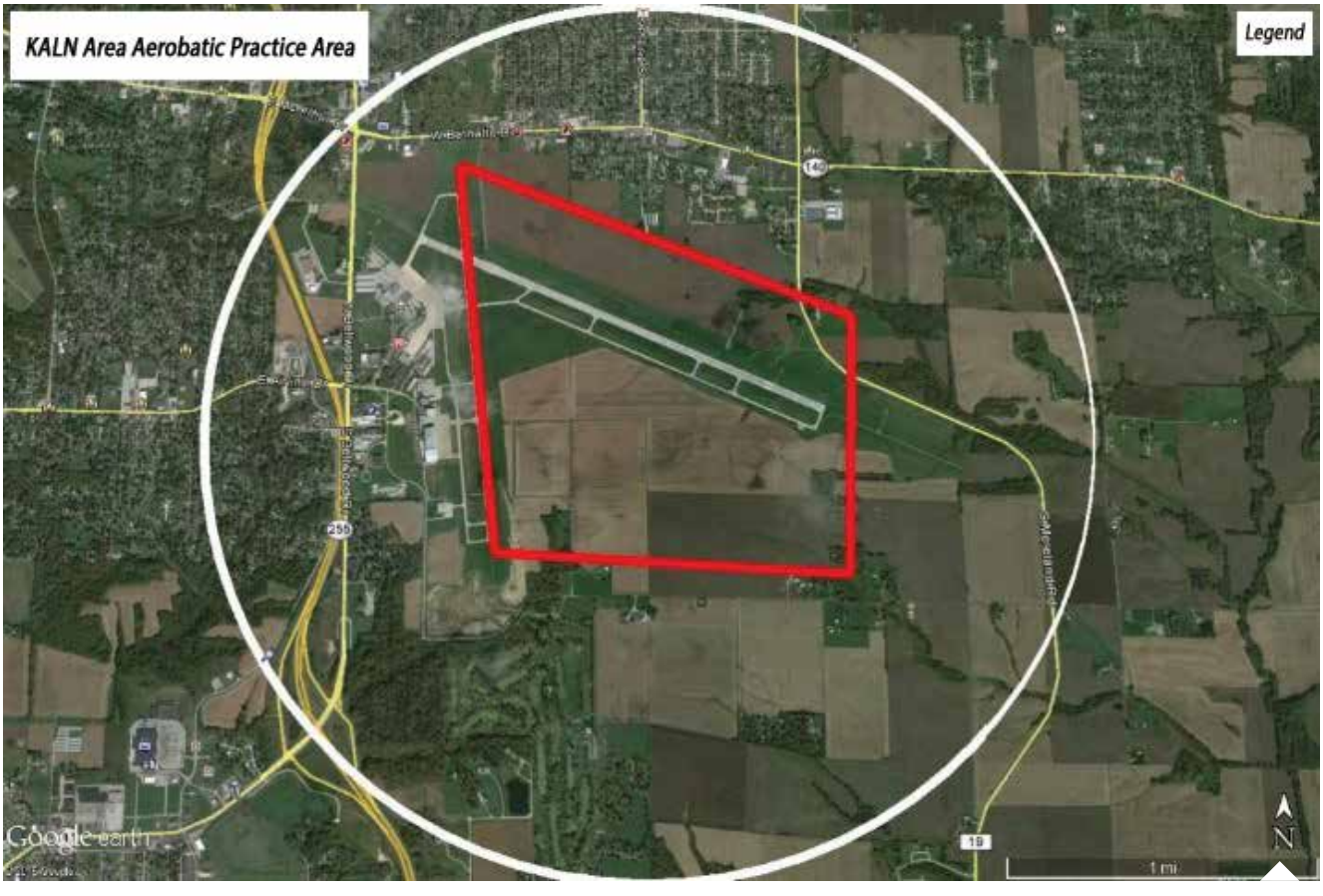
PHOTOGRAPHY COURTESY OF **BRUCE BALLEW**

As shown in Figure 2 below, there is enough flat, unpopulated terrain at the KALN airport to contain an aerobatic practice area. There are several advantages to locating an APA at an airport, such as the ability to obtain ground coaching/critiquing, food, water, restrooms, shelter, fuel, and some services in case of a mechanical issue. This airport lies under the KSTL Class B airspace (approximately 4,500 AGL), has an operating control tower, serves corporate jet aviation, and accommodates practice instrument approaches for other nearby fields. As shown in the figure, the airport is bordered by densely populated areas to the north and west, and although the south side has a golf course, this too would be considered a no-aerobatic area. Greater coordination can help achieve APA approval at this location, and greater pilot skills are needed due to the altitude (Class B overlying airspace) and population constraints.

ATTITUDE

Now that you have your goals defined and several sites identified, it's time for an attitude check before beginning the pre-application coordination. Some applicants think that obtaining an APA is a right and not a privilege. They either perform no coordination or try to bulldoze their way through, ignoring the concerns of other stakeholders. This approach is inconsiderate, does not help IAC's reputation, and leads to delays, confrontation, and possibly denials. The "good neighbor" attitude where the applicant seeks input and listens to concerns from other stakeholders is the high road that I and the IAC recommend. This approach has proven successful in both the short and long term.

FIGURE 2



PRE-APPLICATION COORDINATION

Although not required in order to submit the APA application to the FAA, presenting your plan ahead of time to those who might be affected by APA operations is the best path to follow for long-term compatibility. Failure to properly socialize the APA, listen to concerns, and address them can lead to complaints (noise, traffic conflicts, unsafe operation, regulatory violations) that may end the APA or at the very least create disharmony within the community. Below are some of the groups that you should coordinate with before submitting your APA application to the FAA:

ATC

It's important to note that ATC does not approve the APA, but it will probably have an opinion and can influence the FSDO's view of your proposed APA. Each APA can have its own unique issues related to ATC and is very site-specific. ATC issues usually arise at towered airports or areas where there is a nearby TRACON that services class B, C, or D airports. Does the proposed APA encroach on arrivals, departures, or instrument approaches for a busy airport? If so, what is your plan for that?

It is worth mentioning to ATC that APA operations will be conducted only during VFR conditions and will not conflict with IMC approaches or other IMC-related handling on their part. Depending on your situation, it might be a good idea to meet with the tower or TRACON guys as part of your planning process. Face-to-face meetings where you can lay out pictures and diagrams and have a better two-way discussion are usually better than phone calls since APAs are not a topic many of these ATC folks have dealt with much, and it can sometimes be hard to communicate exactly what you want and how the APA will operate. When you have these discussions, put yourself in their shoes. Be reasonable and willing to tweak your plans if ATC has legitimate issues or concerns.

IT'S A REALLY GOOD IDEA (MANDATORY, IN MY OPINION) TO TOUCH BASE WITH YOUR AIRPORT MANAGER ABOUT YOUR PLANS TO GET AN APA OVER OR CLOSE TO THE AIRPORT.

Airport Management

It's a *really* good idea (mandatory, in my opinion) to touch base with your airport manager about your plans to get an APA over or close to the airport. While the airport managers don't have the authority to approve or disapprove the issuance of the APA and do not have any authority to regulate the airspace above the airport, they are stakeholders who deserve your genuine attention. The FSDO will likely reach out to them for their thoughts about the APA, and you don't want this to be the first time they've heard about your plans. If you don't already have a relationship with the airport management, establish one.

Airports that receive federal funding (and most do) are obligated to permit lawful aviation activities under the Grant Assurances Program that they sign onto when they get their check from the feds. The FAA decides what is lawful, not the airport manager. Depending on the organization and management of the airport, it may be useful to talk to the airport board. You'll need to feel out the best path forward, but your life will be much better with their support.

Flight Schools and FBOs

If there is a flight school at the airport on or near your proposed APA, you should touch base with them. Be prepared to explain what, if any, impact this may have on them. Specifically, address any impacts to the traffic pattern instrument approaches, real or perceived. It's also a good opportunity to make them aware of the benefits of unusual attitude training, the responsibility of all pilots to "see and avoid," and any issues with off-normal airport and traffic situations. This doesn't have to be a big deal. Understanding their operations and concerns can help you design your APA. Again, having a good relationship with these guys can go a long way.

Airport Tenants

Each airport has its own vibe and personality. Presumably, you are seeking the APA at or near your home base and know whom it would be a good idea to talk with about your plans. As with your discussions with the airport manager, this is an opportunity to explain how an APA works, assure tenants that it should not impact normal operations, and put to bed any misconceptions they may have. Making friends here is also very important. These could be your advocates or the guys who make the complaints about noise, safety, or whatever. Which would you prefer? Don't expect them to necessarily share your excitement or enthusiasm about aerobatics, but you definitely want to respect their views.


Bruce Ballew

Off-Airport Stakeholders

This group varies by location. Stakeholders could include churches, farmers, local residents, or business owners. If you think your APA would significantly impact them, it may be worthwhile to reach out. As an example, if there is a church near the APA, let them know that you will not use the APA before 11 a.m. on Sundays, or whatever makes sense for your location.

MY RESULTS

Although each situation is unique, I will share my experiences with two APAs that I applied for in the St. Louis area, as they illustrate many of the challenges our members may encounter when creating an APA.

THE PRIMARY REASON TO OBTAIN AN APA IS FOR ENHANCED SAFETY.

I followed these steps with the potential APA sites shown in the proceeding figures. Here's how things went:

For the first site, located over the flood plain farmland next to the Missouri River, we received the APA waiver and have been operating without any issues for several years. The TRACON provides traffic advisories that permit us to discontinue aerobatics when a nonparticipating aircraft is approaching (ADS-B traffic alerts become unreliable/nonexistent during aerobatics). Safety is enhanced through the constant controller oversight, and in the event of an emergency, we are already in contact with a controller and just 6 miles from an airport.

For the second site, located at KALN airport, we received the APA waiver and have been operating for several years without any issues. The tower assigns us a discrete frequency so we are not bothered with the other traffic calls and are allowed to use this frequency for real-time coaching/critique. The airport is generally underused, so interruptions/restrictions are infrequent. The tower seems to appreciate the free entertainment and the break in routine.

In a future issue, I will discuss the process of completing the APA application (Form 7711-2 and environmental impact document). Until then, discuss your chapter's aerobatic goals and start thinking about the best location for an APA in your area. IAC

It Would All Happen So Fast!

Practicing egress with your parachute

BY BILL BANCROFT, IAC 12187

IT WAS TIME TO GET BACK TO FLYING after a long hot summer. Gathering my gear, I noticed my parachute hanging on a chair, and I wondered, "When did I last pack that chute? It's been a while. No doubt it's time to visit Rigger Rick's loft."

Rick tossed it up on his bench and pulled out the packing slip. His eyebrows raised and then furrowed.

"You've used this chute for 25 years?" He smiled quizzically. "Looks like it's way past time for a new one."

Taken back, I countered, "But, Rick, I haven't used it, not even one time."

"And we both hope the same will be true for your new chute as well."

A few days later, FedEx delivered my new parachute, and of course, I immediately busted it out and tried it on. Hmm, not a perfect fit, and I knew why. I'm sort of long from butt plate to stacking swivel, and in the new chute, there just wasn't room for all of me. It needed a serious adjustment. I dove in, but as soon as I began tugging on the various Velcro edges, it was obvious that this was a job for a professional. My better judgment had stepped in, in the nick of time. I called Rick and made an appointment for a professional fitting.

Rick and I completed the fitting. It was much like spending a few minutes with a seasoned tailor. But before I could shrug out of my much better fitting chute, Rick raised both hands in a "whoa, halt, stop" motion.

"Wait a second," he said. Caught off guard, I stopped to listen. "Tell me how you're going to bail out."

Quickly, I summoned up the only two bits of thought I'd ever given to bailing out. "Well, Rick, to begin with, I need to tell you that every time before strapping on my flying machine, I reacquaint myself with exactly where the rip cord is. I place my right hand on the handle."

"That's almost a good practice." Rick rolled his eyes and drew the "almost" part out. So, his questions were going to be a test. In hopes of saving my aeronautical ego, I began prompting myself for another gem of parachute insightfulness.

Rick gave no quarter. "But I want to know exactly how you're going to bail out."

With as much self-assurance as I could muster, I said, "I'd get rid of my headset by removing my helmet."

"Excellent," Rick said.

Eagerly awaiting what this ersatz aviator might offer next, I said, "Ah well, I guess "Ah, well, I guess I'd free myself from the seat belts, unlatch the canopy, and jump out." I rushed to get through what was quickly becoming an inquisition.

"Not so fast, my friend," Rick chided me.

"What'd I miss, Rick?"

"First, some airplanes are hurt when you leave them in midair, even if they are on fire or are missing a wing or some other essential part. To get even, they can turn around and come after you with vengeance."

"Oh, yeah, right." I'd never thought of that.

With quick hand movements, Rick demonstrated the correct answer. "Pull the mixture and turn off the ignition." I was getting more nervous by the second. Clearly, I was a little kid who'd been playing with the big boys, and my weakness has been discovered.

"Okay, now that you've pulled the mixture and switched off the ignition, what's next?" Rick asked.

"Release the seat belts?" By now, Rick had identified a remedial student and was delivering as much mentoring as he could muster.

"Nope! Who knows what you and that airplane might be doing by now? You certainly don't want to find yourself *g*-force-pinned against a latched canopy."

"Wow" was the only word that came to mind.

"The right answer is to jettison the canopy, then release the seat belts in anticipation of jumping or being thrown clear of a machine soon to be owned by your insurance company," Rick said.

"Okay, I get it. That makes sense. I guess I didn't think this through very well, did I?" Rick didn't need to answer; his look said it all.

Bill Bancroft

"Now that you've jumped or been thrown clear, hopefully, without slamming into a horizontal stabilizer or rudder, what's next on your survival list?"

"I'd grab the rip cord and pull it all the way out." I smiled as I reached across my chest with my right hand, grabbed the imaginary rip cord, and simulated pulling it all the way out, something I hazily recalled reading somewhere.

"Where's your left arm?" he asked.

"Well, I guess it didn't have anything to do, so it's just sticking out to the left somewhere."

"Yeah and acting like a wing, causing you to spin or tumble. First, before grabbing anything, look at and see the rip cord."

His eyes bugged out, and he stared at the place where his rip cord would be. It was obvious. He really meant that I must make visual contact with the rip cord before even contemplating grabbing and pulling.

"And when you pull it, it must always be with both hands, pulling straight out and then bringing your hands back to your chest," he said. "And most importantly, as you're floating down, remember to keep your feet together for the landing."

