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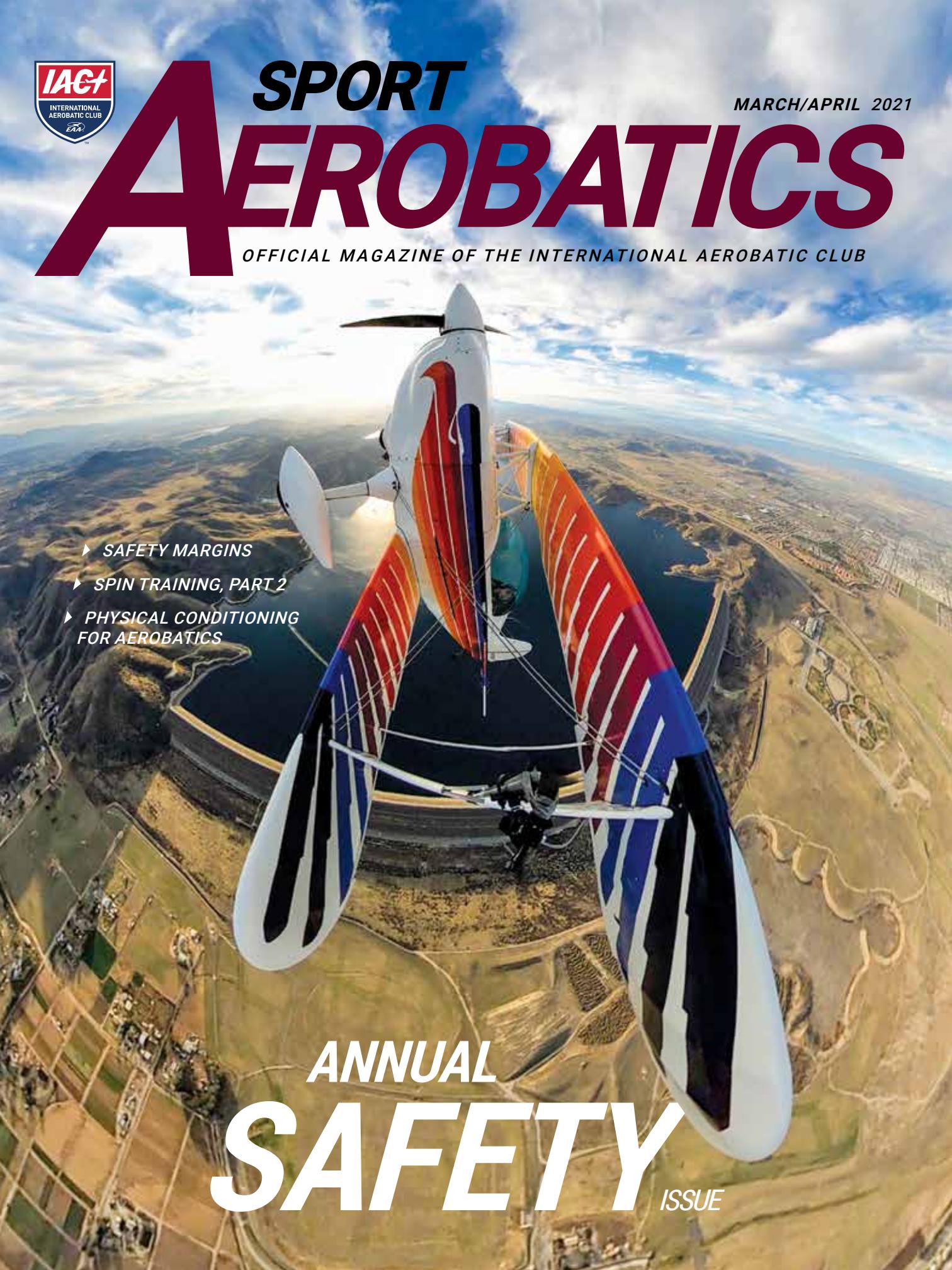
AEROBATICS

OFFICIAL MAGAZINE OF THE INTERNATIONAL AEROBATIC CLUB

MARCH/APRIL 2021

- ▶ SAFETY MARGINS
- ▶ SPIN TRAINING, PART 2
- ▶ PHYSICAL CONDITIONING FOR AEROBATICS

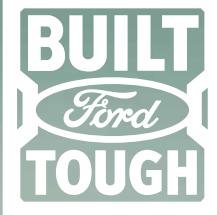
ANNUAL
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CONTENTS



FEATURES



- 6 KATHY JAFFE CHALLENGE ACROBLAST 2020**
by Eric Anderson and Ron Mann
- 10 TRAJECTORY CHANGE**
Aviation high school altered the course of my life
by Melvin Williams; written by Lorrie Penner
- 18 ADVENTURES IN FLIGHT INSTRUCTION**
by Alain Aguayo; written by Lorrie Penner
- 26 SAFETY MARGINS**
How much is enough?
by Budd Davisson
- 30 AEROBATIC SPRING TRAINING**
by Tom Johnson
- 32 PREPARATION FOR AEROBATICS**
Detailed and personalized protocol
by Francois Le Vot

DEPARTMENTS

- 2 PRESIDENT'S PAGE**
by Jim Bourke
- 3 EDITOR'S LOG**
by Lorrie Penner
- 4 LINES & ANGLES**
- 36 SAFETY SERIES**
by Keith Doyne
- 38 FLYING FIGURES**
by Tony Johnstone
- 44 TECH TIPS**
by Tom Myers
- 46 MEET A MEMBER**
by Zinnia Kilkenny
- 48 FLYMART**

COVER

ON THE COVER: Alexander Coats flies his beautiful Christen Eagle over Diamond Valley Lake, Hemet, California. Photo pulled from a 360-degree video.
Photo by Alex Coats

ABOVE: Nationals from 2012.

Photo courtesy of IAC archives.

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Changes, Curiosity, and New Initiatives

BY JIM BOURKE, IAC 434151

I'VE GOTTEN A LOT OF QUESTIONS

about the aerobatic contest calendar and all the other aviation events this year. Of course, by the time you read this article, what I speculate now could be outdated, but I want to relay that EAA fully expects that EAA AirVenture Oshkosh 2021 will happen. For that reason alone, I think we should be able to have a nearly complete contest calendar including the U.S. National Aerobatic Championships. Cross your fingers. Hopefully, you have been practicing!

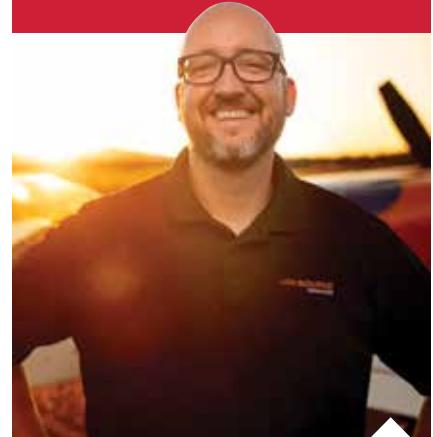
OF COURSE, BY THE TIME YOU READ THIS ARTICLE, WHAT I SPECULATE NOW COULD BE OUTDATED, BUT I WANT TO RELAY THAT EAA FULLY EXPECTS THAT EAA AIRVENTURE OSHKOSH 2021 WILL HAPPEN.

CHANGES TO THE JUDGE AND RULES PROGRAMS

We've recently had a change in our Judge and Rules programs. Doug Sowder has stepped down from the Rules program to take on other things. Doug is a good friend, an IAC president emeritus, and a fantastic volunteer who will continue to serve the International Aerobatic Club in other areas. I'm sad to see him leave this position but very happy to announce that I've appointed Barrett Hines to take on the Rules program on an interim basis. Barrett is frequently called on to be a juror in contests in the southwest region because of his calm demeanor, intellect, and prodigious understanding of the subject matter.

Meanwhile, our judge chair, Wes Liu, has moved on after many years of faithful service. Wes put in an uncountable number of hours training judges. His attention to the problem of "Santa Claus" judges, as he likes to jokingly call them, was tireless and produced results. Wes made himself available throughout the contest season, never more than a phone call away when a judge candidate was ready to be certified and put on the judges' line at the last moment. Wes' attention to detail and dry humor added substance and personality to the program. He will be ably replaced on an interim basis with DJ Molny. DJ, who hails from Colorado, is familiar to many of you as a judge instructor and as a longstanding member of our IT team.

These interim appointments will be put before the IAC board of directors at the spring meeting in early April, where they may become official. Please reach out to all four of these exceptional volunteers to share your gratitude.



AEROBATIC FITNESS

This month we present an article from World Aerobatic Champion Francois Le Vot. I first saw this information in a social media post, and I knew we just had to have it more accessible to IAC members. Regardless of what category you participate in, aerobatics is an athletic activity. We don't think of it that way in the United States often enough. We could learn a lot from Francois.

THE IMPORTANCE OF CURIOSITY

Aerobatics is not just an athletic activity; it's also an intellectual one. For some unknown reason, I was thinking a couple of days ago about how important curiosity is to become a great aerobatic pilot. A curious person does not repeat the same mistake over and over. A curious person tries new things. I remember when I was first learning snap rolls, and I thought I had it down. I was doing it wrong again and again. Finally, I just got in the airplane and started really playing with the timing, with how hard I pushed the rudder pedal, with the speed and force with which I unloaded the elevator input. An instructor a long time ago told me whenever I get stuck with something, try "bracketing." Bracketing is when you try things one way, then another way that is wildly different. When you practice bracketing, you find lots of bad ways to do things, but you also get to narrow in and find out exactly what works the best. When you get stuck, get curious.

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



It's an Active Safe, Not a Passive Safe

BY LORRIE PENNER, IAC 431036

FOR THE PAST FIVE YEARS as a tow pilot, I had been making the same approach to landing at our glider club field on Runway 27. Nothing unusual had ever happened, and I didn't expect anything on this occasion either. It was a beautiful fall day with a pleasant breeze, and the foliage on the trees surrounding the grass runway was starting to show tips of yellow. I wasn't tired, having only towed four times, and was humming a bit as I turned base to final.

I checked my speed and altitude, cleared the threshold at 200 feet, as is the custom at our field to make an allowance for the tow rope wiping through the sky, and had just started to cut power in preparation to descend quickly for a nice landing before the crow's nest. Suddenly, there were alarm bells and my heart raced — a car towing a glider popped out onto the runway less than a thousand feet in front of me.

My hand automatically went to the throttle. I could hear a voice in my head, "You know what to do — go around just like you've always practiced." Once I was climbing, I retracted my flaps and headed back to get in the pattern and attempt the landing again. Hopefully, I wouldn't get any more surprises.

I don't believe I actually counted the seconds it took me to add in power, but I would have to say it was no more than two seconds. I didn't know the circumstances or who drove out onto the runway, and I didn't care; I was hopping mad. As I came back to the field, landed safely, and shut down the engine, my anger was replaced by a wave of gratitude — gratitude to all of my flight instructors over the years who made me do all of those go-arounds, planned and unplanned. Especially the unplanned ones.

**DON'T GO IT
ALONE; GET SOME
INSTRUCTION OR
GROUND CRITIQUE.**

This month's magazine is the annual safety issue, and you will find many of our authors writing about safety for you as a pilot and for your airplane. Not all of us live in a climate where we can fly year-round, and Tom Johnson uses baseball's spring training as an example of getting back into playing (flying) shape. Sage words of advice roll off Budd Davisson's pen as he extols the concept of safety margins, and the same can be said for Francois Le Vot's detailed and personal physical preparation for flying aerobatics.

We have a couple of tech tips this month, including one from Tom Myers, who talks about the joys of diligent maintenance. The second article from Keith Doyne delves into nondestructive testing (NDT) and the benefits of the ability to test a structure or part without damaging it.

After this long season of COVID-19, whether you are rusty or simply a little out of flying shape, get with an instructor and have them put you through your paces. Haven't flown aerobatics in a while? Fly high and start out with basic maneuvers. Don't go it alone; get some instruction or ground critique. Make sure your annual is current on your airplane and your parachute.

Have fun, and put safety first! **IAC**

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

► TOP STORY

Call for IAC Board Nominations – Petitions Due April 16

BY DOUG SOWDER, IAC NOMINATIONS CHAIR

HELLO, IAC MEMBERS. It is time to nominate our 2021 slate of officers and directors. **Nominating petitions are due April 16.** Voting will be done electronically on the IAC website, beginning June 30. Voting ends on July 27. Results will be announced and new officers and directors will be installed at the close of the IAC annual membership meeting at AirVenture in Oshkosh on July 30, 2021.

Positions to be filled are vice president, treasurer, and four directors. Directors are elected “at large,” not by region, and are then assigned a region after they’re elected. If you wish to see which directors’ positions are up for election or reelection, go to IAC.org and navigate to About/Leadership/Yellow Pages. (IAC member login is required.) Terms of those officers and directors with “July 2021” after their names are expiring this year.

Very briefly, a candidate for office must submit a nominating petition signed by 10 current IAC members in good standing, a photograph, and a résumé/bio. More details are listed below. All signatures must be on a petition form, and I can accept multiple petition forms. So, if you choose to run for office, you can fill out a blank petition form, email it to your best friend in, say, Scobey, Montana, and have them sign it, scan it, and then email, fax, or snail mail it to me. My fax number is 509-489-4783.

I prefer to have IAC-related email sent to me at dougsowder@gmail.com.

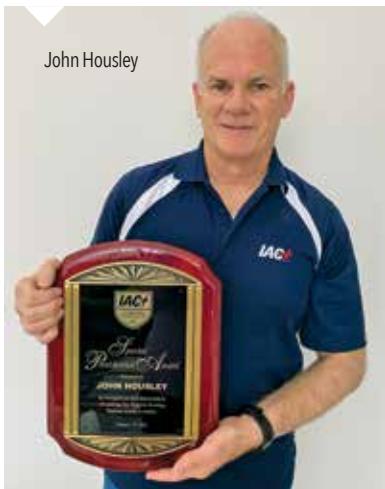
Feel free to contact me with any questions that you may have.

Doug Sowder
IAC 14590, Lifetime Member
Elections Chair

DIRECTOR/OFFICER NOMINATIONS DETAILS

1. Candidate petition form with 10 current IAC members’ signatures; download the form on the IAC website, IAC.org. Note: Members can sign separate petition forms and email them after they have printed, signed, and scanned it. All names do not have to be placed on one form. Email endorsements will *not* be accepted; it must be on the petition form.
2. Current photo emailed as a JPEG.
3. Résumé/bio must be less than 800 words.

