



SPORT

# AEROBATICS

OFFICIAL MAGAZINE OF THE INTERNATIONAL AEROBATIC CLUB

SEPTEMBER/OCTOBER 2021

## DIMENSIONS

OF AEROBATICS

► THE FINAL PITTS  
FINDS A HOME, PG. 10

► NATIONAL AEROBATICS  
DAY SUCCESS!, PG. 20

► BACK INTO AEROBATICS  
AFTER 25 YEARS, PG. 26



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### COVER

#### ON THE COVER:

Jamie Pittman in the Pitts Model 12 flies in formation with Dagmar Kress in her Extra NG and Michael Hoy in his Monosport 360 over the lakes surrounding Oshkosh, Wisconsin. Photo by Jim Koepnick

#### ABOVE:

N80003 is flown to the podium in Primary by Carson Hawkins in first place and Dan Ferrin in second place. PJ Tom also flew the spunky Pitts S-2A for first place in Sportsman at the 2021 Mark Fullerton Memorial Bear Creek Bash. Photo by Leigh Hubner

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# Midterm Recap

**IAC growth, National Aerobatics Day and thank you to the U.S. Advanced Team**

BY JIM BOURKE, IAC 434151

**I'M ONE YEAR INTO MY TERM** as IAC president! It has been quite a year for a bunch of reasons — most obviously because the coronavirus pandemic is such a horrible pain for me, you, and everyone else. Our treasurer, Jordan Ashley, says we've done a solid job of keeping things on track financially. Along with all of you, I believe and hope that the pandemic restrictions are a thing of the past — but, again, like all of you, we've proven we can adapt to challenges!

In fact, we've managed to gain membership in spite of the pandemic, recently surpassing 4,000 members. The last time we had more than 4,000 members without a "six-month free" program to boost our numbers was in 2008!

I have to thank our decidedly deferential executive director, Steve Kurtzahn, and our deliriously delightful editor, Lorrie Penner, for this success. Steve has made a personal effort to contact and retain members even though he already has plenty on his plate. Lorrie made the most of her shift in responsibilities as we transitioned our media efforts from 12 issues of *Sport Aerobatics* annually to six printed issues plus a lot of online content. Imagine all the good we can do for the sport and our members if we continue to grow!

I'm typing this a few days before the start of AirVenture. I'll be using AirVenture week to further the IAC's goals by participating in as many interviews and talks as

possible. We're projecting that this AirVenture will be the biggest ever by a wide margin. (Update — EAA reported over 608,000 in attendance this year.) This gives us an amazing opportunity to reach many new people with our message about the joy of precision flying.

I was recently interviewed by Mark Pollard and Jeff Petrocelli for a podcast with an objectively offensive title. Sometimes they call their podcast *Fly Cool Stuff*, which is a variant that meets our editorial standards. We had a great time talking about airplanes and the IAC. These two are as entertaining as they are sharp. While there is a bit of toilet humor involved, the love they have for this sport shows in the hard work they do. With each episode they demonstrate how to build energy and excitement for our sport while having an absolute blast doing it. Their podcast is worth checking out.

I will take a moment now to get one last word in about National Aerobatics Day (NAD). Let me say that nothing in the past year has been as satisfying as watching all the social media posts and text messages come in during that day. This guerilla marketing initiative was fun, inexpensive, and effective. We learned a lot about what worked and what did not work this year, so expect a few changes for next time, but overall I think we have something special on our hands. I was especially heartened to see so many people from outside the United States join in. Perhaps "International Aerobatics Day" is a better name. I hope you formed new, lasting friendships on NAD.

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



Speaking of events outside the United States, I was extremely disappointed that Team USA felt compelled to withdraw from the World Advanced Aerobic Championships (WAAC). There was clearly no other choice left to us, so the decision was the right one, but I'm very discouraged by the chain of events that led up to our team being unable to participate for the first time in history. The many issues surrounding the event simply did not get settled quickly enough to allow for our participation. We hope we can work things out with our international partners, CIVA and the FAI. The next CIVA plenary happens to be in the United States. Our CIVA representative, Mike Gallaway, and NAA President Greg Principato will lead the effort to institute reforms that will protect our interests in future world championships.

Let me take a moment now to thank the people who put so much effort into preparing for two years to attend this WAAC. They spent a great deal of time and money to bring glory to their homeland, and I offer them what little I can by listing them here by name. Thanks to team manager Mike Heuer, team coach Rob Holland, team captain Jeff Petrocelli, team assistants Alice Johnson and Steve Johnson, and team members Jerry Riedinger, Marty Flournoy, Jeff Petrocelli, Adam Messenheimer, Alain Aguayo, Don Hartmann, Matt Dunfee, and John Wacker.

I now begin the second year of my first term! I look forward to a successful and highly popular IAC National Aerobic Championships event headed by the able and affable Doug Bartlett. See you there! **IAC**



# Everything Old Is New Again, But Is It?

BY LORRIE PENNER, IAC 431036

**MY FAVORITE COWBOY BOOTS' SOLES** wore out three times, and each time I faithfully brought them to my local shoe repair shop. Each time, the boots were like new again, and I had to break them in. This went on for about 15 years until I finally outgrew my hometown style statement and moved to a city where no one wore cowboy boots. By the way, the boots are perfectly fine, and I may bring them out again now that I live in a town that has a horse-drawn carriage parade at Christmas.

In Allen Silver's column titled "A Reason to Replace Old Parachutes," we see why cowboy boots are not like parachutes. First, I am not counting on my boots to save my life, and second, a parachute is not as simple as a pair of boots. I won't spoil all the details for you. The article is a worthwhile read to find out why most parachute riggers won't service your chute after 20 years.

Been out of aerobatics for a while? If you came back, could it be as exciting as it was when you first started 25 years ago? Jeff Garibotti indicates in a feature article that it could be better than new — it could be different and more exciting. When he left aerobatics for the race car world, most of the airplanes he was flying had metal props. Now he's flying with a composite prop and learning to fly gyroscopic maneuvers that he had not been able to do in the past.

**"IT IS EXCITING THAT THE FINAL PITTS DESIGN HAS COME OUT OF THE WOODWORK AND HOPEFULLY WILL SOON BEGIN SHOWING ITS ROTUND FACE AT FLY-INS AROUND THE COUNTRY."**

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

What about an aircraft project that never got off the ground? In Budd Davisson's article "The Final Pitts Finds a Home," he leads us through the history of the Model 14 and its journey to come out of hiding. "Remember: It was the last airplane that Curtis Pitts had designed, and he had personally helped build it. ... It has to be remembered that ... it has never been flown, which means there are numerous unknowns," Budd said in the article. "It is exciting that the final Pitts design has come out of the woodwork and hopefully will soon begin showing its rotund face at fly-ins around the country." It remains to be seen if the 2004 final design can be "new" again.

One thing that I am confident about is that the U.S. National Aerobatic Championships can be not only old but also new at the same time. A rich tradition of crowning our national champions and picking the next world team continues as it has for over 50 years. Although some of the faces are old (mature), there are always many new faces to inspire us and keep the tradition alive and well. We are eagerly expecting 100 pilots! I hope to see you in Salina, Kansas, September 19-24!

Check out all the details on the Nationals at [IAC.org/Nationals](http://IAC.org/Nationals). **IAC**

## ► TOP STORY

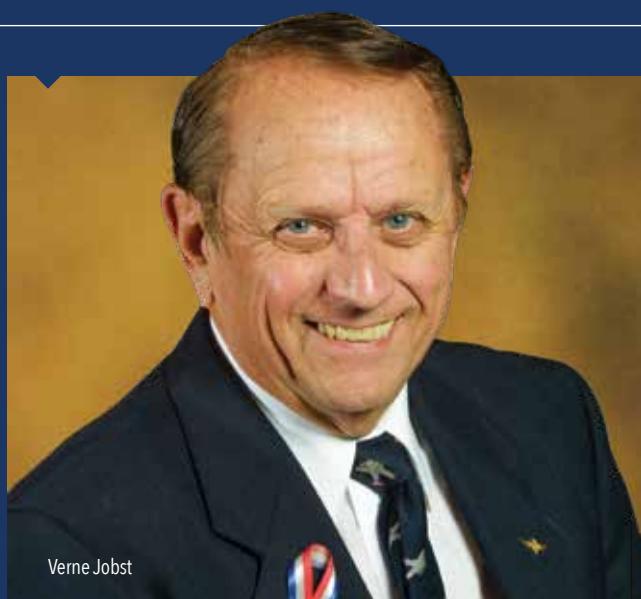
# IAC Fall Board Meeting and International Aerobatics Hall of Fame Induction

THE IAC BOARD OF DIRECTORS will once again return in person to Oshkosh, Wisconsin, for the IAC annual fall board meeting. A full day meeting will be held on Friday, November 12, from 8 a.m. to 5 p.m. with a half day on Saturday, November 13, from 8 a.m. to noon. The location for the meeting will be in the EAA Aviation Museum, and the conference room will be announced on the IAC website (IAC.org).

The EAA Sport Aviation Halls of Fame were established to honor the outstanding achievements of men and women in aviation who share the spirit of EAA and its community. Those inducted into the halls of fame are selected by their peers for the myriad contributions made to their respective areas of aviation.

The 2020 International Aerobatics Hall of Fame inductee is Verne Jobst. He will be joined by 2021 International Aerobatics Hall of Fame inductee Kirby Chambliss. The IAC board of directors, IAC members, family, and friends will gather to recognize the inductees' significant contribution to aerobatics.

The induction ceremony will be held at the EAA Aviation Museum, 3000 Poberezny Rd., Oshkosh, Wisconsin, on Thursday, November 11, 2021, from 6 to 9 p.m. **IAC**





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# Prop Thrum

BY TOM MYERS, IAC 16830



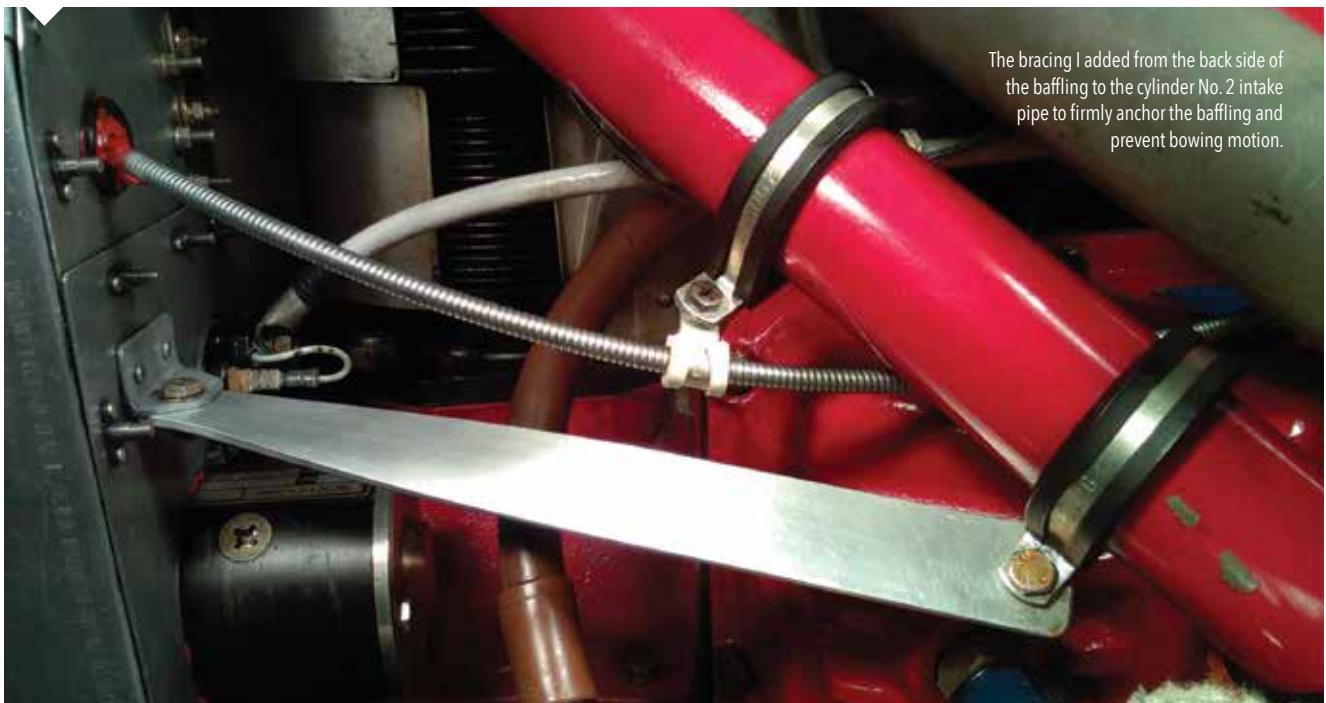
**WHEN I FIRST PURCHASED** my current airplane, the prop had an “interesting” behavior. The audible pitch, as in musical note, of the prop would thrum with about a two-second period. It was a sort of “wah-wah” sound. While not dangerous, I could definitely live without it. To make matters even trickier, the prop would not always do it. The behavior would seemingly appear and disappear randomly.

Intuitively, I felt the thrumming had to be rpm-based, even though the rpm modulation was too low in amplitude and too fast in frequency to be definitively seen on the tachometer. Put another way, the tach was too slow responding to display the behavior.

The previous owner of the airplane had advised me of the behavior, so it did not come as a surprise when it started appearing. The previous owner had tried overhauling the prop, dynamically balancing the prop, overhauling the prop governor, and replacing the prop governor, all to no avail. An “interesting” problem indeed.

A controllable-pitch propeller and a propeller governor form a feedback control loop. A desired rpm is commanded to the governor. The governor measures rpm error, which is the difference between the actual rpm and the commanded rpm, and adjusts the actual rpm accordingly in order to zero the rpm error. If the actual rpm is too high, the actual rpm is reduced. If the actual rpm is too low, the actual rpm is increased.