Next followed several minutes of hangar flying tales and war stories about all kinds of parachute misadventures, after which I thanked Rick profusely. He had generously mentored me in a subtle and memorable way, and I wanted him to know how much I'd learned and appreciated the extra time he'd spent with me. He even helped me develop this checklist:

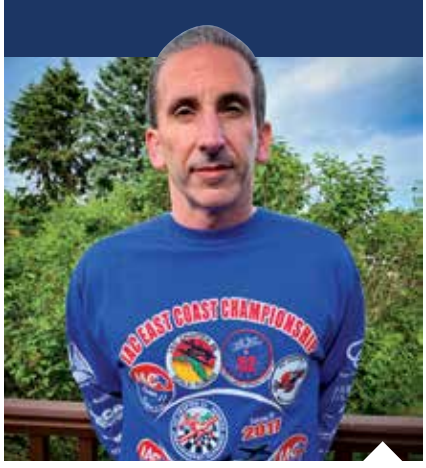
- Headset
- Canopy
- Two hands
- Mixture
- Belts
- Out and back
- Ignition
- Rip cord — see it
- Feet together

Later, as I sat in the cockpit of my Extra 300S, I attempted a dry fire drill of what I'd learned. My execution wasn't perfect the first time nor even the 10th time; there was a lot to remember, but it did get better and better with each iteration. I kept at it because I knew it had to become automatic, something I did almost without thinking, because on that fateful day, *it will all happen so fast!* IAC

You can contact Rigger Rick at pilotrem@sbcglobal.net.

BILL BANCROFT has been an IAC member since 1986. He served as IAC Chapter 36 president for a few terms and as newsletter editor for many years. He has been the contest director for both Akrofest and the Minifest.

Electronic Ignition Systems and You



BY KEITH DOYNE, IAC 10545

FOR AS LONG AS I CAN REMEMBER, magnetos have been the staple of general aviation engines. When I went to A&P school more than 20 years ago, my training covered just magnetos for general aviation engines. But times have changed and so have the options for aircraft engine ignition. Every new gasoline car uses electronic ignition, and the general aviation industry is slowly catching up. There are several choices of electronic ignition for owners to consider, and no surprise, the largest number of choices are for experimental aircraft. Light Speed Engineering, Lycoming EIS, SureFly, and E-Mag are just some of the choices for aircraft electronic ignition systems.

FAR 33.37 states, "Each spark ignition engine must have a dual ignition system with at least two spark plugs for each cylinder and two separate electric circuits with separate sources of electrical energy or have an ignition system of equivalent in-flight reliability." Traditional magnetos provide their own source of power and meet the FAA requirements. The first move toward electronic ignition was the introduction of Slick Start to boost the magneto performance. The first true electronic ignition system (EIS) was developed in the 1990s and was called limited authority spark advanced regulator or LASAR. It used cylinder head temperature, manifold pressure, and rpm to determine the correct ignition timing. LASAR was designed to revert to a mechanical magneto when either the electrical power failed or a sensor failed. LASAR is STC'd for some certified aircraft engines.

One of several companies providing electronic ignition systems – Lycoming EIS drop-in replacement for magnetos.

Since then, several other manufacturers have developed certified electronic ignition systems. Electroair has four- and six-cylinder electronic ignition systems for certified and experimental aircraft. For certified aircraft installation, only one magneto is replaced. The electronic ignition is powered by a battery, and the position of the crankshaft is the key input to this system. SureFly is a more recent development for electronic ignition, in which you replace one magneto with the company's electronic, solid-state magneto replacement unit. It even looks like a modern magneto. This unit is STC'd for installation on some certified engines. Additionally, this unit uses manifold pressure as the input for advanced timing mode. Just like other electronic ignition systems, the SureFly unit needs a source of power, which typically is the aircraft battery.

As stated for experimental aircraft, the choices are greater. Light Speed Engineering has electronic ignition units to replace one or both magnetos. Four- and six-cylinder aircraft engine options are available. As with most electronic ignition systems, a battery provides power. Light Speed Engineering uses a crankshaft and manifold pressure data to provide key information for the system. Its system can replace one or both magnetos. All of these systems have been around for a while, and you can find owners' experiences recounted on different forums and chat boards.

Sky Dynamics offers its version called UltraSky Ignite electronic ignition system, which has been developed for use on high-performance Lycoming aircraft engines. Each UltraSky Ignite system is custom-built to the specific engine and aircraft. The Sky Dynamics unit replaces one magneto on the engine. Another direct magneto replacement is the E-Mag. The aircraft owner can choose to replace one or both magnetos. The newer model or P-model has an internal alternator, which provides power to the unit starting around 900 rpm. A battery is still needed to power the E-Mag for engine starting, but once the engine is running, the E-Mag can produce its own power. Versions are now available for four- and six-cylinder aircraft engines.

The latest company to produce an electronic ignition is Lycoming. Its EIS is a direct magneto replacement. Currently, the Lycoming EIS is only available for experimental engines and can be ordered with a Lycoming Thunderbolt engine. However, Lycoming is working on approval for use on certified engines. As with other electronic ignition systems, the Lycoming unit needs a battery source.

PHOTOGRAPHY COURTESY OF **KEITH DOYNE**

Most of these electronic ignition systems rely on an external power source to operate. Magnetos don't have this requirement. Current FAA-certified electronic ignition systems replace only one magneto. In the case of an electrical system or battery failure, the remaining magneto is allowing the engine to produce power.

Another limitation of some electronic ignition components is the amount of heat exposure. In some situations, these components need to be installed on the cold side of the firewall to limit heat exposure. Despite these limitations, electronic ignition systems have multiple advantages over magnetos. Improved starting, more efficiency, improved engine horsepower, no moving parts, and greater energy to the spark plug are just some of the improvements these systems bring to aviation.

Some pilots are concerned about keeping their aircraft as light as possible. In the past, an acceptably lighter weight could be accomplished easily by removing that heavy battery, installing a handheld radio, and using other lightweight engine parts or propellers. With the introduction of very lightweight batteries and lightweight avionics and electronic engine instruments/management systems, an electrical system can be installed in an aerobatic airplane without a huge weight penalty. If you are going to have a lightweight electrical system, it makes sense to look at electronic ignition systems as well. By the way, some electronic ignition systems are lighter than the magneto being replaced, adding the advantage of better performance.

Alan Bush's Snargasher.

The Weeks Solution, Phoenix, Sunbird, Snargasher, Patriot 300, any retractable-gear Pitts, and Gerry Younger's six-cylinder Pitts S1-T are some aerobatic airplanes that I would love to see with these modern upgrades. The owners, designers, and builders made performance decisions based on the technology available at the time. Whether you make the move to put electronic ignition in your plane or go old-school with no such system at all, please take the time to get informed and make the best decision for your situation. Let's not lose sight of being safe and having fun.

Have a great contest season and fly safe. ***IAC***

3.5 Things to Work On to Become a Better Aerobatic Pilot

BY ANDREW BOYD

I THOUGHT ABOUT THIS SUBJECT for a few minutes and am humbly suggesting that there are **3.5** things someone needs to work on to become a better aerobatic pilot.

Let's start with something that at first appears completely unrelated: riding a motorcycle. Leo Loudenslager, who probably makes anyone's list of 10 best aerobatic pilots, died on a motorcycle, so stick with me for a moment.

When you start riding a motorcycle, it is *technique intensive*. There is a clutch, for goodness sake. And where is the gear shift lever again? When you start riding a motorcycle, it seems like 95 percent of your brain is required to operate the machine, and only 5 percent of your brain is available for other tasks such as traffic threat analysis.

As time goes by and you develop skill, the percentage of your brain required to operate the motorcycle eventually drops, leaving a larger percentage of your brain's power available to watch for traffic that is going to kill you. The left-turner says, "I never saw him." Andy Grove, ex-CEO of Intel, said, "Only the paranoid survive," and I believe him.

Back to flying, the first thing you need to develop as an aerobatic pilot is similar skill in flying your airplane. You need to put an awful lot of 100LL through your Lycoming so that you drop your percentage of your brain required to operate your aerobatic aircraft precisely at the edges of the V*g* diagram. You do know what the Vg diagram looks like for your aircraft, right?

This awareness allows you to spend most of your brain power looking outside. You know. **Closed-loop**.

I remember watching the very best pilot of our generation, Rob Holland, playing back his in-cockpit video after an aerobatic flight, back and forth, in slow motion, to observe exactly what the aircraft did. **Closed-loop**.

Andrew Boyd putting 100LL through his Lycoming.

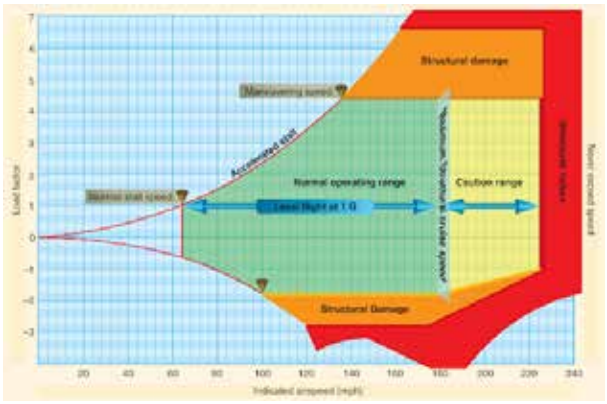
YOU CAN BURN ALL THE 100LL THAT YOU WANT, BUT IF YOU ARE PRACTICING YOUR MISTAKES, YOU'RE NOT GOING TO GET ANY BETTER — YOU ARE STUCK ON A PLATEAU.

Okay, onto the second thing: not practicing your mistakes. You can burn all the 100LL that you want, but if you are practicing your mistakes, you're not going to get any better — you are stuck on a plateau. You can do it yourself like Rob with cockpit video, or another way is to get a cranky old guy on the ground with a name like Fangio or Kalishnakov with a handheld shouting at you during your sequence.

"Pinched at the top! Shallow! Short after!" You will hear all these things, and many more, and try really hard not to let your ego get in the way of getting better. This closed-loop feedback does not need to be formal, merely skilled.

The third thing. It's the wind. Flying in general would be a lot easier if there was never any wind. Navigation would be so much simpler, and no one would ever come to grief from a crosswind landing anymore. While it would be nice to live in that world, we don't. The wind is a significant percentage of an aircraft's speed — especially while it is stopped at the top of a vertical — and you must learn to deal with it. Wind on the X-axis. Wind on the Y-axis. You must learn what the wind is doing *at altitude* and compensate for it. Contest flying is completely different than air show flying in this regard. As an air show pilot, you learn to spiral loops and take angled cuts before vertical maneuvers.

Now, onto thing 3.5. It's mechanical. Some pilots are mechanical wizards — Lycoming whisperers. If that's you, you don't need to read this paragraph. The rest of us will spend our lives struggling with rough-running Lycomings and misbehaving tail wheels. If I could only give pilots one piece of advice, it would be to lean the mixture. Lean the mixture immediately after start for max rpm. Lean the mixture immediately after landing. I do it on the landing roll. Don't tell my mechanic; I don't need another $602.01 charge. Get someone to show you how to remove your bottom plugs and pick the lead out with a piece of sharpened lock wire. Run the hotter 40s instead of the cooler 38s. If you can get past fouled spark plugs, you can move onto fuel injectors and troublesome exhaust valves, which I could write a book on and are the source of most of your woes. A piece of advice: Keep the metal cool. The hotter you run the metal, the shorter its life. Keep the CHTs under 400 degrees Fahrenheit, well under redline. I am a chicken; I run mixture full rich during aerobatics.



The operating flight strength of an airplane is presented in the form of a Vg diagram.

IF I COULD ONLY GIVE PILOTS ONE PIECE OF ADVICE, IT WOULD BE TO LEAN THE MIXTURE.

There was a really smart guy called Dave Schwantz in Florida who taught 128 different spins and leaned the mixture during aerobatics. I was horrified, but Dave had a brain the size of Wyoming and had calculated that the fuel savings during leaning in aerobatics paid for his next engine overhaul over the life of his engine. Sometime, get Dave to show you the elevator trim trick. I won't mention it because my mechanic hates me enough already. Free advice: Get one of those data-logging engine monitors. One day, I discovered that the condenser (really just a 0.3 uF capacitor) in my right magneto was failing over 150 degrees F and would cause the points to arc. Try diagnosing that one without three samples a second, Lycoming whisperers! ***IAC***

ANDREW BOYD is a third-generation pilot who has been flying for over 35 years. He holds an airline transport pilot certificate, Class 1 flight instructor rating, Class 1 aerobatic instructor rating, and an International Council of Air Shows Statement of Aerobatic Competency (SAC) card, which is required to fly low-altitude aerobatics at air shows. Andrew routinely flies surface-level aerobatics at Smiths Falls Airport. He flies and fixes many different types of airplanes, from World War II radial engine trainers to turbine fighter jets. Andrew graduated with an engineering degree from Queen's University at Kingston, Ontario, and his patented software is used to control the core routers of the internet (Cisco CRS).

PHOTO COURTESY OF **JAYSON CHAPPELL**

1975 BELLANCA SUPER DECATHLON FLIES AGAIN

BY JAYSON CHAPPELL, EAA 1277874

A PILE OF PARTS living in an old hangar and covered in 20 years' worth of dust. Hardly the airplane of one's dreams, but for me and my dad, Chip, it was the one for us! We had been looking for an airplane, initially thinking of a flyable airplane that we could at least get some use out of for a few years before restoring it.

The gentleman who sold us the aircraft told Dad that it was the first Super Decathlon. However, I was unaware of this until we brought the plane home. Upon hearing the news, I spent some time on the internet doing a search for old photos of the plane from when it was still in one piece. I wasn't able to find any photos until I joined a Citabria/Decathlon/Scout owners group on Facebook. I made an inquiry in a post, and a few days later received an email from a man who was friends with the airplane's original owner. I received scanned photos from my new Facebook friend, and they depicted the plane in its original livery of red, white, and blue from when it was still flying in the '80s and '90s.

The 1975 Bellanca Super Decathlon, serial No. 219-76, was the very first Bellanca Super Decathlon certified by the FAA. The tail number, N180SD, stands for 180-hp Super Decathlon. The fuselage came off the Bellanca assembly line and received a 180-hp Lycoming engine for testing. After the testing was complete, the FAA certified the airplane, and this Super Decathlon was born. The logbooks have all the FAA certification markings. It's amazing to see all the history.

Although it was not an easy project, we had a bit of an advantage, since Dad is an Airframe and Powerplant (A&P) mechanic and has an Inspection Authorization Certificate (IA). He grew up the youngest of four children in Weirton, West Virginia. During his childhood, Weirton was the home of the world-famous Weirton Steel mill, which was West Virginia's largest employer at the time. My grandfather, Earl, worked at Weirton Steel for many years, and in his free time he learned how to fly a J-3 Cub. He passed on his love of aviation to Dad, who then passed it on to me.

