

12th ANNUAL
SAFETY ISSUE

SPORT Aerobatics

OFFICIAL MAGAZINE

INTERNATIONAL AEROBATIC CLUB

MAY 2007



12th Annual Safety Issue: Building on the Basics

- Inverted Spins
- Do You Need Training?
- Rethinking Stall Speeds

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Instructor and air show pilot Greg Koontz enjoying EAA AirVenture Oshkosh 2006 in his trusty Decathlon.

– Photo by Bonnie Kratz



Judson Bartlett

LETTER from the EDITOR

by Scott Westover

Safety Needs Structure

As Greg Koontz says, "We're flying, not fishing."

There are times when being the editor of *Sport Aerobatics* feels like being a student pilot. The aerobatic community is generous when it comes to sharing our expertise, and the pages of this magazine are filled with technical tips to help us become better and safer pilots.

I have learned that when an instructor or respected aerobatic pilot takes the time to write an article, it pays to read every word. Of course the technical tips are important. But there is usually a subtler message. For example, this month Greg Koontz writes extensively about the importance of mastering the basics and the role that practice plays in building proficiency. He does a great job of making the point that different pilots learn in different ways. However, one of the things we all have in common is the need to practice.

When Greg compares flying aerobatics with fishing, he makes an important point. He writes, "A few years ago I bought a little bass boat and took up fishing. I don't have much time for it, but now and then I dust off the boat and go out on the lake and take up the hobby right where I left off. What's that got to do with aerobatics? Nothing, and that's my point. Just being a pilot takes a commitment to maintain proficiency, but being an aerobatic pilot is a step more intense." There is nothing revolutionary about those words. In fact, Greg is understating the obvious: Our sport is intense and needs to be treated with the respect it deserves, and that takes time. Sometimes it is a challenge for practice and time to

occupy the same space.

Greg's article got me thinking about how much time I really have to devote to our sport. Like all of us, my life seems crazy at times. A 2-year-old with a brother or sister on the way and living in a 200-year-old house tend to eliminate the concept of "free" time. And then there is that pesky thing called a job that most of us need to hold down in order to feed our flying habit and our families—not necessarily in that order. So I tried something different. I talked with my wife, who has always been a strong supporter of my passion for flying, about the looming house projects and family obligations, and we worked the topic for dedicated flying time right into the mix. Now, I am a realist. Weather, work, and other things outside of my control will interfere with the time I have in the cockpit. But the act of sitting down and talking about the need to create some sort of structured schedule is a huge step in the right direction with regard to my personal safety goals in the airplane.

I hope you enjoy our annual safety issue, and that it makes you think. As you read these stories, challenge yourself to create a list of things you can do to become a safer pilot and to encourage the gang you fly with to increase their personal safety. Whether you have 10 hours or 10,000 hours, there is always something you can do to be safer and smarter. Go find it, and help keep aerobatics both the most intense and safest extreme sport out there.

Contact Scott Westover with your articles and suggestions at Tookyflyer@tds.net.

Sport Aerobatics is your magazine. To submit news, comments, articles, or article ideas, please send them to: IAC, P.O. Box 3086, Oshkosh, WI 54903-3086; or email them to tookyflyer@tds.net.

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PRESIDENT'S PAGE

by Vicki Cruse • IAC 22968
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Tell Our Story

Aerobatic training saves lives

One of the hardest concepts to get across to "laypeople" is the notion that aerobatic training makes safer pilots. The hardest to convince seem to be the insurance underwriters, non-pilots, and flight instructors, followed closely by straight-and-level pilots. Most fear aerobatics out of misunderstanding. To them it's all foam and no beer with a lot of ego thrown in. Why is it so hard to understand what seems so obvious to those with aerobatic training?

For one thing, there aren't many records we can use for verification. Accident reports usually don't detail training the pilot received. Most assume that if an aerobatic plane was involved, the pilot must have had some training. While insurance tends to dictate this today, at least with regard to flight time and takeoffs and landings (but not aerobatic or unusual attitude training), this was not the case in the not-too-distant past.

Stupid pilots, uneducated "witnesses," and the media cause more harm than good to our endeavor. Aerobic planes and pilots attract attention—good and bad. One screw-up and word travels through our tiny aviation community faster than avgas goes through an M14P. Yet, take someone on a ride that encourages them to take an unusual attitude course, and no one notices.

There are hundreds of stories about the benefits of aerobatic training. The problem is we rarely hear about them. Instead it's all about the ones who didn't make it. One man who attests to the safety advantage of aerobatic training, and particularly competition aerobatics, is Bob H (he asked us not to use his last name). As

a result of his actions, he also saved the lives of both passengers on the flight, his wife and dog.

Bob enjoys recreational aerobatics and over the past three years moved into competition. He recalls at numerous early contests being called for little to no downline on many of his figures. He hated this part and was never comfortable with flying straight at the ground, no matter the altitude.

Within minutes the aircraft was hit with golf ball-sized hail, struck by lightning three times, and had the front windscreen blown open . . .

Last summer, on a routine trip to Montana from Oregon in his 421, he was vectored by air traffic control (ATC) into a thunderstorm over the Rockies. Within minutes the aircraft was hit with golf ball-sized hail, struck by lightning three times, and had the front windscreens blown open, all while in instrument meteorological conditions. All avionics were lost and the airplane was flipped more than 90 degrees to one side, as indicated by the compass he kept on top of the instrument panel. Bob isn't sure just how far the airplane rolled, but inverted wasn't far off. The ailerons would not roll the plane upright. So, he pushed on the controls, and ATC later told him he ascended 3,000 feet in less than 30 seconds, largely as a result of the storm updraft.

Finally, Bob saw the airspeed go to zero in the partially inverted climb, and the airplane started to fall nose-down. He pulled power from both engines and tried to keep the nose straight down, watching the airspeed build quickly and hoping to find the horizon. Just after passing through 350 mph (V_{NE} is 276), he blew out of the clouds and started a gentle pull back on the yoke to level flight. He lost more than 12,000 feet and broke out at 13,000 feet over the Rockies.

He made it to a nearby airport, where a safe, flapless landing was made after manually dropping the gear. After collecting himself and making sure his passengers were all right, he assessed the damage to the 421. He says, "There was not one square inch of the airplane that wasn't damaged." The front windscreens were blown out on either side of the center divider, the de-ice boots were shredded, all the lights were gone, the tip tanks were damaged, the nose and tail cones were missing, and the wiring in the engine compartment was melted. It's an understatement to say the aircraft was totaled, but everyone was alive. Bob attributes his recovery to aerobatics. He said that without the training and the harassment he received regarding his downlines, he never would have been able to do what he did.

We don't need stories as drastic as this to educate people about the benefits of aerobatics, but when they come along they provide an opportunity to educate others. If we don't take that opportunity, I fear in the near future we might be saying, "Remember when..." ☺

NEWSBRIEFS



Jim Koepnick

EAA Warbirds to Expand at AirVenture 2007

The unmistakable din created by the roaring engines of former military aircraft is one of the many unique sensory experiences that bring aviation devotees back to EAA AirVenture Oshkosh every summer. Visitors to this year's July 23-29 AirVenture are in for a special treat, as the EAA Warbirds of America will expand its activities in the air and on the ground.

According to Rick Siegfried, EAA Warbirds of America president, an impressive lineup of warbirds attractions for AirVenture 2007 is already taking shape, with more confirmations coming. Some current confirmed aircraft and personalities include the following:

- ❖ The Lone Star Flight Museum's B-25, B-17, and Hawker Hurricane
 - ❖ The Commemorative Air Force's Curtiss SB2C Helldiver, the world's only flying example
 - ❖ P-51 Old Crow with WWII veteran Col. Bud Anderson piloting
 - ❖ The third-ranking fighter-pilot ace of all time, Günther Rall, and the T-6 that he flew after World War II
 - ❖ Col. Bob "Shorty" Rankin and a P-47 that was part of the mission that shot down Rall
 - ❖ An F4U Corsair, and a Junkers JU-52
 - ❖ A Flying Tigers P-40 and appearances by famed Flying Tigers ace Tex Hill
- EAA and its Warbirds Division will issue more information on featured daily Warbirds in Review attractions and personalities as the schedule is finalized. Complete EAA AirVenture information is available at www.AirVenture.org.

Regional Series Enrollment Extended

The International Aerobatic Club is launching an online registration and payment system to make it easier for pilots to participate in the Regional Series. The online registration is expected to be available in May at www.IAC.org, and the sign-up period has been extended to July 1, 2007. In recent years participation in the program has declined, and the IAC

will be making a final decision in the coming months about continuing the Regional Series beyond 2007. Any IAC members who would like to comment on the program should contact Lisa Popp, executive director, at lpopp@eaa.org. A complete write-up for the 2006 participants will be featured in the June issue of *Sport Aerobatics*.

Our Apologies

Recently *Sport Aerobatics* listed incorrect contact information for the Bill Kershner Memorial Fund. The correct contact information is Betty Kershner (931-598-5732) or Bill C. Kershner (931-598-0706).

FAI and Red Bull Unite for Safety

In recent years, Red Bull Air Races have attracted impressive numbers of spectators and television viewers all around the world. From now on, the races will be conducted under the supervision of the FAI.

Fédération Aéronautique Internationale (FAI) is the international body founded over 100 years ago that supervised the exploits of aviators such as Blériot, Lindbergh, and Gagarin. Starting with the race in Abu Dhabi (United Arab Emirates) last April, FAI's experienced safety expert Roger Schad will supervise the preparation and conduct of each of the 12 races in the 2007 series.

FAI President Pierre Portmann said, "Red Bull Air Race has done a great job to re-create the excitement generated by the early aviation pioneers, and to inspire youngsters to take to the air. We are proud to help Red Bull take this work forward and create even more fans." For the Red Bull Air Race, too, this collaboration with FAI is an important step forward. In the words of Aviation Manager Heinz Möller, "This shows that Red Bull races are a true sporting challenge, part of a long historical air racing tradition, and showing the way to the future." For further information on Red Bull Air Race visit www.RedBullAirRace.com.