John Housley



2020 President's Award and Presidential Recognition Recipients

THE 2020 SEASON will be long remembered for the coronavirus shutdown that took most of our competition season away. While it was not possible for everyone to compete, some of our most die-hard enthusiasts worked hard to make the competition season as full as possible. This year, the IAC recognizes those who put in extra effort with a special IAC Presidential Recognition certificate.

IAC President Jim Bourke is honored this year to award an IAC President’s Award to John Housley for his work in creating a new award program specifically for biplane enthusiasts.

2020 IAC PRESIDENT'S AWARD

The following person performed service of exceptional merit and shall receive an **IAC President's Award** with a plaque, a signed letter, and special notice on the website:

- ▶ **John Housley** for arranging the Highest Scoring Biplane Award

John created a proposal, arranged for a sponsor, and successfully established a new award program that has broad popular support for its potential to unite and encourage grassroots competitors.

IAC PRESIDENTIAL RECOGNITION

Awards to Competitors Who Almost Qualified for Regional Standings

The Regional Series requires three contests. The southwest region finished the season with two contests: Akrofest and Foxy Figures. The top finishers from the southwest are recognized for their efforts:

- ▶ Primary: **Shanna Crawford**
- ▶ Sportsman: **Lloyd Massey**
- ▶ Intermediate: **Michael Hartenstine**
- ▶ Advanced: **Barrett Hines**
- ▶ Unlimited: **AJ Wilder**

RECOGNIZING OUR CONTEST DIRECTORS

The contest directors dealt with a lot of extra work to make their contests happen. They are hereby recognized:

- ▶ Akrofest: **Bryan Jones**
- ▶ Ben Lowell Aerial Confrontation: **Nick Slabakov**
- ▶ Canadian Nationals Rocky Mountain House: **Lenora Crane**
- ▶ Clyde Cable Rocky Mountain Aerobatic Contest: **Jamie Treat**

- ▶ Corvallis Corkscrew: **Travis Forsman**
- ▶ Foxy Figures: **Susan Bell**
- ▶ High Planes Hotpoxia Fest: **Duncan Koerbel**
- ▶ Hill Country Hammerfest: **Doug Jenkins**
- ▶ Kathy Jaffe Challenge: **Eric Anderson**

RECOGNIZING SPECIAL CONTRIBUTIONS

The following volunteers are recognized for special work to make the 2020 contest season happen.

- ▶ **Dave Watson and Britt Lincoln** for administering the achievement awards
- ▶ **Jordan Ashley** for being treasurer during a financially difficult time
- ▶ **IT, the entire tech committee**, Tom Myers, Bob (Bwana) Buckley, Brennon York, Doug Lovell, and DJ Molny for working on updating our systems
- ▶ **Lenora Crane and Jeff Seaborn** for reinvigorating IAC activity in Canada
- ▶ **Lorrie Penner** for her work on updating the IAC Policies and Procedures documents
- ▶ **Michael Lents** and his committee for providing contest Unknowns
- ▶ **Mike Heuer** for maintaining the IAC archives and sharing his knowledge of the IAC's history during our 50th anniversary year
- ▶ **Sara Arnold** for her work arranging IAC webinars
- ▶ **Sara Arnold and Michael Church** for arranging four full days of IAC AirVenture seminars (which were canceled; however, some were converted to webinars)
- ▶ **Wes Liu, DJ Molny, Steve Johnson, and Hector Ramirez**, who put together the spring online judges school



Get Your Start

THE IAC HAS ROLLED out its 2021 marketing initiative, which is called "Get Your Start." The focus this year is on first-time competitors. There are a lot of barriers to getting started in aerobatics, so we want to encourage everyone who is brave enough to take on the risk and dedicated enough to expend their time and money on flying aerobatics. What you can do to help is invite people to come out and join in on the fun. You don't have to do anything fancy; just tell them about what you do and how great it is. If everyone in the IAC spreads that message to a couple dozen people in 2021, we will be overflowing with members in 2022. I know you can do it! **IAC**



**GET
YOUR
START**



Kathy Jaffe Challenge ACROBLAST → 2020

BY ERIC ANDERSON, IAC 436341, AND RON MANN, IAC 18815

AC chapters 58 and 52 combined efforts in 2020 to hold a single year-end contest in October at the Cape May County Airport. Each chapter's individual contests had been previously canceled like most others due to the COVID-19 pandemic. Low case rates in the Cape May region and state rules made this combined contest possible. All participants wore masks when in proximity to each other and socially distanced, as per state guidelines. We had no banquet or mass gatherings for meals.

Cape May County Airport is located on the southern end of New Jersey and has the resort towns of Wildwood to the east and Cape May 7 miles away on the south tip of the peninsula. When flying, the entire Cape May peninsula, Delaware Bay, and the Atlantic Ocean are visible. Cape May is the oldest seaside resort and has welcomed visitors for generations. In addition to miles of white sandy beaches, Wildwood is home to a 3-kilometer boardwalk, three amusement piers, and two water parks. It is a lovely place to visit. There are plenty of hotels and eateries in the vicinity. One of our members, Will Morey, lifelong resident and businessman of Cape May County, has helped sponsor events with hotel accommodations and support over the years.



Out on the judges' line.

Seasonably comfortable temperatures and sunny skies made the practice day on Friday and contest day on Saturday delightful. However, there was a monster lurking to our south, the remnants of Hurricane Delta. We wrapped up Saturday afternoon so that folks could head home early. Sportsman and Primary pilots completed two scored flights. Intermediate completed all three of their competition flights: Known, Unknown, and Freestyle. Our two Unlimited competitors elected to fly two flights rather than pushing for all three flights on the same day.

Results were delayed due to computer gremlins. But Contest Director Eric Anderson brought the score sheets home and finished up the scoring. We had fewer flyers than usual for our Garden State gatherings, but a respectable number did participate (17 competitors).

The results were as follows.

► PRIMARY (ONE CONTESTANT)

Congratulations to **JIM SPALLER!** He was first place — and only place — flying for a Stars patch. His final scoring percentage was 73.74 percent, which was more than respectable for a first-timer. Move up!

► SPORTSMAN (NINE CONTESTANTS)

PILOT	AIRPLANE	KNOWN	FREE	TOTAL
* STEPHEN COLEMAN	(35) PITTS SPECIAL S-1C N93BS	1125.17 80.95% (1)	1095.83 78.84% (1)	2221.00 79.89% (1)
* CLINTON DAVIES	(35) AMERICAN CHAMPION 8KCAB DECATHLON N622AC	1107.17 79.65% (3)	1056.50 76.01% (3)	2163.67 77.83% (2)
* MARK MEREDITH	(58) DE HAVILLAND DHC-1 SUPER CHIPMUNK N7DW	1111.17 79.94% (2)	1041.83 74.95% (5)	2153.00 77.45% (3)
* JOHN SHAVINSKY	(35) EXTRA 300L N154EX	1093.17 78.65% (4)	1041.50 74.93% (6)	2134.67 76.79% (4)
RON SMITH	(52/58) AMERICAN CHAMPION 8KCAB DECATHLON N465AC	1061.00 76.33% (6)	1045.33 75.20% (4)	2106.33 75.77% (5)
DENNIS HARVAN	(58) PITTS SPECIAL S-1S N27WP	949.50 68.31% (7)	1061.67 76.38% (2)	2011.17 72.34% (6)
CHRIS THOMAS	(133) RHIN DR-107 ONE DESIGN N1421W	1080.17 77.71% (5)	929.00 66.83% (8)	2009.17 72.27% (7)
LUIZ PEREGRINO	PITTS SPECIAL S-1T N49329	899.67 64.72% (8)	980.00 70.50% (7)	1879.67 67.61% (8)
LJ SMITH	AMERICAN CHAMPION 8KCAB SUPER DECATHLON N411DW	624.60 44.94% (9)	736.33 52.97% (9)	1360.93 48.95% (9)

Congratulations, **STEPHEN!** We didn't get much of a chance to spectate on the Sportsman flights but did happen to see your Free, and it looked like a well-deserved first-place finish. Great job also to first-timer **LUIZ PEREGRINO**, flying his Pitts S-1T. In addition, he served as recorder on the judges' line. Finally, for the category, a shout-out goes to IAC 58 members **DENNIS HARVAN** for a second-place Free and **MARK MEREDITH** for both his second-place Known and third place overall. It was worth having a contest just to see Mark's lovely Super Chipmunk in the sky.

► INTERMEDIATE (FIVE CONTESTANTS)

PILOT	AIRPLANE	KNOWN	FREE	UNKNOWN	TOTAL
RONALD MANN	(52) EXTRA 300L N300L	1447.00 74.97% (1)	1725.17 84.15% (1)	1184.33 63.33% (3)	4356.50 74.47% (1)
GLEN BECKER	(11) PITTS SPECIAL S-1S N115WC	1438.83 74.55% (3)	1571.00 76.63% (2)	1343.50 71.84% (2)	4353.33 74.42% (2)
MARCO BOUW	(19) LASER 200 N199J	1439.67 74.59% (2)	1524.33 74.36% (3)	1365.83 73.04% (1)	4329.83 74.01% (3)
WESTON LIU	(35/52) PITTS SPECIAL S-2A N78PS	1385.67 71.80% (4)	1484.50 72.41% (5)	1169.67 62.55% (4)	4039.84 69.06% (4)
PETE MUNTEAN	(58) AMERICAN CHAMPION 8KCAB SUPER DECATHLON N464SC	1203.93 62.38% (5)	1485.17 72.45% (4)	1079.43 57.72% (5)	3768.53 64.42% (5)

Our co-contest director, **RON MANN**, not only won but also invented a new figure during the Unknown sequence. We are calling it the Mann-oops. This category was hotly contested, which can be seen from the tightly grouped final scores.

► UNLIMITED (TWO CONTESTANTS)

PILOT	AIRPLANE	KNOWN	FREE	TOTAL
MICHAEL CILIBERTI	MX AIRCRAFT MXS	3184.50 72.71% (1)	2908.50 63.23% (1)	6093.00 67.85% (1)
JOHN FELLENZER	GILES G-200	2520.50 57.55% (2)	2656.33 57.75% (2)	5176.83 57.65% (2)

The Grassroots and the new American Champion medallions went to our first- and second-place Sportsman winners respectively; congratulations to **STEPHEN COLEMAN** and **CLINT DAVIES!**

► VOLUNTEERS

It is not news that a host of aerobatic contests were forced to cancel this year. By and large, we would bet that they were scrubbed not just because of local COVID-19 restrictions but also because the contest lacked the critical mass of participation needed to fill the volunteer slots. We were shorthanded too! But we were saved by the good fortune of having a handful of nonflying volunteers. Without them, we'd have been sunk. Volunteers included:

- Jim and Connie Wells, chief judge and his fine assistant
- Demi Eluwawalage, registrar
- Kate Russo, drafted registrar's assistant
- Paul Russo, starter
- Rin Anderson, scorer who didn't get to score
- Patty Anderson, who did a bunch of behind-the-scenes work. Those prizes are incredible!
- Tom "T-bone" Barrett, clipboard builder and adviser, plus he spent a full day on the judges' line
- Rob Dumovic, who worked a full day on the judges' line
- Bart Cocchiola, runner
- Bob Berkley, boundary driver
- Malia Manter, recorder
- Joe Flood and son Jason scoured the flightline in search of mechanical issues that we lesser "mechanics" might have missed during inspection.
- Chip Chiappelli, super staff member from FlightLevel Aviation who led his co-workers to coordinate and actively assist with ground operations. Their work for the Acroblast begins months before the contest and ends days afterward.

We hope to have our two contests next year. Please be safe and healthy. **IAC**



Mike Ciliberti's MXS rests on the ramp after a workout.

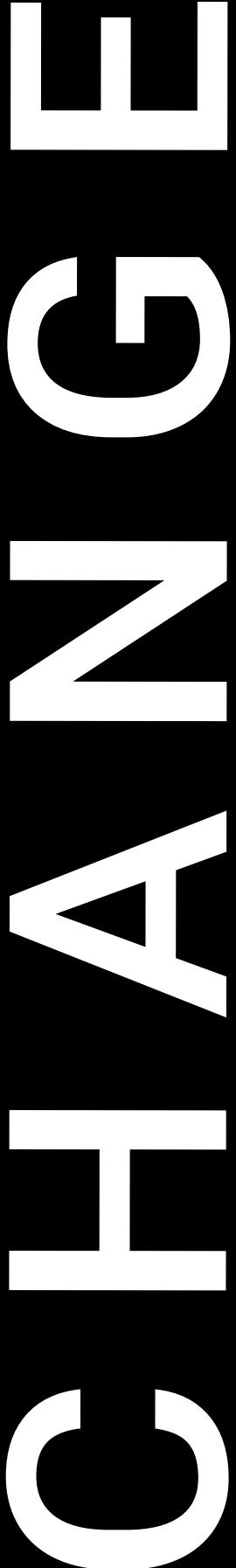
A man with a bald head and glasses, wearing a grey sweater, sits cross-legged on the floor of a hangar in front of a yellow and red Extra NG aircraft. He is holding up a white certificate towards the camera. The aircraft behind him has the registration N3EXTRA and the letters 'NG' on its side. The hangar has large windows in the background.

Walter Extra is proud to inform the aerobatic world that the new Extra NG has just received FAA Certification. The NG (new generation) aircraft is the first totally composite/carbon fiber aerobatic aircraft from Extra. Extra Aircraft is also proud to inform that Southeast Aero Sales Inc. is the North American Distributor for Extra.

Contact Chad Graves at CGraves@southeastaero.com, 303-946-6020 or Doug Vayda at DVayda@southeastaero.com, 904-568-9410
www.extraaircaft.com or www.southeastaro.com

EXTRA NG
SOUTHEAST AERO

AERONAUTICAL AEROBATIC ACADEMY



Aviation high school altered the course of my life

BY MELVIN WILLIAMS, IAC 440849

WRITTEN BY LORRIE PENNER, IAC 431036

“A

erobatics was always an interest,” Melvin (Mel) Williams said. “I was watching ESPN one day, and the Red Bull Air Races were on. I thought, ‘That would be cool to do. But how do these people get into this sport?’ After some research, I found that all of them had aerobatic backgrounds. Well, that’s the place to start.”

