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On the Cover: Recreational aerobatics in a 7KCAB

Photo by Jim Koepnick



Jitters or Outcasts

Making new competitors feel welcome is everyone's responsibility

By Ken Ibold

With another competition season underway, the brave souls who embrace competitions are juggling their schedules and maybe their finances to afford them the opportunity to fly against other like-minded pilots.

There is another group, however, that seems far removed from the action. These are the would-be competitors who are nervously pondering their skills and considering their options as the calendar ticks down to the registration deadlines for nearby competitions. Some of these have mentors who help shepherd them through the competition process, helping them understand the requirements, sure, but also taking some of the sting out of the human side of the process.

Experienced competitors probably forgot the anxiety associated with those first few competitions. To them, a contest is a chance to catch up with old friends, make new acquaintances, and have some fun flying. The others—you can tell them by the deer-in-the-headlights look on their faces—are unsure where to go, what to do, and when to fly. Like as not they wind up eating alone and wandering through the competition wondering what the heck they're doing there.

For the past several months, I've been talking with would-be competitors and some with limited competition experience. Some report their competition experience was memorable because of the camaraderie they found, but virtually all of these pilots were those who were involved with active IAC chapters or went to the competition accompanied by an instructor/friend, experienced significant other, or other mentor.

There is another—and potentially larger group. These are the ones who bumble through the first couple of contests. They don't know anyone, and whether they fly poorly or well, go back home thinking there are probably better ways to spend \$1,000 over a weekend.

An IAC member who began competing last year had a lot to say on the subject: "Until one meets a few people at contests and sees them over and over, it's a pretty lonely experience. Nobody helps guide a newbie through the contest, nobody asks them to have dinner after the first day, etc. Usually a contest will assign a person to help a first-time competitor, but from what I've seen it's pretty much a 'let me know how I can help.' It needs to be more than that."

This competitor adds that contest veterans can help in little ways. "Show them how to volunteer and work the same station they do to help them feel comfortable. Help them know when to suit up and get ready to fly, and how to go about it. Stand beside their airplane all the way through start-up, making sure they understand the procedure for staging, and encouraging them. Be there when they land to help them out. It takes a special person to pull this off."

Anecdotally, we've all heard about competitors who showed up for a contest or two and then disappeared, never to be heard from again. One story, possibly apocryphal, tells of a pilot who didn't even land after the sequence, just flew away into the sunset.

Though we don't know how common this kind of stuff is, I'd venture that any time it happens it's as much a reflection on us as it is the frustrated competitor.

Sport Aerobatics



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President's Page

by VICKI CRUSE IAC 22968
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Getting Things Done

'No news' doesn't mean 'no work'

One of life's necessities are to-do lists—both the never-ending honey-do lists from home and action lists made on the job. We make, revise, edit, and do, and yet the lists never seem to get any shorter.

The IAC is no exception. It has a huge to-do list, and it has for some time. The No. 1 item on former president Gerry Molidor's to-do list was stabilization of the organization (on many fronts), which Gerry did well. The problem was that focusing on this major effort and the World Aerobatic Championships left no time or energy to do anything more.

With the new administration, one of the first things we needed to address was where we are going and how we want to get there. A strategy session last fall took us through all of our wants and needs, and we realized we have far too many needs. We had to prioritize, just like all of you reading this. While it might be nice to have a new paint scheme, it isn't a priority right now.

One of the most frustrating things facing any organization is members not knowing what goes on behind the scenes. While many board members are active with projects, you likely won't see an outcome for some time. As a result, it often appears nothing is being accomplished. This couldn't be further from the truth, so here are some things currently in the works, many of which you will hear about in more detail in the coming months. As always, your feedback is essential to making any of this successful.

Member Surveys

One of the things you've heard from me on at least two occasions is, "What do the members want?" During the month of April, we intend to find out by randomly calling a number of you and asking a series of questions to help guide us. Please take the time to answer the call and be honest with your answers. This is the single-most important item on our to-do list right now.

Though this doesn't apply to many of you reading this, we will also be surveying members who did not renew

their memberships and asking questions such as, "What didn't you get from us that you thought you would?" In other words, why did you leave?

Category Changes

In the coming months, you will have the opportunity to review, comment, and vote on a revision to what are now the Primary, Sportsman, and Intermediate categories. The brainchild of secretary Scott Poehlman, this concept was introduced to the board two years ago. After a hiatus due to other priorities, the committee led by Scott has been working hard to make this a reality for the 2007 contest season, pending your approval.

One complaint we often hear is that the jump between Intermediate and Advanced is too big. We lose a lot of people who don't want to fly all the pushes (negative g's) in the CIVA-regulated Advanced category. There have also been problems with what is now Primary, in that it has failed to attract competitors, and people have complained that the Sportsman category is either too simple or too complicated. This, too, has been reviewed to make it not only more fun to fly,

but also open to grassroots aircraft.

This year's Primary and Sportsman sequences are an introduction to the changes proposed for next year. These sequences were designed by National Champion Giles Henderson (who flew and continues to fly a clipped-wing Cub) and have received a lot of positive feedback from the pilots of low-powered aircraft.

We are at a crossroads; either we grow and introduce pilots to the world of aerobatics, or we stagnate and go back to a competitors-only club.

Website

Two major changes we are implementing to the website are scoring results that will appear as soon as the contest directors send in the results and up-to-date Regional Series results. Thanks to efforts of the Scoring Software Committee, contest results are now output from the scoring software and go directly for posting—no more manual entry. Same with the Regional Series results.

Continued on page 29

Aerobatics 3

NEWSBRIEFS

Stowell Named CFI of the Year

The General Aviation Industry Awards Program and the FAA named **Rich Stowell** CFI of the Year for 2006. Stowell, the first recipient of the Master Instructor-Aerobatics designation given by the National Association of Flight Instructors, specializes in emergency maneuver training, spin training, tailwheel training, and aerobatics training. He conducts clinics nationwide and instructs at CP Aviation at Santa Paula Airport in Santa Paula, California.



Other recipients of this year's national awards are **Gene Hudson** of Mission Hills, California, who was named Aviation Safety Counselor of the Year; **Joe Hawkins** of Murfreesboro, Tennessee, who was Aviation Maintenance Technician of the Year; and **Terry Markovich** of Bedminster, New Jersey, who was Avionics Technician of the Year.

Stowell represented the FAA's Western Pacific Region. This year's other regional CFI winners include Master Instructor **Michael Berlin** of West Hartford, Connecticut (FAA's New England Region); **Janice Gray Driscoll** of Kernersville, North Carolina (FAA's Southern Region); Master Instructor **Helen D. "Pat" Knight** of Naperville, Illinois (FAA's Great Lakes Region); Master Instructor **Janice Walton** of Marion, Iowa (FAA's Central Region); and **Charles "Bud" Welch** of Arkadelphia, Arkansas (FAA's Southwest Region).

Yost Aerobic Scholarship Applications Sought

IAC Chapter 78 is soliciting applications for the Douglas Yost Aerobic Scholarship, an award presented each year to promote air safety through aerobatics training. Each recipient of this scholarship will receive a complete course of aerobatics and stall-spin awareness training of approximately 10 flight hours.

The successful applicant must be well-rounded and involved in school and community activities as well as in aviation. The applicant's academic record should demonstrate that he or she could successfully complete the educational portion of aerobatic training. Flight instructor comment reports or letters of recommendation must indicate that the successful applicant has the basic flying skills and potential to benefit from this type of training.

