



**SPORT**

JANUARY/FEBRUARY 2025

# **AEROBATICS**

OFFICIAL MAGAZINE OF THE INTERNATIONAL AEROBATIC CLUB

RECAP OF THE 2024

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### ON THE COVER:

2024 U.S. National Aerobatic Championships were held at the Salina Regional Airport in Salina, Kansas. A great overhead drone shot by Jaerett Engeseth.

### ABOVE:

Starters Doug Vayda (left) and Dale Byrkit kept things running at the 2024 U.S. National Aerobatic Championships. Photo by Lorrie Penner.

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# 2026 World Aerobatic Championships and the IAC Fall Board Meeting Recap

BY JIM BOURKE, IAC 434151



## WAC 2026 in New York

**EXCITING NEWS FOR THOSE** of you interested in world competition: The 33rd FAI World Aerobatic Championships will be held from August 18 to September 1 at the Genesee County Airport in Batavia, New York!

Our Nationals contest director, Shad Coulson, will be taking his talents to the world stage with this event that will bring in pilots and national teams from all over the world. Please reach out to Shad if you are interested in volunteering: [shadcoulson@gmail.com](mailto:shadcoulson@gmail.com).

Check in with Shad for details and watch [IAC.org](http://IAC.org) as well as [CIVA-News.com](http://CIVA-News.com) for the latest info.

My thanks to everyone involved in this bid and to our CIVA delegate, Mike Gallaway, for making the pitch at the recent CIVA Plenary.

## Fall Board Meeting Recap

We had a productive and professional board meeting in Oshkosh on October 17. The event was a bit earlier than some previous years, which, thankfully, meant it was a bit warmer!

We met for a single day of discussion and debate on various topics, including the budget, EAA AirVenture Oshkosh, the U.S. National Aerobatic Championships, sequences, and the rule change proposals. The results of our meeting can be found at [IAC.org](http://IAC.org) by selecting “Govern” from the main menu, then choosing “Meeting Minutes and Documents.” Note that you must be logged in to see this menu item.

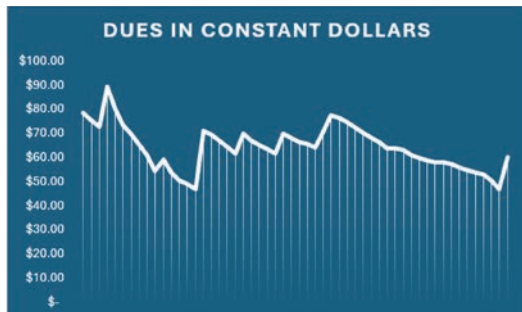
## Budget

Regarding the budget, I am encouraging the board to adopt a policy of regular increases to our dues and other fees to keep pace with inflation. The following charts will tell the story.

## Dues in Constant Dollars

As you can see from the chart at right, our dues in constant dollars have decreased over time.

Prior to 2001, the board was increasing dues by roughly \$1 per year, in five-year periods, which

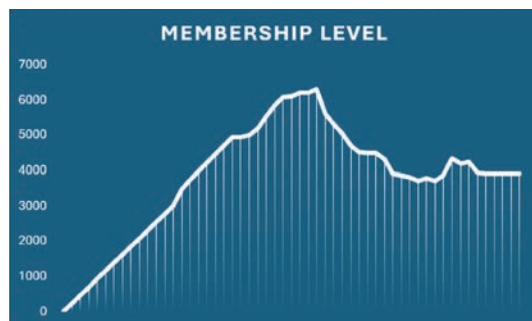


shows up as a jagged sawtooth shape. At that time, IAC leadership was watching over the revenue picture.

But then from 2001 to 2022, incredibly, there were no inflation-based adjustments at all. This can be seen as a long ramp gently downward that takes up about a third of the graph.

In 2022, the IAC board approved an increase from \$45 per year to \$60 per year. This can be seen as a sharp ramp up near the right edge of the graph.

While each increase is painful to our membership, failing to increase the dues to keep pace with inflation slowly erodes our ability to provide services to our membership. Without that increase in 2022, we would have had to make some tough decisions this year.



## Our Membership Levels Over Time

As this chart shows, our membership levels peaked in about 2000 at 6,000 members, then dropped off a cliff to about 4,000 members, where we've stayed.

Perhaps post-peak, the board felt that it was too risky to increase dues with the membership numbers on the decline. But that decline ended quickly and surely had nothing to do with pricing. In fact, surely every sport follows the same pattern of rapid expansion followed by a contraction to a stable norm.



It seems likely that we will stay at 4,000 members indefinitely unless there is some kind of societal shift that is out of our control.



### Membership Revenue in Constant Dollars

Combining the previous two charts provides us with a picture of the IAC's membership

revenue in constant dollars. Membership revenue makes up over 50 percent of the IAC's total revenue.

Unfortunately, another major source of revenue for the IAC was ad sales for *Sport Aerobatics*. Those are dramatically down, as well, and unlikely to recover.

The good news is that the IAC can be successful with 4,000 members. We've been operating with that level of membership for a couple of decades now. In fact, we could remain financially solvent with fewer members if we had to.

Therefore, my advice to the board is to adopt another dues increase. More importantly, I will be asking the board to adopt a policy to regularly increase dues as we did in the early years of the IAC's existence.

Hopefully, these charts and my quick summary of the situation will help everyone understand where I'm coming from. Reach out if you need more info.

### See You Next Month!

That's it from me this month. Please reach out with any reaction you have to this or anything else going on with the IAC! You can email me at [president@iac.org](mailto:president@iac.org). **IAC+**

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# Thank You, and We Celebrate the Pitts Special 80th Anniversary

BY LORRIE PENNER, IAC 431036



**DURING THE 2024 IAC OCTOBER** fall board meeting, I submitted a resignation (retirement) letter, which IAC President Jim Bourke presented at the meeting. This is my last issue of *Sport Aerobatics* as I will be retired on January 31, 2025.

I want to say thank you to my aerobatic family for the wonderful opportunity to share your stories with the IAC membership. It has been an honor this last five-and-a-half years to work with over 275 authors and 183 photographers/illustrators from among our IAC ranks.

Thank you to those of you who have contributed to *Sport Aerobatics* or *In the Loop*, engaging in the IAC's core purposes to educate and share our aerobatic knowledge and a commitment to safety. Because of you, our IAC members, a deeper understanding of the sport of aerobatics and its safety culture has been shared to those within and outside the club.

Our IAC publications have been an amazing mainstay of our ability to reach out. Articles that appear in these publications have given food for thought, innovative approaches to perplexing technical issues, and valuable information on the art of flying aerobatic maneuvers. Our members also enjoy being entertained with IAC members' experiences or have delighted in seeing chapter activities, names of their friends, and their airplanes featured.

I encourage you to keep sharing. Writing or submitting photography is another way to give back to the IAC and the aerobatic community. Just as volunteering allows us to continue providing club activities, sharing information not only edifies but also ties us together on common ground and fuels each of our individual passions for aerobatics.

In this issue of the magazine, we feature and celebrate the 80th anniversary of the Pitts Special. "Was there ever a time when the Pitts Special wasn't on every sport pilot's 'Wanna Fly' list?" said Budd Davisson in his article "2025: The Year of the Pitts. "Yes, there was, but that time was before 1945, the birth year of the Pitts,

which makes 2025 the 80th anniversary of Curtis Pitts' enduring legacy." For those new to aerobatics, it is a great article with historical background on how the Pitts Special came to be.

In 2015, the IAC celebrated the 70th anniversary at EAA AirVenture Oshkosh. There was Pitts merchandise in the store and a full series of exhibition panels that now hang on the walls of the Pitts Flying Museum in Arizona, and many of the forums were "Pitts-centric." IAC AirVenture Chairman Jordan Ashley is in the planning stages for an 80th anniversary Pitts celebration at EAA AirVenture Oshkosh in 2025. Watch for more information in the coming months.

As I write this log, I don't know what my retirement life will look like, but I do know the time is right. My husband is retiring from the airlines, and we will reap the fruits of a lifetime of labor and enjoy some fun cross-country trips to see family and friends while we still are healthy and young enough to appreciate a good adventure. Wishing you all the best in the new year! **IAC**

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## 2025 IAC CONTEST SEASON CALENDAR



DATES	HOST CHAPTER	NAME	REGION	LOCATION	AIRPORT
March 20, 2025	62	Estrella Glider Classic	Southwest	Maricopa, Arizona	E68
March 20, 2025	62	U.S. Nationals – Unlimited/Advanced Glider	Southwest	Maricopa, Arizona	E68
March 27, 2025	89	Snowbird Classic	Southeast	Keystone Heights, Florida	K42J
June 6, 2025	15	Harold Neumann Barnstormer	South Central	Ottawa, Kansas	KOWI
June 20, 2025	80	MAC80 Aerobatic Championship	South Central	Seward, Nebraska	KSWT
July 12, 2025	88	Michigan Aerobatic Open	Mid-America	Bay City, Michigan	K3CM
September 21, 2025	119	U.S. National Aerobatic Championships	South Central	Salina, Kansas	KSLN

► [IAC.org/Contests](https://IAC.org/Contests)

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*Mikhael Ponso, Brian Kaufman, Greg Bruyn and Mike Cappiello, the ERAU grads at the 86th Sebring contest 2023. Photo by Ken Kopp.*

# A College Reunion of Sorts

**86TH SEBRING REUNITES COLLEGIATE AEROBATIC COMPETITORS**

**BY MIKE CAPIELLO, IAC 430121**

**I CAN REMEMBER MY** early days as a student at Embry-Riddle Aeronautical University's (ERAU) Daytona Beach, Florida, campus back in the early 2000s. I was awestruck by what could potentially lie before me in aviation as long as I kept my focus. Ever since I was a kid, I knew I wanted to be a pilot. There were few things that piqued my interest as much as flying back then, especially aerobatics.

In the mid-1980s, I can remember watching a movie with my father that featured a fighter jet doing all sorts of fast rolls and inverted flying. I had to do that. I had to fly inverted and pull some g's, and there was nothing that was going to stop me. I did not come from a flying family so I didn't know what I needed to do to accomplish my goals.

Ironically, my high school physics teacher was a private pilot, and he filled me in on a little school down in Daytona Beach. Luckily, with my parents' approval and support, I attended a summer camp at ERAU while still in high school and obtained my private pilot certificate. I was absolutely hooked and ended up attending four years of college there starting in 2000.



*Mike Cappiello at the U.S. Nationals 2003. Photo by Greg Bruyn.*

While attending Riddle, I was able to meet some great people, many of whom still remain my closest friends to this day. It was there that I was able to get hooked on aerobatics. I first met Greg Bruyn, IAC 430458, while attending a summer camp during high school that Riddle offered. We earned our private pilot certificates in the summer of 1999 and became close friends while attending Riddle as full-time students upon graduating from high school. We were passionate about all things airplanes, and we were responsible (for the most part) for keeping an eye on our future goals and aspirations.



I could tell right away that Greg and I were similar in our interest in flying as much as we could, and not just doing the minimum amount of work. We joined the Eagles Sport Aviation Club, which at the time operated several sailplanes and offered aerobatic instruction in Randy Gagne's Pitts S-2B (aka, the "B") that was recently donated to the school by Randy's family. At the time, the school didn't want much to do with aerobatics and the Pitts, so the club was established and offered aerobatic and unusual-attitude instruction in the airplane. The famous N260AB. Many know the airplane and its long history, but for those who don't know, it was Randy's personal airplane.

Randy Gagne was a well-loved and respected aerobatic instructor. Throughout the 1980s and '90s, he was an aerobatic pilot who filmed many TV shows and movies and trained several well-known aerobatic pilots around the world. He was tragically killed in an accident in 1997, and his family wanted the airplane to live on at his alma mater, training future generations of aerobatic competitors in order to make them safer, more competent pilots. It was then that Greg and I met Brian Kaufman, IAC 27457.

Greg and I became heavily involved in flying the "B" as much as we could. I can remember my first aerobatic flight in 260AB like it was yesterday. It was 0.2

**It was my first contest  
in almost 20 years,  
and it certainly won't  
be the last.**



Mike at the "office" flying left seat on the Airbus 319-320.

over to Brian to do the landing. As he took the controls while laughing at the same time over the intercom, he said, "Welcome to the club!" My reply was, "What? What are you talking about?" I had no idea I messed up my flight and flew the wrong figure, but he was sure to tell me about it! Good times were still had.

About a month or so later, at the 48th Sebring contest in October 2003, I had my "revenge" against Greg. It certainly wasn't the Nationals, but I still beat him and came in first place. Throughout our years at Riddle, the three of us became great friends, flew a lot together, and got to meet a lot of great people in the aerobatic community. It was always amazing for us to walk up and down the ramp at the aerobatic contests and see the beautiful airplanes all lined up ... Pitts Specials, Extras, Staudachers, Sukhois, Gileses, Christen Eagles, and Decathlons. I would always turn to Brian or Greg and the others and say, "Do you think we'll be able to do this someday ourselves, own one of these and compete like these 'old' guys?" They would turn and look at me in agreement and say, "I sure as hell hope so!"

Unfortunately, we had to grow up (sort of) and start careers of our own in order to keep those dreams alive. Brian continued to teach in 260AB, as did Greg, throughout college and upon



Eagles Sport Aviation Club competing at the U.S. Nationals 2003. Photo by Jason Newburg.

on the Hobbs meter in duration, right into the aerobatic box at Flagler airport. Two loops, two rolls, and a crazy approach to a landing. I was hooked. Life-changing to say the least. Greg and I flew as much as we could, and Brian was our instructor. In fact, Greg was Brian's first student in the Pitts. I flew as much as I possibly could and competed at every contest that was held in Florida at the time ... Sebring, Flagler, Keystone.

The club even took the airplane to the U.S. National Aerobatic Competition back in 2003 when it was held in Denison, Texas. Greg and I were competing in Sportsman then and always had a friendly rivalry between us and our other club friends who were competing with us. Unfortunately, that year at Nationals I didn't fly as well as Greg did. He beat me and became the U.S. National Aerobatic Champion in the Sportsman category! Brian was my safety pilot for my flight, and after my sequence was over, I did my wing-wags and handed the controls

graduation. When I graduated, I was fortunate enough to land a flying job in the post-9/11 world working for Michael Goulian. It was an amazing experience to say the least. It is still to this day by far the best job I've had. The things I learned, the people I met, the airplanes I flew — it was an experience I'll never forget. The air show and aerobatic community are like no other when compared to other facets of aviation.

I was also fortunate enough to fly for a charter company Michael started and then moved on, flying for a fractional operation, then onto flying corporate for the PGA Tour flight department out of St. Augustine, Florida. In 2014, I finally made the move to the dark side and started flying for a Part 121 major airline. I started flying the MD-80 for Allegiant in September 2014, then transitioned to the Airbus. I upgraded to captain and check airman on the Airbus 319/320 and most recently took a position as an initial cadre check pilot that will be onboarding the 737 Max 8-200. We are still awaiting delivery of our first jet as this is being written.

Brian had a similar career path. We both didn't want an airline career initially. I can remember Brian telling me when we were flying aerobatics together one day that he called Gene

Beggs and was given some great advice. Gene said to him as a newly minted Pitts instructor, "Read my book on *Spins in the Pitts Special*, and get a job with Southwest Airlines." Brian did the first part right away, but it took him about 12 years or so to follow through on the second part. He flew charter, fractional, then corporate, similar to me, until making the transition to the airlines. He has been with Southwest for almost 10 years and is currently based in Denver.

Greg was teaching in 260AB and also was ferrying aerobatic and tailwheel airplanes and Extras for Southeast Aero back in the day. He was constantly bringing an airplane here and there, and we were occasionally crossing paths throughout the United States as I was ferrying the air show airplane across the country. Greg started his Part 121 airline career with Atlantic Southeast Airlines shortly after graduation, then moved on to SkyWest, all while still ferrying airplanes on the side as well as doing aerobatic checkouts in customers' airplanes. He is now a pilot at Delta, living in the Atlanta area.

**The young kid walking on the ramp many years ago wondering if he'd ever be able to do this blinked his eyes, and it was almost 20 years later all of a sudden.**

Mike's plane, N203MC, over the Sunshine Skyway Bridge in 2024. Photo by Evan Lewis.



left to right: 3rd place Mike, 1st Greg, 2nd Brian and all flying N203MC at the 86th Sebring contest in 2023. Photo by Ken Kopp.



Throughout the years, both Greg and Brian have been able to continue flying general aviation and maintain adequate tailwheel currency. Brian owns a share in a 150-hp Decathlon based in the Kansas City area. Over the years, I have been longing to get back into aerobatics and fly a “real” airplane again. About a year and a half ago, I decided I was ready to pull the trigger and make the crazy financial decision to buy myself an airplane. It had to be one that went upside down. No question about it. None of this straight and level autopilot on stuff. I’ve had enough of that at work over the years.

I missed competing and aerobatics, and this was my opportunity to finally get back into it. The young kid walking on the ramp many years ago wondering if he’d ever be able to do this blinked his eyes, and it was almost 20 years later all of a sudden.