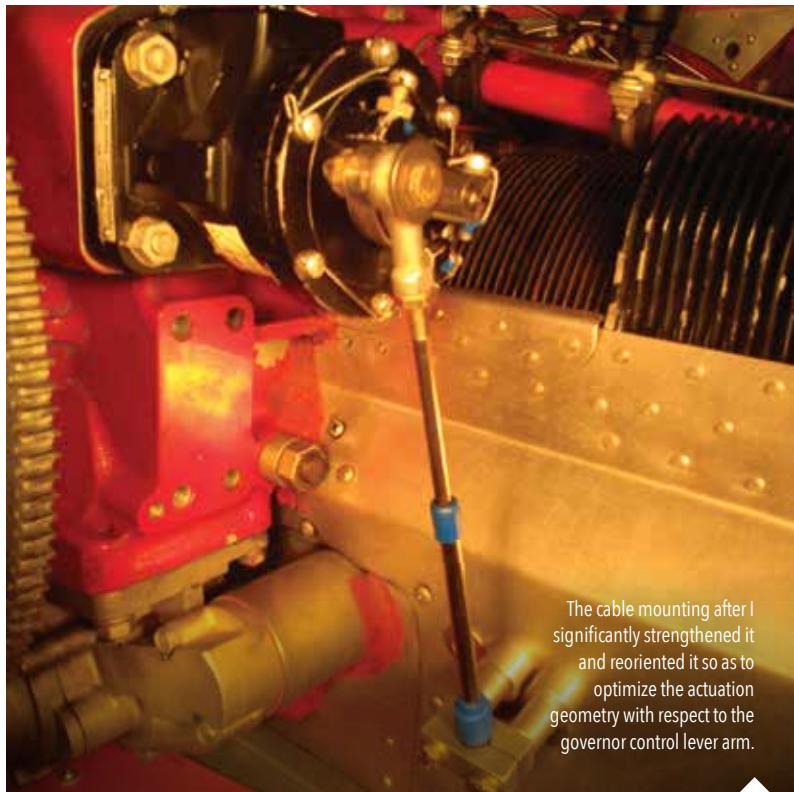
This process is called negative feedback. If what is to be controlled is too high, it is lowered. If what is to be controlled is too low, it is raised. This works just fine as long as the feedback amplitude is not too big and the feedback delay is not too long. In other words, the feedback loop is stable as long as the controller doesn’t overcorrect or take so long to correct that it ends up “chasing its tail.”



If the feedback amplitude is too big and or the feedback delay is too long, the result can be oscillation. In the case of a propeller and governor, the result can be thrumming. Control loop theory and math are very well codified. If you know the characteristics of the control loop components, the system stability or lack thereof can be predicted.

The prop and governor have been deployed on aerobatic planes for a many years, and their designs have stood the test of time. I had every confidence that after all the work that had been previously put into the prop and governor, they were performing to their specifications. Therefore, my conclusion up to this point was that the control loop itself was unlikely to be the source of the thrumming, and the cause was probably lurking elsewhere.

Another way to get a control loop to oscillate is to inject an external oscillating influence into the control loop. In this case, the injected signal represents an undesired command. Locating the source of this unwanted signal and the path it was taking was the strategy I used in order to solve the problem.



The cable mounting after I significantly strengthened it and reoriented it so as to optimize the actuation geometry with respect to the governor control lever arm.

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## FIND TECH TIPS WITH THESE NEW INDEXES

Have you ever looked for a technical tip and just couldn't find it? If you are looking for a tech tip related to the Decathlon, your search has been made easier by Bruce Mamont, IAC 432407. He has created an index that will help you locate Decathlon articles from the *Technical Tips Manual* volumes 1 through 4 and a few articles from *Sport Aerobatics* magazine. There are over 50 articles for your reading enjoyment!

His next project will be pulling all the articles together in one PDF, "The Technical Tip Guide to the Decathlon." This Decathlon tech tips PDF will be posted on the same webpage as the *Technical Tips Manual* volumes where the new index currently lives: [IAC.org/Technical-Tips](http://IAC.org/Technical-Tips). Still in the planning stages is a tech tips index for the Pitts Special.

Bruce's previous project, which is being enjoyed by many, is the *Sport Aerobatics Article Index*. The index catalogs over 1,000 articles that appeared as features or in columns from January 2006 to May 2020. So, if you are looking for a title or something written by your favorite author, check out the article index (in Excel spreadsheet format) at [IAC.org/Magazines](http://IAC.org/Magazines). The index includes hyperlinks to the month and year of the *Sports Aerobatics* issue where the articles appear.

As shown in the accompanying photos, the prop governor is mounted to the left front side of the engine crankcase, just behind the prop. The rpm command is transmitted from the cockpit to the prop governor via a push-pull cable. The cable rotates a lever arm on the end of the governor. The rotation of the lever arm sets the force on a spring inside of the governor. When the centrifugal force created by rotating weights inside of the governor balances the spring force created by the lever arm, the prop is rotating at the commanded rpm.

Note in the photos that the governor control cable end is anchored to the left front engine baffling. Upon taking a really close look at the baffling for the first time, I made two significant observations. The baffling was not restrained from bowing inward due to ram air pressure, and the control cable end mounting provided a less than ideal geometry for rotating the governor command lever arm.

What was happening was that under certain aerodynamic conditions, the baffling would bow inward due to ram air pressure, and would pull the governor control cable end away from the governor in the process. The movement of the control cable end away from the governor would rotate the governor control lever arm toward a lower rpm command. At the lower rpm command, the airplane would slow down, and thus lessen the ram air pressure on the baffling. The baffling would bow back outward and raise the rpm command back up. This oscillatory process would continue on and on and would perceptually manifest itself as thrumming.

The photos show the governor control cable mounting after I significantly strengthened it and reoriented it so as to optimize the actuation geometry with respect to the governor control lever arm. The photos also show the bracing I added from the back side of the baffling to the cylinder No. 2 intake pipe to firmly anchor the baffling and prevent bowing motion.

The end result was no more uncommanded motion of the governor control cable end, no more thrumming, and a baffling problem solved.

Fly safe. **IAC**



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Pete Diaz of Queen Creek, Arizona, may be the world's most devout Pitts aficionado, and his Pitts Flying Museum shows it.



The Final  
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Finds a Home

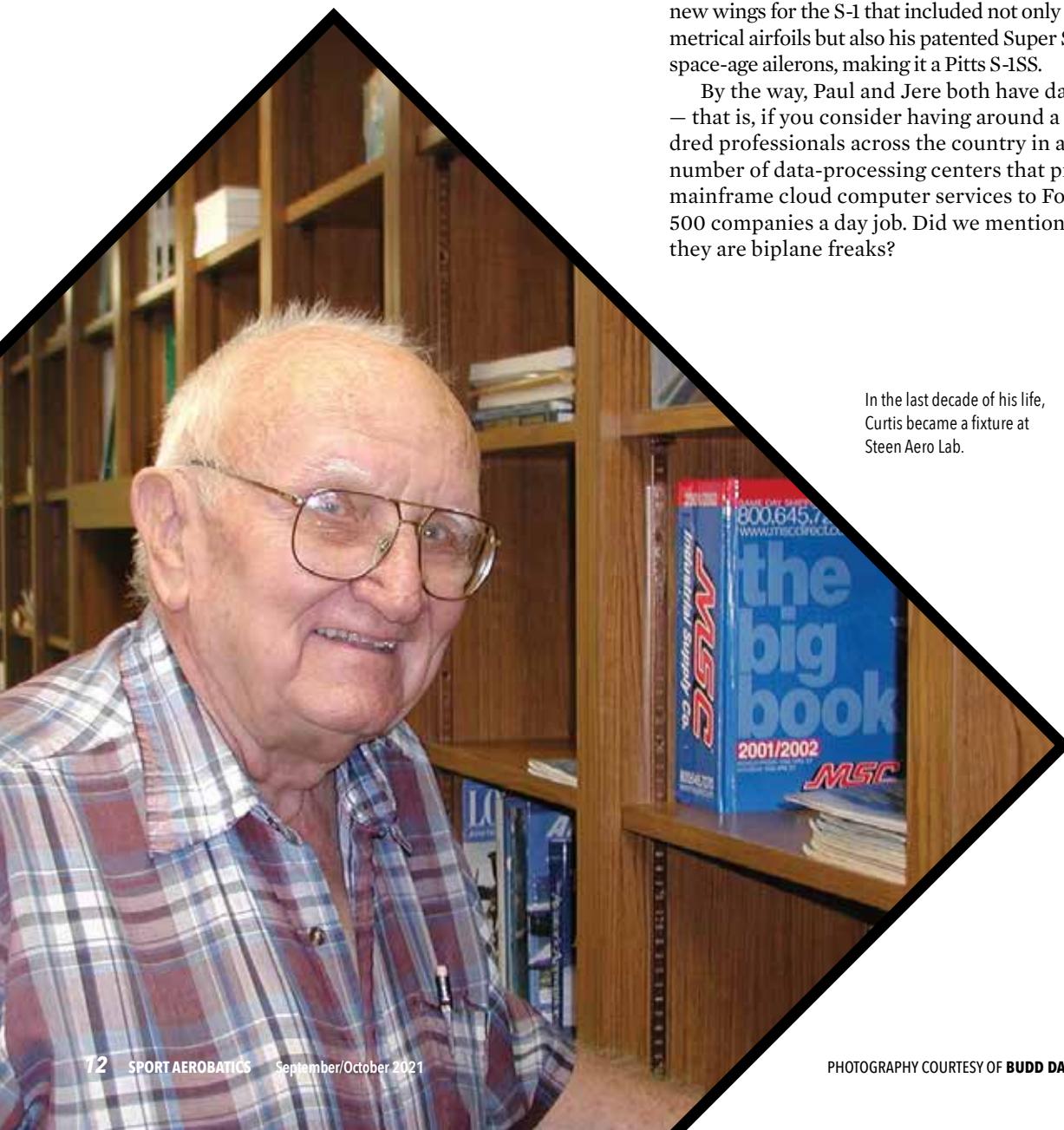


**THE MODEL 14 COMES OUT OF HIDING**

**BUDD DAVISSON, IAC 435420**



# The Final *Pitts* Finds a Home

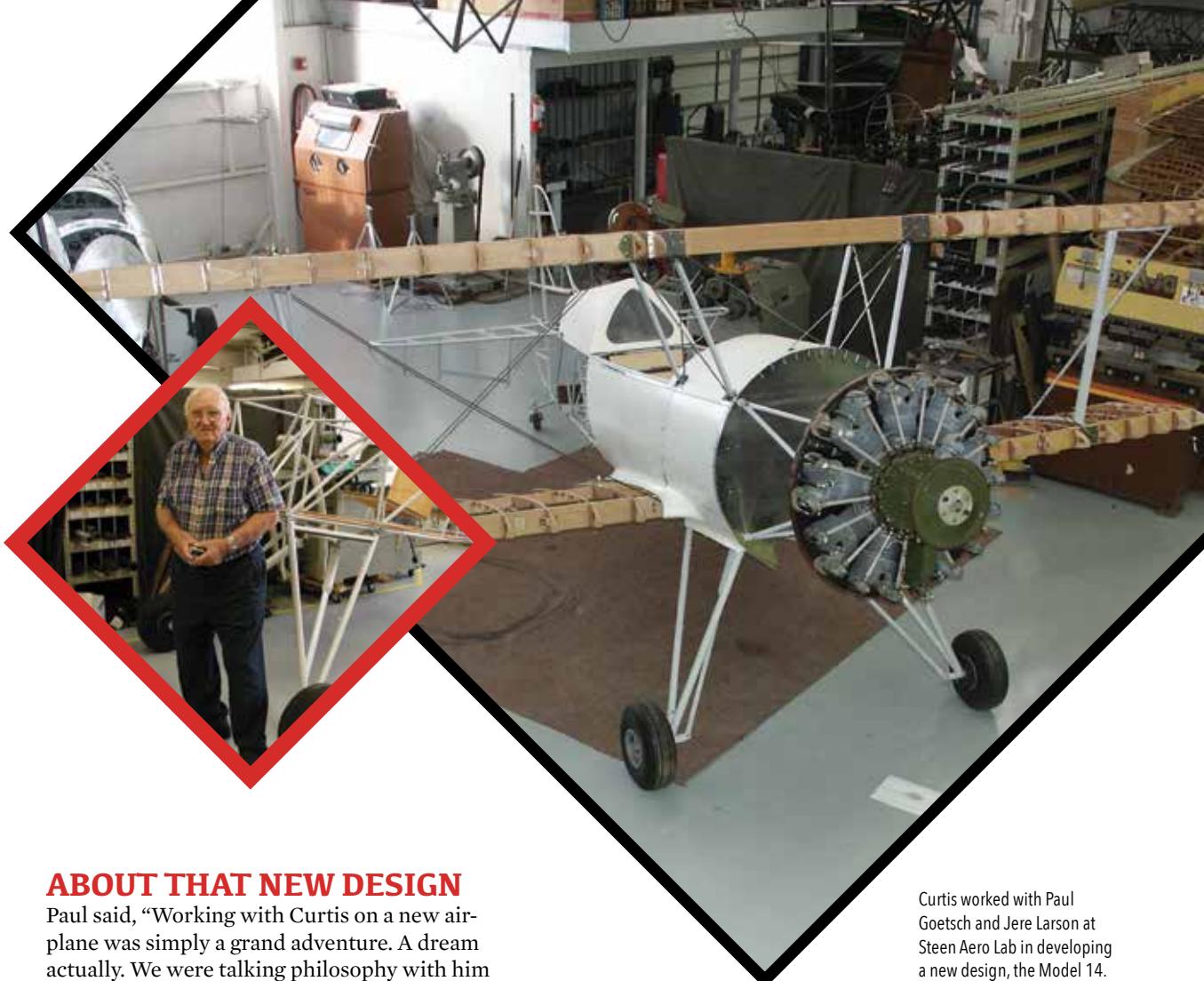


**"I USED TO READ** about Curtis in *Air Progress* when I was 10 and 11. I never dreamed that I'd ever meet him, or that in the last decade of his life, he would become one of my dearest friends. Paul and I were asked to be pallbearers; a sad but honored day."