Lycoming Improves Online Access

Lycoming Engines, a Textron Inc. company, recently launched its new and improved Internet website, www.Lycoming.com. "The new site is easy-to-use, active, and friendly," remarked Dennis Racine, director of Marketing and Customer Leadership for Lycoming Engines. Visitors of the transformed website can expect to see key product features, an easy-to-use search element, an online company store, as well as the much anticipated Thunderbolt Site and Engine Configurator.

Fraudulent Medical Certificates Draw Attention

Rep. James Oberstar (D-Minnesota), chairman of the House Transportation and Infrastructure Committee, released a report this week calling on the FAA to further efforts to identify and deal with pilots who provide fraudulent information to obtain their airman medical certificates. The report stems from a 2005 study by the DOT inspector general in which thousands of certified airmen were identified as receiving Social Security benefits, some for medically disabling conditions that would void their medicals. The report states that while the U.S. Attorney's Office ultimately prosecuted more than 40 cases, hundreds more could have been pursued if resources had not been constrained.

The report urges the FAA to run periodic spot-checks of pilots' medi-

cal information and follow through with "swift and meaningful consequences if falsifications are found."

While EAA condemns any pilot for knowingly submitting false information to obtain or maintain medical certification, including omission of known disqualifying medical conditions, it doesn't want the FAA to use too broad a brush that may unfairly categorize unintentional omissions.

"Our concern is that any such effort could turn into a witch hunt against pilots simply because of an omission on a form, as opposed to the real issue of fraud against the U.S. government," said Earl Lawrence, EAA vice president of industry and regulatory affairs. "EAA does not believe that this concern is a medical issue, as most if not all the medical concerns in question could be

addressed under the special issuance medical process and do not pose a medical safety issue."

EAA members who have questions surrounding their medical certification should consult with the EAA Aeromedical Advisory Council. To learn more, visit <http://Members.EAA.org/home/medical>.



The EAA Aeromedical Advisory Council offers information to pilots with questions about their medical certification.



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m i s h a p s d a t a

Compiled by Bruce Johnson

MISHAPS BY MONTH

Year	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
2006	0/0	1/2	1/1	1/0	1/1	1/0	0/0	1/0	0/0	1/1	1/1	1/2
2007	0/0	0/0	1/1									

MISHAPS BY YEAR

Year	1995	1996	1997	1998	1999	2000	2001	2002	2003	2004	2005	2006
Mishaps	20	26	21	24	20	18	12	9	15	9	10	16

Numbers depict accidents/fatalities of total accidents in the U.S. by aerobatic aircraft. Accidents included are only those which occurred during aerobatic maneuvering (including air shows) or during an IAC-sanctioned competition.

Preliminary

Occurrence: Friday, March 16, 2007, in Titusville, FL.
Aircraft: Aero Vodochody Aero Works L-39C, Reg: N63925
Injuries: 1 Fatal

This is preliminary information, subject to change, and may contain errors. Any errors in this report will be corrected when the final report has been completed.

On March 16, 2007, about 1443 Eastern Daylight Time, an Aero Vodochody L-39C, N63925, registered to and operated by Best Jet Services LC, crashed while the pilot was performing aerobatic maneuvers at the TICO Warbird Airshow, Space Coast Regional Airport, Titusville, Florida. Visual meteorological conditions prevailed, and no flight plan was filed. The airline transport pilot, sole occupant of the airplane, received fatal injuries, and the airplane was destroyed. The flight originated in Titusville, the same day, about 1430.

A witness stated that while the pilot of the accident airplane was performing his solo routine at the air show, the airplane ascended and penetrated a scattered cloud layer at the top of a loop. The airplane then came back into view out of the loop and continued to roll right while descending in a steep nose-low attitude, at a high speed. The witness further stated that during the loop the angle of descent became progressively shallow as the airplane neared the ground, as if the pilot was attempting to pull out of the dive at too low an altitude. The airplane impacted the terrain just north of the tree line along Runway 09-27 and was destroyed.

Final

Occurrence: Saturday, March 25, 2006, in McKittrick, CA.
Aircraft: Cooper Harmon Rocket II, Registration: N96CR
Injuries: 1 Fatal

On March 25, 2006, about 0715 Pacific Standard Time, a Cooper Harmon Rocket II, amateur-built experimental airplane, N96CR, was destroyed by impact with terrain and a post-crash fire while performing low-altitude aerobatic flight maneuvers, about 5 miles east of McKittrick, California. The airplane was being operated by the pilot as a visual flight rules (VFR) personal local flight under Title 14, CFR Part 91, when the accident occurred. The solo private pilot received fatal injuries. Visual meteorological conditions prevailed, and no flight plan was filed. The airplane departed a private airstrip about 5 miles south of McKittrick, about 0700.

During a telephone conversation with the National Transportation Safety Board (NTSB) investigator-in-charge (IIC) on March 27, the FAA aviation safety inspector who visited the accident site said he spoke with several people

who witnessed the accident. The inspector said the witnesses reported the area is a common camping area for friends and family of the pilot, located on ranchland owned by the pilot's family. They indicated it was fairly routine for the pilot to perform aerobatic maneuvers in the area on Saturday mornings. They said that on the morning of the accident, the pilot performed several aerobatic maneuvers and passed overhead inverted, waving at the campers. They said the pilot was exiting the area while performing aileron rolls when the airplane pitched down and impacted the ground. The inspector said the airplane impacted the terrain in a near-vertical, nose-down descent. He said a post-crash fire consumed most of the wreckage, and flight control continuity could not be confirmed.

Photographs taken by the FAA inspector were forwarded to the IIC. The pictures showed the terrain was sparsely treed and had low rolling hills. The impact footprint was on fairly level ground and was not much larger than the diameter of the wingspan. The engine and propeller were buried out of view in the impact crater. The airframe and associated structures were stacked vertically, protruding from the impact crater with the vertical and horizontal stabilizers on the top.

The IIC conducted telephone interviews with the witnesses, and all of the witness statements were consistent with the information provided by the FAA inspector who responded to the accident site. No airplane or pilot logbooks were discovered for examination. According to FAA documents, the airplane was an amateur-built experimental airplane, which received FAA certification on August 11, 1998. The airplane, commonly referred to as a Harmon Rocket, was a low-wing, two-place, tandem cockpit, aerobatic airplane equipped with a tail wheel. The airplane was constructed by the pilot who, according to FAA records, received an experimental repair certificate for the airplane on August 24, 2000. According to an application for a third-class medical certificate submitted to the FAA, dated August 18, 2005, the pilot had accumulated 4,400 hours of flying experience. There is no record of the pilot applying to the FAA for a waiver to perform low-altitude aerobatic flight, nor is there an FAA designated special use aerobatic flight area located at the accident site.

The impact site is on ranch property owned by the pilot and his family. Ranch personnel buried the accident airplane wreckage on the property. The airplane was not examined by the NTSB.

The National Transportation Safety Board determines the probable cause(s) of this accident as follows: The pilot's failure to maintain altitude/clearance while performing intentional low-altitude aerobatic flight maneuvers. Factors associated with the accident are the low-altitude aerobatic flight maneuvers.

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Karl Keppen

Thoughts on Safety

Candid comments from IAC's "mishaps guru"

By Bruce Johnson

At least a couple of times a week, one of my airline colleagues forwards to me an e-mail video of some fascinating extreme flying or tragic crash footage; most likely it is from YouTube.com. When I click on the hyperlink, it sends me to the video in question. Under the virtual screen is a rating by the previous viewers, which can be anywhere from zero to five stars. I know that when it is rated four stars or above, the video that I'm about to view will be of a spectacular crash. The raters, it seems, prefer death over talent.

Over the last decade, those of us involved in safety at the IAC have tried to present to the membership information that hopefully will provide the tools to plan and execute safe aerobatic flight. The May safety issue features articles by some of our best pilots. Each IAC president has pushed mentoring as a key tool to educate new and existing members into the correct path for safe operations. Even though these urgings are sometimes poorly received, it is our hope that a seed will be planted that will grow into a realization that the mentor was acting in the member's best interest. Additionally, each month we present a review of recent aerobatic mishaps from National Transportation Safety Board reports so

you can learn from other's misfortunes. Reading the text of dry factual reports and analysis loses much of what could be learned from the accident. We have become a visual society. Our imaginations are not as keen as in the past to project from words, to a mind's eye picture, what really happened. Could YouTube.com be the answer? Could it be used as a tool and give us a clearer view of what actually happened in a particular mishap? As an investigator, it does for me. And almost every air show mishap has film footage.

In the last 12 months there have been four fatal air show or air show practice accidents. These have accounted for 36 percent of the overall mishap count. Of these, all have occurred in Extra 300 aircraft. These mishap pilots were experienced aerobatic pilots and were longtime IAC members. But in these cases, they were not in the IAC arena. Further, they were what I'll call "part-time" air show performers. By that I mean they were not involved in continuous work-ups and a full season schedule. What was their aerobatic flight currency? Who was involved in risk assessing the air show routine? Was an ICAS aerobatic competency evaluator (ACE) aware of the flight?

On March 21 of last year an Extra 300S crashed upon landing after practicing for an upcoming air show. For an experienced aerobatic pilot to perish in a landing mishap is mysterious. Early indications showed no mechanical anomalies. The landing may have been downwind. Was there a lapse in judgment?

An Extra 300 crashed during air show prep at Mojave, California, on August 16. Witnesses stated that the pilot was performing Cuban-eights and on the last loop did not clear the ground. The pilot survived with serious injuries.