I found my airplane, or I should say it found me. After a few deals on a couple other S-2Bs fell through (including 260AB), an old air show friend, Brian Norris, who was Sean D. Tucker’s ferry pilot/mechanic/air show grunt extraordinaire,

told me he was selling an S-2B for his good friend. I immediately crunched some numbers and made some phone calls to Greg and Brian and asked them if they’d help me get back up to speed in the “B.” They helped. They more than helped, answering questions and especially reassuring me that this will be the best financial decision of my life (ha!). I took delivery of the airplane and worked with both Brian and Greg for a few days getting my feet working again. I told them both that they better clear their schedules in December for the 86th Sebring contest — come on down, and we’ll compete at Sebring like we did many years ago. We have an airplane, although it wouldn’t be N260AB this time, but it would be great to compete against you two and hopefully beat you after all these years.

We made it happen. Our crazy airline schedules matched up, and we were able to do something that we thought we’d never be able to do again. I hate to admit this, but the two of them didn’t have much time to practice prior to the contest and they still managed to beat me. I was, however, able to beat each of them on at least two flights and came in third overall. Greg came in first, and Brian in second. They’re never flying my airplane again!

It was an awesome week reminiscing about our college years and seeing familiar faces at the competition that we haven’t seen in many years. It was my first contest in almost 20 years, and it certainly won’t be the last. It’s good to be back! To see all the beautiful aerobatic airplanes lined up like many years before back in college made me think, “Where have all the years gone?” Here’s to many more, and as we used to say, “Keep the down side up!”

**IAC+**

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**Mike Cappiello** graduated from Embry-Riddle in 2004 with a bachelor’s degree in aerospace studies and minors in flight, aviation meteorology, and air traffic control. He holds an ATP certificate with type ratings in the Citation X, DC-9 (MD-80), A320 and B737, with 10,000-plus flight hours. He also holds seaplane ratings, as well as his CFI and CFI-I. Mike is currently a line check airman and simulator instructor on the Boeing 737 at Allegiant Air based out of St. Petersburg, Florida.



*“They are never flying my plane again,” said Mike. Pictured with Brian and Greg at the 86th Sebring. Photo by Peter Marsh.*





*First New England Aerobatic Club meeting at Beverly Airport, 1973.*

# IAC Chapter 35 - A History of Friends, Flying, and Aerobatics!

BY CLINT DAVIES, PRESIDENT OF THE NEW ENGLAND AEROBATIC CLUB (IAC CHAPTER 35)

**ANNIVERSARIES ARE OPPORTUNITIES TO** reflect and look to the future. This year the New England Aerobatic Club, IAC Chapter 35, celebrated our 50th Anniversary.

The IAC Chapter 35 story began with a focus and simple philosophy, later described as a place where fun-loving and caring individuals — men, women, and children — could gather to enjoy “grassroots aerobatics.”

Eastern Airlines pilots Ward Bryant and Valmore (Val) Beaudrault were inspired by the idea of learning and flying sport aerobatics. The founders met monthly and started to collect interested pilots. In 1975, they held their first Sportsman mini contest in Jaffrey, New Hampshire. Two pilots flew, and there were five judges.

In 1976, they had the second contest, and seven pilots participated. More people began to volunteer, and the club gained momentum. Scores were tabulated with the help of programmable handheld calculators. Awards and trophies were individually crafted by Ward and Val.

In the first decade, several members built their airplanes, including a Skybolt, Pitts, Cassutt, and Christen Eagles. There was also a 450-hp Stearman, a Swick Conversion T-Craft, and a clipped wing Cub. The



*Rick Runnels with co-founders Val Beaudrault and Ward Bryant.*



*Ward Bryant with Charles Schumacher 50 years later.*





*Michael Goulian's first aerobatic contest 1986.*



*This is why we don't have contests in May anymore.*



*The Green Mountain Aerobatic Contest is the signature July event.*



*Flightline photo from the Green Mountain Aerobatic Contest.*



*Traditional mid-winter gathering continues.*



*IAC Chapter 35 group photo GMAC.*

New England weather was a challenge, and cross-country was an adventure. Winters were not conducive to aerobatic flying. A tradition began of holding a mid-winter social gathering that became very popular. It continues to this day.

The club's second and third decade saw the growth of members, pilots, judges, and volunteers and expanding practices and contests. Club members competed throughout the northeast region and beyond. A young Michael Goulian started aerobatic flying, and Rob Holland began a flight school in Nashua, New Hampshire.

The 2000s and 2010s saw our current generation of learners, teachers, and leaders appear in New England. Chapter members actively teach, coach, develop, challenge, and mentor each other.

In this, our 50th anniversary season, the weather continues to be challenging, and the winters are still too long. We now have five long-term aerobatic practice areas in the club and two contests each year. Club members try to have practices, in some fashion, almost every weekend of the season.

The Green Mountain Aerobatic Contest (GMAC) is our signature July event, and the New England Fall Classic continues to be a Sportsman-focused grassroots mini contest. We collaborate with our friends from other chapters in the Northeast, across the country, and at Nationals.

As we look to the future, the chapter's focus continues to be on learning, teaching, gathering with our good friends, and enjoying the world of sport aerobatics together.

We work to invite new members, collect pilots and help them grow, develop and sustain judges, depend on and appreciate volunteers, and encourage the next generation. Our community and members have an increasing social-media presence. IAC35.org is the latest iteration of the chapter website.

We value those who came before us and do our part to sustain the traditions and adapt them for today and for our collective future.

When we gather, there is a strong feeling that we are with "our people." In this we are confident that Chapter 35, among all our IAC friends, is not unique. ***IAC***



*IAC Chapter 35 member Ron Mann strapping in at the contest.*



2025,  
THE YEAR  
OF THE

*Pitts*

80 years of Curtis'  
inspirational *g*-machines

BY BUDD DAVISSON, IAC 435420





*First Pitts S-2B SN 5261 built by Aviat, September 1992.*

**WAS THERE EVER A** time when the Pitts Special wasn't on every sport pilot's "wanna fly" list? Yes, there was, but that time was before 1945, the birth year of the Pitts, which makes 2025 the 80th anniversary of Curtis Pitts' enduring legacy. So you need to go back quite a few generations before you'll find pilots who were actually flying before the tiny Special first took to the air, eventually to become a fixture on the homebuilt and aerobatic scenes. This bumblebee of an airplane has always just been "there."

### **THE SPECIAL'S BIRTH WAS CAUSED BY A WACO**

Before becoming an aviation icon, Curtis Pitts had a number of careers, including being a railroad man, but, from his high school days, when he built his first "airplane" (with no training, he rolled it up in a ball taxiing, which was probably fortunate), aviation was never far away. Nor was aerobatics. In fact, as he watched the likes of Mike Murphy rocketing through the air in his mighty Waco Taperwing, he was determined to get up there



*First Pitts S-2C SN 6001 built by Aviat in 1998.*

and enjoy what he saw as the ultimate freedom the maneuvers represented.

On the advice of some airport "experts," he bought a Waco F-2, which was supposedly a good aerobatic airplane. Unfortunately, Curtis found

otherwise. He said, “It was the sorriest airplane I’ve ever owned. Could barely get it high enough to build the speed for a loop, and it flat didn’t like to roll.”

Curtis was convinced he could design and build an airplane that did better aerobatics. However, World War II got in his way, and he found work as a welding inspector for the Navy at NAS Jacksonville. But that didn’t stop him from dreaming.

## PARTNERS IN EVERYTHING: MA AND PA

Curtis, known as “Pa” to just about everyone, wasn’t dreaming alone. In 1938, while still railroad-ing (and flying on weekends), he met Willie Mae Lord. Even though this brash young Georgia boy was full of crazy ideas about airplanes and such, she said yes when he proposed, and the inseparable team of Pa and Ma Pitts was born. She was right

**“You have no idea how quickly an airplane will slow down when it is sliding upside down and backwards in the grass.”  
— Curtis Pitts**

there at his side, and as his businesses and adventures grew, the community they created around them revered her as much as they did the maestro himself. In fact, her kitchen saw not only more than a few airplane parts being covered and rib stitched, but also a wide assortment of aviation’s most obsessed and unique characters, all of whom felt as if Ma and Pa were family. And the feeling was mutual.

## AN ENGINEER HATCHES THAT FIRST BABY BIRD

The extent of Curtis’ formal education was high school. But he had a voracious appetite for learning and a thoroughly natural understanding of all things mechanical, both theoretical and practical. He always referred to himself as a “redneck engineer,” someone who didn’t cling to highfalutin theories but got the job done as simply and as inexpensively as possible. But even in his later life, having

designed and built lots of airplanes, he never saw himself as knowing all the answers, although, by that time, he probably did know most of them. At the beginning at NAS Jacksonville, while he was sketching little biplanes, he made it a point to get to know the professional engineers on base, the most important of whom was Dr. Fred Thompson. Thompson would check his numbers and his design work, and the relationship continued for decades.

If the sorry Waco had taught him nothing else, it was that aircraft performance was a function of size and structural efficiency (another way of saying strong but light). The smaller and lighter the airplane, the less horsepower would be needed to give outstanding performance. An ancillary aspect of that formula was that horsepower cost money, something that was in short supply in the Pitts household.

Apparently liking the concept of a new bird flitting around her cosmos, Mother Nature at first picked on him by striding across his field in the form of a hurricane, totally destroying the E-2 Cub and Taylorcraft he had in his little flight school. However, that T-craft’s 55-hp O-145 Lycoming may not have been the world’s greatest engine, but it was exactly what he needed for his little airplane. At the time, he didn’t know the thought of a Pitts with a 55-hp engine would be not only unbelievable but also laughable to future generations.

As he began to lay down the outlines for the fuselage, tail, and wings, he also didn’t know that he was designing the very definition of an aviation icon. Those lines would be totally recognizable to every generation of sport pilot to come, and the airplane’s fame would only grow with time.

## IT WAS A DIFFERENT KIND OF PITTS

That first airplane set the mold for the Pitts look, but it had some features that would never be seen again. Chief amongst those was a rigid gear; the only shock absorption system was the oversized (for the airplane) 700-by-4 balloon tires (one size down from a J-3 Cub) as were used on E-2 Cubs and early Ercoupes. The rigid gear came to cause Curtis some grief when he made a harder-than-normal landing.

He said, “When I hit and bounced, I didn’t know that both axles had broken off and I had just two steel tripods sticking down. You have no idea how quickly an airplane will slow down when it is sliding upside down and backwards in the grass.”

When the airplane was rebuilt, it was with a 90-hp Franklin and a bungee spring landing gear.



However, the turtleneck, which on the first Special was formed in fabric with a distinct headrest outlined by stringers, remained. But not for long. After Curtis sold it, the new owner, a duster pilot, got a little too low in a roll without an inverted fuel system and destroyed it. In Curtis' slow, south-Georgia drawl, he said, "That airplane would have fit in a No. 10 washtub." The pilot, however, survived with minor injuries.

### **THEN CAME BETTY, THE STINKER, AND FAME**

When Curtis and his ever-present co-conspirator Phil Quigley started on the second Special, they had a much better idea of what they thought this one should include. The result was the airplane that not only set the pattern for all follow-on Pittses, but also became the most famous baby biplane of all time.

Special No. 2, registered as NX86401, had the now-proven bungee landing gear and one of the

new C85 Continentals equipped with an Ex-Cell-O fuel injection unit. This was a major improvement because the airplane now had the necessary fourth dimension to round out its three-dimensional performance; it could now run upside down so outside flight was possible. Yes, technically being able to fly inverted isn't the fourth dimension, but the first time you do it, it feels like it is. With those capabilities, the little Special was a true do-it-all aerobat, and Phil began showing what it could do at various air shows in the Southeast. It was at one of those, the Miami Air Maneuvers in 1947, where the fortune and fame of the Pitts Special took a decided turn for the better. However, that turn of fate almost didn't happen.

One of the participants in the show, a petite, incredibly vivacious young lady named Betty Skelton, looked down from her Great Lakes and saw a crowd of people around the tiniest biplane she'd ever seen. Upon landing, she pushed her way



*The late Jim Klick with his Pitts S-1S SN001, which was the first built of its kind.*

**As he began to lay down the outlines for the fuselage, tail, and wings, he also didn't know that he was designing the very definition of an aviation icon.**

through the crowd and beheld the airplane that she just knew she had to have. As she described it, "I love small things. Tiny things. Maybe it's because of my size, but the Pitts just looked like it would fit me exactly right."

She was so smitten by the airplane that she asked if she could sit in it and got a chauvinistic rebuff from the men around the airplane, which included Phil Quigley and Curtis Pitts. They all became close friends and laughed about it later, but she was miffed and determined to own that little airplane, and a few months later she did.

Betty flew the second Special for a short time in its original paint scheme, but then had it repainted white with the familiar skunk on the turtledeck. *Little Stinker* was born, and what was now the Pitts Special hit the aerobatic fast track. Betty zoomed to fame, partially by winning the women's aerobatic championship three years running. But her engaging personality made her a press favorite, which launched her into the limelight, dragging *Little Stinker* with her.

By the time Betty retired from the aerobatic and air show game to race cars and set records, former WASP pilot Caro Bayley had already spent time with Curtis and Phil, having them build a Special for her ("I kept having to threaten them that they couldn't go fishing until something was done on the airplane."). She used that airplane to capture the women's crown in 1951. With a 125-hp Lycoming in the nose and her nonexistent weight (she was even smaller than Betty, only a few inches over 5 feet), the airplane was a rocket ship. Unfortunately, it was destroyed in a fire after she sold it.

Curtis' bright future building aerobatic airplanes was dashed on September 15, 1951, in Flagler,

Colorado, when a pilot not on the schedule to perform in an air show attempted a low-altitude slow roll. The airplane cartwheeled into the crowd, killing 20 spectators, half of them children. Almost immediately, the air show business disappeared and Curtis' phone stopped ringing. The result was that through the 1950s, only two Pitts Specials were built, both of them using the partial plans Curtis had lying around the shop, most having been lost in a flood.

By the early 1960s, a lot of pilots in the Homestead, Florida, area where Curtis lived were beginning to hound him for plans. He too thought full plans should exist for the airplane, because all he had were marked-up drawings and sketches for the basic parts with no details shown. However, he said he couldn't easily draw up plans with nothing to work from. Enter Pat Ledford, one of Curtis' local friends.



PHOTOGRAPHY BY PITTS FLYING MUSEUM



Pat volunteered to build the airplane from what few drawings existed, with Curtis looking over his shoulder filling in the blank spots. At the same time that parts were being made, Curtis did the drawings. So Pat's airplane, N8L, became the first plansbuilt S-1C.

Incidentally, the C stood for Continental, because Curtis thought people would be putting 100-hp O-200 Continentals in it. And a few probably did, but it was very few. The airplane was simply born to be hot-rodged, and any Lycoming with four cylinders would eventually rest ahead of the firewall.

### **THE 1960S: THE BIRTH OF MODERN AEROBATICS AND ROUND WINGS**

Aerobatics, as we know it today, began to gain a real foothold internationally in the 1960s, with the Russians and Soviet Bloc countries cleaning up with



*N49305, the first factory Pitts S-1T, built by Aerotek in 1981.*



*N8L is the first plansbuilt Pitts S-1C. Builder was Pat Ledford, one of Curtis' local friends.*



their Yaks and Zlins. They were redefining maneuvers with their outside capabilities, which made it difficult for the early S-1C Pitts to compete with its M6 semiflat-bottom airfoil. So Curtis decided symmetrical airfoils were the ticket. Those wings wouldn't care whether they were upside-down or right-side-up, as long as the engine was running.

Again, Pat Ledford and N8L were called into service, and the little S-1C was used as a test bed for the new symmetrical wings. Theoretically, Curtis knew what needed to be done, but on the initial set he said, "On the first flight, I pushed just a little too hard, and that thing reared up and did things I didn't know an airplane could do. It scared me big-time. As soon as I got on the ground, we yanked those wings off, and I cut them up to make sure they didn't wind up on someone's airplane!"

It took only a little more building and experimentation before Curtis had built what many consider to be the quintessential single-hole Pitts, the S-1S — S for symmetrical. In nothing flat, two categories of Pitts Specials were created: the

"flatwing" S-1C and the "roundwing" S-1S, nicknames that have survived to this day.

In developing the S-1S, Curtis came up with an idea that was so unique that he was issued a patent on the concept. In a normal biplane, the top wing is indexed on the fuselage with a higher angle of attack than the bottom wing. That ensures the top wing will always stall first, and the bottom wing, which isn't fully stalled, will lift the nose down. However, that's exactly what you don't want when upside-down. Curtis' cure was to make the wings symmetrical and parallel, and use a different airfoil section for the top wing, causing it to stall first, whether right-side-up or upside-down.

The symmetrical airfoils meant the airplane didn't care whether it was right-side-up or upside-down, which was the goal. But the parallel wings also meant the aerodynamic drag of the airframe was much less. So, all things being equal, the airplane is much faster than a traditional biplane, which, combined with bigger engines, helps it go uphill for a much longer time.