The speaker is Jere Larson, and the Paul he was referring to is Paul Goetsch, his business partner and best friend of some 40 years. The two of them are total biplane freaks, which led them to purchase Steen Aero Lab, the home of Lamar Steen's Skybolt in 2000. That purchase also included the rights and plans for the svelte Knight Twister by legendary genius Vernon Payne, the Pitts S-1C, and the Pitts S-1SS. The SS was the result of Curtis designing new wings for the S-1 that included not only symmetrical airfoils but also his patented Super Stinker space-age ailerons, making it a Pitts S-1SS.

By the way, Paul and Jere both have day jobs — that is, if you consider having around a hundred professionals across the country in a number of data-processing centers that provide mainframe cloud computer services to Fortune 500 companies a day job. Did we mention that they are biplane freaks?

In the last decade of his life,  
Curtis became a fixture at  
Steen Aero Lab.



## ABOUT THAT NEW DESIGN

Paul said, "Working with Curtis on a new airplane was simply a grand adventure. A dream actually. We were talking philosophy with him one day, and Jere asked deliberately, 'We have a small favor to ask of you,' and hesitated ... 'We would like you to do another airplane before you retire.'"

Curtis was silent for a moment and asked quietly, "What kind of airplane?"

"We responded, 'An aerobatic biplane, of course ...!' Paul said.

Curtis paused, a pensive look on his face. "That's a lot of work," he said evenly.

"Still, we could sense a tiny twinkle in his eyes," Paul said. "Over the next few weeks, he would randomly comment, 'Ya know, I was thinkin' about this new airplane and ...' Many of the 'new' ideas had been in his head for some time. Incrementally, his vision for the new airplane gained focus."

Curtis said, "It would have a short wingspan with a straight upper wing." He had always loved the straight wing of Sampson.

"One of us asked, 'How about snap performance with a straight upper?'" Paul said.

Curtis replied, "With short wings, it will snap smartly."

There was no debate about the powerplant — the Vedeneyev M14P.

Curtis worked with Paul Goetsch and Jere Larson at Steen Aero Lab in developing a new design, the Model 14.

"I've watched that engine for 40 years," Curtis drawled. "Next time you boys visit, I'll have some sketches to show you."

Paul remembered, "Mr. Pitts was wrapping up his design for the M14P radial-powered Skybolt — the Skybolt R, so we were scheduled to travel to Homestead [Florida] in a week or so to discuss some details.

"We were expecting sketches of the new airplane, but what we found on his drafting table were rather formal three-views," Paul said. "The lines were classic, those of a simply beautiful woman ... just elegant. The elemental structural design was in place. The brace wire reactive loads are all in a single plane — along the rear spar on top and the front spar on the bottom. Simply brilliant in-line simplicity."

"Curtis has used the same title block on his drawings for decades," he continued. "In each title block, there was a preprinted box labeled 'Model.' In this one, he had written in '14.' The Model 14 had been born!"



The Final  
*Pitts*  
Finds a Home

# S P E C S

<b>WINGSPAN (UPPER)</b>	21.5 feet
<b>WINGSPAN (LOWER)</b>	20.5 feet
<b>FUEL CAPACITY</b>	35 (+18 optional) gallons
<b>AIRFOILS</b>	NACA 23012 (both wings)
<b>WING AREA</b>	157 square feet
<b>EMPTY WEIGHT</b>	1,500 pounds
<b>MAX ACRO WEIGHT</b>	2,000 pounds
<b>GROSS WEIGHT</b>	2,250 pounds
<b>ULTIMATE LOAD FACTOR</b>	+9/-6g
<b>WING LOADING AT GROSS</b>	14.33 pounds/square foot
<b>POWERPLANT</b>	Vedeneyev M14P
<b>HORSEPOWER</b>	360/400
<b>POWER LOADING AT GROSS</b>	6.25 pounds/hp (360 hp)
<b>POWER LOADING AT ACRO WEIGHT</b>	4.68 pounds/hp (400 hp)
<b>STALL SPEED AT GROSS</b>	57-62 mph, estimated
<b>CRUISE SPEED AT 75 PERCENT</b>	180 mph, estimated
<b>NEVER-EXCEED SPEED</b>	235 mph
<b>RATE OF CLIMB (INITIAL)</b>	3,500 fpm, estimated



The straight wings of the Model 14 were intended to be easier to build, with the top one having a center section rather than being a single piece.

## **GETTING TO WORK — THEN A HALT**

In very short order, Paul, Jere, and their building crew found themselves having to work fast to keep up with Curtis, who began doing the detail design and the required production drawings. By the summer of 2004, the airplane was on its gear, the engine hung, and although none of the systems had been installed, the basic airframe was closing in on being ready for cover. That was the state it was in when displayed in the Steen Aero Lab tent at Lakeland, Florida, and then EAA AirVenture Oshkosh in 2004. That, unfortunately, would be the last time the airplane would be seen in public.

Less than a year later, on June 10, 2005, Curtis Pitts died at the age of 89 at his home in Homestead, Florida, due to complications from a heart valve replacement. Aviation had lost one of its most productive and beloved members. His effect on thousands of aviators will be felt for generations.

Jere lamented, "My God, but that dumped the wind from our sails."

Shortly thereafter, Paul and Jere's other businesses began to demand more of their attention. Ultimately, they sold their aerospace manufacturing sector of some "70 nerds with very beat-up hands" in July 2012.

So, combined with Curtis being gone, the priority just wasn't there. Progress on the Model 14 came to a halt. It stayed that way, sitting on the satin epoxy hangar floor at Steen Aero as a frequent conversation piece.

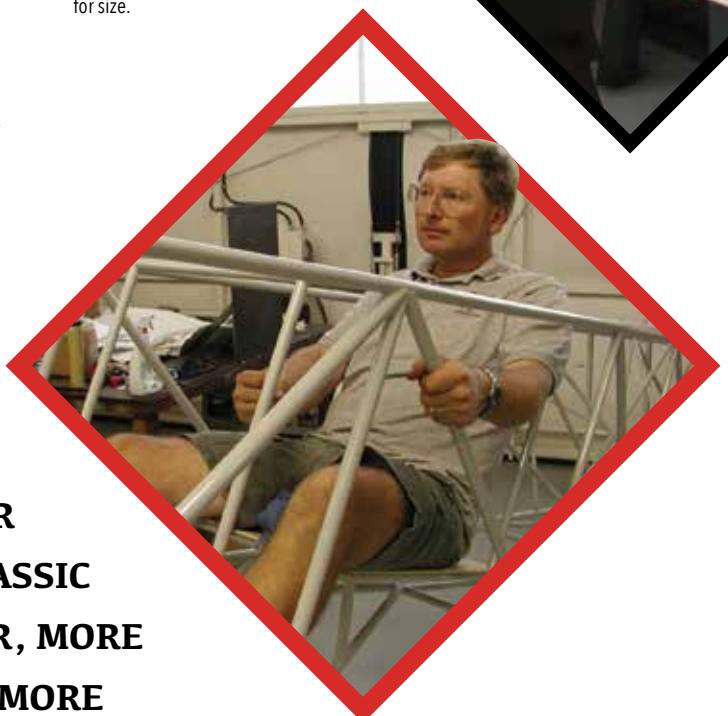
Sixteen years later, in early 2020, a new character entered their lives: Peter Diaz.

**IN THE MOLD OF THE EARLIER  
SAMPSON, ITS LINES ARE CLASSIC  
1930S BIPLANE BUT SMALLER, MORE  
PERSONAL, AND OBVIOUSLY MORE  
AFFORDABLE WITH PROBABLY  
BETTER PERFORMANCE.**



**TOP:** Curtis at work on the Model 14 at Steen Aero Lab.

**BOTTOM:** Paul Goetsch tries on the Model 14 fuselage for size.





The Final  
*Pitts*  
Finds a Home

## ENTER PITTS FLYING MUSEUM — PFM

Pete more than shared the Steen partners' love for Pitts Specials. A manufacturing entrepreneur who lives on Pegasus Airpark in Queen Creek, Arizona, a southeastern suburb of Phoenix, Pete was already well on his way to building the ultimate tribute to Curtis Pitts — a full-fledged Pitts museum. The Pitts Flying Museum already showcased not only important Pitts aircraft (almost all of the serial No. 1 birds for each model produced in Afton, Wyoming, are displayed there), but historic Pitts aircraft as well. This collection included N8L, the airplane Curtis and Pat Ledford built in 1963. As they were building the airplane, Curtis was making formal drawings from it for the S-1C series to be offered to homebuilders. Later, he used it as the test machine for his symmetrical-wing concept. It's a very important, historic airplane.

By the way, don't think the Pitts Flying Museum is just a hangar full of biplanes. It is a large hangar that has been reconfigured, refurbished, and outfitted as an art gallery with a mezzanine running across the middle, and it has a library, a lounge, and tons of Pitts artwork and historic photography adorning the walls. At some point in the future, we'll chronicle the details of the museum. When someone is taking it all in for the first time and asks Pete why, most often he says, "This is just a big version of my bedroom as a kid. It was blanketed with airplane stuff. I loved making up airplane displays, and to this day when I dream, they almost always feature little red biplanes."



Seen against an S-1T, it's obvious that the Model 14 hearkens back to the day when airplanes had round motors and were man-sized. The landing gear uses shock struts.



Jere Larson and Curtis Pitts overseeing some of the wing work on the Model 14.

## SERENDIPITY STEPS IN

This part is where the author (me) got involved. To my taste, the Model 14 is just about the ultimate Pitts. In the mold of the earlier Sampson, its lines are classic 1930s biplane but smaller, more personal, and obviously more affordable with probably better performance. I had been bugging Pete for some time to reach out and see if he couldn't acquire or at least finish the stillborn Model 14 for the museum. The airplane deserved to be dragged out of obscurity and finished. I offered to help set up a meeting with the owners because both Paul and Jere are longtime friends.

Initially, Pete displayed minimal interest. Then a series of highly unexpected events took place in a matter of days. First, Pete apparently did some research on the airplane, and I received a text from him that said, "Okay, I'm going to do it. Hook me up with them."

That text came in on a Monday morning. I immediately sent a note to Paul Goetsch telling him about Pete and how the PFM would be a great place for the airplane to be finished and displayed. Paul usually returns my emails the same day, but not this time. Nor the next day. I was puzzled. Then on Wednesday, I got a note from him, "Hey, let's get together. I'm in Phoenix working in our new Tempe data center." I couldn't believe it! He was less than 10 miles away!

The next evening, we went out to dinner, Paul met Pete, and by the end of the evening, the hook had been set: It was obvious that, in one way or another, the Model 14 was going to wind up in the PFM. From the initial idea to a meeting of the minds was four days. How often does that happen? How about never!

There was some due diligence to be done on both sides, but it was obvious that it was going to happen. Eventually, anyway. Within weeks, nature decided to intervene when COVID-19 raised its ugly head, so it wasn't until over a year later, July 2021, that the truck pulled up to Pete's maintenance hangar and started unloading aviation treasure. Remember: It was the last airplane that Curtis Pitts had designed, and he had personally helped build it. Pitts DNA, both physical and mechanical, came out of that truck to join so many of its brethren.



## MODEL 14 HAS A NEW LIFE

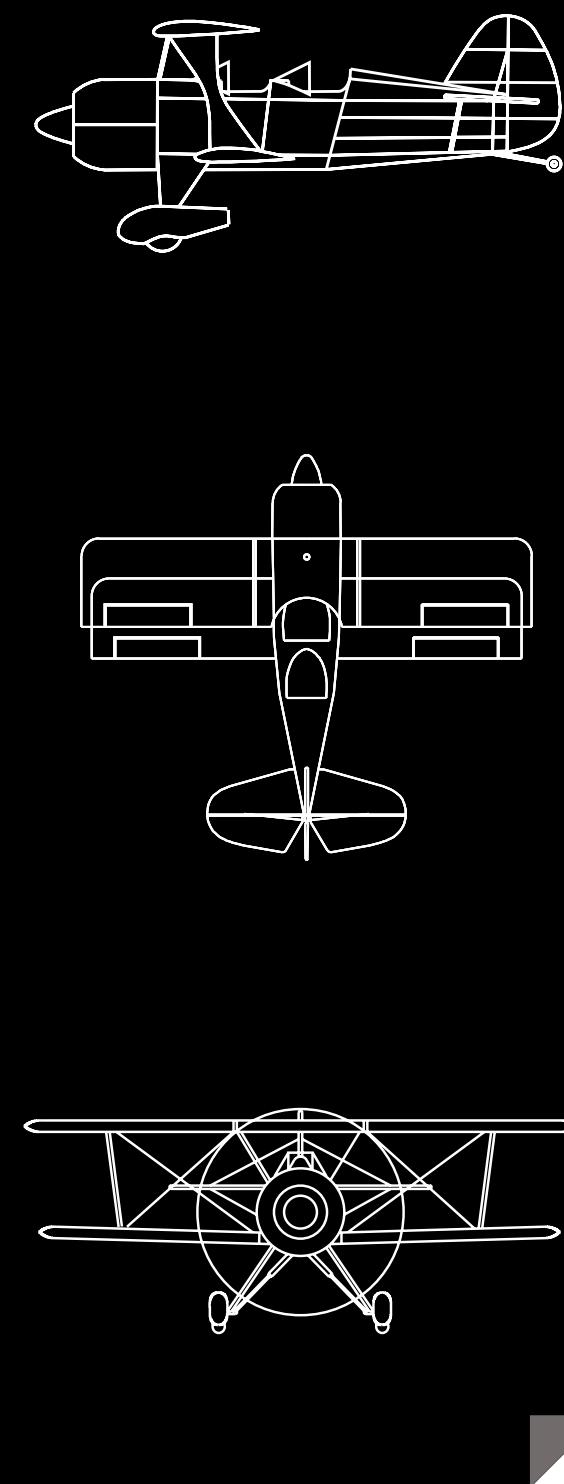
What Pete received might be what would qualify as a “quick-build” kit today. All of the welding has been finished, so the fuselage, tail, and landing gear need nothing. But every system (fuel, electric, etc.) needs to be constructed and installed. Proof-of-concept adjustable seats are installed, ready to be patterns for the real thing. The control system is complete, but no canopy or windshield parts. As for a cowling, it’s probable a Model 12 cowling will be adapted.