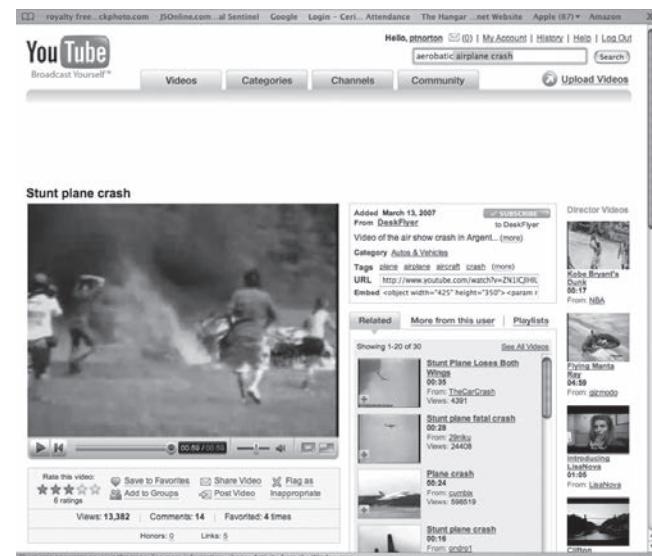
At Tucumcari, New Mexico, (4,000 feet MSL) on October 4, the mishap pilot flying his Extra 300L was involved in a fatal air show mishap. The pilot was from Tulsa, Oklahoma (600 feet MSL). It appeared from witness and video accounts that after exiting a loop the aircraft started to wing rock and was in an obvious high angle of attack situation. Density altitude may have been a factor.

Just ten days later another Extra 300L crashed at Culpeper, Virginia. The air show pilot had indicated that she had just recently received a surface waiver (that could not be verified). The mishap maneuver was five snap rolls on a 45-degree downline. After the second snap the flight vector drifted to near vertical. At the completion of the last snap there was insufficient altitude to recover.

What did all of these mishaps have in common? They occurred while flying an Extra 300, the pilots loved to perform in front of a crowd, and they hit the ground. The Extra 300 is a fine aerobatic machine and has fantastic control harmonies. Yet the aircraft is what I call a "station wagon" and has more seats than needed for an air show performance. Most pilots purchase the 300L to give aerobatic instruction or to pass on the experience of aerobatics to others. But serious air show performances require an aircraft with lower wing loading and more power. With its extra weight, the Extra 300 may not be the desired choice to perform aerobatics to the surface.

What are some other air show safety issues? There have been those that have, shall we say, stepped off the reservation. Even though they had received ACE training counseling and approval, they succumbed to the thrill

"There is a large portion of society that attends a hockey game not to appreciate the athleticism of the players, but for the violence of the game, in particular, the inevitable fight that will break out. The same type of person attends air shows not to see our great aerobatic safety and control skills, but to see a crash."



Video of aerobatic accidents that are available on the internet, such as this example from YouTube (www.youtube.com), may help pilots understand what actually happened during a mishap.

of the crowd and chose to disregard these established rules and deviated from their ACE approved flight plan. And some have died for the mistake. If you are a person without self-discipline, are unwilling to adhere to the directives of your ICAS ACE, or are impulsive, my suggestion to you is to stay away from air show flying. Your family and friends will thank you!

Currency and risk assessment are paramount in any endeavor where you could lose your life. U.S. military fighter aviation uses high-risk, low-altitude extreme maneuvering as a part of its operations. Even though each pilot is thoroughly acquainted with these maneuvers at altitude, each pilot must complete as much as a five-sortie checkout that steps him down into the high-threat, low-altitude arena. What's more, and I think more important, is that the requirement for currency is most stringent. As an example, if a pilot has not performed low-altitude attack tactics in the preceding 30 days, he must be chased by an instructor (or have him in the back seat) and complete a recurrent one-sortie checkout. In any case, every mission is risk-assessed by another set of eyes to determine if anything is overlooked. Do air show performers seek out their ACE after an extended layoff or step up the floor for their practice sessions? Does the part-time performer risk-assess each air show environment to include density altitude and wind? How about assessing his or her own health? We would hope so, but it doesn't always happen.

There is a large portion of society that attends a hockey game not to appreciate the athleticism of the players, but for the violence of the game, in particular, the inevitable fight that will break out. The same type of person attends air shows not to see our great aerobatic safety and control skills, but to see a crash. And now, with YouTube.com, these voyeurs don't even have to pay the price of gate admission. They're just a click away for a sick thrill. Are five stars in your future? Let's hope not. If air shows are in your plans, get the proper mentoring and check your ego at the airport gate. Better pilots than you are no longer with us because they didn't.

Inverted Spins



DeKevin Thornton

Fear or misinformation?

By Bill Finagin

Inverted spins ... why does that term cause fear and trepidation in many pilots? Just where, exactly, does this fear come from? Is it the fear of an airplane failing to "come out" of an inverted spin? Does it come from misinformation that is amplified by "macho pilots?" Regardless of your answer, let us examine some myths and then discuss an inverted spin.

First, let's try to erase all the myths and garbage we have heard from many well-meaning pilots (or "baloney artists" who masquerade as pilots) and try to understand just what is taking place in an inverted spin. Not unlike a marathon runner or a rifle expert or a skier, we must first master the basics. A good starting point is to master flying inverted. Practice flying straight and level until you are comfortable being "upside down." Next, try turning 90 degrees right and left and recovering straight ahead while flying inverted. Note here that to turn right (as viewed from the cockpit) you must lower the right wing toward the ground. This requires deflecting the stick to the left, which feels very unnatural. Next, try practicing simple, straightforward stalls while inverted. Remember, unless you have installed an inclinometer (upside down) do not look at the ball – it will not tell you anything. Some of you might be so smart that you recall that the instrument might be useful if you look at the small air bubble. You are technically correct, but in general just remember that the ball does not work when upside down.

After practicing stalls and recoveries upside down you are ready to progress to inverted spins. Hopefully they will seem less scary when considered simply as the next step in a progression of inverted maneuvers. Before spinning, let's review what the controls are doing when flying inverted. We begin with the stick. Flying straight and level while inverted, we see, if we look to the side, that we must generally keep a slightly higher angle of attack in most aircraft than when flying right side up, particularly if we are using a sighting device as our reference. It feels strange using the stick, because movement appears to be reversed in that you push the stick forward to gain altitude and pull the stick rearward to lower altitude. Next we examine the roll, or the aileron movement, in a turn. In order to bank right in a right turn (as viewed from the cockpit), we will lower the right wing toward the ground by moving the stick to the LEFT. Try to remember that you are effectively rolling left to turn right. Don't get hung up on these facts; just continue and keep learning – arguing just stops your learning process.

A good technique that might help you to understand control inputs is to get a model or use your right hand to "hangar fly" the maneuver. If you always use your right hand as the "airplane" when hangar flying, you will see that your thumb is always going to point in the direction of a left turn. Simply lower your thumb toward the ground and turn in your thumb's direction. Why are these seemingly trivial items important? We will see momentarily in the flying.

Now we are going to do our first inverted spin. We are, for this discussion, flying in a Pitts S2C. We are tooling along at about 120 mph. We now roll the aircraft to inverted, nice and easy, remembering to use sky rudder to keep the nose from falling toward the ground. Once we are upside down we keep things straight and level toward a point in front of the aircraft's nose. We reduce throttle, keeping an eye on the airspeed indicator, just glancing at it every five seconds or so because our primary attention should be on keeping the nose straight and increasing our angle of attack to maintain altitude. As we reduce our power to idle and continue to raise the nose

skyward, we will eventually feel a stall coming on. Add a final full forward deflection of the stick as the stall occurs. It is exactly like the one we use when upright, except our senses are all "screwed up" and it feels very different. As it stalls we push either the left or right rudder all the way to the firewall and keep it there. With the stick fully forward and the rudder fully deflected, let's say to the left, the plane will begin to spin to the left (as viewed from the cockpit).

Let's stop here and define a little more thoroughly just what is going on in an inverted spin and how one should describe it. There are two perspectives, one from the cockpit and another from the ground. From now on, we will define an inverted spin to the left or right based on which rudder pedal is being applied. Always describe the inverted spin as "inverted left rudder spin" or "inverted right rudder spin." If you are inverted spinning with the left rudder pedal depressed to the firewall, you will look over the nose and see that it is moving to the left. If you are pressing the right rudder in an inverted spin, the nose will be moving to the right.



Courtesy Bill Finigan

Knowing what the airplane looks like from the ground helps pilots understand the effect of control inputs. Contests provide an excellent opportunity to develop your "ground perspective" as you watch competitors fly.

“...and as a consequence you will most likely fly like a gorilla and overcontrol your airplane.”

In this example flight we are inverted and spinning with the stick held fully forward and the rudder pedal fully depressed to the left; thus, by definition we are in an inverted left rudder spin. Looking over the nose, which is where our eyes are supposed to be 95 percent of the time, we will see that the nose is moving to the left in relation to the ground. So, before we go brain-dead from our new maneuver, we simply reverse the rudder, remembering that the nose always moves toward too much rudder, and observe the nose to slow down in rotation. As it comes almost to a stop, we now release the forward pressure on the stick and let it come back to the neutral position. Keeping the rudder pedals still and in a neutral position, we then push the stick forward to recover straight and level in the inverted position. Our second choice is to recover into an upright position by continuing to pull the stick back after stopping the rotation, so we recover in the upright position.

Always do this training with an instructor in the airplane with you. It makes it much safer, and he/she can tell you about mistakes you have made or suggest small corrections that can greatly improve your technique and quality of the maneuver.

COMMON ERRORS

First and foremost is the fact that you are pumping a lot of adrenalin in your body, and as a consequence you will most likely fly like a gorilla and overcontrol your airplane. That is why training is so important. You want to make it feel natural, and only by practicing can that be accomplished. Second, almost all new students will not hold the stick fully forward. Remember your first roll? How many of us really completed that first roll? I can tell you that, of the people flying with me the first time they attempted an “unassisted aileron roll,” 80 percent stopped less than half way around. Heck, I did, and I was in a Champ 7AC at 2,000

feet with no training and no backseat instructor. I was also a very stupid 17 years old! That story is a candidate for the “never again” column!