First Pitts S-2S SN 1001, built by Aviat in 1978.





*Pitts S-1T prototype SN 002, tail number N22XP.*

Although the little S-1S has been eclipsed by the super-slick, high-powered monoplanes, the truth is there are only a few pilots in the world better than a really lightweight, well-built S-1S. No pilot ever forgets his first takeoff in a 180-hp S-1S. The airplane's crowning glory came in 1972, when — equipped with super-lightweight (715 pounds!) 180-hp S-1S aircraft, mostly built by Curtis — the United States took the team gold and both men's and women's gold.

### **ENTER THE S-2 SCHOOLMARM: THE ACRO WORLD SUDDENLY HAS A TRAINER**

During the 1960s, aerobatics exploded. Mid-decade the Citabria was introduced, and few were prepared for the amount of interest the general flying public showed in learning aerobatics. At the same time, the more serious acronauts had a dilemma: How did they get training in such competition staples as outside snaps and loops, as well as the more exotic maneuvers that were begging to be



*Budd Davisson's Pitts S-2A, tail number N8PB.*

invented? The Czech Zlin Z-526 was the only trainer up to the task, but was largely unavailable on this side of the pond. However, Curtis took care of that in typical Pitts fashion: He designed a two-place version of the little Special that was sized and designed to go where any newbie acro pilot wanted

to go, with an instructor on board. What made this an entirely different enterprise, however, was that the FAA certified it. Curtis, the country boy crop duster, was about as laid back as laid back gets, but his time dealing with the bureaucracy wasn't his favorite. He hired Gene Deering to be his engineer and did his best to stay out of his way when dealing with the FAA.

The original S-2 was 180 hp with a fixed-pitch propeller, but it was never produced that way. Before going into production, it was fitted with the 200-hp IO-360-A1A angle-valve Lycoming and a constant-speed propeller, becoming the S-2A in the process. Those additions added lots of weight to the airframe, but it was, and still is, a stellar performer. More important, it led to the partnership with Herb Anderson and Doyle Child in Afton, Wyoming. Herb had a long history of producing rag and tube airplanes (CallAir ag airplanes), and Doyle owned a defunct plant that had built snowmobiles in Afton. So Aerotek Inc. was born, and the S-2A went into production in mid-1971. A new Pitts era began.

## THE PITTS FAMILY GROWS

The Pitts family tree of aircraft developed some major crotches and tons of side branches and twigs. The factory has changed hands and names several times, with the current incarnation being Aviat Aircraft under the tutelage of owner Stu Horn. The Pittses that started life in the Star Valley where Afton is located (one of the most beautiful spots on

the continent) are listed below. Homebuilt varieties are also listed, so the entire Pitts family tree is here.

S-1C: Homebuilt only, flatwing, plans and kits from Steen Aero Lab

S-1D: Homebuilt only, flatwing, four-aileron, lightly modified from the S-1C

S-1SS: Homebuilt only, S-1S wings modified by Curtis to utilize new *Super Stinker* ailerons and tips for faster roll and lighter forces, plans and kits from Steen Aero Lab

S-1S: Homebuilt, plans available from Aviat Aircraft

S-1S: Factory-built, 180-hp fixed pitch, several new ones produced in 2014, still available on special order from Aviat Aircraft

S-1-11B: *Super Stinker*, homebuilt only, entirely new single-place with unique, new aileron design, 260-plus hp, a rocket ship, plans from Aviat Aircraft

S-1E: Factory kit of S-1, usually seen with 180-hp fixed pitch

S-1T: Factory single-place, 200 hp, constant speed, available on special order from Aviat

S-2A: Factory two-place, 200 hp, constant speed, 1971-1981

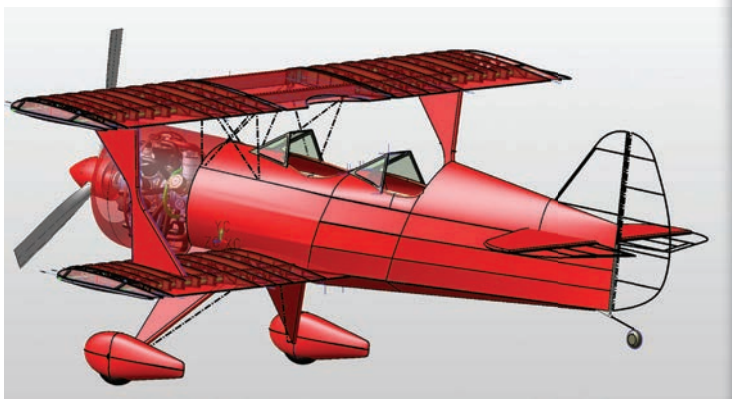
S-2E: Factory kit version, two-place, supposed to be 180-hp fixed pitch but most are 200 hp, about 30 produced

S-2S: Factory single-seat version of S-2 with 260 hp, constant speed, approximately 30 built

*The first factory-built Pitts S-2A SN 2001, tail number N14CB, was built by Aerotek in 1971.*







*Pitts Model 14 Representation*



*Curtis Pitts Memorial Trophy recipient Tony Horvath with the Pitts Model 14 project.*

S-2ES: Factory kit version of S-2S, unknown number produced

S-2B: Factory two-place, 260 hp, two-bladed constant speed, 1981-XXX

S-2C: Two-place, 260 hp, three-bladed Hartzell; completely new wing, aileron, and tail design; Curtis did wing design; 1998-present

Model 12: Two-place, 360/400-hp Vedeneyev radial, swept-top wing, spring gear, kits and plans available through Kimball Enterprises

Model 14: Two-place, straight wing, bungee gear, designed for Steen Aero Lab, airframe finished but it's on a back burner

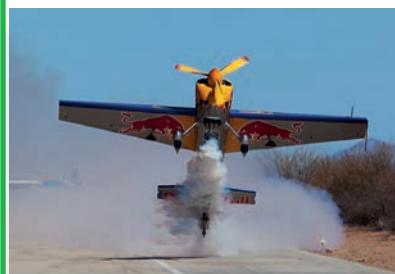
The entire story of Curtis and his airplanes requires a book to adequately cover. Or an entire magazine dedicated to it. It's an intriguing tale. **IAC**

**Budd Davisson**, of Phoenix, Arizona, is known worldwide for his extensive writings on homebuilt aircraft, aerobatic flight, and aviation safety. Budd is a CFI-I/MEL and is also type-rated in the B-25 and the P-38. Nearly 7,500 of his 10,500 hours are landing instruction in the Pitts Special.

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# 2024 U.S. NATIONAL AEROBATIC CHAMPIONSHIPS RECAP

BY SHAD COULSON, IAC 440759, U.S. NATIONALS CONTEST DIRECTOR



## CONTEST OVERVIEW

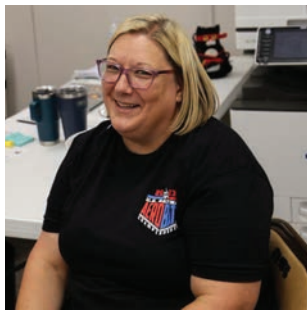


Shad Coulson

**BY ALMOST ANY MEASURE**, the 2024 Nationals was a huge success, and there is only one factor that made it so: the key volunteers! Having only one year of experience as the contest director (CD) for the U.S. Nationals, I knew from the outset I would need to rely on and empower a select group of experienced volunteers to manage the details. Looking at the list of key volunteers, many of the names are familiar to anyone who has been around the IAC for a few years. Most of these amazing volunteers return year after year, and I am grateful for their experience, knowledge, and the guidance given to me throughout the planning phase and execution of the contest. We truly cannot give enough credit and appreciation to our contest volunteers.



(left to right) Monique Hartman, communications, and Alice Johnson, volunteer coordinator



Mary Beth Rudd, registrar



(left to right) John Smutny, air boss and Dale Brykit, starter



(left to right) Michael Lents, UND coach and advanced competitor, with Nick Buckenham, chief judge for Primary and Intermediate



## COMPETITORS

If we include the competitors who attended the Advanced and Unlimited glider nationals held in Arizona earlier in the year, the U.S. Nationals had a total attendance of 93 pilots, of which 73 were powered and 20 were glider. If we exclude those competitors who attended the Advanced and Unlimited glider nationals, the U.S. Nationals in Salina, Kansas, had a total of 86 competitors, of which 73 were powered and 13 were glider. Attendance this year saw a near 20 percent increase over the 2023 U.S. Nationals.

Serving as the CD of the U.S. Nationals affords me the opportunity to inspire new ideas, to provide fresh perspectives, and to renew interest in and participation at the national contest. From the onset, I had a customer service mentality while conducting planning activities. I aimed to ensure that volunteers and participants felt valued and received an event worthy of the time away from family, friends, and their professions, as well as the entry fee.



Tuesday night at Blue Sky Brewery to present flight medals.

Chris Rudd (right) works on Marty Flournoy's MX Aircraft.



# 2024 U.S. NATIONAL AEROBATIC CHAMPIONSHIPS RECAP



**ERIC LEDET - 1ST PRIMARY POWER  
+ GRASS ROOTS + AVIAT BIPLANE**



**JUSTIN MILLER - 1ST PLACE  
SPORTSMAN POWER**



**STEVEN JOHNSON -  
INTERMEDIATE**



**KYLE COLLINS - 1ST PLACE  
ADVANCED POWER**



**ROB HOLLAND - 1ST PLACE  
UNLIMITED POWER AND 4-MIN FREE**

## 2024 U.S. Nationals - Powered

Held in Salina, Kansas. Director: Shad Coulson. Chief Judge(s): Nick Buckenham, Mark Matticola, DJ. Molny, Hector Ramirez.

### PRIMARY POWER

Pilot	Chapter	Airplane	Known	Free	Unknown	Total
★ Erik Ledet	78	Pitts Special S-1S N519DC	529.70 84.08% (1)	547.60 86.92% (1)	512.20 81.30% (3)	1589.50 84.10% (1)
★ Peter Winter	12	Gamebird GB1 N488GC	503.90 79.98% (5)	515.00 81.75% (4)	528.80 83.94% (1)	1547.70 81.89% (2)
★ Patrick Keating	78	Super Decathlon N192R	495.80 78.70% (6)	531.80 84.41% (2)	509.50 80.87% (4)	1537.10 81.33% (3)
★ Vincent Evans	12	Gamebird GB1 N488GC	494.92 78.56% (7)	488.00 77.46% (6)	506.60 80.41% (5)	1489.52 78.81% (4)
★ Kyle Wren	12	Gamebird GB1 N488GC	478.78 76.00% (8)	524.50 83.25% (3)	480.86 76.33% (8)	1484.14 78.53% (5)
★ Dillon Johnson	78	Super Decathlon N192R	462.30 73.38% (9)	500.60 79.46% (5)	478.30 75.92% (9)	1441.20 76.25% (6)
Zach Paluch	78	Super Decathlon N192R	515.90 81.89% (4)	406.80 64.57% (9)	495.30 78.62% (7)	1418.00 75.03% (7)
Brayden Berringer	12	Gamebird GB1 N488GC	519.00 82.38% (3)	465.00 73.81% (7)	409.80 65.05% (10)	1393.80 73.75% (8)
Kathleen Thompson	78	Super Decathlon N192R	430.50 68.33% (10)	408.46 64.83% (8)	505.90 80.30% (6)	1344.86 71.16% (9)
Sencer Elliott	12	Gamebird GB1 N488GC	528.88 83.95% (2)	73.78 11.71% (10)	520.10 82.56% (2)	1122.76 59.41% (10)

### SPORTSMAN POWER

Pilot	Chapter	Airplane	Known	Free	Unknown	Total
★ Justin Miller	1	Pitts Special S-11B N426CU	1131.00 81.37% (3)	1199.50 86.29% (2)	1168.88 84.09% (7)	3499.38 83.92% (1)
★ Mark Haven	3	Christen Eagle II N101BR	1140.60 82.06% (1)	1162.60 83.64% (3)	1173.50 84.42% (6)	3476.70 83.37% (2)
★ Trevor Smith	61	Extra NG N609CS	1073.30 77.22% (10)	1212.80 87.25% (1)	1183.80 85.17% (2)	3469.90 83.21% (3)
★ Forrest Scholin	78	Super Decathlon N192R	1112.00 80.00% (4)	1141.10 82.09% (8)	1176.40 84.63% (5)	3429.50 82.24% (4)
★ Adro Begrow	89	Pitts Special S-2B N5349X	1106.90 79.63% (5)	1130.90 81.36% (11)	1163.70 83.72% (8)	3401.50 81.57% (5)
★ Sara Arnold	78	Bellanca Decathlon N8SC	1067.50 76.80% (12)	1137.20 81.81% (10)	1179.40 84.85% (4)	3384.10 81.15% (6)
★ Casey Siebel	38	Gamebird GB1 N4GB	1038.80 74.73% (15)	1145.80 82.43% (7)	1186.12 85.33% (1)	3370.72 80.83% (7)
★ Chris Kleinhenz	12	Extra 330LX N330AN	1058.70 76.17% (13)	1147.40 82.55% (6)	1148.00 82.59% (11)	3354.10 80.43% (8)
★ Chris Lidel	78	Pitts Special S-2B N24FF	1053.60 75.80% (14)	1117.20 80.37% (13)	1145.70 82.42% (12)	3316.50 79.53% (9)
★ Alex Trautmann	12	Gamebird GB1 N488GC	1004.60 72.27% (17)	1137.70 81.85% (9)	1149.80 82.72% (10)	3292.10 78.95% (10)
★ Jonathan Griffith	52	Pitts Special S-2C N385BF	1133.22 81.53% (2)	1095.30 78.80% (15)	1060.50 76.29% (19)	3289.02 78.87% (11)
★ Bo Kalabus	24	Christen Eagle II N28EK	1076.90 77.47% (8)	1076.28 77.99% (17)	1135.00 82.25% (12)	3288.18 79.23% (12)
★ Raul O'Brien	52	Pitts Special S-1T N742MA	1092.10 78.57% (6)	1099.20 76.20% (19)	1125.08 80.94% (15)	3292.10 78.95% (10)
★ Dick Swanson	78	Bellanca Decathlon N8SC	919.80 66.17% (22)	1154.30 83.04% (5)	1182.90 85.10% (3)	3257.00 78.11% (14)
★ Braeden Giltinan	12	Gamebird N488GC	1090.90 78.48% (7)	1041.90 74.96% (22)	1118.60 80.47% (16)	3251.40 77.97% (15)
★ Tien Luu	12	Gamebird N488GC	903.80 65.02% (23)	1158.20 83.32% (4)	1156.20 80.47% (16)	3218.20 77.18% (16)
★ Tyler Sperry	78	Super Decathlon N192R	995.50 71.62% (18)	1100.90 79.20% (14)	1118.20 80.45% (17)	3214.60 77.09% (17)
Jonathan De Lone	78	Super Decathlon N192R	1072.70 77.17% (11)	1126.70 81.06% (12)	979.68 70.48% (23)	3179.08 76.24% (18)
★ Stephen Thorne	12	Vans RV-14 C-FCGA	1072.80 77.25% (9)	1056.40 76.00% (20)	1045.90 75.24% (20)	3174.10 76.17% (19)
Marcus Daiber	3	Pitts Special S-2C N97SC	940.20 67.64% (21)	1062.02 76.40% (18)	1127.50 81.12% (14)	3129.72 75.05% (20)
Joseph Chennault	3	Extra 300L N540MK	968.00 69.64% (19)	1094.50 78.74% (16)	1017.96 73.23% (21)	3080.46 73.87% (21)
Kelly Fawcett	12	Extra 300L C-GXRA	1012.70 72.86% (16)	1042.82 75.02% (21)	945.94 68.05% (24)	3001.46 71.98% (22)
Jaret Burgess	24	Decathlon N81SD	948.20 68.22% (20)	870.50 63.08% (24)	1117.08 80.95% (18)	2935.78 70.74% (23)
★ Scott Beadle	24	Bellanca Citabria N86594	868.90 62.51% (24)	913.80 65.74% (23)	995.40 71.61% (22)	2778.10 66.62% (24)
Steven Litsky	67	Zlin Z-242 N242LM	0.00 0.00% (25)	755.02 54.32% (25)	784.90 56.47% (25)	1539.92 36.93% (25)