With no pilot friends and only one cousin in aviation, Mel did not have many aviation role models growing up. He was raised in Brooklyn, New York, where his family home was not far from John F. Kennedy International Airport (KJFK). Hearing the air traffic around his home — without finding it irritating as it can be for some — was fascinating to Mel. When it came time to choose his high school, the New York City school system had prospective students make a list of high schools they were interested in; Mel picked the Aviation High School in Queens as his first choice. He imagined it was a way into his dream of becoming a pilot.

Having been accepted as a student, he started his freshman year with excitement, only to discover that the school didn’t have classes for pilots but rather offered training for aircraft technicians. The Aviation High School’s vision for its students is to work with staff, parents, students, and industry partners to develop a belief within their students that they can meet and exceed the required standards of academic excellence in Regents and Federal Aviation Administration curricula. Specifically, the Aviation program students engage in classes aimed at becoming an aircraft maintenance technician (AMT), resulting in an AMT certificate issued by the FAA.

Mel graduated at 18 years old. He said, “I earned my airframe and powerplant licenses to work on aircraft. I often say that my high school saved my life because it started my career at an early age and allowed me to do a plethora of things that wouldn’t have been possible without it.”



Shortly after graduating, Mel was hired by Delta Air Lines to work as an aircraft maintenance technician at the age of 19, and he's been there ever since. In his current position, he teaches the Boeing 737NG aircraft to maintenance personnel for the airline and other companies.

He said, "I took up flying in 2017 because I figured if I fix them, I might as well fly them!" Flying has been a blessing and an escape for Mel — a blessing because he can share his journey and inspire others, and an escape because when he is flying, nothing on the ground matters. It's just him and the airplane.

In 2018, Mel started looking around his home in South Georgia for some aerobatic instruction. After a couple of recommendations, he finally found Citabria owner Kevin Harper and CFI Mike Fitzpatrick who were willing to give him some training. Before this new experience in the Citabria, spins scared him. "Spins are just weird," Mel said. "But the more you do them, the better it gets. Doing them often creates a muscle memory once you get enough of them under your belt. Then they are just plain empowering and fun!" During that first aerobatic flight in the Citabria, he found that he loved flying upside down, doing loops and barrel rolls. His favorite maneuver: loops. For him, it was a relaxing maneuver, feeling the g's hanging from the seat belts and rounding it out at the end.



Mel received his tailwheel endorsement and spin training from Tom Lake in a Decathlon.

Next steps were to get more aerobatic training. Mel went through a tailwheel endorsement and spin training with IAC member Tom Lake, IAC 432400, in Tom's Decathlon. For Mel's tailwheel endorsement, he had questions sent to him from his Instagram followers and answered: "Some of you guys have been asking what the most challenging part of my tailwheel training was ... *wheel landings!* Timing and finesse are required to land on just the two mains and keep it straight until the tail falls down."



Happy day! Mel realized one of his aerobatic goals in 2020 when he purchased his Decathlon.

Mel has been so inspired by aerobatic flight that he set some goals for himself: 1) to purchase a Decathlon, 2) get in plenty of practice, and 3) get into competition. In September 2020, Mel realized his first goal by purchasing an American Champion Decathlon. He is still getting used to the plane and especially the fixed-pitch prop. He has flown other airplanes with constant-speed propellers that modulate themselves, so working with the fixed-pitch prop has him learning to deliberately moderate the speed and keep from over speeding during aerobatic maneuvers — another aspect of learning aerobatics.

His second goal of getting in plenty of practice is also being checked off. With his own plane, he has plenty of opportunity to get in some flying. He can be seen on his Instagram account, @melthetraveler, posting aerobatic flights with friends and family. He takes as many friends flying as possible. “You never know what a difference it will make in someone’s life,” Mel said. He is a serious proponent of using social media. “It is a powerful medium that gives me many opportunities to communicate with others who are interested in aviation and want to know how to get started.”

“I DEFINITELY FEEL THAT I WAS CHOSEN TO SHARE MY PASSION OF AVIATION WITH THE COMMUNITY. NO BETTER FEELING WHEN YOU GIVE SOMEONE A NEW EXPERIENCE AND A NEW PERSPECTIVE ON AVIATION. WHEN I KICK MY FEET UP AND LOOK AT HOW MUCH YOU CAN MAKE AN IMPACT IN SOMEONE’S LIFE, IT’S TRULY GRATIFYING.”

 MELTHETRAVELER



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Mel still goes back to his Aviation High School as often as he can to talk to the kids about aviation. Typically, he will go for Career Day and three or four times a year casually when he is there visiting friends and family. "I try to talk to as many kids as I can," he said. "Some are on the fence about aviation; it is a long process." Mel explained that the Aviation High School program takes students into a fifth year to finish up the AMT curriculum in order to get both of the A&P certificates. "A lot of kids will get discouraged. They have some of their high school buddies that are going on to college rather than attending an extra year at the high school. Mentally, you have to be focused. When I visit, I show the students that I am living proof that they can do it, too!"

Closer to home, he has become involved with the Brock Foundation, which provides opportunities for minority youth in the Greater Atlanta area by developing today's youth for tomorrow's aerospace careers through providing them with mentors who look like them. Mel's good friend, Omar Brock, formed the nonprofit organization. Omar asked Mel to volunteer as a pilot for an event they held in the Atlanta area in late 2020.

Mel would like to continue promoting the enjoyment of aviation and act as an ambassador for the industry. "Being an African American, representing my community is imperative because then they know they can pursue aviation," Mel said in an interview with *Flying* magazine in its January–February 2021 issue. The Brock Foundation has another aviation event coming up this spring, and Mel is looking forward to being a part of it again.



At Sky Country Lodge in Alabama with Greg Koontz for a two-day basic aerobatic course.

**"WITHOUT THRUST, THERE IS NO MOVEMENT;
WITHOUT A DESTINATION,
THERE IS NO JOURNEY!
BE INTENTIONAL ..."**

 MELTHETRAVELER



On Juneteenth, Mel with fellow aviators in the Atlanta area flew to Tuskegee, Alabama.

In addition to getting more of his own personal aerobatic practice in, Mel went to Greg Koontz's two-day basic aerobatic course, which operates out of the bed-and-breakfast at Sky Country Lodge in Alabama. The basic aerobatic course covered training for loops, rolls, hammer-heads, and spins along with ground lessons before each flight.

"Greg doesn't assume you know anything," Mel said. "He goes over aerodynamics, which is really helpful. He makes things easier to understand. You may think something is complex until he boils it down. The two-day course helped me refine some skills I already had. The best example of that is Greg explaining where to look. I may have been looking in a place that wasn't that helpful, so his direction helped me to retrain my scan and direct my attention in a productive way."

As part of his quest to get more exposure to aerobatics, Mel contacted IAC 3 President Faith Drewry recently and found that the chapter had scheduled an aerobatic practice at his home airport, Henry County (KHMP). At the time of this writing, the January 23 practice day had not taken place. Mel was looking forward to meeting chapter members and either watch or participate.

There are other IAC members who Mel contacted in Georgia — Rick Ferrin, IAC 440492, and his son Dan Ferrin, IAC 441057. Rick is the IAC Chapter 3 secretary. He reached out to Mel on Facebook because they are both on a Facebook/Instagram group: Citabria Decathlon Scout Pilots Owners Enthusiasts. The father and son team fly a Super Decathlon and competed at the Bear Creek Bash in 2019. Rick has encouraged Mel to participate in the Primary category in 2021. A little cagey, Mel doesn't commit; maybe he will, maybe he won't fly. A part of him really wants to.

When it comes to Mel's final goal of getting into competition, only time will tell. The IAC contest season typically consists of 30 or more contests in a normal year. The closest aerobatic contest in proximity is the Bear Creek Bash, which has been held in Rome since 2013. Prior to that year, IAC Chapter 3 had been holding the contest, previously named the Southeast Aerobatic Open, in Hampton, Georgia.

"I'VE COME A LONG WAY, AND I PLAN ON GOING EVEN FURTHER THAN I CAN IMAGINE ..."

 MELTHETRAVELER



Mike Goulian is an aerobatic inspiration for Mel.



Receiving some encouragement from role model Anthony Oshinuga.

One thing that many pilots are challenged with are the funds to support their aviation obsession.

For Mel, “The biggest setback was trying to find the funds to fly. When I started working, I spent money on some of the dumbest things you can think of, just because.” At 19 years old, he was buying clothes and sneakers and spending money on girls, taking them out for dates. One night at work, one of his co-workers asked him what he spent his money on. When Mel replied, his co-workers told Mel he should get into real estate and allow his money to work for him. That was a new concept for Mel. “I had never heard anything about real estate investing before,” he said. His co-worker told him, “There is nothing like having your tenant hand you a big wad of cash.”

Before Mel moved to Georgia, he visited a cousin of his and was surprised at what a great house she had. In New York, \$200K wouldn’t have been enough buying power for anything, but in Atlanta, his cousin’s house was huge. He realized that once he was in Atlanta, the idea of getting some investment property wasn’t out of his reach. By the time he was 26, he owned his home and had three rentals. He still has the home and rentals and is working on another rental purchase, even in this uncertain real estate market.

Being a real estate investor has paid for Mel’s flight hours. The co-worker who put him onto the investing idea has retired at age 36 and is living off his investments! Mel still makes dumb purchases every once and again, but his money works for him now. He wholeheartedly encourages others to be smart with their money.

Mel has earned his CFI and is starting to teach a few primary students now. “I’m nervous about it,” he said. “One of my first students is this 15-year-old kid. He is sharp, very intelligent. He is way out in front of other people I’ve seen fly. He’s gonna be a star. I’m responsible for his journey. It hit me – wow, he’s looking at me like, ‘You’re the guy to get me to my goal.’ There’s a lot of pressure. At the same time, it is really cool to feel in charge of helping someone reach their goal, but you want to make sure everything you do and say is absolutely correct.”

A mentor or role model is important to guide our way to success. Who does Mel consider to be a role model in aerobatics for him? “IAC member Anthony Oshinuga,” Mel said. “Seeing Anthony doing what he does puts an extra battery in my back. I feel like if Anthony can do it, I can do it, too. I see others coming along in aerobatics like Justin Bethune. Seeing another diverse face feels great. Diversity is important. I like aerobatics, and it’s fun to do. Having representation in the sport is important. I hope someone will look at me the same way that I look at Anthony.” **IAC**

MELVIN WILLIAMS, IAC 440849, is an aviation technician for Delta in his role as a Boeing 737NG/Max/C40 educator. He is a commercial pilot and flight instructor (ASEL, AMEL) with over 500 hours of flight time. Melvin owns a Beech Musketeer and a Decathlon. Follow him on Instagram @melthetraveler and on his YouTube channel, Mel the Traveler.



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ADVENTURES IN FLIGHT INSTRUCTION

BY ALAIN AGUAYO; WRITTEN BY LORRIE PENNER, IAC 431036





He never really wanted to become a flight instructor, but Alain Aguayo always knew he wanted to fly. Even though no one in his family is or was a pilot, all of his childhood toys were either airplanes or spaceships. Something in his subconscious was telling him the sky was his home.

Alain's parents weren't too excited about his budding interest in becoming a pilot, but they were supportive of his need to find his way into the world of aviation. At the age of 12 he was sent from his family home in the Dominican Republic to the Culver Military Academy and boarding school in Indiana for a summer. Upon returning to Culver a few years later at the age of 16, he was determined to explore aviation but was discouraged. "It wasn't very conducive to building proficiency since I was only allowed flight training for 15 hours every summer," Alain said. The academy was the only option at the time because opportunities were very limited in the Dominican Republic. The next year he was introduced to a flight instructor who was very eager to teach and motivate his students. He told Alain to keep at it no matter the obstacles.

With that encouragement bolstering his determination, Alain returned once again to the United States, and in 2006 he was accepted into Embry-Riddle Aeronautical University (ERAU). The university's admissions office happily welcomed him, in part because of an amazing recommendation letter Culver had written for him and also because he'd graduated with the highest rank attainable. He began enthusiastically working toward his goal of becoming an airline pilot, with the hopes of flying a Boeing 747 or 777.

Then it happened — he was introduced to aerobatics in his second year. Mikhael Ponso, IAC 432733, was his first aerobatic instructor. Mikhael was an exacting taskmaster, and rather than tell Alain his flying looked fine, as other flight instructors had, he told Alain what needed to be fixed. Alain really respected that and became an avid fan, ready to follow in Mikhael's footsteps by earning multiple certificates and experiencing numerous types of aircraft. Still on his bucket list is a glider rating.

Surprisingly enough, Alain fell into instructing by accident. He began flying aerobatics in the Pitts Special S-2B at the Eagle Sport Aviation Club near ERAU. "We had to fly with an instructor/safety pilot, even at competitions, which was the club's policy at the time. One of the many requirements to solo this airplane was to have a CFI certificate," Alain said. "So after almost three years of flying the Pitts and progressing to Intermediate, I felt that it was time to fly it solo. I obtained my CFI certificate in 2013 just to be able to fly the club plane solo in competition. Once I was able to fly the Pitts solo, it was a night-and-day difference in all aspects. Because I had my CFI certificate, I was asked to instruct some of the club members and provide aerobatic training. I realized that this was something I truly enjoyed doing and became passionate about it. Funny enough, I started teaching aerobatics before any kind of primary flight training. In fact, I very rarely flew with private pilot applicants, and to this day, I still haven't given a solo endorsement."

Patience was the best skill that Alain picked up from his instructors over the years.



PHOTOGRAPH BY LEIGH HUBNER

"BECAUSE I HAD MY CFI CERTIFICATE, I WAS ASKED TO INSTRUCT SOME OF THE CLUB MEMBERS AND PROVIDE AEROBATIC TRAINING. I REALIZED THAT THIS WAS SOMETHING I TRULY ENJOYED DOING AND BECAME PASSIONATE ABOUT IT. FUNNY ENOUGH, I STARTED TEACHING AEROBATICS BEFORE ANY KIND OF PRIMARY FLIGHT TRAINING. IN FACT, I VERY RARELY FLEW WITH PRIVATE PILOT APPLICANTS, AND TO THIS DAY, I STILL HAVEN'T GIVEN A SOLO ENDORSEMENT."

— ALAIN AGUAYO

“You have to be understanding and know that every student learns differently and some faster than others,” Alain said. “Put yourself in their shoes, because we were all students at some point. I had many different instructors in my many years of flight training. Once I became an instructor, I adopted some of the different teaching styles and techniques from some of my favorite CFIs.