The third item many pilots screw up is the rudder position. They forget to hold the rudder pedal fully depressed. Not purposefully, just brain-dumb! But, the combination of incorrect stick and faulty rudder pedal pressure can create some quite interesting figures.

So, let's move along after practicing the inverted right and left rudder spins to a more advanced inverted spin. We will tackle the inverted flat spin. Just reading this will give some the “willies” (no pun intended!). Remember, when doing the upright flat spin we must spin to the left in the Pitts because of the engine turning clockwise, as viewed from the cockpit, and thus causing gyroscopic moments that will raise the nose when going left while advancing the throttle. Since we are inverted, we must realize that our inverted flat spin must be done to the right, which means using right rudder pedal deflection.

We are cruising at about 120 mph, and we slowly roll to the inverted position, keeping the nose straightforward, wings level, and our flight path level while remembering to keep our eyes over the nose of the aircraft most of the time. We begin to reduce the power and slow the aircraft. We push the stick forward to maintain altitude as well and to compensate for the changing angle of attack that we must keep increasing. Removing any remaining power will bring us to a stall rather quickly. When the stall warning comes we will lead a slight amount of right rudder to ensure the right wing stalls first and we will rotate to the right. As the aircraft stalls we push full right rudder pedal as we continue to hold the stick fully forward. As the plane enters the spin (watching the nose move to the right in relation to the ground) we will now move the stick to the full right

forward position. Most of us will call this “in stick aileron,” as the stick is on the inside of the rotation of the aircraft. By moving the stick toward the right, the right wing ailerons move toward the ground, thus creating more lift and more drag at the same time. The right wing lifts and makes the right and left wings more horizontal to the earth as the plane rotates in a tighter (smaller) diameter, thus increasing the rate of rotation.

As soon as you move the stick to the right, increase your throttle to cruise power. This will effectively increase the prop blast over your elevator, which is deflected toward the sky (remember, the stick is still forward), and the tail appears to move faster toward the earth, thus giving you the effect that the nose is raising more to the sky. We are now in a fully developed flat spin. Now we will reverse the procedure to recover.

First we reduce the power; next, we remove the ailerons by centering the stick while maintaining a fully forward deflection. We are now in the exact same position as we were in recovering from the previous inverted spin. We'll recover using the same technique: opposite rudder until slowing to almost no rotation. Then, as you hold neutral rudder, let the stick passively come back to neutral and recover from the dive.

We will discuss other inverted spins in a future article. Read and reread this article. It is a beginning. There are other techniques, and some contain things that will be done differently as you progress. However, this is the basis for a strong foundation. Much stronger than trying to teach yourself at 17 years old! ☺



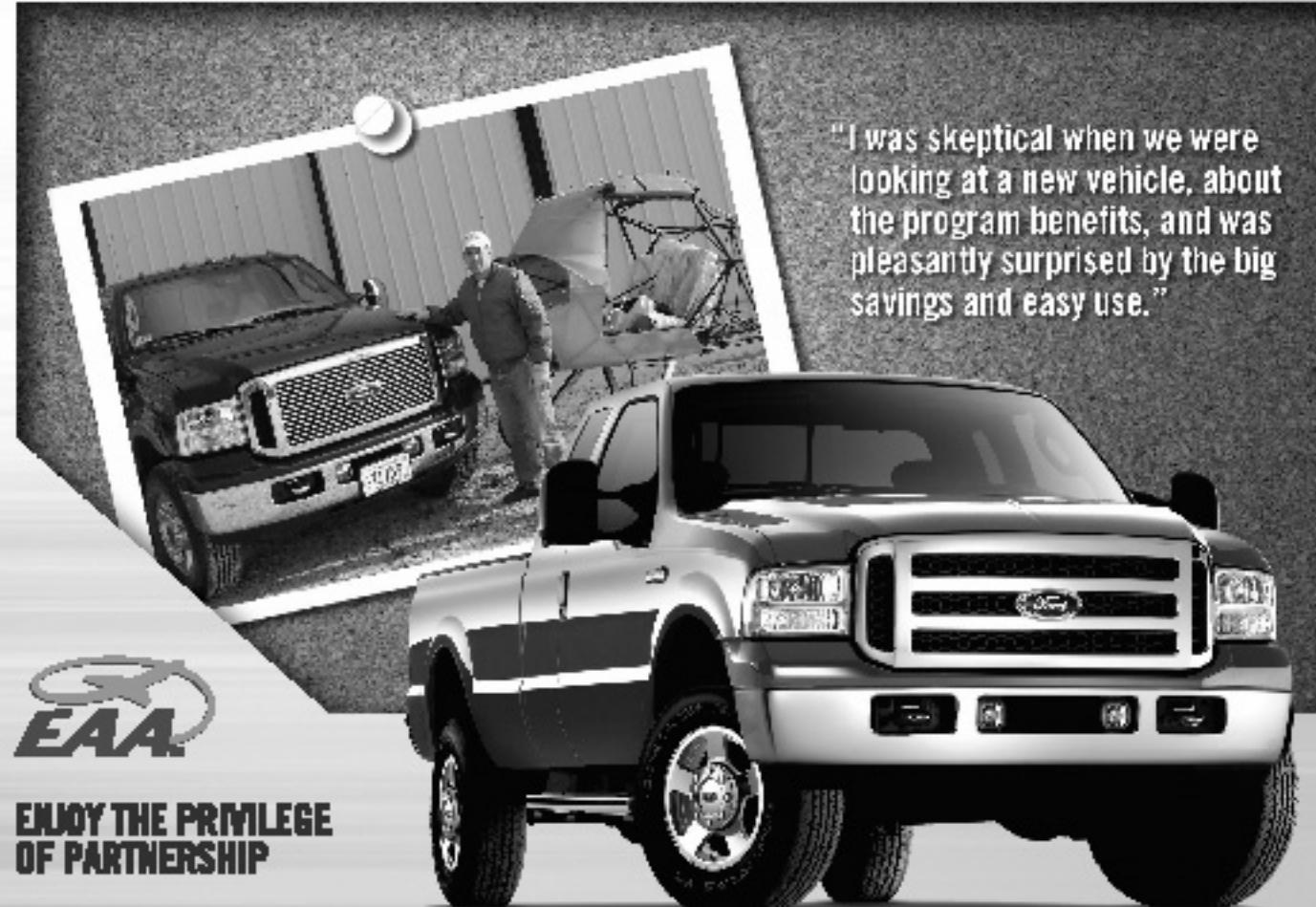
Courtesy Bill Finigan

Bill Finigan's reputation (most notably in Pitts aircraft) has taken him to instructing assignments throughout the world and attracted international students to his hangar.



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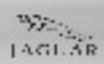
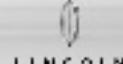
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WHY DO I NEED TRAINING?

An airline captain answers his own question

By Oliver Hasenberg

It was one of the greatest moments in my life when I arrived at a small airfield near my hometown in Germany. It has been a lifelong dream for me to own one of these great airplanes. Thanks to a friend of mine who owns a S-2A and has reasonable experience with various Pitts, we unloaded and assembled my airplane over the following three weeks. It took so long because I am commuting between Germany and Dubai, where I work as a captain on a Boeing 777 for Emirates Airlines.

I trained with my friend in his S-2A and got my check-out. This has been an interesting experience. Having made thousands of landings in different types of taildraggers, I thought landing a Pitts would be a piece of cake. I was wrong! Not that it's overly difficult; it's just different. In my nearly 12,500 hours of flying, I have never landed anything like the Pitts, and it took me more landings than I originally anticipated to get used to it and fly my first solo.

Eventually the great moment came – the first flight in my own airplane. I was stunned when I experienced how much better my single-place performed as compared to the double-holer I flew before. After a few basic maneuvers and an uneventful landing, I was a very happy man. However, there was also a slightly uncomfortable feeling, and I knew the cause of it. I was scared! Not of flying or landing, but of botching a maneuver and ending up in a situation I have never been in before, like an inverted flat spin. Things which are known to have greedily claimed the lives of Pitts pilots.

When I decided to buy the Pitts, I thought I could just climb into it and start practicing aerobatics on my own based on training I received 15 years ago. That was simply not the case. Also, I soon realized this airplane and the type of flying I intended to practice were beyond my capabilities, and I needed training again.

Admitting that you need training even though you are a high-time pilot with lots of experience in all sorts of airplanes is not exactly ego boosting. As most of us know, pilots have strong egos, and the urge to avoid training comes almost naturally. I guess it is because we perceive criticism as something negative, albeit we know that critique is essential in any kind of training. I hardly know a professional pilot in my company who enjoys having a training flight (not a checkride) in the simulator, even though it is one of the greatest training tools we have.

So, here I am with my shiny new airplane and insufficient experience to make use of it properly. After some research I realized two things. First, there are a lot of myths out there about spinning in general and spinning a Pitts especially. Second, and more importantly, there is no substitute for practical training with a good instructor. I knew a lot about spin-recovery techniques, but would I be able to apply these techniques if I entered an inadvertent inverted flat spin from a botched hammerhead? I wasn't 100 percent certain, so I decided to seek instruction from

Courtesy Oliver Hasenberg



When purchasing your dream airplane, remember to factor specialized training into the equation, even if that means traveling to a different country.

a specialist. Thanks to the Internet, information about flight schools and/or instructors can be easily obtained, and for various reasons I chose to ask Bill Finagin if he could teach me everything I need to know about spins. Among these reasons were that he has a very good reputation and lots of experience in the Pitts, and last but not least he is located on the East Coast, which is more conveniently located for me coming from Dubai.

I met Bill the day before our first flight, and we discussed what my goals were. He gave me a thorough briefing on what we were going to do on the next two days. We spent the next two days flying for about two hours a day with a break in between. We started off with the upright stuff, which I thought I was familiar with, but the vertigo effect after coming out of an 18-turn spin caught me by surprise. After completing the upright spin variations, Bill introduced me to inverted spinning, which we continued for most of the second day. This was a whole new world to me. I would not have wanted to discover this world on my own, but with the help of a good instructor it became a pleasant experience. The four-hour training enabled me to recognize different types of spins, execute them myself, and recover safely. Now, I feel a lot more competent and confident to do aerobatics and spins in my airplane, and I enjoy flying my Pitts a lot more than before. Thanks, Bill!