The scholarship is open to juniors or seniors in college or other post-secondary school, and applicants must hold a private certificate or higher and a current medical certificate. Applications must be submitted to the scholarship chairman no later than June 1.

The application form may be downloaded and printed from the Chapter 78 website: www.iac78.org. Applications or any questions should be sent to IAC Chapter 78 Scholarship Committee, c/o Terrence J. Wakely, 43 Fareway Dr., Northfield, MN 55057.

Soucy Joins ACAP

The Association of Competition Airshow Pilots welcomed veteran performer **Gene Soucy** to the ACAP Extreme Airshow Challenge Series as a guest performer and celebrity judge for the 2006 season.

The ACAP series is set to launch this month. Each participant in the series will have onboard video technology provided by EVQ. This groundbreaking marriage of technology and air show promotion/management is intended to bring the audience, sponsors, and participants closer together.

The performers include **Sergei Boriak**, **Matt Chapman**, **Jeff Mawhinney**, **Jon Melby**, **Jim Peitz**, **Greg Poe**, and **Skip Stewart**. In addition, guest performers such as **Soucy**, **Mike Goulian**, and **Greg Koontz** will present shows before and in between the competition events, and then serve as judges for the competitions.

For more info, see www.evqshows.com/aspsite/index.asp.

Aresti Catalogue Updated for '06

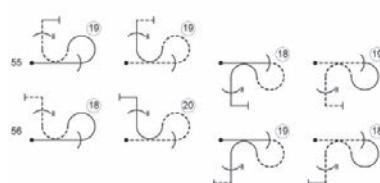
Minor changes to the official Aresti Aerobatic Catalogue for 2006 require a few changes in order to apply to the 2006 competition year. If you already have a version 2003-1 or 2005-1 Aresti Aerobic Catalogue, you can make your catalog current simply by making the "pen and ink" changes shown here.

Both the power and glider (GAF) catalogs require the addition of the optional full roll on the entry line of the Family 8.55-8.56 figures. The remaining changes listed are all deletions within the glider catalog only. If you wish to download your own copy of the changes, you may do so at www.fai.org/aerobatics/documents.

The Aresti Aerobic Catalogue is no longer available as a free download from the FAI. Rather, you will have to purchase a catalog directly from Aresti Systems at www.arestisystem.com/english/catalogue. Note that Aresti



CHANGES TO THE POWER AND GLIDER CATALOGUES
Rolls are added to the entry lines of figures 8.55 and 8.56 as follows:



CHANGES TO THE GLIDER CATALOGUE ONLY
Page 9: Delete entire line 2.5
Page 11: Delete all except line 3.1
Page 29: Delete catalogue numbers 9.1.1.3, 9.1.1.4, 9.1.2.3, 9.1.2.6, 9.1.4.6, 9.1.5.4
Page 30: Delete all except line 9.2.3 and catalogue number 9.2.4.4
Page 31: Delete catalogue number 9.4.5.3
Page 33: Delete catalogue numbers 9.9.1.3, 9.9.1.4, 9.9.6.3, 9.9.6.4, 9.9.7.3, 9.9.7.4
Page 34: Delete catalogue numbers 9.10.1.3, 9.10.1.4, 9.10.6.3, 9.10.6.4, 9.10.7.3, 9.10.7.4

NEWSBRIEFS NEWSBRIEFS NEWSBRIEFS

New EAA Homebuilt Certification Kit Simplifies Complex Process

EAA's new Amateur-Built Aircraft Certification Kit includes everything you need to register and certificate a new experimental amateur-built aircraft. The 15-page, step-by-step Certification Guide walks you through the entire process—from getting an N number to the aircraft inspection—and provides samples of how to complete each required form.



EAA staff member and amateur-built designated airworthiness representative (AB-DAR) **Joe Norris**, who reviewed all of the materials included in the kit, commented, "Whenever I inspect an aircraft for certification, it is the paperwork that causes the delay more often than anything on the aircraft. This guide will make a homebuilder's inspection go a lot easier."

The certification kit also includes all FAA forms, an "Experimental" sticker (in black), a dataplate, and a convenient placard decal sheet. Cost for EAA members is \$12.99 plus shipping. The kit is also available for nonmembers for \$19.99 plus shipping. To order, call EAA Membership Services at 800/564-6322 or visit <http://shop.eaa.org>.

Goulian Rejoins Red Bull Race

Mike Goulian will join 10 other elite aerobatic pilots competing in this year's roster of competitions in the Red Bull Air Race World Series.

Goulian participated in the Red Bull Air Race in Reno, Nevada, in 2004, but did not participate in the race series last year. He then participated in trials during the San Francisco Air Race in September 2005 and a training camp last November, and was chosen by Red Bull to join the squadron of pilots.



The Red Bull Air Races will have a nine-race schedule in 2006, including races in Australia, England, Germany, Hungary, Russia, Spain, Turkey, United Arab Emirates, and the United States.

Goulian, 37, is a three-time member of the U.S. National Aerobatic Team, was the 1995 U.S. National Aerobatic Champion, and is a 17-year veteran of air shows.

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FUN ... with a Purpose





Exploring the envelope with recreational aerobatics

by Rich Stowell

Whether we call them “gentleman’s aerobatics,” or “Sunday afternoon aerobatics,” or “grassroots aerobatics,” we are talking about recreational aerobatics—*aerobatics performed not in the name of sport or for trophy, but aerobatics performed for the sheer joy of it, or to improve piloting skills.* In this context, recreational aerobatics is a natural extension of IAC’s fledgling Aerobic Rally concept, where pilots regardless of experience are invited to explore the approved operating envelope of the airplanes they fly.

Although the IAC is focused extensively on competition, its mission statement also enumerates core values that form the backbone of our organization—values such as openness and inclusiveness, a responsibility to educate and share knowledge, and a commitment to enhance the safety and enjoyment of our sport.

Although the competition side of the organization attracts the most attention and consumes the bulk of available resources, just 10 percent of IAC members compete during a typical contest season. What about the 90 percent who don’t compete? Those who might enjoy an occasional loop or roll, or perhaps who do not routinely do aerobatics *per se* themselves, but are drawn to it nonetheless?

This new series of periodical columns on recreational aerobatics is specifically for them, although the competitors are also invited to experiment with the techniques that will be introduced throughout this series. At the very least,

this series might give you new ways of presenting aerobatic concepts to those outside of the IAC.

Subsequent articles will cover specific maneuvers applied to specific airplanes. Featured airplanes could range from non-aerobatic mounts such as the Cessna 172 to mildly aerobatic mounts such as the RV-series to full-blown aerobatic airplanes. Only maneuvers that are approved in the featured airplanes will be presented, albeit from an aerobatic frame of reference. Safety, of course, will always be the overriding principle. As embodied in the words of IAC board member Jim Taylor, “Our goal here is not to make the loop perfectly round, but to make the loop perfectly safe.”

The primary purpose of this inaugural article is to introduce a number of the principles that will form the basis for future discussions. Let’s start by reviewing the definition of aerobatic flight.

What is Aerobatic Flight?

FAR 91.303 specifies the conditions under which you can perform aerobatics. More importantly, the FAA defines aerobatic flight as "an intentional maneuver involving an abrupt change in an aircraft's attitude, an abnormal attitude, or abnormal acceleration, not necessary for normal flight." The implication is that aerobatics are an intentional endeavor resulting from planning and practice. Think checkride, where a required task is evaluated partly with the understanding that the successful outcome is never seriously in question.