Dad learned how to fly at Herron Airport (7G1), a short, narrow, hilly runway with a county road intersecting its center. He earned his A&P certificates from the Pittsburgh Institute of Aeronautics and began working as an airline mechanic. During his time as a mechanic, he continued to earn pilot certificates all the way up to ATP, CFII, and MEI. When he wasn't servicing commercial jets at work, he was teaching others how to fly and flying his own Piper Cherokee with his friends and my mom.

PHOTO COURTESY OF **JAYSON CHAPPELL**

WE STARTED THE RESTORATION BY STRIPPING THE FUSELAGE DOWN TO THE BARE FRAME, BEAD-BLASTING IT, AND WORKING OUR WAY UP FROM THERE. EVERY NUT, BOLT, WIRE – YOU NAME IT – HAS BEEN REPLACED WITH NEW PARTS.

The Super Decathlon wasn't Dad's first restoration project, either. He has also restored a Taylorcraft BC-12D and a Piper Cherokee. When my sister and I were born, Dad sold his airplanes, but he still loved aviation. A major airline merger prompted him to transition from airline mechanic to airline pilot, and he has been flying for the same Pittsburgh-based airline ever since.

The Decathlon project has turned out to be the best learning experience of my life. Getting to work on it every day with my father while soaking up all his knowledge was like reading a book you just can't put down. I was learning hands-on, connecting my lessons to what I had learned at school, and everything started to make sense! The expertise I gained working with Dad aided my flying career, and the project was a great bonding experience for us. And I am sure my grandfather was smiling down watching the two of us work on our project.

WE HAVE MANY HIGHLIGHTS FROM OUR PROJECT TO REFLECT ON, BUT THE BIGGEST HIGHLIGHT WAS FLYING THE PLANE TOGETHER WHEN IT WAS COMPLETED IN JULY 2019 AFTER MORE THAN TWO YEARS OF RESTORATION WORK.

I always knew I wanted to fly, and I took flight training during my senior year of high school. The family joined a local flying club and Dad taught both my sister and me to fly. I soloed at 18 before graduating from high school and earned a private certificate a few months later. From there, I attended CCBC Aviation Academy and Southern Illinois University, earning various pilot certificates and a bachelor's degree in aviation management, all before my 21st birthday.

Dad and I started the Decathlon restoration by stripping the fuselage down to the bare frame, bead-blasting it, and working our way up from there. We replaced every nut, bolt, wire — you name it — with new parts. We also installed an all-new instrument panel and a brand-new interior.

PHOTO COURTESY OF **JAYSON CHAPPELL**

Jayson's first aerobatic ride was in a friend's Pitts Special S-2C.

When we purchased the airplane, it was mostly disassembled, so not having the benefit of taking things apart ourselves was difficult. The service and parts manuals lack some of the finer details, but thanks to the great people at American Champion Aircraft, we were able to work through the challenges as they came up. We complied with all the current service modifications and airworthiness directives.

Coordinating the painting of the fuselage and wings was also a challenge, since we painted them in our garage in West Virginia during the cold winter months. The red, white, and blue paint scheme we selected pays tribute to the original vintage Bellanca design but also incorporates a classy look.

Besides engaging in family fun and flying straight and level, I would absolutely love to venture into flying both recreational and competitive aerobatics! I remember my first aerobatic flight like it was yesterday — the adrenaline rush, the thrills, and the excitement were incredible. The airplane was a Pitts S-2C that was owned by a gentleman who has been a great friend and mentor to me during my aviation career. Ever since I was tall enough to ride roller coasters, I have loved the excitement of feeling *g*'s and the absolute thrill of amusement park rides. That Pitts flight was the best roller coaster ride one could ever dream of! The aerobatic bug bit me that day, sparking my desire to learn and fly aerobatics.

Dad and I both have many highlights from our project to reflect on, but the biggest highlight was flying the plane together when it was completed in July 2019 after more than two years of restoration work. ***IAC***

THE DECATHLON ON ITS 50TH ANNIVERSARY

TRANSCRIBED FROM THE WEBINAR
DECATHLON AIRPLANES: EVOLUTION IN 50 YEARS OF PRODUCTION, BY JODY BRADT

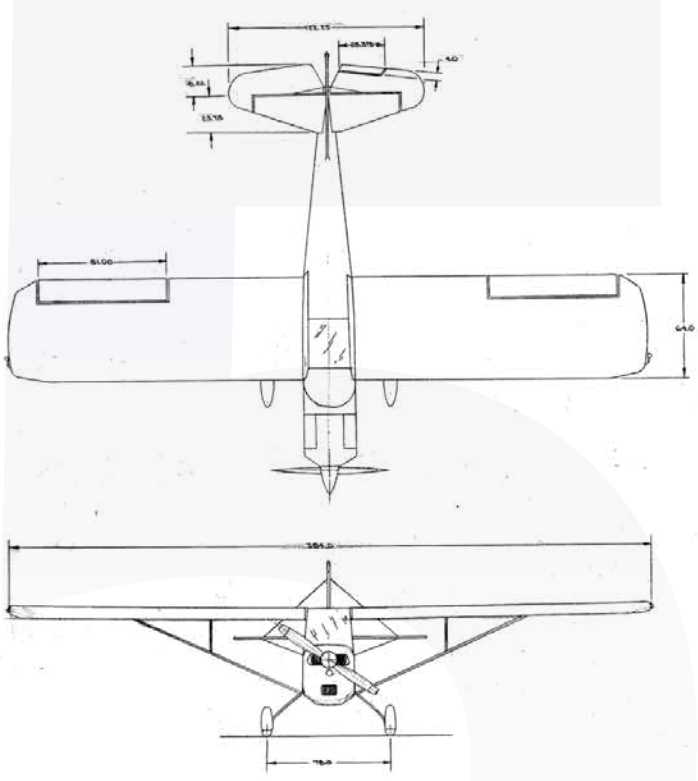
Jody Bradt's 1997 American Champion Decathlon.

PHOTO COURTESY OF **JODY BRADT**

In October 2019, American Champion engineer and flight-test pilot Jody Bradt gave a webinar titled "Decathlon Airplanes: Evolution in 50 Years of Production" for the IAC. It was about his experience supporting changes and updates to the Decathlon. He led the audience through the history, building, testing, and maintenance of the Decathlon. In the webinar, he pointed out the modifications that have improved the utility of the American Champion.

Outwardly, the basic design has appeared pretty stable over its 50-year history. But inwardly, American Champion makes changes every day — a lot of changes, most of which are very minor. Those who have owned American Champion aircraft will of course recognize changes to parts.

American Champion Aircraft Corporation flies the Decathlon 50th Anniversary banner at Fox River Airport.



Now a little history about the companies that manufactured the aircraft. Champion Aircraft Co. of Osceola, Wisconsin, owned the rights to the 7-series Aeronca Champ and had been building a number of variants of the Champ going back to 1959. In the early '60s, the company decided to create an aerobatic version, and in 1964 it introduced the Citabria ("airbatic" spelled backward). By 1970, hundreds of Citabrias had been delivered, and a huge number of recreational pilots had become qualified in and enthusiastic about aerobatics. Champion had started in on the Decathlon design in 1968 and by 1970 had built the first prototype and conducted early testing.

The Decathlon was certified in late 1970, and Champion Aircraft Co. produced a handful of the aircraft. By 1972, Bellanca Aircraft Corp. had produced the 8KCAB and would continue with the Super Decathlon (1976). Bellanca built more than 600 of these aircraft over the next nine years.

American Champion Aircraft Corp. picked up the rights to the Decathlon in 1988, along with the 8GCBC Scout and the group of Citabria and Champ variants. It originally planned to start a parts business and wasn't intending to go into aircraft production. In 1991 it brought the Super Decathlon back into production and introduced the Xtreme Decathlon in 2012.

One early aircraft design that led up to the Decathlon was the 1961 7KC Olympia, which weighed in at 1,650 pounds. The airplane had a shortened wingspan, was missing some of the accoutrements in the back seat, and had a bigger engine. In 1966, the Reno Project — which was a single-seat version with no wing tanks and a 10-gallon tank where the back seat used to be — reduced dihedral and had a modified rudder. The biggest takeaway from the modifications to both airplanes was that the shorter wingspan significantly improved the plane's aerobatic capability.

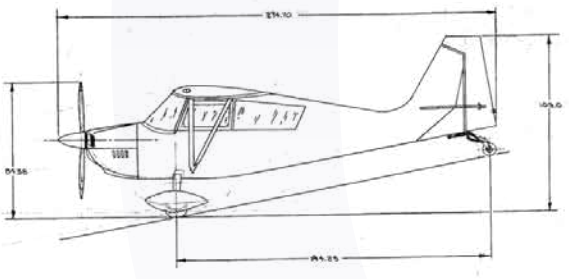


PHOTO COURTESY OF **JODY BRADT**

The 7KCAB Citabria, which was also developed around 1966, incorporated an inverted fuel system and had more reasonably sized fuel tanks than the 10-gallon tank from the Reno Project. The Citabria "Pro" came next with a semi-symmetrical airfoil, a 180-hp/constant-speed prop, and an open cockpit, and was a one-off experimental parasol Decathlon prototype.

From a design perspective, Jody appreciated the original Decathlon specs. They called for sealed ailerons with internal balance, which helped with roll performance and were among the standard features of the 8KCAB. Other features included reduced dihedral to 1 degree and reduced stabilizer incidence, which reduced the trim drag and made the airplane fly a bit faster. The airplane weighed 1,800 pounds (which was better for carrying the weight of two passengers), a limit load factor of +6/-5*g*, and a V_{NE} of 180 mph.

THE DECATHLON WAS CERTIFIED IN LATE 1970, AND CHAMPION AIRCRAFT CO. PRODUCED A HANDFUL OF THE AIRCRAFT. BY 1972, BELLANCA AIRCRAFT CO. HAD PRODUCED THE 8KCAB AND WOULD GO ON TO PRODUCE 600 OF THEM OVER THE NEXT NINE YEARS.

ABOVE: Ladies at the Bellanca Factory building up the wings.

ABOVE: Fox River (96C) 2 miles out of Rochester, Wisconsin, is the current home of American Champion.

BELOW: Working in the fabric room at American Champion.

BELOW: Bellanca equipment

HOW THE DECATHLON GOT ITS NAME

When the Decathlon was certified in late 1970, IAC President Emeritus Doug McConnell had the pleasure of performing the final stages of the flight test and creating the marketing launch plans. The aircraft was nameless at that point, so Doug started brainstorming a name that would imply readiness for competition. His thoughts turned him toward the Olympic Games, which are synonymous with competition. Initially he considered the Olympian, but Champion Aircraft had already used "Olympia" for its 1961 7KC aircraft. Continuing with the Olympic theme, Doug landed on Decathlon because it is the most demanding event at the summer Olympics.

Once the name was selected, Doug tackled the marketing plans in his role as Champion's marketing and sales vice president. His idea for the introductory color scheme of red, white, and blue was confirmed. To introduce the aerobatic community to the new plane, Doug hired a little-known but promising (and very young) pilot by the name of Gene Soucy. Some of you may have heard of him. He was featured in early advertising for the Decathlon and gained lots of early exposure.

"It's no coincidence that the International Aerobatic Club and the Decathlon are both celebrating their 50th anniversaries this year," Doug said. "They both a took wing at a time [1970] when interest in aerobatic flight was sweeping the country. The IAC provided the organizational structure while the Decathlon offered an outstanding and economical factory-produced aerobatic mount for both training and personal fun — and they've fit nicely together ever since!"

American Champion Aircraft Corp. is located at the Fox River Airport (96C). Jody gave a slideshow presentation of the operations as they exist today. Hangar 1 is still on-site. It was the site of production from 1991. Painting, assembly, and parts production all happened in Hangar 1. Today it is used for storage. Other buildings include 1) welding, where fuselage assembly, engine mounting, pressure testing/dunk tank, the inspection station, and engineering/drawing are housed, 2) the machine shop, which contains axles, castings, the turning center, and the Bystronic laser and press machine for sheet and aluminum parts, and 3) the fabric building where Superflight fabric is applied, the painting booth is located there and custom paint blends are offered to the customer.

It takes approximately 1,400 to 1,600 man-hours to build a single Decathlon. ACA currently builds about 25 airplanes per year. The company needs around 35 employees to keep up with the current production rate. ACA has built nearly 1,200 Decathlons since 1991.

IT TAKES APPROXIMATELY 1,400 TO 1,600 MAN-HOURS TO BUILD A SINGLE DECATHLON. ACA CURRENTLY BUILDS ABOUT 25 AIRPLANES PER YEAR.

ABOVE: 7KCAB Citabria

PHOTO COURTESY OF **JODY BRADT**

ABOVE: Bellanca factory

BELOW: Decathlon fuselage

Knowing that aerobatic pilots are always looking to lighten up their airplanes, Jody reviewed some of the lightweight gear that can be retrofitted to improve the utility of the aircraft. Aluminum gear legs save about 15 pounds, an Odyssey Battery saves more than 7 pounds, and the Plane-Power Alternator and Sky-Tec starter save another pound. Carbon fiber floorboards, which can be installed with or without carpet, save more than 5 pounds. If they're installed without carpet, you can lighten the aircraft by another 4 pounds.

If you prefer to take things into your own hands and not rely solely on your mechanic for maintenance, you can check out ATP.com, which distributes service letters and manuals from before 1990. If you want to save money, Jody recommends you ask for the manual only and not revision service, assuming you don't already have a service subscription with them. ACA does publish service letters from 1990 or before. They're available on the company's website, along with an FAQ page that covers things like tail-wheel shimmies, Decathlon wing changes and fuel tank changes, and a number of other common issues. www.AmericanChampionAircraft.com

In addition to the ATP and ACA websites, Jody also recommends Rgl.FAA.gov for airworthiness directives and special airworthiness information bulletins. He gave a shoutout to the four *IAC Technical Tips* manuals as well, which include old Bellanca service letters to IAC members in the 1970s. www.IAC.org/technical-tips IAC

ABOVE: Final assembly hangar at American Champion

ABOVE: The IAC Technical Tips manual includes old Bellanca service letters.

JODY BRADT has been an engineer and test pilot for American Champion Aircraft for 17 years. A graduate of Embry-Riddle Aeronautical University, he holds commercial, instrument, and multiengine certificates. He has owned two Decathlons, restoring the first and significantly updating the second.