### INTERMEDIATE POWER

Pilot	Chapter	Airplane	Known	Free	Unknown	Total
★ Steven Johnson	27	MX Aircraft MX2 N487MX	1572.90 82.35% (1)	1748.40 83.26% (2)	1529.30 80.07% (1)	4850.60 81.94% (1)
★ Phillip Gragg	15	Aerotek Pitts S-2A N5FV	1539.96 80.63% (2)	1814.50 86.40% (1)	1474.88 77.22% (3)	4829.34 81.58% (2)
★ Jared Bixenman	78	Extra 300L N252RF	1520.90 79.63% (3)	1647.40 78.45% (6)	1458.48 76.36% (4)	4626.78 78.16% (3)
★ Ryan Chapman	78	Extra 300L C-GXRA	1465.02 76.70% (HC)	1676.56 79.84% (HC)	1482.10 77.60% (HC)	4623.68 78.10% (HC)
★ John Shavinsky	35	Extra 300L N64AL	1510.70 79.09% (4)	1665.50 79.31% (5)	1399.48 73.27% (5)	4575.68 77.29% (4)
★ Nathan Ruedy	78	Decathlon N40EM	1429.76 74.86% (6)	1674.28 79.73% (4)	1448.00 75.81% (6)	4552.04 76.89% (5)
★ Justin Hickson	78	P Rex KS-2B N540TK	1497.00 78.38% (5)	1611.80 76.75% (8)	1391.90 72.87% (7)	4500.70 76.03% (6)
James Spaller	35	Pitts Special S-2B N260IH	1309.40 68.55% (7)	1640.12 78.10% (7)	1496.10 78.33% (2)	4445.62 75.09% (7)
Tom Rhodes	24	Muddy CAP 232 N232LR	983.30 51.48% (8)	1740.36 82.87% (3)	1160.06 60.74% (8)	3883.72 65.60% (8)

### UNLIMITED POWER

Pilot	Chapter	Airplane	Known	Free	Unknown	Total
★ Robert Holland	3	MX Aircraft MXS N530RH	3989.33 81.44% (1)	3751.42 79.65% (1)	4169.33 79.57% (1)	11910.08 80.20% (1)
Goodwin Thomas	23	Extra 330SC N580BG	3836.75 78.30% (2)	3519.83 74.73% (2)	3439.83 65.65% (2)	10796.41 72.70% (2)
★ Luke Penner	78	Extra 330SC C-FXLP	3469.75 70.81% (6)	3365.57 71.46% (3)	3739.08 71.36% (4)	10574.40 71.21% (3)
Aaron McCartan	78	XtremeAir Sbach 300 N66KA	3549.67 72.44% (4)	3063.25 65.04% (6)	3616.52 69.02% (3)	10229.44 68.89% (4)
Ekaterina Volkova	35	Extra 300S N330X	3415.00 69.69% (7)	3056.87 64.90% (7)	3314.17 63.25% (5)	9786.04 65.90% (5)
A.J. Wilder	49	Extra 300LSC N669AJ	3635.58 74.20% (3)	3067.00 65.12% (5)	3040.25 58.02% (6)	9742.83 65.61% (6)
Michael Gallaway	24	Extra 300S N540BW	3323.60 68.83% (8)	2854.22 60.60% (9)	2994.37 57.14% (7)	9172.19 61.77% (7)
Mario Mena Marqua	35	Extra 330SC N893WVV	3186.98 65.04% (10)	3119.67 66.24% (4)	2472.00 47.18% (8)	8778.65 59.12% (8)
Yuichi Takagi	12	Pitts Special S-2S N806GJ	2935.37 59.91% (11)	2375.47 50.43% (10)	2131.45 40.68% (9)	7442.29 50.12% (9)
Hiroyasu Endo	36	Extra 300 N300UY	3268.23 66.70% (9)	2227.95 47.30% (11)	1904.68 36.35% (10)	7400.86 49.84% (10)
Jeffrey Petrocelli	52	Extra 330/SC N330MP	3522.83 71.89% (5)	2951.25 62.66% (8)	426.00 8.13% (11)	6900.08 46.47% (11)



## ADVANCED POWER

Pilot	Chapter	Airplane	Known	Free	Unknown	Total
★ Kyle Collins	3	Panzl S-330 N330LS	2432.67 76.38% (3)	2412.67 79.10% (2)	2890.50 79.63% (1)	7716.84 78.42% (1)
★ Brittanee Lincoln	138	Extra 330SC N330CZ	2440.83 77.24% (2)	2367.08 77.61% (4)	2843.33 78.33% (2)	7651.24 77.76% (2)
Craig Gifford	138	Extra 330SC N330CG	2508.42 79.38% (1)	2494.08 81.77% (1)	2542.20 70.03% (10)	7544.70 76.67% (3)
★ Martin Flournoy	3	MX Aircraft MX2 N540RH	2325.83 73.60% (8)	2386.13 78.23% (3)	2769.33 76.29% (3)	7481.29 76.03% (4)
Stanley Moye	3	Extra 300S N919GM	2337.33 73.97% (7)	2313.00 75.84% (6)	2721.90 74.98% (4)	7372.23 74.92% (5)
Don Hartmann	138	Extra 300S N169DH	2393.63 75.75% (4)	2320.25 76.07% (5)	2654.17 73.12% (6)	7368.05 74.88% (6)
Michael Gilberti	52	Extra 330SX N330RX	2355.00 74.53% (6)	2207.25 72.37% (7)	2644.83 72.86% (7)	7207.08 73.24% (7)
Michael Lents	78	Extra 330SC C-FXLP	2291.42 72.51% (11)	2091.98 68.59% (10)	2706.92 74.57% (5)	7090.32 72.06% (8)
David Taylor	11	Giles G-200 N1210Y	2302.57 72.87% (10)	2192.22 71.88% (8)	2594.42 71.47% (8)	7089.21 72.04% (9)
Alexander Coats	36	Zivko Edge 540 N22ZE	2382.67 75.40% (5)	2089.58 68.51% (11)	2453.75 67.60% (12)	6926.00 70.39% (10)
Ryan Chapman	78	Extra 300L C-GXRA	2019.42 63.91% (14)	2111.17 69.22% (9)	2556.12 70.42% (9)	6686.71 67.95% (11)
*Steven Bakhtiari		XtremeAir Sbach 300 N66XA	2324.08 73.55% (9)	2009.50 65.89% (12)	2253.50 62.08% (13)	6587.08 66.94% (12)
Nick Slabakov	12	Extra 330LX N330AN	2214.00 70.06% (12)	1873.82 61.44% (14)	2454.80 67.63% (11)	6542.62 66.49% (13)
Mark Steward	5	Pitts Special S-1S N187GS	1782.92 56.42% (17)	1948.47 63.88% (13)	1758.57 48.45% (15)	5489.96 55.79% (14)
Anthony Oshinuga		Pitts Special S-1S N45SS	1877.17 59.40% (15)	1781.35 58.40% (15)	1740.50 47.95% (16)	5399.02 54.87% (15)
Darren Behm	24	Extra 300S N43DM	2074.75 65.66% (13)	1486.32 48.73% (17)	1836.03 50.58% (14)	5397.10 54.85% (16)
Barrett Hines	26	Extra 300 N410WB	1500.18 42.47% (18)	1569.15 51.45% (16)	1704.52 46.96% (17)	4773.85 48.51% (17)
Tom Thomason	89	Panzl S-330 N330TA	1785.83 56.51% (16)	1385.02 45.44% (18)	182.50 5.03% (18)	3353.35 34.08% (18)

## FOUR-MINUTE FREE

Pilot	Chapter	Airplane	Known	Total
Robert Holland	35	MX Aircraft MXS N530RH	3486.67 87.17% (1)	3486.67 87.17% (1)
Yuichi Takagi		Pitts Special S-2S N8061J	3016.67 75.42% (2)	3016.67 75.42% (2)
Michael Gallaway	24	Extra 300S N540BG	2796.67 69.92% (3)	2796.67 69.92% (3)
Goodwin Thomas	23	Extra 330SC N580BG	2673.33 66.83% (4)	2673.33 66.83% (4)
Aaron McCartan	78	XtremeAir Sbach 300 N66XA	2646.67 66.17% (5)	2646.67 66.17% (5)
Craig Gifford	138	Extra 330SC N330CG	2606.67 65.17% (6)	2606.67 65.17% (6)

## 2024 U.S. Nationals - Gliders

Held in Salina, Kansas. Director: Shad Coulson. Chief Judge(s): Nick Buckenham, Mark Matticola, Mark Matticola.

### PRIMARY GLIDER

Pilot	Chapter	Airplane	Known	Free	Unknown	Total
★ Amelia Anderson	11	MDM Fox-1P N163VT	530.16 75.74% (2)	547.60 78.23% (3)	603.60 86.23% (1)	1681.36 80.06% (1)
★ Brennan Hughes		DG Flugzeugbau DG-1000 N502DG	555.90 79.41% (1)	550.60 78.66% (1)	511.70 73.10% (2)	1618.20 77.06% (2)
Nicholas Gierach	12	DG Flugzeugbau DG-1000 N502DG	509.20 72.74% (3)	536.90 76.70% (4)	466.20 66.60% (3)	1512.30 72.01% (3)
Larry Ruggiero	19	PZL-BIELSKI SZD-59 Acro N4416S	275.82 39.40% (4)	550.30 78.61% (2)	446.30 63.76% (4)	1272.42 60.59% (4)

### SPORTSMAN GLIDER

Pilot	Chapter	Airplane	Known	Free	Unknown	Total
★ Robin Simmons	62	MDM Fox-1P N163VT	963.20 77.68% (1)	1038.10 83.72% (1)	1043.00 84.11% (1)	3044.30 81.84% (1)
Payton Nunn	12	DG Flugzeugbau DG-1000 N502DG	870.60 70.21% (5)	929.10 74.93% (2)	908.90 73.30% (4)	2708.60 72.81% (2)
Daniel Russell	12	DG Flugzeugbau DG-1000 N502DG	923.90 74.51% (3)	856.70 69.09% (5)	925.40 74.63% (3)	2706.00 72.74% (3)
Gavin McCormick	12	DG Flugzeugbau DG-1000 N502DG	942.80 76.03% (2)	911.10 73.48% (3)	784.70 63.28% (7)	2638.60 70.93% (4)
Anirvin Puttur	12	DG Flugzeugbau DG-1000 N502DG	891.10 71.86% (4)	807.80 65.15% (6)	879.54 70.93% (5)	2578.44 69.31% (5)
Marcus Rosenthal		DG Flugzeugbau DG-1000 N502DG	822.30 66.31% (7)	884.00 71.29% (4)	866.36 69.87% (6)	2572.66 69.16% (6)
Oleg Shorokhov		MDM Fox-1P N163VT	846.60 68.52% (6)	787.70 63.52% (7)	926.00 74.68% (2)	2560.30 68.91% (7)

### INTERMEDIATE GLIDER

Pilot	Chapter	Airplane	Known	Free	Unknown	Total
★ Greg Borovykh		MDM Fox-1P N163VT	1253.20 78.33% (1)	1261.94 81.42% (1)	1142.30 78.78% (1)	3657.44 79.51% (1)
David Petzold	12	Flugzeugbau DG-1000 N502DG	969.30 60.58% (2)	1061.70 69.39% (2)	973.48 67.14% (2)	3004.48 65.60% (2)

## 2024 U.S. Nationals - Unlimited and Advanced Gliders

Held in Maricopa, Arizona. Director: Shad Coulson. Chief judge(s): Mark Matticola, Peggy Riedinger.

### ADVANCED GLIDER

Pilot	Airplane	Known	Unknown	Unknown II	Total
Ethan Smith	DG Flugzeugbau DG-1000 N500DG	1392.43 68.93% (2)	1090.60 71.28% (2)	1174.33 72.49% (3)	3657.36 70.74% (1)
Gretchen Knox	DG Flugzeugbau DG-1000 N500DG	1377.67 68.20% (3)	1081.33 70.68% (3)	1181.67 72.94% (2)	3640.67 70.42% (2)
Jacob Mohanacs	DG Flugzeugbau DG-1000 N500DG	1284.10 63.57% (4)	1097.83 71.75% (1)	1186.33 73.23% (1)	3568.26 69.02% (3)
Michael Laub	DG Flugzeugbau DG-1000 N500DG	1434.00 70.99% (1)	1013.67 66.25% (4)	1077.50 66.51% (5)	3525.17 68.19% (4)
Kelly Murphy	DG Flugzeugbau DG-1000 N500DG	1037.67 51.37% (5)	768.50 50.23% (5)	1169.33 72.18% (4)	2975.50 57.55% (5)

### UNLIMITED GLIDER

Pilot	Chapter	Airplane	Known	Unknown	Unknown II	Total
★ Jason Stephens		Swift S-1 N31TX	1960.83 80.69% (1)	1760.00 81.86% (1)	1616.00 76.23% (1)	5336.83 79.65% (1)
Jim Bourke		Swift S-1 N113TX	1857.67 76.45% (2)	1747.00 81.26% (2)	1527.83 72.07% (2)	5132.50 76.60% (2)

★ Indicates that their score earned them an IAC Achievement Award.

\* Non-U.S. citizen

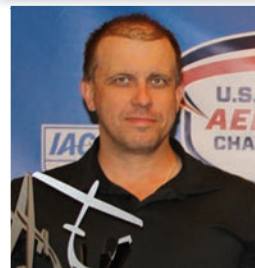
PHOTOGRAPHY BY LORRIE PENNER, IAC ARCHIVES



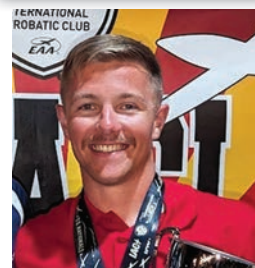
AMELIA ANDERSON -  
1ST PLACE PRIMARY GLIDER



ROBIN SIMMONS -  
SPORTSMAN GLIDER



GREG BOROVYKH - 1ST PLACE  
INTERMEDIATE GLIDER



ETHAN SMITH -  
1ST PLACE ADVANCED GLIDER



JASON STEPHENS -  
1ST PLACE UNLIMITED GLIDER



(left to right) IAC board members Nathan Ruedy, Sara Arnold, Michael Goulian, Phillip Gragg, and Rob Holland in the background with his plane.



Thursday night in the hangar for flight medal presentations.



Thank you to MX Aircraft for sponsoring the Thursday night BBQ!

In my short tenure with the IAC, I have noticed a great deal of time and effort is spent celebrating the achievements of the upper two categories of the sport. While I have great respect and admiration for the time, effort, and money spent by those folks to achieve their level of competency and competitiveness, my priority for the 2024 U.S. Nationals was to celebrate the club and camaraderie associated with being a member of the IAC. Special emphasis was also given to the lower three categories, which make up the largest body of our club membership and contest participation.

## SAFETY AND MECHANICAL ISSUES

Safety is the bedrock of all activities conducted by the IAC. To my knowledge, there were no significant safety concerns or events during the contest. However, we did have a few minor events occur throughout the week.

At the end of the last full official practice day, the wind rapidly picked up. At the time, we had a Sportsman competitor exiting the aerobatic box in a Citabria. The intensity of the wind prevented the competitor from being able to taxi safely off the runway. The pilot wisely opted to shut down and push the aircraft off the runway. The only notable element to this was the inability of the Salina tower to clear personnel on the ground ready and able to assist onto the runway to aid the pilot. Personnel had to wait for the pilot to slowly work the aircraft onto the nonmovement area to assist.

The other notable medical event occurred when an Unlimited competitor had a nosebleed occur shortly after beginning the Free Unknown II program. The competitor wisely decided to cease aerobatic activity and return to the ramp for medical assistance. No significant safety of flight issue occurred as a result of this, and the



One of the 12 Pitts Specials flown at the 2024 U.S. Nationals.



The Sportsman category is lined up and ready to go at the 2024 U.S. Nationals.



pilot was fine following a checkup from the contest medical director, Dr. Jonathan Apfelbaum.

## WEATHER AND SCHEDULE CHANGES

Weather for the first few unofficial and official practice days was excellent, though some wind was present at times. No issues with ceilings or precipitation were noted. I closely monitored the weather leading up to the contest and noted a potential for rain and low ceilings on Sunday, September 21, the day on which we were scheduled to hold the last four hours of official practice and the Advanced Known program. As such, I began working on an alternate contest schedule ahead of the potential conflict, ensuring compliance with the program priorities per the *IAC Policy and Procedure Manual*.

Contest officials waited until the afternoon of the 21st before deciding to cancel activities for the day. This proved to be a good decision and mitigated any potential conflict or unrest by splitting the Advanced category. The alternate 2024 Nationals schedule was implemented, and the first official contest flights began on Monday. Following the weather impact on the 21st, no other weather issues were noted, and conditions throughout the week were excellent, with nice temperatures, blue skies, and light winds. The only notable issue following the rain on the 21st was some mud and standing water on the E and W judging positions, which dried out quickly over the coming days.

Despite the early challenges, we were able to complete three programs for all categories and the 4-Minute Free. The updated flight program schedule for Advanced and Unlimited within P&P 509 proved beneficial and afforded me the flexibility to successfully complete the contest within the allotted amount of time.

## FACILITIES

For the second year, the U.S. Nationals was headquartered in Hangar 509. This hangar, though slightly smaller than those previously utilized, has other added benefits, to include kitchens, offices, and more bathroom facilities. Following some feedback I gave the Salina Airport Authority (SAA) after the 2023 contest, a significant amount of time and money was put into enhancing the facility and improving the competitor/volunteer experience. Hangar 509 proved to be of adequate size for this year's contest, and we were able to safely store all participating aircraft within the facility. The smaller footprint of this facility would only accommodate another four to six aircraft. As in years past, aircraft were parked within the hangar by

category, which has been proven to minimize effort and reduce risk to aircraft.