The work that has been accomplished is amazingly well done. For instance, the hinged and Camloc side panels should be standard equipment on every biplane of any kind to ease maintenance and cleaning.

The primary wood structures in the wings (which are furniture-grade craftsmanship, by the way) are completed with leading and trailing edges, some drag-antidrag wires, and internal fittings, yet to be installed. The same thing is true of the center section, but a fuel tank has yet to be constructed.

There has been no decision as to what kind of canopy, if any, will be fabricated. Pete likes the open-air version, Paul and Jere want the blown, two-place bubble, and I like the single-place slider. So, why not build all three?

Although Curtis drew up enough drawings to allow Steen to build the airplane, there are many details that Steen and PFM are going to have to design and fabricate. However, inasmuch as the M14 has similar systems to the Culp Specials, the Skybolt R, and the Pitts Model 12, it’s likely that many of the details, such as air-start, fuel, and electrical systems, can be from common tribal knowledge and experience.



**TOP:** The Model 14 differs from the Model 12 in many ways, including the shock strut rather than spring, landing gear, and a more 1930s outline to the fuselage.

**CENTER:** The straight wings simplify the construction while adding to the period look.

**BOTTOM:** From the front, the Model 14 looks like it means business, because it does.

There have been some discussions as to whether plans for the Model 14 would be available to the general public and whether they would come from Steen Aero Lab or Pitts Flying Museum. As of this writing, Pete Diaz has said he'll have the hand-drawn plans reproduced in a CAD format for posterity, and Jere and Paul have said they don't have the bandwidth to support builders. They have said they might give the drawings to a few highly experienced builders in exchange for a commitment-to-not-compete and for an absolute hold-harmless.



**LEFT:** The side panels are hinged and Camloc in place. They feature glued-on internal stiffeners.

**RIGHT:** Two wings and a round motor in a Pitts design: What else could you ask for?

It has to be remembered that, although this plane is a Curtis Pitts design, it has never been flown, which means there are numerous unknowns.

Jere remembered, "One evening, chewing fat with Mr. Pitts, he lamented, 'Regrets? I've lost some fine friends — a few in my airplanes. But wild horses couldn't keep me from doing this. This is why we went to the moon.'"

It is exciting that the final Pitts design has come out of the woodwork and hopefully will soon begin showing its rotund face at fly-ins around the country. All three of the principals agree that Jere pretty much summed up the situation when he said, "We have a strong desire to see the airplane fly. We owe this to Curtis."

For information on the Pitts Flying Museum, email [PFMInfo@pittsfm.com](mailto:PFMInfo@pittsfm.com).

Visit its Facebook page at [Facebook.com/PittsFM](https://www.facebook.com/PittsFM). **IAC**





**INAUGURAL NATIONAL  
AEROBATICS DAY  
A SUCCESS!**



**LORRIE PENNER, IAC 431036**

# IAC 3

**HE FOURTH SATURDAY** in June turned out to be an excellent day for the first National Aerobatics Day celebration. When IAC President Jim Bourke made the announcement in March 2021 that a day dedicated to celebrating aerobatics was going to be instituted, he didn't have a clear idea of how many aerobatic enthusiasts would show up.

The plan for the day was loose. "National Aerobatics Day is the perfect day to host an aerobatic camp, a barbecue, a practice session, or to share videos of aerobatic activity online," Jim said. "With over 40 chapters nationwide and two international chapters, IAC members will be organizing these types of activities and others to engage the public and general aviation pilots in aerobatics."

The new holiday was greeted with enthusiasm by other organizations in the aviation world. "Aerobatics is another way to improve your overall stick and rudder skills. It is a natural extension to upset training that is often encouraged by airplane manufacturers and insurance companies," said Jack J. Pelton, EAA CEO and chairman of the board.

"When I got my private pilot certificate 44 years ago, I was encouraged by my mentor to go out and do some aerobatic training. One, to understand what happens if you do encounter a wake turbulence upset event, and two, to learn to fly even more precise stick and rudder maneuvers. I loved it. While I never competed, it always has been something of interest," Jack said.

"There are few things in life and nothing else in aviation that are as joyful and liberating as flying aerobatics," said John Cudahy, president of the International Council of Air Shows. "And the idea of devoting one day each year to celebrating aerobatics is brilliant."

Greg Principato, president and CEO of the National Aeronautic Association, enthusiastically stated, "Aerobatics thrill. They also inspire. And there is no telling to what heights that inspiration will take someone!"

The IAC chapters rose to the occasion, with 11 chapters planning special practice days, barbecues, and open houses. There were also two chapters to hold aerobatic contests over that same weekend: the Apple Cup in Ephrata, Washington, and the Midwest Aerobic Championship in Seward, Nebraska.



**TOP:** IAC 3 experiences an overwhelming support from the aviation community in Georgia.

**MIDDLE:** IAC 11 hooks new acro enthusiasts with its static display.

**BOTTOM:** IAC 36 gets time in the practice box.



In addition, IAC chapters, individuals, businesses, and our international friends sent well wishes and shared photos of how they were celebrating the joy of aerobatics.

IAC Chapter 3 (the Bear Creek Bunch) held a meet-and-greet in Williamson, Georgia (GA2). The chapter's efforts saw overwhelming support from fellow aviators and the community. "All of the IAC Chapter 3 members want to thank everyone that came out to enjoy the first ever National Aerobatics Day," said IAC Chapter 3 member Leigh Hubner. "We met a lot of pilots who haven't yet started their aerobatic journey, and we hope to see you all at a contest soon! Middle Georgia [State] University made an impact at our Rome, Georgia, contest this year and backed that up at National Aerobatics Day by sending plenty of planes and pilots."

A huge thanks to the team at Peach State Aerodrome and Barnstormer's Grill for their support of the event. The chapter members knew it was a success when the manager said, "What have you guys done? We've run out of parking for the planes!" Thank you for keeping everyone safe and managing so many aircraft and hungry mouths! There were over 30 airplanes on the field June 26.

Meanwhile in Warrenton, Virginia, IAC Chapter 11 members had an amazing day with a ramp full of aerobatic airplanes, people showing up from the community, and some fun flying. The chapter added three new members and made lots of new friends who they hope are now hooked on aerobatics.

Four IAC Chapter 11 chapter members flew aerobatic sequences for their new friends: Scott Francis in his MXS, Mark Meredith in his Super Chipmunk, Adam Cope in his DR-107, and RJ Gritter in his Bellanca Decathlon. Flights from all of them can be found on YouTube by searching their names.

On the West Coast, members of IAC Chapter 26 held a practice day. We had five pilots flying, awarded 13 Smooth patches, and got some critiquing in on Knowns. Fun was had by all who stopped by, even if at one point the temperature might have been 109 degrees Fahrenheit!

In Jackson, Tennessee, IAC Chapter 27 members and friends — including Steve Johnson in his MX2, chapter president Mark Popeck in his Extra 300L, and Corey Gerulitis flying an Extra 330SC — held a practice day in the chapter's aerobatic box at McKellar-Sipes Regional Airport.

The day started out overcast and windy at Bellefontaine, Ohio. Although the weather didn't improve for the practice day that IAC Chapter 34 had planned, the chapter members lined up their airplanes on the tarmac and led lively discussions about aerobatics with community participants who mingled with the pilots. When the wind continued to pick up and the ceiling didn't raise, the group trooped back into the FBO's conference room for lunch, aerobatic videos, and some hangar flying. Fun was had by all!

Caught in the same band of weather as Ohio, IAC Chapter 35's celebration of National Aerobatics Day in Concord, New Hampshire, was a success! They were also able to show off some of the member's airplanes and spend the afternoon talking about aerobatics. The chapter thanks Concord Aviation Services for hosting and Paul Russo for manning the grill!

Chris Murley orchestrated an aerobatics weekend for IAC Chapter 58 that was fully in the spirit of National Aerobatics Day. There were seven aerobatic planes and dozens of nonpilot spectators and visitors in Sky Haven, Pennsylvania, for the afternoon. Chris flew beautifully in his immaculate Acro Sport, often with smoke on. Check out his video, *Mom and Son Acro Sport IIS Fun*, where he flies his full-scale Acro Sport IIS along with a 40-percent-scale RC version of it (<https://youtu.be/2EbJf54urH8>).

Other IAC 58 aerobatic activities included practice flights by Travis and his new-to-him Skybolt; "Stearman Steve," who put on a beautiful display of aerobatics flown slowly and with care; a lovely side-by-side RV's spectacular flight; and Jim Krisovitch in his Xtreme Decathlon. The chapter welcomed many dozens of neighbors who came out to watch throughout the weekend. They weren't complaining about noise. Instead, they seemed grateful for the playful display of airmanship.

Over the weekend of National Aerobatics Day, there were two IAC-sanctioned contests scheduled: the Apple Cup in Washington and the Midwest Aerobatics Championships (MAC80) in Nebraska.

Despite sweltering heat (91 degrees Fahrenheit) and winds at 27 mph gusting to 35, the Apple Cup flew three flights each for Sportsman through Unlimited competitors for a total of 14 pilots. Also saddled with weather problems, the MAC80 contest welcomed six first-time competitors. A total of 25 competitors flew in Seward, six of which were from the University of North Dakota.

Sometimes when the weather doesn't cooperate, you have to go to an alternate date, and that is what the resourceful organizers at IAC Chapter 88 decided to do. They moved their National Aerobatics Day fun to July 3, which turned out to be a very successful day, with sunshine and many aerobatic and nonaerobatic airplanes on-site at Romeo State Airport in Ray, Michigan.

Jason Ledbetter flew the Sportsman Known in his Bücker Jungmann, Wayne Buescher flew the Intermediate Known in his Staudacher F600, and Hugo Ritzenthaler flew the Unlimited Known in his Pitts S-1E. At the conclusion of the flight demonstration part of the celebration, a door prize drawing was held. A special thank-you to the volunteers for making this special day a success!

Team Light Aviation held a barbecue at the Big Blue Hangar at the Rio Vista Municipal Airport (O88), California. It was a wonderful, sunny day for the festivities. "It wouldn't have been possible without Lee Apaka opening his monster hangar to host the event," Joe McMurray said.

"National Aerobatics Day was a blast! Huge thanks to sponsor LIFT Aviation for supporting the event! Hauled a dozen donuts in the Extra over to Rio Vista airport for the event. So great to catch up with the incredible Wayne Handley and everyone else that came," Mark Pollard said.

We are looking forward to next year. "We learned a lot about what worked and what did not work this year, so expect a few changes for next time, but overall, I think we have something special on our hands," IAC President Jim Bourke said. "I was especially heartened to see so many people from outside the USA join in. Perhaps 'International Aerobatics Day' is a better name. I hope you formed new, lasting friendships on N.A.D." **IAC**

**"THERE ARE FEW THINGS IN LIFE AND NOTHING ELSE IN AVIATION THAT ARE AS JOYFUL AND LIBERATING AS FLYING AEROBATICS." – JOHN CUDAHY**



**TOP:** Ready to fly in San Diego.

**BOTTOM:** Aerobatic planes wait their turn to fly at Warrenton, Virginia.



PHOTOGRAPHY BY SUSAN BELL, ADAM COPE, LEIGH HUBNER, PHILLIP JOSEPH,  
LORRIE PENNER, MARK POPECK, IAC 36, AND IAC 80



# A 25-YEAR HIATUS

## FROM AEROBATICS TO RACING CARS AND BACK AGAIN

LORRIE PENNER, IAC 431036

**WHILE STUDYING TO BE** an airline pilot at the University of Illinois Urbana-Champaign, along with his fellow students, Jeff Garibotti was given the choice of flying one of the three school aircraft. His choice was not difficult; who could pass up training in a Stearman? “I was given a great ride by an old-timer,” Jeff said. He sheepishly added that the “old-timer” was probably about 50 years old. “Unbeknownst to me, that experience stuck in my memory,” he said.

After graduating from college during a recession, he was hired as an instructor and lineman by Rudy Frasca, founder of Frasca International, pilot, researcher, and flight simulation engineer at Frasca Field, Urbana, Illinois. Watching Rudy fly his Curtiss P-40 Warhawk and his son, Joe, fly their Grumman FM-2 Wildcat, performing strafing runs over the airport, Jeff was inspired to get involved in aerobatics.

Further inspiration would be found in a trip to EAA AirVenture Oshkosh where he learned about the International Aerobatic Club (IAC). “My first call, after returning from Oshkosh, was to Vlado Lenoch, who was very gracious and provided me with Dan McGarry’s phone number,” Jeff said. Dan McGarry, IAC 30, is an early IAC member who flew in the Advanced category in the 1980s. “When I owned my Pitts Special, modifications were limited,” Jeff said. “I did most of the work myself on them with the assistance of a local IA. Dan McGarry was such a good innovator that his mods would show up on Pitts being built by Aviat.”