In the Beginning

IAC 50th anniversary spotlight — the 1970s

"WHEN THE IAC WAS FOUNDED two major goals were set: first, to establish and promote grass roots aerobatics in the form of our present first three categories; and the second, to offer assistance to any group or organization anywhere in the world who wanted to compete and grow in those categories or just to have fun with barnyard aerobatics in a more organized and safe manner. Safety has always been the watchword. International has always been in the background since as a Division of EAA, a major international organization, we wanted to promote our categories wherever there was an interested demand." — From the President's Forum by Carl Bury in the August 1980 issue of *Sport Aerobatics*.

In the 10th anniversary issue of the magazine, Carl went on to describe the many accomplishments and goals of the IAC. In the first 10 years there was a lengthy list, which included:

- Setting up the general organization and initial bylaws.
- Producing the first official IAC rulebook.
- Outlining the three flight categories: Sportsman, Intermediate, and Advanced.
- Chapter development: IAC Chapter 1 in the Chicago area was the first and others soon followed; by 1980 there were 60 chapters providing the framework for aerobatic pilots to sponsor sanctioned contests, fun days, and critique sessions.
- *Sport Aerobatics* magazine, the membership's official monthly publication.
- The IAC Stars and Smooth patch Achievement Awards program established early in the organization by Verne Jobst.
- Judges school program and the *IAC Judging Standards and Techniques Manual* (later incorporated into the *IAC Official Contest Rules*); in the first year of the program, over 250 students completed the course.
- Government relations: One of the most visible areas is that IAC received recognition in its relationship with the FAA. The IAC was approached about the value of aerobatic flight and training, low-altitude waiver information, spin testing, the inclusion of spin requirements in obtaining a private pilot certificate, aerobatic zones, regulation modifications on items such as parachute packing and VFR/aerobatic fuel requirements.
- The IAC Safety Program, led by Fred Cailey through his technical articles. Committee members Bill McCollough and Bob Bloodwell added valuable information regarding medical aspects connected to aerobatic flight, such as diet, *g*-forces, mental and physical forces.
- Sanctioning and sponsorship of 33 regional contests in 1978-79; in preceding years, IAC events were numbering in the mid to high 20s.

May 1974 IAC board of directors meeting in Haedtler Hall at the EAA Air Museum in Hales Corners, Wisconsin. Among the board members are founding members Don Taylor, Mike Heuer, and Bob Heuer.

Bob Heuer shakes hands with Marion Cole, who inspired him in the 1950s with the famous Cole Brothers Airshow.

Contained elsewhere in the 10th anniversary edition, written by Verne Jobst, was a full rundown of how the IAC was formed. In 1970, rather than watching football games or recovering from New Year's Eve, a meeting was called to develop the final draft of the rulebook. Those in attendance were Don Taylor, Jim Lacey, Jim Dees, and Bob and Mike Heuer. A few days after this meeting, Bob Heuer, along with his sons Mark and Mike, took off on a 10-day tour to talk with the most knowledgeable people in aerobatics from around the country. Their purpose was to gather all the expertise for the rulebook and guidelines for the organization.

The whirlwind tour of the Heuer men brought them to Louisville, Kentucky, to see L. Paul and Gene Soucy and Paul and Tom Poberezny were there to go over the new rules. Then on to Atlanta to see Frank Morgan, who would later become president of IAC Chapter 3. They met up with Bill Dodd and Cotton Hodges in Okeechobee and with Curtis Pitts in Homestead, Florida. In New Orleans, they met with Roscoe Morton and Bill Sheppard, and then moved on to Monroe, Louisiana, to meet with Marion Cole. In Waco, Texas, they met with Frank Price. Then headed back to Illinois, stopping in Kansas City to pick up ideas from the Dr. Dale Drummond, who was recognized at the time as one of the best judges in the country.

After the tour was completed, all the ideas were compiled and reviewed. The finalized version of the rulebook was turned over to Mike Heuer for editing and typing and prepped for printing. At the same time, a newsletter came from Bob and Martha Heuer's basement to help keep the newly formed club informed and up to date. The first issue of *Sport Aerobatics* was in October 1971, printed by Times Publishing under the direction of editor Verne Jobst.

In 1971 things were moving fast as contests were being planned and the Achievement Awards program was solidified. The first to qualify for all five Smooth patches was IAC President Bob Heuer, all in one flight in a borrowed airplane! The first to qualify for all nine awards (Stars and Smooth) was Clint McHenry, who later earned a spot on the U.S. Unlimited Aerobatic Team.

In 1972 the first female pilot to win the EAA-IAC Championship at Fond du Lac was Norma Worland. That year the Grogan Belt came into existence through the efforts of tireless volunteer Tom Grogan. The belt was given as an incentive to the last-place Sportsman pilot.

Clint McHenry flew his first contest in 1972 in the Advanced Category. He was the first to qualify for all of the IAC Achievement Awards.

At the end of 1973 there was a concern over fuel shortages, which were plaguing the world. Would there be enough fuel for sport aviation, let alone competitions? Fortunately, the crisis passed and plans were formulated for 1974, with turnouts for competitions and chapter events better than ever.

"It wasn't easy to be a pioneer in aerobatics in those days," the late Bob Heuer wrote in an August 1980 *Sports Aerobatics* article titled "Looking Back."

"There was virtually no information available on the subject then and you were really on your own," Bob wrote. "My special thanks are extended to Duane and Marion Cole, who inspired me in the early 1950s with the famous Cole Brothers Airshow. I'll never forget their early flying."

IAC 50 1970-2020

PHOTOGRAPHY COURTESY OF **IAC ARCHIVES**

IAC Grows and Takes On the World

IAC 50th anniversary spotlight — the 1980s

THE 1980 WORLD AEROBATIC CHAMPIONSHIPS is coming to Oshkosh! And so, the second decade of the IAC began with notification from Don Taylor that volunteers were needed at the IAC building. IAC board member Dan McGarry was put in charge of the work site. Work continued over the next seven months to prepare the grounds for the event.

The first international airplane to arrive on May 19 was a Pitts Special from Australia, shipped via a Royal Australia Air Force Lockheed C-130 by way of Honolulu, to Chicago O'Hare field and then shipped by ground transport to Oshkosh. The contest's first official day was August 17.

At WAC '80, competition aerobatics stepped into the world of automatic radar tracking and the blinding speed of the microcomputer. Discussed for the first time in 1979 by Don Taylor and Dr. Jim Young during a judges school in Los Angeles, Dr. Young offered to work up a comprehensive package that would provide boundary judging and framing scoring for the championship. Computer and radar were integrated to visualize the six sides of the aerobatic box plus the 150-foot low deadline surface.

The radar tracking team was made up of Gerry Mahoney, Lou Entin, and Bob Davis of Hughes Radar; Floyd Stillwell from the field of digital signal processing and applications (DSPA); Ken Clark of NOAA; and Dave Meade, IAC director. The scores for positioning and excursions from the aerobatic box were recorded and scored automatically by the radar/computer system. An electronic scoreboard gave results to the participants and spectators.

Although plagued by weather problems and delays, the championship was well organized and an eventful competition for the Americans. Sadly, both the Russians and Czechs declined at the last moment for technical and financial reasons. Canadian fan Dan Mackie wrote an article that appeared in the October 1980 issue of *Sport Aerobatics*. He observed that there were no disputes over the fact the winners were all deserving of their medals and it was too bad that the Russians weren't there to be beaten.

Betty Stewart earned the title of Women's World Aerobatic Champion at WAC '80.

The U.S. men's team — made up of Leo Loudenslager, Henry Haigh, and Kermit Weeks — succeeded in winning the Nesterov Cup. Leo achieved what he had so aggressively pursued: Men's World Aerobatic Champion. Team member Betty Stewart earned the title of Women's World Aerobatic Champion; finishing second and third were team members Patti Johnson and Paula Moore.

Carl Bury served as IAC president from 1978 to 1981. During that time, the IAC board of directors began negotiations with Aerobatic Club of America to enact a merger. In his February 1980 letter to the membership, he wrote, "Over the last twelve months the officers and boards of the IAC and ACA have worked long and diligently on the merger proposal of the two organizations." Stating it as simply as possible, Carl wrote that the merger had to be put on hold. The ACA had fully believed they were operating under a tax-exempt status, but had discovered that this was not the situation. To protect IAC and ACA, both organizations had decided to delay any further plans until the problem could be resolved.

PHOTOGRAPHY COURTESY OF **IAC ARCHIVES**

DON MACDONALD'S GROGAN BELT

BY DON MCDONALD, IAC 2621

I received the Grogan Belt at my third contest sponsored by IAC Chapter 88 at Owosso, Michigan, July 11–12, 1981. The belt was hand-tooled by Tom Grogan of Freeport, Long Island, New York. He and his wife, Boots, were active IAC members in the early years of the International Aerobatic Club. Tom didn't fly competition; he just enjoyed the IAC people, was a judge, and helped out in every way. Boots was always in the scoring room with the mechanical adding machines, and then later rudimentary calculators that were used to compile the final scores.

Tom always felt sorry for the pilots who came in last in Sportsman. Being a craftsman in leather, he decided to create the belt for the last-place finisher in Sportsman at Fond du Lac. That's where it started — and he later started making belts for other contests as well.

The 1981 Sportsman sequence shown on this belt has received comments from other IAC members when I have shown them the belt, in particular the snap roll and barrel roll (no longer Sportsman figures). I have listed the figures shown on the belt that represents those flown in the 1981 Sportsman Known sequence.

- Slow roll
- Split-S
- Inside loop
- Immelmann
- Snap roll
- 1-1/4 spin
- Hammerhead
- 90-degree turn
- Half-Cuban-eight
- Reverse half-Cuban-eight
- 270-degree turn
- Barrel roll

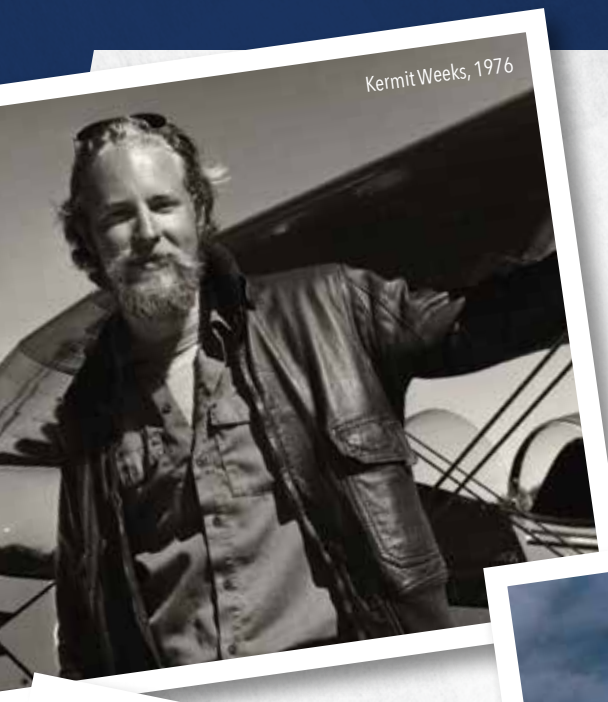
Please note the "poor man's" inverted fuel and oil system in the photo of my 1946 clipped wing Piper J-3 Cub. Both inverted fuel and oil vent to the bungees. Photo credit: Robert F. Pauley

In September 1981, Mike Heuer assumed the presidency of the IAC. Earlier in the year, ACA had indicated it wanted to create two or three categories of its own other than Unlimited, which was in their agreement with NAA. Following up on Carl's letter in July to the NAA, Mike was instrumental in convincing the NAA to grant the IAC full sanctioning power for all aerobatic contests held in the United States. NAA terminated its letter of agreement with ACA, and the IAC became its aerobatic division. This gave the IAC the charge of administering all aerobatic activities in the United States under the banner of the Fédération Aéronautique Internationale in Lausanne, Switzerland.

Henry Haigh won the World Aerobatic Men's Championship at Red Deer, Canada, in 1988, as a member of the United States Aerobatic Team.

We think that airplanes and fuel are expensive now, but it appears we have always felt this way. Before he left office, Carl wrote in his President's Forum, "In the past many of those who have been practicing several nights a week have cut back and one contestant reported he is dropping from 8 contests in 1979 to 4 contests in 1980 because of fuel costs." Mike would later write, "The development of less expensive aerobatic airplanes must be a priority in the near future. Costs are simply out of sight today. This sport needs a good aerobatic airplane for under $10,000."

Even with the economic challenges, the IAC continued to grow through the 1980s. By the end of the decade, the IAC had surpassed 5,000 in membership. Membership growth from January 1981 to fourth-quarter 1989 increased by 67 percent, from 3,129 to a total of 5,018 members. Pilot participation took a jump in 1988, with the Intermediate category showing the most growth. Pilot participation averages for 1988: Basic 53, Sportsman 263, Intermediate 154, Advanced 84, and Unlimited 52, a total of 606 pilots.



Kermit Weeks, 1976

IAC 50
1970-2020

Don Peterson Stampe

Kirby Chambliss, 2004

John and Matt Morrissey with John's Starduster Too

IAC's first official rule book, 1970

Fernando Barros, Brazil, 1990

PHOTOGRAPHY COURTESY OF **IAC ARCHIVES**

The End of the 20th Century

IAC 50th anniversary spotlight — the 1990s

IN THE DECEMBER 1999 issue of *Sports Aerobatics*, then-editor Karen Diamond aimed to commemorate the 20th century treasures of the world of aerobatics. "Those treasures are *people*. In this issue we have profiled an exceptional group. But it includes only a very few of the many whose accomplishments and contributions have made our sport what it is today. It is not solely a list of the most influential, but a mere glimpse of the leaders, thinkers, tinkerers, and doers of aerobatics."

A Lifetime Achievement Award was presented to Bob Davis, IAC 103, for his devotion, dedication, and service to aviation and aerobatics over a 30-year span. Bob became interested in aerobatics in 1965, and it was his friendship with IAC's first president, Bob Heuer, that got him started in competition aerobatics. In partnership with Verne Jobst, he purchased the first symmetrical-wing Pitts S-1S. Bob made the U.S. Aerobatic Team and flew at the 1976 World Aerobatic Championships (WAC) in Kiev. By 1999 he had served on the IAC board for 20 years, which at the time made him the longest-serving IAC director in the club's history.

Henry Haigh was inducted into the IAC Hall of Fame in 1999 and recognized for flying his *Superstar* aerobatic monoplane at WAC 1988 to clinch the title of World Aerobatic Champion at the age of 63. By WAC 1990, Henry had announced his official retirement from aerobatic competition. After his first contest in 1970, Henry flew in more than 100 local and regional IAC contests, winning more than 60 of them. He won both the L. Paul Soucy Award and the Curtis Pitts Trophy on two separate occasions.

