SPORT Aerobatics

JUNE 2020

OFFICIAL MAGAZINE OF THE INTERNATIONAL AEROBATIC CLUB

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INTERNATIONAL AEROBATIC CLUB
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BUILT Ford PROUD

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ON THE COVER: American Champion Decathlon N92SG going vertical at the Patty Wagstaff Flight School in St. Augustine, Florida. Photo courtesy of Sporty's.

ABOVE: Pitts Specials reigned supreme in 1976 at the IAC Championships in Fond du Lac, Wisconsin. Photo courtesy of IAC Archives.

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Challenges, Innovative Members, and the Aerobatic Family Tree

BY ROBERT ARMSTRONG, IAC 6712

WELCOME, ALL AEROBATIC ENTHUSIASTS! As with us in the International Aerobatic Club, everyone is following state and local guidelines, and as a result, contests and judges schools have been postponed or canceled. Circumstances are challenging, but we've already seen a positive in the way chapters and members are stepping up their games. A report appeared in the May issue of *In the Loop* about IAC's first online judges school webinar on April 25. Another chapter in Florida established a virtual competition, and we applaud our innovative IAC membership! Virtual "anything" will be more commonplace, and it has been a good lesson in how we can adapt to benefit our IACers.

I have had good results with individual members contacting me with their perspective and thoughts for innovation as we move forward. I thank all for their efforts. One comment in particular made me realize that we toss acronyms about as if everyone understands what we are talking about. Not all share our broad knowledge of these references to other organizations, and now might be a good time to address this question: What is CIVA?

So, here's a bit of the aerobatic family tree for all. The IAC is the aerobatic club that is a division of the EAA. We are a standalone 501(c)(3) nonprofit corporation. In addition to our affiliation with EAA, the IAC is a member of the United States' official aero club, the National Aeronautic Association (NAA). This organization is the official U.S. agent that oversees all aero sports in the United States as the member of the Fédération Aéronautique Internationale (FAI). The FAI was formed in 1905 and is the organization that watches over all forms of aero sports around the world. There are many types of aero sports covered by the NAA — gliding, parachuting, hang gliding, and aerobatics are a few of the disciplines covered. Each group is represented in this organization by its council. For aerobatics, the original name of this council was "Commission Internationale de Voltige Aérienne" (CIVA). Today the commission is identified as the FAI Aerobatics Commission (CIVA), its official name. CIVA conducts FAI's aerobatic activities, in particular international competitions. The NAA, headquartered in Washington, D.C., accepts corporations, affiliated aviation associations, aero clubs, and air sport organizations in the United States into its membership. CIVA is headquartered in Lausanne, Switzerland.

Other communications I have received from members occurred shortly after the April issue of *Sport Aerobatics* made it to members' homes. An IAC member commented that the description of what the members are looking for mirrored himself and several of his pilot friends. He was referring to the April President's Page in which I said, "When you look at aerobatics as a sport, then it is rather clear that only a small portion of pilots involved have any goal of being more than good, safe aerobatic pilots." This member is part of a group of four pilots sitting in the hangar with a Citabria. Their only desire is to learn how to safely fly aerobatics. This example is what grassroots may be to you as well. To grow and prosper in the future, we need to work to accommodate all persons who have a similar interest.

Now before anyone begins to think that I have no interest in the other end of the membership, specifically, those who fly on our international teams, take heart. I have a tremendous desire to assure that the needs of this unique set of pilots representing the United States in various events around the world is met. After all, I was part of this subset of IAC competition pilots for 38 years! My position as president of the IAC makes me the keeper of the entire club. From my many sleepless nights trying to decide how to ensure that we, the IAC, continue for another 50 years, it became clear that new members are the key, and any form of interest in aerobatics will be encouraged.

I am not sure what will transpire regarding our ability to resume our aerobatic flying events and gatherings during the COVID-19 pandemic. My only hope is we soon will return to a level of activity that will make us all happy. Again, I remind everyone of the virtual competition in action now that may spur others to consider innovative ways for us to stay in contact with people in our sport while maintaining our 6 feet of separation. It will be encouraging to see articles on these innovative activities in upcoming issues of *Sport Aerobatics*!

Included in this issue are the candidate biographies for the upcoming IAC election of officers and directors. I am running for reelection as president, and if you like the direction we are headed, let's keep it going. But no matter your choices, it is important to *vote!*

Best wishes for good health, and always fly safely. IAC

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

Nervous About Flying Weird Attitudes?

BY LORRIE PENNER, IAC 431036

MY FIRST AEROBATIC RIDE was in a Baby Great Lakes from an acquaintance at our local airfield. Strapping on the parachute was all quite foreign and uncomfortable. Climbing up in the front cockpit was awkward, but was I afraid? No. I was super excited! From the moment the plane did the first loop, I was laughing and whooping it up. What fun, what exhilaration!

I had been in flight training for about a year when I got a wild hair and decided to take aerobatic lessons and earn my Primary Achievement Award. In this month's article "Learning to Love Getting All Shook Up," author Jim Luger asks, "Are you a little nervous about flying weird attitudes?" From my experience in the Baby Great Lakes, I would have to say a resounding no to the question Jim asks.

I don't think it was so much that I was afraid of really screwing up but rather not being precise enough. I had taken most of my regular flight training from my husband, and it worked out great for us. As my husband later told people, "I was so relieved that she was a good stick. I didn't want to be the one to tell her she should take up knitting instead of aviation."

My mental attitude changed when learning aerobatics. No longer was I confident in my own newly acquired abilities, and I put an exceptional amount of pressure on myself. I didn't want to disgrace my husband's tutelage by turning out to be the worst aerobatic student ever. At the time, I thought if I flew poorly that it would reflect badly on him and he would lose some respect from his fellow CFIs. After a few lessons with my husband, who was bewildered at my seemingly sudden lack of trust in his instruction, we decided I needed to change to another instructor.

Once the change took place, I was immediately a much better student. I really liked the instructor, but I didn't care if I turned out to suck at aerobatics or if that might ruin his good instructor reputation; that solution relieved me of all of the pressure I had built up. We settled into a regular schedule, and I was soon working through all the Primary Achievement Award figures confidently.

Enjoy Jim's article; you may recognize yourself in his paragraph about mental attitude. I know I did.

This month's issue features bios on all of the officer and director candidates for the 2020 IAC election. We will be electing the president, secretary, and three directors this year. You are encouraged to study their qualifications and platform to represent the IAC membership. It is an exceptional election because we have two candidates for president. Historically, there can be a number of candidates vying for a director slot, but it is uncommon for more than one candidate to run for president. Please vote online starting June 24 at www.IAC.org/2020-board-election. *IAC*

Getting ready for weird attitudes in a Baby Great Lakes.

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

2020 U.S. National Aerobatic Championships Update

AT THE IAC BOARD OF DIRECTORS SPRING BOARD Meeting held April 25 by teleconference, Contest Director Duncan Koerbel submitted an update on the status of planning for the U.S. Nationals scheduled for September 20-25. Preparations are well underway. Hangar 606 will be our home base again this year, jury chairman and chief judges have been selected, and the core group of volunteers have signed up to help yet again! Thank you all for volunteering.

Overhead view of Hangar 606.

We are hopeful that 2020 U.S. Nationals will continue as scheduled.

There is a plan in place with decision dates for committing funds and ordering event materials, etc. Duncan indicated there is not a rush to make a final decision about the U.S. Nationals. Bulletin No. 1 will be published July 4, 2020! We are all excited to get regional contests going first. Duncan and the IAC leadership will continue monitoring regional events as well as the Kansas and Salina guidelines for COVID-19 restrictions. The Go/No Go decision and any other major event modifications will be made sometime within the first 10 days of August. Further updates will come through IAC official publications and the IAC website.

PHOTOGRAPHY BY **LEIGH HUBNER**

2020 AirVenture Cancellation and the IAC Annual Membership Meeting

IN HIS MAY 2 news release Jack J. Pelton, EAA's CEO and chairman of the board, announced that AirVenture 2020 had to be canceled. With Wisconsin under Safer at Home orders through May 26, preparations with staff and volunteers were unable to proceed. Due to COVID-19 current phasing-in guidelines, no one can predict when Wisconsin will be at a point that AirVenture meets the all-clear Phase 3 milestone for mass gatherings with restrictions.

During AirVenture, the International Aerobatic Club typically holds a couple of important club activities: the IAC annual meeting and the IAC member gathering dinner. Both events were scheduled for Friday, July 24, with the annual meeting in the morning and the member gathering in the evening. There are no plans to replicate the IAC member gathering on another date or location.

Currently the EAA legal office is researching with the state of Wisconsin to determine if holding an annual meeting by teleconference or webinar is a valid possibility. Our bylaws state that the IAC's annual meeting is to be a date in July or August but nothing further on whether it has to be in person. The EAA is asking the question for its own annual meeting and IAC President Robert Armstrong indicated the IAC will follow EAA's lead.

Once options are presented, IAC leadership will announce the annual meeting date, time, and location at least 30 days in advance, according to the IAC bylaws. Further updates will come through IAC official publications and the IAC website. *IAC!*

2020 IAC Elections

CANDIDATES FOR OFFICER AND DIRECTOR POSITIONS

Voting Starts Wednesday, June 24, 2020

The International Aerobatic Club board of directors invites members to vote in the 2020 election for club officers and directors. Balloting closes on Tuesday, July 21, at 6 p.m. CDT. Ballots must be received before closing in order for them to be counted. Cast your vote using the secure online ballot at www.IAC.org (member login required). The ballot certification committee will tally the election results and announce the election outcome at the annual members meeting. The meeting is typically held at AirVenture; however, with the event's cancellation the meeting is currently being rescheduled.

CANDIDATE PROFILES

ROBERT ARMSTRONG FOR PRESIDENT, IAC 6712

A significant number of changes have occurred in the IAC since I accepted the position of president and subsequently was elected by the membership. IAC members continue to communicate to me that I am moving in a direction they appreciate, and I hope you will agree.

Some of the notable activities and direction in which I have been instrumental are listed below:

- Relocation of the U.S. Nationals. While the move away from Sherman, Texas, was necessary, we found after two years at Oshkosh that the fit wasn't what we hoped for or expected. At my urging and with my full support, the decision was made to search for a central location, the committee did its job, and the board made what I believe is the right decision for the future of the U.S. National Aerobatic Championships. We have found a new home in Salina, Kansas, and I'm extremely proud that it was accomplished during my term as your president.