“Making mistakes is a big part of flight training,” he said. “In fact, I believe that students learn best from their mistakes as long as they can identify them. An issue I experienced many times as a flight student was that some of my instructors were brand-new instructors with very little experience and therefore didn’t allow me to take my mistakes further. But instructors have to start somewhere, right? Being involved in aerobatics and actually teaching it first was of tremendous help and advantage because it taught me the knowledge and skills to become a more confident pilot. As a result of my exposure to aerobatics, I felt very comfortable letting students make mistakes, and perhaps letting them take those mistakes a bit further.”



ALAIN AGUAYO

TOTAL FLIGHT TIME: 3,600 hours

TOTAL AEROBATIC TIME: 1,100 hours

EDUCATION: Bachelor’s degrees in aeronautical science and aerospace and occupational safety

PROFESSION: Pilot

CFI JOBS: Eagle Sport Aviation and ERAU. Currently teaches privately in the pilot’s own airplane.

YEARS AS FLIGHT INSTRUCTOR: 8

CERTIFICATES AND RATINGS: ATP, instrument, SEL, SES, MEL, MES, CFI, CFII, MEI

FIRST CONTEST: 2010 Fall Sebring Contest in the Primary category

FIRST AEROBATIC PLANE: Eagle Sport Aviation Club’s Pitts S-2B

CURRENT AEROBATIC PLANE: A Giles G-202 was the first aerobatic plane Alain owned, but he is currently transitioning to an MX2.



PHOTOGRAPH BY WESTLEY BENCON

"BEING INVOLVED IN AEROBATICS AND ACTUALLY TEACHING IT FIRST WAS OF TREMENDOUS HELP AND ADVANTAGE BECAUSE IT TAUGHT ME THE KNOWLEDGE AND SKILLS TO BECOME A MORE CONFIDENT PILOT. AS A RESULT OF MY EXPOSURE TO AEROBATICS, I FELT VERY COMFORTABLE LETTING STUDENTS MAKE MISTAKES, AND PERHAPS LETTING THEM TAKE THOSE MISTAKES A BIT FURTHER."

— ALAIN AGUAYO

Since most of Alain's students at Embry-Riddle were coming from a Cessna 172 with a Garmin G1000 environment, these Children of the Magenta Line had to put aside their nose-wheel habits. They had to learn how to handle a tailwheel aircraft in order to take their upset prevention and recovery training (UPRT) or aerobatics course. This was another situation where applying a good deal of patience paid off. Once his students became more comfortable with handling tailwheel aircraft, they could concentrate on learning more about unusual attitudes.

"At one point I was training students in a Piper J-3 Cub; in a Cub you have heel brakes," Alain said. You probably know what's coming here if you've ever flown a Cub or an Aeronca Champ. "The students that came to me usually did not have any experience with a Cub. Upon landing, most of them had a hard time remembering about the heel brakes. One time I had a student hit the brakes too much, with more pressure on the left side than the right. It looked like we were about to have an unpleasant experience, so I took the plane off the paved runway onto the grass to keep it from ground-looping."

When asked what was the most challenging aerobatic maneuver for his students to learn, Alain gave a surprising reply: "Inverted steep turns." It's surprising only because it isn't usually on the list of beginning aerobatic maneuvers at most aerobatic flight schools. It makes sense, though, for students who are near the end of their training or are advancing their training after having mastered other maneuvers like an inverted turn at 30 degrees of bank or an inverted Dutch roll. Alain said doing the more aggressive inverted steep turns is something he includes as a drill. "It is eye-opening for them — a way to warm them up for the rest of the maneuvers. To the students everything is backwards, so most of them find it very disorienting at first."

Although most of Alain's students who have done a basic aerobatic course express how much they enjoy doing hammerheads, it is a dramatic maneuver for beginners. "This maneuver is nothing like what the students have done before," Alain said. "They love the sensation of hanging straight up. Hammerheads are fun to do, and the maneuver shows you how you still have control of the aircraft at little to no airspeed. However, the pitfall for most when they are new at flying a hammerhead is looking at the right place and paying attention before the pivot."

While at ERAU, 90 percent of the instruction Alain gave was UPRT and spin training for CFI applicants. The other 10 percent was multiengine training. "Teaching multiengine kept me on my toes all the time," Alain said. "The biggest part of learning how to fly with two engines is actually learning how to fly the aircraft with just one engine. Doing simulated engine failures on takeoff at 500 feet was always interesting. I would see various students react differently – either take a bit too long to determine which rudder to use to prevent the yaw and loss of control, to using full deflection aileron, to students using the wrong rudder entirely. These were always topics that were debriefed after every flight, with the emphasis on rudder usage."

While doing a simulated engine failure at 500 feet, one brand-new multiengine student began yawing to the left. The student added more left rudder and Alain had to step in with right rudder to avoid a more exciting flight than anticipated. After Alain added the right rudder, the student became startled because his head wasn't in the game and he didn't realize why the right rudder was needed. There was a major debrief after the flight.

These days, in addition to practicing with the U.S. Advanced Aerobatic Team and working part time as a commercial pilot, Alain is getting excited about an upcoming venture. He just announced he is expanding his private flight training by starting his own UPRT and aerobatic programs business. Alain has secured a Super Decathlon to use in this new venture.

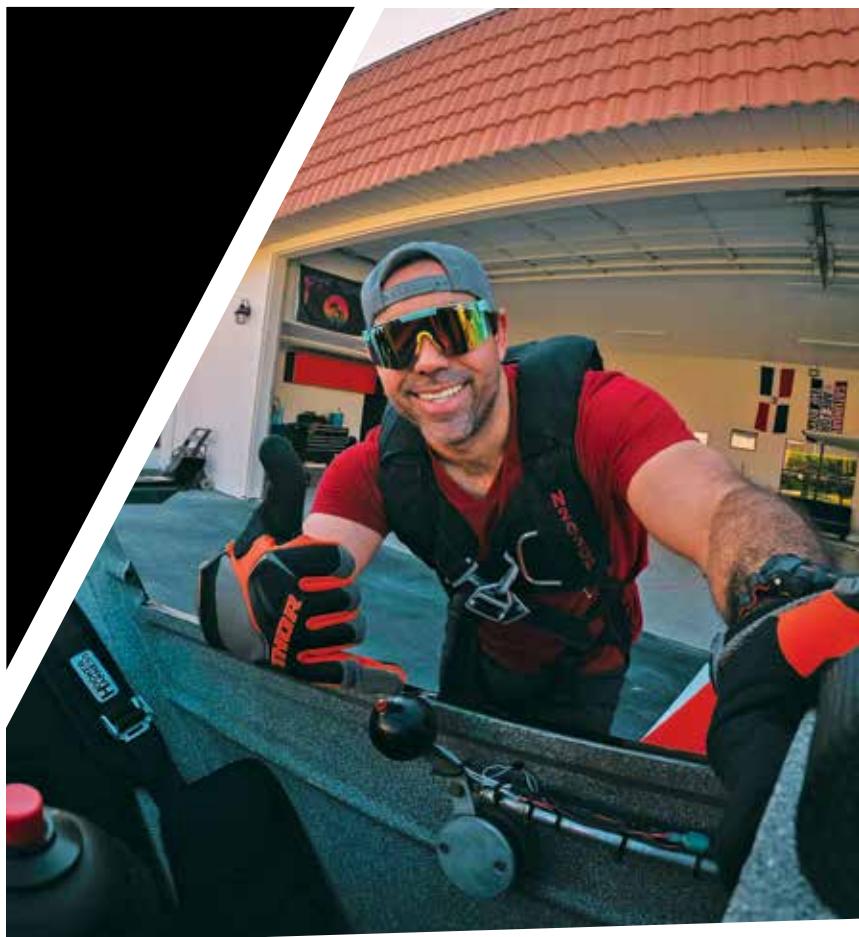
From his own experience as a student and CFI, here are Alain's top tips for anyone getting started in aerobatics:

First of all, find a reputable flight school and aerobatic instructor. You want to learn this the right way from the beginning.

Stay consistent. If you are serious about aerobatics, particularly competition aerobatics, you must dedicate the time, put in the effort, and gain the discipline. Doing it once every other month won't cut it.

Have someone watch you fly. If no one is giving you feedback from the ground or from inside the airplane, all you're doing is practicing mistakes and reinforcing bad habits that will be hard to break later on. If you have access to an aerobatic box, that is the best place to practice. Even at competitions, you can get feedback from the judges in the form of scores, which can be very beneficial.

Don't skip steps. Start from the bottom (Primary) and work your way up in categories. Master a particular category before moving up to the next one. You don't want to miss out on the fundamentals. There is no single criterion that determines when you should move up, but each pilot should develop his or her own criteria. For me, it was finishing in the top three consistently and capturing first place at least once before moving up. Again, it's all about discipline! **IAC**



DISCIPLINE!

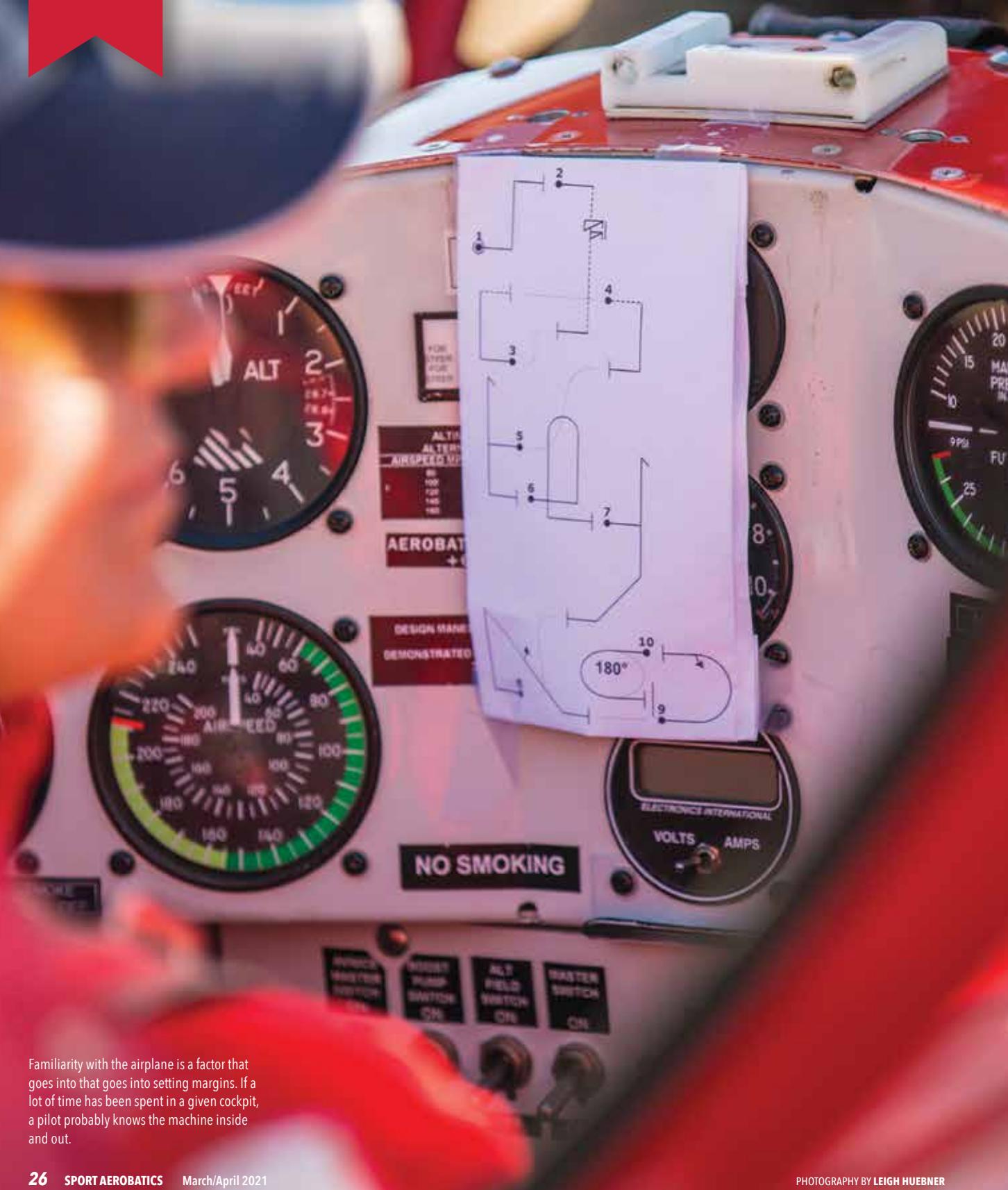
Alain Aguayo, serious about aerobatics, puts in the time and effort in his Giles G-202.







SAFETY



Familiarity with the airplane is a factor that goes into that goes into setting margins. If a lot of time has been spent in a given cockpit, a pilot probably knows the machine inside and out.

SAFETY MARGINS

How much Is enough?

BY BUDD DAVISSON, IAC 435420

We don't talk about it much, but airplanes can actually be pretty damn dangerous. No, let's rephrase that: Airplanes themselves aren't actually much more dangerous than the drive to the airport. However, they are the magic machines that hoist us up into a dangerous environment. A fall from more than about three stories, 30 feet, in almost any situation by almost any means, airplane or otherwise, generally doesn't have a happy outcome. So, airplanes can be viewed as nothing more than very high, very expensive stepladders that put us in situations where our survival is dependent upon (a) the airplane functioning properly, and (b) us knowing how to properly protect ourselves from the height by knowing how to operate the machine properly. Central to all of that is the concept of safety margins.

IT'S ALL ABOUT MARGINS

The concept of margins of safety is engrained in every aspect of aviation from beginning to end. Nothing is pushed or designed right to the limit. Each bolt or rivet is selected with a safety factor that covers possible material or design flaws. Then that bolt is inserted into a fitting that was designed with a huge margin to cover possible fit problems, and the fitting is part of an airframe that was designed around assumed flight loads that are higher than are likely to be encountered. An airplane is safety margins layered upon safety margins.

Using the same logic that guides the design of our airplanes, it only makes sense that safety margins also be built into the way we fly. This seems especially applicable to the types of airplanes those of us in the aerobatic community are flying and how we're flying them.