Since I started my airline career some 17 years ago, I have gone through the most extensive training programs, and I will continue to do so to keep flying safely for my passengers, my crew, and myself, regardless of flying a Boeing 777 or my Pitts. I think you can do the same,

"ADMITTING THAT YOU NEED TRAINING EVEN THOUGH YOU ARE A HIGH-TIME PILOT WITH LOTS OF EXPERIENCE IN ALL SORTS OF AIRPLANES IS NOT EXACTLY EGO BOOSTING."

whether you are flying for fun or for a living. Take advantage of the knowledge and experience of other people whenever you can, and realize that you can always learn something new even though you have lots of experience. I am glad that I decided to seek out training from a competent person despite my initial hesitation to do so. It might have worked out, but I could also be a smoking hole in the ground. Like Albert Einstein once said: "Do not stop asking questions." ☺

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SAFETY ISSUE

Bed & Breakfast . . .

Bonnie Kratz

"Learning to manipulate an aircraft beyond the familiarity of level flight is the same no matter where your goals will take you."

and Basic Aerobatics!



By Greg Koontz

When I was 7 years old my father, a corporate pilot, did something rare. He rented a private airplane and flew me to Gadsden, Alabama, for an air show. It was a huge event for me. Bill Sweet Airshows was putting on an extravaganza fitting for the 1960s. Bevo Howard, Hal Krier, and Dick Schram headlined the show. On the flight home I told my dad that I was going to be an air show pilot.

At age 19 I bought a Cub from Ernie Moser in St. Augustine, Florida. He wanted to use it for his flying circus, so I struck a deal—I got to do the comedy act for \$100, and he got to use the Cub for his other acts. Now I was an air show pilot, and I soon joined the group full time and started instructing. Back then, if you could successfully loop a Citabria, you were assigned

the role of aerobatic instructor. I muddled through students and, after teaching who knows what to my first victims, learned the trade. Of course, like many of us, I owe many thanks to Duane Cole and those classic books he wrote so long ago. For more than 30 years I have learned from my peers and my students. Today I find no side of aerobatics more important than safety-oriented training.

The Federal Aviation Administration (FAA) takes a very cautious approach to aerobatics. It defines aerobatics as only a limit to bank and roll, or an excursion from normal flight. They tell us how high to do maneuvers, and where to do them, and add the requirement of parachutes if a passenger is involved. What they so carefully avoid is telling us specifically what a loop or roll is! And can we blame them? I can't find two instructors who teach an aileron roll the same or agree on the logical course of an aerobatic curriculum. While aerobatic instruction has plenty of room for individual style, there are right and wrong ways to teach.



Courtesy Greg Koontz

Greg Koontz opened his Sky Country Lodge in Ashville, Alabama, to provide grass strip, grass roots aerobatic training in a bed and breakfast environment.

Choosing a good instructor is very basic. I admit that I learned as I went, stumbling through students while learning by my mistakes. I asked for advice and was fortunate to be surrounded by talented pilots. Today training has become more formal and sophisticated (although basic principles remain the same) and there are some fine schools out there. The tough part for the aspiring aerobatic pilot is identifying a quality program. Here is a basic checklist that will help students find a safe way along what can be a very confusing path.

Look for experience in the school's instructors. Not everyone gets to compete, so we shouldn't limit any search to that one criteria. We should be looking for someone who has had professional instruction and is involved with organized aerobatics through associations such as the International Aerobatic Club (IAC). Avoid the pilot who became an aerobatic instructor based solely on the fact that he or she just bought a Citabria!

Consider credentials. Our sport has benefited a great deal from the introduction of the Master Instructor program. The National Association of Flight Instructors (NAFI) is a progressive organization that is dedicated to professionalism in flight instruction. It is a good source for research. The FAA has recently started looking into a new flight instructor program designed around the concept of pilot qualifications. The yet-to-be-named program is intended to replace or build upon the old Gold Seal Instructor and the more recent Master Instructor by encouraging actual advanced training and accountability of skills rather than a previous record of some level of success. The idea is to offer instructors a way of showing their credentials by a certificate notation saying they have received specific training in how to teach basic aerobatics, aircraft upset situations,

Just being a pilot takes a commitment to maintain proficiency, but being an aerobatic pilot is a step more intense. A training program needs consistency so you are building on a fresh foundation.

spins, and conventional-gear aircraft. This would give the student something specific to look for when searching for that elusive aerobatic instructor. Hopefully it will also serve to discourage the "fly-by-night" operators. Stay tuned.

Understand the commitment. A few years ago I bought a little bass boat and took up fishing. I don't have much time for it, but now and then I dust off the boat and go out on the lake and take up the hobby right where I left off. What's that got to do with aerobatics? Nothing, and that's my point. Just being a pilot takes a commitment to maintain proficiency, but being an aerobatic pilot is a step more intense. A training program needs consistency so you are building on a fresh foundation. I ask my students to come stay at my school until they complete the basic aerobatic course in one visit. This gives me a chance to critique each flight and build on the next while everything is fresh. Instructing is like painting a picture in a person's mind. Every time I go to add to the picture, I need the previous work to still be there. This holds true for the hours of practice that follow. Practice and critique need to be a steady program to achieve positive results. This sport takes time and money, and both need to be available at the same time.

Review the curriculum and look for a strong foundation. In 2002 I took an early retirement from a corporate flying job to put my aerobatic school into full-time status. I'm flying more than a hundred students each year at my fly-in bed-and-breakfast. They come to learn upset training, spins, tailwheel flying, and basic aerobatics. They are doctors, lawyers, businesspeople, and professional pilots. Some have bought an American Champion product (my sponsor) and want a checkout. Some want to prepare for entering a contest. Others want to learn a sport, and most simply want to improve what they love, which is flying. Regardless of the motivation, it all boils down to starting with the basics. My upset training course looks just exactly like my basic aerobatic course. It has to. The physics are the same. Learning to manipulate an aircraft beyond the familiarity of level flight is the same no matter where your goals will take you. So my training curriculum starts with reviewing the principles of flight and then showing how they apply to aerobatics. The next layer is a few maneuvers designed to build the kind of orientation skills required for aerobatics, and then finally I start a layer of aerobatic maneuvers. I prefer doing the four fundamental maneuvers in the order of rolls, loops, hammerheads, then spins. This allows me to have the roll skills started early so I can mold and improve on them during each subsequent flight. I wait until the last lesson plan to introduce spins so my student has time to acclimate to all these crazy gyrations! Each instructor will have his or her own style and preference, but in the end we all should be achieving the same foundation.

Invest in the basics. As a rule, most pilots want to learn too quickly. Bigger is better, faster is greater. There is no rest until we get to that super-duper airplane, be it a Lear or an Edge 540. But every pilot starts somewhere, and that somewhere must be rooted in the basics if it is going to help them reach their ultimate flying goal.

Hey, we instructors are prone to grandiosity, too. Who wants to be a lowly basic acro instructor when the excitement and recognition is in that high-performance mount?

They are super fun to fly and can do mighty feats! As instructors we have to be careful that we are not trying to move Primary pilots along too quickly. It is not doing our sport a favor. What we really need is a push to emphasize Primary and Sportsman aerobatics. Boy, do we need the boost. Our sport is the most exciting sport to participate in and the most confusing to start. There are so many affordable and fun-to-fly aircraft that would do well in the beginning categories, and we tend to pass over them as we put so much attention to the upper categories. All of my contest experience comes from Sportsman, and if you have not been there lately, or at all, I'm here to tell you it's a blast!

Set clear goals. When my students arrive for a couple of days of personal instruction, the first thing I do is strike up a conversation about their goals. Those with a goal in sport aerobatics start the same as anyone, but their intent to continue in the sport leads us eventually down another route. The start, much to everyone's surprise, is a lesson in stick and rudder. Most of us can fly our regular aircraft just fine, but many of us have stored the technical parts of our control movements in the deep wrinkles of our brains. I first drag that stuff back to the surface where I begin the first layer of the foundation. Then, after steep turns, slow flight, and stalls, finally come the rolls. Not a slow roll, but the fundamental aileron roll. Let's put the foundation down in simple and strong layers. Loops and hammerheads follow in later lessons, and the program ends with a good cleaning of all those spin bugaboos.

So what happens next? Rolling 360s? Outside loops? Maybe a good gyroscopic sequence? Nope. We focus



Courtesy Greg Koontz
As an aerobatic competency evaluator, Greg evaluates the competency of air show pilots that wish to perform low level aerobatics.

on mastering the basics—shoring up that foundation. Once a student is ready to solo the four basic maneuvers (rolls, loops, hammerheads, and spins) I send them out to practice. But practice is not productive if not critiqued regularly. My advice to my students is to latch up immediately with an IAC chapter, go to the meetings, go to the practice days, and, before he burns up much fuel, pick a mentor. That's right; I give my students away after a basic course and ask them to find a local expert. Then, with great faith, I depend on this mentor to carefully monitor their progress. When the time comes to add on, a good mentor will send my student back to me or to any one of many experienced instructors so his or her program will continue to build in a logical order.

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Bonnie Kraatz

Building a safe aerobatic foundation often starts with a review of basic stick and rudder technique.

Safety first. Now comes safety, and nothing is more basic. I am very proud of our record at IAC contests. Not too long ago a student of mine reported that the safety check at his first contest was "picky." He even had to open up the back inspection plate of his Acro Sport to please the inspector. That's great! We set a great example at the contests. But what happens in everyday flying when the safety inspector is not looking over your shoulder? I know of some pilots who actually believe preflight planning and inspection make them appear to be inexperienced. In the corporate world I almost never saw the high-time captains working a full weight and balance. It seemed they were just kicking the tires and lighting the fires! Of course, they did have advanced experience and intuitive judgment, something learned by computing many a take-off and endless weight-and-balance sheets. But why take a chance? Let beginners and spectators witness your safety habits so there is no misunderstanding.