The article "The End of the Century — the State of Aerobatics Around the World" included an overview of aerobatics in the United States and 12 other countries. Following are the international IAC members' and chapters' observations as well as an overview from the United States.

IAC Chapter 132 of Norway President Thore Thoresen in his Extra. The chapter runs all of its contests by IAC rules.

FINLAND

In the past, aerobatics were mainly flown in the Air Force and by some individual show pilots. The Aerobatic Club of Finland was established in 1983, and the first Nationals were held in 1986. From the very beginning, the IAC category system was observed both in instruction and competitions. We do not have an IAC chapter in Finland, but many of us are individual members of IAC.

We currently have one Extra 300, one Ultimate 300, three Christen Eagle IIs and Pitts S-1s, two Bellancas, and a few Cessna Aerobats. The first Sukhoi Su-26 is due to arrive in the early spring.

There is good cooperation in aerobatics between the four Nordic countries — Denmark, Finland, Norway, and Sweden. We have Nordic Championships, which are conducted according to IAC rules. All contests, training camps, and judges' schools are open for every Nordic nation.

CANADA

Aerobatics in Canada are supported by eight chapters that include members who are not part of the national organization. Some chapters have more members than the national organization. For instance, Chapter 8 in Vancouver has 60 members and the national organization has 55.

The aircraft flown are mostly Pitts and various prototypes. Also a few Extras and One Designs.

Growth seems to be stunted at the moment. This is mostly with regard to organizational matters, not flying. Quite a few fresh faces are surfacing. Competitions include Nationals and the Can-Am. The Can-Am is organized in cooperation with IAC Chapter 67 in Cut Bank, Montana. Both contests are run according to IAC rules, and we have many IAC members*.

**Note: As of May 2020, 160 Canadians are on the IAC membership list.*

PHOTOGRAPHY COURTESY OF **IAC ARCHIVES**

IAC 50TH ANNIVERSARY SPOTLIGHT

BY CLISTEN MURRAY, IAC 1696

Like many others, I was hooked as a young boy when an occasional airplane flew over our southern Indiana farm. Many years later, I was able to do the same thing – what a thrill!

My first flight took place in Vincennes, Indiana, in the 1980s.

I traveled to Boulder, Colorado, to take my first aerobatic lesson. I was privileged to take it with Betty Stewart, two-time women's World Aerobatic Champion.

A Pitts checkout was in order when, in 1984, I purchased a Pitts Special S-1S, tail No. N21KR. I chose John Morrissey for that checkout, who had been a Pitts dealer for a short time and had a flight school called Great Planes Aerobatics. The first contest I attended with my Pitts was the 1984 U.S. National Aerobatic Championships.

On a local level, I was a charter member of IAC Chapter 61, which was established in 1978. The first president of the chapter was John Ford, followed by Jim Wheaton, and then me in the mid-1980s. During my time with Chapter 61, I was the contest director twice for the Salem, Illinois, contest. The chapter awarded me a lifetime membership. I spent a quite a few years with Chapter 12 in Colorado, where I was also awarded a lifetime membership.

Several other volunteer duties included assisting at the judges line, as well as becoming a judge and a chief judge. I also spent some time instructing at some of the early judges schools. Judging and assisting was hard on my eyes, and in later years the sun damage to my face would force me to retire from judging.

On the national scene, I put my contest director experience to good use and twice was the CD at Fond du Lac. I was elected to the IAC board of directors three times, serving from 1985 to 1997.

I will always remember the good times with IAC folks. It's been just great to meet with, talk to, compete against, and encourage the novice pilot.

Here's to blue skies and calm winds – all 10s.

BRAZIL

Despite the troublesome economic situation most countries, including Brazil, are facing, aerobatics is a growing sport. Almost all aerobatic activities in the country are regulated by ACRO, the Brazilian Aerobatic Association, which currently has around 250 active members.

The Brazilian Aerobatic Championships consist of several IAC-style, five-category contests, usually four per year. Brazil has seen a resurrection of aerobatics that started around 12 years ago. This new phase in aerobatics owes much to the work of well-known IAC friend Rudy Penteado, who at first was a direct link between IAC and the Brazilian pilots and was part of the effort to bring the Unlimited category to the country. Rudy also worked to bring complete Brazilian teams to the WAC, and those efforts ultimately came to fruition in Oklahoma in 1996. This led to the importation into the country of several Sukhoi airplanes and paved the way for camp trainings with international trainers like Nikolay Timofeev and Sergei Boriak.

UNITED STATES

The IAC has finished the '90s with more than 6,000 members, about 900 of whom are active in competition. IAC members live in more than 25 countries. The United States has 58 active chapters spread across the country that serve as sponsors for about 60 local and regional sanctioned contests each year. Over the past 30 years, competitions have included the IAC Championships and the U.S. National Aerobatic Championships.

Near record activity has been spurred by the introduction of many new aerobatic aircraft in the United States, including the Zivko Edge, Staudacher, Aviat Pitts S-2C, Giles, and DR series. Add to this the ready availability of Yaks, Sukhois, CAPs, and Extras, and you have levels of performance and excitement that will propel the sport for many years. U.S. enthusiasts have also been drawn to medium-performance aircraft such as Stardusters, Acro Sports, Eagles, and Skybolts. Add a sprinkling of Bückers, Stampes, Stearmans, Zlins, and Cubs, and the sport remains diversified and very interesting.

A Decade of Triumph and Tragedy

IAC 50th anniversary spotlight — the 2000s

THE HIGHLIGHT OF THE DECADE for IAC was hosting the 8th Advanced World Aerobatic Championships (AWAC) in 2008 in Pendleton, Oregon. The event is now officially called the World Advanced Aerobatic Championships (WAAC), but that doesn't quite roll off the tongue like AWAC used to. The contest was in the works as far back as 2006 when CIVA awarded the event to the United States.

IAC Chapter 77 in Oregon and IAC Chapter 67 in Washington took on the event, forming a not-for-profit 501(c)(3). The key volunteers for AWAC 2008 conducted fundraising, planning, and volunteer recruiting for 18 months before the first competitor dived into the box on August 3. Contest Director Bob Higbee was later presented with the President's Award by then-IAC President Vicki Cruse.

Thirty-four competitors from 11 countries flew a variety of aircraft, including a couple of MX2s, an Edge 540, an Extra 230 and 300, a Sukhoi Su-29, a Pitts S-1T, a Pitts S-2B, a Giles G-202, a Zlin-50, and a Yak-55M. The MX2 was flown by Rob Holland, who came away with the Advanced World Aerobatic Champion title. His teammates Hector Ramirez and Todd Whitmer finished in the fourth and fifth spots to put the team in first place.

Rob Holland in his MX2 is the WAAC '08 Advanced World Aerobatic Champion.

Hector Ramirez's fourth-place finish at AWAC '08 helps solidify team gold for the Americans.

Rob Holland's competition aircraft was the MX2, which was developed as a prototype modified from a G-202 in May 2002. The aerobatic world also welcomed Jon Staudacher's S-300 and S-600 in 2003, as well as Philipp Steinbach's Sbach 300 and 600 in 2004 and 2008.

In a departure from IAC competition aerobatics, three IAC members would enter the new Red Bull Air Race World Series (RBAR). They were Kirby Chambliss, a five-time U.S. National Aerobatic Champion and three-time U.S. Unlimited Aerobatic Team member; Mike Mangold, who won flight medals at the U.S. National Aerobatic Championships, won the L. Paul Soucy Award in 2002; and Mike Goulian, a U.S. National Unlimited Champion and Advanced Champion and three-time U.S. Unlimited Aerobatic Team member.

Having come from IAC competition and air show backgrounds there were some insights into how important their backgrounds were to their success in RBAR. "Actually, it is not so different from IAC competitions," Mangold said. "Judging, presentations, boundaries, rules, and flying the program as depicted are both similar."

Being able to control one's nerves prior to flights was a skill that Goulian learned from IAC competition and which he was able to take with him into RBAR. "I am comfortable being nervous for races," Goulian said. "Essentially, every RBAR feels like a World Aerobatic Championship."

Meanwhile, Lisa Popp, IAC's executive director for nine years, quietly submitted her resignation shortly after EAA AirVenture Oshkosh 2008. She remained on part time through April 2009 until a replacement could be found. Trish Deimer, program manager for the National Association of Flight Instructors, was hired on as the new IAC executive manager.

IAC leadership would change hands as WAC 2009 ended in tragedy. "For many the name Silverstone will always generate a mix of emotions: admiration for those who fly and organize, compassion for those who suffered so much loss, and a strong sense of what the aerobatic community is all about," Mike Heuer, then-president of CIVA, wrote in the November 2009 issue of *Sport Aerobatics*. No one could have ever foreseen the loss of IAC President and U.S. Team member Vicki Cruse, the first WAC competitor to be killed in competition since 1960.

Vice President Doug Bartlett transitioned into the IAC presidency immediately. The organization was rocked by loss, but it continued to function effectively during an extremely difficult period. Doug had been groomed by Vicki, who was preparing him to fill the president's shoes. "There were no surprises or fires to put out because the IAC was well led and in sound order," Doug said. Doug indicated that the most important task ahead for IAC in the long term was membership retention. At the end of the 1990s, the club's membership was at an all-time high of 6,000. By December 2009 the membership numbers had declined to 4,000.

Vicki Cruse, 2007 U.S. National Aerobatic Champion, 2005-2009 IAC president, and 2002-2009 U.S. Aerobatic Team member.

Todd Whitmer, finishing in fifth, is the third member of the U.S. Advanced Aerobatic Team winning gold at AWAC '08.

At the IAC board of directors' fall meeting, a membership committee was formed to focus on retention and expansion. The group would take advantage of the opportunities the internet provided to reach out to its members. While the magazine continued to be the organization's primary publication, an e-newsletter, *In the Loop*, was launched in April 2010 to help bring the club closer to its membership on a more frequent basis.

Before leaving office, Lisa Popp, along with Vicki Cruse, went through all the contest results from 2000 to 2008 to determine the number of competitors per contest and what categories were flown at these contests. They put all the numbers together in a spreadsheet in order to aid EAA in risk management and shared the findings with the IAC membership in the February 2009 issue of the magazine.

Highest number of participants at a regional contest:

- 69 — Sebring, Florida, Fall 2000
- 66 — Paso Robles, California, 2008
- 65 — Sebring, Florida, Spring 2000

Highest number of participants at the U.S. Nationals: 2017, 102; 2001, 101; and 2006, 96.

Average number of competitors in each region, 2000-2008:

Northwest: 32	South Central: 26
Southwest: 36	Southeast: 40
Mid-America: 30	Northeast: 28

Number of IAC members participating in contests: 2006, 496; 2007, 495; 2008, 489

PHOTOGRAPHY COURTESY OF **IAC ARCHIVES**

Our Club Turns 40!

IAC 50th anniversary spotlight — the 2010s

IN HIS JANUARY 2010 Letter From the Editor column for *Sport Aerobatics*, Reggie Paulk wrote, "This year marks the 40th anniversary of the International Aerobatic Club. That's quite a feat, but what's even more amazing is that 115 of our current members have been with us the entire time."

The club's fifth decade has proven to be a productive time. In 2011, then-judge program chair Greg Dungan began to recommend judges school enhancements, including the use of video and online classes. Today we see that many of his ideas have come to fruition through the efforts of current judges' program chair Wes Liu. Wes has added video, which includes 12 judges school training modules and 40 videos on the IAC YouTube channel that ask, "How did the judges miss that?" All of these excellent flight videos are from the U.S. National Aerobatic Championships and were recorded by videographer Forrest Fox.

Also, in 2011 the IAC board appointed then-IAC director Wayne Roberts to lead up a working group of IAC volunteers to revamp the outdated IAC website. Over a year and a half worth of work went into the IAC.org site we have today.

2011 proved to be the start of something really big for one IAC member. Rob Holland won his first U.S. National Aerobatic Championship. His record-setting winning streak continued through 2019, giving him a total of nine championship titles. His participation in the 2020 U.S. Nationals in Salina, Kansas, will mark his 10th year competing in the Unlimited category.

Often working behind the scenes, the government relations committee, now led by chairman Bruce Ballew, has worked diligently over the last decade to represent the IAC membership before many federal agencies, including the FAA. The committee helps shape future policies and supports aerobatic enthusiasts in their continual efforts to enjoy aerobatics.

On the world aerobatic stage, the United States once again received a bid on a world championship. The WAC was held in October 2013 in Sherman, Texas. The site was very familiar to Team USA, as it was the location for the U.S. Aerobatic Championships for more than 40 years. Beginning in 2012, contest director Chris Rudd and assistant director Lorrie Penner began assembling their volunteer team from around the United States and Canada and filed for not-for-profit 501(c)(3) status.

The event attracted 58 pilots from 17 countries. The championship successfully completed the Known (Programme 1), Free Program (Programme 2), and enough of the Free Unknown No. 1 (Programme 3) to conclude with a new world champion. The 4-minute Free (Programme 5) was also flown successfully to completion, and all operations were executed with safety in mind.

Wayne Roberts with wife Trisha at WAC 2013. Wayne served as an IAC director and government relations chair for many years.

Michael Lents, professor and coach at the University of North Dakota, with two team members. The UND team has won the collegiate Team championship trophy nine times.

Gamebird GB1 is the newest addition to the stable of aerobatic aircraft.

The U.S. women's team made up of Debby Rihn-Harvey and Melissa Pemberton won silver, as did the U.S. men's team consisting of Rob Holland, Michael Racy, and Nikolay Timofeev. Rob Holland was awarded gold in the final programme 5 — the 4-Minute Free.

2015 marked an exciting time in the growth of the IAC. A new, reenergized logo and brand system were unveiled, representing the best of the organization's history and the exciting future the IAC is creating together with its members. Through the leadership of IAC member and Advanced competitor Margo Chase, the club wanted its brand to reflect the organization and one of its biggest assets: The IAC is the largest aerobatic club in the world. During the rebranding period, the IAC also upgraded the IAC Pavilion building and created an open welcoming space for members and AirVenture attendees.

Lineup of competitors wait their turn at WAC 2013.

Margo Chase lead the IAC logo rebranding project in 2015.

IAC 50 1970-2020

PHOTOGRAPHY COURTESY OF **IAC ARCHIVES**

In 2011, Rob Holland wins the first of nine U.S. National championship titles.

WAC 2013
Opening Ceremony.