Gliders and towplanes were once again hangared in an alternate facility, Hangar 504, which proved to be too small in 2023 for the number of civilian gliders and towplanes. I worked with the SAA to secure additional hangars for transient and tow aircraft on the south side of the airfield. One towplane was moved to Hangar C18. The SAA has agreed to provide 20,000 square feet of space in Hangar 600, or an equivalent facility, for future use by the gliders and towplanes and as contest overflow.

The opening briefing was conducted in the main hangar and proved to be a more adequate area given the number of competitors and volunteers on site. Individual flight briefings were conducted on the second floor, which houses two large air-conditioned rooms. These rooms are narrow but long and adequate for individual flight briefings.



*Judges on the west side evaluating flights.*



*Hector Ramirez acted as the chief judge for the Unlimited category and the 4-Minute Free.*

*Alex Coats' Zivko Edge 540 (white plane) parked amongst other Advanced planes.*



*Dick Swanson's and Nathan Ruedy's Decathlons in Hangar 509.*

## SECOND- AND THIRD-PLACE WINNERS WHO CHALLENGED THE CHAMPIONS.



Brennon Hughes – Primary Glider



Brittane Lincoln – Advanced



David Petzold – Intermediate Glider



Goody Thomas – Unlimited



Jared Bixenman – Intermediate



Mark Haven – Sportsman



Payton Nunn – Sportsman Glider



Vincent Evans, left, and Peter Winter – Primary



Yuichi Takagi – 4-Minute Free

Salina continues to prove itself as a premier venue for the U.S. Nationals. The airport administration is supportive of the IAC and willing to invest in the facilities to improve the quality of our event. Before departing, I met with the airport authority to discuss some additional facility improvements within Hangar 509. They expressed a willingness to survey and support a more enhanced aerobatic box (CIVA markings), with permanent box position markers to reduce the time and effort of getting the aerobatic box in place. Past CD reports also indicated the airport was willing to pour the aerobatic box markers in concrete, which may be advantageous if we sign a long-term contract.

## BOUNDARY JUDGES

The 2024 U.S. Nationals saw the return of boundary judges, as mandated in P&P 503. Ultimately, the decision to mandate boundary judges at the championship proved impactful on the logistics and time needed to transport and establish personnel to the corner locations. Additionally, I personally transported volunteers to and from the boundary positions, one of which is literally in the middle of a bean field.

I would estimate 60-70 percent of boundary volunteers had no prior experience in that role. One must question the value added when the personnel sitting in the position are not vetted, as we do with judges and assistants. If the boundary judges are as critical to the outcome of the contest, as many folks advocate, should we not be relying on our most experienced and seasoned competitors to support this activity? I plan on continuing to advocate for the removal of boundary judges for future U.S. Nationals.

## THE FLYING

Eighteen Advanced power category competitors opened the flying at the U.S. Nationals with their Known sequence on Monday. Typically, the first flight of the championships takes place on Sunday afternoon; however, as mentioned, weather concerns caused the contest organizers to move the start and avoid having to split the category flying to two days.

Craig Gifford leaped out in front of the pack, securing first place in the Knowns flying an Extra 330SC. Last year's champion, Brittane Lincoln, finished second, and Kyle Collins placed third. With each succeeding flight, Kyle's flying grew stronger, and the trio finished the competition with him coming out on top as the U.S. Nationals Advanced champion. Brittane finished in second, and Craig finished in third place.

For the rest of the contest, the weather continued to be pleasant, with plenty of sunshine and light winds. In the Unlimited power category, Rob Holland dominated the field by winning the Free Known and the Free Unknown I and II. Congratulations to Rob on his 13th win as the U.S. National Unlimited aerobatic champion! Goody Thomas finished in second, and Aaron McCartan finished in third place. Having moved up from the Advanced category, Luke Penner had three strong flights, which would have put him in third place, and won the Goodrich Trophy for the highest scoring non-U.S. citizen.

The Intermediate power category saw Steve Johnson flying his MX2 to take the top honors as the 2024 U.S. Nationals Intermediate champion. This was Steve's first championship win – congratulations!



Typically flying in the Advanced category, Steve opted to move to Intermediate when he returned from extended travel out of the country, his airplane had been in maintenance, and he only got in two weeks' worth of practice before Nationals. In second place was Phillip Gragg flying his Pitts S-2A, and third place went to Jared Bixenman flying an Extra 300L.

Meanwhile in the Intermediate glider category, there were two competitors this year. Civilian Greg Borovykh repeated his 2023 win and won his second back-to-back Intermediate glider championship. U.S. Air Force cadet David Petzold came in second place.

The Sportsman power category was once again a hotly contested race for first place. The top three final scores were only 10ths of percentage points apart. Congratulations to our 2024 U.S. National Sportsman champion, Justin Miller, with a total score of 83.92 percent, who won the Primary category last year. Mark Haven came in second place with 83.37 percent, and Trevor Smith took third with 83.21 percent. Not sure how it could get much tighter than this!

Repeat winner Robin Simmons reclaimed his title as U.S. Nationals Sportsman glider champion. U.S. Air Force cadet Payton Nunn and Daniel Russell finished in second and third places, respectively.

Out of a field of 10 Primary power pilots, six qualified for the IAC Achievement Award Stars patch. The top four finishers included Peter Winter, a non-U.S. citizen, whose points put him in second place. He was gracious to point out the fact, and the trophies were awarded to U.S. citizens. Erik Ledet in first place flying a Pitts S-1S, Patrick Keating in second place flying a Super Decathlon, and Vincent Evans in third place flying a GameBird GB1.

For the second time in Nationals history, a female glider pilot became the U.S. Nationals aerobatic primary glider champion. Congratulations to Amelia Anderson, who is this year's first-place winner. Last year's winner was Vivian Pfleger. Both pilots are students at the Arizona Soaring flight school operated by Jason Stephens. The second and third-place winners were U.S. Air Force cadets Brandon Hughes, and Nicholas Gierach.

Rob Holland reigned supreme in his MXS aircraft, winning the 4-Minute Free program for the 13th time. In other big news, the second-place finisher was Yuichi Takagi (aka Redfox Airshows) flying his Pitts Special S-2S. Yuichi was the only pilot flying a Pitts in the 4-Minute Free program and in the entire Unlimited category of competitors. The third-place finisher was Michael Gallaway in his Extra 300S.

## VIDEO

The IAC has a long-standing relationship with Forrest Fox, who provides video services for the U.S. Nationals. Per the *P&P*, videos are mandatory for the category conducting team selection flights and are to be used in support of protests and upon request by the chief judge or line judge for that category. These video services have been expanded in recent years to cover all categories, and the IAC began livestreaming the flights, which has been well received by competitors and the broader aerobatic community.

I would recommend we continue to invest in the quality of the livestream. Forrest applied considerable effort to improve the stream with graphics for each competitor, order of flight during breaks, and



*Forrest Fox is out on the judges' line for 5 and 1/2 days, every day, from 0800 to the last flight.*

commentators throughout. There were a few technical issues associated with the expanded capabilities of the live feed, but much of the streaming activity went seamlessly. Expanding the live feed viewership provides interesting opportunities to attract larger sponsorships to the event as well as interest in competition aerobatics, which may help drive an increase in IAC membership.

## LOOKING TO 2025

Planning for the 2025 Nationals has already begun. Meetings were held with the Salina Airport Authority, Hilton, and chamber of commerce. I am looking forward to returning as contest director for the 2025 U.S. Nationals.

The 2025 contest schedule will include an additional practice day to alleviate concerns and potential burdens associated with weather. Access to the contest hangar will also be coordinated for the evening prior to official practice to allow competitors arriving ahead of the practice days to safely secure and store their aircraft.

I am honored and humbled by the confidence entrusted to me by the IAC board of directors and the members of this community. Thank you for the opportunity to serve as the contest director. I hope to see you in 2025 at the U.S. Nationals. Please feel free to contact me with questions or to volunteer: [nationalsdirector@iac.org](mailto:nationalsdirector@iac.org). **IAC+**



2024 Estrella Classic hosted the U.S. National Unlimited and Advanced Aerobatic Glider Championships.

# 2024 U.S. NATIONAL AEROBATIC UNLIMITED AND ADVANCED GLIDER CHAMPIONSHIPS

BY LORRIE PENNER, IAC 431036

**THE ANNUAL U.S. NATIONAL** Aerobatic Championships for the Unlimited and Advanced glider categories was once again held in conjunction with the Estrella Classic in March 2024.



Lorrie Penner

The weather was a bit chilly the first couple of days, during practice, but by the first competition flight temperatures climbed into the 80s. A repeat of last year's high winds and dust devils thankfully didn't make an appearance this year.

PHOTOGRAPHY BY LORRIE PENNER

Attendance was slightly reduced due to moving the contest date from February to March for a weather improvement. Spring break was in effect, causing a few pilots and volunteers to opt for family vacations.

Both the Unlimited and Advanced categories were affected by lower participation. In 2022 the Unlimited category had five competitors, and in 2023 there were three. The Unlimited category this year was reduced to Jason Stephens

**FIND ALL THE SCORES ONLINE HERE:**

**ESTRELLA CLASSIC:**  
<https://iaccdb.iac.org/contests/856>

**2024 U.S. NATIONAL GLIDER  
CHAMPIONSHIPS:**  
<https://iaccdb.iac.org/contests/857>



and Jim Bourke, who felt déjà vu, as they had faced each other in 2021 as the two lone competitors in Unlimited. The result was the same as 2021, with Jason finishing in first place to become the seven-time U.S. National Unlimited aerobatic glider champion and Jim Bourke in second.

The Advanced pilots were all U.S. Air Force Academy officers. The top three competitors — Ethan Smith, Gretchen Knox, and Jacob Mohnancs — alternated position standings, finishing first, second, and third throughout their three flights. Michael Laub, also from the academy, challenged the trio when he won the Known flight. When the championship came to its conclusion, Ethan came away as the U.S. National Advanced champion, followed by Gretchen in second, and Jacob in third place.

The contest couldn't have been run without all the volunteers who came out to support the effort. Thank you to Shad Coulson, who planned many of the details months in advance. Due to his work schedule, he was unable to attend; however, he was available throughout the contest on the phone for any last-minute questions or details.

Thank you to the airport manager, Amber, who suddenly became the registrar when another volunteer was unable to attend due to a health issue. I was happy to train Amber and help her out with all the paperwork, as well as acting as the scoring director. Special thanks to Jason Stephens for promoting glider aerobatics and hosting glider competitions at Arizona Soaring (Estrella Sailport).

Without the judges, we'd have no scores! So, we are humbled by those who traveled great distances to take care of judging for the U.S. Nationals and the Estrella Classic, including Gordon Penner, Joe McMurray, Jim Bourke, Mark Matticola, Keith Doyne, Peggy Riedinger, and the late Jerry Riedinger.

**IACF**



*Jacob Mohnancs, third place. Not pictured: Gretchen Knox. And the U.S. National Advanced Glider Champion is Ethan Smith.*



*Jason Stephens, U.S. National Unlimited Glider champion*



*The judges (left to right): Joe McMurray, the late Jerry Riedinger, Peggy Riedinger, Jim Bourke, Gordon Penner, and Mark Matticola.*

# Flying the 2025 Sportsman Sequence — Part 1

BY GORDON PENNER, IAC 429704

## Overview

**ALL RIGHT! FOR 2025** we have an excellent Sportsman Known sequence that is high energy and can be flown by a Citabria or 150-hp Decathlon.

Welcome to Part 1 of the 2025 Sportsman sequence.

The late sportsman champion Giles Henderson and I had long wished for a sequence that rewarded finesse instead of horsepower. Giles had a saying I love that encapsulates that desire: “Energy management is something one does with the right hand, not the left.”

In his earlier writings, Giles stated that, above all, low-horsepower/high-drag aircraft need to have access to their energy by diving. These aircraft also have difficulty performing a good slow roll or point roll unless they have some airspeed. Consequently, a sequence shouldn’t have an energy-sapping maneuver right before that slow roll.

This sequence meets most of Giles’ wishes. My hope is that this sequence will be the model for those that come after. We must continue to leave room in Sportsman for Citabrias, Van’s RVs, and other experimental aircraft of similar performance. For those who want more difficulty, I would suggest developing a Freestyle.

In addition to this article, there are separate, stand-alone maneuver articles on the IAC website, just like those below. If one wishes, they can go straight to each individual maneuver on the website as desired. They all start with the title “Flying the ....” To get to any of these articles, go to IAC.org, hit the search function, and type in “Flying the Hammerhead,” “Flying the Immelmann,” “Flying the Loop,” etc.



## Safety

One of the best books ever written about flying is still *Stick and Rudder* by engineer and test pilot Wolfgang Langewiesche. He said that a horse has “gaits,” like the walk, trot, canter, and gallop, and each of the gaits have a different feel. So it is with the airplane. Riders and pilots must be sensitive to the feel of their mounts in each gait. **Listen to the horse.**

If the airplane doesn’t feel right, if the tip of the nose is not responding to pitch commands, or if it begins to do something you did not expect, abandon the maneuver **immediately**. Aggressively centering the rudder pedals and the stick, and getting the power back once the nose is close to or below the horizon, will normally keep the airplane from departing.

In the movie *Top Gun*, Viper, the instructor, said that when dogfighting, don’t push a bad position — extend and escape. We are not curing cancer or bombing Berlin. Come back and try again.



## Sequence Analysis

The sequence analysis comes in two flavors: Super Decathlon and Citabria or 150-hp Decathlon.

Sequence analysis should start at the last maneuver and work backward. In both of the above cases, the bottom altitude on maneuver No. 10 should be 1,700 feet AGL. The Decathlon/Citabria body type is big enough that the judges will always call it low if flying at 1,500 feet AGL. Now we just work backward from there. See below.

The sequence was flown by Emerson Stewart and me in the above aircraft. The altitudes will vary due to temperature and altitude, but they are a place for new people to start. Adjust from there with practice.

Maneuver	Start Altitude, Citabria 150-hp D/Super D	Altitude Change
1. 45-degree upline	2,700'/2,200'	+700'/+900'
2. one-turn spin	3,400'/3,100'	-1200'/-1200'
3. Immelmann	2,200'/1,900'	+500'/+600'
4. 180-degree aerobatic turn	2,700'/2,500'	0'
5. goldfish	2,700'/2,500'	-300'/-200'
6. wedge	2,400'/2,300'	-400'/-300'
7. loop	2,000'/2,000'	0'
8. hammerhead	2,000'/2,000'	-300'/-300'
9. 2-point roll	1,700'/1,700'	0'
10. 270-degree aerobatic turn	1,700'/1,700'	0'

## Big Picture

The Sportsman pilot should **mentally prepare to “take a break” during a sequence**. Mathematically, it is better to take a break, or take the “out” and take the penalty, than it is to fly a truncated maneuver that scores badly.

The low penalty score for the breaks and the outs was intentionally designed into the program “way back when” to enhance learning and safety. The flying of a chopped-up maneuver by new (and not-so-new) pilots, in an attempt to stay in bounds, is what frequently causes unsafe flying. Beware, and be ready to “take a break.” Your flying will not only be safer, but you will also score higher.

**How to look:** The eyes at rest will naturally default to what is called “infinity focus.” They focus on a spot about 30-60 feet in front of them. This brings peripheral vision detection to a higher level, which pulls the center of the eye away from John Morrissey’s “deep focus.”

**“Energy management is something one does with the right hand, not the left.”**  
**-Giles Henderson.**

Morrissey maintains that a “clear and distinct focus to the farthest point ahead of the aircraft’s flight path must be maintained. I refer to this as Deep Focus.” In level flight, he wants pilots to be focused on a spot 20 miles away. “When vertical down, I want them to pick out blades of grass. This is the beginning of situational awareness in all axes of flight.”

If they are not consciously looking to a spot on the horizon, they cannot make the tip of the nose draw British aerobatic champion Alan Cassidy’s “sacred circle” when doing a slow roll (aileron roll).

More on these terms later.

Now let us get into individual maneuvers.

## Individual Maneuvers

**BOX ENTRY:** Yes, Dorothy, the box entry and the wing-wags ARE a maneuver. New people tend to come into the box in a low-energy manner, with half-hearted wing-wags. No, no, no!

Come in fast, loud, strong, and snappy! Make a good first impression. As past competitor Larry Connor said, “Fly it like you stole it!”

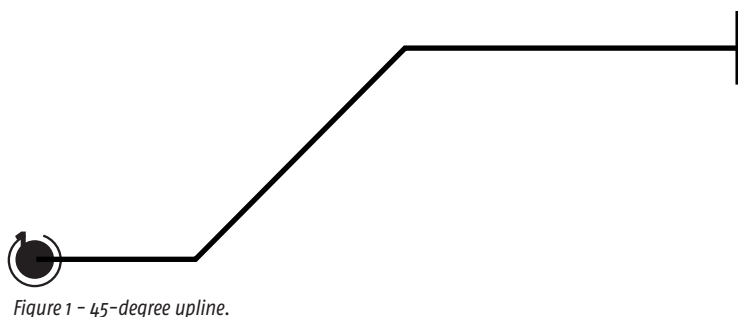


Figure 1 - 45-degree upline.