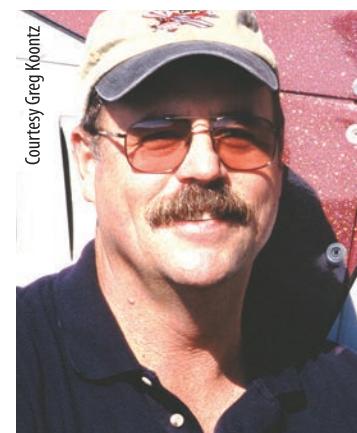
Pick the right airplane. Obviously safety comes with the right equipment. A good airworthy aircraft selected correctly for its task is imperative. A well-chosen parachute can make a big difference. Comfort is essential to your happiness in that little cockpit, but also be sure your rigging is correct for the way you need to sit, and your path clear to the exit. Parachutes are very personal and should fit your needs, including your aircraft speed, your weight, and your experience as a jumper.

Thinking beyond equipment drives me right back to the basics. I do aerobatic competency evaluations, where experienced pilots come to demonstrate their abilities and acquire a low-level air show aerobatic waiver. I often have the privilege of watching some really beautiful aerial demonstrations that are destined to entertain thousands. On rare occasions I watch someone who struggles. That person is usually delinquent in his or her practice, and I see the flaws caused by a poor foundation. I have asked for the required inverted spins, only to be told that he or she has never flown them...yet the practical test standards clearly demand them. I just cannot imagine doing aggressive low aerobatics and avoiding such an important safety factor. We have friends who are avoiding certain parts of their flying. As we guide pilots through the maze of beginning aerobatics, we must be committed to mak-

ing sure everyone has good basic instruction and current practice on those maneuvers they need for safe recoveries, even though they do not intend to use them in their flights.

My methods of teaching the basics of aerobatics are surely unique and will differ from an equally solid program taught by any number of qualified aerobatic instructors. What all of those solid programs have in common is that they are based on mastering the basics and understanding what works. Being unique is what every instructor has to offer. Years ago I taught at a school so busy that all I had was a back-to-back schedule of hour-and-a-half slots to teach everything from private pilots to aerobatics to multiengine courses and so on. It was hard work, paid poorly, and left little time for quality. Today I have developed an entirely new concept. My humble little school is located on a private grass strip far away from any congestion. The aerobatic box is right over the strip. You can sit on the porch and critique! I made my house into a bed-and-breakfast so my students can stay right on the runway. This creates a relaxed and friendly atmosphere where students can immerse themselves into the program. Unless otherwise requested, I limit my students to two people at a time so when a person comes here to train, it is more like staying with a personal trainer for a couple of days. We get up in the morning for a good breakfast (hey, we said it was a B&B) followed by ground school, and then we fly as the day progresses. Most students can fly two aerobatic lessons a day, so with two students we fly a total of four flights a day around the extensive ground sessions. Then comes time to light up the grill and have a relaxed evening. As you can tell, it is very fortunate that I like to cook almost as much as I love to fly!

The important thing is to know that there are different styles of teaching, different personalities, and different aerobatic goals. Helping students find the place where they will be the most successful is our shared interest. I happen to prefer serving up aerobatics with a side of bacon. It works for my students, and that's what it is all about. 



Courtesy Greg Koontz

Greg Koontz has held a flight instructor certificate since 1972. Of his 22,000 flight hours 7,000 have been as a flight instructor. He has flown most aerobatic types as well as 165 total types of aircraft. Greg spent 20 years as a corporate pilot and retired in 2002 to expand his aerobatic business into a full-time operation. He performs in about 16 air shows each year, and his major sponsor is American Champion Aircraft. Greg operates Sky Country Lodge as his home base and aerobatic flying school. You can learn more about his school at www.GKairshows.com or contact him at Greg@GKairshows.com.

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FLY the Wing

**So . . . how many stall
speeds does your
airplane have?**

By Paul Logue

This article is printed with permission from Aviation Safety magazine, where it originally appeared in the April 2007 issue.

I continue to be surprised about pilots having accidents while doing maneuvers close to the ground. This list of pilots includes a wide variety of backgrounds, including air show performers, flight instructors, military pilots, and general aviation pilots. It seems to me that some have forgotten or misplaced the early-learned information concerning the relationship between g's and wing stall speed.

Even though there are many factors contributing to wing stall, in this article I will use "wing stall" as an indication of the reduction of lift and corresponding increase in drag when the critical angle of attack of the wing is exceeded. As that statement hints, and as we shall see, a wing can be stalled at any airspeed; all we have to do is exceed the critical angle of attack.

Recently, while performing a "review" preflight briefing with a pilot, we were sitting in the airplane and I was asking him some questions about the various airplane speeds. I asked, "What is the stall speed of the wing?" I could see that he was not sure what to look at, and I reminded him of the arcs on the indicator. "Oh, yes," he said, "The stall speed would be the bottom of the green arc." I reminded him that the bottom of the white arc was the stall speed with full flaps, and the bottom of the green arc was the stall speed without flaps. I asked him, "Under what conditions does this represent the stall speed?" He hesitated and said, "Gross weight?" Yes, and what else? "I don't know," he said. I replied, "In addition to what you have said, the bottom of the green arc is the stall speed under 1g." I felt the necessity to stop, pull out my blank tablet, and do some arithmetic. "Let's review," I said.

The stall speed of the wing at any g is equal to the stall speed of the wing at 1g times the square root of the g. We then used some real numbers for different situations, and it can be startling, to say the least. In our primary training, the first place this relationship shows up is when we are doing steep turns. It is during these 45- to 60-degree bank turns that we can experience our first 2-plus g's.

So the stall speed of the wing in this turn is the stall speed of the wing at 1g times the square root of 2, which is 1.41. That is a 41 percent increase in stall speed while in this turn. It is here that the student first experiences the "accelerated" or "high-speed" stall. In many cases, this knowledge is left there in the private pilot curriculum and is never correlated to the dangers we can encounter in our future flying activities.

Now let us fast forward to a common example experienced by many certificated pilots. The pilot and pas-

senger-friend are pleasure-flying around the local lake or perhaps the friend's neighborhood, doing turns around a point. To keep on top of the point, it is necessary to increase the bank to perhaps as much as 60 to 75 degrees. If the g-load reaches 4, the wing will now have a new wing stall speed equal to the stall speed at 1g times the square root of 4, or twice the 1g stall speed. So with a 1g stall speed of 60, the new stall speed will be 120. That is a 100 percent increase!

So, if the airplane's speed is not above the new stall speed and the airplane is 500 feet above the ground, what do you think the outcome will be? Yes, the wing will stall; and if the pilot is not coordinated, the wing will drop off to one side or the other. Normally, the airplane will drop off toward the ground, since the pilot is typically holding more bottom (inside) rudder than top (outside) rudder. This, of course, results in a spin very close to the ground and is hardly ever recoverable.

Does this scenario sound familiar? It should; it's the old story we often hear about when a pilot overshoots the turn to final from base and increases bank and rudder to get back to the extended centerline. Typically it's a case of not remembering about those "accelerated" stalls from primary training. Although we think of these as spin accidents, they are sometimes initially caused by not being aware of the g-versus-stall-speed relationship of the wing.

Recently, we may have witnessed a



Courtesy Paul Logue

When Paul takes his Pitts S-2A vertical, the stall speed of the wing changes as the g's build.

very public demonstration of an accelerated stall while turning: the Cory Lidle accident. Apparently, Lidle and his instructor were making a downwind 180-degree turn. The NTSB, in its preliminary report, determined Lidle's Cirrus SR20 needed at least 53 degrees of bank to make the turn. So, if the pilot saw he wasn't going to make it, he may have increased the bank beyond 60 degrees in an effort to make the turn. If such a turn was attempted and if the pilot didn't increase airspeed to above the high-g

"The stall speed of the wing at any g is equal to the stall speed of the wing at 1g times the square root of the g... the first place this shows up is when we are doing steep turns."



Paul has helped many students understand that airplanes have different stall speeds under different flight conditions.

stall speed, the wing would stall and the airplane would begin a trajectory away from the desired turn path. If the pilot did increase the speed to compensate for the increased *g*-load, he would have increased the radius of turn of the aircraft, with the effect of almost ensuring the airplane would hit the building.

Another scenario where this "V-*g*" relationship is forgotten is during the steep approach to landing with power off and, during the last minute, an attempt to flare above the runway. Often this pull to the flare exceeds 1*g*. The result is an increase in stall speed of approximately 20 percent to 40 percent down near the runway. A typical result is the airplane passing into the well-known "area of reverse command." In other words, as the pilot pitches the nose *up* to the flare, the wing slows to stall speed and the airplane continues its *descent toward the runway*. The result is a hard (sometimes very hard) landing, rather than leveling off just above the runway and smoothly sliding on the mains.

Similarly, we see this occurring when the pilot is using a hard slip to make his descent to the runway, where it is not unusual to reach 500 to 1,000 fpm. If a high-speed stall occurs during the flare it makes for a very hard landing and possibly aircraft damage, personal injury, or worse.

The most alarming occurrences of V-*g* relationship violations probably come from professional pilots per-

forming at air shows. Several times a year we see or hear of an experienced pilot hitting the ground very hard when trying to complete a simple looping maneuver. When performing a loop and allowing the airplane to get too close to the ground at the bottom, it is necessary to pull harder in an effort to keep from hitting the ground. This results in a high-*g* pull, and without the proper speed a high-speed stall occurs, causing an increase in descent. Many times, the "turn radius versus speed relationship" is violated prior to the V-*g* relationship. This is particularly true of the incidents involving military demonstration pilots. High speed means bigger radii, and so even with all their great power-to-weight ratios, military fighters are not exempt from violating these basic relationships with speed, *g* forces, and turn radius.