The FAA definition also leads to the conclusion that if it isn't "necessary for normal flight," it must be "aerobic flight." Hence, a case could be made that everything you do in an airplane that doesn't involve cruise flight, shallow climbs and descents, and traffic pattern bank angles qualifies as aerobatic flight.

Stalls, steep turns, spirals, chandelles, lazy-eights—though they might be required for a particular rating or certificate, none are necessary for normal flight. From this perspective, perhaps all pilots engage in aerobatics to some degree. Having said that, the regulations also stipulate that you don parachutes per FAR 91.307 only if some of that flying will exceed 60 degrees of bank or 30 degrees of pitch relative to the horizon (except for spins).

Fundamentals of Maneuvering

All flight maneuvers can be broken down into the trinity of flight path, attitude, and altitude. Flight path is determined by the pilot's manipulation of airspeed and g-load. Correspondingly, the airplane either travels in straight lines or along curved lines. Attitude, on the other hand, describes the position of the airplane relative to the horizon: upright, inverted, banked, or vertical. And altitude, of course, describes the position relative to the ground below, which could be conveyed with adjectives such as climbing, descending, or level.

Using this trinity, you can now describe a vanilla, inside loop as

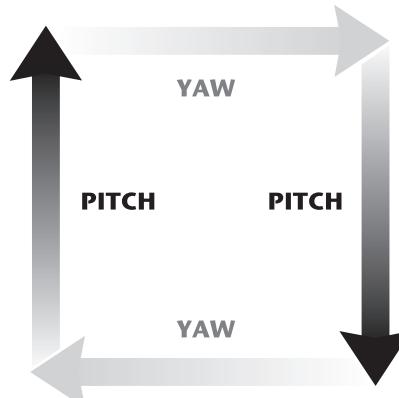
Table 1: Maneuver Motivators & Their Effects

CONTROL	PRIMARY EFFECT	EFFECT MEASURE	RELATIVE MOVEMENT	POSSIBLE EFFECTS
Aileron	Roll	Bank Angle, Roll Rate	Head-to-hip	Adverse Yawing
Rudder	Yaw	Sideslip Angle	Ear-to-Ear	Roll Coupling, Precessing
Elevator	Angle of Attack	Airspeed, g-load	Head-to-Feet	Stalling, Zooming, Precessing
Throttle	Altitude Profile	Feet, VSI, Fuel Flow	Here-to-There	Torque, P-Factor, Slipstream

follows: The flight path curves continuously in the vertical plane; the attitude transitions from level, to inverted, and back to level flight; and the airplane climbs during the first half of the maneuver and descends during the second half. Other maneuvers can be dissected in a similar fashion.

Naturally, pilots use aileron, rudder, elevator, and throttle inputs to execute the maneuvers. Aerobatic pilot and instructor Sammy Mason aptly labeled the primary controls "maneuver motivators." Each elicits a specific response; each also contributes a secondary effect that may or may not be desirable. It is also useful to correlate airplane movements relative to the pilot sitting in the cockpit, rather than to some outside observer. Left and right, for example,

Figure 1: Precession Effects, Clockwise Rotating Propeller



should be relative to the pilot, not to someone looking up from the ground.

Thus the ailerons control roll, which we perceive as a head-to-hip movement of the nose and wingtips.

Rudder controls yaw, which we observe as an ear-to-ear movement of the nose and wingtips. Elevator controls angle of attack, which manifests itself as changes in airspeed and g-load and is seen as a head-to-feet movement of the nose and wingtips. Throttle controls the altitude profile, which you can think of as the here-to-there control. By internalizing roll, yaw, and pitch movements relative to yourself rather than the horizon, you make them attitude-independent. Roll, yaw, and pitch will now always look the same regardless of attitude.

Unfortunately, nothing is free. The adverse effects of control actions must be understood, appreciated, and often compensated for when maneuvering. For example, the downside of making an aileron input is adverse yaw; rudder inputs introduce a secondary roll; elevator actions can induce the effects of gyroscopic precession; and throttle changes influence the balance of torque, P-factor, and spiral slipstream. Table 1 summarizes the effects of the primary controls.

Gyroscopic precession is one secondary effect many pilots have a hard time visualizing, partly because the effect is negligible in so many airplanes and partly because it involves physics. But tailwheel flying and aerobatics are two areas where precession can have a significant influence. Figure 1 presents a simple way in which to predict and visualize gyroscopic effects. The figure represents actions and reactions when sitting in the cockpit behind a propeller that rotates clockwise (for counterclockwise rotation, just reverse the direc-

Table 2: Equivalent Ways of Referring to Bank Angle

Bank Angle	Portion of Roll	Descriptor	Turning g
0°	None	Upright	+1.00
10°	1/36	Shallow	+1.02
30°	1/12	Medium	+1.15
60°	1/6	Steep	+2.00
90°	1/4	Knife-Edge	Infinite
180°	1/2	Inverted	-1.00

tion of the arrowheads).

The concepts in Figure 1 are straightforward. Simply follow the arrows and think in terms of ACTION-REACTION-CORRECTION. For example, you elect to do a two-point takeoff in a tailwheel airplane. Follow the arrows.

During the takeoff roll, you pitch the nose toward your feet (i.e., you

der in slow flight; REACTION: Nose pitches toward your head (i.e., falling onto your back); CORRECTION: Apply more forward elevator.

Picture you're now initiating a pull-up into a loop in a Pitts. ACTION: Pitch the nose toward your head; REACTION: Nose yaws right; CORRECTION: Apply left rudder.



raise the tail). The pitch force precesses, with the effect appearing 90 degrees ahead in the direction of propeller rotation. Consequently, the nose of the airplane yaws to the left, requiring additional right rudder to hold the runway centerline as the pitch attitude changes. ACTION: Pitch the nose toward your feet; REACTION: Nose yaws left; CORRECTION: Apply additional right rudder.

Now imagine you're kicking in full left rudder to pivot at the top of a hammerhead. ACTION: Full left rudder

Put Language to Work

Humpty bump, shark's tooth, avalanche—language can be quite colorful, especially the language associated with aerobatics. One of the problems, however, is that a variety of different words can describe the same event. For example, rolling to 30 degrees of bank is equivalent to performing 1/12 of a roll. Some might call this a medium bank. Pulling +1.15g in a level turn means you must be banked 30 degrees as well. Table 2 provides several ways of alluding to angles of bank.

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In aviation, we also use words and phrases that don't exactly convey what is happening, or that might have multiple meanings depending on the context. Take the Dutch roll for instance: in an aerobatic context, the Dutch roll is a controlled, coordinated exercise; in a non-aerobatic context, the Dutch roll tends to be presented as a cross-controlled maneuver (who knows why); and in the context of swept-wing jet aircraft, the Dutch roll is an undesirable stability issue.

Snap rolls aren't rolls at all, but rather they're accelerated stall/spins (just look at the Aresti symbol). Flaps don't flap. Applying "more throttle" actually reduces the amount of throttling. And the elevator doesn't always result in the airplane staying elevated.

Language problems notwithstanding, we can take advantage of the words we use to reveal the aerobatic underpinnings of flight. For example, doesn't saying the phrase "horizontal loop" sound a whole lot more exciting than the mundane "level turn"? Why not say you'll perform the sexy "one point of an eight point roll to the left, horizontal loop, one point of an eight point roll to the right" rather than the boring "360-degree turn at 45 degrees of bank"?