***"I BECAME FRIENDS WITH A LOT OF GREAT PEOPLE FROM IAC CHAPTER 1, GOING TO REGIONAL CONTESTS IN THE MIDWEST AND ALSO FROM ATTENDING REGIONAL JUDGES SCHOOLS."***



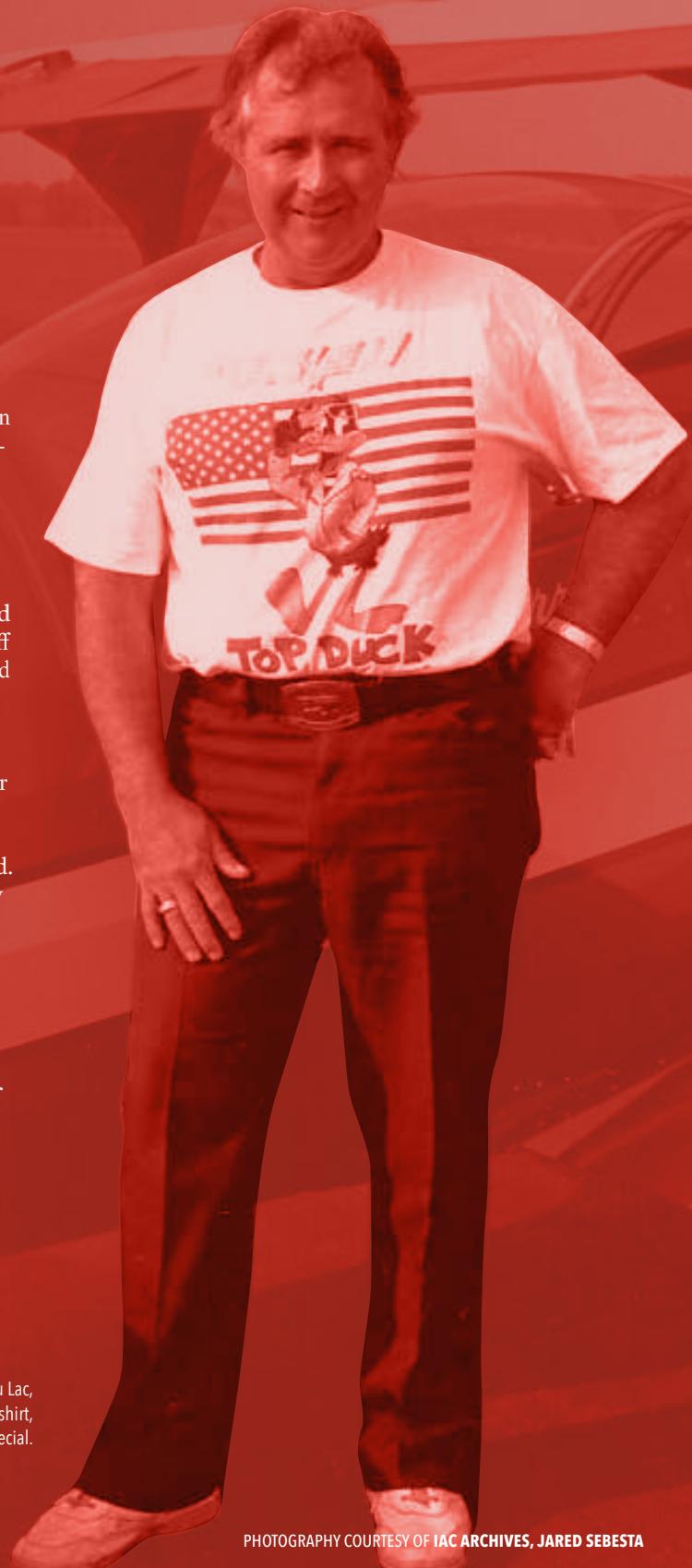
# A 25-YEAR HIATUS

“Dan subsequently provided me with Pete Myers’ contact information, who checked me out in my Pitts S-2A,” Jeff said. “Years later, I discovered what an accomplished aerobatic pilot and aerobatic aircraft innovator Pete was and that his clipped wing Cub is at the EAA’s museum in Oshkosh.” In 1949, H.H. “Pete” Myers bought a damaged Piper J-3C-65 Cub on floats. He removed the floats and started modifying the plane for aerobatics. Pete made changes to the plane, including swapping out the 65-hp engine with a 100-hp Lycoming O-235-C. He shortened the fuselage and installed a set of clipped Taylorcraft wings.

“Dan was very helpful in sharing his love and knowledge of aerobatics with many people,” Jeff said. “He and Larry Warren shared their marked aerobatic box located over a local farmer’s field that also had a grass strip. I’m sorry I don’t remember his name — he loved watching us fly and would sometimes provide comments on our flying.” Larry, Dan, and Jeff purchased a membership into IAC for the farmer and a subscription to *Sport Aerobatics*, which he loved. Larry Warren, IAC 13441, was the L. Paul Soucy Trophy recipient in 1990 and the 17th person to earn the IAC ALL TEN Achievement Award.

Once bitten by the aerobatic bug, Jeff took instruction at three different airports. His first aerobatic mount was a Decathlon. At Pompano Air Center, he took instruction after buying his first aircraft, a Pitts Special S-2A. His instructor was Randy Gagne, and they used the flight school’s Pitts S-2B for instruction. During his time at Pompano, Jeff was privileged to meet Clint McHenry, who was the chief aerobatic instructor at the flight school founded by John Becker and his son Brian, IAC 4399, in 1976.

Dan McGarry pictured here at Fond du Lac, Wisconsin, in 1989 in his Top Duck T-shirt, which matched the artwork on his Pitts Special.



# THE BUNKER

JARED SEBESTA, IAC 435804

Jeff began his return into aerobatics by transitioning into an Extra operated by The Bunker. The Bunker was officially established in June 2021. It is an aerobatic and warbird training facility that specializes in programs such as upset and loss of control training, jet warbird transition, Unlimited category aerobatics, radial engine familiarization, and more. We have a solo rental program of our Extra 330LX that has been increasing in popularity over the past two years, and we expanded our fleet to include a Pitts Model 12, a Pitts S-2B, and a few other surprises! In addition to me, we have two other instructors: Gunnar Jeanette and John Beck.

I've been in love with flying machines since I could recognize what an airplane was. I started working a line service job in 2010 so I could be around airplanes, and was fortunate enough to earn a job cleaning aerobatic airplanes for flight time in a Decathlon at Lumanair Aviation Services located in the Aurora Municipal Airport, Sugar Grove, Illinois.

After proving my ability in floor mopping, I was offered a promotion – giving rides in Extras and T-6s. Years later, with a bit of determination and luck, I now find myself with 120 types of aircraft flown between most aerobatic airframes you can think of, a few warbirds, and some jets. I live for the moments where I get to watch a pilot take the controls of an Extra for their first time, or do their first loop in a jet warbird.

After I've been flying all day in the sweltering heat teaching Unlimited aerobatics, I try to steal some time for myself to go flying and always end up with that same stupid smile on my face that I had the first time I rolled that old Decathlon all those years ago.

**PILOT CERTIFICATES:** Commercial, instrument, single/multiengine land; has Hawker HS125 and Aero Vodochody L-29 Delfin type ratings; and is a CFI.

**FLIGHT TIME IN GA AIRCRAFT:** 3,000 hours

**FLIGHT TIME IN CORPORATE JETS:** 1,000, and 50 in the L-29

**AEROBATIC FLIGHT TIME:** 1,500 (mostly dual given)

Attended Lumanair Aviation Services for flight instrument and commercial training.

Flew Part 135 jet charter in the Hawker HS125, IAI 1125 Astra, and King Air 350. Currently flies corporate in a single-pilot operation in a Pilatus PC-12.



**TOP:** Jared teaches courses in Basic to Unlimited aerobatics.

**BOTTOM:** Other courses at The Bunker include UPRT, LOC-I, spin endorsement, and tailwheel transition.



# A 25-YEAR HIATUS



The first contest Jeff flew was in his "new-to-him" Pitts S-1T at Howell New Lenox, Illinois.

"I became friends with a lot of great people from IAC Chapter 1, going to regional contests in the Midwest and also from attending regional judges schools," Jeff said. During his time actively flying aerobatics, he earned the Sportsman, Intermediate, and Advanced Stars Achievement Awards.

So, what derailed Jeff's aerobatic passion? Work, family, and his other hobby of race cars took up all his time. He had room for only one all-consuming hobby and began racing in 2004 when he joined a country club race track called Autobahn Country Club in Joliet, Illinois. "The race car community and aerobatic community are similar," he said, "and I have made a number of great friends in both. I have owned two different Formula cars, the first one being similar to a Pitts S-2A and the last being similar to an Extra. The last Formula car, a Swift 016 Formula Atlantic, was capable of 3.5g when cornering or stopping. It had wings and tunnels to create downforce."

While in the race car world, Jeff designed and built a trailer to tow his race car from its garage to the track. He said, "Since my race car had about 1 inch of ground clearance, it required lots of planks of wood to make a gradual transition from the ground to a normal trailer and also required a winch. I designed a trailer that allows a race car with almost zero ground clearance to be driven or pushed onto the trailer with no ramps whatsoever. I also fabricated it myself, [and] taught myself to weld by watching 'how to MIG weld' YouTube videos. I am definitely not a good welder, although my trailer never fell apart."

With the world of Formula cars now in his rearview mirror, Jeff is dipping his toe back into aerobatics. He took his first pre-solo aerobatic flight at the end of 2018 with Jared Sebesta, president and chief flight instructor at The Bunker at the Aurora Municipal Airport, Illinois. "Jared is a great pilot and very knowledgeable," Jeff said. "His teaching style — low-key and calm — coordinates perfectly with my learning style. When I last flew, metal props were only being used, and gyroscopic maneuvers could create loads high enough to cause the crankshaft to break. Therefore, I had never done tumbles or multiple snaps. Jared taught me these and the transition to the Extra."

# JEFF GARIBOTTI

IAC 436853

Joined in 1987 and rejoined in 2013.

<b>PRIVATE PILOT CERTIFICATE:</b>	1980 at the University of Illinois
<b>ADDITIONAL CERTIFICATES:</b>	Instrument, commercial, multiengine, and expired CFI
<b>TOTAL FLIGHT HOURS:</b>	850
<b>HOURS AEROBATIC:</b>	600
<b>AIRPLANES FLOWN:</b>	Decathlon, Stearman, Agcat, Pawnee, Pitts S-2A (owned), Pitts S-1T (owned), Pitts S-2B, Extra 300L, Extra 330LX, and Pitts Model 12



@AEROBOTTI



AEROBOTTI



In addition to racing cars and flying aerobatics, Jeff enjoys a good time boating with family and friends on Lake Michigan.



Jeff transitioned to The Bunker's Extra 300L under the tutelage of Jared Sebesta.

Jeff is finding a lot of pleasure in relearning maneuvers, including his favorites: rolling turns and snap rolls. He said, "Rollers because of the smoothness and finesse required because you are constantly changing control inputs. Snaps because they are so violent, and in an aircraft such as the Pitts or Extra, they create such a high rate of roll and require timing, not just visual clues, in order to stop perfectly on heading."

Jeff has been flying aerobatics at least once a week. He recently decided to compete again and will go back to Advanced, which was the last category he flew. He will step up his practice time to daily. "I still have my old Advanced Freestyle sequence card," he said. "When I started, I flew my first year in Sportsman, then the next in Intermediate, and the last two in Advanced. Dan McGarry recommended to spend a year at each level, which I listened to and think it is great advice."

To facilitate his return to competitive aerobatics, Jeff is on the hunt for an Extra 330SC. A deal with a seller in Switzerland recently fell through. "If [the Extra 330SC] doesn't materialize, I am thinking about building, by myself, in kit form, an MXS," he said.

Jeff has come full circle from aerobatics to racing cars and back again. Just like the ride in the Stearman during his college days, the aerobatic experience stuck with him, and he is pursuing it with delight and having some fun. **IAC**

# A Turn Is a Loop Laid on Its Side, Part 2

**BY GORDON PENNER, IAC 429704, THREE-TIME MASTER CFI-AEROBATIC,  
FAA GOLD SEAL CFI, SAFE MEMBER**



**WELCOME. THIS IS THE SECOND** in a series of articles meant to educate pilots, from a big-picture point of view, about the fundamentals of flying and spins, which most of us never learned when we were new. Here we'll focus on turn coordination, which also means we are focusing on spin prevention.

## OVERVIEW AND THE BIG PICTURE

The four levels of learning are *rote, understanding, application, and correlation*. As a rule, pilots do not have an *understanding level of knowledge* about the balance of four forces as they act on an aircraft, or of the physics of turning. Modern training leaves many areas at the *rote level of knowledge*. We are also not taught about *yaw-roll coupling*, which is the true beginning of the incipient phase of the spin.

I want to recommend instructor Greg Koontz's great article in the May 2020 issue of *Sport Aerobatics* titled "Three-Dimensional Thinking."

We want to give you a true understanding so you are respectful of flying, not fearful.

Coordination is everything.

What do we mean by coordination? If we fly coordinated, we will have no excess of yaw in one direction or the other as we maneuver. We cancel out unwanted yaw with our rudder work. If we never have an excess of yaw, we will never have yaw-roll coupling. If there is no yaw-roll coupling, there can be no incipient phase of the spin. This is true even if stalled, which the rudder stall, or falling leaf, maneuver demonstrates.

## BIG PICTURE ABOUT TURNING

A turn is just a loop laid on its side. A loop is just a turn with zero degrees of bank.

Lift acts perpendicular to the wings. You turn by pointing your lift sideways, and you manage that lift with elevator *and* power until the turn is done. Pitch + power = performance.

Once you level your wings, you point your lift straight up against gravity and stop turning.

When you are upside down, you are pointing your lift toward the ground. Learn how far forward you must move your elevator control to turn the lift to zero in case you get turned upside down. Otherwise, when upside down you are just pulling yourself down to the ground.

The airplane does not turn like a boat or a car. The rudder is simply a trimming device used to cancel out unwanted yaw motions while the aircraft is pointing its lift in the desired direction.

The rudder is not the star of the show; it is only a supporting player. You do not turn with the rudder.