Upset training for pilots of varied backgrounds is becoming very popular these days. The V-*g* diagram for your aircraft can prove to be very interesting in this regard. If you don't have one for your aircraft, you can make one using this equation:

$$V_g(g) = V_g(1g) \times \text{square root of the } g$$

One of the popular scenarios in this type of training course is the one that puts the airplane in a bank beyond 90 degrees, as might be encountered by flying into wake turbulence or bad weather. This can put the wing close to

its 1*g* stall speed; an attempt to recover by pulling and rolling can cause a higher *g* and a stall, perhaps followed soon afterward by loss of control.

If we are at the 1*g* stall speed and inverted, we should add power and push the stick or yoke forward, which will reduce the *g*-load and the stall speed (since it always corresponds to the new *g*-load). Now we can safely use the controls to roll the airplane to the upright position without fear of stalling the wing.

Even practicing aerobatics, these attitudes can be encountered unexpectedly, and if the nose is pointed downward and inverted, speed builds up rather quickly. The *g*-load occurring as a result of the pullout from this attitude can be easily outside the V-*g* envelope.

The training for this recovery includes not only throttling back, but also pushing enough to "unload" the wing (remove the high *g*) and lower the stall speed. Follow the push to unload the airplane with a simple roll—without pulling again to safely recover the airplane to upright level flight.

It should be noted that our *g* meters are built to indicate *g*'s for straight pulls or pushes. For rolling pulls, it is recommended that we adjust the maximum *g* to about two-thirds of the published maximum for straight pulls or pushes. So if the published maximum *g*-load of your airplane is 6 and you perform a rolling pull to 6 *g*'s, you have more than likely exceeded the aircraft's limitation.

Lastly, for aerobatic pilots, when you demonstrate a hammerhead turn to a pilot and ask him or her to look at the airspeed at the top of it, he or she is amazed at what they see on the airspeed indicator. This is a good time for you to review this V-*g* relationship.

So, how many stall speeds does your airplane have? ☺

Paul Logue (ATP, CFII-MSEL, IAC judge, and competitor) is a retired corporate pilot living in Suwanee, Georgia. He has been an International Aerobic Club member since 1970 and has flown the Pitts Special series since 1972, after his checkout with Marion Cole. His current airplane is a Laser 230 and, after nearly 18,000 flying hours, the Laser is keeping him busy learning to fly aerobatic figures in his first aerobatic monoplane.

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Back row from the left: Dan Clark, David Martin, Goody Thomas, Robert Armstrong, Zach Heffley, Michael Racy
Front row from the left: Debby Rihn-Harvey, Vicki Cruse, Melissa Andrzejewski, Allyson Parker-Lauck, Chandy Clanton

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Meet the Candidates

By Ann Salcedo, IAC Board of Directors Nominations/Elections Chair

Once again it is time for elections of officers and directors to the IAC board of directors. Up for re-election this term are two officer positions (president and vice president) and three director positions (northeast, southeast, and southwest). Ballots will be sent out to all current IAC members giving you the opportunity to vote.

All ballots and proxy cards need to be received by IAC headquarters as soon as possible, and no later than July 24, 2007. Ballots and proxies will be accepted by mail or by fax. For your ballot votes to be counted, you must completely follow the directions as written on the ballot. I will announce all newly elected officers and directors at the IAC Annual Membership Meeting held on Friday, July 27, 2007, at AirVenture in Oshkosh, Wisconsin. I wish each candidate the best of luck!



Vicki Cruse
Candidate for President

In a way, it doesn't seem like it's been two years since I was coerced into this job by outgoing president Gerry Molidor, and yet, in another, it seems like a long time. I've decided to run again for this position because two years hasn't been long enough to work with you to see some important

projects through to completion.

In the past two years, I've established a Strategic Planning Committee charged with ensuring that the future direction of the club will address *all* our members' interests. I want to make certain you get the value you are looking for in your membership dollar. We started with making the magazine a priority. We have a fantastic editor with a vision to create a magazine that addresses all IAC members and their interests, not just competition pilots. It is hard to please everyone, but we are trying.

We also instilled an open door policy to listen to members' wishes and implement their requests. If you don't think we've listened, look what happened to the Category Change Proposal. Despite more than two years of work, it was voted down by the board because we didn't feel it accurately addressed the wishes of the majority of competition pilots.

We've automated a large portion of the website to handle contest scheduling and results, judges schools, and the regional series. This is but a small portion of the

plans we have for the web in the near future. We have formed a Government Relations Committee that assists members with aerobatic waivers and noise issues and that works collaboratively with the FAA on government policies affecting aerobatic flight. We also struck a relationship with Enterprise Rent-A-Car, giving IAC members discounts on cars for most contests.

However, my biggest wish I'd like to see through to completion is the Mastery of Flight (MoF) program, which is intended to introduce all general aviation pilots to the benefits of aerobatic training. We are also working on partnering with flight schools via MoF, establishing the IAC as the authority on aerobatic education and safety.

Most of all, I enjoy this "job," as frustrating and time-consuming as it may be sometimes. I've found a passion within the IAC, and I'd like to continue down the path a while longer. Thanks for all the support and especially for being a great group of people to work with to make the frustrations easier. Thank you for your vote.

... your opportunity to shape the future of the IAC



David Martin
Candidate for Vice President

I became interested in aerobatics after attending the 1968 U.S. National Aerobic Championships in Fort Worth, Texas, at the age of 9. My first aerobatics were in my grandfather's Fleet biplane. When I was 16, I started learning aerobatics in my family's 150 Aerobat. Duane Cole introduced me to competition aerobatics in a Decathlon when I was 18.

My first contest was in 1980. I flew intermediate in a Pitts S-2A. In 1992, I began competing seriously in my homebuilt Laser 200. I switched to an Extra 300S in 1994 and made the U.S. Aerobic Team in 1997. I have been on six teams and currently fly a CAP 232.

Although deeply involved in Unlimited competition, I have not lost interest in grass-roots aerobatics. I still enjoy basic aerobatics in my Bücker Jungmeister and just finished

rebuilding a clipped-wing Cub. I am interested in the history of aviation and specifically the history of aerobatics. During my life I have been influenced by knowing some of the great aerobatic pilots including Duane Cole, Charlie Hillard, and Leo Loudenslager.

My past accomplishments include 1999 Unlimited Champion, 2001 U.S. National Aerobic Champion, and winner of the Charlie Hillard Trophy, Harold Krier Cup, Bob Schnuerle Cup, and the Mike Murphy Trophy. I have also won a gold medal and three bronze medals at the World Aerobatic Championships.

I have been a member of the IAC since 1981 and have been on the IAC board of directors for the last four years. I look forward to working for you as a vice president of the IAC board.



Scott Poehlmann
Candidate for Vice President

I have been flying for more than 25 years and have been a member of

the IAC and an active competitor at Sportsman and Intermediate levels since 1997. Flying is my passion, not my career, and I, like the majority of our membership, must find a way to balance my passion with my work and family responsibilities. I think I represent a "typical" mid-level competition pilot, and as such I think that I am in a position to understand and reflect the concerns of much of our membership.

Our organization finds itself at a crossroads. We continue to see declining membership at a time when our sport faces numerous outside threats: the closing of airports and aerobatic boxes, noise complaints, and ever increasing costs for insurance, for aircraft, and for fuel. I have watched too many otherwise interested pilots leave the sport or drop to very minimal levels of activity because the sport has not managed to keep their

passion alive. We need to retain our current members and keep their interest. At the same time, we need to make our sport friendlier to those outside of it: to our family members, our fellow pilots, and the general public.

I cannot pretend to have all of the answers to these questions, but I do think that within the ranks of the membership that we can find the answers. I do know that we cannot keep our heads buried in the sand and continue to proceed in our well-worn tracks. I have attempted over my terms on the board of directors to encourage debate and discussion and to bring new ideas before the members for their consideration. I have also worked diligently to try to make our procedures more open and visible and to make this organization more user-friendly. I would be honored by the opportunity to continue to serve at this critical time.



Gregory D. Dungan, IAC 16628 *Candidate for Director*

I am again running for re-election as an IAC regional director and would very much like to have your vote. To help you determine if I deserve it, I would like to remind you about my background, my service to IAC to date, and why I think I should be re-elected to the board.

My interest in aerobatics sparked as a small boy growing up in the '60s and '70s watching the likes of Harold Krier, Duane Cole, Art Scholl, Leo Loudenslager, and countless other aerobatic pilots at countless air shows. Those guys were my heroes as a kid, and I knew that someday I wanted to become a pilot and learn to fly an airplane like that.

Growing up in a single-parent household provided few opportunities for learning to fly, so while in high school, I quit a better paying part-time job to take a job at my hometown airport fueling airplanes so I could earn enough money to learn to fly. I earned a private certificate in my junior year and soon after took my first aerobatic lesson in a Great Lakes biplane. I was hooked! Nothing I'd previously experienced came close to that feeling of being pressed hard into the seat during a loop or looking "up" to see the world below as my instructor showed me how to fly upside down.

Convinced I wanted a career in aviation, I continued flight training, receiving instrument, commercial, multiengine, and flight instructor and instrument instructor certificates.

Although a member of the IAC for the better part of two decades, my civil service career for the U.S. Navy at Patuxent River took up most of my spare time, until promotions and a change in career paths allowed me more time to pursue my aerobatic dreams.

I joined IAC Chapter 58 in Maytown, Pennsylvania, and purchased a Pitts S-1S. I also attended a judges school in 1997, and my experience there convinced me I might like to become a certified IAC judge. After gaining a few years of competition and judging experience, I became a national judge and later a judges school instructor. I started getting involved in the leadership of IAC Chapter 58, serving as its vice president for three years. Additionally, I started participating in judging and volunteering at the U.S. Nationals, serving as the chief judge for Intermediate and as a grading judge for all remaining categories for the last four years.

