SPORT
Aerobatics
MARCH 2016
OFFICIAL MAGAZINE of the INTERNATIONAL AEROBATIC CLUB

- A Grand Champion Clip T
- 2016 Sportsman Sequence
- Grassroots?
- Cure for the Flying Doldrums

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After talking for a while he offered me a ride in *T Clips*! I was hooked! Erik said, "Well, why don't you just build one?" So that's what I began to do.

—Trevor Niemyjski

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Former air show pilot Tom Henry flies the Pitts home to Alabama.

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EDITOR'S LOG

BY REGGIE PAULK

Is It Worth It?

Flying when you shouldn't

I WAS RECENTLY READING MY local newspaper when I came across a report of fatal crash of a Beechcraft V-tail Bonanza. I was saddened to read that the pilot was an acquaintance I knew through a local EAA chapter and, as is usual with such an accident, wanted to find out the cause.

The article didn't mention the N number of his airplane, and it was too badly damaged to make out on the tail from photographs, so I couldn't find the accident on the NTSB database right away. A call from a mutual friend helped me get more information.

The friend who called me told me he spoke to the pilot a couple hours before the accident, and advised him not to fly that afternoon—the weather in Utah and western Colorado was deteriorating, and it was getting late. I knew he wasn't instrument rated, and the airplane was a 1950s-era V-tail with minimal instrumentation. My friend advised me to look up the flight on FlightAware, and I was deeply disappointed to read the radar data leading up to the accident.

Using FlightAware, I was able to determine that he had taken his Bonanza up to nearly 19,000 feet, under visual flight rules, at night, flying single-pilot over the Colorado Rockies. His friend informed me that he did not have oxygen on board. It doesn't take much to figure out what may have led to this crash.

The reason I'm writing about this accident at all is because it shouldn't have happened in the first place, in my opinion. Barring major findings from the NTSB, I think what happened here was a classic case of get-home-itis. The pilot had mentioned to my friend that he was in a hurry to get home. Contributing factors were the fact that he'd gotten away with similar incidents in the past.

As a former flight instructor, it pains me to read about these types of accidents. There is just no logical reason for them to occur. The next time you just have to be somewhere, consider this—what will your friends and loved ones think if they never see you again? Will other pilots read your accident report and shake their heads? My friend who'd spoken to the pilot prior to his crash was devastated. Please listen to those nagging doubts the next time you just have to be somewhere—they just might be the voice of reason. *IAC*

Please submit news, comments, articles or suggestions to: ***reggie.paulk@gmail.com***

PRESIDENT'S COLUMN

BY MIKE HEUER, IAC PRESIDENT, IAC 4

Awards, Nominations, Elections

Your call to action

One of the most enjoyable aspects of my job as IAC president is to play a part in the presentation of the various awards and trophies we give away every year. All of the recipients have come a long way to achieve what they have in aerobatics and richly deserve our recognition.

Some of the most important awards we present are what we call the "Non-Flying Awards." More information on these awards can be found on the IAC website (*www.IAC.org*), and nominations can be submitted there with online forms. They go directly to our new awards chair, Patty Anderson of New Jersey, who collects them and submits a ballot to the board of directors for them to vote for the winners. Deadline this year for submission of nominations is *June 15, 2016*. I urge you to go to the website, look at the five different awards and their criteria, and submit your nominations to Patty so we can recognize their accomplishments. Only those nominated will be considered. We do not meet somewhere and come up with a list—it is up to you, the members, to provide us those names along with a summary of their achievements.

What I really enjoy about the five non-flying awards is the fact they are all named after people who made a mark of their own in the sport and have now passed on. I had the pleasure to know all of them. We will present the Frank Price trophy to the person who contributed the most to the sport in 2015; the Robert L. Heuer trophy to an outstanding judge; the Kathy Jaffe trophy to a noteworthy volunteer; the Harold Neumann trophy to an accomplished chief judge; and the Curtis Pitts trophy to a person or company who has developed outstanding products for sport aerobatics. I am quite certain that the people who had trophies named after them would be proud of those who receive them. It also lets us remember them for what they did. Once again, please visit the website and look over those awards and nominate an outstanding individual you know who qualifies.

In this very political year in the United States, we also will turn our attention soon to an election within the IAC. I cannot overemphasize how important this is to our future. The president, secretary, and three director positions are open this year, and I do expect most of the incumbents to stand for re-election. That said, we are always looking for new blood, and the board has had some significant changes in the last couple of years. This is all to the good. How they do their jobs is important to each and every one of you.

Our busiest and most complex meeting of the board of directors is held each November. This one is the most difficult as we deal with rules changes for the following year, choose Known sequences for all categories of competition, receive and review the reports of all our program chairs, hear from our U.S. National Aerobatic Championships officials, plan for an ever-expanding presence at EAA AirVenture, and approve a budget for the next fiscal year. All of our directors must bring their skills, talents, and aerobatic experience to bear to make it all work, and they do so in a positive, friendly, constructive, and open atmosphere. We disagree on many issues, but in the end, we sort out our issues and problems, come to consensus, and support the final decisions. The IAC is very lucky to have such a fine leadership team—one of the best in my 46 years as a member.

Finally, I come to the subject of bringing new people into the sport and the importance of mentoring and role models. For this, I always turn to my own experience, as I described last month about my first shot at being a volunteer. But it came to mind again when I received the February issue of *Sport Aviation* magazine and saw that beautiful Clipped Wing Cub owned by Todd Crist of Clearwater, Kansas (N70137). The wonderful article that appeared inside, supplemented by a great selection of photos, was written by Jim Busha, EAA's director of publications. The airplane was owned by Harold Krier at one time, before he moved on to his famous Great Lakes. Todd has the airplane in its original colors and also pays tribute to Harold on the side of the airplane. There is a National Air Shows logo on the cowling, the air show group run by Bill Sweet that featured some of the finest aerobatic pilots in the country, including

continued on page 27

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

LINES & ANGLES

IAC TO CREATE MEMBERSHIP ALBUM WITH HARRIS CONNECT

As a result of requests from members, the International Aerobatic Club has partnered again with Harris Connect to create a 2016 membership album, a showcase of member stories and the sport's history. The last membership album was produced in 2000.

The album will list current IAC members and feature a member profile section in which folks can contribute stories and photographs to celebrate our sport and the impact it has had on their lives.

Members will receive a postcard in the mail and/or an e-mail requesting a brief telephone call, which will ensure their listings are accurate and current. To be included in the 2016 membership album, members may call 1-866-216-4150, Monday through Friday between 8 a.m. and 10 p.m. ET.

No purchase is necessary to be included, and members are not required to provide any information they would prefer not to share. The information included in the book makes it possible for members to see who of their peers has similar interests, aviation careers, geography, etc., as part of a networking opportunity.

All books are custom-ordered and not mass-produced. Sale prices begin at $79.99 for soft bound and $99.99 for hard bound, plus applicable shipping, handling, and state tax may apply. Book orders must be placed by May 2, 2016. Members can order the book through the Harris Connect call center (1-866-216-4150). All books will be shipped in late August 2016.

If you have questions, please e-mail *pdeimersteineke@eaa.org*.

Don't Miss Out on An
IAC Content
Get it delivered to your inbox!

If the IAC doesn't yet have your e-mail address, you're missing out on a valuable part of your membership. *In The Loop*, our e-newsletter packed full of essential information and interesting stories, will be e-mailed to you every month. You also can update your address, phone number, and more, all in one convenient place. Do it all right here: ***https://secure.eaa.org/apps/joinrenew/address.aspx***

NOMINATIONS AND ELECTION 2016

The Nominating Committee for the 2016 IAC election has been named and consists of chair Lynne Stoltenberg, Doug McConnell, Bob Hart, Tim Just, Bruce Ballew, Michael Steveson, and Mike Rinker.

Nominations for officer and board positions can be submitted at any time. Forms and requirements can be found on the IAC website at *https://www.iac.org/legacy/iac-leadership*. Membership sign-in is required. Important dates for the 2016 election are as follows:

- IAC Annual Membership Meeting, Oshkosh, Wisconsin – 0830 CDT, Friday, July 29, 2016
- Nominations Close – April 5, 2016
- Balloting Begins – No later than June 29, 2016
- Balloting Closes – 1800 CDT, Monday, July 25, 2016

The method of voting in 2016 will be electronic only.

EMILY JOHNSON

A Grand Champion Clip T

Building a fun aerobat

BY TREVOR NIEMYJSKI

I was on downwind, climbing as I circled the airport on the first flight of the Clip T when it sank in that I was actually flying it. All those long nights in the shop the previous year and many hours of research and dreaming had paid off. It was a great feeling, and I thank the Lord everything went well that day.

Now to back up a few years.

Growing up flying with my dad is a highlight of my life. As soon as I started flying I began to want to do aerobatics. I loved going up and doing rolls with him in his Jacobs-powered Starduster. The problem with the big radial is that it's limited in aerobatic capabilities.

As I was nearing the completion

of my Aeronca Chief project a clipwing Taylorcraft came up for sale, and it was just what I wanted, an affordable-to-fly aerobatic plane with an antique feel. I was in high school at the time, scraping together money to finish the Chief, so I couldn't afford it. That's where the dreaming started.

A few years later at the Antique Airplane Association I met Erik Edgren. Erik flies a beautiful clipwing, *T Clips*, around the Midwest, performing Duane Cole-style aerobatics paired with a great comedy act. After talking for a while he offered me a ride in *T Clips*! I was hooked! Erik said, "Well, why don't you just build one?" So that's what I began to do. I picked his brain a lot and read all I could. I got in touch with Eric Minnis of Bully Aero. He helped me through a lot with design ideas and plans. With that I was on to building.