- Committee activity. I have found and promoted fresh voices and enthusiastic members to chair our established committees, and I believe strongly that these are the people who will take us into the future of aerobatics. New ideas, energetic personalities, and their excited outlook on aerobatics, competition, and recreational interests are what I believe the direction of the IAC should be. In order to keep us from growing stagnant, we need our members with different perspectives to keep IAC moving forward, and I appreciate every new voice in our committees and programs and on our IAC board of directors.

- Legacy category. At our spring board meeting in 2019, I fully supported the direction to bring former competitors back into the contest arena through the establishment of a new category – Legacy. By offering this option to chapters, they can attract members who have dropped by the wayside, and in the short time it has been enacted, I have been pleased with the interest this new idea brings to the IAC.

My future plans include:

- A focus directed toward IAC chapters with activities that they can host other than an annual contest.

- Membership initiatives that are aimed at attracting new members and retaining existing members.

- A team selection process for CIVA events that allows for the U.S. National Aerobatic Championships to give targeted attention to the championships' purpose of crowning our national champion. The championships also should recognize the importance of all categories and skill levels of competition in what is our premier event in the IAC.

My background in aerobatics is deep. I began competition in 1982 in regional contests; enjoyed aircraft building, including the construction of my own airplane that I flew in international competition at the World Aerobatic Championships in 2001; served as the IAC director for the South Central Region from 2007 through 2012; and finally began to serve our membership as the president of the IAC from 2017 to present day. I have been involved in the mechanics of the IAC from the basics of grassroots through Unlimited competition and understand what it takes to be successful in your aerobatic journey. I am a believer in the all-inclusive aspects of our sport.

With your support, I would like to continue giving back to the membership as your IAC president, and together we will make a lasting impact for our organization.

Your vote is your voice of support, and I ask for your vote and continued support as president of the IAC.

JIM BOURKE FOR PRESIDENT, IAC 434151

I currently serve you as the IAC membership chair, as a member of the IAC board of directors, and on the IAC's government liaison team. I now ask for your support as I seek the position of IAC president.

My campaign is endorsed by national champions Patty Wagstaff, Jeff Boerboon, and Rob Holland. My qualifications include the following:

Competition experience: I am an active competitor with 14 first-place Unlimited wins and 40 IAC competitions total. I am a two-time member of the U.S. Unlimited Aerobatic Team: in 2017 at Malelane, South Africa, and in 2019 at Chateauroux, France. I've placed second in the Nationals in the 4-Minute Free and sixth at the world level.

Judge experience: I am a national judge, a judge school instructor, a member of the rulebook committee, and the lead of the rulebook refactoring team, which trimmed the rulebook last year to just over a third of its original volume, from 269 pages to 96.

Professional experience: I am the owner of Knife Edge Software, the makers of the RealFlight simulator. We also make Acro FS, a free-to-play flight simulator for aerobatic enthusiasts with virtual-reality support. My RC industry experience of over 25 years and the many contacts I've developed from it allow me to champion the sport of aerobatics from all angles, including model aviation.

Air show experience: I am a nationally active air show pilot with a surface level waiver.

Other relevant experience: I am a coach and mentor to hundreds of aspiring aerobatic pilots both in real life and via my YouTube channel. I am a vocal proponent of aerobatics at all levels and disciplines, from grassroots to Unlimited, from sailplanes to power, from beginner to professional. I believe strongly that aerobatics is for everyone.

I give regular talks on aerobatics at EAA chapters, at AirVenture, and via the EAA webinars program. I also write articles for EAA's *Sport Aviation* and the IAC's *Sport Aerobatics* magazine. I try to contribute two or three pieces of new content on aerobatics each month to various outlets.

My commitment to you: Are you aware that the IAC has not called a meeting of the executive committee in over a year? We cannot drift along without attention to our important business any longer. I will fix this problem and many others.

I have the time and enthusiasm needed to be an effective leader. I will communicate respectfully with all IAC partners and volunteers on your behalf. I will listen to concerns and apply myself to find real solutions.

My platform is simple:

1. We will push the FAA harder to meet the needs of aerobatic enthusiasts.
2. We will better leverage our relationship with the EAA to gain new members.
3. We will promote fair, safe, and joyful participation of aerobatics.

I promise a future where the burden of the past is lifted and where every IAC member trusts the leadership to listen and respond to concerns. Let's work together and make it happen!

SARA ARNOLD FOR SECRETARY, IAC 436667

I am a candidate for IAC secretary, and I am asking for your support and vote.

Currently, I work at the Des Moines Airport in Iowa where I am an airport operations supervisor who oversees the daily operation of all tenants and verifies the airport is within compliance of the Part 139 certificate. In 2018, I founded the Heartland Chapter of Women in Aviation International, and to this day, I am president of the chapter. In October 2019, I was able to have the governor of Iowa sign a proclamation for the Girls in Aviation Day. At the 2019 Doug Yost competition, I was the assistant contest director and will be the 2020 contest director. In the 2020 contest year, I helped facilitate the new American Champion medallion that will be handed out for the next five years. During prior contests, I have been a recorder, line judge, and score runner.

I live in Iowa with my husband and three kids. In my spare time, I enjoy flying a Decathlon and competing in aerobatic competitions around the Midwest.

MARTY FLOURNOY FOR DIRECTOR, IAC 23687

I am interested in supporting and furthering the efforts that have been put in motion to make IAC a more inclusive and welcome place for pilots, aspiring aviators, and generally anyone with an interest in sport airplanes and those who support them.

During 25 years of contest organizing with IAC Chapter 3 in the Southeastern United States, like many members I began in Sportsman with an older Citabria and competed later in a Pitts I rebuilt before flying into Advanced and eventually taking it to the Nationals. Like many of you, I judge and volunteer and give back as much as possible. Our club also works to appreciate the dedication of mentors and unseen support key members such as scoring directors and registrars behind the scenes in our local IAC chapters.

Our local chapters have seen how involvement with practice days is critical for growth. The benefit of hosting an annual judges school with minimal cost and maximum fun and education as our goal has helped expand our core volunteers.

Acquiring a two-place Pitts years ago, our chapter has the goal of recruiting and keeping members active, which only happens if they can participate in some way. As with collegiate programs or aero club members, having a less expensive entry point available without initial maintenance concerns or lump sum outlay for an aerobatic plane helps lower the barrier for aspiring pilots. As such, promoting club activities with insured aircraft and safety pilots should be a goal IAC supports and improves.

If elected, I will have the goal of reinforcing the current IAC leadership efforts that work to be proactive in the broader pilot community – not only as a place for competition but also as a place to find a mentor, become better pilots, and most importantly, to enjoy the fellowship experience through the collective knowledge we have in over 50 years.

ROB HOLLAND FOR DIRECTOR, IAC 27724

I'm asking for your vote so I can continue to represent the membership of IAC as a board director.

I have been a proud member of the IAC for 19 years. In that time, I have dedicated my life to the art and passion of aerobatics. Climbing the ranks from flying Sportsman to eventually earning a position on the U.S. Aerobatic Team, I'm a nine-time U.S. National Aerobatic Champion, and I also have been proud to represent my country at the World Aerobatic Championships many times. But through all that I have never lost sight of what makes this sport and the IAC great: It's the people. If you're a new Primary pilot, an Unlimited competitor, or just someone who likes to watch aerobatics, I will represent you to the best of my abilities.

DEBBY RIHN-HARVEY FOR DIRECTOR, IAC 6548

Ladies and gentlemen, I ask again for your support. It would be an honor to continue to be your representative on the IAC board of directors and to be a voice for all members, especially the grassroots members.

We have made a great deal of progress in the IAC the past few years, but there is still work to accomplish. The board wants to make the IAC strong, profitable, and a fun place where we can share, educate, and pass on our passion for aerobatics. We have addressed many issues in the past two years and have many great ideas and plans for the future to make our membership proud.

For those who may not be familiar, I will try to brief you on my background. I have been involved in aviation my entire life, being the third generation of aviators in my family. However, when I started aerobatics in 1978, my family thought I had lost my mind. I guess I had because now it is my passion. I began competition in 1980, and on a regional level, I have held many offices within IAC Chapter 25 (Houston, Texas). I have been a contest director for several regional contests as well as working all positions necessary during contests. Nationally, I have been a judges school instructor and am currently an active national judge.

I have been involved with international aerobatics since first qualifying for the U.S. Unlimited Aerobatic Team in 1983. I had the honor of qualifying for 16 U.S. Unlimited Aerobatic Teams and represented the United States in 15 world aerobatic championships over a 31-year period. Internationally, I have represented the United States as a delegate to CIVA.

My passion goes beyond just that of the IAC. It also includes teaching, coaching, mentoring, and encouraging and promoting aviation. I have owned and managed a fixed base operation since 1979, with an emphasis on aerobatics and safety proficiency training. My other jobs include being an FAA designated examiner, an aerobatic competency evaluator for International Council of Air Shows, and an air show pilot.

If reelected, I promise to continue being a voice for the membership. Being actively involved in all aspects and levels of the sport, I understand your concerns. Through business and competition, I have had many of the problems that each of you have experienced. There is much work to be done, but together we can make it the best aerobatic club possible. Let's remember the *fun* of aerobatics. IAC

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Flying WITH LEGENDS

Learning to fly aerobatics with Patty Wagstaff

BY ANDREA MCGILVRAY, IAC 440477

MY INTRODUCTION TO FLIGHT was not typical, and I was not the little kid looking up with fascination. In my sleeping dreams, I imagined I could fly, but to become a pilot myself — that was a foreign concept in which I had zero interest. My father had a Cessna C-150 and an ultralight, but I never gave them a second look; I was into horses. He also had not encouraged me toward aviation.

The day my interest in aviation changed was the first time I flew a Spectrum Beaver ultralight. Although not planned, it was the day that changed the rest of my life. The instructor and I lifted off and the world moved! I was told I was a natural, and it felt that way, too. I was like a fish; the hook was set and would not let me loose of this newfound passion. There is a long story about the way I was living my life at the time, but the short version is that this accidental ultralight experience saved my life and has helped me become who I am today. The passion that burned and grew from that ultralight flight straightened up my attitude. My love for flying was much stronger than my misplaced intentions to keep my social life and partying with friends.

Patty knew exactly how to take Andrea from A to Z in her aerobatic training.

PHOTOGRAPHY COURTESY OF **ANDREA MCGILVRAY**

Contrary to regulations in the United States at the time I was flying ultralights in Canada, I was required to get an ultralight certificate, which I received right at the minimum of the required five hours. Even with the certificate in hand, it was clear to me that I wanted to go much further than being an ultralight pilot. Mind you, ultralights are a lot of fun, and I still enjoy flying them today.