In 2002, I was asked by the IAC president to assume the chair of the IAC Judges Program, a leadership position for which I felt I could make a positive influence by drawing on my experience as a professional instructor for the Navy. As a longtime member of IAC, I have always endeavored to apply my knowledge, experience, and attention to detail acquired in professional life to my beloved sport. I've worked very hard to improve the quality of an already high quality program and hope to continue that trend.

Why should you vote for Greg Dungan as an IAC director? The simple answer to this question is that I believe my record of service on the IAC board and as chairman of the IAC Judges Program proves you will find no person more dedicated to representing the IAC membership in governance of our club. If re-elected, I will continue to work *for you*, the members of the IAC, and represent your wishes as the board deliberates any particular issue. To do that, here is a list of issues that concern me based on the comments of many members whom I've conversed with and that I hope to focus on in the next term: One of our biggest concerns for this sport is the difficulty of individuals and fixed base operators to obtain affordable insurance that allows them to operate and rent aerobatic aircraft.

While there is probably little influence the IAC can have on the cost of insurance in general, a \$7,000-plus per year insurance bill for a Decathlon is virtually cost-prohibitive for all but the largest of commercial operations. Without flight schools to feed the sport by providing basic aerobatic training and, in particular, competent spin awareness training, we will continue to suffer declining participation. It's hard to encourage members to go and get training if they have few choices available to them. And individual members should be able to get the best deal possible on insurance.

Another concern is the difficulty chapters and individuals are having in maintaining waivered airspace for aerobatic practice. The IAC now has three representatives to liaison with the FAA on airspace waivers, and those folks are doing great work. However, we all need to do our part to improve the image of aerobatic enthusiasts with the non-flying public and even pilots who don't fly aerobatics such that they all perceive us as just like them: as environmentally friendly, fun-loving people who want to be good neighbors.

I am also concerned with ways to reach out to the more passive IAC members, who make up more than 80 percent of the total membership, and ensure they will remain members and never doubt that the IAC adds value to their personal enjoyment of aerobatics and flying as a whole.

Finally, I feel I am well-prepared to continue serving you, the IAC membership, because through my work as the Judge Education and Certification chair, I have made it a point to become intimately familiar with the intricate details of the club's organizational structure, including the IAC's Articles of Incorporation, Bylaws, IAC Official Contest Rules, and the *IAC Policy & Procedures Manual*. I have also developed and maintained good working relationships with IAC headquarters staff and other members of the board.

This past two years of service have been a very informative and rewarding experience, but I can't help feeling I have more to offer so I hope to have the opportunity to continue serving each and every one of you. I thank you for the consideration of your vote!

Tom Adams
Candidate for Director

Once again I am running for re-election to the board of directors. For those of you who are not familiar with me, I would like to give you some background on my experience in the IAC and my thoughts on my responsibilities as a director. I have been an IAC member since 1972. I started flying competition at Fond du Lac the same year.

During the last 34 years, I have constantly been active and have flown an average of six contests a year. Some years flying four contests, while others flying eight or nine. I have competed in all five categories. I represented the United States in the first Advanced World Aerobatic Championships in Cape Town, South Africa, in 1995.

I began judging in the mid-1970s and have tried to judge or volunteer at every contest I have attended. I served on the board for one term in the early 1980s and again from 1997 to 2002. I am currently on the board, serving the last year of my two-year term. I have a good working knowledge of the board, the club, its bylaws, and how to get things accomplished.

To be an effective director, he or she must be in touch with the membership. That is only accomplished by being at IAC events. By going to six to seven contests a year (about 200 total since joining IAC) I get the input required. I also have attended Oshkosh numerous times. I have no problem staying in touch with members by phone or e-mail; I am always available. When members contact me with a request from their chapter on an item of concern, I have been able to address their concerns quickly and place the issue on an upcoming board meeting agenda, if needed.

I believe that as a director, I must do all I can to achieve the changes the members want to see, even if it goes against my personal opinion. During my current term, the board worked to realign the categories so category creep would be eliminated. I worked on that committee. During the one and a

half years the committee was active, the membership kept increasing its disfavor with category realignment. Despite the many hours put into the effort, the entire committee felt the realignment was not what the majority of members wanted, and we listened to the voice of the group.

A director cannot be effective if all he or she does is attend the board meetings. A director must be active in all aspects of the club's events, contests, judging, chapter events, and major fly-ins. Most importantly, a director must represent the members. I hope you will give me the opportunity to continue doing just that.

The logo for Harvey & Rihm Aviation Inc. It features a circular design with a biplane in the center. The top half of the circle contains the text "HARVEY & RIHM AVIATION INC." and the bottom half contains "101 AIRPORT BLVD. LAPORTE, TX 77511 (281) 471-1675". Below the circle, there are two columns of text: "AEROBATICS" and "MAINTENANCE FACILITIES". Under "AEROBATICS", it lists "Basic through Unlimited", "Competition & Sport", "Safety & Proficiency", and "Basic & Advanced Spins". Under "MAINTENANCE FACILITIES", it lists "We specialize in", "Fabric", "Tailwheel", and "Aerobatic Aircraft Repair". At the bottom, it lists "Pitts S-2B", "Super Decathlon", and "Cirabria".

Owned and operated by Debbie Rihm-Harvey



Erica Hoagland
Candidate for Director

I attended my first EAA Oshkosh in 1979 and later knew I had to fly aerobatics after watching the

Christen Eagles perform. I have been competing in the IAC for eight years and have owned three Pitts and a clipped-wing Cub I had a blast flying Primary at one contest. My current job as a Citation captain follows my teaching in a Pitts S-2B, Cubs, gliders, and nose-wheel airplanes for Embry-Riddle. I would like to see the IAC make decisions based on what is best for the flying members. At the top of my list would be the discussion to lessen or halt category creep. Also, as many of you may have experienced as a new aerobatic pilot, I for one did not feel welcome at my first contest and knew I was a real outsider entering the contest the day of the event.

I would like to discuss creating a true mentoring program, where perhaps three non-flying or flying members of each IAC chapter would be designated mentors to lead new competitors, to introduce them to old faces and show them the ropes during their first few contests. Contests could

be more inviting for all levels of aerobatic pilots by perhaps creating goals we can work toward which may or may not include the contest arena. I believe many pilots leave the sport or do not continue to pursue their passion because they become either bored or discouraged.

The addition of an e-mail discussion board for the Southeast members could be a great tool. This would not be a means to disconnect from the rest of the group, but rather allow for discussion regarding local issues or to ask performance, maintenance, or general aircraft questions with less fear of hostile reaction. Most importantly, it would be an avenue for free communication to tell your Southeast director what you as the members would like to see accomplished or be communicated to the IAC board. I would do my best to work on ways to help the IAC work for you, and I would serve you as a voice of the flying members.



Doug Sowder
Candidate for Director

Greetings from the Northwest! We have an active group of dedicated IAC members here in the upper left corner of the United States.

Not only would I like to encourage more of you from other parts of the country to visit our contests and other functions, but I also ask that you consider returning one of us—me—to the IAC's board of directors. We're active, but we're also the smallest IAC region, population-wise, so I'm going to need a little help from my many IAC friends around the country. But regardless, please do vote. It's easy, and every one counts. And, as a separate issue, please support our two Chapters, 67 and 77, in our efforts to bring AWAC 2008 to Pendleton, Oregon.

I learned to fly in 1967 and am a multiengine and instrument rated private pilot. I joined EAA in 1972 at Oshkosh on honeymoon with my wife, Pat, joined the IAC at Oshkosh in 1988, and am currently a member of Chapters 67 (Washington) and 77 (Oregon).

Beginning with Basic in 1993, I have flown about 55 contests, and I have been flying Advanced category

since 1998, first with a Pitts S-2B and now with an Extra 300L. I flew at AWAC 2004 in Sweden and would like to earn the opportunity to fly at AWAC again. I'm a national judge and have judged Unlimited at the U.S. Nationals for the past three years, and I served on the contest jury at the Nationals in 2006.

While I am, admittedly, contest oriented, I believe that the IAC can have a strong influence on those who fly just for fun, especially in the areas of safety and technical support. I would like to see our organization work toward helping interested pilots find aerobatic training and suitable aircraft, and encourage those pilots to participate in IAC, whether they fly for competition or purely for recreation. Many pilots in the grass roots of EAA chapters, antiquers, warbirds, and sport plane builders/pilots see aerobatics as a goal to work toward, a goal that I think the IAC can help them to achieve. Thank you for your support!

Be sure to vote soon; this is your opportunity to



Marti Kalko
Candidate for Director

I have been a member of the IAC since the late '70s. I have been a judge in power aerobatics since that

time and also served in the capacity of chief judge. In 1983, I became involved in glider aerobatics as my husband, Charles, was on the World Glider Aerobic Championships Team. I served as a judge at World Glider Aerobic Championships and as team manager, including the responsibility of transporting the gliders overseas working with government officials solely on my own.

I, in turn, became a member of CIVA and served on every jury for the World Glider Aerobic Championships since the inception. I am currently a CIVA member for the glider category. I currently have a private airstrip with a waiver to perform aerobatics, in which the local chapter practices. With a close relationship with the local FAA, they have designated my aerobatic box as their recommended area of practice. I look forward to working on the IAC board of directors if so elected.



Tony Wood
Candidate for Director

I started my aerobatic career in 1992 at Hobby Airport in a one Decathlon operation. I moved to Harvey & Rihn Aviation

that had two Pitts Specials and a Decathlon, and through my excitement in the sport, I helped it grow to two Decathlons, two Pitts Specials, and an Extra 300. My enthusiasm, excitement, and intensity will do the same for the sport and make this club a place in which people are excited to be a part and a place in which people seek to belong.

I have been competing in aerobatics since 1994 and currently compete in Advanced and Unlimited in the Pitts S-2B and Sukhoi 26. I have been involved with the U.S. Advanced Aerobic Team as coach and/or manager since 2002 and am on the board of directors for the Dallas Chapter 24. My experiences with AWAC have given me unique insights into the inner workings of aerobatic clubs around the world. I'm excited with the opportunity to bring many of those insights to our club. I look forward to representing you.

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