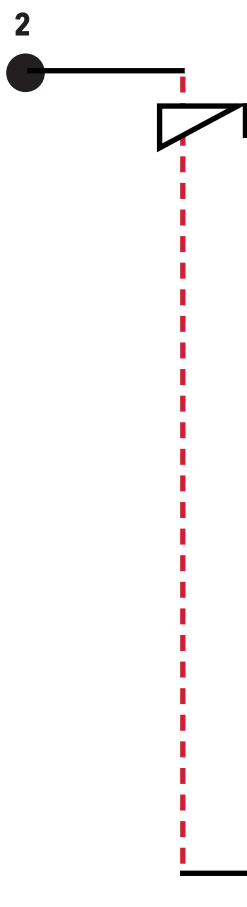


Figure 2 - One-turn spin.

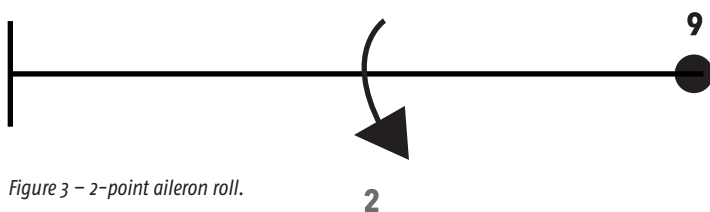


Figure 3 - 2-point aileron roll.

Treat the box entry like a maneuver number 1A. When you practice the whole sequence, include the box entry as well. Also, set up your box entry so your aircraft is exactly at the speed and altitude desired for the pull up into the first printed maneuver 1B. That takes some practice.

**The 45-DEGREE UPLINE:** The 45-degree upline and downline require ground coaching. (Figure 1) Remember, you fly for the judges, not yourself. Flying them well depends on the pilot's eye position.

Whatever sighting system is used, always sit so that the eye position, and its relation to the sighting system or airplane structure, is the same for every flight.

When flying the 45-degree upline, leave some energy for the top. The judges must see that the 45 ended and that the aircraft began a segment of level flight.

Also, when it comes to 45-degree lines, most new people are shallow. Getting ground coaching would be best, but if you can't get it, being a little steep is better than being a little shallow. If half of the score sheets say "shallow" and half say "steep," steepen your 45-degree lines. That will get rid of half the demerits.

**ONE-TURN SPIN:** (Figure 2) Four things must be kept in mind for spins. First, don't settle or climb on the entry line. I watch my altimeter as I am slowing down toward the beginning of the spin departure. Settling is most common.

The second thing is the entry criteria. Here is what the judges must see.



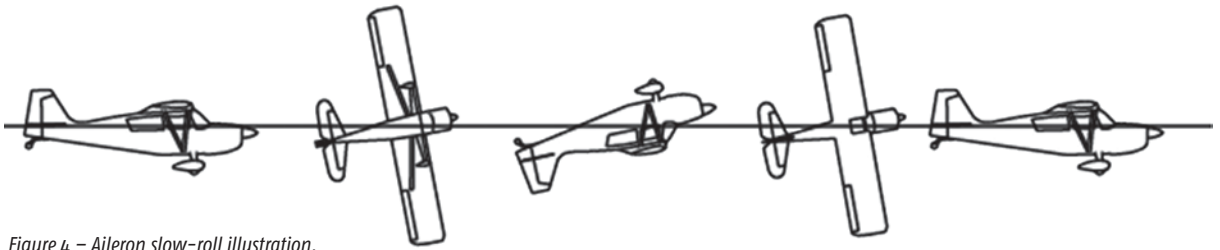


Figure 4 – Aileron slow-roll illustration.

To quote the IAC Rule Book (AKA “the Good Book”) : “When the aircraft stalls, the aircraft must *simultaneously* move around all three flight axes: (1) The nose will pitch toward the ground, (2) the nose will yaw in the direction of spin, and (3) the wing tip will drop in the direction of the spin. Failure to achieve simultaneous motion about all three axes will be downgraded 1 point per 5 degrees of deviation on EACH axis [emphasis added].”

Third, the spin exit must be practiced enough so a finish on head- ing is reliable, and the pilot must maintain orientation throughout. Keep your situational (directional) awareness in relation to the X and Y axes.

Fourth, get reliable ground coaching to make sure your down- lines are straight down. Setting the trim before the sequence begins (and leaving it there throughout) at something slightly *above looping speed* will help in this area. If the trim is set to a slower speed, the airplane will want to pitch “up” (nose toward the pilot’s forehead) when it gets to that speed. This will require the pilot to have to push to maintain the downline. See an aerobatic trim article online at [www.iac.org/aerobatic-trim-2](http://www.iac.org/aerobatic-trim-2).

Also, as the downline is being established, the rudder must be utilized to make sure neither wing is low.

Lastly, the second you finish the spin and begin the downline, hammer the power! You need to feed a lot of energy into the next maneuver. If you have high power, you will gain speed quicker while losing less altitude (believe it or not!), and your elevator will work better for the pullout.

**The 2-POINT AILERON ROLL:** (Figure 3) I am doing the aile- ron roll, maneuver No. 9, out of order because its elements and techniques apply to the part rolls in the Immelmann (No. 3), goldfish (No. 5), and the wedge (No. 6). See Figure 4.

Competition aileron rolls, which are really slow rolls in tech- nique, are one of the harder things to teach in the basic aerobatics

course. You must not pitch first before initiating the roll, as you would in a pure, lg, Bob Hoover-smooth, coordinated aileron roll. A slow roll is definitely NOT coordinated, as top rudder, or “sky” rudder, is applied in each knife-edge portion of the roll.

Aileron (slow) rolls are judged by center of gravity track (CGT). Imagine reducing the aircraft to a dot at the center of gravity (CG). In the roll, the track of that CG dot must make a straight path. See above. The circle made by either the nose or the tail in the roll is not important and not a judging criteria.

The main problem in this maneu- ver is people do not maintain the straight and level path of the CGT before, during, and after the roll. Sinking during the roll is quite com- mon, especially in the inverted and second knife-edge portions of the roll. Another problem is not main- taining a constant roll rate. Most pilots allow the roll rate to speed up in the second half of the roll.

People also end up off heading, usually to the right in a left roll.

The key to a good competition aileron (slow) roll is picking a spot on the horizon, and then drawing Alan

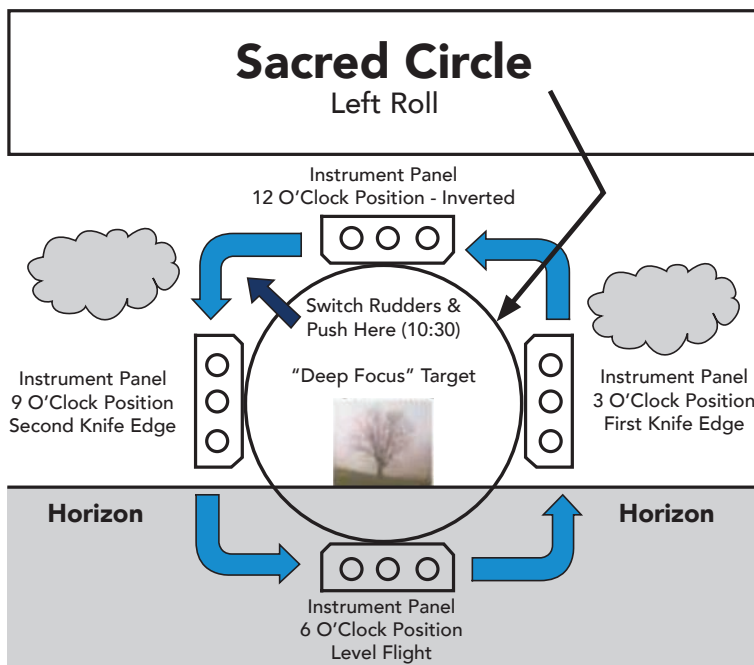


Figure 5 Alan Cassidy's sacred circle.

Cassidy's "sacred circle" with the tip of the nose around that spot. John Morrissey's "deep focus" must be maintained throughout the roll, which will be a challenge in and of itself as the controls are manipulated and the eyes try to go to infinity focus (Figure 5).

If we consider a left roll, the tip of the nose starts at 6 o'clock on the sacred circle, rotates counterclockwise up to 3 o'clock for the first knife edge, continues up to 12 o'clock when inverted, down to 9 o'clock for the second knife edge, and then back to 6 o'clock. The controls must be manipulated in such a way to "draw" that sacred circle with the tip of the nose around that point on the horizon.

Pitch is a "head-to-foot" motion, yaw is an "ear-to-ear" motion of the nose of the aircraft, and these motions are in relation to the pilot. The pitch, roll, and yaw axes move with the airplane; they don't stay rooted to the horizon. This fact will be illustrated heavily in the slow roll as you make the sacred circle with the nose.

To find the 12 o'clock attitude, the pilot must first fly inverted at different speeds and see how high the nose has to be above the horizon while holding an altitude.

When rolling past 3 o'clock on the sacred circle, on the way to 12 o'clock, there must be enough push added to get the nose up to the correct inverted attitude. Blend this push in between 3 o'clock and 12 o'clock.

Enough knife-edge practice must be flown to determine how much top rudder must be held to maintain altitude at the selected speeds. Since an aircraft in a slow roll is basically in a slip from before the first knife edge until past inverted (left aileron for the roll and right rudder for "top" rudder), it is losing energy throughout.

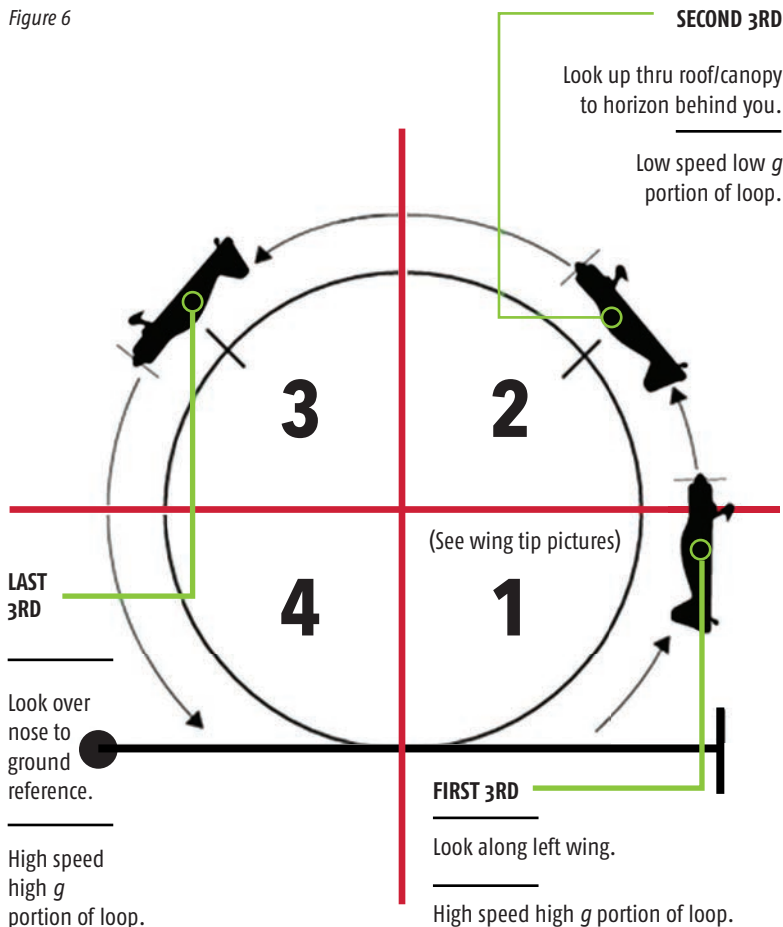
A good trick taught to me by Emerson Stewart here in Ohio was to not switch the rudders (when switching to the "other" top rudder) when passing through 12 o'clock, but to wait until about the 10:30 o'clock position.

Additionally, as it says in Alan Cassidy's book, *Better Aerobatics*, a little push with the elevator about the same time as the feet are switched (10:30) will also keep the nose pointed in the right direction as the rolling motion continues, rounding out the second half of the sacred circle. This push will fix the problem of ending off heading to the right all the time.

Once the rudder pedals are switched, the roll rate will increase, which is a downgrade. This happens because once the pilot shifts to the left rudder for "top" rudder, the



Figure 6



*We fly the loop in thirds, but we must analyze it in quarters.*

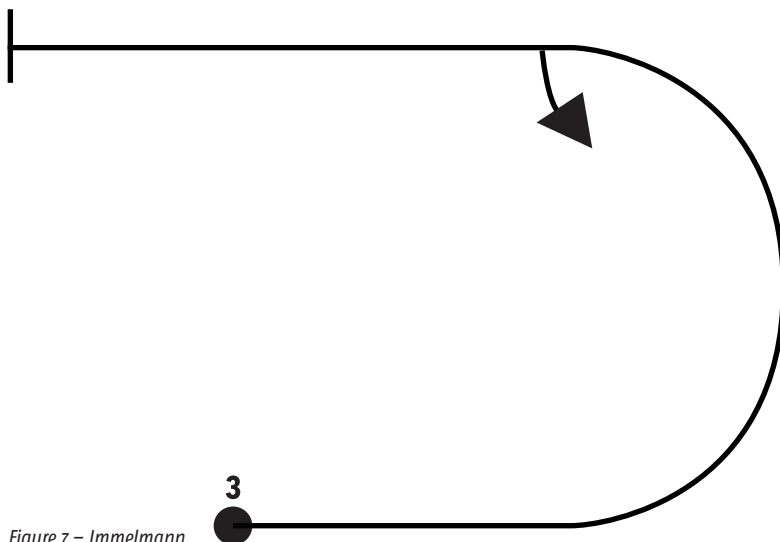


Figure 7 – Immelmann.

**Mathematically, it is better to take a break, or take the “out” and take the penalty, than it is to fly a truncated maneuver that scores badly.**

aircraft is no longer slipping. Ease off the aileron deflection a bit when the rudder pedals are switched so the roll rate stays the same.

As to judging, the illustration (see figure 4) of a low-horsepower/high-drag aircraft should be scored as a 10. When looking at the nose and tail above, judges have sometimes called the roll “barreled.” The nose and tail of the above aircraft will be drawing circles, but the **flight path of the center of gravity “dot” is NOT drawing a corkscrew line around a “barrel.”**

The IAC judging training organization is working hard on correcting this common judging error, but the pilot must do everything possible to perform for their flawed, human judges. When an aircraft is flown faster, it will require less top rudder and a lesser inverted nose-up attitude to perform the roll.

**IMMELMANN:** The Immelmann (Figure 7) can be the bane of new people’s existence, and one of their highest causes of frustration.

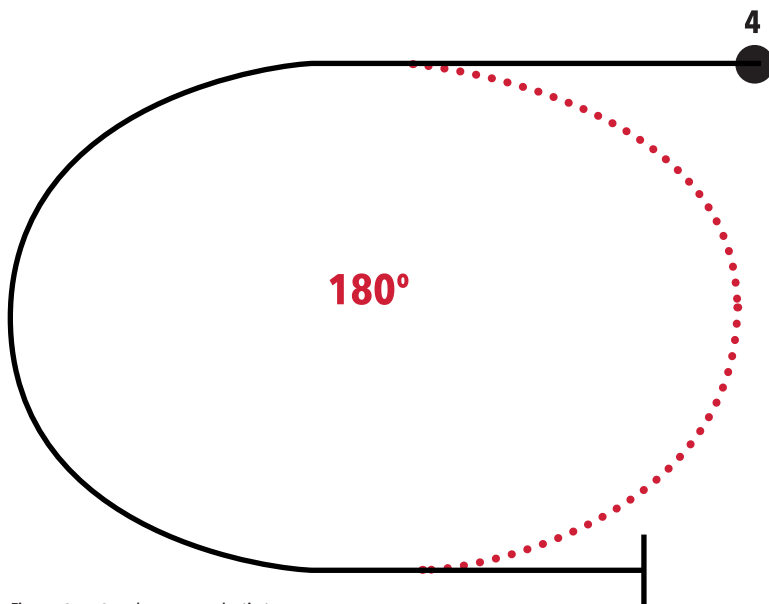


Figure 8 – 180-degree aerobatic turn

If you push too much during the half-roll, it can turn into an inverted spin entry. The second problem is finishing the half-loop “early.” The half-loop must finish directly above where it began, meaning compensated for wind. The third is sagging or settling after the roll. The last problem is finishing off heading.

We analyze a loop in quarters. Here we are flying quarters 1 and 2. (Figure 6)

The normal recommendations in all of the aerobatic books are that the Immelmann should be started 5-10 mph above normal looping speed, that the looping segment should be flown with  $1/2 g$  more than normal for a loop in quarter 1 in your particular aircraft, and to not float the top of the half-loop.