I started to build wings to Cole plans. I had the wing basically framed up, but then it got set aside for a while. I later found a project that was close to being complete with an engine so I purchased that plane and got to work on it. It turned out to be a lot bigger project than I thought, as I wasn't happy with how some of the modifications were done.

I would like to start the story of the build as being a team project. There is no way I could have done it

JACK FLEETWOOD

EMILY JOHNSON

on my own. From friends and family helping to countless phone calls to others, it really is a blessing to be surrounded by some great people.

The project I started with was a new trim system borrowing from Pitts and Skybolt designs, a servo trim tab. The control system is what I liked the least so I rebuilt it using a Skybolt torque tube-and-elevator push-pull system, which fit with minor modification thanks to David Guntly.

The airplane now has all push-pull to elevator and aileron. The aileron bell cranks were a bit of a challenge, as space was limited and needing to be behind the rear spar. We eventually got the correct geometry, although the scrap pile grew during this process. The builder I got it from had no intentions of aerobatics, so that is why many of these things had to be changed. An example is the seat had too much flex because it was made of thin plywood with nylon strap carrying the weight. Not a bad design for a sport plane but not for my intentions. A new seat was constructed using a tube frame and 1/4-inch plywood, absolutely solid. The stick is in the middle allowing it to be flown from the middle or side by side. I almost always fly in the middle, but occasionally give some rides. It did have the horizontal stabilizer angle changed already, which is done when clipping wings and adding a larger engine. Along with that was solid landing gear, which was nicely done. Eric Minnis supplied the fuselage tank that uses a flop tube, eliminating the need for a header tank. The struts were built, which was a huge bonus for me as I was hesitant to build a set. With clipping the wings, the strut's angle increases, causing the attach fitting on the fuselage to be wrong. Therefore, the attach fittings needed to be modified.

The wings needed some work. I had new drag/anti-drag wires made and made compression tubes. It is a 27-foot wingspan, which is shorter than the Cole at 30 feet or the Swick at 28, although a few have been clipped to 24 feet! A stock T-craft is 36 feet. The wing was built using wood ribs, unlike the typical aluminum T-craft rib. This allowed the use of a plywood leading edge. I molded them using two layers of 1/32-inch, 3-ply plywood—a time-consuming job but very rewarding because it makes the wing so solid. The ailerons had been shortened one bay from stock and most clip wings. I decided to make new ailerons and go one bay longer than stock, resulting in 3/4-span ailerons. Swick conversion uses servo tabs, but I opted to go with spades instead. Two wing tanks were added, one for fuel and the other for smoke.

The engine, a Continental C-90, was fresh with a lot of new parts but had been sitting a while, so my friend and inspection authorized mechanic (IA) Tom Guntly went through it. We installed Lycon 9-to-1 pistons, a Rotec TBI, and machined the accessory case

EMILY JOHNSON

to accept an inverted oil system. It's estimated to be about 110 hp now. A homemade smoke system was also installed. The plane came with a beautiful cowling, so that was one less thing to build. I did get to do some metal work, making the windshield trim piece and new instrument panel. I don't weld aluminum, so a friend helped weld the doors up.

Everything being built, the fuselage was prepped and painted, the wings were varnished, and covering began. I have good memories of rib stitching with my brother Colton late at night, after he was done with school and I was done with work. It couldn't have been done without all the help.

When it came time to paint

EMILY JOHNSON

all those checkers, I'm glad I had help masking! My dad, mom, and Colton all helped mask the wings. It still took us eight hours. The fuselage was another story. I decided to start masking one night after work. Once you start masking, it's recommend to not leave it sit for long. Well, I finished painting one hour before work the next day—probably not the best choice, but it turned out good and is a fond memory I guess. It was fun to see it all come together once painted, seeing the paint scheme I had drawn and hung on the shop wall come to life.

Again Dad, Mom, and Colton helped hang the wings. Then the "90-percent-done, 25-percent-to-go" part came. Around this time is when I started dating my now fiancé, Emily, who loves to fly. She really enjoyed time in the hangar with Colton and me, and was a great help. Eventually it was ready for its airworthiness inspection. The designated airworthiness representative passed the inspection, and we were ready to *fly*!

After some taxiing, I decided to go for it one clear, calm evening. It went great and felt so good to fly—just what I was looking for! I did some rigging adjustments and started flying the test period off. I really enjoy flying it. The controls are light, the roll rate is about what I expected, it's somewhat fast (110-115 mph), and it's relaxing to fly. It doesn't have any bad habits: stalls easy, comes out of a spin instantly, and is super easy on the ground. I fly aerobatics for fun but would like to get into competition in the future. After a summer of learning basics of aerobatics and getting comfortable in the plane, I feel ready for the next step. I enjoy going up in the late afternoon for some Sportsman-type aerobatics: rolls, loops, hammerheads, Cubans, etc. My favorite is probably slow rolls or hammerheads. Like most projects, they're never done. I think I can get the ailerons a bit lighter with spade adjustment and little projects like that, but overall, I'm just enjoying flying it.

The Clip T's first fly-in was EAA AirVenture Oshkosh 2015. It was a great flight up. A group of guys from the biplane forum (yes, it's missing a wing) flew up together (Starduster, Acro Sport II, Marquart Charger, Pitts, and Super Chipmunk). We also did a few local fly-ins. We made it to the Antique Airplane Association's Blakesburg fly-in. This is where I got my first ride in Erik's *T Clips*. We made a few "smoke on" laps together. It was a great time! Blakesburg, in my opinion, is how a fly-in should be. The atmosphere is like nothing else, and people are great. It was an honor to receive Grand Champion Homebuilt there.

As I mentioned before, I'm so thankful for those who have helped make this happen—many who haven't been mentioned. There were a lot of hours helping and many phone calls. I also want to thank my Lord Jesus for the opportunity to build and fly. Thank you, as well, to the IAC and *Sport Aerobatics* for this opportunity. IAC

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Flying It

The 2016 Sportsman sequence

by Gordon Penner
Master CFI-Aerobatic, FAA Gold Seal CFI

I see aerobatics, especially Sportsman aerobatics, in two ways. First and foremost, aerobatics is fun. We must not forget that as we hunker down to wrangle with maneuvers and sequences. Remember to pay attention to the delicious feeling of slicing through the air in all attitudes while you are also trying to fly each maneuver "just so."

The second thing is that aerobatics is about stretching personally and striving to be the best you can be. It is just one of many vehicles that can be used for self-discovery, and for self-expansion beyond this activity.

In that vein, the Sportsman category is also about education. It is where most of us begin to hone our piloting ability to allow us to smoothly and crisply fly the airplane within its limits, and to slowly expand our own limits. We all endeavor to fly like Bob Hoover, the master of Smooth. The Sportsman Known sequence this year will be an educational and aircraft challenge, so let's dig in!

Safety

One of the best books ever written about flying is still *Stick and Rudder* by Wolfgang Langewiesche. He has always said that just as a horse has "gaits," like the walk, trot, canter, and gallop, so does an airplane. When riding a horse, the gaits each have a different feel. So it is with the airplane, especially the high angle of attack/mushy/pre-stall "gait." The rider and pilot must be sensitive to the feel of their mounts in each gait.

If a horse isn't able to descend down a hill because it is too steep, it will refuse to go. If the rider is trying to jump a fence that is too high, the horse won't go. The horse may send the rider over the fence (!), but the horse won't go. The horse knows if it can't do a maneuver. *Listen to the horse.*

The airplane is the same way. If you are trying to do a maneuver but the airplane has a "mushy" feel, if the stick or yoke is in your gut (no matter what the airspeed), and if the tip of the nose is not responding to pitch commands, the airplane (the horse) is telling you it can't do what you are asking. It is talking to you through the reins and through the saddle. *Listen to the horse.*

The airplane has natural stability and will initially resist departing from controlled flight, but only for a short period of time. If the airplane begins to do something you did not expect, abandon the maneuver *immediately*. Aggressively centering the rudders and the stick and getting the power back will normally keep the airplane from departing. As they said in the movie *Top Gun,* don't push a bad position. Extend and escape. We are competing in aerobatics, which is a hobby. We are not curing cancer or bombing Berlin. Come back and try again.

Lastly, as I've said before, the Sportsman pilot must mentally prepare him or herself to "take the out" or "take a break" during a sequence. By this I mean that it is better, mathematically, to take a break, with its penalty, or take the "out" penalty than it is to fly a tightened, truncated maneuver that scores badly. In Sportsman, the "out" or "interruption" penalties are quite low on purpose, to keep the pain of taking a safety break small for those who are still getting "ed-u-mah-caaaa-ted" to our sport.

Maneuvers 7, 8, and 9 will probably demand a break in low-horsepower/high-drag airplanes, or those with a safety pilot on board. More importantly, the flying of a chopped-up maneuver by new (and not-so-new) pilots, in an attempt to stay in bounds, is what frequently causes unsafe flying. Beware of this, take the out, or take a break. Your flying will not only be safer, but you will also score higher.

Overview

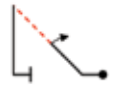
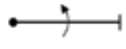
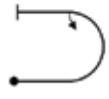
The key to aerobatics, as stated by 1972 World Champion Charlie Hillard, is "where to look and *when*." As you think about the sequence, I want you to also think about when you are looking over the nose, and when you are looking past your sight gauge or wingtip to the horizon. As you mentally walk through the sequence, using your hands as you go, think about where you are looking and tie that in with the control movements you will be making at each moment.