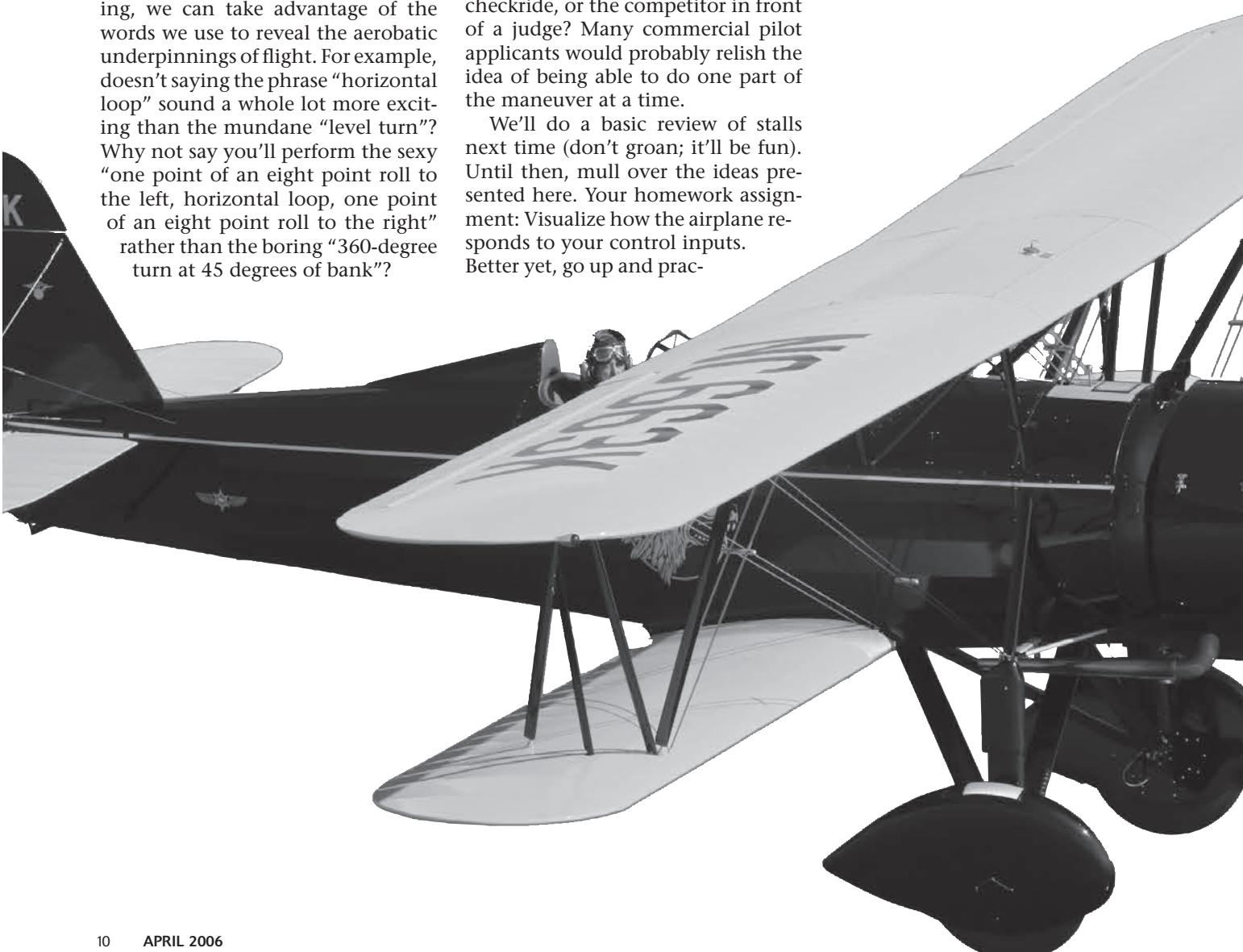
Consider, too, that the chandelle and the Immelman are closely related, as are the lazy-eight and the Cuban-eight. The only difference between chandelle and Immelman, lazy-eight and Cuban-eight is the placement of the roll. The chandelles and lazy-eights used for the commercial certificate require that rolling be blended continuously with looping. Competition Immelmans and Cuban-eights, however, separate rolling from looping.

And before getting smug because you can do an Immelman or a Cuban-eight, bear in mind that these maneuvers only require you to do a single task at a time—loop for a while, and then roll. The chandelle and lazy-eight, on the other hand, require multi-tasking—loop and roll simultaneously throughout. So who really has the tougher time of it, the commercial pilot applicant on a checkride, or the competitor in front of a judge? Many commercial pilot applicants would probably relish the idea of being able to do one part of the maneuver at a time.

We'll do a basic review of stalls next time (don't groan; it'll be fun). Until then, mull over the ideas presented here. Your homework assignment: Visualize how the airplane responds to your control inputs. Better yet, go up and prac-

tice, really seeing how the airplane moves relative to you. Think about the commonality shared by all the maneuvers you fly, not about how they are different from each other. And come up with more stimulating ways—aerobatic ways—of describing otherwise routine flight operations. Most of all, share these concepts with others when you're talking about aviation. 

Rich Stowell is a Master Instructor of Aerobatics and has been named the FAA's 2006 National CFI of the Year. E-mail your thoughts, ideas, or novel ways of describing standard maneuvers to rich@richstowell.com.



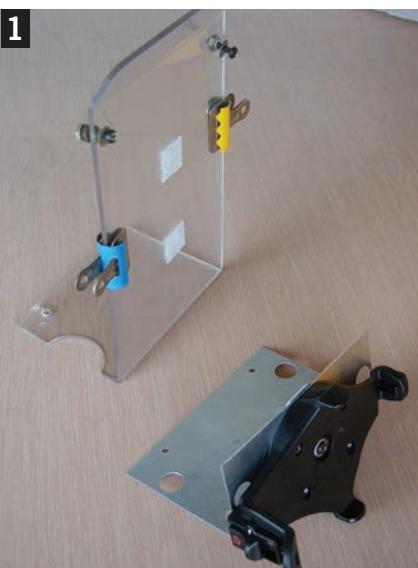
Portables on the Panel

Clamp 'em,
mount 'em,
screw 'em
or glue 'em,
but use some
common sense

By Ken Ibold



Handheld GPS receivers and portable radios enjoy a healthy niche in the cockpits of aerobatic airplanes. Designed to add capability to the airplane and reduce the pilot's workload, at least one can be found in just about every aerobatic pilot's possession . . .



Mounting a GPS and electronic attitude indicator to the panel of a two-seat Pitts

Step 1: An aluminum mounting bracket was fabricated to fit the existing sequence cardholder and the clip mount from the Garmin-issued yoke mount.

Step 2: The assembly reinstalled on the panel.

Step 3: The Garmin 296 and sequence can co-exist happily.

Step 4: When appropriate, a PC Flightsystems eGyro3 is mounted with Dual Lock on the sequence card holder.

Step 5: The portable attitude indicator plugs into a properly installed and fused power outlet. The full assembly covers the g meter but leaves the compass visible and unaffected.



In some airplanes—notably single-seat Pitts built without electrical systems—a handheld transceiver constitutes the entire avionics suite. Other airplanes contain panel-mounted comm radios but are not equipped with navigation radios of any kind, for reasons of weight, space, or cost.

However, airspace restrictions have some pilots rethinking the notion that a fair-weather, locally flown airplane need not have navigation gear. Cross-country trips have some pilots wishing for a backup radio. And what pilot hasn't wanted, from time to time, a look at the weather ahead—or behind?

Portable electronics are appealing in aerobatic airplanes because they enable the pilot to use the capability

when desired, such as on cross-country flights to and from contests, and then leave them behind when they want maximum performance and minimum distraction, such as when actually flying in the contest.