Be careful when initiating the half-roll. These three actions above should feed enough energy into the half-roll segment, and will also keep you from finishing the half-loop segment early.

There also must not be a line drawn between the finish of the looping segment and the beginning of the roll. They must NOT,

however, be blended together. The criterion (no line) is not meant to imply that one element (roll or loop) must start before the preceding element is completely finished. A brief hesitation between elements (similar to opposite rolls) must not be downgraded.

Remember from the safety section above, you lose WAY FEWER points by taking a break than you do by flying it badly due to not having enough energy, or by getting a ZERO by falling out of it.

#### **The 180- and 270-DEGREE AEROBATIC TURNS** (see Figure 8):

Most new people don’t hold enough bank angle in aerobatic turns. The judging criteria requires that the turn must be 60 degrees of bank minimum.

There must be an observable pause between the roll, the turn, and the rollout. Also, the roll in and the roll out must be at the same roll rate.

To coordinate, or not to coordinate, that is the question. Actually, both are correct.

The steps in the maneuver are: (1) a coordinated roll to 60 degrees of bank or more, (2) an uncoordinated pause, using forward elevator to maintain the roll-in heading and top rudder to hold altitude, (3) a coordinated pull, with constant bank and ball back in the center, to the new heading, (4) an uncoordinated pause, again using pitch to maintain the finish heading and top rudder to hold



altitude, and (5) a coordinated roll back to wings level. Altitude must be maintained throughout.

### Final Thoughts

If time and resources permit, I always recommend flying a Freestyle sequence. It is okay to use someone else's. First and foremost, in a Freestyle you can leave out the loop, that bane of the new pilot's existence!

But let us go further. Remember that this activity is also about education and about expanding who you are. The pilot can use this category as a springboard to higher categories, or stay there for a lifetime. In either case, the Freestyle is a great place for education and self-challenge.

Back to the 2025 Sportsman Known sequence — whether a pilot is staying in Sportsman forever or trying to move up, a Freestyle is challenging and fun. In this Known, there are many pieces, or strings of maneuvers, that would fit nicely in a Freestyle.

See you next issue for Part 2.

Watch your redlines, watch your altitudes, wear your parachute, and have fun! **IAC**

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**Gordon Penner** is a 3-Time Master CFI-Aerobatics, FAA Gold Seal Flight Instructor, and CFI for Emergency Maneuver Training, Aerobatics, tail-wheel and gliders. He has been flying for 35 years with a total of 14,000+ hours. He is a professional airline pilot currently flying the Boeing 767, with experience in the Boeing 747, DC-8 and EMB120. Gordon has been a member of the IAC since 2001. He is a sportsman category competitor, a grading judge and a past president of IAC Chapter 34 (Ohio).



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# ACROWRX: Revolutionizing Aerobatics

BY PAULO ISCOLD, IAC 435118



**FOR OVER 25 YEARS**, I've been deeply involved in the world of aerobatics, beginning in 2003 with a project in Brazil where my students, a friend, and I designed and built the Mehari, an aerobatic airplane. This project set the foundation for my career and passion for aviation. By 2008, I found myself working with a South African team in the Red Bull Air Race, where my initial focus on aerodynamic modifications evolved into the role of "tactician." My job was to optimize the flight paths of high-speed, low-altitude aerobatic airplanes. This role demanded a reliable data acquisition system to track their dynamic maneuvers, and it took years to develop a system robust enough to handle these challenges.

Over the next decade, I worked with other top teams, including Paul Bonhomme and Kirby Chambliss, where the role of tactician became essential for winning races. By then, my system had become a standard in the sport, making the presence of a tactician critical for success.

Despite my extensive involvement with aerobatic airplanes, I only began flying competitively two years ago when I partnered with three friends to buy an Extra 300L. Early in my aerobatic flying journey, I learned that competitive flying and treating every flight as training were essential for proficiency and safety. This realization, combined with my experience from the Red Bull Air Race, led me to adapt my data system to help both me and other aerobatic pilots improve.

However, unlike air racing, where I guarded my innovations, my approach in competitive aerobatics shifted to sharing. This led to the creation of ACROWRX (Acro Works).

ACROWRX is a web-based application tailored for aerobatic pilots to analyze their flights, recorded with an advanced data acquisition system capable of tracking aerobatic maneuvers with a high degree of accuracy. The system presents flight data in formats that are highly relevant

to the unique demands of precision flying, providing pilots with the insights necessary for postflight analysis and performance improvement.

## TRACKING AEROBATIC AIRPLANES

Tracking an aerobatic airplane is no easy task. These aircraft fly at incredible speeds and endure extreme load factors, leaving conventional GPS systems struggling to keep up. During the early years of the Red Bull Air Race, teams were constantly seeking a reliable way to accurately track an airplane's position in the air.

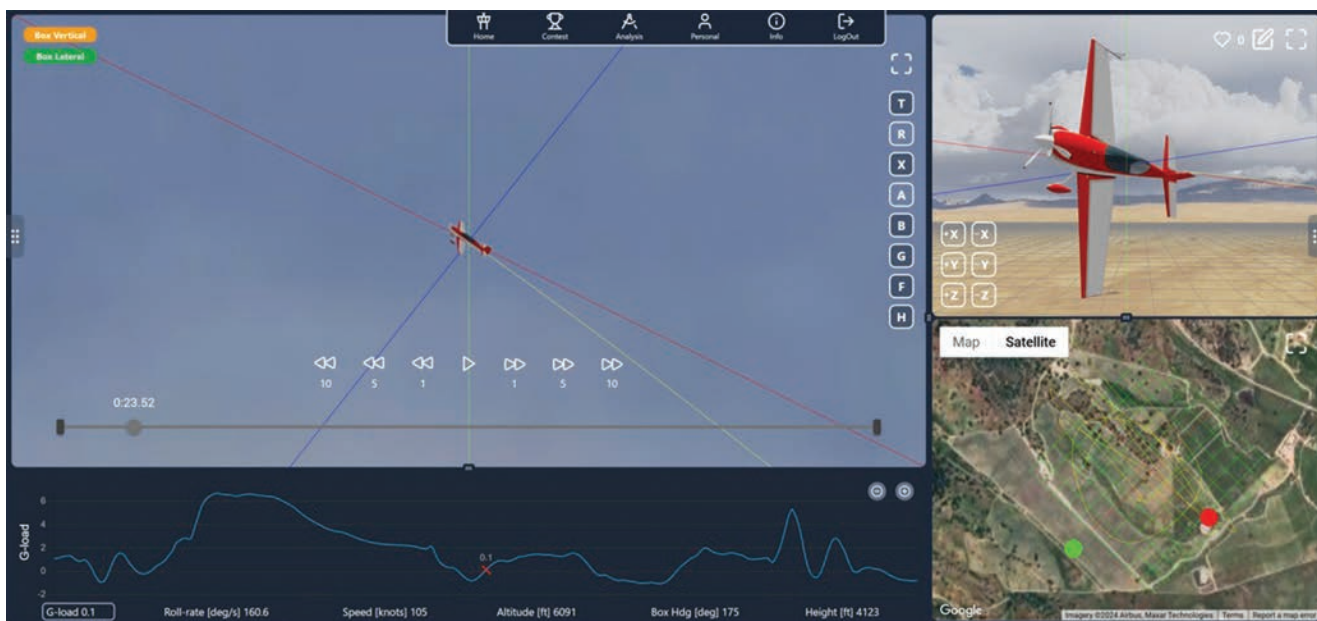
Originally, ACROWRX used the same position tracking system that I utilized during my time at the Red Bull Air Races. However, the costs associated with these sensors led to a search for a more commercially viable solution. After extensive testing, Bolder Flight Systems, a company founded by a former NASA researcher, proved to be the ideal fit. Its "OnFlight Hub" data unit is now central to the ACROWRX system, offering reliable tracking at a significantly lower cost.

The OnFlight Hub is a compact, self-contained unit weighing approximately 200 grams. It requires no external power or antennas, making it both efficient and easy to install. For optimal performance, the unit should be aligned as closely as possible to the aircraft's coordinate axes. There is a straightforward configuration process required for integration with ACROWRX, which can be completed over Wi-Fi via a web browser. The unit records data onto a micro-SD card (not provided) at a rate of about 1 MB per minute of flight time.

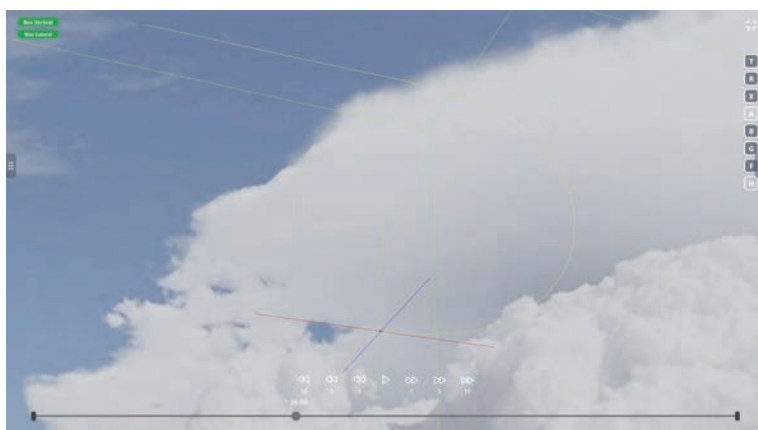
The OnFlight Hub is not certified, and any installation should be nonpermanent. The use of ram mounts, GoPro mounts, or dual-lock Velcro is recommended. Its size and weight are similar to those of an action camera or a cellphone that you might take with you during your flights. The data unit does require a clear view of the sky; therefore, for aluminum or carbon fiber airplanes, ensure that it is not placed in the baggage compartment.

Before takeoff, the system must be powered on while the aircraft is stationary, allowing it to initialize and for the onboard algorithms to stabilize. Once the flight is completed, removing the SD card and transferring the data to a computer reveals a detailed file containing all essential flight metrics. The dataset includes a wide range of parameters, such as accelerations, angular rates, velocity, position, and time stamps — all critical for validating the accuracy of the measurements.





ACROWRX analysis window is the core of the software. On the top left side is the judge's view, which replicates what a person on the ground will see while watching your flight. The top right view is the chase view, which allows the pilot to have a much precise view of the airplane attitude. On the bottom right, the map view allows the pilot to set the aerobatic box and to visualize the flight trajectory. Time history of the main relevant data for aerobatics is also presented on the bottom of the judge's view.



In the judge's view, the zoom (mouse scroll wheel) and head position (H) can be manipulated (click and drag) in order to have an overall view of the flight. The yellow trajectory line can be made persistent (R) to help verify the overall shape of a maneuver.

## VISUALIZING THE DATA

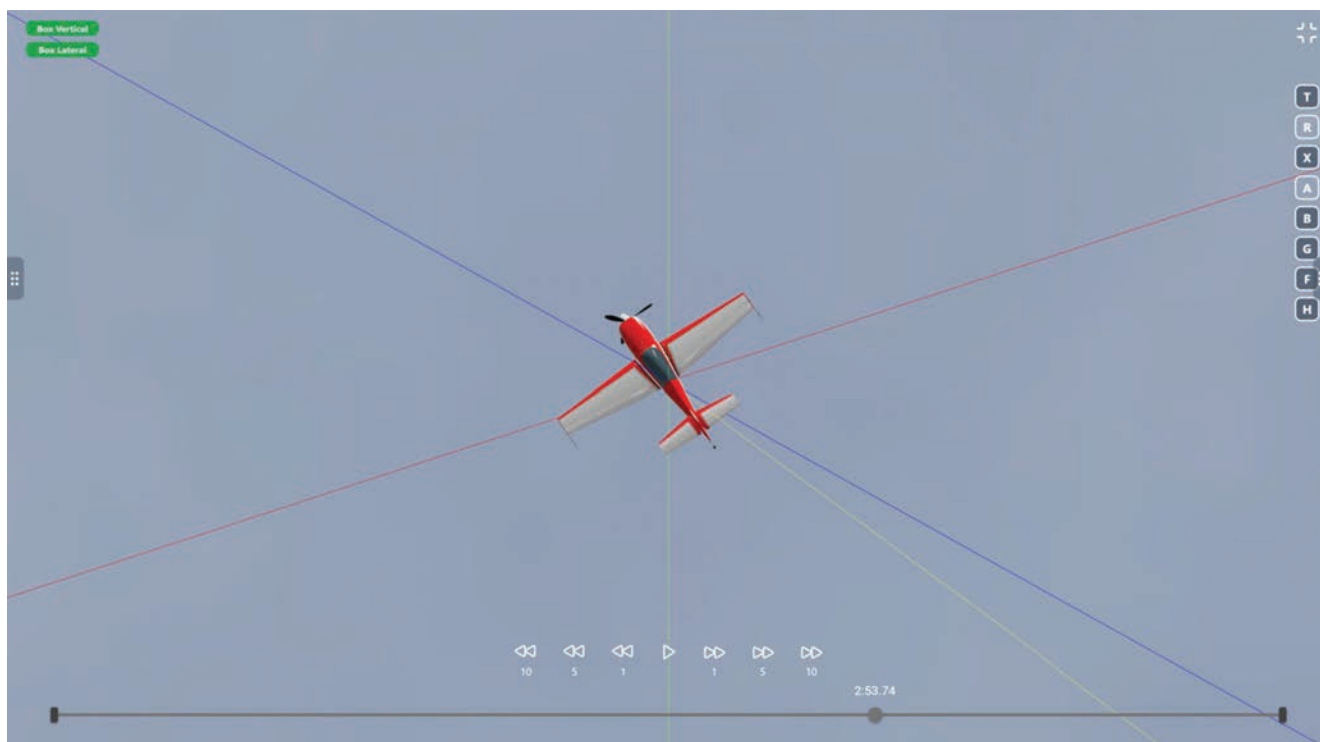
The heart of ACROWRX's web application is its comprehensive flight analysis tool. Pilots can review their flights from various perspectives, with the most important being the "judge's view." This simulates the perspective of a ground-based judge assessing the flight, which is an invaluable tool for pilots preparing for competition. Additional views include a chase perspective of the aircraft, a map display, and data visualized through time-history charts. All flight data is stored locally on the user's machine, ensuring full privacy for the pilot.

Setting up the virtual judge's position is simple and can be done over a detailed map. The judge can be placed at ground level or at any

altitude relevant to the flight path. Additionally, the application allows users to define an aerobatic box with dimensions in accordance with IAC regulations. Pilots can select from multiple aircraft models and even synchronize flight data with video footage, enabling simultaneous playback of both for a comprehensive review.

ACROWRX is equipped with several analytical tools designed to enhance flight reviews. A built-in protractor can measure angles, while markers can be dropped along the aircraft's trajectory to highlight key aerobatic elements. A coordinate axis system helps clarify the aircraft's orientation relative to the aerobatic box. Flight data can be played back in real time or in slow motion down to 1/50 of a second per frame, allowing pilots to scrutinize each maneuver in detail. Replaying specific maneuvers repeatedly is simple, aiding in a thorough understanding of each phase of the flight.

In essence, ACROWRX provides the functionality of video footage but with the flexibility to position the "camera" anywhere in 3D space. This is particularly useful for reviewing critical angles, such as 45-degree and vertical lines, from multiple viewpoints. Time-history data is essential for postflight analysis, providing valuable insights into speed and altitude at various points in the routine. This data is critical for planning



Due to the bidimensional nature of the computer screen image, an orthogonal axis was added in the judge's view to help the visualization of the aircraft alignment with box axis. Red line is the x-axis, blue is the y-axis and green is the vertical line.

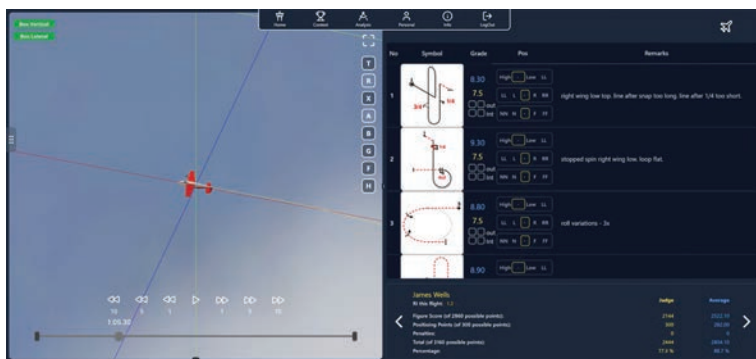
future aerobatic sequences, enabling precise determination of how much altitude is required for each maneuver.

The mapping feature offers both ground-level and 3D views of the flight path, helping pilots assess their performance within the aerobatic box. This visualization is particularly useful for determining if maneuvers were executed inside the designated box, a key requirement in competitions. For routine planning and postflight reviews, ACROWRX offers an unmatched level of detail and accuracy.

## MORE THAN JUST VISUAL

ACROWRX also has an impressive file management and database system, transforming it from a simple analysis tool into a full-fledged platform. ACROWRX is not just a system for pilots to analyze their flights — it is a space where aerobatic pilots can share their flights, comment on each other's performances, and more. It is a community-driven platform.