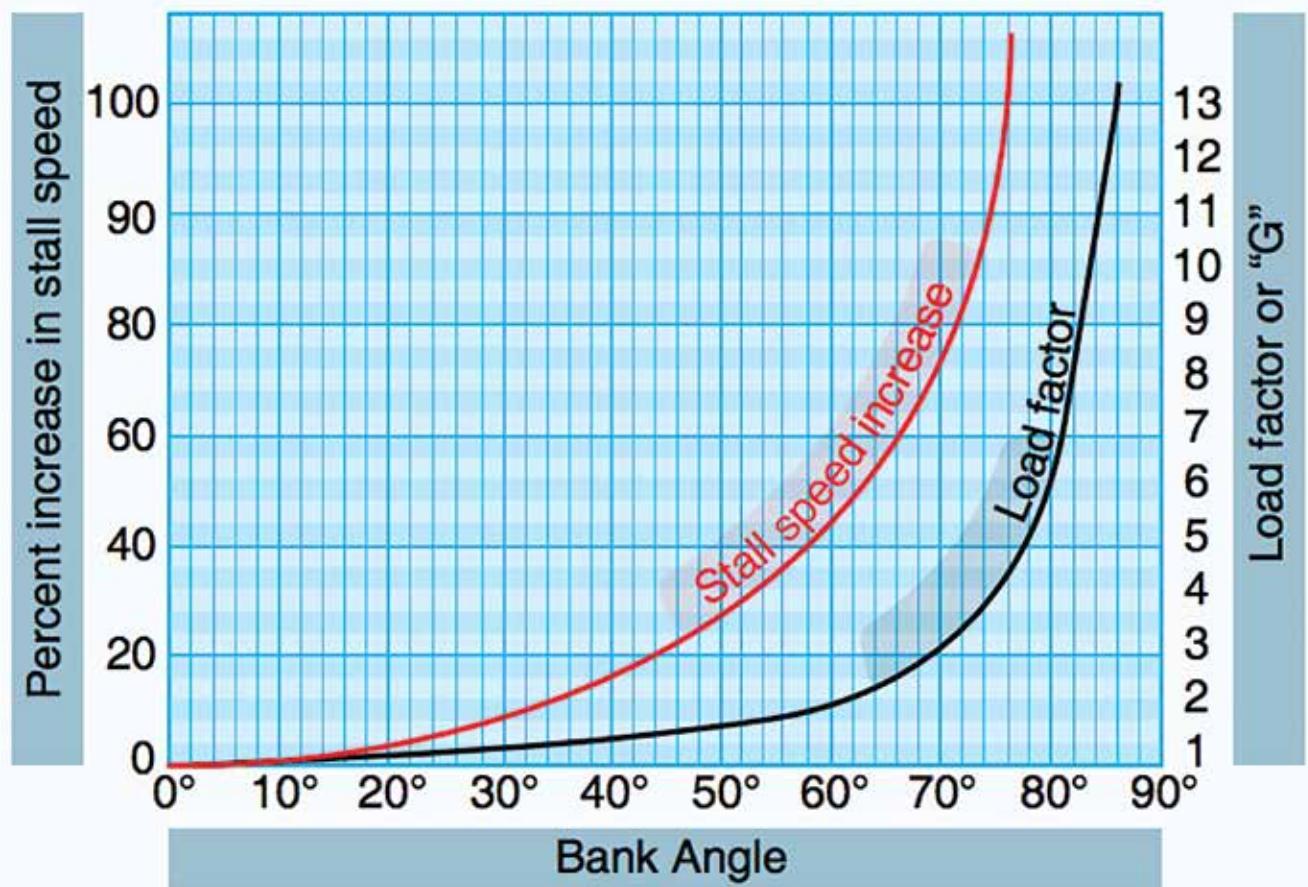
Correct and coordinated rudder usage causes the tail to follow directly behind the nose into the relative wind, whether you're turning or flying straight. If so, the ball will be centered or the yaw string on a glider will be straight.

If the tail is directly behind the nose into the relative wind, neither the airplane nor the pilot will feel a side load force on their body. In other words, the pilot is just another "ball," or inclinometer, instrument.

Excess rudder, one way or another, can lead to loss of control.



**FIGURE 1:** The above picture shows the unbalanced forces on each wingtip during the turn, causing a yaw away from the turn direction. That is why we need rudder, *even in a glider*.



**FIGURE 2:** The logarithmic (exponential, not linear) curve showing the increase in stall speed.

#### FEAR OF BANK ANGLE

You have all been taught that 60 degrees of bank creates a load factor of 2g's, with a 40 percent increase in stall speed, right?

That is not completely true. Sixty degrees of bank *with enough back elevator to hold level flight* – that puts 2g's of lift and apparent weight on the airplane. Elevator is what we use to control g-load. Concept was discussed in Part 1, which appeared in the May/June issue of *Sport Aerobatics*.

Unfortunately, we in the training industry have inadvertently made pilots afraid of bank angle. We keep quoting this 60 degrees of bank figure, when we really need to talk about 45 degrees of bank and less.

*Don't be afraid of 45 degrees of bank. Make it your best friend.*

The logarithmic (exponential) curve showing the increase in stall speed above hardly goes up at all until past 45 degrees of bank (Figure 2).

Forty-five degrees of bank will *always* require 1.4g's of back elevator *to hold altitude*, and the stall speed increase will *always* be 18 percent. Thirty degrees of bank, *with enough back elevator to hold altitude*, will *always* be 1.15g's with an 8 percent increase in stall speed. It is just a physics and trig thing. It applies to all aircraft – airliners and ultralights alike.

See instructor Tony Johnstone's excellent article expanding this conversation in the January/February 2021 issue of *Sport Aerobatics*. He has his students round up and memorize the following numbers, *remembering that these are level-flight numbers*:

- a.) 30 degrees = 10 percent stall speed increase (1.15g's)
- b.) 45 degrees = 20 percent stall speed increase (1.4g's)

These g numbers are true for level flight, and they're also true in a descent once the aircraft has reached its descending steady state.

Your approach speeds are usually about 30 percent over stall speed ( $1.3 \times V_s$ ), so you have a maneuvering buffer up to 45 degrees of bank, with at least 10 to 12 percent left over.

Do we want all turns in the traffic pattern to be 45 degrees of bank? Of course not. But fear of bank angle, and fear of the increase in stall speed, is part of the reason pilots overshooting the centerline on base-to-final stop banking and start “ruddering the nose around.” The other reason they stop banking and begin ruddering the nose around is they are close to the ground.

#### **ENGINE FAILURE TURNBACK**

Pilots do the same thing with the rudder when trying to turn back to the runway after engine failure, also causing a spin entry. Notice that the “180 back to the runway” takes 245 to 270 degrees to accomplish. When close to the ground with adrenaline pumping, the drive to rudder the nose around to complete the turn is overwhelming. Unfortunately, they spin at this point, digging a wingtip in, which is usually fatal. See Rich Stowell’s figure below (Figure 3). The red boxes are mine.

Studies have shown that 45 degrees of bank is optimal for the quickest turnaround, assuming you are high enough to start and do the full 270 degrees of turn, but it is not practiced. Most power pilots are uncomfortable at 45 degrees of bank, and most don’t remain coordinated. The FAA now wants the turnaround to be taught. See the Flight Review Advisory Circular.

Conversely, in the glider world the 45-degree-banked, coordinated turnback (from a safe return altitude) is practiced to a high level. It is performed on the checkride and in every flight review.

#### **THINKING ABOUT ‘CRASHING WELL’**

Statistics show that landing ahead with the wings level is much, much more survivable.

Light aircraft are built to a 9g crash standard. If you can touch the ground wings-level, your chances of survival are high. Fifty knots of touchdown speed down to 0 knots, wings-level, while taking 9g’s of crash energy takes 20 feet. It is not fun, but it is survivable.

Digging in a wingtip, on the other hand, stuffs the nose into the ground a few feet later and is not survivable. That is why spins close to the ground are usually fatal. So let us watch our footwork and avoid that whole process altogether.

# **ENGINE FAILURE TURN BACK**

**45 Degrees of Bank  
Quickest Turnaround  
(Not Practiced)**

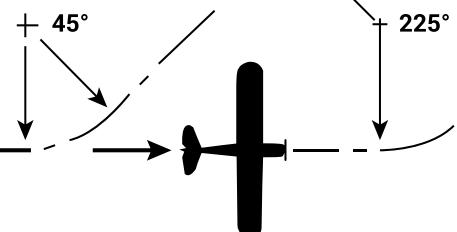
**Spin Entry Here due  
to Skidded Turn**

TOTAL MINIMUM HEADING CHANGE = 270°  
HIGHER: g-LOAD

ANGLE OF ATTACK  
STALL SPEED  
DRAG  
RATE OF DESCENT

22

— — — — — 4



**FIGURE 3:** Factors involved when turning back to the runway.



**FIGURE 4:** Go-arounds are free – don't go in the bad alley!

#### DECISION-MAKING

Since most turns are made to the left and most traffic patterns are to the left, in our example we will show the classic left-base-to-final-turn scenario. The pilot is turning from base to final but has overshot and finds themselves on the right-hand side of the runway's extended centerline. In other words, they are in the danger zone, or bad alley.

Once in the danger zone, the pilot should go around. Modern decision-making processes require pilots to think ahead and commit themselves beforehand to going around automatically when in the red zone (Figure 4). But they don't. They commit to the landing when they don't have to. They are not curing cancer or bombing Berlin, but they commit to the landing like they are. Pilots! But if the engine is still running, they do not have to make this landing.

Also, *go-arounds are free*. Hear this loud and clear. Go-arounds are not indicators of bad piloting. They are indicators of good judgment. Only a small part of flying is control manipulation. The biggest part is airmanship — or head work, as the fighter pilots call it.

The best way to win a knife fight in an alley is don't go in the alley!

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**"EXPERTS SAY LOSS OF CONTROL (LOC)  
ACCIDENTS SHARE A COMMON CAUSE:  
PILOTS' LACK OF UNDERSTANDING ON THE  
CORRECT USE OF THE RUDDER."**

— ROB MARK, FLYING MAGAZINE,  
"LOSS OF CONTROL: THE PERSISTENT THREAT," FEBRUARY 2018

#### **YAW-ROLL COUPLING AND INCIPIENT SPIN ENTRY**

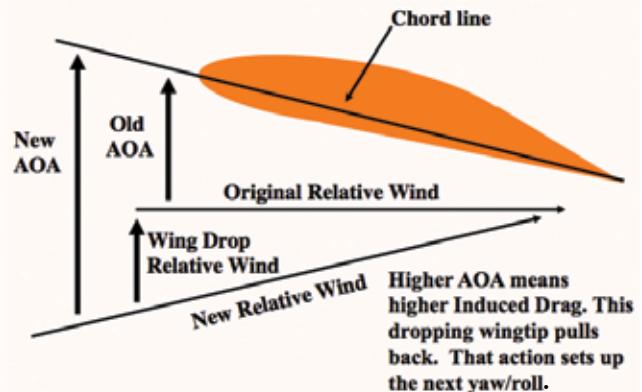
See Stowell's diagram below (Figure 5) showing what happens at the wingtips when the pilot stops banking and yaws the aircraft left. In the diagram, the left yaw action results in a left roll that the pilot didn't ask for. Yaw-roll coupling begins.

You now see how a yaw motion by the pilot can generate an unwanted roll. The pilot puts in yaw No. 1, which generates unwanted and uncommanded roll No. 1.

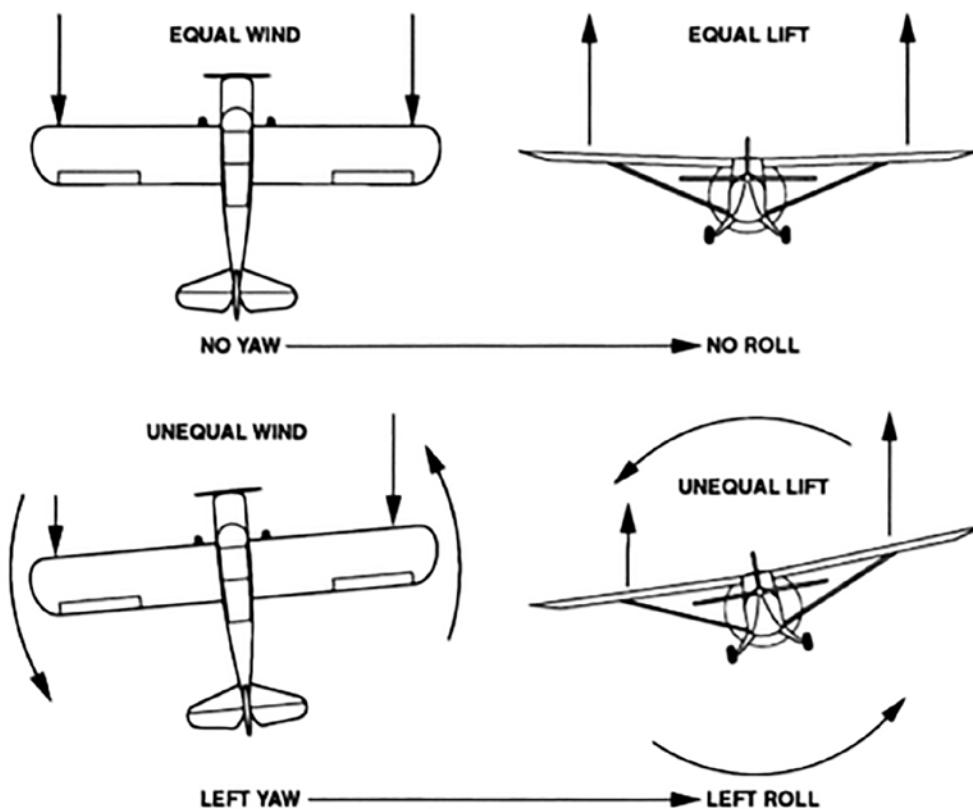
In the diagram to the right (Figure 6), you see how roll No. 1 generates yaw No. 2. You see that the action of the left wingtip dropping brings an additional upward relative wind, which causes an angle-of-attack increase, which causes an induced drag increase. Induced drag always mirrors angle of attack.

This increase in induced drag from roll No. 1 pulls the wingtip back, causing yaw No. 2. Yaw No. 2, due to yaw-roll coupling, causes roll No. 2. Roll No. 2 causes yaw No. 3, etc. That is how the spin animal feeds itself, causing the autorotation.