My first aerobatic flight was in a 1942 Stearman. I was about halfway through my private pilot training when Ted, my flight instructor, asked me to go fly with him. He was practicing for an upcoming air show and wanted some company. I asked if he could fly the plane upside down; I didn't know to call it inverted at that point. He answered that he could "kinda" fly inverted until the engine started to cough and then he would have to turn the Stearman back upright. On that air show practice flight, he put the plane through loops, rolls, and a hammerhead. That experience was so perfect and amazing, the memory has stayed with me. It inspired me to where I am currently in my aerobatic life.

In addition to the experience in the Stearman, I had seen a Pitts Special at a local air show 30-plus years ago. Although small in size, it put on a big show with its smooth, long, inverted lines, vertical climbs, and amazing multiple snap rolls. I fell in love with the plane while having no thought that one day this plane or one like it could be mine. I treasure the photo I took in 1988 at the Pembroke-Ontario Air Show of that 1971 Pitts Special S-1C, tail number C-FALR. I still have the photo to this day!

Andrea fell in love with this Pitts Special at a local air show over 30 years ago. She never dreamed she would own one like it later in life.

Thirty years after that air show, I had the opportunity to see if my fascination for aerobatics was a made-up memory or a real tangible passion that still simmered under the surface. One day after our EAA chapter meeting, one of the members said he had done some dual training in a Pitts Special S-2B. My ears shot up, and I asked for his information. I called the instructor as I was leaving the parking lot. I asked when I could come up and took the first opportunity offered. I flew with him for three hours in the fall of 2017. During that aerobatic flight experience, my memories of my previous passion were reignited, and I heard the aerobatic siren's call again. During this flight, the instructor let me play and torture the Pitts S-2B until we both were tired. I was so seriously hooked; I was completely and utterly addicted. I had to learn how to fly aerobatics, and that was all there was to it!

I belong to a number of Facebook pages, and on the *LadiesLoveTaildraggers* (LLT) page, I saw an offer for a scholarship being advertised. I was persuaded to apply for the scholarship by one of the LLT members, probably Judy Birchler, the online LLT aviation group founder, as her enthusiasm for all things aviation is very contagious.

The scholarship application and screening process all happened *really* fast. I applied, and only a few weeks later, I received an email saying that Figure 1 Foundation wanted to do a conference call with me to find out more about my aviation aspirations. After that call, I was told I was on the short list of the potential winner for the scholarship. I honestly did not believe that I would even get a call, never mind having a chance to win.

Figure 1 Foundation was founded by Chris Olmsted and A.J. Wilder, both International Aerobatic Club members. The foundation is a 501(c)(3) nonprofit organization dedicated to aviation scholarships: one for a pilot certificate, another for a tailwheel endorsement, and one for an aerobatic judge training. The scholarship I would receive was for Upset Recovery/Spin Training and Introduction to Aerobatics.

At the time of the scholarship notification, I was at EAA AirVenture Oshkosh where the scholarship was being presented, which was a nice stroke of luck as it turned out. Chris Olmsted sent me a few text messages to encourage me to come to his location on the AirVenture grounds to meet him. He

didn't know I had plans only to stay for two days at AirVenture or that I had plans to go to Wausau, Wisconsin, for a warbird fly-in, so he was forced to spoil the surprise and tell me that I was the scholarship recipient!

I had never received any monetary help with anything in my life before, so it was a strange feeling and I am extremely grateful. The potential challenges for me to attend the press conference worked themselves out quickly. Chris had an extra room at a hotel in Appleton, I canceled my hotel room in Wausau, and I more than willingly changed my plans of the warbird fly-in to receive my scholarship at the press conference that Wednesday.

There were three schools that were authorized to be used, and Patty Wagstaff's Aviation Safety school in St. Augustine, Florida, was one of them. I called Patty's flight school and booked my training as soon as I got back home from Oshkosh. I booked my airline flight and accommodations at a yoga hostel (way too amazing to pass on), and Patty's flight school accepted me for September 3 as a start of a 10-day training session. Even with all the plans confirmed, I was pinching myself to see if I was just dreaming or if this was all for real!

Between Patty and Allan Moore, one of the instructors at her school, I received instruction on flying loops, ballistic aileron rolls, slow rolls, reverse half-Cuban-eights, both inverted and upright rolls on a 45-degree line, figure eights, the hammerhead, and humpty bumps. After flying the Super Decathlon for most of the training, I was overjoyed to fly the Extra 300L for an hour. That, I can only say, was amazing, and you hardly need to know how to do aerobatics to have fun in that machine!

During the 10-hour course, each day started out early: one flight in the morning and one in the afternoon. Almost every day we had some ground school of what we were going to cover during the day's training. During our aerobatic flights, it took me seven hours before I was not having to be reminded to "look left" after we pulled up. I so appreciated the instantaneous feedback both Patty and Allan provided when we were flying.

The hardest maneuver for me was the slow roll, and the most fun were the vertical maneuvers. The most memorable flight was with Patty on our last landing together. We were abeam the numbers, and there were two Cessna C-172s ahead of us on exaggerated 10-mile final approaches. The tower radioed and asked Patty if she wanted to come in ahead of them. Of course, we didn't want to pass up that opportunity, and she took the controls. Patty demonstrated some amazing flying, quickly dropping altitude in that Super D like I had never experienced. A slip to the left, then one to the right, then back, and while the wing was mere feet off the ground still in a full slip, she briskly straightened the airplane, and the landing felt like we gently settled onto a cushion. I will never forget that landing and hope that one day I can come close to being as capable and in control as Patty.

In my hour flying the Extra, I stalled it twice vertically going down, which was quite a surprise, and experienced inverted spins. We also went through training on two standard spins and one spin from a hammerhead (on purpose). The spins were included in the course and were done by demonstrating what adding in aileron both left and right did to the character of the spin. It was enlightening to experience some of these very interesting changes for myself. When adding aileron opposite to the direction of the spin, some flattening of the spin attitude was observed. When adding aileron in the same direction of the spin, it accelerated the rate of rotation.

The training was amazing. Both Patty and Allan knew exactly how to take me from A to Z. There was a steep learning curve, and I do remember that initially the exercise of thinking and doing were hard. But the training finally got easier. During and after the training, I was still shell-shocked that the whole experience of receiving the scholarship and going through training at Patty's flight school had happened to me. I still feel a deep sense of thankfulness for the whole experience: 10 hours in a Super Decathlon and one hour in an Extra 300L. (In my mind, the aircraft name stands for Extra fun and a gentle two-fingered toy!)

I slept well every night. Pulling *g*'s does that to me. I would typically spend a good part of the day at the hangar. When away from the airfield, I would either rest or tour St. Augustine's unique scenery, stroll the brick-lined streets with centuries-old buildings, sample an excellent variety of restaurants, and stroll around the historical Castillo de San Marcos National Monument.

The training experience in St. Augustine cemented part of my goal in aviation to share this amazing gift of flight with others. I want to pour the joy and happiness into a cup that I experience and share it with anyone who wishes to have some. I have given rides to many people over the last three years (nearly 50 at my last count). All of them have this amazing smile when we come back from a flight. Last fall I gave each of my Ninety-Nines chapter members a ride. One lady was so happy, she cried. Everyone has a wonderful experience flying in the open-air cockpit. Their smiles, excitement, and gratitude are way too amazing not to share. ***IAC+***

PHOTOGRAPHY COURTESY OF **ANDREA MCGILVRAY**

A History of Category Creep

IAC 50th anniversary spotlight

BY LORRIE PENNER, IAC 431036

A LAMENT AND SOMETIMES HEATED discussion you will often hear if you've been around the International Aerobatic Club contests long enough is that we have a real problem with category creep. The creep is a phenomenon where our modern top-end aerobatic airplanes, which came on in the 1980s, have an exceptional increase in performance compared to the classic aerobatic aircraft of earlier years, this allows them to easily fly a maneuver without running out of smash. Because of the high-performance capabilities of the aircraft itself, pilots with lower-performing classic aircraft watch forlornly as the complexity and K-factor of the competition sequences creep higher.

During the 25th anniversary of the IAC, President Emeritus and IAC historian Mike Heuer wrote an article in the March 1995 issue of *Sport Aerobatics* describing how little the sequences had changed over a quarter century. IAC's philosophy had remained the same since its inception in 1970: "to keep the sequences simple and flyable by a majority of aircraft available to our members."

Looking at the total program Known Unlimited K-factor from, including positioning (which doesn't affect the difficulty of the individual figures), gives us a background of the changes through time:

1973's total program K-factor was 442k and was made up of 18 figures;

1995's total program was 392k and made up of 14 figures;

2020's total program is 438k and made up of nine figures.

Some have advocated that a partial answer to the category creep may have lain in the decision of the IAC board to match the number of figures used by CIVA. Although the actual total program K-factor was similar to earlier years, the reduction of the number of figures flown caused some competitors with lower-performing aircraft to change their strategy in energy management and push hard into the redline of their aging aircraft. With the reduction of figures and the added complexity, the higher-performance aircraft were the benefactors.

The example of U.S. National Unlimited Champions shows us the progression of competitive aircraft types through the 1970s, '80s, and '90s. The last time that a biplane won the category was in 1988. U.S. Unlimited team member Tom Jones flew his highly modified Pitts Special that year.

1970 - GENE SOUCY PITTS SPECIAL	**1980 - LEO LOUDENSLAGER** LASER 200	**1990 - PETER ANDERSON** EXTRA 230
1971 - GENE SOUCY PITTS SPECIAL	**1981 - LEO LOUDENSLAGER** LASER 200	**1991 - PATTY WAGSTAFF** EXTRA 230
1972 - GENE SOUCY PITTS SPECIAL	**1982 - LEO LOUDENSLAGER** LASER 200	**1992 - PATTY WAGSTAFF** EXTRA 230
1973 - TOM POBEREZNY PITTS SPECIAL	**1983 - KERMIT WEEKS** WEEKS SOLUTION	**1993 - PATTY WAGSTAFF** EXTRA 230
1974 - ART SCHOLL PITTS SPECIAL	**1984 - NOT FLOWN**	**1994 - PHIL KNIGHT** EXTRA 300S
1975 - LEO LOUDENSLAGER LASER 200	**1985 - KERMIT WEEKS** WEEKS SOLUTION	**1995 - MICHAEL GOULIAN** EXTRA 300S
1976 - LEO LOUDENSLAGER LASER 200	**1986 - CLINT MCHENRY** EXTRA 300	**1996 - NOT FLOWN**
1977 - LEO LOUDENSLAGER LASER 200	**1987 - CLINT MCHENRY** EXTRA 300	**1997 - DIANE HAKALA** STAUDAUCHER S-300
1978 - LEO LOUDENSLAGER LASER 200	**1988 - TOM JONES** PITTS X S-2S	**1998 - KIRBY CHAMBLISS** EDGE 540
1979 - HENRY HAIGH SUPERSTAR	**1989 - CLINT MCHENRY** EXTRA 300	**1999 - ROBERT ARMSTRONG** CAP 231

The Phoenix, designed by Dan Rihn with a roll rate of 360 degrees per second. The plane was flown by Mike Anderson and finished in second place at 1989 Nationals behind Clint McHenry in his Extra 300.