Also try to maintain what aerobatic coach John Morrissey calls "deep focus," in which a "clear and distinct focus to the farthest point ahead of the aircraft's flight path must be maintained." In level flight he wants pilots to focus on a spot 20 miles away. When pilots are on a downline, "I want them to pick out

INTERNATIONAL AEROBATIC CLUB SCORESHEET

A

Contest:	Date:	Category:	Programme:	pilot's number
	2016	Sportsman	Known	

No	Symbol	Catalogue No.	K	Total K	Grade	Remarks
1		8.4.1.1	13	13		
2		1.2.7.1 9.1.4.2	13 4	17		
3		8.5.6.1 9.4.4.2	10 5	15		
4		7.4.1.1	10	10		
5		5.2.1.1	17	17		
6		1.2.3.1 9.1.2.2	12 6	18		
7		1.1.1.1 9.1.3.4	2 8	10		
8		7.2.2.1 9.1.3.2	6 4	10		
9		1.1.1.1 9.2.3.4	2 9	11		
10		2.3.1.1	5	5		

Item	K	Score
Presentation	**6**	

FIGURE TOTAL K =	126
INCLUDING PRESENTATION =	**132**

Aircraft Type:

FREE PROGRAM CHECKED BY:

Signature:	Printed Name:	Date:
		IAC No.

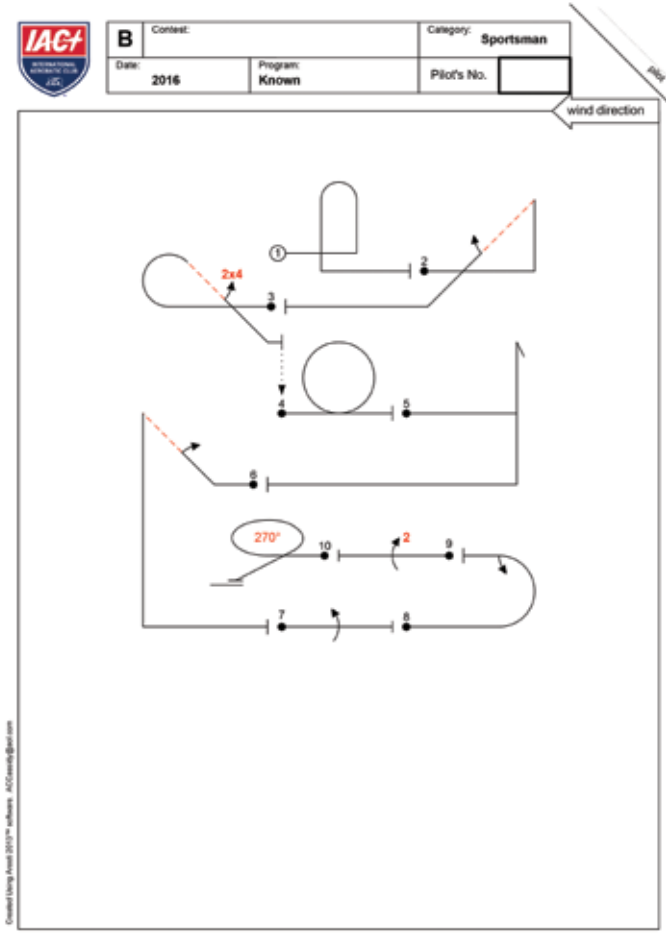
Judge Name:

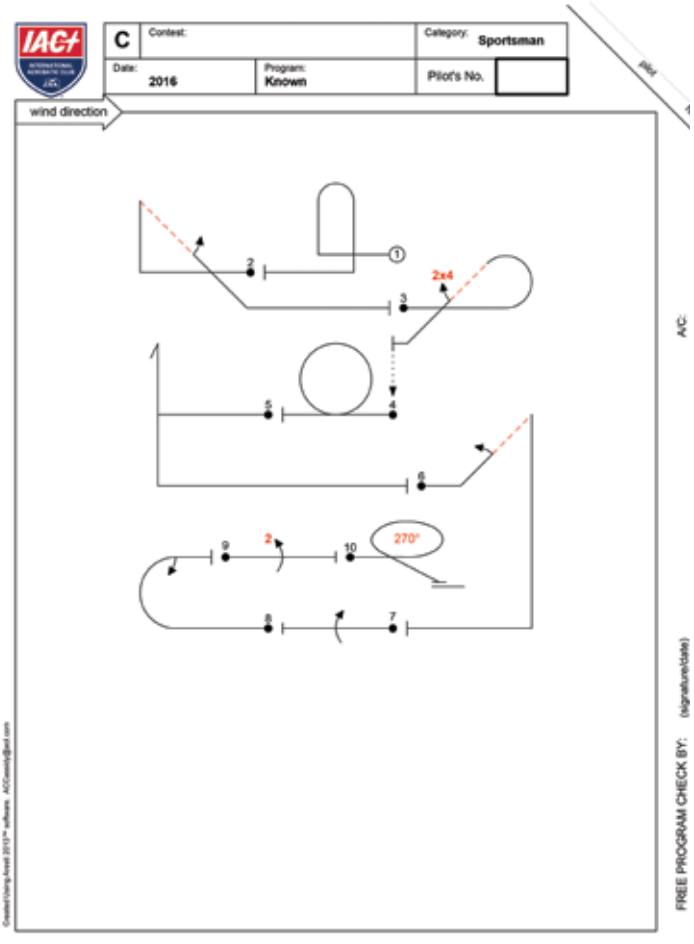
IAC#

Assistant Name:

IAC#

pilot





blades of grass," he says. Keep these things in mind throughout the sequence.

I similarly tell my students that the farther away they look from the aircraft the better their flying will be, which is true in regular as well as aerobatic flying. Your eyes naturally go to an "at-rest" focus about 30 to 60 feet away in what is called "infinity focus." You must consciously refocus on something farther away from the aircraft.

Maneuvers

Box Entry—Yes, the box entry and the wing-wags constitute a maneuver. Call it Maneuver 1A, and it must be practiced like any other. The first impression you are giving to the flawed human judges involves the entry and the wing-wags, so come in fast, loud, strong, and snappy! Announce to the world that you are here to fly and here to win!

Make your wing-wags *at least* 45 degrees of bank, with a pause between each "wag." That takes time and distance. Also, set up your box entry in such a way that your aircraft is exactly at the speed and altitude desired for the initial pull-up into the first *printed* maneuver, which I'll call Maneuver 1B. That takes some practice. For low-powered/high-drag airplanes, the speed should be close to the airspeed redline, but watch your prop/engine redlines. Instructor Emerson Stewart from Ohio, who flies a Citabria in his air show act, jokes that the airspeed redline is not a limit—it's a *goal*!

The Pull-Pull-Pull Humpty—The rule book says that the length of the lines in a humpty bump do not need to be equal. The rule book also says, "The radii of the first and last partial loops (meaning the partial loops at the entry and exit) must be equal. However, the half-loop in the middle of the figure can be of a *different radius*. These half-loops must still have a constant radius from the time they depart the vertical... line. This requires a change in *angular velocity* during the half-loop."

Those last two sentences illuminate the main problem of flying the humpty bump. The half-loop in the middle of the maneuver must be a perfect half circle, and the half-loop must be completed *directly across from* the point where it began. If the half-loop finishes after, or lower, than that beginning point it is called "finishing late," which is a downgrade.

In the first part of the half-loop, your speed is slow as you are still going uphill. As a result, the pitch rate, or speed of pitch change, is slow and you must fly a widened arc across the top. In the second part of the half-loop you're going downhill and the airspeed is increasing, so the pitch rate must be increased with it to continue to draw a constant radius and to avoid finishing late.

As you pull on the stick faster and faster, the gyroscopic forces of the propeller induce a right yaw force.

The yaw then induces a right roll. There won't be much yaw initially when the pitch rate is low. When on the down side of the half-loop with an American engine, more and more *left rudder* will be required on an *inside* half-loop as the pilot pulls faster and faster on the stick.

The Aileron Roll

Let's talk about all the aileron rolls in one place because their elements and techniques apply to the half-rolls in maneuvers 2, 3, 6, and 8, as well as the full roll in Maneuver 7 and the 2-point roll in Maneuver 9. Competition aileron rolls, which are really slow rolls in technique, are among the hardest things to teach in the basic aerobatics course. You must not pitch up first before initiating the roll, as you would in a true Bob Hoover-Smooth, coordinated aileron or primary roll.

Pilots must maintain a straight path before, during, and after the roll. The straight path of the aircraft's CG "dot" is the judging standard. Sinking during the roll is quite common, especially in the inverted and knife-edge portions of the roll. Sinking means the pilot didn't use enough top rudder in the knife edges, or enough push when inverted.

You see in the illustration above the attitudes needed to fly a straight line when inverted or when in knife-edge flight, especially in a slow, low-horsepower airplane. Another problem is failing to maintain a constant roll rate. Lastly, people usually end up heading to the right in a left roll.

The keys to a good competition aileron roll (slow roll) are picking a spot on the horizon, then drawing British champion Alan Cassidy's "sacred circle" with the tip of the nose around that spot and maintaining John Morrissey's "deep focus" on that spot throughout.

In earlier *Sport Aerobatics* articles Morrissey has stated, "If pilots were having any difficulty with their rolls during the years I was team trainer, all I asked them to do was to remember their 'deep focus.' Without fail, that small reminder immediately cleared up any problem they were having with their rolls."