#### **ANGLE OF ATTACK WINGTIP DROPPING**



**FIGURE 6**



**FIGURE 5:** The left yaw action results in a left roll that the pilot didn't ask for. Yaw-roll coupling begins.

## **"STALL SPEED IS A USELESS NUMBER WITHOUT A LOAD," AND "SPIN ENTRIES DON'T HAPPEN TO THE PILOT. THEY HAPPEN BECAUSE OF THE PILOT."**

— RICH STOWELL, AUTHOR OF EMERGENCY MANEUVER TRAINING, 1996, AND THE LIGHT AIRPLANE PILOT'S GUIDE TO STALL/SPIN AWARENESS, 2007

As the left wingtip drops, the pilot mistakenly moves the stick or yoke to the right to raise the wingtip. This action puts the left aileron down and causes another angle-of-attack increase, which produces another induced drag increase. That drag increase pulls the wingtip back even more, which is yaw No. 4. Yaw No. 4 causes roll No. 4, etc.

By moving the aileron, the pilot made everything worse, feeding the animal raw meat.

Opposite rudder, neutral ailerons, and dropping the nose will get the airplane out of this rotation in an eighth of a turn. It takes recognition and training, and is pretty easy. Using ailerons for recovery, however, is like pouring gas on a fire (Figure 7).

Better yet, let's fly coordinated and never get here in the first place.

### **STOPPING SPIN WITH AILERON-BAD!**

Moving a flight control increases the Angle of Attack because it changes the chord line .

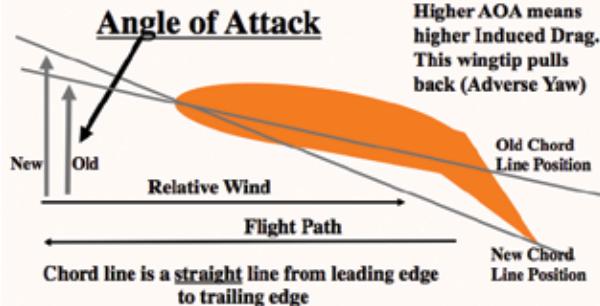


FIGURE 7

### **A TURN IS NOT ONE UNIT – A TURN HAS THREE PARTS**

In reality, the turn consists of three parts. Each part has different physics.

The roll-in until the desired bank angle is reached is Part 1. The banked portion, where the actual lift-pointing and heading-changing occurs, is Part 2. The rollout is Part 3.

Part 1 and Part 3 are mirror images of each other. In these parts, the displaced ailerons are rolling the airplane into the desired angle of bank. The adverse, or unwanted, yaw is a result of the down aileron having more drag than the up aileron. Rolling into a left turn, the right aileron would be down, pulling back to move the nose right, away from the turn. The increased induced drag comes from the higher angle of attack at the down aileron.

The reason you still have some adverse yaw away from the turn in Part 2, and still require rudder to overcome it (even in a glider), is primarily because of the higher parasitic drag on the faster, raised, outside wingtip. Engine/propeller/torque effects are separate from this.

The rudder needed for centering the ball in Part 2 of the turn is usually about 25 percent less than the rudder required for the roll-in during Part 1. See the “Dutch roll” and “coordination exercises” later in the article.

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**'FEEL THE FORCE(S), LUKE' OF COORDINATION,  
AND HOW COORDINATION IS ACHIEVED**

Use the ball, or the yaw string, for coordination. But as you can see in the figure below (Figure 8), you can also learn to “feel” coordination the 1930s/Tex Rankin/World War II military way. When you’re on base to final, you might be looking at the runway, or something else. Learn to feel your coordination when you can’t look at the ball or the yaw string.

You are the ball.

We say “step on the ball” for rudder coordination using the inclinometer. When not looking at the ball, or if no ball is installed, you can take the place of the ball.

If you feel pressure on your right buttock, or your shoulders are moving toward the right side of the airplane, you need right rudder, or same-side rudder, to fix it. This is shown by the right-hand slip picture below, which is from the FAA’s *Airplane Flying Handbook*.

**THE BIG SECRET: DON’T LET THE BANK ANGLE  
CHANGE WHILE YOU ARE MAKING COORDINATING  
RUDDER ADJUSTMENTS**

In a set angle of bank, there is a speed and drag difference between the two wingtips. The outside wingtip is going faster, with more drag. It is a set ratio. The correct amount of rudder needed in Part 2 of the turn is based on that drag difference. If you let the bank angle increase, the speed and drag difference ratio between the two wingtips increases, prompting the need for more rudder. Don’t let the bank change while you’re making rudder adjustments.

Also, on the slip picture below, notice that the pilot needs downhill rudder to fix it. It is counterintuitive, but if you’re feeling like you are falling downhill, *step downhill* until the feeling of falling goes away. Just like the ball; you are the ball.

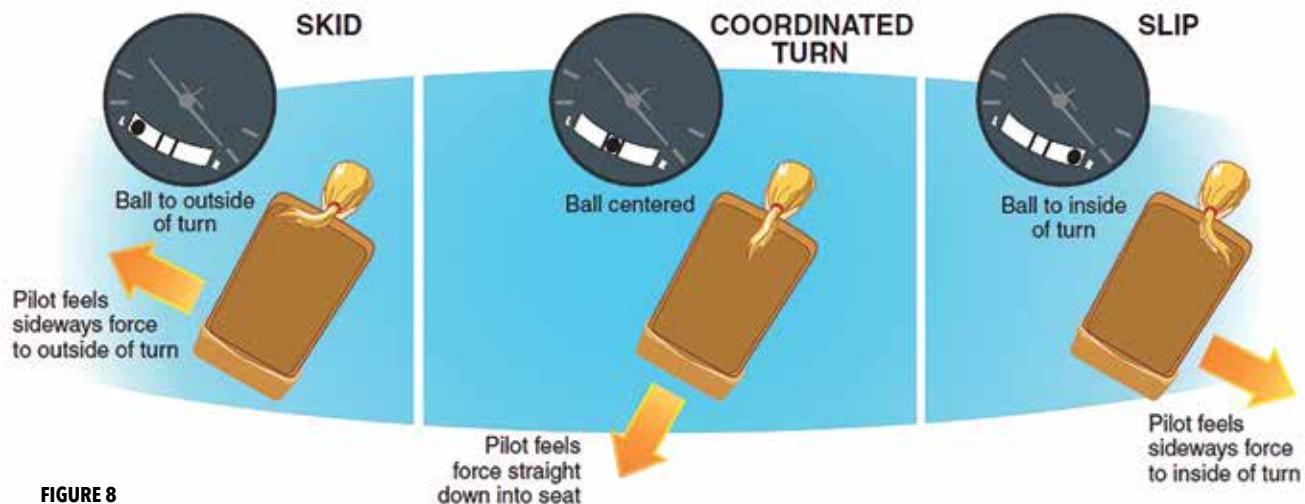
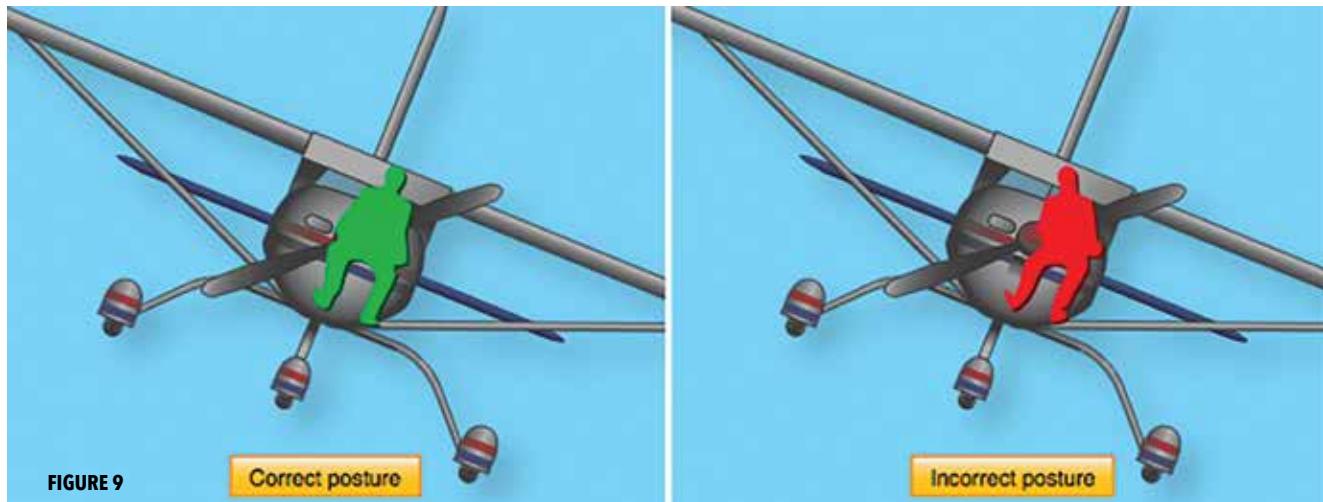


FIGURE 8



## Overbanking Tendency

- Outer wing travels greater distance
- Higher speed
  - More lift



- Inner wing travels shorter distance
- Lower speed
  - Less lift

**FIGURE 10:** The aircraft is in steep-turn territory, where the overbanking force is stronger than the dihedral force.

The skid illustration on the left in the picture above depicts a scenario that can lead to a spin entry. We have excess right rudder for that bank angle present.

As Stowell said, skids are spin-prone and slips are spin-resistant. If you are thrown to the high side of the aircraft in a turn, you are in a skid. Beware! A spin entry is soon to follow.

If you feel a side load on your seat or your shoulders, *do not lean*. Fix the side load with rudder while keeping your torso vertical with the seatback (Figure 9).

### CROSS-CONTROLLED OR COORDINATED.

#### WHICH IS BETTER?

*Cross-controlled* and *uncoordinated* are not the same thing. What is more important is to be coordinated, no matter how the controls have to be manipulated to make that happen.

Imagine an aircraft at 35 to 40 degrees of bank. The aircraft is in steep-turn territory, where the overbanking force is stronger than the dihedral force (Figure 10).

In this left turn, the aileron control will be displaced right to prevent overbanking, and the rudder will be displaced left enough for coordination. The ball will be centered. Is this aircraft cross-controlled? Yes. We have left rudder and right aileron. Is this aircraft coordinated? Yes. Being coordinated is the most important part.

If you're coordinated you won't spin, even if you stall.

### TURN COORDINATION AND EXERCISES

The *Dutch roll* exercise is where we do Part 1 and Part 3 back to back without Part 2, holding heading throughout. Roll back and forth from 30 degrees left bank to 30 degrees right bank while keeping your nose on a heading with your feet, with no pauses. You roll back and forth around a point. This is an exercise to learn how to do coordinated roll-ins and rollouts. Make the rudder match the aileron displacement, not the other way around. Aileron is the leader of the formation, and the rudder is the wingman. Aileron commands the turn; rudder is just the subordinate trimming device.

I do coordination exercises for Part 2 of the turn as well.

I give the student rudder only, then I use the roll control to enter a turn. While I maintain a set bank angle, I have the student first hold too much outside rudder, then too much inside rudder. The student has to experience the feel of too much outside rudder, too much inside rudder, then has to move the rudder to capture and maintain zero side load with their feet, without leaning.

I then increase the bank, requiring the student to add enough rudder for coordination by feel. By zero side load I mean equal butt-cheek pressure or zero side pressure on the shoulders. Then I decrease the bank angle, again requiring the student to find the zero side load “sweet spot.”

If pilots feels like they are falling to the low side of the airplane, they need to step downhill until the feeling of falling goes away. If they are being thrown uphill, they need to step uphill to get back to zero side load on their bodies.

Once they can do that, and do the Dutch rolls, the student puts them together and does all three parts of the turn with all the controls.

### RUDDER STALL, OR FALLING LEAF, TRAINING MANEUVER

The rudder stall, or falling leaf, exercise can be done in a regular airplane. A specialty aircraft is not required. It is designed to show that a stall doesn't have to turn into a spin if proper footwork is used.

Students not only learn how to prevent a spin, but also gain confidence in controlling the airplane while in a stall — while on their way to getting out of the stall.



## “ALMOST ALL FATAL FLYING ACCIDENTS ARE CAUSED BY LOSS OF CONTROL DURING A TURN.”

— WOLFGANG LANGEWIESCHE, STICK AND RUDDER, 1944



In this exercise, the airplane is stalled up at a safe altitude and then held in the stall mode. Then, while the airplane is mushing downhill, the pilot keeps the wings level and the nose on a rough heading with the rudder only — no ailerons. The ailerons must remain neutral throughout.

The rudder here is doing two jobs: keeping the wings level and holding a coarse heading. The rudders must be moved quite quickly here to accomplish both jobs. Stowell says pilots must move their feet “like a man running from a tiger.”

I initially give students the rudders only while I work the bank and pitch controls. The footwork is not easy to learn at first. Once they have the required rudder usage in hand, I then give them all the controls.

Actually, you are using yaw-roll coupling to your advantage. You are yawing and rolling back to level flight over and over, never moving the ailerons.

While mushing downhill we ask the three questions:

- |                              |                          |
|------------------------------|--------------------------|
| a.) Are you stalled?         | Yes                      |
| b.) Are you spinning?        | No                       |
| c.) Why aren't you spinning? | I'm controlling the yaw. |

No excess yaw, no yaw-roll coupling. No yaw-roll coupling, no spin.

The point here is that a stall is not a death sentence that results in a spin every time. The stall regime is just another regime of flight with different rules. It is like driving a car on snow. If you get in trouble on dry pavement in a car, you can hit the brakes. On snow, what is the worst thing you can do? Hit the brakes.

A similar rule applies to flying. In normal flight, what do you do to raise a dropped wingtip? Use the ailerons. Close to stall or in a stall, what is the worst thing you can do to raise a lowered wing? Use the ailerons.