The accepted definition of category creep is the more or less steady increase in difficulty in Sportsman through Unlimited. As the Unlimited Known sequences are reviewed from 1997 through 2020 a few things pop out. In 1997, the Unlimited sequences were made up of 12 figures and the total figures in 2001 were reduced to nine. For the next 10 years starting in 2002 through 2012, the total program K-factor averaged 332k. The next seven years proved to be the changing point in total program K-factor; 2013 started out with a big increase of 71k over the previous year for a total program K-factor of 403k. From there the average program K-factor through current day carries an average of 424k, which is nearly 100 more points than the previous decade's average K-factor.

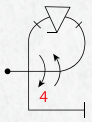
In 1980, Sam Burgess of San Antonio, Texas, wrote an article titled "Rewrite Aresti." He called for vast modifications in the K-factors due to the development of higher-performance aerobatic aircraft. According to the article, Aresti himself already had begun work on the project. In the mid-1980s, the Swiss delegate to CIVA, Eric Muller, presented his own ideas. These initiatives resulted in the official adoption and publication by CIVA of the new *FAI Aerobatic Catalogue* in 1987. To many it was a welcome change to the old system. The K-factors were substantially changed in this new catalogue. For instance, maneuvers that were difficult in a Jungmeister were not as difficult in a Laser or an Extra.

Here are some examples of the K-factor changes for some simple maneuvers:

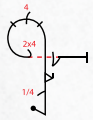
LOOP:	BEFORE 1988 = 12K	AFTER 1988 = 10K
HAMMERHEAD:	BEFORE 1988 = 20K	AFTER 1988 = 17K
HALF-CUBAN:	BEFORE 1988 = 16K	AFTER 1988 = 14K
OUTSIDE/INSIDE HORIZONTAL EIGHT:	BEFORE 1988 = 33K	AFTER 1988 = 23K

PHOTOGRAPHY COURTESY OF **IAC ARCHIVES**

Yet the total program K-factor doesn't tell the whole story; the average K per figure has also gone up dramatically over the years. A compare and contrast on a couple of the Unlimited Known figures reveals that the individual figures are consistently being loaded up with additional elements, thereby increasing the K-factor of each individual figure.

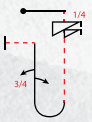
NO.	SYMBOL	CATALOGUE NO.	K	TOTAL K
1		8.43.1 9.4.3.4 9.1.3.4 9.9.3.4	11 11 8 11	41

2003 UNLIMITED KNOWN

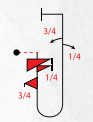
NO.	SYMBOL	CATALOGUE NO.	K	TOTAL K
1		8.6.1.1 9.1.1.1 9.9.1.2 9.4.3.4 9.4.3.2 9.1.3.6	11 6 15 11 5 10	58 SF 7

2020 UNLIMITED KNOWN

– P LOOP –

NO.	SYMBOL	CATALOGUE NO.	K	TOTAL K
3		8.4.3 9.11.1.5 9.1.1.2 9.1.1.3	14 4 8 10	36

2010 UNLIMITED KNOWN

NO.	SYMBOL	CATALOGUE NO.	K	TOTAL K
2		8.4.2.4 9.12.1.5 9.10.3.4 9.1.1.1 9.1.1.3	14 6 13 6 10	49

2018 UNLIMITED KNOWN

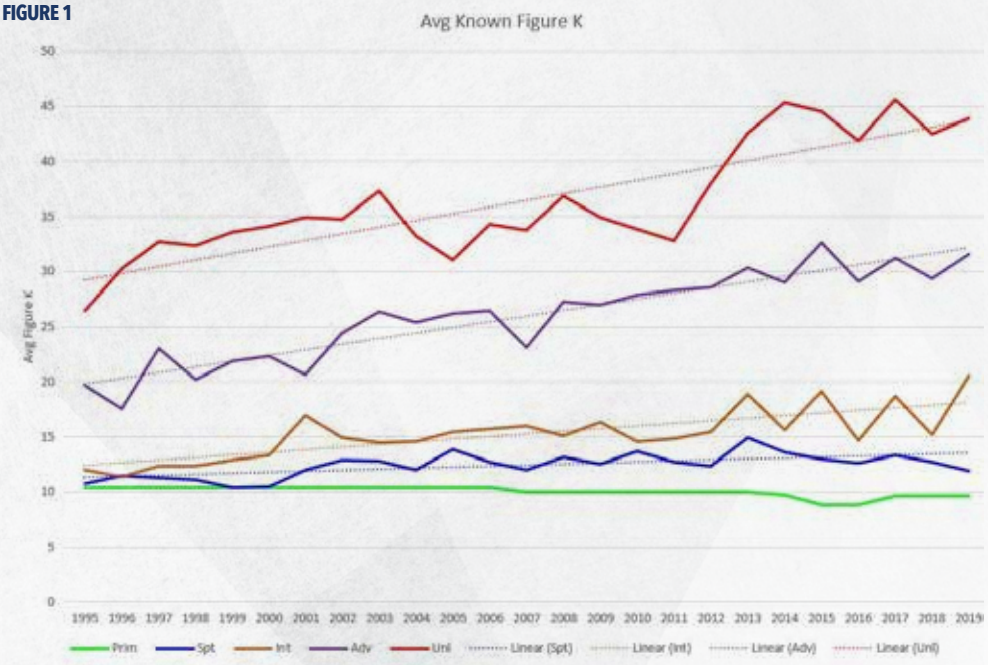
– HUMPTY BUMP –

Prior to 2016 IAC, along with other countries, submitted Known sequences for consideration in the Advanced and Unlimited categories. When CIVA had made the final decision on the new sequences, the IAC board approved or rejected the sequences for use in IAC regional contests for these two categories.

Beginning in the 2016 contest season, CIVA adopted the Free Known concept for Advanced and Unlimited categories. Although the board briefly discussed using it at the U.S. Nationals, in the end it stuck to traditional sequences derived from the Knowns submitted by IAC members and the sequence committee.

The IAC has a bank of past sequences from 1995 through 2020 on its website, www.IAC.org/sequences (member login required). From this collection of sequences, IAC member DJ Molny developed a graph of the average Known K-factor for each category. (See Figure 1.)

FIGURE 1



GRAPH COURTESY OF **DJ MOLNY**

The sequence committee accepts Known sequence proposals from the IAC membership for Primary through Unlimited categories and presents its recommendations at the IAC fall board meeting. The sequence committee, now chaired by Michael Lents, University of North Dakota professor and U.S. Advanced team member, has the responsibility of gathering and designing the Known sequences for all power and glider categories.

America's revolution on the monoplane – the Stephen's Akro highly modified by Leo Loudenslager would become the Laser 200.

In the mid-1990s, the American-made Zivko Edge 540 began to fly to victory in Unlimited aerobatics. Kirby Chambliss flew his Edge 540 to become five-time U.S. National Aerobatic Champion.

Once the proposals are either designed by the committee and/or received from the IAC membership, the committee members are responsible for testing the proposals. They evaluate factors such as altitude loss and maximum positive/negative *g* necessary to fly the sequence by an aircraft appropriate to the category. Additional criteria used in sequence evaluation are adherence to the Aresti System and *IAC Official Contest Rules*, appropriate level of difficulty for the category, safety limits for both the pilot and aircraft, and flyability by the baseline aircraft.

The eight-member sequence committee consists of national and international volunteers who are experienced CFIs, competitors, air show performers, and coaches and/or aerobatic judges. Specific aircraft experience ranges from high-drag, low-performance power airplanes such as the Great Lakes, Citabria, or Decathlon and up through the higher-performance aircraft such as the Extra 330SC.

Each competition category has a reference aircraft: Power Primary and Sportsman sequences shall be flyable without inverted fuel or oil systems in the class of the 115-hp Citabria; the Intermediate sequences shall be flyable by aircraft in the class of the 150-hp Decathlon; the Advanced sequences shall be flyable by aircraft in the class of the Pitts S-2B; and there are no aircraft restrictions for the Unlimited Known, but consideration will be given for the IAC legacy aircraft (Pitts S-1) known to compete in this category. IAC

PHOTOGRAPHY COURTESY OF **IAC ARCHIVES**

LEARNING TO LOVE GETTING ALL SHOOK UP

Or how aerobatic training affects all your flying

BY JIM LUGER, IAC 12105

ARE YOU A LITTLE nervous about flying weird attitudes? Don't worry — you've been through this before.

When you first learned to fly an airplane, making precise turns, climbs, and glides, it likely felt challenging, maybe a little scary — perhaps even risky. But it only felt that way at first, right? You soon became fluent with controlling the airplane, and normal flight operations became increasingly intuitive. Likewise, when stretching your limits with basic aerobatics, spins, and upset recoveries, it might at first seem a little edgy. But you'll soon roll and loop and spin as if the airplane is an extension of your mind and body. I've never talked to a bird about this, but it must be the way it feels when it twirls and soars through the sky with abandon.

PHOTO COURTESY OF **UND AEROBATICS TEAM**

UNDAEROSPACE
UNIVERSITY OF NORTH DAKOTA
UNDAEROSPACE
UNIVERSITY OF NORTH DAKOTA

BEGIN WITH YOUR MENTAL ATTITUDE

Psychological research has shown that the way you mentally frame an experience will directly affect how you react to it. If you think of something as fun, it will be. If you think of it as scary, it will be. For example, when each of my three nonpilot daughters reached 12 years old, I let them perform a loop all by themselves (with me monitoring the controls from the back seat). I introduced this experience by asking, "Do you want to have a lot of fun doing an easy loop?" By saying yes, they framed the experience, and each of them giggled all the way through the maneuver. (By the way, my instruction was simply, "Pull the stick all the way back, and when we're right-side up again, put the stick back where it was." To this day, the only flying skill each of them has is flying an egg-shaped loop.) The point of all this is that if you think about your aerobatic and upset exercises as fun, you'll be smiling all the way through them. If you ever feel anxious before a maneuver, simply tell yourself that you are *excited* — same emotion, different connotation, very different experience.

TAMING PESKY PERCEPTION GREMLINS

Sensory signals can affect your mental perception of what the airplane is doing, both during an extreme attitude and after you've recovered. Let's look at a few of those physiological factors.