Pilot shops and the big hangars at EAA AirVenture Oshkosh and Sun 'n Fun are filled with electronic devices designed to reduce the pilot's workload, increase safety, or enhance comfort. Many of them plug into an auxiliary power plug or run off batteries.

They mount in a variety of ways, ranging from Velcro or suction cups to clamps or screws. Some are powered by batteries, others by auxiliary power plugs.

One thing essentially all of them have in common is that they cannot

be installed in a certificated airplane. If your aerobatic mount is experimental, just about anything within reason goes. But for factory-built airplanes, installation is right out. The key, of course, is the word "installation."

Lest the matter degenerate into a Clinton-esque discussion of word definitions, let's be clear about one thing: Not even the FAA will specify exactly what constitutes an installation.

The regulations are fairly straightforward, at least on the face of them.

For an electronic device to be installed in a certificated airplane, it has to be "TSO'd," that is, meet Technical Standard Order C-129 to ensure its operation will not interfere with

other instruments installed, nor will its failure take down other instruments.

With a TSO, the device gets installed by a properly licensed technician, the logbooks are filled out, and the airplane is good to go.

Without a TSO, the process is more complicated. The manufacturer must obtain a parts manufacturer approval (PMA) and get a supplemental type certificate (STC) for the first installation. After that installations on similar aircraft can be made through a Form 337 that references the original STC.

The dilemma facing pilots of certificated airplanes is that "portable" avionics generally carry neither a TSO nor a PMA. Installation—at least in the traditional sense—is a no-no. For these devices to be installed, the aircraft operator must pursue a field approval, which will require engineering drawings of the device in question, inspections, and a bushel of cash.

Install a device improperly or without the right paperwork and the

aircraft is legally rendered unairworthy. Any pilots who have flown it that way are subject to enforcement action.

And so the question remains: What constitutes installation?

**Imagine this mess staying put
while running through the
Sportsman sequence, or trying
not to get tangled in the wires
while bailing out.**

The Name Game

From the FAA's point of view, portable electronics are luggage. The PIC needs to ensure that any device operated on the airplane doesn't interfere with existing instrumentation. Luggage, of course, isn't plugged into your airplane, and initially the FAA was reluctant to allow using the auxiliary power plug to even power the devices. Batteries were the norm.

The proliferation of handheld GPS units spurred an evolution-

ary change. While early adopters of handheld GPS were sometimes surprised to find yoke mounts leading to grounded airplanes, the FAA eventually relented and allowed yoke mounts and Velcro—and by extension suction cups and ball-type mounts. As time went by, the FAA eventually agreed that a device could draw ship's power through the now-misnamed cigar lighter socket. Evolution continued, and the agency later decided a portable device could plug into a properly installed external antenna as well.

Eventually, it also became acceptable for the portable device to accept some data input. So, finally, the rule regarding installation was left to hinge on two points. Velcro/clamp mounts and power plugs are okay; screws and hard-wired power input are not.

But even within that understanding there is still plenty of room for communications to go horribly wrong. A lack of an official, specific interpretation for when "portable" becomes "installed" has led to a



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RAM mount attached to a tube in a Citabria serves as a sequence card holder or a GPS holder. The pilot reports the mount came loose during aerobatics once.

hodgepodge of interpretations at the Flight Standards District Offices (FSDOs).

Simply put, some FSDOs are generous, giving aircraft operators leeway to do what they think makes sense—particularly for the VFR flying aerobatic airplanes undertake—while others stick hard and fast to specific regulatory wording and assume that if something is not specifically permitted, it must be forbidden.

The owners of experimental aircraft have it somewhat easier. They are free to, well, experiment, and that opens up a brave new world of opportunity. As we will see, however, that opportunity carries with it some pitfalls that add to the risk in perhaps unexpected ways.

Safe Versus Legal

In many respects, the regulations and the FAA's reluctance to allow untested electronics to take center stage in a cockpit make sense. Even simple, slow airplanes operate in an environment somewhat more harsh than an electronics lab.

At the same time, the FAA's historical reluctance to approve unfamiliar technology has led to over-engineered and over-built products that few could afford and fewer would want. The Beech Starship is a classic example.

The FAA's position that Velcro/clamps and power plugs are okay still gives a pilot plenty of rope with which to hang himself—and we use "himself" because everyone knows women aren't gadget freaks to the same extent men are. For that rea-

son, it makes sense to examine some of the criteria FAA inspectors use to approve installations of electronics done on Form 337s.

The most official guidance available on this issue is Advisory Circular 20-138, a 1994 publication that outlines the approval criteria for installing a GPS. For the purposes of judging a portable electronic device, the section on assessing the airworthiness of VFR installations is most germane.

Some of the provisions are obvious. The equipment should not interfere with other electronics, either in normal operation or when

tronic flight instrumentation appears to be easy, especially for devices designed to be portable and therefore self-contained.

The field approval process that outlines how to get legal permission to install unapproved devices, however, is extremely conservative. That makes getting approval an uncertain thing at best, and the engineering tests involved make it a more expensive proposition than most aircraft operators are willing to undertake.

At the same time, anything mounted in an airplane that does aerobatics will need to be mounted more securely than the same product in an airplane that never even sees

2g. For aerobatic airplanes, more permanent is more secure, while less permanent is more flexible. How, then, does one make sense of how far to go with this whole "installation" thing?

"installation" thing?

Portable. Sort of

Consider the portable devices now available and take it to extremes by imagining a cockpit equipped with the full range—and we think we've seen some Extra 300s equipped like this.

A PDA could take center stage, displaying any of a number of products that include GPS with moving maps, real-time weather downloads, and a solid-state attitude indicator with GPS-derived directional gyro.

Backing up the portable EFIS could be a handheld GPS and a standalone electronic attitude indicator. A hand-

For aerobatic airplanes, more permanent is more secure, while less permanent is more flexible. How, then, does one make sense of how far to go with this whole "installation" thing?

it malfunctions, nor should other equipment interfere with it. The GPS should be appropriate to the aircraft involved, and the hardware should be mounted in accordance with accepted standards for aircraft alterations.

Failures should either be clearly annunciated or the unit should turn off. The unit should be ground tested before flown and test-flown before it's considered ready for use. And the manufacturer should provide information about the operation of the unit that will become part of the pilots operating handbook.

That sounds easy, and on the face of it, installing non-approved elec-

held transceiver (or two) could supply communications through a portable intercom, and portable traffic detection systems could alert you to traffic.

If you're counting, you're up to at least six power plugs, seven if you have an ANR headset that plugs into ship's power. Augmenting the power plugs are the wires that connect the PDA to the gyro module and the two GPS antennas to their respective receivers and the headsets to the intercom. And while we're at it, let's get really spoiled and add a portable XM or Sirius radio setup, good for another power plug and another antenna.

Add lots of Velcro, a clamp mount or two, some twist ties to bundle the wires, and it's obvious that each "portable" item is part of a larger non-portable mess. The safety implications in the extreme reflect the

FAA's caution in officially entering the fray of what constitutes installation.

Imagine this mess staying put while running through the Sportsman sequence. Think about trying not to get tangled in the wires while bailing out. Consider troubleshooting an intermittent display while hand-flying an airplane that doesn't exactly fit the definition of "stable platform."

FAA blessing or not, there are several standards to which portable electronics must be held if the installation passes muster on the safety meter of a pilot operating the airplane, including weight, visibility, electronic or physical interference, component strength, electrical system loads, and the mess of electrical spaghetti that can result.