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

Airplanes with wings mounted at a high angle of incidence, like the Decathlon or Citabria, need a higher nose attitude when inverted at the 12 o'clock position on the sacred circle. That makes the 12 o'clock position tall, turning the "sacred circle" into the "sacred egg." To find the required 12 o'clock attitude, the pilot must first fly inverted at the expected speeds and see how high the nose has to be above the horizon *while holding an altitude*.

With the nose attitude that high while inverted, some students have a hard time judging whether their pitch is right. Some instructors have found that putting a dot about a third to two-thirds of the way up the windshield from the glare shield (usually with a dry erase marker or a piece of masking tape), for use as a pitch reference against the horizon while inverted, seems to help in some cases.

When rolling counterclockwise past 3 o'clock on the sacred circle on the way to 12 o'clock, enough push must be added to smoothly get the nose up to the correct inverted attitude. This will keep you from sinking as you transition from knife-edge to inverted. Blend this push in. Don't try to put the push in all at once at 12 o'clock or you may get an inverted mush or stall, especially in the Citabria.

Enough knife-edge practice must be flown to determine how much top rudder is needed to maintain altitude at the expected speeds. As you see in both diagrams above, the nose will be above the horizon in both knife-edges.

For low-horsepower airplanes, a *lot* of top rudder will be required in both knife-edges, which adds a lot of drag and will slow the airplane down *a lot*. I've found that, at about 130 mph entry speed, the 150-hp Decathlon requires about two-thirds of right rudder in the first knife-edge and about three-quarters left rudder in the second knife-edge. At slower speeds, nearly full rudder is required.

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

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

Also, once the rudder pedals are switched, the roll rate will increase, which is a downgrade. Ease off the aileron deflection a bit when the rudder pedals are switched so the roll rate stays the same.

Former IAC President Rob Dorsey used to say repeatedly in his Stick and Rudder columns that you could tell who the new people were by the fact that they pulled the throttle to idle on the downlines and that they rushed their point rolls. In maneuvers 3 and 9, the points must look distinct and crisp. There *must* be enough of a pause at the points that the judges can see them.

The Loop

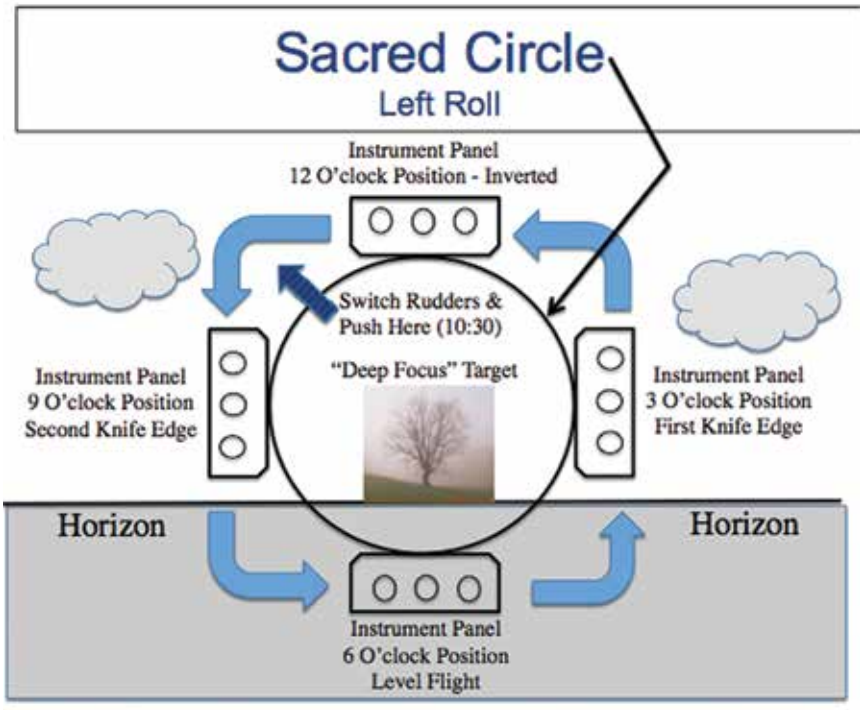
We fly the loop in three parts, but we must analyze and judge it in quarters. *Quarter 1 is free and sets the*

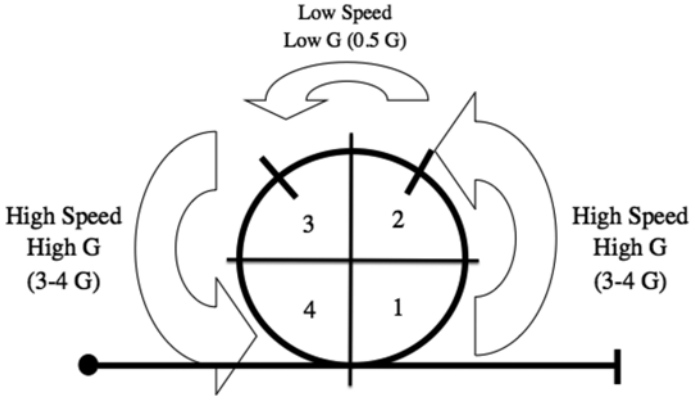
standard. Whatever radius is drawn during the initial pull-up in Quarter 1 must be re-created in quarters 2, 3, and 4. Quarters 2 and 3 are the hardest to draw over the top of the loop as the airplane's energy state is at its lowest, with 3 being the dreaded "downgrade zone."

The partial loops in maneuvers 1, 3, and 8 must also follow this model. Maneuver 1 has quarters 2 and 3. Maneuver 3 has quarters 1, 2, and half of 3. Maneuver 8 has quarters 1 and 2. Make sure all the quarters, or parts of quarters, available have the same radius.

The first key, especially in a low-performance airplane, *is to make Quarter 1 small*. Keep Quarter 1 small enough that you can duplicate it three more times. You don't have the horsepower to drive around a bigger loop. It is very important to pull enough *g* in the first quarter (at least 3*g* to 4*g* for you Decathlon/Citabria drivers) along with the proper entry speed, or you won't have enough energy left over to make quarters 2 and 3 look good.

The third quarter is where the pilot must fly "out" to round out the quarter so it is equal to Quarter 1. This quarter, because of its low energy, must be rounded out with a smooth, tiny, gentle push, and only ground coaching can tell you when and how much. As a starting point, put the gentle push in (smoothly) *before* you hit the middle of Quarter 3. The middle is too late. Also, if you don't have the energy, the push here won't help.





As you are finishing the loop, pull just a little less *g* at the end of the fourth quarter than you did at the beginning of the first. The aircraft is going a little slower in the fourth quarter, and it is very common for people to finish the loop "high." This means the exit altitude was higher than the entry altitude, which is a downgrade. Watch your finish altitude at the end of your loops in practice if you don't have a ground coach.

Loops are hard to do well and usually suffer under the judges' pens. I highly recommend that all Sportsman pilots fly a Freestyle, even if they borrow it from someone else. And the first thing I do on my Freestyles is get rid of the loop! The loop is not required in the Freestyle.

The Hammerhead—The hammerhead is fun to do. It is also a maneuver that can induce an inverted spin if mishandled. The important points to discuss are the upline and the rotation.

First, the more vertical the upline is the better the rotation is. Once the vertical line has been set, the stick cannot be frozen in position. The Decathlon, for instance, will slowly creep on its back (negative) as it goes uphill. The stick must be moved in pitch (head to foot) as necessary to maintain a perfect vertical attitude until the time of the pivot, or "kick." Keep your eyes on the sight gauge or wingtip against the horizon and don't let it stray from vertical.

In this discussion we're in a left hammerhead with an American (clockwise-turning) engine. The engine at full power will "torque" the aircraft as it slows while going uphill. This will cause the aircraft to roll left, which is a downgrade. Put in right aileron as necessary to prevent any rolling on the upline. From a sight gauge or wingtip perspective, put in enough right aileron to keep the sight gauge or wingtip from

"walking across" the horizon.

The "kick," or pivot, is really not a kick but a rapid and smooth push of the rudder to the stop, followed a split second later by opposite aileron and forward stick. These movements are not to be done simultaneously, but sequentially. The aircraft type will determine the timing.

The rudder and elevator are effective immediately because they are in the propeller's energized slipstream. The aileron only becomes effective once the wingtip is moving in yaw and has some relative wind over it. Enough additional aileron must be added so that the aircraft yaws "in plane" with no rolling motion present. Any roll is a downgrade.

Now here is where we enter the possible inverted spin zone. The left yaw motion causes gyroscopic forces in the propeller to pitch the airplane on its back. Pushing the stick forward cancels out this pitching to keep the aircraft yawing "in plane." Preventing an inverted spin entry is all about *not overdoing the forward stick input*.

EMT instructor Rich Stowell taught me a neat visual trick that helps the pilot use the correct amount of forward stick. It is natural for the eye to want to follow the wingtip or sight gauge down across the ground as the pivot begins, but you must resist it. Instead, keep the eyes on that spot on the horizon where the wingtip or sight gauge was and let the wingtip or sight gauge drop away out of sight. Then, as the airplane yaws left, apply just enough forward stick to put the tip of the nose through the same spot on the horizon the wingtip or sight gauge just vacated. Once the nose is on the horizon you can look elsewhere for establishing a downline.

When the nose reaches straight down, just neutralizing the rudder pedals will bring about a "pendulum" effect, which is a downgrade. To avoid this, put in full opposite (right) rudder when about 30 degrees away from straight down, then quickly go to neutral. That will stop the nose quite smartly, and it will point straight down. Once the rotation stops, you don't need as much forward stick, so ease off. Avoid pushing negative on the downline.