VERTIGO

After flying an avalanche (a snap roll on the top of a loop), you might initially feel a little dizzy afterward. That's because you — or specifically, your head — accelerated, decelerated, and moved through multiple three-dimensional planes in quick succession. Similarly, if you perform a lot of turning maneuvers, one after the other, you might get dizzy and confused, a condition called *vertigo*. If you want a sample of this feeling on the ground, sit securely in a swivel chair with armrests to steady yourself. (Have someone with you who can keep you from falling out of the chair.) With your eyes open, spin around three or four times. During the last turn, nod your head up and down once or twice and then stop quickly while holding the armrests. Notice how you feel. You might feel unstable, and it might feel like you are still spinning. That's vertigo. Wait until your perceptions settle down before getting up from the chair.

Vertigo is a natural reaction to mixed signals that come from the semicircular canals inside your inner ear, which are designed to help you detect movement. One of the semicircular canals reacts when you rotate your head from one side to the other or when you are completely turning; another reacts when you move your head toward one shoulder and then the other; and one reacts when you nod up and down. In other words, they detect yaw, roll, and pitch movements. While you are moving your head one way or the other, an oily fluid inside each semicircular canal moves past tiny sensitive hairs. These hairs send an electrical message to the brain to warn you that you are moving in a certain direction. But when you stop moving, the fluid's momentum can continue giving you the false perception that you are still moving. For example, when you stop a spin, the fluid inside the sensing semicircular canal continues flowing for a moment, sending a false message to your brain that you are still spinning, even though you're not. This misperception has led pilots to keep pressing the opposite rudder too long during their spin recovery, resulting in a secondary spin to the other direction. The way to override this misperception is to fix your eyes on something on the ground to "prove" to your brain that you are no longer spinning. If you watch a video of a ballet dancer whirling around on her toe in a pirouette, you'll see her quickly moving her head to keep track of a single point of reference. (There's nothing more unstable than a dizzy dancer.)

THE POINT OF ALL THIS IS THAT IF YOU THINK ABOUT YOUR AEROBATIC AND UPSET EXERCISES AS FUN, YOU'LL BE SMILING ALL THE WAY THROUGH THEM. IF YOU EVER FEEL ANXIOUS BEFORE A MANEUVER, SIMPLY TELL YOURSELF THAT YOU ARE EXCITED — SAME EMOTION, DIFFERENT CONNOTATION, VERY DIFFERENT EXPERIENCE.

PHOTO COURTESY OF **MARC DINGMAN**

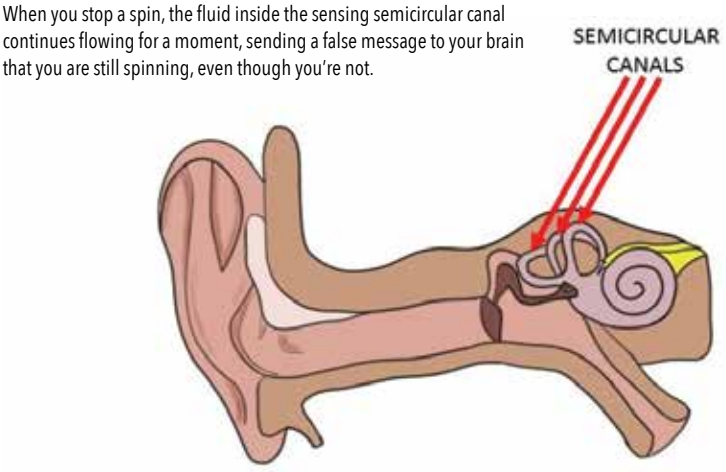
NYSTAGMUS

If you are walking and then trip, falling, say, to your left side, your eyes will automatically flick to the left to help you find something to either grab or to safely land on. In a 1965 study reported by the FAA's Office of Aviation Medicine, Civil Aeromedical Research Institute, the eye movements of ice figure skaters were sometimes found to keep moving after recovering from multiturn rotations. Their eyes continued darting involuntarily toward the direction of the spin even though the skater had just stopped spinning. The affected skaters reported this experience as blurred vision and the illusion they were still spinning, a condition technically known as *nystagmus*. The skaters were able to override this blurring by fixing their gaze on something stationary for a moment after they stopped spinning.

Nystagmus also can make a pilot who has just recovered from a spin, and especially from a multiturn spin, think that she is continuing to spin, even though rotation has actually stopped. This instance could lead to overholding the opposite rudder and then inadvertently spinning in the opposite direction, or worse, into a diving spiral. As with vertigo, the prevention is to look at a fixed reference point on the ground.

As an aside, another interesting finding from that FAA study was that when the skaters were allowed to choose either direction to spin, seven of the eight skaters chose to spin to the left. Perhaps the overwhelming bias to turn left is the original reason why airport patterns generally require turns to the left. When I give aerobatic students a choice to make their first roll or spin either left or right, they usually choose left. Soldiers always start marching by stepping out on their left foot, and wilderness rescuers know that lost hikers tend to wander aimlessly toward the left. And so on, but I'll get back to the subject at hand.

When you stop a spin, the fluid inside the sensing semicircular canal continues flowing for a moment, sending a false message to your brain that you are still spinning, even though you're not.



AWE

An experience becomes *awesome* when you are overwhelmingly fascinated by it. Being fascinated can be a delight, but being overly awestruck during a multiturn spin can severely distract your spatial orientation and situational awareness, making you lose track of your number of turns and your altitude — and just about everything else except the whirling ground at which you are staring. That's why you should always call out aloud each half-turn, even when flying solo. It's easy to lose track when just counting full turns, but counting half-turns requires keen focus and mental discipline. (You want the maximum of both.)

CONFUSION

When a student stops counting aloud or miscounts half-turns in a spin, I always say, "Okay, recover." The airplane is taking control. After recovering, I ask those students how many turns they made, and they invariably guess fewer turns than they actually made. They also lost track of their altitude. That confusion impaired their ability to control the airplane. If you lose count of your half-turns, recover immediately.

If your plan is to spin down to a specific altitude, recover immediately upon reaching it. If you glance at your altimeter and feel even momentarily confused, recover immediately.

If you lose spatial orientation or situational awareness during any aerobatic maneuver, you've lost some control. Retake control by aborting the maneuver and redoing it from the beginning. When practicing, that's what champion aerobatic pilots do; it's what renowned air show pilots do, and so should you.

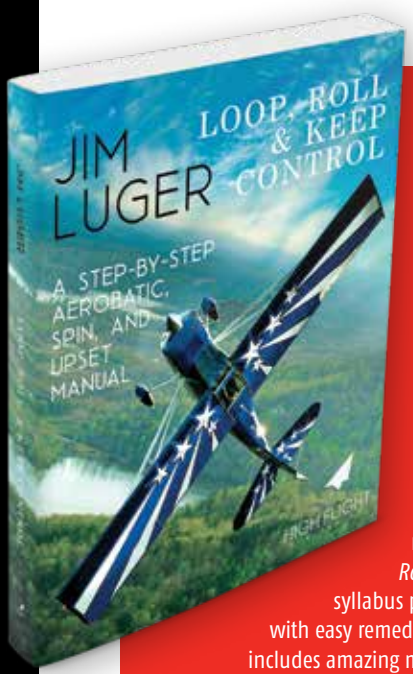
Jim Luger with grandson Frankie.

PUSHING PAST YOUR LIMITATIONS

Many of my aerobatic students have told me that their aerobatic and upset recovery training has made them feel more relaxed and confident in all types of flying, even during simple cross-country flights. That confidence is the reward you'll earn when you safely push past your prior aeronautical limits.

It reminds me of when I was a young Boy Scout learning how to paddle a canoe at Scout camp. Compared to my dad's wide, stable fishing boat, the canoe seemed tippy and finicky, threatening to capsize with the slightest wiggle. When I enrolled in advanced training for the canoeing merit badge, I learned canoe techniques to handle all kinds of conditions. The most fun exercise was paddling several feet from shore with a buddy, both of us in swimsuits, and purposely swamping the canoe. I was surprised by how the canoe easily banked to one side, but it resisted going past the gunnel in spite of us leaning and rocking to spill it over. Eventually, we swamped the canoe, but it stayed afloat while we wiggled back in and started bailing water with our hands. After that experience, my confidence in canoes spiked and remains so to this day when I canoe in Minnesota's beautiful lakes and rivers.

That canoe learning experience flashed back when I started learning the maneuvering limits of an airplane during my initial aerobatic training. I soon felt more confident about aborting maneuvers or recovering after mishaps. I was able to mentally stay further ahead of every airplane I flew, sensing any lack of coordination in a turn, even before the inclinometer's sluggish ball could ooze to one side or the other.* I felt the subtle lack of control authority in my fingers when airspeed was low and the wing was on the edge of the critical angle of attack. As my confidence reached new levels, every aspect of flying became more relaxed and fun, and I was more mindful of my airplane's performance.



BOOK COMING OUT SOON

LOOP, ROLL, AND KEEP CONTROL

Aerobatic flight instructor Jim Luger describes step-by-step aerobatic, spin, and upset maneuvers in his new book, *Loop, Roll, and Keep Control*. His flight syllabus progresses from simple to complex, with easy remedies for common errors, and includes amazing maneuver histories. The overall objective is to sharpen your control awareness and make correct responses during all flights.

PHOTO COURTESY OF **JIM LUGER**

(*In case you didn't know, the inclinometer is the "ball" part of the multipurpose "turn and bank indicator," also known as the "turn coordinator" or the "turn and slip" indicator. The "2-minute" turn and bank portion is driven by an electric gyro, and the ball is suspended in a fluid-filled, arc-shaped glass tube. It looks like a smile. As you know, when your turns are perfectly coordinated, no matter how steep the bank, the ball will be in the middle of the arc. Some aerobatic airplanes also have an upside-down inclinometer for inverted flight. It looks like a frown.)

Practicing aerobatics also can make corrections and recoveries decisive and expedient. As an example, I'll recount one of the two times that I was unexpectedly rolled inverted at low altitude.

It happened in Alaska when I was earning my floatplane rating and also learning mountain flying techniques. During one training flight in a Super Cub on floats, my instructor and I flew up a canyon to practice box canyon turnarounds. As we entered the canyon, a sudden downdraft from the lee of the closest mountain rolled us past knife-edge, and I immediately, reflexively, pushed on the stick to prevent an inverted dive, while rolling the wings level with full aileron and hard rudder. There was no altitude loss, and I continued flying merrily along. After a few moments of silence, my instructor said, "Okay, turn around. We're going back." When I asked him why, he said, "That really freaked me out." He said he'd never rolled that steeply before, and he wanted to get out of the airplane for a while to collect himself. Sure, it took me by surprise, too, but otherwise it was no big deal to me. The experience was important to me, however, because it made me realize how aerobatic training would have made that CFI smile instead of "freaking out" over an incident that was corrected well within safety margins. It also made me realize that without my aerobatic training, we might not have survived the upset.