The specifics of each one depend

on the airplane, the pilot, and the device itself. Some applications may raise the ire of an FAA inspector, despite strict adherence to the "Velcro/clamp and power-plug" rule, if the assembly violates that inspector's sense of order.

In a way, describing "installation" is like Supreme Court Justice Potter Stewart's 1964 description of obscenity: "I shall not today attempt further to define [it] ... but I know it when I see it."

Portable devices give pilots access to a wide variety of capability that can be welcome in the Spartan cockpits of aerobatic airplanes. A little common sense in putting them into the airplane will go a long way, not only toward making the airplane safer, but also in making sure an FAA inspector won't see something filthy where you see only beauty. ✈

Installation Factors

Good risk management demands the pilot consider several factors when mounting portable devices—besides just "does it fit" and "does it look good there?" Consider the implications of visibility, turbulence, vibration, power, security, and emergency egress before you crank on the mount or stick on the first square of Velcro. Safety and long-term satisfaction will be the rewards.

Component Strength

Make sure the structure you attach something to can handle the stress. Remember that even a light device can cause a relatively heavy load during aerobatics.

If you use Velcro or a similar fastening material, make sure it's strong enough to hold the item in place. Consider also that the adhesive will become soft when the airplane gets hot.

Take into consideration where the device will go if the mount fails. You don't want it wedging into controls that are out of reach.

Weight

The weight of most portable electronic devices is negligible from a weight and balance standpoint. Generally speaking, installations that weigh less than a pound do not require a recalculation of the airplane's weight and balance, so neither would portable electronics. Unless you go overboard, of course.

Interference

Test the device on the ground. Turn it on and off and note if the airplane's compass, radios, or other devices are affected. Then turn everything off. Turn on the portable and then turn other devices on. Make sure the portable is not affected by interference from the installed gear.

Conduct a test flight in benign VFR conditions. Ensure the device operates properly in all flight regimes and that any electrical equipment installed on the airplane does not cause the device to malfunction.

Spaghetti

The last thing you want during an emergency egress is to be tangled in wires. You also don't want wires accidentally snagging the stick, switches, or other controls.

Consider tying or wrapping all wires, taking into considering the potential for chafing and vibration-induced strand breakage.

Electrical System Loads

In general, do not use auxiliary power plug splitters without calculating the peak load the intended devices can draw. Make sure the aux plug is properly wired with a fuse or circuit breaker. In older airplanes, consider having the plug rewired to ensure safe operation. Make sure you can quickly unplug the device if an internal failure produces smoke.

Visibility

Mounting a device on the glare shield can hinder visibility outside, particularly in something like a Pitts where you don't have much visibility to begin with. Watch that a mount does not make a gauge, circuit breaker, or switch invisible. Make sure any device you add does not cause additional risk from something you can no longer see.

Helmet Hair? Who Cares?

Crafting a Peltor
helmet into a
lower-cost
alternative for
head protection

By Spencer Suderman



For many who participate in the sport of aerobatics, the increased risk over straight-and-level flying is part of the enticement to the activity. Many pilots become enthralled with the challenge of overcoming the ever-increasing levels of difficulty and gaining control over risky maneuvers to achieve high levels of expertise.

Given the Peltor's cost advantage, it makes sense to put a little effort into transforming it.

However, it is human nature to become complacent over time, and that leads some pilots to marginalize the inherent danger in our sport. It is unfortunate that it takes the injury or death of a member of the community to make the rest of us stop and think about the safety precautions we take—and wonder if there isn't more that we could do to protect ourselves.

Recently in these pages I expounded on the virtues of a proper aerobatic flight suit, shoes, and gloves. Now it is time to get your head in gear. Literally.

Just about every sport and even many occupations—including military aviation—require participants to wear protective headgear. This can't be a bad idea since head injuries are usually severe and often fatal.

Military pilots are required to wear helmets for their own safety in their aircraft while pulling g's and engaging in potentially abrupt and violent maneuvers, but aerobatic pilots seem ignorant of the lessons learned by the military, and most do not take heed of the potential risks to themselves and do the same.

The primary supplier of aviation helmets to both the military and civilians is Gentex. The military spent millions on the research and development of appropriate headgear for aviators. Civilian aviators can benefit from this effort, but the cost is a factor for many.

The Gentex helmet line is the de facto standard in aviation headgear, and the helmets have proven themselves over the course of many years in service. So why then don't more aerobatic pilots wear this essential



Spencer Suderman

The shell of the Peltor is slightly larger than that of the Gentex.

piece of safety gear? Two primary factors come into play: retail availability and price.

The issue of retail availability is straightforward, because there are only two ways to buy a Gentex helmet. If you buy a new Gentex helmet, you must purchase it from Flight Suits Inc. of San Diego, because it is the only authorized retail outlet for this product. If you buy your Gentex

helmet used, then it can come from just about anywhere, including a local surplus store or eBay.

Compounding the limited availability is the fact that the lack of competition in the market for new flight helmets means that a brand-new Gentex HGU-55 helmet with civilian communications gear will carry a price tag of more than \$1,000. The price can—and does—reach the \$1,500-\$2,000 range once you add custom options such as paint schemes, custom-fitted liner systems, and active noise reduction electronics.

Gentex Alternatives

As we did in tracking down a quality aviation-appropriate flight suit, we again turned to the motor sports industry and found, again, that safety gear has come a long way and in some cases seems to mimic the outcome of government-funded research.

Our search for a suitable motor sports helmet led to Peltor, a name well-known to aviators as manufacturers of lightweight headsets.

Feature	Peltor G77	Gentex HGU-55
Lightweight Kevlar composite shell	Standard	Additional cost (fiberglass standard)
Multi-density foam liner	Standard	Standard
Nomex lining	Standard	Not available (leather standard)
Plastic ear cups with Velcro for custom fit	Standard	Additional cost
Weight	46.5 oz	42.6 oz
Standard color (other colors & artwork additional cost)	Blue	Flat gray
Price	\$599	>\$1,000 (plus options)



Among its many ventures, the company also makes headsets, helmets, and intercoms for race car teams worldwide.

It is not too much of a stretch to imagine the Kevlar composite Peltor G77 open-face helmet being used by pilots of aerobatic aircraft to achieve protection and performance similar to what they could get from a Gentex helmet, but at a significantly lower cost.

Both helmets feature a lightweight composite shell with the standard liner consisting of layers of high- and low-density foam. The Peltor also has a Nomex liner for additional flame resistance. Both helmets have built in communications gear and sound-attenuating qualities.

In stock form, the Peltor G77 is not directly compatible with general aviation radios. However, given the helmet's cost advantage it makes sense to put a little effort into transforming it.

While the Peltor G77 has built-in communications that include plastic ear cups and a boom microphone wired together with standard aviation-type fittings (U-174/U plug at the end of its cord and U-172/U and

U-173/U jack/plug for the microphone), it is not directly compatible with general aviation radios. This incompatibility is due to the microphone being the wrong impedance for GA radios and the U-174/U plug being wired differently for race car communications.

Launching a Project

After much research, I contacted Peltor and communicated the project goal: to find a lower-priced alternative to the Gentex HGU-55 helmet for aerobatic pilots.

The company was receptive to the idea and offered tremendous support to the project, including excellent access to technical support staff, which was highly instrumental in helping to create a solution for using the G77 helmet in an aircraft.

After much discussion and a go-forward project plan, I had to become a Peltor dealer before I could place an order with Peltor for a G77 helmet. I then purchased an electret microphone, wire frame boom, and mounting knob from other vendors.