The Wedges—First, maneuvers 2 and 6 are Family 1 figures, which means that the three radii do not have to be the same size. That being said, you can't just flop over the tops of these figures.

You must have enough energy to draw a constant radius across the top, even though that radius can be a lot smaller than the other two. Remember to fly that top radius, with the changes in angular velocity, just as we discussed with regard to the middle half-loop in the humpty.

Second, the lines within the figure do not have to be the same length.

45-Degree Lines—Forty-five-degree uplines and downlines are hard to execute without ground coaching. You are flying for flawed human judges. *Remember, your job is not to fly perfectly. Your job is to present the illusion of flying perfectly*.

So how do you know if you are on a 45-degree upline? This will vary from airplane to airplane and from pilot to pilot. Everything depends on the pilot's eye position. Whatever sighting system is used, it is very important that the pilot be absolutely anal about seating position. Always use the same seat position and the same cushions so that the eye position, and its relation to the sighting system or airplane structure, is the same every flight.

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

When rolling on the 45-degree lines, just like in the level rolls, the aircraft CG dot must follow the same line throughout the roll. Again, the greatest problems are in maintaining that straight line in the inverted and knife-edge portions of the roll. See the above section on aileron rolls for more information about this.

On the 45-degree downlines, pick that spot on the ground for your deep focus and do your sacred circle around that point. On the 45-degree uplines, I pick a spot in the sky ahead of me and roll around that.

As for centering the half-roll, until ground coaching helps you make a proper adjustment, you'll need to

spend a slightly longer *time* on the slower line than on the faster line to make them equal in *distance*.

In Extras and other low-drag airplanes, the time on the fast line is usually half of that spent on the slow line. In high-drag/low-horsepower airplanes, the timing difference is smaller, however, and is not as great as the 2-to-1 ratio.

270-Degree Aerobatic Turn—Most new people don't hold enough bank angle in aerobatic turns. The judging criteria require that the turn be 60 degrees of bank at a *minimum*. Since you are flying for flawed humans, they better not think you are shallow.

There must also be an observable pause between the roll, the turn, and the roll out. Also, the roll in and the roll out must be at the same roll rate. The rookie mistake is to roll in fast and roll out slowly.

The Immelmann—There must not be a line drawn between the finish of the looping segment and the beginning of the roll. They must *not*, however, be blended together. To quote "the good book," "This criterion (no line) is not meant to imply that one element (roll or loop) must start before the preceding element is completely finished. A brief hesitation between elements (similar to opposite rolls) *must not be downgraded*."

Be careful when initiating the half-roll. Here is the other place where one could get into an inverted spin entry. The normal recommendation in all of the aerobatic books is that the Immelmann should be started at 5 to 10 mph above normal looping speed, and that the looping segment should be flown with 1/2*g* more than normal for a loop in your particular aircraft. These two actions should feed enough energy into the half-roll segment. Don't begin the Immelmann too slowly.

Practice this maneuver up high, over and over, to find what entry speed and technique you need to safely get through it, then practice some more to find what entry speed you need for it to score well. Remember from the safety section above that you lose *far fewer* points by taking a break than you do by flying a maneuver badly due to not having enough energy, or by getting a *zero* by falling out of it. Since the Immelmann is also at the bottom of the box, you won't have a lot of recovery altitude.

Sequence Planning

This sequence has a great high-energy flow until Maneuver 7. Maneuvers 7, 8, and 9 are energy killers for low-horsepower/high-drag airplanes and may also be difficult for a Decathlon or Pitts S-2A with an instructor/safety pilot on board. These aircraft need to dive to get the required energy for maneuvering.

Maneuver 8 is the key. Know exactly what entry speed you need to safely do the Immelmann in your aircraft. Then, if you do not have that required minimum entry speed at the end of Maneuver 7, take a break, climb, come back around, dive, resume, and show us a perfect Immelmann.

Again, with Maneuver 8 as the key, I might suggest holding the downline at the end of Maneuver 6 until you can begin Maneuver 7 close to your airspeed redline. After you get through Maneuver 7 you may have enough speed for the Immelmann. Also, don't bust the bottom of the box when finishing Maneuver 6!

Once you know how much altitude you are going to lose in Maneuver 6 you can work your way backward through the sequence to determine your starting altitude for Maneuver 1.

Final Thoughts

The Sportsman category is unique in that the pilot can pick his or her level of participation. First of all, there is no Unknown.

How well a pilot does is directly proportional to how much fuel goes through his or her fuel injectors. If a pilot has meager resources, he or she might elect to fly the Known three times, which would require less practice time than flying the Known and a Freestyle.

In Sportsman, whatever sequence is flown on the second flight is also flown on the third flight. That takes the place of the Unknown. If you fly a Freestyle, your order of flights would be Known, Freestyle, Freestyle.

I always highly recommend flying a Freestyle sequence if time and resources permit. First and foremost, in a Freestyle you can leave out the loop—that bane of the new pilot's existence!

The pilot can use this category as a springboard to higher categories, or stay there for a lifetime. I support the lifetimers and resist anything that edges the Citabria and 150-hp Decathlons out.

I am in agreement with Giles Henderson, who stated, "Energy management is something the pilot does with the right hand, not the left." We want to discern and reward pilot ability, not horsepower. I agree with the conclusions of Giles' article about that statement elsewhere in this edition, and I also hope that we adapt the Primary sequence that he proposes.

Back to the 2016 Sportsman Known sequence: Whether a pilot is staying in Sportsman forever or trying to move up, a Freestyle is challenging and fun. In this Known sequence, there are many pieces, or strings of maneuvers, that would fit nicely in a Freestyle, like maneuvers 1, 2, and 3, or 5 and 6. On the other hand, maneuvers 7, 8, and 9 will be hard on low-horsepower/high-drag aircraft.

If a Freestyle is well-designed to show off your airplane's attributes (and to hide what it doesn't do well, like the loop!), it can earn you higher scores, and also be a lot of fun. And you get to fly the Freestyle twice!

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

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I have just taken delivery of another Ford Fusion under the Ford Partner Recognition Vehicle Purchase Plan. My thanks to EAA and to Ford for their innovative thinking in developing and maintaining this unique benefit plan for EAA members.

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partner recognition
VEHICLE PURCHASE PLAN

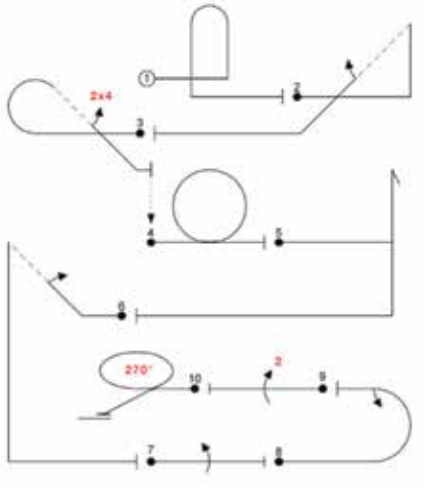
Grassroots?

BY GILES HENDERSON, IAC 159

The IAC was founded in 1970 to promote grassroots aerobatics. Our contests are intended to provide pilots the opportunity to have their skills evaluated by certified judges and to compete against fellow pilots. During our early years IAC contests attracted large numbers of participants. There were 135 competitors at the IAC Championships in Fond du Lac, Wisconsin, in 1975. Fifty-one of the 1975 competitors were in Sportsman. Many of us that were and are limited by finances, family obligations, or time found a home in a lower category.

Sportsman

The most fundamental consideration for a well-designed, entry-level sequence that will encourage and retain new participants and provide a home for the classic aircraft is *energy flow*, the opportunity to exchange potential for kinetic energy, altitude for airspeed. The 2016 Sportsman Known has good energy flow all the way to Figure 7.



However, figures 8, 9, and 10 degrade this sequence to yet another example that measures aircraft performance rather than airmanship. An Immelmann (Figure 8) following a slow roll (Figure 7) excludes virtually all the classic entry-level aircraft, as does a 2-point roll (Figure 9) following an Immelmann (Figure 8). Moreover, putting an Immelmann with inadequate energy at the bottom of the box should provoke safety concerns.

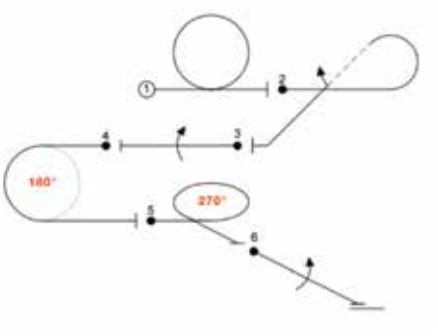
Over most of the past 15 years a high-performance aircraft has been required to be competitive in Sportsman. Competitors who fly classic entry-level trick planes have been relegated to taking "energy breaks" and forfeiting their potential competition by standing or moving down to Primary or, as most have done, dropping out of IAC.

"We continue to see category creep in Advanced/Unlimited because we have been tied to CIVA, but we should not be making it harder for new pilots in the sport by increasing the difficulty of Sportsman and Intermediate. That is exactly what proposal 2016-05 (and last year's change) does since it substantially increases the skill level required to be competitive and/or win. If we make all the low API airplanes nothing more than field fillers and worker bees for the other categories, low API airplane drivers will simply start staying home."—Paul Thomson

"We cannot have rules which shrink our sport rather than grow it. It is our policy that the legacy airplanes, indeed the ones that built the sport, not be chased away from competition by ever increasing difficulty. That is a recipe for organizational suicide."—Mike Heuer

Primary

If we design Sportsman sequences that fail to provide good energy flow, let's not also poison the Primary sequence with performance hurdles. Low-horsepower Citabrias, Clipped Wing Cubs, and other low-powered aerobatics planes are not able to fly a competitive aileron roll from level flight without diving for additional energy.