Safety margins can be extremely personal and subjective. What may be an acceptable margin to one pilot may be cutting it razor thin to another. That's to be expected because pilots vary so widely in their personalities, experience, and skill levels. Although it is tempting to list "skill" as one of the top decision factors in setting margins, skill doesn't always allow narrower margins in all situations. The laws of physics set certain immutable limits to everything, and no amount of skill will save our butts if we've crossed those lines. However, how close we tip-toe to those limits will vary pilot to pilot, situation to situation, and airplane to airplane.

Where does experience, the ultimate intangible, fit in the margin-setting equation? For obvious reasons, it's near the top because experience gives the pilot reference points acquired in a variety of situations, which, in turn, help them decide what margin is too narrow and what's overkill (if there is such a thing as too much margin of safety). Experience gives a basis to more accurately judge margins, but, at the same time, experience can also be dangerous. Too often it breeds overconfidence. If the pilot's personality type makes them prone to pushing the limits, the more they get away with something, the lower those margins will become until the curves cross and experience and skill aren't enough to save their bacon.



Aaron McCartan gives some safety tips to Sara Arnold at the 2019 U.S. National Aerobatic Championships.

Familiarity with the airplane is another of those factors that goes into setting margins. If a lot of time has been spent in a given cockpit, a pilot probably knows the machine inside and out. He's confident in knowing how it will perform in certain maneuvers. However, while the aforementioned laws of physics may be concrete in concept, they are subject to being interpreted differently depending on the air through which the airplane is moving at any given moment. It's not unusual, for instance, for air show pilots to fly several practice shows before the big day, if the airport presents anything unusual. Normally, that includes higher-density altitudes, either because of heat or airport altitude or both. Most longtime air show pilots will willingly add several hundred feet to their hard deck because they know that thinner air can significantly affect their airplanes and the differences are difficult to predict. They also know the effects may be different from one end of the runway to the other. So, they don't rely on guesses. They go out and actually test the situation so they know exactly what they can expect out of their airplane. An airport in the high country of Arizona may be at 6,000 feet MSL (or higher) and the temps may be 100-plus degrees Fahrenheit (density altitude 10,000-plus), which is grossly different than a Florida airport at 200 feet MSL and the same temperature (density altitude approximately 4,000 feet). Their airplane won't have even approximately the same performance, so they build in more altitude for safety margin.

The concept of altitude-as-insurance is probably central to all aerobatic pilots' way of thinking, but if it isn't, it should be. Very few pilots start right off doing aerobatics with their hard deck being 328 feet above ground level, which is the lower limit of the Unlimited aerobatic box. In fact, when someone is just starting out, the 1,500-foot bottom of the Primary and Sportsman boxes could be considered too low. Early on in anyone's aerobatic learning

curve, there will be maneuvers that, when screwed up, momentarily test the pilot's ability to tell up from down. "Aerobic mental disability" strikes all of us at some point and a yet-untrained mind is shut down for a few seconds. It is at that juncture, when the brain is trying to catch up, that extra altitude will make up for any deficiencies in our flying ability.

Assuming we're high enough when things go to hell, if we pretty much leave the airplane alone, in a few seconds it will have the heavy end pointed down and we're good. Some situations, like knowing the difference in the way outside and inside spins look and feel, require some maneuver-specific training. However, in general, the higher we are, the safer we are.



WEATHER MARGINS

So how much margin is enough? The obvious question is, “Enough of what?” For instance, it is often said that flying to a contest or air show is the riskiest aspect of flying aerobatics. So, let’s talk about weather and safety margins. How much ceiling is enough? Although the regulations may let us come down to 500 feet in a given area, is that smart? Why not use 1,000 feet as the limit, regardless of it being legal to fly lower? A lot of factors come into play here. Let’s say you have good visibility, a solid 10 miles under the deck. So, visibility says go ahead and do it. However, where are we? Oklahoma? Here, the tallest thing in the county is an oil derrick or communications tower. Or are we navigating the west slope of Colorado where everything is high and getting higher? Is the weather Oklahoma-type weather where a 500-foot ceiling is likely to stay 500 feet, or is it Pennsylvania-type weather where the ceiling is more likely to be ragged and unpredictable and the topography is the same? And how well do you know the route? A lot of factors enter the equation, and common sense has to reign.

Probably the best way to look at setting weather minimums is to consider what happens if things get worse. What is the worse-case scenario? Will your margin give you enough room to find a safe haven? In most parts of the country, if things start to deteriorate, 500 feet in almost any situation isn’t enough to guarantee you time to find an airport. One thousand feet, on the other hand, lets you see the problem as it develops. If you raise your limits even higher, to 1,500 feet, however, you have a much higher probability of having a VFR airport in a reachable distance.

A lot of folks will have a cross-country altitude limit in mind that they just won’t go below. They’ll pick an altitude, say 800 feet, and the instant they find themselves forced down to that level, they push the “nearest airport” button in their brains and draw a straight line to it. At times, when the destination isn’t far ahead, that may be a difficult decision to make. However, if we don’t adhere to self-imposed limits 100 percent of the time and push into lousy weather, we might as well not even set them.

An additional factor here that has to be included in cross-country safety margins is what kind of airplane we’re flying. A Super D, for instance, has the pilot sitting high, with good visibility, which makes picking our way through crappy weather easier. A Pitts, on the other hand, is one of the world’s worse airplanes for low-level cross-countries. You can’t see squat, you’re not carrying enough fuel to fly around anything, and you definitely don’t have enough gas to let yourself get very lost. Here’s where a GPS and ForeFlight on your phone can be lifesavers. Their best use isn’t in letting you pick your way through stuff ahead, but, as the clag starts closing in, they enable you to immediately find the airport behind you that’s known to be in better weather. The “Go To” button has the downside of sucking us into pushing into stuff that definitely doesn’t look good. It’s a fact that weather kills far more pilots than aerobatics do. We should keep that in mind.

FATIGUE CAN BE A SILENT UNKNOWN

And then there’s a subtlety we seldom talk about: pilot fatigue. It’s never mentioned in accident reports, but fatigue of one kind or another often plays a significant factor in airplane accidents. One of the most commonly heard explanations about why someone likes to fly aerobatics is, “After I’ve had a hard day at the office, all I have to do is jump in the plane, pull some g’s, and I’m right again.” That’s a good outlook, but it’s pretty much agreed that both judgment and skill are seriously eroded by fatigue and mental distractions. So, it only makes sense that we recognize that and set personal limitations to avoid flying when we’re mentally or physical compromised. We can’t put a number on this kind of thing, but all of us have a subliminal understanding of “self,” and continually evaluating how that part of us is functioning is a good idea. Some pilots, generally those who have been around long enough to have experienced some hairy moments, will spend a few seconds after strapping in just sitting there while listening to how their brain is shifting gears. They’re analyzing whether their brain is shifting into “airplane mode,” as it should. Subliminally, we know when we aren’t as sharp as we should be, and the smart ones use that feeling as reason to get out of the cockpit. Most of us have shut down after cranking it up because we realized we were just not up to it.

MARGINS ARE OUR INSURANCE

The concept of safety margins can be applied to just about everything in aviation. The important part of the concept, however, is that a pilot recognizes that no matter how experienced they may be, there are still some aspects of being in the air that are outside of their ability to control. No one is a superhero. Everyone needs a personally set limit in every flight regime that they will not exceed no matter what. Without those limits, it’s only a matter of time before a pilot finds themselves dealing with a combination of factors that have built a situation for which they are neither trained nor mentally equipped to handle. If they have safety margins built in, they will be okay. If not, however, the outcome will be impossible to predict. And we don’t want to work with probabilities. In aviation, we want nothing but certainties. **IAC**



SAFETY

AEROBATIC SPRING TRAINING

BY THOMAS JOHNSON

One of the truly great rites of spring is the return of baseball. Every team has high hopes, and most of the players are optimistic about the season ahead. All the players have to work to get back

into playing shape — getting their bodies loose, getting their timing down, and getting back into the flow of the game.

That ritual almost feels like what we go through as we prepare for the upcoming aerobatic season.

For many of us, the simple act of taking off and landing after a winter of aviation inactivity has challenges all its own. You know what to do, but your reaction time is just a bit slow. Your perception is not quite where it was at the end of last season. You may even feel behind the airplane more than you anticipated. Just like the ball players, you may need a bunch of at-bats (i.e., flights) to get your timing back.

Now, it's time to get back into the flow of the game. Think about how you enter the box, how you begin the sequence, and how it all connects. Notice that this is all planning and practice you can do without getting into an airplane. Much like the baseball players, aerobatics pilots think about their routine in the batter's box prior to getting there, to increase their odds for success.

To increase your probability of success, you should have a plan. Hopefully, you have downloaded the Known sequences, worked up your Free sequence, and began planning which and how many contests you are going to attend.

Look at each of your figures. Mentally picture yourself doing each of them. Where am I looking? Where do I expect the controls to be? What do I expect it will feel like?

Think about some numbers. In my Pitts, if I am on a vertical line down passing 2,200 feet AGL, I know I will have a hard time not going below the Sportsman Class 1,500-feet AGL hard deck. If I start a one-and-a-half-turn spin at 3,000 feet AGL, I will probably bust the hard deck.

Having thought through all of the pieces, it is time to string them together. Can you mentally fly the sequence? Can you mentally picture where you think you will be in the box? If you cannot do this, seek the counsel of a good CFI or of someone you respect in the community. Do not be afraid or ashamed to ask for advice on how to handle a situation.

Once you are in the air, it is time to focus. It is time to access all that preparation and put it to use. Force out all the distractions and fly the aircraft. If you are worried about a sick child or an upcoming meeting, or whatever, evaluate how much stress that is putting on you. Then figure out if it is safe for you to fly.

A wise old aviator once told me that if you doubt you can do a flight safely, there is no doubt. Don't fly.

So, what will you do when something doesn't go as planned? Do you have a plan for the unplanned? Have you established a set of parameters that causes you to knock off the sequence and reset? Hopefully, the answer is yes. And hopefully, it is something you periodically review and update.

As you can see, there is a tremendous amount of mental preparation that must be done prior to the season.

And make no mistake about it, mental preparation is a learned and perishable skill. Like all perishable skills in aviation, you have to routinely practice them to stay sharp.

Mental preparation is the keystone of successful risk management. And risk management is the essence of safe flying. So, have you evaluated your personal risks and developed a strategy to mitigate these risks?

Hopefully, the answer is also a resounding yes.

So, step up to the plate, enjoy the at-bat, and be ready for what our great sport throws at you next. **IAC**



Thomas Johnson



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SAFETY

PREPARATION FOR AEROBATICS

Detailed and personalized protocol

BY FRANCOIS LE VOT, 2013 WORLD AEROBATIC CHAMPION

THERE WAS A QUESTION posed on social media about physical preparation or fitness monitoring applied to aerobatics. As clearly as I can, I have written my experience in this domain; I have no degrees in sports medicine, and I'm not a coach in physical preparation. But I was submitted to an experiment, and it could interest some of you who are interested in this subject.

Regarding physical preparation for aerobatics, I had the ultimately detailed and personalized protocol the two last years of my career as an aerobic “competitor,” when the French Aerobatics Unlimited Team had finally convinced the hierarchy that our sport needed a profoundly serious and individualized physical preparation program. So, we had a chance to use some of our budget for a little cardiology and sports medicine studies. Far from reinventing the wheel, we just confirmed facts that were not too far from what could have been deduced by a little bit of common sense.

Not reinventing the wheel but taking a few minutes to understand how it works could be useful in aerobatics; it is a sport that produces guys so focused on achieving the perfect vertical snap roll on the way up that they tend not to question other matters.

At first sight, what does aerobatics require in terms of physical and mental resources?

PHYSICAL STRENGTH AND RESISTANCE

• **Resistance:** An Unlimited aerobatic sequence lasts on average five minutes, between 10 and 14 main figures, alternating positive and negative g's between -10/+10. That creates around 25 changes between positive and negative g's with every pull or push making you weigh 700 kilograms (1,543 pounds). It is an enormous effort that leaves the pilot totally exhausted and panting at the end of a sequence: This point is where oxygen consumption matters, and this is the reason for which it must be trained and optimized.

Measured heart rates showed peaks (for me) at 110 percent of measured maximum heart rate (HRmax) on the running track. It is not a theoretical number and not so bad according to my Fizifit monitor and the 220-age concept, where you subtract your age from 220 and multiply by the percent of HRmax to get your HR for a given training session.

- **Strength:** The body must be able to sustain its own weight multiplied by 10 numerous times in a day without being damaged. The shoulders, back, and neck must be strong enough to sustain the infinite number of repetition of rolls, stops, pulls, etc., during the “hard season” — the four or five weeks of training camp at two flights per day. Moreover, the body needs strength as an actuator of the airplane controls to execute the maneuvers repeatedly, requiring at the same time accuracy, strength, and swiftness: in other words, “controllable power.”

What are the specificities — the physical behaviors — needed in perfectly controlling an airplane during a sequence?

In opposition to some of the other sports where I've heard that relaxation was the way to accomplish the perfect move (tennis, golf, even boxing), my personal feeling is that aerobatics requires a maximum tension of the whole body for the majority of the sequence. Even a simple fast roll on a level line requires a maximum of tension — in the legs as well, pushing hard on both rudder pedals to keep the perfect line and prevent straying off the x- and y-axis, nose wobbles at the stop, etc.

A side thought: If you keep straying off the axis or if you keep barreling an aileron roll, it could help to push hard on both pedals all the way through the roll, freeze the rudder in the neutral position (on an Unlimited competition airplane; on “smaller airplanes,” make the necessary actions on the rudder, only pushing harder on both pedals to prevent the rudder to live its own life).



Francois' personal feeling is that aerobatics requires a maximum tension of the whole body for the majority of the sequence.

MENTAL RESOURCES

- They are a characteristic of aeronautics in general, and in my opinion, they constitute 90 percent of the difficulty of aerobatics: the constant use of the brain, the constant process of adaptation, decision-making, accessing memory, reading indications, and "listening" to the airplane. All these things need a lot of oxygen. It is more reason to enhance the VO₂ max. (VO₂ max is the maximum (max) rate (V) of oxygen (O₂) your body is able to use during exercise.)

As an example of the multitasking concept alluded to above, there is a funny experiment you can do on a home trainer: Put your exercise bike in front of the TV, playing something that requires quite a bit of attention; start pedaling and regularly increase the resistance. There's a particular moment when you have to change the channel and switch from the MIT quantum physics lecture to the National Geographic reportage about the Krakatoa eruption, then to *The Chef Show*, *Looney Tunes*, and finally, the ultimate downgrade: There is the point where you are not able to understand an advertisement for ham anymore.