Upon receiving the G77 helmet and rest of the avionics components, work commenced to make the necessary modifications to its communications gear. The wiring harness had to be re-soldered in a different configuration for the U-174/U plug to match general aviation standards. An adapter is still required to plug the helmet

into a typical GA airplane, since the U-174/U single plug comes standard on the G77. The good news is that this is the same type of adapter that allows civilian helicopter headsets to be used in fixed-wing aircraft, so that's an off-the-shelf solution.

The Peltor boom microphone was removed and the electret microphone element on a wire frame boom with mounting knob was installed in the original microphone mounting hole in the helmet. The new microphone element plugged directly into the existing wiring harness.

The result is an excellent alternative to the higher-priced Gentex HGU-55.

The Gentex HGU-55 used in the comparison has the following features: custom-molded liner, plastic ear cups with gel seals, custom paint (flat gray is standard) for \$150 extra, and tinted visor. This helmet cost more than \$1,300.

The stock Peltor G77 Rally helmet retails for around \$495 at most racing suppliers. The aviation avionics upgrades add approximately \$100 to the cost of the helmet. Peltor only supplies this helmet in blue, but it could be painted in any color or design at additional cost by a third party vendor.

The G77 modified for general aviation use sells for \$599. Peltor has indicated that if enough demand develops for this product, it would be



The Gentex HGU-55 weighs 42.6 ounces, while the Peltor weighs 46.5 ounces, as measured on a highly calibrated mass-sensing device at the local U.S. Postal Service facility.



A Gentex helmet is a fashion accessory that says you're here to play hard.

willing to produce an aviation-ready version with full factory support.

Flight Testing

I found the prototype helmet to be quite comfortable. The knit Nomex lining is soft and feels like a T-shirt wrapped around your head. The low-density foam inner liner molds nice-

ly to your head, so I never felt any "hot spots" on my noggin.

The electronics modifications to the G77 worked flawlessly in my Pitts. The noise attenuation inside the cockpit was equivalent to the HGU-55 I normally wear when I fly. The stock plastic ear cups have foam ear seals, which do a good job of

staying comfortable and keeping out the noise.

Considering the ear cups are plastic and held in place with Velcro, they could be upgraded with an after-market ANR system, although I think a better solution would be to cannibalize an ANR headset, which would be a minor project for most handy pilots. 

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Aerobatics 19



Hubie Tolson

Gone West. Inverted, no doubt Rudy Penteado leaves behind a rich legacy

By Mike Heuer, CIVA President

Rudy Penteado passed away on Thursday, February 23, in his home country of Brazil. Also a resident of the United States for many years, Rudy contributed greatly to aerobatic competition, both on the domestic scene and internationally.

An enthusiastic and energetic pilot, Rudy was also an accomplished computer programmer, mathematician, statistician, and businessman. In the early 1980s and 1990s, he worked on the development of a DOS version of the IAC scoring software the organization used for many years—up until the recent introduction of the Jasper software currently in use.

It is hard to imagine how the IAC could have functioned without Rudy's work and his devotion to the product. IAC members should remember that prior to Rudy's software being introduced, the IAC had no standardized program in widespread use for competitions, and Rudy single-handedly took on the project, spending thousands of hours in its development.

Not at all a stereotypical programmer or computer nerd, Rudy had an infectious personality, a wonderful sense of humor, a love of people, and a deep affection for aviation and aerobatics.

Along the way, he became an expert on the statistical-averaging scoring system in use since 1978, then called TBL for Tarasov-Bauer-Long (the folks who developed it). Rudy proposed changes to the TBL system that would "soften" its impact and improve it. These changes were adopted by CIVA in the late 1990s, and scoring at world competitions was improved. IAC's software was also updated to use what then became known as TBLP (with the P standing for Penteado, of course).

Aside from his service to the IAC and also representing his country at CIVA for several years, Rudy was a unique individual. Not at all a stereotypical programmer or computer nerd, Rudy had an infectious personality, a wonderful sense of humor, a love of people, and a deep affection for aviation and aerobatics. He made friends everywhere he went. I was fortunate to spend many hours with him, working at competitions (and even flying with him in his Sukhoi 29), and I will miss him greatly. ✈

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Tribute to a Champion

Rudy Penteado brought to aerobatics a sense of skill, style, and fun

By Hubie Tolson

A Brazilian buddy just told me Rudy passed away. A Sukhoi guy from the early days, Rudy was a completely unique unit. He was deeply involved in the development of our scoring system, and I believe he created the first remote, semi-live scoring program.

I was the U.S. National Aerobatic Champion for one minute, as were many other people, because of Rudy. I remember how it felt to stand in front of those TV screens at Nationals and watch the scores popping up. If you flew early enough in a sequence, you could be No. 1 no matter how poorly you flew.

However, I found it best not to check back later.

Some years back, Rudy was a fairly constant presence at many U.S. contests. In the spring of 1994, I was weathered in at Charleston, South Carolina, on my way to the Sebring, Florida, contest. I called to let the folks there know I wasn't going to make it, and before I knew it, I was sitting in Rudy's Cessna 182. He flew seven hours roundtrip to fetch me, and then

lent me his Sukhoi for the week to compete. He wouldn't even take money for gas.

We had met only briefly at that time, and I hadn't a clue of the experiences the future held with Rudy. (This is taking on the tones of a Paco tale!)

That Sebring, made possible only by Rudy's generosity, was a special one for me. It was my second Unlimited contest, and I had taken a beating from everyone (literally) in the first two flights. The Unknown was published, and it contained a vertical outside snap. I had never done one. I was thinking I'd moved up too early.

Many of the hot sticks of the day were there, John Lillberg, Phil Knight, and others. Everyone flew the flight and made a mistake. I was last and somehow hit the snap and won the flight. That was a first. Actually, it was the only one for quite a while.



Rudy's Impact

Due to the mysterious disappearance of many brain cells, I may not have all of the following correct, factually speaking. (But "factually correct" often leads to boring storytelling, and that's not at all what Rudy was about.) I refuse to let the truth get in the way of a good story.

I believe Rudy was pretty much responsible for the development of competition aerobatics in Brazil. He and his buddy Augusto had the first Sukhoi in Brazil. Prior to that, he owned a Pitts, which I believe he sold to Lemi Richieri, who eventually bought a Sukhoi that he uses in air shows throughout South America today.

As a result of Rudy's efforts, a surprising number of folks bought airplanes or became members of flight schools that rented aerobatic airplanes. Ten years or so ago, two fairly major aerobatic contests were held in Brazil each year. Rudy decided he wanted to ratchet it up a notch, so he and the other Brazilian aerobatic pilots decided to host the first ever South American Continental Unlimited Championships in Porte Allegro, Brazil, in November 1994.

There is no doubt whatsoever that Rudy intended to make history by becoming the first-ever South American Continental Unlimited Champion. The reason I have such certainty that Rudy knew he would become the first-ever South American Continental Unlimited Champion? At that time in South American aerobatic history, there were no Unlimited pilots on the continent against whom Rudy could compete. So he invited me, thereby pretty much assuring victory for himself.

I had just transitioned from a Pitts to a Sukhoi, and more or less simultaneously transitioned from Advanced to Unlimited, so as you might imagine, it wasn't pretty. However, the first-ever South American Continental Unlimited Championship sounded pretty good to me, so I decided to kick some Brazilian tail and took Rudy up on his invitation.

Actually, that's all wrong. What I was really thinking was, "Two competitors, guaranteed wood!"