The energy lost in a 180-degree turn followed by a 270-degree turn (figures 4 and 5) in these aircraft precludes a competitive slow roll (Figure 6). It is not in the interest of recruiting IAC participation to make 180 hp a requirement to be competitive at the entry level. Moreover, the current Primary is dumbed down to a humiliating level that's not fun to fly and certainly not serving its intended function. It is indeed ironic that on the one hand this sequence has been deliberately lowered in difficulty, and on the other, sets an energy requirement that excludes low API aircraft from a competitive flight. Surely we can design a fun, six-figure sequence that does not require a Citabria to take an "energy break."

Spin

There isn't much we can do in designing a Primary sequence if there are only three different figures allowed. A one-turn spin was a part of every ACA and IAC entry-level

sequence for more than 30 years. A spin puts a Piper Cub on a level playing field with an Edge 540. It's perhaps the only Aresti figure in the entire catalog that is truly an equalizer. The Basic/Primary category went for years with just a spin, loop, and a roll. After a great deal of turmoil, we got the half-Cuban in the door while Vicki was president with some hope that the hammerhead and Immelmann would follow.

However, in recent years the one-turn spin has been omitted from entry-level sequences even though a spin was traditionally and continues to be the first "aerobatic" figure most students were/are taught. A significant number of IAC newbies interviewed in Gary DeBaun's Meet a Member column have said they became involved with IAC competition as a consequence of their experience in a stall/spin/upset course.

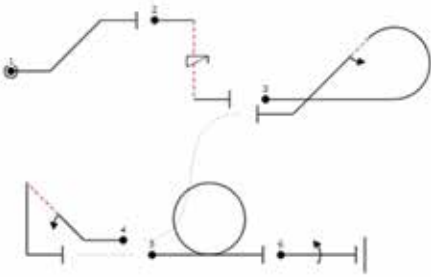
In a recent article Mike Heuer recalled, "When I strapped into the front seat, I knew aerobatics was on the plate, and I had never done anything other than a steep turn and a spin. After we did that first roll and loop, I was hooked for life."

Duane Cole: "Teaching spins may be the most worthy accomplishment of an aerobatic course."

With digital automation replacing stick and rudder skills, the aviation industry has turned its attention to loss of control as an important issue. The IAC would do the NTSB and the entire aviation community a great favor if we put the spin back in Primary and Sportsman and provided pilots the opportunity to learn how to actually do fully developed stalls and at least a one-turn spin.

Primary Sequence Proposal

The Primary figure base desperately needs some turn-around figures that don't kill energy. In addition to the hammerhead, a reverse wedge (starting with a half-roll on a 45 upline) is a reasonable candidate and should be of less controversy than a hammerhead. The following sequence proposal is a fun ride with carefully considered energy flow that can be flown competitively with low-powered, high-drag aircraft.



Power			
Fig 1	1.1.2.1	7	7
Fig 2	1.1.6.3 9.11.1.4	10 5	15
Fig 3	8.5.6.1 9.1.4.2	10 4	14
Fig 4	1.2.3.1 9.1.2.2	12 6	18
Fig 5	7.4.1.1	10	10
Fig 6	1.1.1.1 9.1.3.4	2 8	10
Total K = 74			

If you are in agreement with the ideas presented here and endorse this proposal, let me suggest you convey your thoughts/support to your regional director: *www.IAC.org/yellow-pages*. Hopefully our administrators will listen. IAC

The Cure for the Flying Doldrums

An aerobatic course, just the ticket

BY ED MILLER
emiller775@aol.com

There are a lot of ways for a middle-aged pilot to act out. Most commonly, a seaplane rating in Florida is good for a weekend of chasing alligators from the back seat of a Cub on floats. Coupled with a winter-time trip for the family to Disney World, you have as close to a win-win situation as possible for the modern, multi-dimensional family. The rating is fun, but unless you live on a lake or call Alaska home, it has serious limitations. Floatplanes are expensive, limited in their usefulness, and ones that can be rented solo are almost as rare as $4 a gallon avgas.

Most pilots agree that the pedestrian nature of the GA fleet has resulted in a much reduced occurrence of stall/spin accidents since the day when Cubs and Stearmans ruled the skies. They are great means of getting to all the Point B's in a quiet, comfortable manner. But what if you simply don't have that many Point B's? What if, and I know this is sacrilege, you are simply bored with flying around, not exceeding 30 degrees of bank? An aerobatic course might be just the ticket. And guess what? There are several schools close to family-related vacation spots. A five-hour course in a two-place Pitts or Extra can peg the fun meter on just about anyone willing to risk a touch of nausea, and even that usu-

ally goes away after a couple flights. But after a few days of rolls and loops, you are once again left with only the trip home and a logbook of memories. Or are you?

What if there was a way to continue your acro excitement for a fraction of the cost of renting a 172? I'm not advocating finding a tired Citabria either. To me there is no aerobatic airplane even close to the cost/performance capability of a Pitts S-1. I admit to lusting for one since watching the Red Devils at Oshkosh as a kid. After reading Budd Davisson's articles on the subject, I was hooked.

But shouldn't it be a two-seater you might ask? Isn't it a selfish act to buy a single-place anything? Up to this time, I had begged and borrowed acro time in other people's airplanes. I believe this is how acro has gotten something of a bad rap. For two people to ride in an aerobatic plane doing aerobatics, someone is going to have to be riding while the other is flying. I believe I represent a fairly large group of pilots who have a fair tolerance for doing their own acro but will get sick as the proverbial dog, riding through someone else's. In addition to not having control, you have no way of knowing what's coming next. Besides, one seat eliminates any guilt of not taking a passenger on a practice flight. Insurance for the S-1 is a small fraction of the cost of a two-place, since it is less likely that anyone other than the owner is at risk. Fuel burn and maintenance is less on a four-cylinder Lycoming, especially considering aerobatic flights rarely last more than a half-hour. The plane is so small it will usually fit under the wing of a Cessna in a shared T-hangar—further shrinking expenses. And most importantly, almost any S-1 can be had for $35,000 or less.

A little history: the Pitts Special was designed by self-taught engineer, Curtis Pitts, and first flew shortly after World War II. Low-powered variants were built on a very small scale until the early 1960s, when it was discovered that with a Bendix PS-5C pressure carburetor from an old Navion, combined with an ingenious system of oil check valves, the airplane suddenly had full inverted capability. Its instantaneous, feather-like controls and head-swimming snap roll made the airplane suddenly on a par with the best acro mounts of the time.

The airplane was incredibly strong, simple, and guess what? You could build it in your garage for about the same money as a new Impala. Suddenly world-class acro was no longer the sole domain of Eastern bloc Zlins and Yaks. By 1965, the Pitts was the RV-6/7/8/9 of its time. Hundreds were popping out of garages, and the cottage industry of semi-professionally built homebuilts was born.

The early '70s brought the diminutive airplane to the world stage when the U.S. Aerobatic Team loaded its complement of Pitts on a USAF C-5 and won the 1972 World Aerobatic Championships in France. The aerial equivalent of a Formula One race car was now available to the common man. The acro scene in the United States exploded with the formation of the International Aerobatic Club (IAC) and regional and national contests popped up everywhere.

Unfortunately, with few formal schools, the accident rate also skyrocketed. The 27 accidents attributed to aerobatics in 1971 were more than all those in the previous five years. And most of those were due to spins. Two pilots, Gene Beggs, a Texan, and Eric Muller, a Swiss, from opposite corners of the acro world joined forces in an almost evangelical crusade to teach what would become known as the "Beggs-Muller emergency spin recovery method." By simply chopping the power, letting go of the stick, and pushing opposite rudder the spin would stop. The accidents, attributable usually to an inability to tell whether the spin was upright or inverted, stopped almost overnight. But some would say the damage was done, and the Pitts craze slowed dramatically. The fiberglass revolution of the 1980s, combined with a new crop of nosewheel-only drivers, and the sprightly little airplane disappeared as quickly as it had arrived.

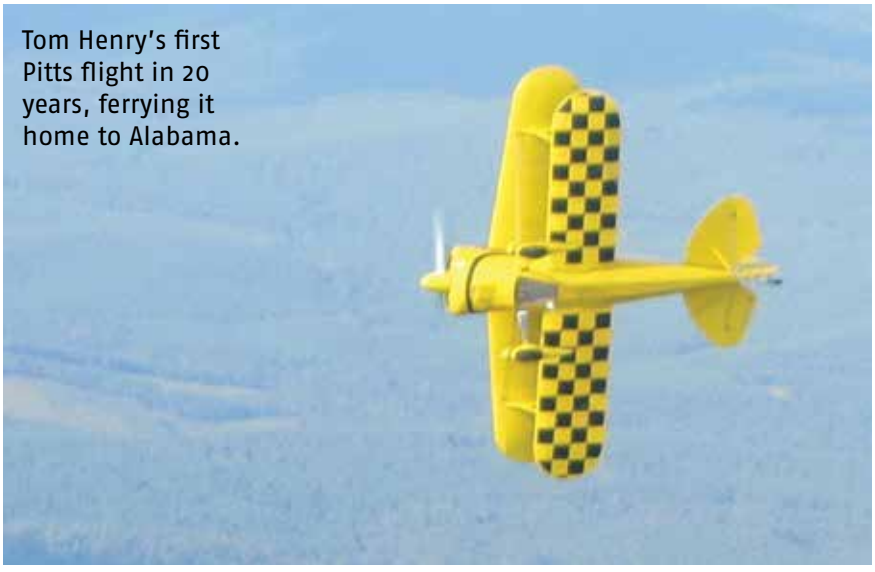
In the 1990s, a subset of these planes found their way back into shops where their cotton coverings were replaced with either the Ceconite or Stits synthetic fabrics. The Pitts factory had also started building a handful of S-1S and, later, the 200-hp S-1T models during the same period. Compared to homebuilts, there are relatively few examples that fit these later categories. Poking around and asking IAC members are a couple ways to find them. Though, to some they might be worth more,

Tom Henry (left) with builders Tyler Gresham and Ted Williams.