The Collegiate Program began in 2001 with three university teams participating. Over time the program has welcomed 14 different schools. The current program chair is IAC member and treasurer Jordan Ashley. Rivalry has been fierce between schools at times. The University of North Dakota holds the record for winning the team trophy nine times between 2008 and 2018. In 2017 and 2019, newcomers from Metropolitan State University of Denver dethroned UND and captured the team trophy.

The following are competition changes and upgrades that occurred during this last decade, making life easier and more interesting for organizers and competitors alike:

In 2013, the IAC East and West Open Championships were approved by the IAC board. Open championship titles were to be awarded each year for one Eastern U.S. and one Western U.S. Regional contest (east and west of the Mississippi River).

Ringo Massa created OpenAero, a free shareware aerobatic sequence design program that can be downloaded as an app or run on a web browser.

The scoring software was updated when the DOS-based program was replaced by the JaSPer program created by IAC member and volunteer Bob Buckley.

The IAC board, led by then-treasurer Bob Hart, revised the flat-payment-per-contest fee structure so that the hosting chapter was invoiced at the end of each contest for each pilot who flew. This replaced a per contest flat fee, which burdened smaller contests.

The newest addition to the stable of aerobatic aircraft came in the form of a bird — GameBird GB1, which was designed by Philipp Steinbach, a four-time German national champion who learned much of his trade working for Walter Extra in the 1990s. Philipp formed Game Composites LLC with Steuart Walton in 2013. By July 2015 the company had two airframes completed and had started its flight-test program. In 2018 its first type certificate was issued and in 2019 an FAA production certificate was issued. ***IAC+***

PHOTOGRAPHY COURTESY OF **IAC ARCHIVES**

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PITTS S1-11B

Malcolm Pond, IAC 429965; Riverside, California

PHOTO COURTESY OF **IAC ARCHIVES**

SO, YOU WANNA BUY A Pitts? PART 1

BY BUDD DAVISSON, IAC 435420

Go ahead. Admit it: At some point in your flying/aerobatic career, whether it has been long or short, or maybe hasn't even started yet, you've thought about buying a Pitts. Maybe you still are. For certain folks (pilot or not), a Pitts just seems to have that look: a combination of cuteness and tradition floating on a sea of testosterone. Today, there are dozens of better aerobatic airplanes, but few of them tug at some folks' heartstrings like a baby biplane does. However, the process of buying one can be often neither cute nor laced with testosterone. It can sometimes be frustrating, exhilarating, disappointing, overwhelming, and unnecessarily expensive.

PITTS S-1C

Robert Hamilton, IAC 436771; Overland, Missouri

BEFORE YOU START LOOKING

Before you get your heart set on buying what is one of the most recognizable and enjoyable airplanes on the planet, do a reality check. Check out some aviation basics so you don't get too far down the road before realizing there can be possible obstacles on the road to buying a Pitts.

Insurance requirements. Insurance companies are leaving the aviation market at an alarming rate, and the remaining companies' requirements for insuring a pilot in a Pitts are difficult to forecast. However, where they used to require a total of 50 hours of tailwheel time and five to 25 hours of Pitts CFI dual, increasingly they are requiring 100 hours of tailwheel time, and sometimes the Pitts dual-received isn't included in the total.

Pilot's physical size. All Pitts are small airplanes with fairly narrow CG ranges. Pilots 6 feet and taller will be only a little cramped; however, as the individual goes past 6 feet, 3 inches, things can get difficult because not all tall pilots are created equal. The height can be a problem, but the leg length can be the real deal-breaker. As the inseam goes past 34 inches, it becomes apparent that the location of the knee in the leg varies greatly from pilot to pilot. Often some pilots with the same inseam length will fit fine (although folded up like a cheap pocket knife) while others can't get their knees under the panel. If you're in that small segment of the population, go try a Pitts on for size before writing a check.

Weight is often a problem. It depends on the exact model. But using an S-2A as an example, with 260 pounds in the back seat, you'll be within the akro envelope on takeoff but barely out of it on landing *yet* still within the normal envelope, so all is good. (CG goes back with fuel burn.) Put 170 pounds in the front seat and your Pitts world changes! With a 170-pound, FAA-standard passenger in the front seat and 20 gallons of fuel on board, about the most that can go in the back seat and stay close to the aerobatic envelope will be 185 pounds. Two hundred five pounds puts you out of the aerobatic envelope but barely within the normal envelope. The fuel load can be lowered and make it better, but for a really heavy pilot, the front seat is just a big baggage compartment. No passengers allowed. The B's and C's are better but still critical. Drop me a note at *buddairbum@cox.net* and I'll send you a nifty piece of software that makes these kinds of calculations easy.

PHOTOGRAPHY BY **CARMELO TURDO**

Airport considerations. A relatively new Pitts pilot is going to be runway sensitive. Runway length isn't a problem with anything over 1,800 feet, being both "hunky" and "dory" as long as it has decent approaches. One thousand two hundred feet will work, but why push it? Runway width and surface, however, can be difficult. The majority of Pitts pilots start worrying when the width is less than 60 feet, although practice will let you go down to 50 feet with no problem. Narrower than that width requires some experience to be safe. A 35- to 40-foot runway is too dicey until you really know the airplane. The problem is you can't see very much of the runway until several seconds before touchdown, so the technique coming down final needs to be slightly modified. The airplanes love grass but only if it is relatively smooth. Rough grass works with the stiff gear to bounce the airplane all over the runway — not a good place for a new Pitts pilot. Also, these little wings don't like density altitude, so temperature and airport altitude can have major effects on the airplane's performance both coming and going. The climb rate really suffers as the altitude goes up, and you find yourself coming over the threshold at breathtaking speeds on landing. So, be critical of the airport where you plan on basing it.

THE MISSION AND THE MONEY

Certainly, one of the basics of Pitts purchasing is that you first have to decide what you're going to do with the airplane (serious aerobatics or just fun stuff) and how much you can afford (not what you *want* to spend, what you *can* spend). When thinking about Pitts, the combination of planned use and finances often points to another major decision: single-place or two-place. Let's take this last point first.

BUYING A SINGLE HOLE

Single-hole Pitts are cheaper. That's a basic fact, although the price of a good S-1T (200 hp, constant speed, factory built, and certified) is creeping into the price range of lower-end S-2As (same engine as S-1T but two-place), sometimes over $60,000. Otherwise, single holes are split into two basic categories: homebuilt and factory built with a lot of other nuanced variations.

PITTS SPECIAL S-1S
Austin Greenheck, IAC 440962; Minot, North Dakota

The most common homebuilt Pitts include the original S-1C (flat wing, two ailerons, engines from 85 hp to whatever can be stuffed in the cowl), the seldom-seen S-1D (flat wing but four ailerons), and the S-1S (symmetrical wings, four ailerons any engine). The last single hole was the S-1-11B (260 hp, completely new design), but they're rare. The S-1C is commonly seen with 150 or 160 hp and is the biggest bang for the buck in sport aviation! Serious low-dollar fun. A 180-hp flat wing is an absolute rocket ship! As a breed, flat wings don't see as much competition aerobatics as the later S-1S because they don't do outside maneuvers as well as the round wing varieties do. So they usually haven't been beaten up as much. Still, any flat wings — 150 hp and up — are huge fun and will do aerobatics as well as most weekend pilots will ever need. They'll run $20,000 to $30,000 with a few either side of that bracket. Get a good one, take care of it, and you can fly it for years and be guaranteed of selling it for what you paid for it – if you ever can bring yourself to part with it, that is.

A homebuilt S-1S, the round wing, will start at $30,000 and work its way past $40,000 with quality and condition setting the price.

An important note about the single holes, especially the S-1S: When was the last time you saw a totally stock, unmodified '32 Ford coupe? A long time, right? Well the S-1S is the aerobatic community's deuce coupe. They love to modify it, and frankly, it's astounding how many people think they are smarter than Curtis Pitts and modify his design. Yes, there are some worthwhile modifications out there like those on the Wolf Pitts, but too often a modification is made to increase a specific area of the performance envelope, such as getting rid of the dihedral in the bottom wings to increase roll performance. Yes, it helps a little, but it degrades the overall handling. Change one thing and it will imbalance something else. You'll see longer fuselages. (S-1Cs started out with 121-3/4 inches, tail post to firewall, and Curtis added 3 more inches in the cockpit of the S-1S.) If a Pitts has been builder-modified in one area, it generally has been modified in other areas you can't see, and you have to ask whether the structural mods were up to Curtis' standards, whether they were done well, and what did they accomplish, if anything? When possible, always go for an airplane that is built to the plans, regardless of model.

A common mod seen on many single-place Pitts is the spring gear, usually using Robby Grove's excellent gear legs. This mod makes the airplane faster, a little lighter, and a little easier to land, although the legs sit a little flatter so they touch down a little faster. However, too often the gear is installed improperly. It requires an additional tube or two in the forward fuselage truss to carry the loads from the rear gear attach point to an existing cluster. Adding a lot of steel in the local area only moves the resulting cracks in the lower longerons to another point. When someone buys an airplane with a spring gear mod, it is critical that the structure in that area be inspected for proper trussing and possible longeron cracks.

PITTS S-1B

Tim Glabbatz, IAC 435929; Albury, New South Wales

PHOTO COURTESY OF **IAC ARCHIVES**

PITTS SPECIAL S-1T

Mike Forney, IAC 8781; Denver, Colorado

A worthwhile alternative to the original bungee gear and the spring gear is the Wolf tapered-rod RV/Wittman type gear that actually sockets into the engine mount. It works well. All of Steve Wolf's Pitts mods are available through Griggs Aircraft Refinishing (www.GriggsAircraft.com).

HOMEBUILT PITTS

A possible problem in buying a single-place experimental amateur-built (E-AB) Pitts is that ... well ... it was built by an amateur. So, there is a wide variety in the quality of S-1s out there. They have to be inspected carefully with the prebuy being done by someone who knows the breed well. By the way, nothing says a homebuilt airplane won't be the same quality as a factory built. Sometimes they'll be significantly better, sometimes not. The inspection has to determine the quality.

Another S-1 consideration is age. A 45- to 49-year-old Pitts (1971-1975) isn't unusual. On a rag and tube airplane such as a Pitts, hours aren't all that important because they don't experience airframe fatigue like aluminum birds do. However, the kind of life it has lived during that half-century *is* important. We're seeing lots of Pitts built during the '60s and '70s being pulled out of barns, washed and waxed, and put up for sale. Forty-year-old fabric is a problem because, besides the condition of the fabric, a 40-year-old airplane with original fabric means that no one has seen the wing's wooden structure for a helluva long time. When you consider it is amateur built and the wings are all pieces of wood glued together, that's a little scary. Modern fabric can be good for 30 years, but who wants to go that long not having inspected the wings? Plus, if the airplane sat for a while not being flown, the engine becomes very, very suspect. More on that subject later.

A POSSIBLE PROBLEM IN BUYING A SINGLE-PLACE EXPERIMENTAL AMATEUR-BUILT (E-AB) PITTS IS THAT ... WELL ... IT WAS BUILT BY AN AMATEUR. SO, THERE IS A WIDE VARIETY IN THE QUALITY OF S-1S OUT THERE. THEY HAVE TO BE INSPECTED CAREFULLY WITH THE PREBUY BEING DONE BY SOMEONE WHO KNOWS THE BREED WELL.

PHOTO COURTESY OF IAC ARCHIVES

GETTING A GOOD ONE

You can get a fairly good idea of the craftsmanship in the airplane by simply hanging your head down in the cockpit and looking around. Scrutinize all the welds: They should be even and pretty. There's no guarantee a pretty weld is any stronger than an ugly one, but it does speak to the welder's pride in the work being done. And that attitude would be carried over to the rest of the airframe.

Look at the fuselage stringers behind the seat and see if there's dirt and crud on top of them. If so, it means the visible area was possibly power washed before being offered for sale. The rest might not be as pretty.

Check the leading edges for popped nails and look at the surface of the fabric where the I-struts bolt into the wings. If the plywood under a strut is dished, it is an indication that either the airplane has seen some hard *g*'s or those bolts were overtightened. Check the logs and see if you can determine the last time the flop tube was changed. If you cannot, it's a bear to change. The factory says to change it every so often because it gets stiff.

If it has a PS-5 pressure carburetor, see how long since it was rebuilt; PS-5s are silly expensive to rebuild. If it has a wobble pump, Christens are good, old T-6s not so much. Some have been built with heel brakes, which is a scary thought. If it has inspection panels in the wings (many homebuilt Pitts don't, which is another scary thing), get in there with a flashlight and mirror, looking carefully for cracks where the ribs go over the spars. Inspect the corner blocks that join the ribs to the spars. We're looking for bad glue joints and discoloration in the varnish indicating water damage. Pull on the drag/anti-drag wires feeling the tension. If there are no inspection panels, see what you can under the panels around the flying/landing wires.

Look for cracks or waves in the wing walks. They tend to crack right next to the spars. Run a thumbnail down all edges on all of the flying/landing wires, feeling for nicks. It doesn't take much of a nick to render a wire too dangerous to fly. Look at the belly between the gear legs; if the little doors are hanging slightly open, the bungees need replacing. If it has lived close to a coast for any length of time, check all the clevises and steel hardware for surface rust. Ditto the fuselage tubing.

In Part II, we take a look at the two-place birds. IAC

PITTS S-1E

Eric Moore, IAC 440671; Cave Creek, Arizona

PHOTO COURTESY OF **RENEE BRILHANTE**

SOCIALLY DISTANT SEBRING COMPETITION!

BY RENEE BRILHANTE, IAC 436022

The email invitation on April 17 started out with, "I hope you've been flying, because we are about to have a Socially Distant Sebring Competition! You can pick as many or as few of the challenges to participate in as you like, based on what is available to you during this quarantine."

This was refreshing news to many after a long spell of limited airport access as well as multiple early contest cancellations or rescheduling due to COVID-19's social distancing guidelines.

Just the week before, our chapter had decided to move its annual spring contest to November and was planning on converting the contest dates to practice days. Unfortunately, the airport pushed back on the practice days because the Florida stay-at-home order was still in effect.

A general sense of excitement permeated the chapter's Facebook page when the virtual contest was announced and fellow aerobatic enthusiasts chimed in. We asked for submissions to be sent in by May 2 via email, our Facebook page, the Aerobatics Google Group, or text. This gave participants a little more than two weeks to get their videos together.

SOCIALLY DISTANT SEBRING COMPETITION!

Robert Drouin flew the Eagle Sport Aviation's Pitts S-2B for the competition.

The virtual contest challenges were unique and included the following:

- "The Three, Let Me Be Freed From Quarantine, Flights": Participants flew the 2020 Known, Free, and an Unknown of the category the entrant is flying with an IAC judge watching and grading from the ground, or if a judge was not available, the participant sent in a video to IAC Chapter 23, which selected a judge to critique the video.