A FINAL WORD ABOUT CONFIDENCE

Early in my aerobatic instructing career, I spent a few days in Venice, Florida, getting advanced spin and aerobatic training from Bill Thomas, the nationally known aerobatic champion and instructor. After he finished entering our last training flight in my logbook, he handed it back to me and said, "My parting advice is to be careful. And when you get really good, be *very* careful."

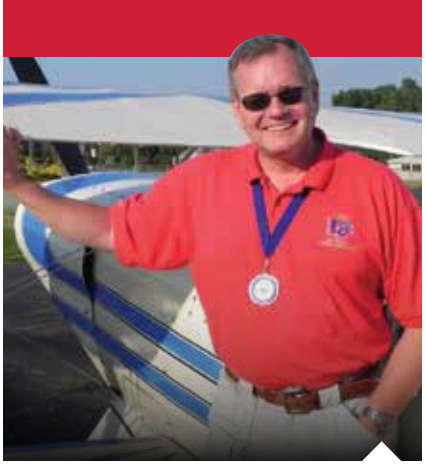
I'd add that when you are flying carefully, you'll have even more fun. IAC

JIM LUGER'S aviation career started in the early 1970s when he became a young commercial pilot and certificated flight instructor. He has specialized in teaching experienced pilots to fly aerobatics and how to maintain and regain control of an airplane that goes out of control.

2020 IAC CONTEST SEASON CALENDAR

DATES	HOST CHAPTER	NAME	REGION	LOCATION	AIRPORT
July 10, 2020	35	Green Mountain Aerobatic Contest	Northeast	Vermont	KVSF
July 10, 2020	88	Michigan Aerobatic Open	Mid-America	Michigan	3CM
July 11, 2020	24	Super D Tango	South-Central	Texas	3TX
July 18, 2020	12	High Planes Hotpoxia Fest	South-Central	Colorado	KFMM
July 25, 2020	134	Yooper Looper – Moved to July	Mid-America	Michigan	KSAW
Aug. 7, 2020	77	Corvallis Corkscrew – IAC West Open	Northwest	Oregon	KCVO
Aug. 8, 2020	78	Doug Yost Challenge	Mid-America	Iowa	KSPW
Aug. 20, 2020	89	Snowbird Classic – IAC East Open Championship	Southeast	Florida	X60
Aug. 29, 2020	11	James K Polk Open Invitational	Northeast	Virginia	KHWY

PHOTOGRAPHY BY **LEIGH HUBNER**



Half-Cuban-Eight

BY GORDON PENNER, IAC 429704, THREE-TIME NAFI MASTER INSTRUCTOR-AEROBATIC, FAA GOLD SEAL CFI

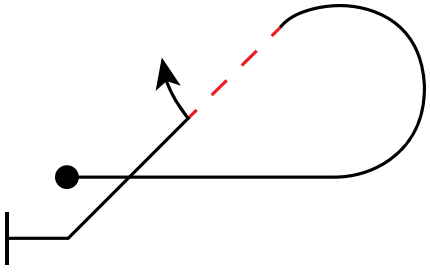
THE HALF-CUBAN-EIGHT is a wonderful recreational aerobatic maneuver and a good-looking competition maneuver. It is relatively easy to fly. Hidden dangers, however, lie in wait for the recreational aerobat in this maneuver.

The problem is that almost all written information about all of these aerobatic maneuvers is written against the international Aresti competition standard. What must be stressed here is that the Aresti standards assume all airplanes have inverted fuel and oil systems, as well as negative-*g* structural capability. If airplanes without inverted fuel and oil systems try to fly this maneuver without going into the negative-*g* area, especially newer low-drag experimental aircraft, they can quickly get into a dangerous situation.

In this article, which is geared toward newer aerobatic pilots, we will first talk about the maneuver as it is to be flown in competition. Then once we have a standard set, we will cover how to safely modify the half-Cuban-eight standard for those airplanes that don't have inverted fuel and oil systems. Some pilots don't want to recreationally perform negative-*g* flight anyway, even if the airplane does possess that capability. They may want to "baby" their hand-built airplanes. Many want to give a good passenger ride.

Knowledge of the Aresti competition aerobatic standards is a good idea for pilots who will never, ever compete. Correct modification for safe recreational aerobatics is uncertain unless it is done from a fixed standard or baseline.

FIGURE 1 ARESTI HALF-CUBAN-EIGHT



Remember, it takes more skill to fly an airplane with more restrictive limitations. That reality is what Bob Hoover and Tex Johnston were demonstrating in their YouTube videos. Are we recommending aerobatics in aircraft not designed and certified for them? *Certainly not*. However, Bob and Tex demonstrate what can be done with the right knowledge and the right practice. They are an inspiration, but they both regularly cautioned others not to do what they've done without instruction, *extensive* practice, and enough altitude. All of you, especially those of you who fly experimentals, must dig into your aircraft manuals for approved maneuvers, speeds, and limitations.

For those in slick experimentals, we don't recommend learning aerobatics in those airplanes. It is suggest you learn basic aerobatics in a high-drag, purpose-built trainer such as a Decathlon or Citabria, and then get type-specific aerobatic training in your model afterward.

Also, please, please, *please* fly high.

HALF-CUBAN-EIGHT COMPETITION STANDARD

As seen in the Aresti symbol in Fig. 1, the half-Cuban-eight starts with a pull-up into 5/8 of a loop, followed by a 45-degree downline, inverted, with a half slow roll to upright. After the slow roll is over, the 45-degree downline is continued, followed by a pull to level flight. All maneuvers must begin and end with a segment of level flight, but the entry and exit altitudes do not have to match.

This maneuver has three elements that must be conquered. First, you must make the 5/8 of a loop a constant radius *without pinching the top*. The other two elements are those darn 45s and centering the roll.

As spelled out in the *IAC Official Contest Rules* book, which conforms to the international standards, the vertical and 45-degree lines are judged on ZLA, or zero-lift axis. ZLA means the attitude when the wing is making zero lift. The judges are looking for the ZLA in relation to the horizon to be at 45 degrees or 90 degrees without wind correction, not the flight path. It means that the flight path angle to the horizon will be shallow in a tailwind and steep into a headwind for no demerits.

Looping segments and rolls are judged differently. They are judged by the CGT, or center of gravity track. It means we reduce the aircraft to a dot at the center of gravity, and then we look at the flight path of that dot. In the rolls, the CG dot must make a straight line while rolling, which means the pilot must use slow roll techniques. More on that later.

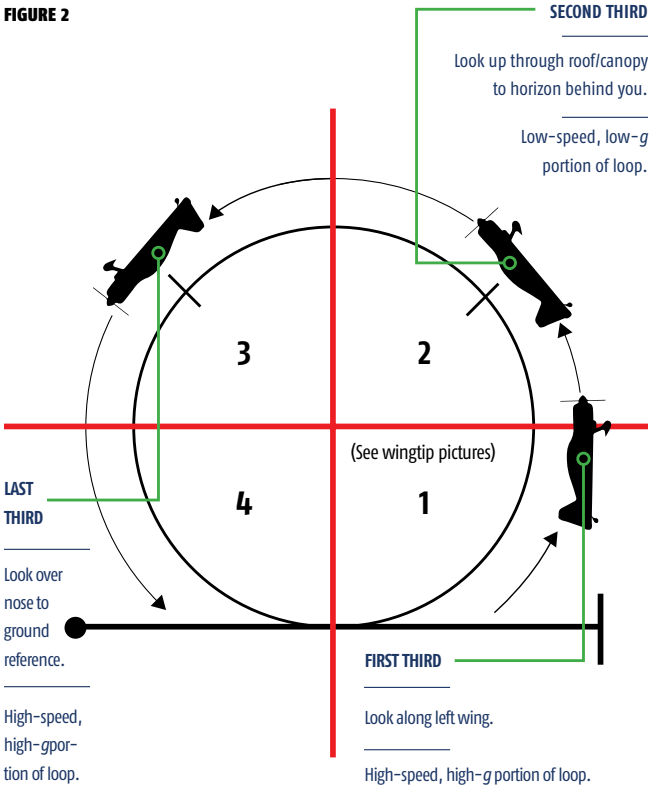
The loop's CGT must be wind corrected.

I wholly endorse the statement made by the late, great Sportsman champion Giles Henderson: "Energy management is something the pilot does with the right hand, not the left." Bob Hoover definitely showed deft energy management! Developed in the '50s and '60s, the Aresti system endeavors to discern and reward pilot ability, not horsepower, hence the ZLA and CGT standards.

First, I need to quickly review the elements of a loop. Even though we fly the loop in thirds, we must analyze it in quarters.

The half-Cuban-eight is started just like the regular loop. Many people do not take enough care of this detail. (See the December 2019 *Sport Aerobatics* article "Looping the Loop.") All quarters *must* have the same radius. In other words, it must be perfectly round with no bulges or flat spots. In this maneuver, you are just leaving the loop in the middle of quarter number three to do the 45-degree downline.

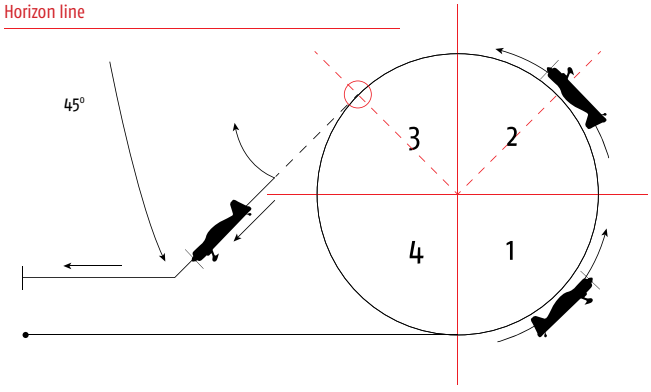
FIGURE 2



As in the full loop, the first rule is to have at least the minimum looping speed for your aircraft (or more). Second, you must pull enough *g* into quarter number one to make it small; 3*g* minimum will be required, which most new pilots are not used to.

Average-horsepower aircraft do not have enough horsepower to get around a bigger loop, so they run out of "Schlitz" or "smash" prior to reaching the top. It is counterintuitive, but pulling harder *g* to keep the looping portion small will give the aircraft more energy over the top.