New owners Ed Miller and Michael Gerhardt.

it's not necessarily a guarantee of a better airplane.

I always loved the aesthetics of the round wings, round tail, and sunburst paint schemes and began talking the project up at the local airport until I was able to find a like-minded partner, which made it all the more doable. It took a year of on-and-off searching, but a near perfect S-1S was located in Atlanta. The plane had been mostly sitting for several years while its builder finished a hot rod Pitts S-1-11B. With only one hangar and two planes, he reluctantly gave up the old S-1S, but only after a very extensive annual and top overhaul. A few weeks later, with the help of a friend, it was delivered to Alabama.



Tom Henry's first Pitts flight in 20 years, ferrying it home to Alabama.

The next month was devoted to learning how to fly and, more precisely, land the little beast. As I was to find out, being able to confidently land a Pitts puts one in a very exclusive club. It's not that it's particularly tricky; it's just that it has a challenging and unique combination of qualities. First, there is absolutely no forward visibility once in the flare; all alignment is by use of peripheral vision. Secondly, the airplane responds immediately and exactly to control inputs. It's not squirrelly, just instantaneous. There are a handful of Pitts transition instructors around the country, and Michael, my partner, and I ended up on the doorstep of Johnny White in Abingdon, Virginia, on a brisk October Saturday morning.

Located in the beautiful Virginia hill country just across the Tennessee border, Johnny operates a one-stop training shop for the tailwheel and aerobatic inclined. Johnny's fleet included a Cub and a Pitts S-2B (and now an Extra 300 has been added). Some would say these are the perfect flight-training vehicles for all aviators. Over the next two days, Michael and I tag-teamed Johnny into submission. The front pit of the S-2 can only be described as completely blind and subsequently very similar to the S-1. Muscle memory from years of taildraggers helped keep the tail behind the front wheels after touchdown, but nothing prepared me for the complete lack of forward visibility.

To add to the excitement, all landings were power-off, which showed off the Pitts glide ratio, which is close to that of a kitchen knife shoved off a counter. Each approach would start with an absurdly high turn to final

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while holding a slip in order to see the airport. Just before what seemed would be sudden impact, the slip was straightened, the airplane was flared, and an attempt was made to keep the plane in the middle of the runway based on the equal distance of the runway lights whizzing by. By holding the stick back, the little biplane would settle on with a small skip. After touchdown, the technique was to bury the stick full aft so the weight on the tail acted like an anchor, and as long as it was pointed down the runway, it just rolled straight down the runway. Once the speed slowed below 30 miles per hour or so, the brakes could be gingerly eased on for the taxi back to repeat the whole process.


In its original 1975 cotton and dope form.

The takeoff, even though equally blind, felt like a cruise missile launch and actually became great fun in fairly short order. After a couple flights, I knew that the part of all Pitts checkouts that I was dreading was coming soon. Even though it's fairly easy to tear up one of these cute little monsters while trying to reattach it to the ground, it is rare for that to result in anything but a very somber phone conversation with an insurance company. The real bugaboo is its incredible spin capabilities.

To prevent the aforementioned spin-related confusion, every checkout includes the full spin buffet. Spins not being my favorite maneuver, I was particularly unenthusiastic about the inverted variety. Johnny was empathetic and fed the spin series slowly to us. He taught us how a little forward stick accelerated the spin, turning the ground into an impressionistic blur. He then showed us both the Beggs emergency recovery technique as well as his "power off, controls neutralized" solution. Both ways stopped the spin easily.

Time constraints and work schedules had me out in Colorado the next week, where I was able to continue training with John Blum in his S-2B. Although John claimed it's the highest-time Pitts still flying, it was in great condition and hardly seemed affected by the mile-high Denver elevation. Our three days of flying included narrow runway operations and even flying in 20 knots of wind. John spent a bit of time on basic acro and, of course, inverted spins. At the end of the training, I won't say I learned to like them, but my apprehension over the dreaded spin was gone.

The next week found me back home in Alabama where a friend graciously hangared us at his grass strip so we could ease into the whole solo Pitts thing. The immaculate grass runway was more than 4,000 feet long and at least 100 feet wide, the perfect training base. A single-hole Pitts provides so many firsts. The smallest airplane, highest performance, shortest coupled, blindest and, oh yeah, your first flight is all by yourself. It's not like it was that much different than the two-place, but this much unknown in aviation is something few of us get to experience on our own for the first time. The long taxi to the runway end provided time for reflection, and my first solo in a Piper Colt nearly 40 years ago came to mind. With only a mag and controls check for a run-up, the excuses to delay this true leap of faith quickly ran out.

Lining up on the runway, looking out at the impossibly short wings, I sucked the stick back hard and shoved in the go lever. I had been told once that an S-1S doesn't experience a takeoff roll; it just scratches off in a flurry of noise and airspeed. The roar was deafening, even though I was wearing David Clarks with ear plugs.

With the tail wheel lifted just off the grass, it rocketed off in what seemed like half the distance of the two-place. The polished Sensenich prop dug in hard, resulting in a ridiculous climb angle just to keep the rpm even close to redline. In less than three minutes, I was level at 5,000 feet, turning 2700 rpm, indicating 150 mph, and grinning from ear to ear. Straight up, straight down, right side up, upside down, the little airplane didn't care. Turning left was a matter of thinking left. Climbing another thousand feet was as simple as pulling back for a few seconds. And yet at straight and level, it was easy to drive around with only the pedals and trim lever. A couple rolls and loops and I knew we had made a great choice. Now I just had to get it back on the ground in a reusable form.

Entering the pattern, I found that the much lighter one-holer didn't seem to have quite the dramatics of the S-2. The lighter controls and slightly better visibility made the first landing an almost pleasant affair. Over the fence at 100, the little wings floated an easy 300 or 400 feet till it said, "I'm done." And with that, it unceremoniously plopped down on all three wheels rolling right down the middle of the Bermuda grass runway. Now, I'm certain this was thanks to all the training of the last few weeks, but I was still surprised. Apparently, this wasn't going to be as difficult as I had feared. A check of the fuel after the flight showed I had burned about 4 gallons over a 30-minute flight. I was astonished. In fun-per-dollars, this was unsurpassed.

Over the next couple months, I read Neil Williams *Aerobatics* and Alan Cassidy's *Better Aerobatics*. Starting slowly, I followed the curriculum set forth in both books easing into the maneuvers that I had flown with my instructors. Rolls and loops at first, then gradually exploring inverted flight, the little plane always responding instantly and without complaint.

By the end of November, we both felt comfortable enough to move

the little plane to its new home south of Birmingham. Shelby County, Alabama, is a 5,000-foot long, smooth asphalt runway with a great pilot community. Even though we are the only Pitts, a number of other aerobats occupy the field. Help with starting (it has no starter) is always available, as is moral support when we show our beginner's status during landings.

I know that it's not for everyone, but with about 20 flights so far, it has been fairly straightforward to expand on the basic maneuvers taught in the two-place. Hammerheads, humpty-bumps, and inverted turns are the figures I'm learning lately. Snap rolls, gyroscopics, outside maneuvers come next and are all easily handled by the Pitts. I know it's not as efficient, and some would argue not as safe, as going to a big school in California. We are staying up around 5,000 feet, giving us plenty of room for falling out of maneuvers. Because of our training, we have a good feel about the inevitable, inadvertent spin. Best of all, we are guaranteed, for less than a 5-gallon can of avgas, to completely forget about the world.

I'm still not sure if either of us will compete with our new toy, but I can already tell how it makes me more attentive in my corporate jet day job. I no longer fear strange attitudes and am even learning to enjoy competition spins. The littlest Pitts has to be the single, least expensive, most exhilarating solution to flying doldrums. Spread the word. *IAC*

PRESIDENT'S COLUMN contintued from page 3

BY MIKE HEUER, IAC PRESIDENT, IAC 4

Harold Krier and Charlie Hillard.

In the same year I was an assistant judge for the first time (1968), I also attended an air show in Dodgeville, Wisconsin, that featured Harold in his Chipmunk and my father in his Ryan ST-A. That evening in the hotel bar, I sat with Harold for a couple of hours as he talked to me about aerobatics, competition, and flying. He had all the time in the world for me and never blew me off. It was an experience for a young man of 18 I will never forget. That conversation was one of many experiences during that time that changed the course of my life. It was also the first year I flew competition. A couple of years after that, I won the L. Paul Soucy Trophy—another of the flying awards we present each year—and in four years, was in U.S. Air Force pilot training.

Like Sean D. Tucker, our Hall of Fame inductee this past year who also chairs the EAA Young Eagles program, take young people under your wing. It doesn't have to be as a part of some organized program, but just talk to them and show them around. It is a great thing that you can do for aviation, your community, and your country. *IAC*

CONTEST CALENDAR

Mark your calendars for these upcoming contests. For a complete list of contests and for the most up-to-date calendar, visit *www.IAC.org*. If your chapter is hosting a contest, be sure to let the world know by posting your event on the IAC website.