- "Sneeze in Your Elbow Slow Roll Challenge": Who can fly the slowest slow roll while maintaining altitude? Videos were recorded on head-view mounted cameras and had to be shown in real time to qualify.

- "The COVID Cool Move Challenge": The winner was determined by social media vote. Each participant had to fly a new and exciting figure and videotape it either from the cockpit or from the ground. Votes were based on the number of Facebook likes received before the May 3 deadline.

- "I Fly So Good, No Virus Can Touch This": A 4-Minute Free videotaped from the cockpit or the ground. Winners of this challenge were also based on the number of Facebook likes received by May 3.

- "Staying at Home but Still a Smooth Patch": Participants flew the figures on the IAC Achievement Award application for their category. If no judge was available to critique the contestants, the chapter once again selected a judge to review the video submissions.

- "Rolls on a Vertical, No Pukes, No Fevers, Please": This competition looked for who could get the most rolls on a vertical up. Start speed could not exceed aircraft limitations. Rolls had to be on the vertical up.

- "Corona Doesn't Furlough Bozo!": That's right, folks. We still awarded a Bozo. Recommended by all past Bozos and chosen by our current Bozo, Peter Nassar. Submissions were accepted from any activity since last fall's Sebring, and we requested that a story be included.

Within a week, the first entrant, Chris Buell, a first-time competitor in his Giles 202, had sent in his 2020 Sportsman Known. Jason Ledbetter also entered a video for the 2020 Sportsman Known sequence, flying his 1937 Bücker Bü 131 Jungmann. The next Sportsman competitor to enter was Robert Drouin, president of Eagle Sport Aviation, in the flight school's Pitts S-2B. The fourth competitor in the Sportsman category was Steve Coleman of IAC Chapter 35 flying his black-and-gold Pitts S-1C. Steve also entered the slow roll challenge and ended up winning with a very slow roll timed at 24 seconds!

The next competitor was Marco Bouw in his Laser 200 flying in the Intermediate category. He successfully entered three videos for "The Three, Let Me Be Freed from Quarantine, Flights": a 2020 Known sequence, a Freestyle, and an Unknown he found from the bank of sequences on the IAC website.

Cameron Grossl of Kentucky also submitted for "The Three" in the Intermediate category, flying his homebuilt Christen Eagle. Cameron worked diligently with an eye toward completing the project by July 2017 in order to attend the 40th anniversary of the Christen Eagle at AirVenture. He successfully flew his Inferno Orange Eagle to third place in Sportsman at the U.S. Nationals that fall.

Jason Ledbetter sent in a second video for the Smooth patch challenge, flying his 1937 Bücker. He ended up as the winner of the "Staying at Home But Still a Smooth Patch Challenge." According to Jason, "The airplane is a joy to fly. This airplane flies exactly how a pilot would want an airplane to fly. The Stradivarius of aircraft. But ... she's quite slow — so much drag. So, my verticals are not very long."

Chad Barber was the first and only pilot to send in his video for the "COVID Cool Move Challenge," flying his Pitts S-1C. The challenge was all about flying a new and exciting figure. Chad brought his A game — spinning, rolling, and tumbling in unusual attitudes at unexpected times — and flew away with the trophy.

WE'VE ALL BEEN MISSING OUR AEROBATIC FAMILY, AND THIS HELPED A LITTLE TO FILL THE VOID AND GET IN SOME GOOD FLYING.

PHOTO COURTESY OF **IAC CHAPTER 23**

Chad Barber spins, loops, tumbles, and rolls over the Atlantic Ocean to clinch the title of "COVID Cool Move" during the Socially Distant Sebring Competition.

Marcio Oliveira, an international competitor from Brazil flying his Sukhoi, submitted his video of the 2020 CIVA Unlimited Free Known (technically a Free Known). He won the category, with a very clean flight and snappy point rolls.

Another international pilot, Andrej Zelem, flying a Zlin-50M from Slovakia, submitted a video that he called a "training flight" at the Intermediate level. Some on the IAC 23 Facebook page thought it looked like an Advanced level sequence. The figures he superimposed on the right lower corner of the screen on his video were a nice added touch.

The final judging of the Sportsman and Intermediate category flights had yet to be completed when I was doing this write-up. We will post the final results on our Facebook page and the IAC website.

Overall, we feel the first Socially Distant Sebring Competition was quite a success. IAC Chapter 23 received submissions from our international friends and members as well as participants from coast to coast within the United States. It was a great time to try to recapture the camaraderie that we usually experience this time of year at competitions. We've all been missing our aerobatic family, and this helped a little to fill the void and get in some good flying.

You can see all the submitted competition flights on the IAC 23 Facebook page: Facebook.com/IACChapter23. *IAC*

My Experience With G-LOC

Human factors – gravity/load factor induced loss of consciousness

BY DAVE FARLEY, IAC 436112

A FEW SEASONS AGO, I had one of those experiences that put my aerobatic flying into perspective. I currently fly a CAP 231 EX at Advanced level in the United Kingdom, but at the time, I was flying my previous plane, a Pitts S-2A, and just starting the season's training for Intermediate.

My plane had been in maintenance over the winter, and as these things do, that necessity had taken longer than expected. The first competition of the season was rapidly approaching by the time my plane was ready. Not an ideal start to the season!

All of these things added up to me feeling a bit under pressure to get up to speed with my flying, after not doing much over the winter because of the maintenance.

My flying was not really where I wanted it to be after my first couple of aerobatic flights, and my *g*-tolerance was not where I would have liked, either, but the competition was close. I was pushing myself.

One of the figures in my Known sequence was a 4-by-8 followed by a 5/8 loop down, ending on a 45 upline, a half-Cuban. I had been practicing it and not flying it well. I wasn't feeling great because of my reduced *g*-tolerance and had been seeing stars at the bottom of the 5/8 loop.

I had been flying the 4-by-8 sloppily because I was entering the figure too slowly. So, on this attempt, I pushed the speed up a bit, flew a nice 4-by-8 pulled fairly hard, and held the pull. I saw stars for a second, blacked out, and woke up moments later on the 45 upline. I felt very disoriented for a second or two before coming to my senses. I got my Pitts on an even keel and headed for home.

I am not really a very nervous flyer. But this experience spooked me for the next few flights, and I was much more cautious about *g* from then on.

What did I do wrong, and what did I learn?

First, I was not looking for the chain of circumstances that can build up. I was putting pressure on myself to go a bit harder than I was comfortable with, given my state of training at the time as evidenced by the fact that I was feeling a little sick.

Dave Farley stands with his Pitts S-2A, in which he experienced the G-LOC event.

PHOTO COURTESY OF **DAVE FARLEY**

I AM NOT REALLY A VERY NERVOUS FLYER. BUT THIS EXPERIENCE SPOOKED ME FOR THE NEXT FEW FLIGHTS, AND I WAS MUCH MORE CAUTIOUS ABOUT G FROM THEN ON.

For me at least, my sensitivity to airsickness is related to my state of *g*-tolerance. If I feel airsick, it is a sign that I am not really as flying-fit as I am when I am in good practice.

Next, I was putting pressure on myself because the first competition of the season was coming up. I was competitive at Intermediate and was hoping to do well that season, and so I let my competitive ambitions overrule my sense of care and my caution. I have learned since then that I fly much better when I focus on flying relaxed rather than forcing the issue. My flying is much better since I learned this lesson. It also means that being less stressed, because of competitive focus, I can think more clearly and have better situational awareness.

This last point was vital. I fly at Advanced level now and pull — and push — a lot more *g* than when I had my *g*-induced loss of consciousness (G-LOC) incident, but I think I am considerably safer as a pilot now than I was then. I was so focused on flying the figure better that I didn't pay attention to the warning signals, and I didn't take the *g* that I was exerting seriously enough. For example, I was not performing any anti-*g* straining.

Also, I was not thinking about my sequence and considering the impact of the *g* profile on me. Hard, long pulls are dangerous, and doubly so after periods of negative *g*!

G-LOC = GRAVITY/INDUCED LOSS OF CONSCIOUSNESS

"Black-Out. You will experience this phenomenon as you pull high positive *g* loads, when blood is drained from the blood vessels in your brain, thereby starving it of oxygen.

"The first effects are felt by the eyes. To start with, everything takes on a yellow hue – then it becomes grey – then dark grey – and finally black, exactly as though you were sitting there in the dark. If this lack of oxygen in the brain continues, your hearing goes next – then your tongue starts to prickle – and finally you lose consciousness completely.

"From start to finish this can take as little as one or two seconds, depending on the amount of *g* pulled and, of course, your own constitution. You will find also that your tolerance changes from one day to another …

"The only way to stop the onset of a black-out is to release the stick. If you have reached the stage of loss of vision, for instance, you will regain your sight at once simply by returning to 1*g*.

"… Loss of consciousness must obviously be avoided at all costs. Unfortunately, for an inexperienced pilot … it can suddenly come upon him before he realizes it … I have observed periods of unconsciousness in pilots lasting up to ten seconds (easily recognized from the ground because the aircraft for no apparent reason ceases the programme being flown and suddenly starts travelling in a straight line).

"Factors contributing to black-out: Such factors include insufficient sleep; an excess of alcohol the previous night; flying too soon after a meal, before the stomach has had time to digest it; any stress or aggravation of any sort; fear; hot weather; and especially going on a starvation diet or losing weight quickly …

"Resistance to black-out decreases considerably after sustained outside maneuvers, e.g. a vertical eight started in the middle with an outside loop, followed at the bottom of the figure with an inside loop, will be conducive to black-out. Even worse is a 360 degrees inverted turn followed by a half inside loop downwards: very dangerous when flown in succession, especially at the end of a programme when the pilot is tired …"

SOURCE: ERIC MÜLLER AND ANNETTE CARSON, FLIGHT UNLIMITED '95, 1994, PP. 121-122

ERIC MÜLLER is a winner of numerous Swiss and European aerobatic championships. He has won 13 world aerobatic gold medals, 11 silver medals, and seven bronze medals. In addition, he was a Delegate to the Aerobatics Commission (CIVA) and an innovator.

ANNETTE CARSON is a British nonfiction author specializing in history, biography, and aviation. In the 1980s Annette was British Delegate to CIVA of the Fédération Aéronautique Internationale (FAI), and was elected secretary of CIVA and chairman of its Judging Sub-Committee. She served in organizational roles including contest director, British team manager and International Jury member.

I WAS NOT LISTENING TO MY BODY, WHICH WAS TELLING ME — THROUGH FEELING LIGHTHEADED, SEEING STARS, AND GENERALLY FEELING A BIT MORE AIRSICK THAN I USUALLY DO — THAT SOMETHING WASN'T RIGHT.

I was not listening to my body, which was telling me — through feeling lightheaded, seeing stars, and generally feeling a bit more airsick than I usually do — that something wasn't right.

Finally, I had not paid enough attention to all of these things in the gap between this moment and my previous flight, when I could and should have taken my hydration more seriously.

A half-Cuban, 5/8 loop from the top is one of the longest pulls that we competition pilots experience. *G* is funny; these days, I regularly pull over 9*g* in pulling hard to hit vertical lines or horizontal lines from the vertical, but the duration of these pulls is counted in fractions of a second. It is a nonevent. However, pulling 4.5*g* or 5*g* for the several seconds that it takes in that half-Cuban is a different thing entirely.

I am more cautious of long pulls now and will always perform an anti-*g* straining maneuver for those figures. During practice, I monitor myself, particularly after a flying break, for my *g*-tolerance. I have taken to flying fairly basic figures and partial sequences during early training sessions after a break to consciously build my *g*-tolerance before I start on full-blown practice. I am much more diligent about hydration and take drinking seriously before a flight, even when I don't think I am thirsty.

PHOTO COURTESY OF **DAVE FARLEY**

Dave Farley goes vertical in his current aircraft, a CAP 231 EX.

ANTI-*G* STRAINING MANEUVER

G-LOC experience

BY GORDON PENNER, IAC429704, FAA Gold Seal CFI,
Three-Time Master Instructor-Aerobatic

Military fighter pilots have learned this anti-*g* straining maneuver (AGSM) during and after World War II. In the Navy, they call it the hook maneuver because you are saying the word "hook" while doing the breathing-out portion.

In their book *Basic Aerobatics*, which I highly recommend, aerobatic champion Mike Goulian and writer/pilot Geza Szurovy describe the maneuver this way: "A quick intake of breath should be followed by tensing the abdominal and chest muscles while slowly exhaling over about 3-4 seconds. The breathing cycle is then repeated. Without going into medical details, the general idea is to make it harder for the blood to flow away from the brain. Recent research has shown that grunting and holding your breath while you tense your muscles is less effective than the described breathing technique … Experienced pilots who properly apply the technique can increase their *g* tolerance by up to 3*g*'s."

According to Caitlyn Shaw in her article "This Unclassified Technique Keeps Fighter Pilots Awake and Alert in the Cockpit," for *Gear Patrol* (website), October 4, 2017, "The Hook Maneuver was unclassified in 1990 in a response to civilians' desire to know how these pilots keep their cool in the cockpit. (This desire came from civilians flying military jets such as the Aero L39, L29, the SIAI-Marchetti S.211, etc. – Editor.) The resulting report by the Naval Air Development Center explains that the Hook Maneuver 'simply emphasizes the proper mechanics for physiologic enhancement of tolerance' in a way that is 'easily understood, rapidly mastered, and easily remembered.'"

On the internet, there are many discussions about the AGSM from technique to blood oxygen content while performing it. Below is a concise example.

Rocky Jedick (*SOFREP, Military Grade Content* (website), February 23, 2015, accessed May 24, 2020) wrote: "First developed during WWII … the AGSM increases aortic blood pressure leaving the heart and ensures the blood is fully oxygenated, which ultimately maintains brain perfusion and pilot consciousness. …

"Effective AGSM can increase your *g* tolerance by approximately three *g*'s.

"The AGSM has two components:

"Breathing: Rapid (<1 sec) exhalation/inspiration cycles every 3 seconds. This maintains oxygen content and decreases carbon dioxide in blood, while also relieving increased pressure of chest, and allowing the heart to refill with de-oxygenated blood from the rest of the body.

"Isometric contraction: Flexion of skeletal muscles of legs and abdomen. When muscles contract, the small blood vessels in them constrict, making them smaller with less room for blood. This step increases pressure in chest and displaces blood away from these contracted muscles into the upper body and brain."