FIGURE 3 HALF-CUBAN-EIGHT WITH LOOP QUARTERS SUPERIMPOSED



If you pull less *g* and make a bigger loop, mistakenly thinking you are being easier on the airplane, you could run out of energy on top. In this case, you would fail to get over the top of the loop and fall into a spin, a whip stall, or a tailslide. Most experimental aircraft and some standard aircraft such as the Decathlon are not built for whip stalls or tailslides, with aircraft damage as a result.

The judging standard with any loops or part loops is that quarter number one is free to the pilot. The radius drawn by the pilot in quarter number one must be duplicated in quarters two, three, and four. Drawing constant radii (ray-dee-eye, not radi-uses) prevents the top of the looping segment from being "pinched," which means the top of the loop has a tighter, smaller radius than quarter number one.

The following left wingtip images show what the pilot should see when going vertical at the beginning of quarter number two in the loop. Most of the first half of the loop is flown by the wingtip reference. (See Figure 2.) Many new people have not flown the aircraft using a wingtip reference instead of a tip-of-the-nose reference. Pitch, roll, and yaw at the wingtip are shown in the illustrations.

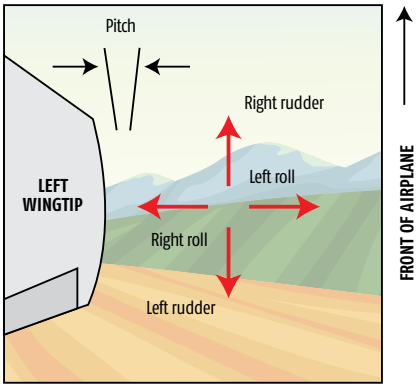
Flying the 45-degree lines well depends a lot on the pilot's eye position and ground coaching.

Whatever sighting system is used, whether it is a sight gauge or some part of the aircraft structure, it is important that the pilot be absolutely fastidious about seating position. Always sit so that the eye position and its relation to the sighting system or airplane structure are the same for every flight.

Also, when it comes to 45-degree lines, most new people are shallow. Getting ground coaching would be best, but if you can't get it, being a little steep is better than being a little shallow.

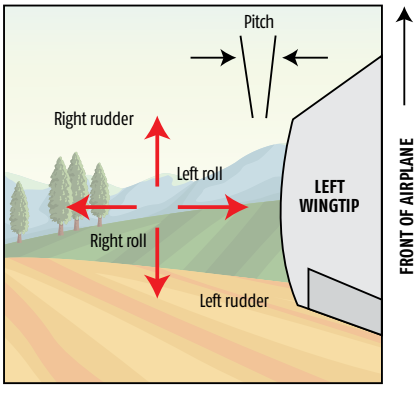
THE BIGGEST SINGLE THING THAT GETS PEOPLE INTO AN OVERSPEED/OVER-*G* SITUATION IS THAT THEY ARE STARTING THIS POSITIVE-*G* ROLL WITH THE NOSE BELOW THE HORIZON. START THIS POSITIVE-*G* ROLL WITH THE NOSE ON OR ABOVE THE HORIZON. I CAN'T STRESS THIS STEP ENOUGH.

FIGURE 4: HIGH-WING AIRCRAFT



Left window view when vertical, beginning of Quarter 2.

FIGURE 5: LOW-WING AIRCRAFT



Left window view when vertical, beginning of Quarter 2.

Your CGT must maintain the same line during the roll. What does that mean?

First, on the 45-degree downline, which you are flying inverted, you must push hard enough to hold your ZLA attitude constant at 45 degrees down. That requires -1*g*.

Notice that in figure 1 Aresti symbol, the 45-degree downline before the roll is a dashed line, not a solid line. Dashed lines indicate negatively loaded flight, which means the pilot's blood is rushing to the pilot's head instead of the pilot's feet. That requires pushing all the way to -1*g*, picking a target on the ground, and driving to that target. Inverted fuel and oil systems will be needed here to keep the engine running and lubricated.

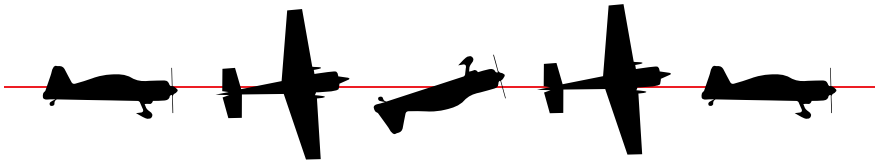
Next, you must make a good slow roll to upright. It might be called the aileron roll in Aresti language, but don't be confused. The ballistic 0*g* or 1*g* Bob Hoover–style aileron roll doesn't exist in Aresti, and neither does the barrel roll. In Aresti, it means the slow roll. See the figure 6 of a slow roll, and just angle the roll centerline 45 degrees down. Since you are only doing a half-roll from inverted to upright, not a full roll, you'll be flying the last three airplane images.

The airplane CGT must make a straight line, 45 degrees down from the horizon, while the airplane is rolling. Unlike the ballistic 0*g* or +1*g* aileron rolls, the slow roll is not coordinated except at the beginning.

The pilot starts the roll from inverted to upright with coordinated rudder, which means rudder opposite the aileron movement. *Remember, opposite rudder is coordinated rudder when holding negative g.*

Once the aircraft rolls about 45 degrees, the pilot will then shift their feet from coordinated rudder to the "top" or "sky" rudder. Now the pilot is no longer coordinated and is falling to the low side of the aircraft. The purpose of this step is to keep the CG dot making that straight line, holding the nose up to the sky with the rudder and not sagging while in knife-edge flight. Once the roll is finished, the airplane must be set back to the 45-degree downline ZLA attitude in upright flight.

FIGURE 6: AEROBATIC ROLL



To the judges, the line must appear as one piece, with no sagging before, during, or after the roll. The roll must also appear centered on the full length of the line.

As for centering the roll, until you get good ground coaching, make the line before and the line after the roll equal in *time*. It is not perfect, but it is a place to start. With coaching, you will find that you'll need to spend slightly longer on the slower line (before the roll) than the faster line (after the roll) to make them equal in *distance*, but the timing difference is not as great as a 2-to-1 ratio. The line before the roll sets the standard, and you will either be "short after" the roll or "long after" if the roll doesn't look centered.

MODIFIED RECREATIONAL HALF-CUBAN-EIGHT

It is hard to believe that such a simple maneuver can cause such high heart rates, damaged airplanes, and soiled underclothing. When people in noninverted-capable aircraft with low experience modify this maneuver, they usually get it wrong. This occurrence leads to the dangerous situation I talked about in the beginning. The problem is worse in slick, modern experimental airplanes.

Here is how it happens.

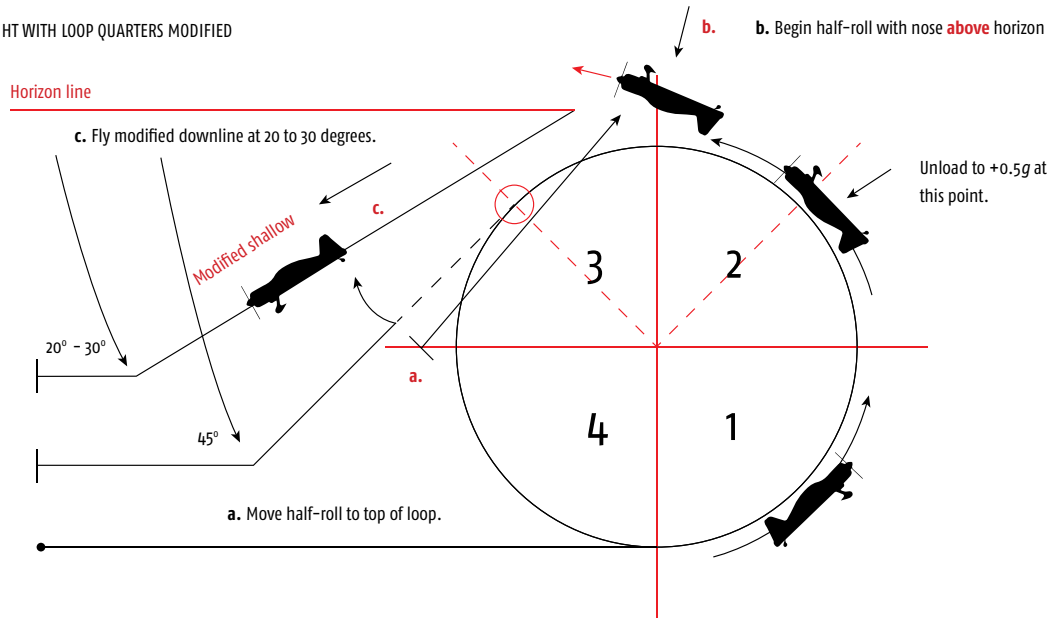
The pilots are trying to avoid negative-*g* flight, so they, correctly, move the half-roll from the middle of the 45-degree downline up to the beginning. It is good thinking. They further think that they will do the half-roll like Bob Hoover does, being coordinated all the way around and maintaining positive *g* on the aircraft. Also good.

The problem is the flying of the roll and the downline together. Even though the competition standard for the downline is 45 degrees, recreationally *you don't have to fly it that steep*. Twenty to 30 degrees down would be better.

More important, the downline angle is what you want to see at the end *of the roll,* not *the beginning*. If you are not doing full slow roll techniques, the nose is moving toward the ground the whole time you are rolling. You are literally pulling yourself down to the ground. The slower you're rolling, the longer the nose is dropping.

The biggest single thing that gets people into an overspeed/over-*g* situation is that *they are starting this positive-g roll with the nose below the horizon.*

FIGURE 7: HALF-CUBAN-EIGHT WITH LOOP QUARTERS MODIFIED



Start this positive-g roll with the nose on *or* above *the horizon.* I can't stress this step enough. By starting the roll with the nose below the horizon, the nose ends up *way* below the horizon when they finish. With the nose down so low, the airspeed needle is *screaming* around the airspeed dial, usually into that black part that comes after the airspeed redline.

What happens next is that they get scared and pull too hard to get back to level flight, over *g*-ing the aircraft.

When pilots are new to aerobatics, they have rarely seen all ground and no sky out of the forward windshield. Looking straight down is scary and disorienting. If they started the maneuver lower than they should have, the closeness of the ground will give them even more incentive to pull hard on the stick or yoke. Assuming the ground does not "intervene," they usually have a damaged aircraft when they get back to level flight.

The maneuver starts out so benign, so it is amazing how fast it can go bad.