It is not benign in aerobatics; when the brain is in debt of oxygen for whatever reason — muscle consumption or high positive g's — the big show begins: Memory vanishes (S#!t, what's now in this vertical up?), decision-making fades away, laziness and procrastination take over (I will correct that crosswind tomorrow), willingness for fight turns into willingness to stop, willingness to stay awake turns into willingness to sleep ... actually, ending with a hard zero for a forgotten figure or one figure flown behind the group of laughing judges is not a bad outcome compared to a g-induced loss of consciousness.

To summarize, the physical preparation for aerobic flights must be well thought out and implemented to keep a maximum of oxygen available for the brain during the five minutes of the Unlimited sequence to think efficiently. The pilot must maintain an efficient body that will physically sustain the rhythm of training during the flight season and will be perfectly fit for the competition — no tendinitis, no pains of any sort.

To recap, the sport of aerobatics requires:

1. mental capacities for adaptation, decisions, focus, and attention
2. physical capacities for the body to obey the brain in all circumstances
3. specific resistance to sustain this five-minute effort; with some cardio exercise but not detrimental to the heart versatility in terms of rhythm and quick adaptation to the effort; capacity to go beyond the maximum rate instantaneously or capacity of slowing down and recovering quickly. A marathon is a particularly bad preparation. VO₂ building with interval training before the season seems to be more appropriate.



SAFETY



Francois is currently an aerobatic coach with over 1,200 hours in aerobatics.

- Strength building on the whole body but not to the point of being detrimental to swiftness and accuracy. Building muscles the size of New Jersey is not necessary; they would be too oxygen consuming, too strong, and non-adapted to the effort required. One doesn't stir one's coffee with an excavator, or not very often. On the opposite side, one does not dig holes with tweezers. There must be an optimal compromise in terms of muscle size and properties, between individual capacities, aircraft setting, flight style, and numerous other things that must be thought of to polish the physical preparation. It is once again stating the obvious, but it is sometimes useful: Accuracy is achieved when strength can relatively easily deal with the load so that the game between action and reaction and the orders and the feedbacks can be easily figured out by the body and other senses. Too strong for no load; no feedback and no precision. Too weak for excess load; random result and exhaustion in the short term.

Working out, strengthening, and bodybuilding just before the training season — between January and March — has proven to be relevant for me. But at the same time, all the VO₂ gains acquired before must be maintained.

- The “boring” strength building, the one that does not grow the visible muscles but the one that rigs your body and makes it strong in depth. It is fundamental. That is the physical basis upon which all the other physical capacities will be built. But for guys who like to travel at 200 knots and yell under 9g, practicing Pilates is extremely, err, how could I say without being politically incorrect? Unmanly. So, do it in the basement where your best friends cannot see you!

And during the flight season, do a little bit of everything mentioned above but with a much lower intensity just to maintain a level. Much stretching, and quite important, a 30-minute routine to warm up before the first training flight of the day. This routine consists of warming up all the joints, from the neck down to the ankles and particularly focused on shoulders. A little bit of cardio in sessions of 30 seconds is recommended, but it is out of the question to produce lactic acid at that stage. So it's just a moderate to slightly hard exercise for a short period. Finally, here is something particularly important and based on the experience the team had with this routine: It must be done at least an hour and 30 minutes before the flight. If it is only done one hour before the flight, it would be disastrous for all, with extremely poor g-tolerance during the flight. We did not dig too much into the problem to find a physiological cause; there must be one, but I think we had no time to look for it. We just relied on our experience, and the empirical law that seemed to emerge was that the shorter the time between the warmup routine and the flight, the shorter the routine had to be. In other terms, if the complete warmup was not done an hour and 15 minutes minimum before the flight (meaning the routine started one hour and 45 minutes to two hours before), the routine was turned into a condensed one of 10 minutes maximum. Naturally, the body had to stay warm between the routine and the flight, so there was no siesta allowed.

This question of physical preparation has been a fantastic experience to me. I found it fascinating to realize how much an elaborated preparation could be effective in numerous domains, not only in the comfort of flight but in many other domains as well. There is also a much better self-confidence from a better natural stress management, better sleep, better everything. But it must be personalized; what worked for me might not work the same for another pilot. There are general principles, though, that remain quite applicable to everybody. My advice would be to make the effort to take the time to think about it first, then to find enough discipline to stick to a medium- to long-term protocol that makes sense. It brings many more benefits than one could expect at first sight. I personally still practice this training even if I do not compete anymore. **IAGT**

FRANCOIS LE VOT, who makes his home in the south of France, retired as a flight instructor from France's Armée de l'Air after a distinguished 24-year career flying Alpha Jets and the Mirage 2000 and serving on the military aerobatics team. He joined the French aerobatics team in 2004 and won the individual Unlimited World Aerobatic Championship title (2013), the team World Aerobatic Championship title (2009 and 2013), the team European Aerobatics Championship title (2012), and the individual French National Aerobatic Championship (2011, 2013, and 2014), as well as numerous other world, European, and national podiums across team and individual competition. Altogether, “Zool,” as he's known in the aviation world, has well over 4,300 flight hours to his name, including 1,500 hours in military jet aircraft and more than 1,200 hours in aerobatics. He is also an aerobatics coach.



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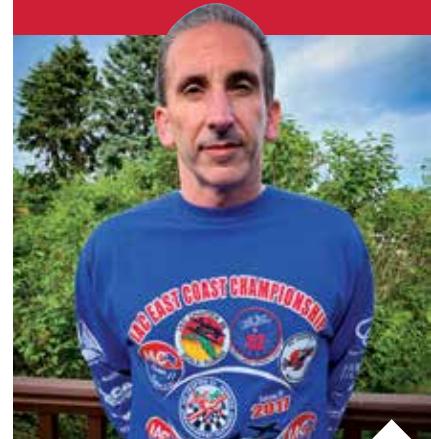
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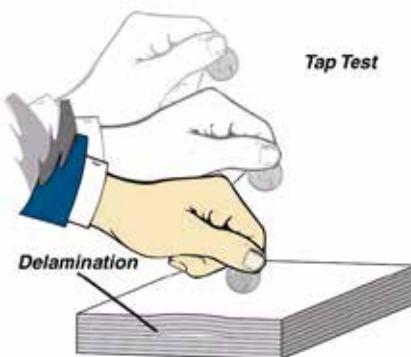
The Big Benefit of Nondestructive Testing

BY KEITH DOYNE, IAC 10545, IAC SAFETY PROGRAM CHAIR



AEROBATIC AIRCRAFT ARE CONSTRUCTED of steel tube, wood, fabric, and composite materials. As the need for maintenance arises, components and structures may need to be replaced or fixed. One way to assist in answering this question is nondestructive testing (NDT). A big benefit of NDT is the ability to test a structure or part without damaging it. The results of the testing provide the basis for maintenance decisions. The decision to select and use NDT is usually identified in aircraft or component manufacturers' technical documentation. In situations where the manufacturer does not provide any guidance or the aircraft is experimental, the FAA Advisory Circular 43-13-1B, *Acceptable Methods, Techniques, and Practices – Aircraft Inspection and Repair*, and AC 43-214A, *Repairs and Alterations to Composite and Bonded Aircraft Structure*, provide important information on NDT. This includes testing and methods of repair on fabric, wood, metal, or composite components or structures. Understanding the different NDT methods can make having repair/replace discussions and decisions easier and less confusing.

Wood has been a traditional material used in modified or older aerobatic aircraft, and in experimental aerobatic aircraft. Wing ribs, wing spars, plywood leading edges, and plywood wing covering are typical wooden structures found in aerobatic aircraft. For these situations, AC 43-13 is an excellent reference for NDT. This publication lists tapping the wood structure with a light plastic hammer for hollow or soft sounds or probing the area with a metal tool for soft or mushy areas, prying the area of a bonded joint to find movement, finding musty or moldy odors as indications, and visual inspection for stains, mold, nests, or cracks in critical areas or structures. This publication contains acceptable methods, techniques, and practices to repair wood structures in aircraft.



Tap tests are used to detect areas of debonding or delamination.



Dye penetrant is applied and gets into the surface crack or discontinuity.

Another traditional material is the use of fabric in airplanes. Modern fabrics have replaced cotton in aerobatic aircraft. Fabric-covered wings, ailerons, tail surfaces, and empennage can be found on Pitts Specials, Christen Eagles, Decathlons, Great Lakes, and several other aerobatic aircraft. Surprisingly, AC 43-13-1B does not approve the use of punch testers to determine fabric condition for airworthiness. The mechanic has the discretion to use a fabric punch tester. Accuracy concerns due to device calibration, total coating thickness, brittleness, and types of coatings and fabrics are the reasons for the FAA view of punch testers. I found that both the Poly Fiber process manual and the Ceronite manual state the following: **"Warning: AC 43.13-1B states that a Maule Tester is not approved for determining airworthiness; it is only an aid. Also, Maule Testers only give an accurate reading on bare fabric. It does no good to 'punch' painted fabric; you are measuring the combined strength of the paint and fabric. The FAA only cares about the fabric. To use the Maule, push until it reads 56 pounds; no need to push further and punch a hole in the fabric unless the IA is seeking additional business repairing your unnecessary holes."**

A vast majority of aerobatic aircraft have welded chromoly steel-tube fuselages. Applicable NDT methods include visual, magnetic particle, dye penetrant, radiography, ultrasonic, and eddy current. AC-43-13 1B, Table 5-1 on pages 5-7, provides a quick list of the advantages and disadvantages of each testing method. As with any inspection, the first attempt is usually a visual test or check. A flashlight and flexible mirror are useful tools, especially in tight-fitting situations. A magnifying glass is another handy tool for visual inspections. If a surface crack is found, other tests may be performed to confirm and better define the size and shape of the surface crack.

Dye penetrant testing is typically performed on nonporous metal and nonmetal components to locate surface issues that may not be evident during a visual inspection. The penetrant is applied and gets into the surface crack or discontinuity. Excess penetrant is removed from the material surface. The developer is applied, draws the penetrant out of the crack, and results in a color contrast in white or black ultraviolet light. Prior to conducting the test, time and care must be taken to clean the surface in order to remove all paints, greases, waxes, and other coatings.

Magnetic particle testing is used to detect surface and slightly subsurface cracks in ferrous metals. This method uses the principle of magnetic lines of force or flux of an applied field passing through the metal. A defect at or near the surface changes the flux line distribution, resulting in increased magnetic field strength near the defect. When fine magnetic particles are added, they will be attracted to and form a pattern around the defect. This pattern provides a visual indication of the defect. It is very important to control the direction of magnetization, and the flux lines must be perpendicular to the long side of the defect. Please note, this method can leave a residual magnetic field on delicate or sensitive instruments. Therefore, demagnetizing is a key step to remove excess or residual magnetic fields. The tested area on the part or component must be cleaned properly.

Radiography or X-ray uses the concept of differential radiation absorption to indicate internal and external condition. This NDT method has the advantage of detecting internal cracks or voids due to variation in material composition. It also provides a permanent record of the inspection data. One big disadvantage is the internal discontinuity needs to be properly aligned with the radiation beam to obtain a good picture. Another problem is delamination can be difficult to detect with X-rays due to the absorption rate being closely the same between the good areas and delaminated areas. There are also safety and cost considerations when using this NDT method.

Ultrasonic testing relies on passing sound energy through the test object, and the amount of sound energy that is reflected is used to identify a flaw or defect. This NDT method can detect surface and subsurface discontinuities, such as cracks, shrinkage cavities, flakes, pores, delamination, and porosity. When using ultrasonic testing on bonded structures, detailed knowledge of structural configurations and materials are critical to ending up with valid test results. Another important aspect of ultrasonic testing is having reference standards to calibrate the testing equipment and provide the technician a baseline to use for comparison to the part in question. The reference standard needs to be similar in material, geometry, and thickness to the test part. There can be substantial time and cost in creating the test standard. This NDT method requires a trained technician to conduct the test.

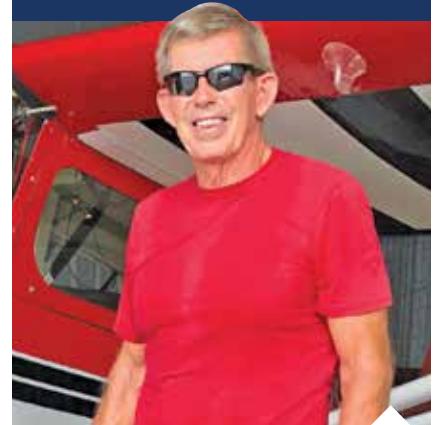
Eddy current testing uses the principle of an AC current passing through a wire coil to generate eddy currents in the test piece. Flaws or thickness changes will impact the flow of the eddy current, which the instrumentation will detect. This NDT method can detect surface and subsurface cracks. Eddy current testing can be conducted on parts without removing surface coatings and is best suited for small, localized areas to test. A reference standard, made from the same material as the test piece, is required to calibrate the equipment. A qualified technician should conduct the test.

For composite surfaces, a relatively simple test is the tap test. This test usually requires the use of a coin or a special light hammer. The sound produced when lightly striking the surface of a known good area is compared to the sound created when striking the surface of an area in question. Tap tests are used to detect areas of debonding or delamination. Some aircraft manufacturers will provide the necessary steps and tools to conduct a tap test. AC 43.13-1B recommends using the tap test on aircraft skins less than 0.080 inch thick. This test may have to be applied to both sides of some structures.

Most people don't realize that NDT happens nearly every day in aviation. Pilots conducting their visual aircraft inspection before a flight are in fact conducting NDT. Another common occurrence is during annual and conditional inspections. Owners, builders, and mechanics use several different NDT methods to look for and identify problems or issues in aircraft. Aircraft manufacturers and the FAA provide a plethora of information regarding NDT and aircraft. Understanding the pros and cons of each NDT method can greatly assist in taking care of your aircraft. NDT can help find the small problem before it becomes a big problem.

Fly safe. **IAC**





Spin Training – Beyond the Basics, Part 2

How I learned to stop worrying and love the back seat!

BY TONY JOHNSTONE, MD, FACS, ATP, CFI, IAC 16578

IN PART 2 OF “Spin Training – Beyond the Basics” we will look at the dynamics of a stall, the character of a spin, and stall/spin recovery techniques.