I was lucky. If you are going to experience G-LOC, it is probably as good as it gets. I ended up in a climb safely and had enough time to regain my wits and regain control of the plane. Not everyone is as fortunate.

At the time of this writing, we are in lockdown and not flying in the United Kingdom. After one of the wettest winters for a while, there will be a lot of pilots who will be rusty and eager to get back to where they were at the end of last season. Be careful; take the *g* that we expose ourselves to seriously, and take the messages from your body seriously, too. ***IAC+***

DAVE FARLEY is from Tring, England. He has been a member of the British Intermediate Team competing at the World Intermediate Aerobatic Championship 2019 in Breclav, Czech Republic. He began flying in gliders in early 1990 and converted to power around 1993.

2020 IAC CONTEST SEASON CALENDAR

DATES	HOST CHAPTER	NAME	REGION	LOCATION	AIRPORT
July 25, 2020	134	Yooper Looper	Mid-America	Michigan	KSAW
Aug. 7, 2020	77	Corvallis Corkscrew – IAC West Open	Northwest	Oregon	KCVO
Aug. 8, 2020	78	Doug Yost Challenge	Mid-America	Iowa	KSPW
Aug. 20 2020	89	Snowbird Classic – IAC East Open Championship	Southeast	Florida	X60
Aug. 29 2020	11	James K Polk Open Invitational	Northeast	Virginia	KHWY
Aug. 29, 2020	12	Ben Lowell Confrontation	South-Central	Colorado	KSTK
Sep. 5, 2020	26	Foxy Figures	Southwest	California	KWJF
Sep. 5, 2020	27	Tennessee Music Hwy Aerobatic Jam	Southeast	Tennessee	KMKL

PHOTOGRAPHY BY **CARMELO TURDO**

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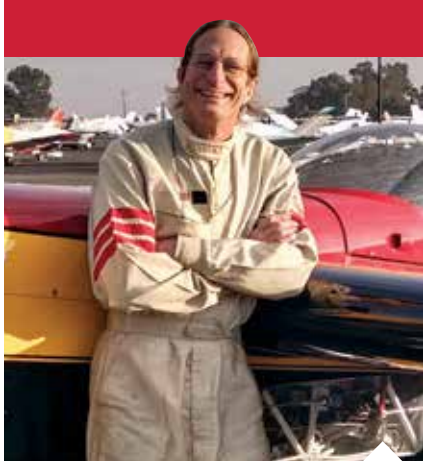

One Good Decision Can Get You Out of a Bad Situation

BY TOM MYERS, IAC 16830

THERE USED TO BE A BIG NATIONAL CONTEST every year called the IAC Championships. It was held just after EAA AirVenture Oshkosh, right down the road from Oshkosh in Fond du Lac, Wisconsin. I would camp out in a tent at the Fond du Lac airport.

One year, I was woken up early in the morning with an impassioned request. Someone was needed to fly the Unlimited low lines. Everyone was waiting, and I was the only free person the judge line volunteers knew. Not wanting to disappoint, I dragged myself out of my tent and hustled over to the hangar. The day before, I did not get a chance to get fuel after my last flight. But I had flown only one sequence, so I figured I had plenty of fuel for low lines. I gave the airplane a quick once-over, hopped in, strapped in, and got aviating.

The low lines were flown without incident. Then the chief judge got on the radio and requested that I fly high lines. High lines? That's a thing? Okay. Not wanting to disappoint, I climbed up and flew high lines — still the first, last, and only time for me. I descended out of the box into the traffic pattern. As I turned 1 mile final, the engine quit. No sputter. No cough. Just noise one moment and silence the next. Uh-oh.

The 1997 IAC Championships at Fond du Lac, Wisconsin.

I DESCENDED OUT OF THE BOX INTO THE TRAFFIC PATTERN. AS I TURNED 1 MILE FINAL, THE ENGINE QUIT. NO SPUTTER. NO COUGH. JUST NOISE ONE MOMENT AND SILENCE THE NEXT. UH-OH.

My airplane at the time, a Stephens Akro, had two fuel tanks, a 10-gallon flop-tube-equipped aerobatic tank and a 30-gallon cross-country tank. I was advised to keep the cross-country tank empty during aerobatics, as the sloshing fuel over time would accelerate wear on the tank. However, keeping one tank empty seemed like a bad idea to me. If anything ever happened to the other fuel supply, I would have a serious problem on my hands. I made the decision to always have at least a few gallons in the cross-country tank, even if it meant that tank maintenance was required more often.

Thus, when the engine quit that morning at Fond du Lac, I had a viable option available. I switched the fuel selector valve from the aerobatic tank to the cross-country tank, and a few long seconds later, the engine came back to life. I landed without incident.

After landing, fueling, and hangaring, I went off and hid to do some serious introspection. I put myself and my actions under a microscope.

From the very start, I had written off that flight as being trivial. When most of your flying is of the aerobatic variety, it is all too easy to develop an attitude of treating intentionally straight and level flights as trivial. There is no such thing as a trivial flight. I now not only make an effort to put the level of care necessary for an aerobatic flight into a non-aerobatic flight, but I also watch myself to ensure I do not develop any bad tendencies over time by letting that level of care degrade.

Tom Myers joins other IAC judges to entertain the audience with their scores during the 1994 Fond du Lac Cup. A trophy was presented at this invitational competition held during the Opening Ceremonies by the Fond du Lac Convention and Visitors Bureau.

I was not mentally prepared to fly. I was making bad decisions. I should have taken the time to be fully awake and gotten my head wrapped around flying.

I did not do a proper preflight inspection. If I had done a proper preflight, both my airplane and I would have actually been ready for the flight. If there is something wrong with your airplane, you are going to find out about it. The only thing to be determined is whether you are going to find out about it in the air or on the ground. I prefer finding out about it on the ground.

I did not do a preflight briefing. I should have known what was expected of me before I strapped in so I could ensure that my airplane and I were properly prepared for the requirements of the flight.

I was in a rush. Rushing and airplanes do not go well together. From what I have seen over the years, the combination all too often ends poorly. If you find yourself in a rush with an airplane, stopping and reassessing the situation is probably a good idea.

I was too worried about not wanting to disappoint anyone. I was too focused on the little picture, not the big picture. If I had gone in, the repercussions and disappointments would have been far, far greater. Now, if I am pressured to rush, cut corners, or make decisions that are not a good idea, I am not shy about pushing back and explaining why.

Fly safe. ***IAC***


Bud Judy

Chasing That One Flawless Flight

Bud Judy

BY ZINNIA KILKENNY, IAC 437244

HAVE YOU EVER SPOKEN WITH SOMEONE and from within you spontaneously smiled? That's the feeling you get with Bud. In a mere matter of seconds of conversing, one could extrapolate he's forthright, not self-aggrandizing, and without false modesty — in the truest sense, a genteel man.

An IAC member since its inception in 1970, he'd become a three-time U.S. Nationals aerobatic champion by age 72, twice in the Intermediate category and once in the Sportsman category.

Neither concerned with daredevilry nor motivated by trophies (though having the mettle for it), he thought the heart of the matter was to challenge himself personally in competitive aerobatics in pursuit of "flying that one flawless flight," and "the chance to feel the fun of flying again."

His friend and fellow aerobatic enthusiast, A.J. Hefel, reminisces, "Bud is the person you'd want to meet at your first contest; his upbeat personality made the sport fun, even though I didn't finish well." While not the finish vied for, Bud's zealous spirit and selfless mentoring made competing fun for those who surrounded him, priming them to come back for more.

It is qualities like these, represented in members like Bud over the club's 50 years of history, that give the International Aerobatic Club its priceless patina.

While rebuilding a Luscombe and reading *Roll Around a Point* by Duane Cole, Bud's foray into aerobatics would begin. Shortly after, several clip wing Taylorcrafts followed, and what began as a Stephens Akro soon metamorphosed over the course of two rebuilds into a Judy Monosport creation.

Not one to let grass grow under his feet, Bud won his first U.S. Nationals championship in 1972 in the Intermediate category at the age of 38. His second U.S. Nationals championship title would come in 2002 in the Sportsman category at the age of 68, and four years after that he would clinch his third U.S. Nationals title in the Intermediate category in 2006 at the age of 72. In total, he flew Sportsman and Intermediate for 34 years between 1972 and 2006. His goal was ultimately to take the Judy Monosport to Unlimited, until determining, "When it was over, it was over," he said. "It was an age thing; the Unknowns, [I] couldn't react quick enough. I felt it coming."

I posed the question to Bud, "Did you consider flying a lower category?"

"It's not my nature," Bud acknowledged contemplatively. "I'm too competitive. I'm not a spectator."

I asked how do contests differ today from those of the past. It was an obvious question, yet worthy of comparison.

"The camaraderie is different today," he said. "Then, we all helped each other; we worked on our planes together. We built our own planes, then flew them. [We] flew to contests as a group.

"It didn't matter what level you were; we'd coach each other all week and laughed at each other. We were as honest as you could possibly be. If someone you coached won, it was like winning yourself. It brought a closeness to the relationship, and then we'd have a drink and go home.

"[Today] everyone shows up in nice equipment and pays vast sums of money to coaches. I'm not griping, just laying it out as I saw it back then."

Bud's volunteer contributions include serving on the Aerobatic Club of America and IAC board of directors simultaneously. He also served as a regional and national contest director and as a national judge, and he volunteered to get the necessary "grunt work" involved with contest minutiae.

When I inquired about volunteering, Bud said, "We'd start at the beginning and gained experience in the sport and worked our way up. We grew up with it.

"No one sat around waiting to fly. Everyone was involved. Wives were involved. Back then, the score keeping wasn't easy; scoring was difficult for the scorekeepers. They did it from a chart. We worked hard, played hard. It's what gave the camaraderie."

BUD JUDY

Located: Texas

IAC: 339

Occupation: Retired Air Force, Air National Guard, airline captain

Former IAC Vice President Bud Judy with his wife Bonnie in 1979.

As for improving competitive aerobatics' popularity, I asked if he had any seasoned advice on how to get more people involved.

"The cost of equipment is a big drawback and has to come down," Bud said. "We enjoyed the satisfaction of building our planes to where it was relatively affordable enough and taking them to competition.

"We were relatively young back then ... how can we get young people involved? I don't know the answer to that. What do you do when the cost of equipment has to come down?"

Presently, Bud continues to dip into aviation's fountain of youth. He's building another clipped wing Taylorcraft like his original airplane. He continues to fly, is excited about planes at age 86, and enjoys the comradeship of his aviation cohorts.

Bud expressed heartfelt appreciation for "close ones and friends who helped me with the airplanes and contests. Without them, none of it could have been done."

It has been an honor looking at the last 50 years through the prism of Bud Judy's interview. Here's to the next 50, tally-ho. *IAC*

The Judy Monosport. Bud finished the project in 1988. In this plane he was recipient of the retired Lycoming 180-hp Trophy four times between 1991-2011.

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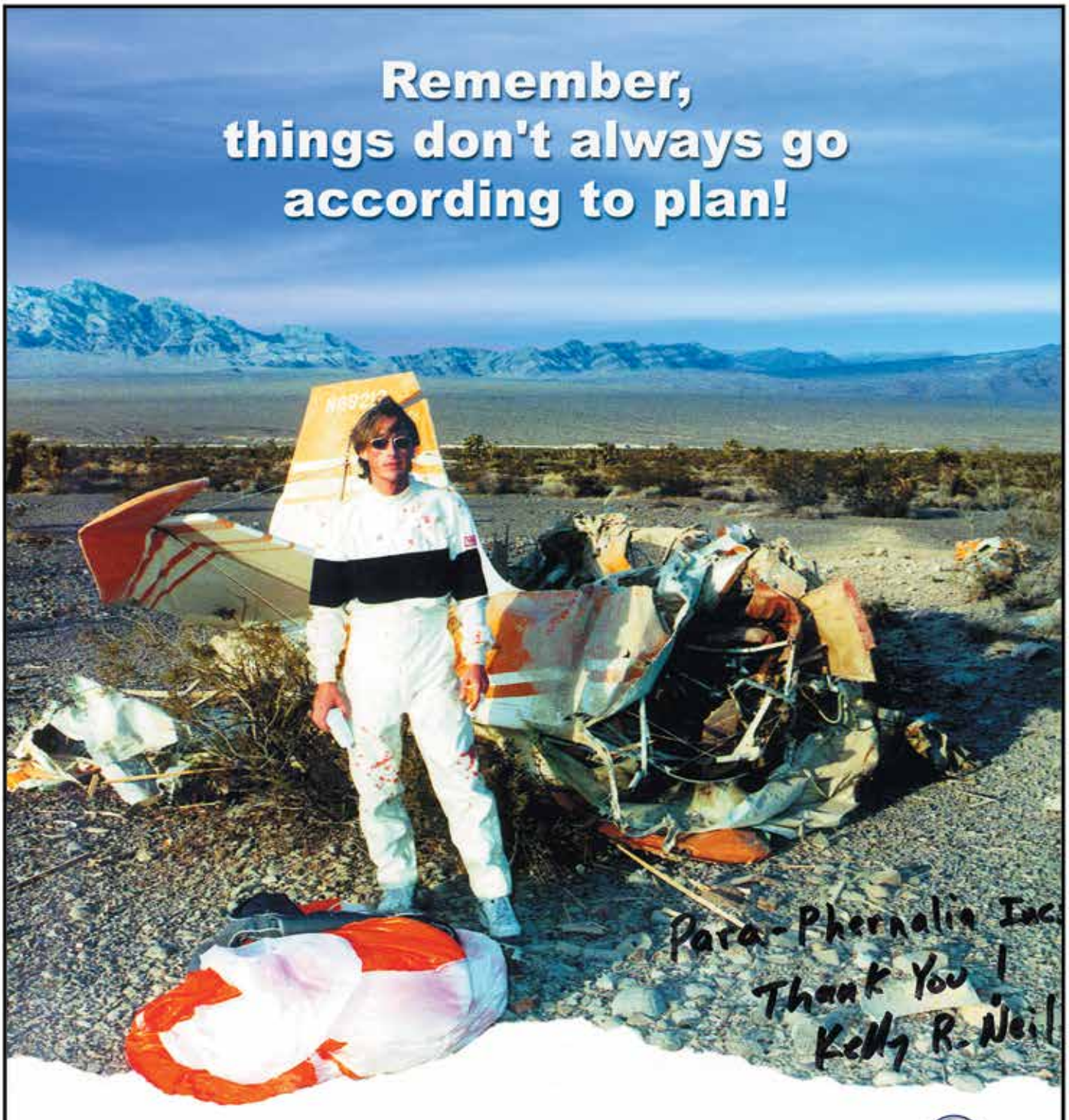

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