The aerobatic community is relatively small, and year after year, we struggle with the challenges of training, coaching, and competing. ACROWRX can be a game changer, offering

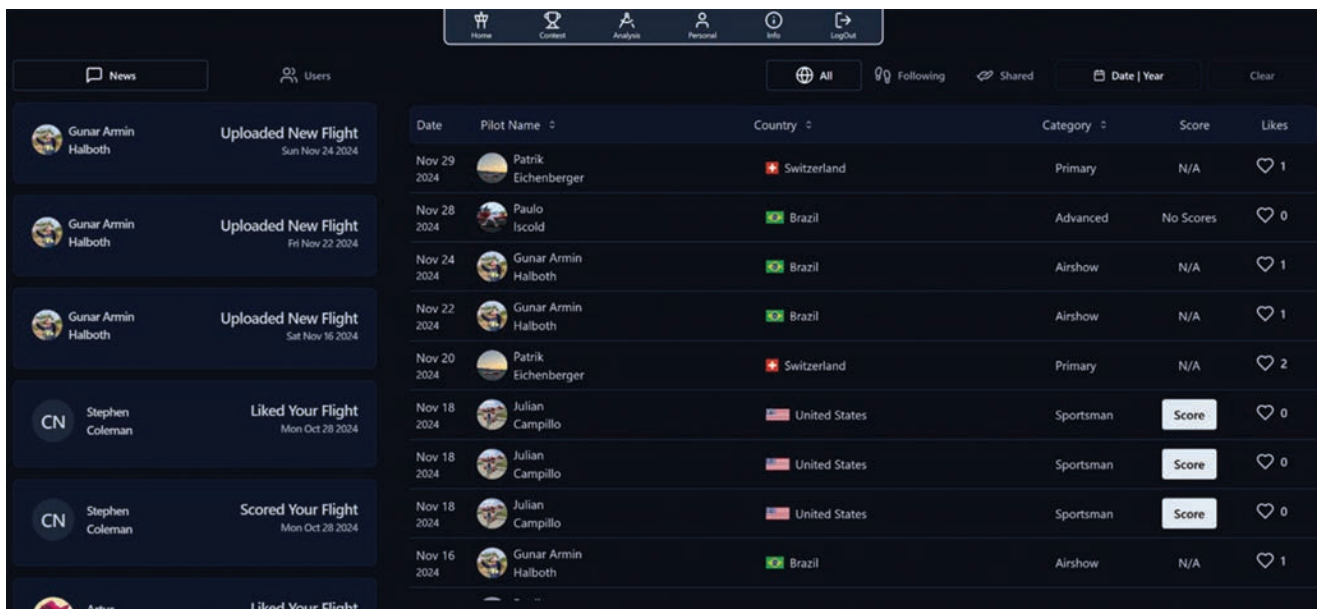


The ACROWRX platform allows easy integration with OpenAero and allow users to score and comment flights. The comments feature is a great tool for coaching, while the scoring feature is the backbone for online contests.

pilots better training through the ability to analyze their own flights or share them with coaches who aren't physically present. This, in turn, can make aerobatics safer overall.

ACROWRX also paves the way for online competitions. Pilots can fly at their convenience, wherever they are in the world, and compete in real time with others in our online contests. While these virtual competitions are by no means a replacement for in-person events, they could follow the path of gliding sports, where online competitions have only increased the popularity and excitement of live competitions.





The ACROWRX platform allow users from any part of the world to share their flights, publicly or privately; add comments and likes; and follow other use creating an environment to promote the growth and engagement of the aerobatic community.

Beyond training and competition, ACROWRX holds great potential for developing new judges for aerobatic contests. The platform's detailed flight data and analytical tools provide an incredible resource for aspiring judges to sharpen their skills, ultimately strengthening the foundation of the sport.

## A GROWING HUB FOR THE AEROBATIC COMMUNITY

ACROWRX has become a reality for the aerobatic community, with a few hundred users worldwide now using the system to enhance their flights, making them safer and more proficient. Every day, we are learning together — users discovering new ways to analyze their flights, and we, as developers, receiving feedback that drives the addition of new features. Pilots are becoming more comfortable sharing their flight data and learning from one another in ways that were previously unheard of in aerobatics.

We're also running online contests to explore a completely new approach to aerobatic competition. These contests are helping pilots around the world familiarize themselves with ACROWRX, and we've been in close contact with the Fédération Aéronautique Internationale (FAI) to bring their expertise into the system. It's a two-way street — ACROWRX is poised to strengthen the world of aerobatics by making the sport more accessible and dynamic.

Where this journey will take us remains an exciting question. Some users are eager for automatic scoring, while others believe the artistic side of aerobatics must always take precedence. Some still struggle with viewing their flights on a flat screen, while others love the ability to review every single maneuver with the precision a coach would provide. We already see users sharing their flights with one another and helping each other improve, creating a collaborative spirit within the community.



The Bolder Flight Systems OnFlight Hub data unit is simple, light, self-contained, and compact, requiring no modification on any aircraft. In this example, the unit is stuck with dual lock Velcro to the glare shield of an Extra 300L.

User feedback has been invaluable, not just for fixing bugs, but also for enhancing the features and capabilities of ACROWRX. We're committed to maintaining this momentum and are excited about the future, especially as more people contribute to the project. Brian from Bolder Flight Systems has a host of new ideas for improving data acquisition, and it's likely that in the near future, we'll be able to measure control positions, heart rates, and other crucial data for aerobatic pilots. *IAC*

# My Experience With ACROWRX

## A GAME CHANGER FOR THE COMPETITIVE AEROBATIC PILOT

BY JOSEPH MCMURRAY, IAC 441329

**AS AN AEROBATIC PILOT,** *precision and continuous improvement are critical to success.* When I first heard about ACROWRX ([acrowrx.com](http://acrowrx.com)), an innovative technology designed to help pilots visualize and analyze their flights, I was intrigued. This tool is not meant to replace traditional training or judging procedures, but rather to complement them and provide additional insights.

Dr. Paulo Iscold, the creator of ACROWRX, was kind enough to reach out to me and discuss his software. I was immediately impressed and shared this with my club, IAC Chapter 38. Dr. Iscold shared his innovative creation to over 20 members of my chapter. Included in the audience were air show performers Randy Howell and Cory Lovell of the Patriots Jet Team and Sukhoi West Demo Team, as well as legendary hall of fame air show performer Sean D. Tucker.

I have been consistently using ACROWRX for over two months. *Some* of my sequences I would share publicly to the online community. Some I would send privately to more highly experienced competitors, asking for tips and advice. But most, I kept private for me to judge and analyze my mistakes and where improvements can be made.

I can confidently say that it has significantly enhanced my aerobatic flying experience.

### INITIAL IMPRESSIONS AND SETUP

My journey with ACROWRX began with the straightforward setup process. I purchased the OnFlight data unit ([BolderFlight.com/acrowrx](http://BolderFlight.com/acrowrx)) and purchased an online subscription to ACROWRX. The software is user-friendly, and the online portal is intuitive, making it easy to get started. As of this writing, there are YouTube videos that can assist the user with the setup. Lastly, I made sure the unit was mounted in the airplane with a clear, unobstructed view of the sky.

### INCORPORATING ACROWRX IN MY PRACTICE FLIGHTS

Here is a typical session that I used to get ready for Akrofest.

**Flying the figure or sequence:** I'd start by flying a particular figure or sequence, focusing on executing it as accurately as possible.

**Downloading the flight data:** *After landing,* I'd upload the flight data into the ACROWRX online portal. The process is seamless and takes mere seconds.

**Analyzing the data:** Once the data is uploaded, I use the software tools to analyze my performance. ACROWRX's features allow me to scrutinize every aspect of my flight. The box parameter is constant; however, I can adjust the judge's height, heading, and distance. I can visualize my flight path, checking angles, speeds, and other critical parameters essential for aerobatic flying. *The beauty of ACROWRX is that all that can be adjusted by the user.*

**Identifying areas for improvement:** A drop-down menu of tools helps me identify areas where I need to improve. For example, if my roll rate was inconsistent, or my vertical lines were not perfect, ACROWRX highlights these discrepancies. This detailed feedback is invaluable for making precise adjustments.

**Implementing feedback:** After a thorough analysis, I'd take a break to digest the information and plan my next flight. With clear insights from ACROWRX, I know exactly what to work on during my next practice session. *No guessing* — I have a clear mission.

**Flying again:** Armed with this feedback, I'd launch one more time to practice the same figure or sequence. This **iterative** process of flying, analyzing, and refining has become an integral part of my training regimen.

Like many of you, my time is limited. *This program gives me a clear mission of what to work on and not waste valuable time.*

### BENEFITS OF USING ACROWRX

**Enhanced visualization:** One of the standout features of ACROWRX is its ability to provide a detailed visualization of my flights. Seeing my flight path in a 3D space allows me to understand the nuances of my figures better than ever before.

**Precise analysis:** The precision of the data provided by ACROWRX is remarkable. Every aspect of my flight is captured and presented in a way that is easy to understand. This level of detail helps me make specific, targeted improvements rather than relying on general "seat-of-the-pants" feedback.



*After landing, the flight data is uploaded to ACROWRX online portal.*





OnFlight Data Unit above the panel.



ACROWRX allows Joe to scrutinize every aspect of his flight

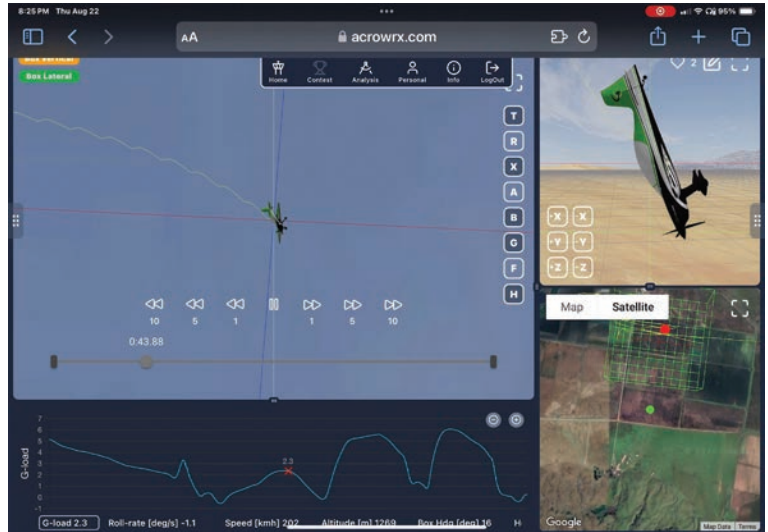
**Continuous improvement:** The ability to immediately analyze my flights and then apply the feedback in subsequent flights has accelerated my learning curve. Instead of waiting for a chapter “critique day” to provide feedback, I can self-assess and make adjustments. This continuous loop of improvement has made me a more proficient and confident pilot.

## CHALLENGES AND CONSIDERATIONS

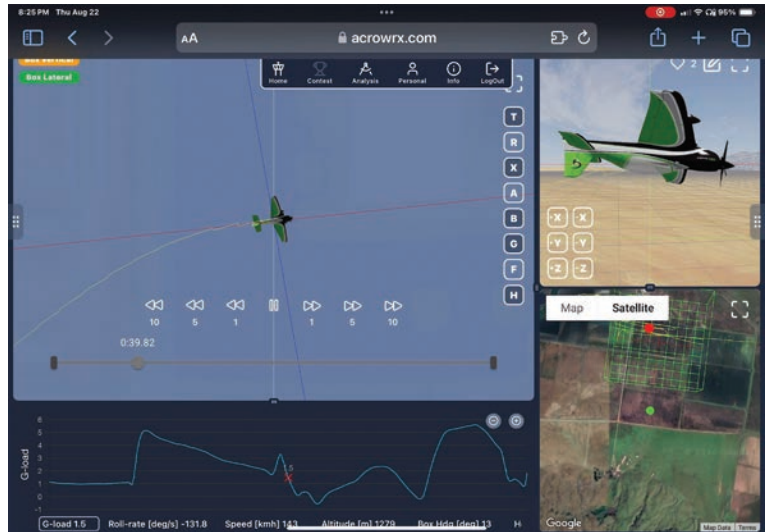
While my experience with ACROWRX has been overwhelmingly positive, there are a few challenges and considerations to keep in mind:

**Website:** It took me some time to learn how to interpret the information effectively. The tools provided online and speaking with Paulo personally helped tremendously. With practice, I became more comfortable with the analysis tools.

**Complementary ground coaching:** It’s important to note that ACROWRX was never intended to replace ground coaching. Instead, it is designed to



Seeing the flight path in 3D.



Visualize the flight path; check angles, speeds, and other critical parameters.

enhance and work in conjunction with ground coaching. The insights gained from ACROWRX can be discussed with a coach to develop a more comprehensive and well-rounded training regimen.

## FINAL THOUGHTS

The software’s user-friendly interface and intuitive online portal have made my experience with ACROWRX seamless and rewarding.

I can confidently attest that ACROWRX has elevated my aerobatic flying. The proof, as they say, “is in the pudding.” With an average score of 81.14 percent, I was awarded second place overall at the Akrofest West Open Championship held October 25-26, 2024. This was my second competition in Intermediate and was especially satisfying since I’d missed two months of practice, recovering from a debilitating leg injury.

My experience with ACROWRX has been profound. It has helped improve my precision as an aerobatic pilot and provided valuable insights for continuous improvement. I am confident that it will help you, too. **IACF**



# Marion Cole's Pitts S-2A in Australia

BY LORRIE PENNER, IAC 431036



*N20MC's original Marion Cole paint scheme in 1973 at the Afton-based Wyoming Factory.*

**IN FRANCOIS BOUGIE'S ARTICLE** "N22Q Lookbook – Some Secrets Revealed," Marion Cole's Pitts Special S-2A, tail number N20MC, was delivered to Marion by Ben Morphey in 1973. The article appeared in the September/October 2024 issue of *Sport Aerobatics*.

*Ben Morphey, today a retired airline pilot, has a lifetime association with the Pitts biplane, though he never got the chance to fly N22Q. At age 22, he was already building his N69BM Pitts S-1S from factory parts. In the spring of 1973, after his Pitts S-2A checkout in type, in Marion Cole's N24MC, serial No. 2065, Ben flew by airline to Jackson Hole, Wyoming, followed by a van ride to Afton, a route still used today.*

*From Afton, in a multi-stop flight, Ben delivered N20MC S-2A, serial No. 2085, to Marion Cole, based at the Shreveport Downtown Airport in Louisiana. In pre-GPS navigation days, this trip meant a lot of preflight planning, including Sky Prints spiral-bound maps and a list of radio frequencies noted down in advance. With the front cockpit hole covered, the rear single-canopy enclosure kept Ben comfortable.*

"Now Marion Cole's Pitts S-2A is VH-MCR in Australia, and I owned it for a while," said Cass Moeller in a Facebook post. "Some years solely my own, some in partnership with Mark Foy plus a time when Ian Close was also a part-owner. Now it is with the Australian Aerobatic Academy." (The certificate issue date of VH-MCR is 2008-11-26. In late 2008, the aircraft was imported to Australia by a syndicate that included IAC member and aerobatic instructor David Pilkington.)

After Francois and Cass emailed back and forth a bit, an airworthiness file copy was exchanged, and it looks like the paint scheme was slightly changed from the original Marion Cole paint scheme in 1984. "Removed the existing cloth covering and, in its place, installed Stits Aircraft Corporation Poly-Fiber covering





Marion Cole

material,” as stated on the OMB No. 2120-0020 – Major Repair and Alteration FAA form.

Marion’s Pitts is in great hands as the Australian Aerobatic Academy reports that it is looking after it. The aircraft is in excellent condition with a recent refurbish and repaint in the 1984 colors as it was sold to the academy.

Marion Cole was inducted into the International Aerobatic Club Hall of Fame in 1988. His aviation career was unique and varied. Perhaps best known as an air show performer, he also has been an aerobatic competitor, flight instructor, corporate pilot, and an aviation innovator.

As a competitor, Marion finished in the top four in the U.S. Nationals from 1949 through 1952, winning first place in 1952. In 1968, he represented the United States as a team



The current paint scheme since 1984.



In Australia, Cole’s Pitts is VH-MCR.

member in the World Aerobatic Championships at Magdeburg, East Germany. He was a founder of EAA Chapter 48 and IAC Chapter 9, as well as IAC Chapter 2 of Shreveport, Louisiana. He produced many contests, even before IAC was formed. Many pilots received their introduction to competitive aerobatics at contests staged by Marion Cole. Among these famous names are Tom Poberezny, Gene Soucy, Mary Gaffaney, Bill Thomas, Clint McHenry, Bob Carmichael, Chuck Caruthers, and many others. **IAC+**

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RJ Gritter, in his Bellanca Decathlon, flies inverted above Jeff Boerboon in his Extra 330SC at 2024 EAA AirVenture Oshkosh.

Photography by SCOTT SLOCUM

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