DYNAMICS OF THE STALL

Next up, what actually happens when the wing stalls? Again, most (but definitely not all) people understand that the stall on a straight-wing airplane starts at the root and progresses outward; the tip is the last to stall, and roll stability is maintained to an extent until enough of the wing is stalled that weight exceeds available lift. Most pilots will identify the prestall buffet as an aerodynamic warning, but very few know what causes it (turbulent airflow from the wing root strikes the horizontal tail). Then we talk about swept wings, which tend to stall tip first, producing lateral instability and no buffet. This gets written off initially as irrelevant to the average piston GA pilot. (“I am flying a straight-wing C-172 or PA-28, so why do I care?”) I tell them to hold the thought for later.

WHAT MAKES A SPIN?

So now we understand the stall. What about a spin? We first need a stall and then some situation where the wings are producing asymmetrical amounts of lift, eventually leading to autorotation. The common method of spin entry is to pull up to a stall and then apply full rudder and full back-elevator. The yaw accelerates the outboard wing and decelerates the inboard one. Most airplanes will roll almost inverted and begin rotation – the “incipient” phase where the spin is developing. Applying opposite rudder will usually stop the rotation immediately, and then unload the wing to reduce angle of attack (AOA) and break the stall. If the inputs are held, the spin will develop fully (about one turn in the Decathlon). At that point, the rotation rate increases and stabilizes. If you hold everything in place, the spin will continue indefinitely; it is actually a stable flight condition. To stop it, you need to first stop the rotation and then allow the wing to start flying again. This needs to be done in a specific order. I rely heavily on Rich Stowell’s (another smart, capable guy!) PARE acronym.

Overshooting the runway on final can lead to a stall/spin scenario – don’t rudder your nose around!



- Power: idle (reduce rotational energy and gyroscopic force)
- Ailerons: neutral (remove any asymmetrical lift from the wings)
- Rudder: full opposite the direction of rotation
- Elevator: forward (reduce AOA below critical)

Spin recovery can be complicated or even precluded if you don't do all this, in that order. The first order of business (as in any loss-of-control situation) is to close the throttle *fully*. Neutralizing ailerons seems like a simple step, but if they are not absolutely neutral, the wings continue to produce asymmetrical lift. Over the years I have seen more than one student instinctively try to help the spin recovery by adding aileron opposite the rotation in addition to rudder. This may lead to a really bad outcome. It doesn't take much to keep the spin going or even accelerate it. If in doubt, let go of the stick and the ailerons will assume aerodynamic neutral. My Zlin had a white stripe in the center of the panel (quite common in Eastern European and Russian aerobats) at which you pointed the stick to neutralize the ailerons (known as the "spin stripe").



Opposite rudder seems like a no-brainer; if you have entered a left spin intentionally, use right rudder to stop it. But if you spun the aircraft unintentionally, it may not be immediately apparent which direction you are rotating. An upright spin to the right and an inverted spin to the left are actually rotations in the same direction as seen from the ground. Fortunately, there is a good way to sort this out, thanks to my friend John Morrissey. Look directly forward over the spinner and see which direction your shoulders are moving relative to the ground. If your shoulders are moving right, you need left rudder to recover. Works every time. When you put the rudder in, it should be all the way to the stop until the rotation slows or stops. Depending on the airplane and the spin mode, it may take two or three turns for recovery, although most GA airplanes (the Decathlon included) will stop within one turn.

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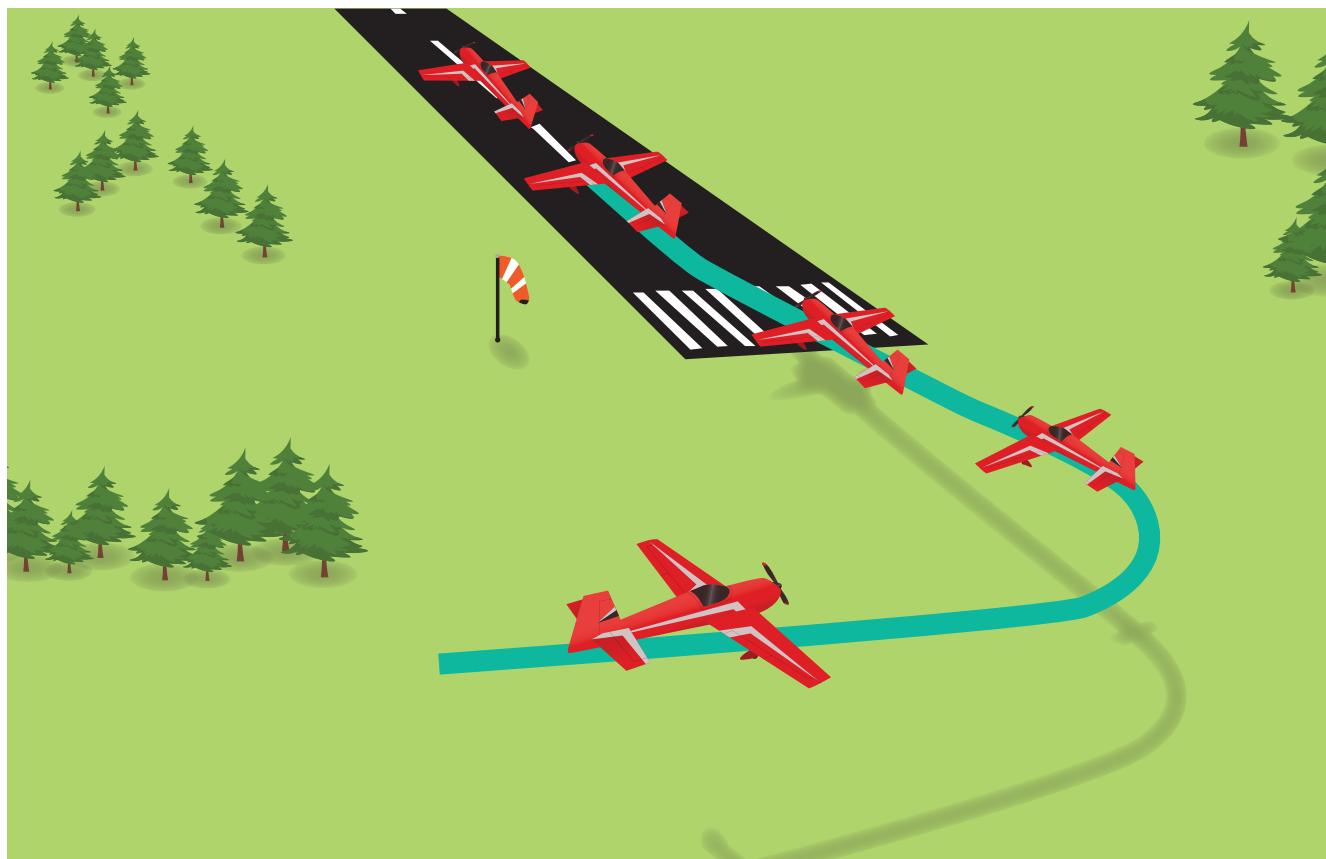
REAL-WORLD SPINS

Now we get to the real world. Fatalities in stall/spin accidents rarely occur as a result of a wings-level, power-off, pull-up to a stall and step on the rudder for spin entry. This is usually done at altitude, leading to a safe recovery. Even an inadvertent spin from a botched power-on stall doesn't result in an accident (though it's frequently an attention-getter for the pilot; I have had more than one pilot show up on my doorstep after being frightened by such an event) unless the ground intervenes.

It would appear that the majority of stall-spin accidents (other than from low-level aerobatics) happen around the traffic pattern. That's not too surprising, considering pilots maneuver close to the ground at relatively low airspeed. My interpretation of the numbers is that the two trouble spots are on initial climb-out (departure stall) and on base-to-final approach. Very few pilots stall and spin flying downwind.

So let's think about the departure stall. This may happen due to pilot distraction (the dog threw up, kids are fighting, or maybe ATC just gave you direct to some fix you never heard of). For whatever reason, aircraft stall at climb power. Two things will happen: The nose will drop, and probably also a wing. It is likely going to be the left wing due to gyroscopic precession, particularly if not enough right rudder is being held to compensate for P-factor.

The instinctive response is to pick up the wing — right aileron. This really isn't a good idea, and here's why. Look at the lift to drag (L/D) curve and visualize the effect of right aileron on the "good" side (i.e., below critical AOA). Stick right, right aileron goes up, camber decreases, AOA decreases, so lift decreases on the right and increases on the left. Left wing picks up; all good. But look what happens if the wing has passed the lift peak and is now on the "dark side." The same input produces the exact opposite effect; lift now increases on the right and decreases on the left. And, significantly, the increase in induced drag on the left would compound the problem, resulting in a spin to the left. Several videos available online show this happening in training flights, and frequently the pilot's initial response is to throw in even more right aileron, compounding the problem. I have seen this myself more than once.



It would appear that the majority of stall-spin accidents (other than from low-level aerobatics) happen around the traffic pattern. The two trouble spots: on initial climb-out and on base-to-final approach.



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THOUGHTS ON ENGINE FAILURE AND THE 'IMPOSSIBLE TURN'

Engine failure on climb-out, especially if the pilot attempts to turn back to the runway without sufficient altitude, may result in a fatal outcome (as it did for Lt. Wilfred Parke so many years ago). This brings up my next question: "How high do you need to be to safely turn back to the airfield if the engine fails on climb-out?" People's answers often vary. I hear everything from 500, 600, or 1,000 feet to "never" to "I hadn't really thought about it." The point is, the correct answer is always pilot- and aircraft-dependent. As a glider pilot, you are trained to make a 180-degree turn back to the runway at 200 feet following a rope break. I know some who can do it from 100 feet. The optimal bank angle seems to be 45 degrees, which gets you around efficiently but does not increase stall speed enough to be dangerous (18 percent).

I recommend the following exercise. Set up a V_y climb, and set climb power. At 3,000 feet AGL (or higher), close the throttle, wait three seconds to account for the startle effect (what just happened?), and then pitch to best glide speed (usually a pretty good shove forward, and simultaneously start an immediate 45-degree banked turn (into the wind if you have any crosswind). See how much altitude you lose through 180 degrees of turn. Add 100 feet and this should be your personal minimum for your aircraft. Remember, this will get you pointing back at the airport, but you may need another 30 degrees of turn to get lined up on the runway.

If you haven't practiced a simulated engine-out scenario (I include this on every flight review), it is probably not a good idea to be a test pilot on your first real engine failure.

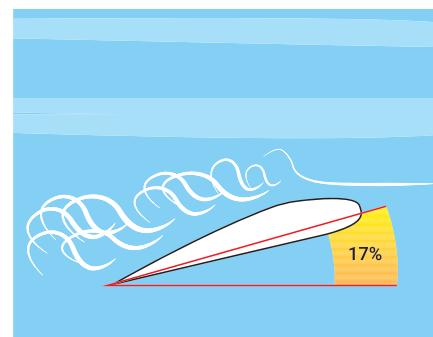
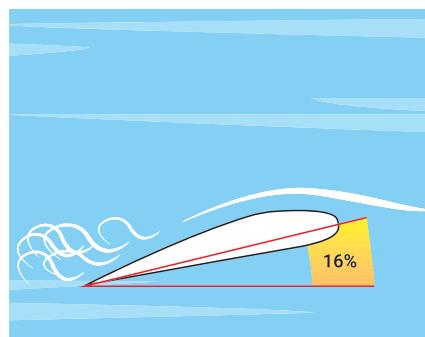
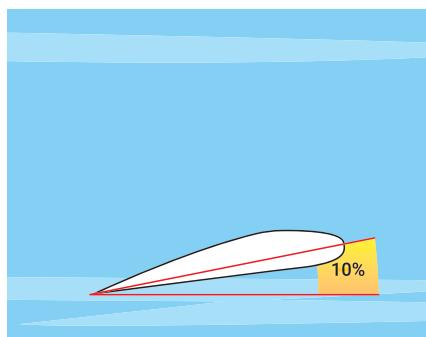
The above exercise gives an approximate idea of your aircraft's performance, but the engine is at idle thrust. For a true test, go up a couple of thousand feet higher and pull the mixture. That will give you true engine-out performance — probably a couple-of-hundred-feet-per-minute-higher descent rate. This is due to the wind pushing the windmilling prop around, driving all the internal engine components and adding extra drag.

You should also make your crosswind turn at 400 feet rather than climbing away from the airport straight ahead. This cuts off 90 degrees of the turn and, just as important, allows you to see the runway and what is coming up behind you; you don't want to land downwind head-on to a departing DC-3.

HOW NOT TO GET KILLED TURNING FINAL

Finally, let's talk about the base-to-final overshoot. This usually starts on downwind. Say you have left traffic and what will be a left crosswind on final. Pilots have a habit of setting up where they want to be relative to the runway and then getting preoccupied with prelanding checklists. If the right crosswind (which will certainly be stronger at pattern altitude than reported at the surface) is not corrected for, the aircraft will drift closer to the runway. Base leg is shortened and groundspeed increases due to the relative tailwind, so it is easy to overshoot the turn to final.

The airplane winds up past the runway and facing a headwind. The initial response is to steepen up the bank, but then the little warning light goes off; my instructor told me not to bank too steeply close to the ground. So shallow bank is maintained but the runway is still off to the left. So add some left rudder to bring the nose around. Remember what the rudder does? It always makes the nose go left or right. So in a left bank, left rudder drives the nose down. The sight picture shows the horizon rising up the windshield, so use back-stick to maintain attitude. And we all know back-elevator increases AOA. If you skid enough and pull enough, a spin to the inside will result. The other aerodynamic quirk is that, in a skid, the wing is actually functioning as a swept wing, which stalls tip first with no buffet. It takes anywhere from 800 to 1,200 feet to recover. If you do this turning final at 500 feet, you don't have enough room to recover.



A stall on a straight-wing airplane starts at the root and progresses outward; the tip is the last to stall, and roll stability is maintained to an extent until enough of the wing is stalled that weight exceeds available lift.



The common method of spin entry is to pull to a stall and then apply full rudder and full back-elevator.

The key to prevention is to first pay attention to the crosswind ahead of time. Keep your spacing on downwind, anticipate an early turn to final (if you undershoot, the wind will drift you to the centerline), and if you do find yourself overshooting, it is safe to increase bank angle as long as you are coordinated. But the safest solution, as Budd Davisson famously says, is to “extend your left arm and add five minutes to your logbook.” Go around!