Remember, when an aileron is moved down, it increases the angle of attack of that part of the wing. The higher angle of attack creates higher induced drag, which yaws the wingtip aft.

Also, if the main wing is close to or beyond a stall angle of attack and a wingtip drops, putting the aileron down will cause an even higher angle of attack on that part of the wing. That could stall that section of the wing further.

In other words, when close to or beyond a stall angle of attack on the main wing, the ailerons will have the opposite effect as they do when in unstalled normal flight.

When stalled, don't use ailerons. It is not a car.

#### SUMMARY

Being coordinated means not having an excess of yaw while in any maneuver.

With no excess of yaw, there can be no yaw-roll coupling. No yaw-roll coupling, no spin. It's that simple.

Greg Koontz: "I never start the aerobatics or the upset recoveries until we do steep turns (check use of attitude control), slow flight (check understanding of the four forces working together), Dutch rolls in slow flight and cruise (check understanding of adverse aileron drag), and stalls (see if the student is looking for speed or a reduction in AOA)."

Use Koontz's maneuvers above as a litmus test of your flying *and* your level of understanding.

Fly safe! **IACF**

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# IAC Achievement Award Program Recipients



**CONGRATULATIONS TO THE INDIVIDUALS** below who have applied for and received Achievement Awards from flying in a noncontest environment (Smooth Achievement) or at a contest (Stars Achievement) in the last quarter of 2020 and the first two quarters of 2021.

Special congratulations go out to:

**Brittane Lincoln** for earning the ALL FIVE, which is all the categories earned in a noncontest environment (Smooth).

She is only the 12th woman to achieve this award since 1970 when the program was first developed.

**Aaron McCartan** for earning the ALL TEN, which is a combination of all power categories earned at a contest (Stars) and all power categories earned in a noncontest environment (Smooth).

**Jim Bourke** for earning the new Mastery of Flight award. He accomplished this achievement over a time of five years between 2016 and 2021 by earning the ALL TEN in power and the ALL FIVE in glider.

<b>3RD QUARTER / 2020</b>			<b>2ND QUARTER / 2021</b>		
<b>POWER</b>			<b>POWER</b>		
1251	Aaron McCartan	Primary Smooth	767	Ashley Winchell-Walrath	Primary Stars
1252	Scott Collins	Primary Smooth	768	Gerry Ortiz	Primary Stars
1581	Dan Towey	Sportsman Stars	769	Aditya Anne	Primary Stars
526	Jason Ledbetter	Intermediate	770	Justin McLeod Bethune	Primary Stars
		Smooth	771	Jaret Burgess	Primary Stars
527	Aaron McCartan	Intermediate	772	Sean Moran	Primary Stars
		Smooth	952	Chris Keegan	Sportsman Smooth
760	Brittane Lincoln	Intermediate Stars	953	Sean Moran	Sportsman Smooth
		Advanced Smooth	954	Sophia Hillard	Sportsman Smooth
300	Aaron McCartan	Advanced Smooth	1582	Lloyd Massey	Sportsman Stars
301	Dan Towey	Advanced Smooth	1583	Landon Diedrich	Sportsman Stars
204	Aaron McCartan	Unlimited Smooth	302	Philip Joseph	Advanced Smooth
179	Aaron McCartan	ALL FIVE (Smooth)	303	Tom Grundherr	Advanced Smooth
44	Aaron McCartan	ALL TEN (Smooth and Stars)	304	John Horwich	Advanced Smooth
<b>1ST QUARTER / 2021</b>					
<b>POWER</b>			<b>POWER</b>		
4TH QUARTER / 2020		<b>POWER</b>	1256	Katherine Scott	Primary Smooth
			1257	Jeff Lombardo	Primary Smooth
1253	Chris Keegan	Primary Smooth	1258	Nathan Johnston	Primary Smooth
			773	Aaron Nahale	Primary Stars
1254	Sean Moran	Primary Smooth	955	Nathan Johnston	Sportsman Smooth
			1584	Joshua Gregg	Sportsman Stars
1255	Sophia Hillard	Primary Smooth	1585	Jim Bourke (2016)	Sportsman Stars
			205	Brittane Lincoln	Unlimited Smooth
762	Doug Jenkins	Primary Stars	180	Brittane Lincoln	ALL FIVE (Smooth)
			4	Jim Bourke	Mastery of Flight
<b>GLIDER</b>			<b>GLIDER</b>		
18	Jim Bourke		18	Jim Bourke	Primary Smooth
			41	Jim Bourke	Sportsman Smooth
41	Jim Bourke		31	Jim Bourke	Intermediate Smooth
			5	Jim Bourke	Advanced Smooth
763	Justin Thomas	Primary Stars	7	Jim Bourke	Unlimited Smooth
			4	Jim Bourke	ALL FIVE (Smooth)
764	Janie Thomas	Primary Stars			
765	Glen Lally	Primary Stars			
766	Cameron Koutz	Primary Stars			

As a reminder, first-time Primary or Sportsman Stars or Smooth Award applicants will receive their first award patch for free. Applicants for glider or power Primary or Sportsman Achievement Awards should fill out an application and only send payment for additional patches, pins, or decals. The first patch will be shipped at no charge. Find applications at [IAC.org/Legacy/Achievement-Awards-Applications](http://IAC.org/Legacy/Achievement-Awards-Applications). **IAC**

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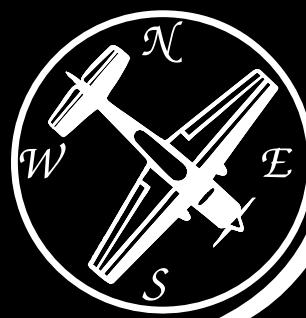
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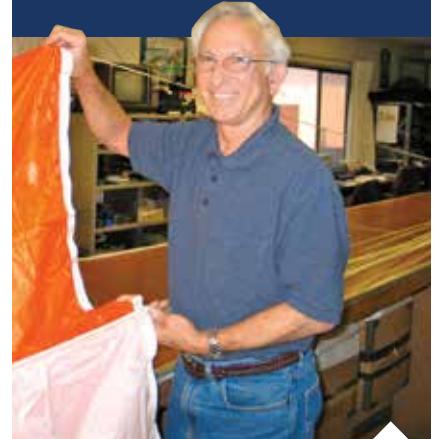


**SOUTHEAST**  
**AERO**

# A Reason to Replace Old Parachutes - 20-Year Expiration Date

BY ALLEN SILVER, IAC 431160

*This article is a reprint from 2015 and was updated July 21, 2021, by the author.*



**RECENTLY I'VE RECEIVED MORE** than the usual number of inquiries from pilots asking me to explain to them why their parachute rigger won't pack their parachute anymore. They usually tell me they store it carefully and it looks brand new, followed by, "Is this a plot by the manufacturers to sell more parachutes?" I've covered this topic before, but I've decided to cover how we came to the 20-year decision in more detail.

Fortunately, the vast majority of riggers will not pack a pilot emergency parachute after it and the harness/container holding it reach their 20th birthday. To put things in perspective, we're also not the same person we were 20 years ago. Fortunately, we do not have to be replaced after 20 years as the manufacturers recommend. Like our parachutes, we too must take care of ourselves so our lifetime warranty doesn't expire early. We all know we should minimize our exposure to the sun, eat healthy, and all that good stuff. Well, our parachutes are the same. But even with the best of tender-loving care, they should be replaced after 20 years.

Here, in a nutshell, is why the parachute industry came to that decision. When I was chairman of the Parachute Industry Association's rigging committee, we had gathered a significant amount of information on why some parachutes were ripping apart while doing nondestructive 40-pound pull tests on the fabric. The technical standard procedures at the time (TS-108) called for a 40-pound pull test. Remember, parachutes are a petroleum-based product and

weaken over time, no matter how diligently you take care of your expensive cushion. What was alarming to me and other riggers was the areas that failed were invisible to the eye. This kind of problem probably is one of the reasons drug manufacturers put a shelf life on medications. They too weaken and lose their strength over time. The areas I had chosen and that failed the nondestructive pull tests were areas that I had selected at random. Most ripped and came apart with a pull as little as 10-15 pounds. The material shouldn't have failed until close to 80 pounds. I was curious, so I pull-tested all around the area that had failed to see if there were other weak areas. This point is where the mystery broadened. These other areas passed the 40-pound pull tests. It was puzzling.



**PHOTO 1:** First, I mark the area to be tested as stated in TS-108 and clamp modified vise grips to that area.

Before I go on, let me show and explain to you how pull tests are performed. First, I mark the area to be tested (see Photo 1) as stated in TS-108 and clamp modified vise grips to that area. The vise grips have rubber jaws to prevent damage to the material. One vise grip is anchored, in my case, to my packing table so it cannot move. On the end of the other vise grip, a calibrated fish-type scale is attached (see Photo 2). The scale is slowly pulled until it reaches 40 pounds, and then I count to three. Next, I slowly release the pressure and remove the vise grips. I then inspect the area and stamp or write the date on it, along with the word "passed" (see Photo 3). I use a stamp to mark the area. Some riggers mark the area with a pen. Whatever method your rigger uses, the area tested must be identified with the type of test, the date the test was performed, and the results. The rigger must also annotate your packing date card, explaining the work performed.

Was I the only person having this problem? Did I do something wrong? Did I improperly clamp the modified vise grips to the material causing the problem? I brought this problem up to the members of my rigging committee and discovered other riggers had experienced the same problem. Fortunately, they also had kept records, and a pattern soon became evident. When I compared the records I had kept with those of other riggers, a common denominator appeared. The notes we kept showed the

age of the parachutes and the pounds or kilograms they had failed at; these findings were the reason we recommended a 20-year service life. All of these parachutes generally had one thing in common — they were all older parachutes. What became clearly apparent was all but a few of those tested, which may have had other issues, were about 25 years of age and older.



**PHOTO 2:** One vise grip is anchored, in my case to my packing table, so it cannot move. On the end of the other vise grip, a calibrated fish-type scale is attached.

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**PHOTO 3:** I then inspect the area and stamp or write the date on it, along with the word "passed."

We put our heads together with the manufacturers, and most everyone agreed that we had a problem. Not all agreed on how to deal with it. Many European countries and other countries around the world already had a service life on their parachutes. They had a 15-year mandatory service life imposed on their pilot emergency parachutes by the equivalent of our FAA. They felt then, and still do, that a pilot emergency parachute should be removed from service in 15 years. Remember, it includes the harness and container, as well.

My committee and the Parachute Industry Association's technical committee felt removing a parachute after 15 years was on the low side and 25 years was on the high side. Based on our findings, we then came up with and recommended a 20-year service life on the parachute and the harness/container holding it. The vast majority of professional riggers agreed and will not go beyond this point, even though the FAA feels a rigger can determine the serviceability of a parachute. Remember, the areas that typically fail often look like new and may be invisible to the naked eye. Riggers doing pull tests may have missed the defective areas by a few inches. It could give you a false sense of



## 2021 IAC CONTEST SEASON CALENDAR



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DATES	HOST CHAPTER	NAME	REGION	LOCATION	AIRPORT
Sept. 19–24, 2021		U.S. National Aerobatic Championships	South-Central	Kansas	KSLN
Oct. 2, 2021	58	Wildwoods Acroblast!	Northeast	New Jersey	KWWD
Oct. 9, 2021	5	Clyde Cable Rocky Mountain Aerobatic Contest	South-Central	Colorado	KLAA
Oct. 15, 2021	36	AKROFEST 2021	Southwest	California	L08
Oct. 15, 2021	107	Hill Country Hammerfest	South-Central	Texas	KAQO
Oct. 16, 2021	35	Keene Fall Classic	Northeast	New Hampshire	KEEN
Oct. 29, 2021	19	Mason-Dixon Clash	Northeast	Virginia	KFVX
Nov. 12, 2021	62	Tequila Cup	Southwest	Arizona	KAVQ

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security that your 25-year or older parachute is in air-worthy condition. I'll be the first to say that it probably is, but I'm not that kind of a gambler. Are you? The 20-year service life is a good number — something that you and I can live with.

The parachute industry now has a new technical standard (TS-108) for doing pull tests. Material has changed for the better over the years, and each manufacturer now sets its own pull-test requirements based on the material used in the construction of its parachutes. The procedures for doing the tests are the same, but the manufacturers may want the person performing them to use 30 pounds, not 40. The manufacturers now prescribe what they feel is best for their product. However, no matter how careful you are with your parachute, or how good the material appears, over time it will weaken. The care or lack of care you give your parachute may speed the aging process. I consider UV exposure the worst of the problems. Try to keep your parachute out of the sun as much as possible.

If there is a problem with your geriatric parachute and it fails when you need it the most — causing serious injury or death — lawyers will smell the blood a mile away and will have a field day, especially with all the information that is available today.

When I receive an old parachute and refuse to service it, I always explain to my customer that it's still legal to have it packed, no matter what its age, if you can find someone to pack it, but I won't. Unlike other countries, we do not have laws carved in stone that govern the service life of a pilot emergency parachute. It's left up to you and your rigger. All I can say is, "I wouldn't want to be standing under you after you've pulled your rip cord."

Before I service a parachute and before it leaves my shop, I ask myself this question: Would I put that parachute on my back and jump with it? If I'm not willing to do that, then it won't get packed by me. I encourage you to make sure your rigger would also be willing to do that. **IAC**

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**ALLEN SILVER** owns and operates Silver Parachute Sales & Service located in Sonora, California. He has been an FAA Master Rigger since 1974 and in 1991 was designated as a parachute rigger examiner for the FAA, a position he held for many years before moving. Allen also has served three terms as the chairman of the Parachute Industry Association (PIA) Rigging Committee, a worldwide organization that represents the parachute industry. In 2017, Allen retired after 55 years of jumping, with over 3,200 parachute jumps as a sport and professional skydiver. He has over 1,900 hours of flying experience, of which more than 1,200 are in a Marchetti SF-260. He enjoys swimming, hiking, scuba diving, photography, and a good glass of wine or two.

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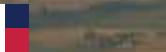
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