Modern, slick experimental aircraft, where aerobatics is a "side dish" capability rather than the aircraft's primary mission, get into this problem quicker due to their low drag. Their airspeed redlines may also be lower than purpose-built aerobatic aircraft. These aircraft are as bad as gliders in reaching overspeed quickly due to their low-drag quotients.

You can slow down how fast the nose of the aircraft approaches the ground by unloading slightly both before and during the roll. Easing forward on the elevator to where you are light in the seat can still have you and the aircraft at half of a positive *g*. You should feel light in the seat over the top of the loop, anyway. The fuel and oil will still feed, and the engine will still run. But you are not pulling toward the ground as hard when upside down.

Also, we don't care if you pinch the top of the looping segment when flying recreationally. Spending less time at the upper, slow-speed portion of the loop is actually safer. Doing the looping segment like a good old-fashioned barnstormer's loop (which is pinched at the top and is taller than it is wide) is okay and encouraged.

See Figure 7 for recreational figure modification.

Don't teach yourself aerobatics. Get a qualified instructor, watch your redlines, watch your altitudes, wear a parachute, and have fun! ***IAC***

Motion Sickness and Physical Fitness

BY FRED G. DELACERDA, IAC 12474

IN EARLIER ISSUES OF *SPORT AEROBATICS*, a series of articles on the sense of balance identified two types of motion sickness. Both are found in the sport of aerobatic competition.

The pattern of Type 1 motion sickness is characterized by nausea and vomiting, usually found when we are experiencing aerobatics for the first time or found in experienced pilots who have not currently been flying aerobatics. While the precise mechanics are not known, it appears to be the cross-coupling of the semicircular canals. Type 2 pattern involves a balance instability in experienced pilots who are exposed to the negative *g*'s of outside maneuvers. The instability is characterized by the perception of dizziness usually noted after a flight, and it lasts for varying time periods. The author theorized it was due to the displacement resulting from negative *g*-loads.

Following a study of the relationship of physical fitness to *g*-loads, Air Force researchers found a significant amount of motion sickness symptoms in the aerobically fit subjects; those symptoms were comparable to the type found in Type 1 aerobatic motion sickness. Additional research confirmed this observation.

A study was designed to determine the correlation of susceptibility of motion sickness with the level of aerobic physical fitness. A group of volunteers was selected, each using a different exercise program: 1) high-intensity exercise three to four times a week with a 30-minute duration for each session; 2) moderate-intensity exercise two to three times per week for 20 minutes; or 3) low to no regular exercise per week. Running was identified as the exercise of choice for most of the subjects. The aerobic fitness of each volunteer was determined by treadmill testing and by maximum oxygen uptake. Motion sickness susceptibility was determined by inducing Coriolis cross-coupling. The results indicated a greater degree of motion sickness among the more aerobically fit subjects.

Since most of the aerobically fit subjects had used running as exercise for many years, it was suggested that running may train the individual to be highly conscious of deviations from expected body motion, yet being a natural voluntary body movement, running provides little experience with conflicting sensory information about total body movement. Therefore, the susceptibility could result from: 1) some alteration in a physiological system, primarily the nervous and hormonal systems; 2) conditioned alertness to sensory inputs of body position deviation; or 3) aerobic fitness developed without habituation to a range of sensory stimuli. This latter theory would be compatible with Type 1 motion sickness found in sport aerobatics.

It seems, however, that other exercise programs used in aerobic training can produce a motion sickness with balance instability found in the Type 2 pattern of aerobatic motion sickness. Rope jumping, high-impact aerobics routines, and heavy weight lifting have been reported to produce a perceived rolling motion such as that found in flying negative-*g* aerobatics. It has been suggested that these exercises create excessive pressure within the inner ear that dislodges the otoliths. This theory is compatible to that proposed by the author regarding the balance instability of negative-*g* aerobatics. Either displacement of the otoliths through excessive pressure or direct influence on *g*-loads would account for a balance instability.

To find the range of *g*-loads imposed on the human system during various forms of aerobic exercise, the author strapped an accelerometer to his body and determined the *g*-loads range during different types of exercise programs. During jogging at the pace of 10 to 12 minutes per mile, loads cycled between +3.5*g* and -1.5*g* when running on a smooth hard surface; however, when jogging on an uneven turf, the cycle was +4*g* to -2*g* with spikes of +6*g* and -2.5*g*. When jumping rope, the *g*-loads cycled between +4*g* and -2*g*, but this varied with the tempo of jumping. All of these *g*-loads were well within the range of a competitor aerobatic sequence. Therefore, it is probable that the balance instabilities of exercise and sport aerobatics have the same source — erroneous information from the otoliths. Whether the otoliths are displaced mechanically or due to pressure remains unknown.

THE MOTION SICKNESS COMMONLY FOUND IN AEROBICALLY TRAINED PEOPLE AND IN CERTAIN EXERCISE PROGRAMS IS, FOR ALL PRACTICAL PURPOSES, IDENTICAL TO THAT FOUND IN AEROBATICS.

The author has found through informal discussions with aerobatic pilots that many have some form of regular physical fitness program. It has been noted that a significant number of pilots who have experienced balance instability after negative-*g* aerobatics also have the same symptoms when engaging in aerobic training, particularly running and high-impact exercise routines. There has been no evidence of any having balance instability during or after weight training.

THERE SHOULD BE A GRADUAL BUILDUP IN THE INTENSITY OF THE EXERCISE AND AEROBATIC PROGRAMS. OVER A PERIOD OF TIME, THE INTENSITY OF BOTH PROGRAMS SHOULD VARY RATHER THAN REMAIN AT ONE LEVEL.

This finding does not mean that a pilot should refrain from aerobic training. The health benefits, both long and short term, are too valuable. It does mean, however, that the pilot should consider progressive conditioning to allow time for the human system to adapt. An aerobic conditioning program should follow the same guidelines as set forth for conditioning the body for negative *g*-loads encountered in the three-dimensional environment of aerobatics. It should be noted that other athletes who engage in body position deviation with altered *g*-loads (diving, trampoline, swimming, gymnastics, skating) must condition the human system for postural deviations.

The following factors must be considered in conjunction with combined aerobic and aerobatic training. First, there should be a gradual buildup in the intensity of the exercise and aerobatic programs. Over a period of time, the intensity of both programs should vary rather than remain at one level. Second, sensory input as to the position of the body should be varied during aerobic exercises so as to program the human system for varied body positions relative to the horizon and to gravity. Third, pilots should coordinate the exercise program with the aerobatic program. Do not engage in aerobatics following an exercise session and vice versa. This practice can overload the human system. Fourth, should any signs/symptoms of motion sickness of either pattern develop, it is time to rest the human system. The human system has been overloaded. The human system must be given adequate time to readjust. For balance instability, the adjustment is usually two to three weeks and sometimes longer. Once the signs/symptoms have subsided, a gradual increase in both aerobic and aerobatic training intensity can be started. Fifth, exercise and aerobatic program content should not be considered separately but should be coordinated in terms of duration, time, and content. Both activities place the human system under stress, and the system has limited ability, both short and long term, to handle stress. Once the limit is exceeded, physical performance deteriorates, and the human system starts to break down. Fatigue and lack of concentration are the most common signs of overload.

The motion sickness commonly found in aerobically trained people and in certain exercise programs is, for all practical purposes, identical to that found in aerobatics. In view of the similarities and the type of stress imposed on the human system by both aerobic programs and aerobatic training, conditioning principles are related. Pilots should give thought and planning in coordination of both activities. ***IAC***

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No Matter What, I've Consistently Had a Blast


Matt Warden

Matt Warden

BY ZINNIA KILKENNY, IAC 437244

ZK: HOW, AND BY WHOM, WERE YOU INTRODUCED TO AEROBATIC FLYING?
MW: My very first introduction was when I was around 10 years old. My dad performed a few rolls with me in the back of a friend's RV-4 while my mom watched from another airplane in formation on the way back home from a fly-in.

Later, I was fortunate enough to go flying with my friend, former coworker, and fellow IAC member Neil Shepherd in his Pitts S-2B. We ended up attending a social event that night that Chapter 77 hosted, and I was sold on the idea of volunteering and competing. The opportunity to become a partner with Neil in that same Pitts a short time later was something I couldn't pass up!

ZK: WHY COMPETITION AEROBATICS?
MW: It was definitely the challenge initially. Aviation has been a lifelong passion, and I've always been driven to fly at the highest level I could. I've come to appreciate just how honest competition aerobatics can be when it simply comes down to how a pilot interacts with a machine and how well the figures produced present to the judges at that moment. The dedicated focus and practice necessary to do this type of flying precisely continues to be both humbling and motivating.

ZK: FROM WHOM HAVE YOU'VE RECEIVED COACHING?
MW: My first aerobatic camp was with Lew Shattuck and Bob Higbee, which was awesome. Their calm and patient teaching styles over the radio during my introduction to flying in the box made it a great experience. Jim Bourke provided most of my coaching over the years while being a quick flight away from where I'm based in Oregon's Willamette Valley.

ZK: WHAT HAS BEEN THE BEST AEROBATIC ADVICE YOU HAVE RECEIVED?
MW: Anything that's helped make things click while being coached in the box. Having someone critique from the ground while working on individual figures, lines, timing, and box placement has been indispensable in my development every season. I try to participate in at least one aerobatic camp a year, and it's always an awesome experience with a lot of great people that motivate and support each other.

ZK: HOW MANY CONTESTS HAVE YOU PARTICIPATED, AND HOW DID THEY GO?
MW: I've competed in 10 contests so far since 2015. As luck would have it, I placed first overall in Sportsman at my second contest. Over the years since, with practice — and luck — I've managed to place within the top three at all but one contest so far in Intermediate. I've definitely managed to make plenty of facepalm-worthy mistakes during competition! However, no matter what, I've consistently had a blast at every competition I've been a part of, and to me, that's the biggest measure of success.

ZK: WHAT VOLUNTEER POSITIONS HAVE YOU HELD? WHICH WERE THE MOST REWARDING?
MW: I've been a judge's assistant, a recorder, and a boundary judge. They've equally been rewarding since every role allows the opportunity to help support the IAC, and being part of such a great community that shares this common bond and interest in promoting general aviation.

ZK: TOWARD WHAT DO YOU ASPIRE?
MW: Ideally, I want to dedicate more time and resources to focus on competition aerobatics and move up to Advanced. I know it won't come easy, but I look forward to that challenge along with becoming more active in the IAC community and participating in more contests.

These contests have given myself and many others something to look forward to every year, and in these uncertain times, it's important to remind ourselves why we fell in love with aviation in the first place and to never take for granted future opportunities to gather and celebrate that. ***IAC+***

MATT WARDEN

Chapter: 77

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Occupation: Airline pilot

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