That pretty much covers my ground briefing. Next time we'll go flying! **IAC**

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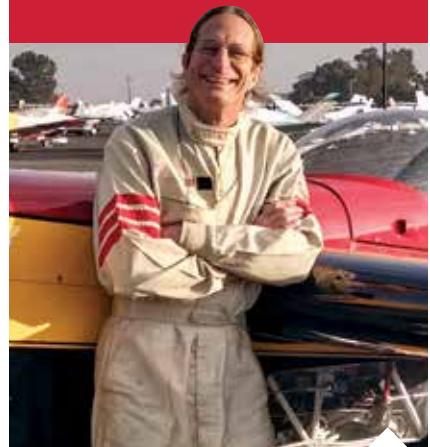
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The Joys of Diligent Maintenance

BY TOM MYERS, IAC 16830



LET'S SAY A PART IN YOUR AIRPLANE wears out. Where would you prefer to be when you become aware of the fact? At a contest? In the sky? How about on the ground at your home airport? When would you prefer to become aware of the fact? In the middle of a contest? How about at a time when you have the opportunity to properly deal with it? Given the fact that the part is no longer airworthy, the question is really whether you would prefer to find out about it at a time and place of your own choosing, or the part's choosing?

It is unusual for parts to just up and wear out suddenly with no warning whatsoever. There are often warning signs. I often tell people that a clean airplane is a happy airplane. What I am really saying is that if you really want to discover warning signs, clean your airplane often, and pay attention to what you see while you do it. Warning signs may be subtle and seem inconsequential. The problem is that inconsequential now does not mean inconsequential later. My point is that the time to take care of maintenance problems is when they are inconsequential, not when they are consequential.

This means having the discipline and diligence to chase down warning signs to their root causes when they are subtle and the trail of clues is difficult to follow. Ignoring warning signs because they are difficult and inconvenient to diagnose is a great method of once again proving the accuracy of the law of unintended consequences, aka Murphy's law.

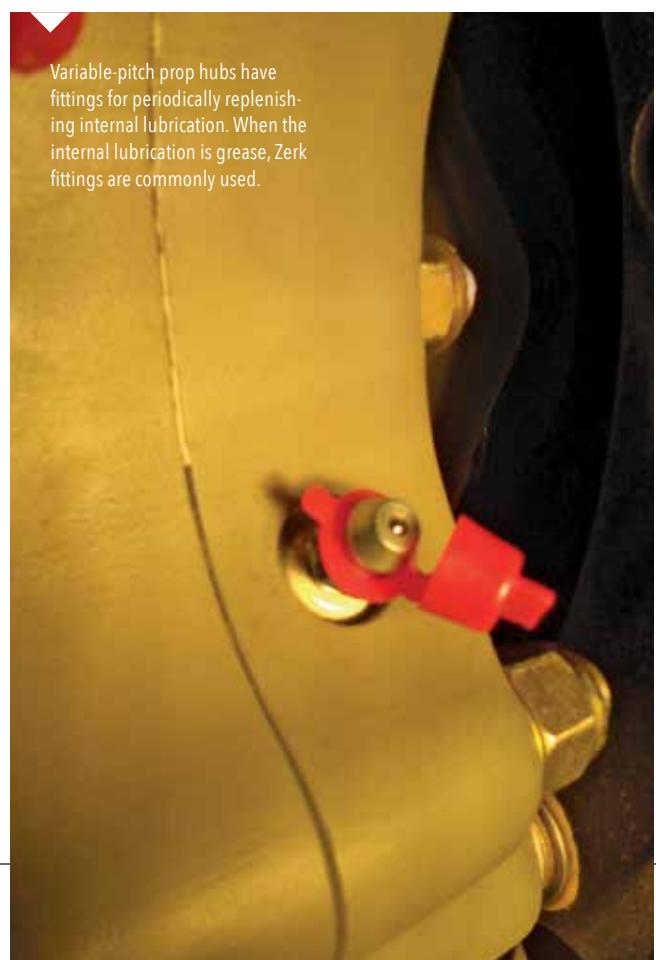
There are plenty of times when the best tools for chasing down such problems are your eyes, your brain, your time, your attention, and a little elbow grease. I will illustrate with a recent example.

Over the course of several practice flights this spring, I started to notice a very fine, widely scattered spray of tiny oil drops on my windscreens while cleaning the airplane afterward. I inspected possible engine and propeller sources after every flight, but there was so little oil involved, there wasn't much evidence to follow. I kept a careful eye out for oil drips or streaks. I monitored the spray pattern, particularly looking for increases in the accumulated amount of oil.

Recently, the amount of accumulated oil spray, though still very small, increased noticeably. Once I got the airplane into the hangar, I pulled off the cowling and spinner, and performed a very thorough cleaning and careful inspection of the entire engine and prop. Once again, no source was found.

After the subsequent practice flight, the amount of accumulated oil spray was still attention-getting. Instead of pulling the airplane into the hangar, I started my inspection out on the ramp under the bright midday summer sun. My hope was that the additional light would make it easier to see even subtle oil streaks. This time, I was successful. I discovered the absolute barest wisp of an oil streak on one of my propeller blades just outboard of the counterweight clamp. There is no oil inside of this part of a propeller blade, so I removed the spinner and went hunting for the source.

The propeller blade roots were all clean and dry. The propeller hub was clean and dry. The propeller dome was clean and dry. There was no leak source of oil anywhere where there could be internal oil. There was just a fine streak of oil in a location with no oil source. I stood there staring at the prop hub thinking about what I could possibly be missing. It was at that moment that I realized that I was staring right at the source. Or as it turned out, sources.



Variable-pitch prop hubs have fittings for periodically replenishing internal lubrication. When the internal lubrication is grease, Zerk fittings are commonly used.

Variable-pitch prop hubs have fittings for periodically replenishing internal lubrication. When the internal lubrication is grease, Zerk fittings are commonly used. A Zerk fitting contains a ball bearing and a spring. A grease gun is connected to the Zerk fitting, and the grease in the gun is pressurized. The pressure of grease pushes the ball bearing into the Zerk fitting and allows grease to flow into the propeller hub. When the pressure is removed, the spring pushes the ball bearing back into place, thus sealing the fitting and preventing grease from leaking back out. See the accompanying photograph. A small portion of the internal ball bearing can be seen at the top of the fitting.

Grease is a mixture of solid and liquid constituents. A spinning prop can act like a centrifuge and separate the liquids from the solids. If a Zerk fitting ball bearing does not form a proper seal, the centrifugal forces can liberate the grease liquids from a prop hub through that grease fitting.

When I pulled the little plastic protective cover off the Zerk fitting closest to the prop blade with the oil streak, I discovered that it contained grease liquids. When I pulled the plastic protective covers off the other five Zerk fittings, I discovered that they too contained grease liquids, but just not as much.



In hindsight, I believe that all six Zerk fittings had been seeping for a while, but the amount of liquid lost was too small to be noticed. It was only when the leak rate of one of the Zerk fittings became noticeable that the problem was discovered.

About five years ago during the first annual inspection of the airplane, it occurred to me during the process of greasing the prop that I would not want to see the airplane grounded for something like an issue with a Zerk fitting. Since Zerk fittings are inexpensive, I bought a full set of six spares and stashed them away just in case. Lo and behold, five years later, I had a set of six brand-new Hartzell Zerk fittings sitting there on the shelf ready to install. Ear-to-ear grins ensued. Oh, the joys of diligent maintenance.

Fly safe. **IAC**



2021 IAC CONTEST SEASON CALENDAR



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

DATES	HOST CHAPTER	NAME	REGION	LOCATION	AIRPORT
Mar. 25, 2021	89	Snowbird Classic 2021	Southeast	Florida	X60
Mar. 27, 2021	62	Estrella Classic Aerobatic Championships	Southwest	Arizona	E68
Apr. 23, 2021	25	Early Bird	South-Central	Texas	26R
Apr. 29, 2021	23	Sebring 81 2021	Southeast	Florida	KSEF
Apr. 30, 2021	36	Hammerhead Roundup	Southwest	California	L08
May 14, 2021	3	2021 Mark Fullerton Memorial Bear Creek Bash	Southeast	Georgia	KRMG
May 14, 2021	24	Lone Star Contest	South-Central	Texas	KGYI
June 4, 2021	15	Harold Neumann Barnstormer	South-Central	Kansas	KOWI

Shanna Crawford

BY ZINNIA KILKENNY, IAC 437244

**ZINNIA KILKENNY: SHARE WITH US
YOUR AEROBATIC BAPTÈME DE L'AIR.**

SHANNA CRAWFORD: Lloyd Massey, an airline pilot for United Airlines, introduced me to aerobatics a couple of years ago when I was a flight attendant. We learned he happened to live in my childhood hometown. I contacted him for advice when I enrolled in flight school, and he offered to have me fly his recently purchased Super Decathlon. [Though I had] only 10 hours as a student pilot, Lloyd introduced me to spins, rolls, and loops. Who could go back to 152s after something so exhilarating?

I loved aerobatics but didn't know if I was cut out for it because I got a bit motion sick. After taking emergency maneuver training lessons, I felt more in control and confident doing beginner aerobatics; my motion sickness didn't return.

Learning to stop a spin on a predetermined heading was a major moment for me. It grew my confidence exponentially — that and flying back and landing with a simulated elevator control lockup was fun.

**ZK: YOU'RE THE FIRST AVIATOR IN YOUR FAMILY;
WHY DID YOU CHOOSE TO FLY?**

SC: Ultimately, it was my love for flight. As a flight attendant, I saw that the lifestyle worked, but I knew I would always wish I was the one flying the plane, so I had to chase that dream. When I started flight training, I didn't know how I would make it happen and definitely had no clue I would be flying aerobatics, but I knew that I would forever regret it if I didn't at least try.

I pursued flying not only out of fear of regret but because it truly called to me. I was also drawn to the philanthropic and leadership potentials within aviation. Working out of Houston during Hurricane Harvey, I saw the way pilots and the community worked together to help those in need of crucial supplies. It showed me how aviation as a profession could be fun yet fulfilling.

My dream is to own an aircraft that I'd use for weekend family trips as well as altruistically, such as flying supplies to remote areas after natural disasters or animals to safety with organizations such as Pilots N Paws.



Shanna Crawford

► **SHANNA CRAWFORD**

IAC: 4412575

Chapter: 26

Occupation: Flight attendant

ZK: YOU'VE HAD AN EXHILARATING 2020. SHARE THE EXCITEMENT LEADING UP TO YOUR FIRST CONTEST.

SC: I had just earned my private pilot certificate in May when my mentor and friend Lloyd encouraged me to join him in competing at the Foxy Figures contest at Lancaster, California, in September. I didn't even know what Aresti was at this point! I had seen it but did not know what it was called or how to read it, let alone fly it. Lloyd's Decathlon was down for maintenance longer than expected, allowing me only a handful of practice flights the weekend before what was my first competition.

Crunched for time, we didn't practice each maneuver individually first. Instead, I was thrown straight into the fire and shown the full 2020 Primary sequence before being asked to duplicate it. I had been exposed to some maneuvers — such as rolls, loops, and spins — a handful of times before this. While flying with Lloyd and during several lessons I took at CP Aviation in Santa Paula, California, I worked on my tailwheel endorsement and emergency maneuvers training. While I had some exposure to aerobatics over the prior year, I had not done all of the maneuvers and not all in the appropriate sequence at the appropriate altitude. Heck, I had not seen an aerobatic box until one week before the competition!

I think the nerves made me more focused than anything. It wasn't until after my first flight that I could relax a little and start to enjoy it. My excitement came after the competition, and I exceeded my original goal, which was not getting any hard zeros. I had flown better than I had expected and completed three competition flights in 113 degrees Fahrenheit, won the American Champion Award, and qualified for the Stars Award.



Shanna exceeded her own expectations at 2020 Foxy Figures.
Winner of the American Champion award.

ZK: FROM WHOM DO YOU GARNER INSPIRATION?

SC: My family, who have been nothing short of supportive and excited every step of the way. And Lloyd's selflessness when promoting and encouraging myself and others. He truly deserves recognition for the time he mentors and shares aviation and aerobatics.

My flight training program and its incredible faculty inspired me. While [I attended] Mount San Antonio College's aeronautics program, my professors were some of the most encouraging, helpful, personable, and enthusiastic individuals. They inspired me from day one when I showed up for a department tour and was encouraged to register and join in class that evening.

**ZK: THE POSSIBILITIES IN AVIATION ARE ENDLESS.
WHAT ARE YOUR GOALS?**

SC: They really are. Aerobatics is a perfect example; unless you were raised around it or know someone involved in it, [you] do not know much about it — just like I didn't. I am still new to aviation. I don't know all of my options yet, but that is what is so exciting. As of right now, careerwise, I ultimately want to fly for the airlines and continue supplying my parents with pass travel privileges. It is such an awesome perk that gives me so much joy when I see them traveling all over the world.

When it comes to aerobatics, I would love to continue to progress in the sport; however, due to financial constraints from being furloughed, I have to put aerobatics on hold while pursuing my next ratings. I dream of competing again, but I want it to be when I can afford to have more training and preparation to ensure I continue to make Lloyd proud and "crush my competitors" [laughs]. While I am very competitive and like to win, we also like to joke. I want to make friends and learn and grow with others in this sport — despite what Lloyd might tell you. Please don't believe a word he says. **IAC**

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PRESIDENT'S PAGE CONTINUED FROM **PAGE 1**

Curiosity is also an asset when it comes to solving big problems. I know the IAC is vibrant and alive, as is the sport of aerobatics, but like any sport, it has problems. Some of them go way back. But there is no problem we can't solve without working together in a curious manner. When we lose our curiosity, we become like me when I was learning snaps: We do the same wrong thing over and over. If you feel like your local aerobatic community is stuck, get curious. Experiment.

The last item I get to share is that I hereby proclaim that the fourth Saturday in June is now National Aerobatics Day! We will be promoting this day on social media, and we ask that you do the same. National Aerobatics Day is the perfect day to host an aerobatic camp, a barbecue, or a practice session or to share videos of your aerobatic activity online. We hope that National Aerobatics Day will become as famous as International Podiatry Day (October 8) and International Talk Like a Pirate Day (September 19). Yar!

I am always available for you at president@iac.org. **IAC**



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