Hammerhead Roundup (Southwest)
Friday, April 8 - Saturday, April 9, 2016
Practice/Registration: Thursday, April 7
Power: Primary through Unlimited
Location: Borrego Valley Airport (L08): Borrego Springs, CA
Contest Director: Kevin Elizondo
Phone: 5625775776
E-Mail: *Kelizondo1@yahoo.com*
Website: *www.iac36.org*

Carolina Boogie (Northeast)
Friday, April 22 - Saturday, April 23, 2016
Practice/Registration: Thursday, April 21 - Friday, April 22
Power: Primary through Unlimited
Location: Wilson Industrial Airport (W03): Wilson, NC
Contest Director: Eric Sandifer
Phone: 919-605-9585
E-Mail: *n100mp@yahoo.com*
Website: *www.facebook.com/IAC-Chapter-19-1537619346652 42/*

Sebring Spring (Southeast)
Thursday, May 5 - Saturday, May 7, 2016
Practice/Registration: Saturday, April 30 - Wednesday, May 4
Glider Categories: Sportsman through Unlimited
Power: Primary through Unlimited
Location: Sebring Regional Airport (SEF): Sebring, FL
Contest Director: Don Hartmann
Phone: 561-644-1312
E-Mail: *donchartmann@yahoo.com*

Gulf Coast Regional (South Central)
Friday, May 13 - Saturday, May 14, 2016
Power: Primary through Unlimited
Location: Jackson County (26R): Edna, Tx

Duel In The Desert (Southwest)
Friday, May 13 - Saturday, May 14, 2016
Practice/Registration: Thursday, May 12
Power: Primary through Unlimited
Location: Apple Valley Airport (APV): Apple Valley, CA
Contest Director: Chris Olmsted
Phone: 831 334 7232
E-Mail: *chris@olmstedaviation.com*

Ben Lowell Aerial Confrontation (South Central)
Saturday, May 21 - Sunday, May 22, 2016
Practice/Registration: Friday, May 20
Power: Primary through Unlimited
Location: Sterling Municipal Airport (tentative) (STK): Sterling, CO (tentative)
Contest Director: Bob Freeman
Phone: 303-709-6465
E-Mail: *2bafree.man@gmail.com*
Website: *www.iac12.org*

Hoosier Hoedown (Mid-America)
Saturday, May 21 - Sunday, May 22, 2016
Practice/Registration: Friday, May 20
Power: Primary through Unlimited
Location: Kokomo Municipal Airport (OKK): Kokomo, Indiana
Contest Director: Mike Wild
Phone: 765-860-3231
E-Mail: *mike.wild@hotmail.com*
Website: *www.hoosierhammerheads.com*

Armed Forces Memorial (South Central)
Friday, May 27 - Sunday, May 29, 2016
Location: Grenada Municipal (GNF): Grenada, MS

Salem Regional Aerobatic Contest (Mid-America)
Friday, June 3 - Sunday, June 5, 2016
Practice/Registration: Friday, June 3
Power: Primary through Unlimited
Location: Salem-Leckrone (SLO): Salem, IL
Contest Director: Joe Overman
Phone: 314-452-6049
E-Mail: *joeoverman2000@yahoo.com*

Coalinga Western Open Championship (Southwest)
Friday, June 3 - Saturday, June 4, 2016
Practice/Registration: Thursday, June 2
Power: Primary through Unlimited
Location: New Coalinga (C80): Coalinga, CA
Contest Director: Tom Myers
Phone: 650-799-6854
E-Mail: *tom.myers@stanfordalumni.org*
Website: *www.iac38.org*

Lone Star Aerobatic Championships (South Central)
Friday, June 10 - Saturday, June 11, 2016
Practice/Registration: Thursday, June 9
Rain/Weather: Sunday, June 12
Power: Primary through Unlimited
Location: TBD (NA): TBD
Contest Director: J. J. Humphreys
Phone: 940-564-6673
E-Mail: *jjhump1@brazosnet.com*
Website: *www.iac24.org*

Ohio Aerobatic Open (Mid-America)
Friday, June 17 - Saturday, June 18, 2016
Practice/Registration: Thursday, June 16
Power: Primary through Unlimited
Location: Bellefontaine Regional Airport (KEDJ): Bellefontaine, OH
Contest Director: Samuel Weaver
Phone: 937-681-2680
E-Mail: *piperj3cub46@gmail.com*
Website: *www.iac34.eaachapter.org/*

Killam-Flagstaff Aerobatic Contest (International)
Saturday, June 18 - Saturday, June 18, 2016
Practice/Registration: Friday, June 17
Power: Primary through Unlimited
Location: Killam-Sedgwich/Flagstaff Regional (CEK6): Killam,Alberta, Canada
Contest Director: Randy Skiba
Phone: 403-504-7788
E-Mail: *randallj@shaw.ca*
Website: *www.aerobaticscanada.org*

Apple Cup (Northwest)
Friday, June 24 - Saturday, June 25, 2016
Practice/Registration: Thursday, June 23
Power: Primary through Unlimited
Location: Ephrata Municipal Airport (EPH): Ephrata, WA
Contest Director: Jerry Riedinger
Phone: 425-985-9469
E-Mail: *jriedinger@perkinscoie.com*

U.S. National Aerobatic Aerobatic Championships 2016 (South Central)
Friday, September 23 - Friday, September 30, 2016
Practice/Registration: Friday, September 23 - Saturday, September 24
Glider Categories: Sportsman through Unlimited
Power: Primary through Unlimited
Location: North Texas Regional Airport/Perrin Field (KGYI): Denison, TX
Contest Director: Gary DeBaun
Phone: 612-810-6783
E-Mail: *b747inst@aol.com*
Website: *www.iac.org/us-national-aerobatic-championships-2016*

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BY GARY DEBAUN IAC #4145

Cody Zorn

IAC 437939
Occupation: Evangelist
Chapter affiliation: 3
Age: 31

GD: Standard first question, Cody, how did you first become involved in aerobatics?

CZ: Basically I grew up in the cockpit of an airplane. Soloed when I was 16 and got my license shortly thereafter. At the time Dad was highly involved in competition and had a Giles 202. I should've taken advantage of the opportunity then to get involved. But life happened, got married, kids, occupation, and kind of lost interest and touch with flying in general. Last year I decided I wanted to get involved, not just flying but also in competition. I went and got checked out by Danny Bond in an S-2C back in July '15. And from there I was hooked!

GD: I know you are currently flying a DR-107. Did you help your dad (Tony) build it?

CZ: No, we didn't build it. Dad kind of left the sport for a few years, and when he got back in some years ago, he found the 1D. It has proven to be a fun and competitive little plane.

GD: When and where was your first contest? How did it go?

CZ: My first contest was at Warrenton, Virginia, in September 2015. I flew Primary and ended up coming away with first place! The first day basically weathered us out, but the experience of just meeting and hangar flying with some amazing people really is what makes this sport so rewarding and enjoyable to me.

GD: Have you flown any other aerobatic aircraft?

CZ: Well, I got some dual time in the Giles years ago. Got checked out in the S-2C last year, and have also flown the RV-4 of a friend of ours.

GD: If money were no object, what aerobatic aircraft would you have?

CZ: Wow, I guess one of those single-seat MXs would be pretty cool. Or one of the new Extra SCs!

GD: What is your favorite figure to fly?

CZ: Figure 5 in Intermediate this year is pretty fun. It's a goldfish, push down to a 45, snap roll, loop around, and 2x4 on the back side 45. Also with moving up to Intermediate, I've been practicing 90-degree inside rolling turns. Those are challenging and fun.

GD: Do you have any pre-aerobatics routine, like stretching, yoga, or listening to music?

CZ: [laughs] Yoga? No, generally I like to be alone a few minutes before I saddle up and, as my dad says, "get my head in the game"! I have a word of prayer in the plane for safety, and then it's go time! It seems to me like the mental preparation in Intermediate is a little greater than what I was doing in Primary/Sportsman. Whereas in those categories I would fly the same exact sequence three straight times, now in Intermediate we fly the Known, Free, and Unknown. So there's a little more coming at you.

GD: You are relatively new to the International Aerobatic Club (IAC). Anything you would like to see changed?

CZ: I think President Heuer made a good move by keeping our IAC regional contests and what CIVA is doing on a world level separate. While I am 100 percent behind those who dedicate so much time and effort to fly at the Advanced/Unlimited level in world competition and represent the United States, most of us have neither the time, desire, or money to throw at competing at that level. So I think keeping the regional contests simple yet challenging in the air was a good move. My two cents.

GD: Who in the sport has been an inspiration to you?

CZ: Well, obviously I have to say my dad is my mentor/biggest inspiration! His love not only for the sport but for flying in general is infectious! One of the greatest enjoyments of getting involved in competition has been just getting to spend time with him. I get Advanced-level coaching every time I go up for a practice flight, which most guys don't get, or they have to pay for. Others have been very helpful and friendly to impart their knowledge and make a newbie like me feel like I belong. Guys like Danny Bond, Ron Schreck, Mark Fullerton, and Marty Flournoy.

GD: Do you have any interests outside of flying?

CZ: My family and I are on the road holding revivals, conferences, and youth camps around 45 weeks out of the year, so there's not a whole lot of time for anything else. I am a huge Georgia Bulldogs football fan! My wife and I are season-ticket holders, and we try to make most of the home games in the fall. GO, DAWGS! *IAC*


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