So he faxed about 4.5 feet (fax paper was slippery and came in rolls then) of hand-drawn maps and directions from Sao Paulo to Uba Tuba, an oceanside beach resort in the north

(translation: warm) part of the country. I'm not sure why Rudy chose Uba Tuba as his pre-first-ever South American Continental Unlimited Championships training site, but I can't help but think it had something to do with the fact that most of the women on the beaches there were beautiful. And naked.

So in November, I was sitting in the goats and chickens section of the Varig Airlines flight to Sao Paulo, on the ramp in Atlanta waiting to begin what looked like seven hours of hell. Even though the seats were so close together that my knees were up around my ears, I decided I should use the time to studiously commit my sequences to memory. This, I knew, would guarantee victory.

A flight attendant (there were probably 10 of them), walked by, noticed the Aresti form, and asked if I was studying an aerobatic sequence. That was followed by the question, "Do you know Rudy Penteado?" Can you say golden horseshoe? Poof! In the blink of an eye I was sitting in first class with only one or two others.

This was my first time in first class, and I can't tell you how quickly I

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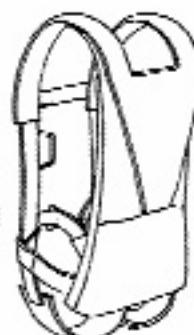
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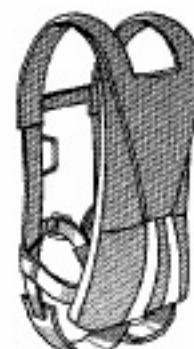
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caught on. The reason I can't tell you is because they serve free drinks up there. I hadn't even watched the seat belt demonstration or reviewed the emergency exit card, and somehow those people had already pushed three drinks at me.

I had never understood why someone could pay 500 percent over the goats and chickens cost and justify it. It's a no-brainer. At that moment, I resolved to bring aerobatic sequence cards on all future airline flights. No more sitting in the back of the bus for me.

Just as I dozed off (okay, passed out), I was tapped on the shoulder and invited to sit in the engineer's seat of the 767-200 and watch a zero/zero auto landing at Sao Paulo Airport. There were sunlit buildings and mountains sticking out of the fog. I'm going to pass a suggestion on to the TSA that this should be allowed, as it's a breathtaking experience, but I'm not sure they'll go along with it.

Going for the Win

One thing I can tell you with certainty is that you don't feel good if you stay up all night drinking most everything in the first class bar. Another thing I picked up on immediately was that no one spoke English at the Sao Paulo Airport. Not the gate folks, not the car rental folks, no one.

Sao Paulo is a delightful village of around 20 million, a fact of which I was completely unaware until that moment. I learned that the Sao Paulo Airport is very large, and that it has many, many rental car companies.

After finding my rental car, an unairconditioned VW Golf, I unscrolled my fax and set out. It was 110°F, and I was sweating profusely. My fax paper was turning to mush. Soon I noticed the traffic was six or seven cars wide on a four-lane road. People were waving flags out their car windows; pickup trucks were packed with revelers firing weapons into the air. It was most reassuring. Election weekend in Brazil.

Everybody in Brazil goes to Uba Tuba for the weekend, and then returns home Monday to vote. To say how ramped-up this crowd was is difficult. I was thinking, "People, it's a friggin' weekend at the beach,

and an election. It's going to be very anticlimactic." That didn't seem to bother them in the least.

It was a most pleasing next four hours. I don't know whether any of you have noticed, but the trucks in the United States have exhausts that protrude into the air, while the trucks in Brazil use a side exhaust setup. The side exhaust has been carefully engineered to blow precisely into the open window of an unairconditioned VW Golf. Fabulous.

I watched the plane land and finally located Rudy and Augusto, and life immediately became fabulous. Really, really fabulous.

Almost to Uba Tuba, I began to relax a bit. Then I came to the tollbooth. I become acutely aware that all the folks behind me really wanted to get to the beach. They don't take dollars in Brazilian tollbooths. What's up with that? Also, they scream at you when the folks behind you start blowing the horn. International travel tip: Go to the currency exchange when you arrive. Drive rapidly through the tollbooth if you forget.

Frustrated and exhausted, I stopped at the first beachfront bar in Uba Tuba for a little hair of the dog, and as I was sipping my cold beer, a Sukhoi came barreling down the beach. This was my first clue they don't have an FAA in Brazil. I watched the plane land and finally located Rudy and Augusto, and life immediately became fabulous. Really, really fabulous.

It's a Brazilian tradition, I learned, to have beers with lunch. I noted the flying after lunch was much better, and I believe there is a link. I'm thinking we need to implement a 0.04 rule, but I'm not sure it'll pass here.

We trained and trained, and soon I found myself headed for the contest site in the cockpit of a 7-something airliner. Lemi Richieri had arranged this little surprise.

The contest began, and I won the first flight by a few points. We did the Free, and I won by a thread. Only the Unknown was between victory and me. Rudy was pretty much "da man," being the only Unlimited guy living on the continent, and I began to think he was influencing the volunteer coordinator when I was asked to judge the Advanced category, and assigned the most beautiful girl at the contest as my assistant. She was Lemi's sister Lyga, and she spoke fluent English. She had a fabulous attitude.

This didn't fluster me in the least, and in the Unknown, surprisingly, I did not fly the whole sequence backward. Rather, I left out the roller. I had not yet burned in my later habit of sequence reversal at this early point in my Unlimited career. I landed without a clue, mentally patting myself (the soon-to-be first-ever South American Continental Unlimited Aerobatic Champion) on the back. I taxied up, waiting for the applause that was completely absent, and Rudy rushed up to the airplane and gave me a bear hug (bear hug being a wild understatement). Rudy thanked me repeatedly for being such a gentleman, a true sportsman.

The contest ended, and Rudy was crowned the first ever South American Continental Unlimited Aerobatic Champion. I got second and a fabulous trophy. I flew home with the goats and chickens, despite passing an Aresti card to each of the 10 flight attendants.

I could never convince Rudy I left that roller out completely unintentionally. From that day forth, I believe Rudy thought I dropped that flight so he could take his place in the history books.

Actually, now that I think about it, I might not have ever mentioned it to him. 

Hubie Tolson is an Unlimited pilot from New Bern, North Carolina. He is a commercial and residential real estate developer. When he retires Hubie plans to continue his writing career, a talent he recently revealed while in Spain flying and covering the World Aerobatic Championships.



Second contest is a charm during Primary competitor's first season

Take Two!

By Dianna Ingram

Eight a.m. on Saturday, and the airport was quiet. Twenty-five aircraft in a myriad of bright colors sat in a row on the ramp: Extras, Pitts, Sukhois, and Decathlons in reds, yellows, blues, greens, and oranges. On the south end of the ramp, a pilot walked through his routine on the ground, his hand spinning and pirouetting through the sky the same way he will guide his airplane in flight.

I sat under the wing of my rented green and white Super Decathlon, eyes closed, lost in thought. I, too, was going through my routine in my mind before the flight. I had worked hard the past two weeks in between my first and second competitions, trying to perfect the maneuvers that didn't work so well the first time around. I had placed fourth at my first competition, and I was determined to do better this time.

After the first competition, I had

a wealth of criticism and advice at my disposal from fellow competitors and the judges. After thinking about what they had said, and reading every single piece of advice that might help me become a more effective competitor, I formulated a practice plan for the weeks between competitions. I spent a lot of time experimenting with various spin entry and exit techniques to see which

better prepared this time, and not at all nervous.

I snapped out of my reverie as I noticed the starter heading my way, clipboard in hand. After I put on my parachute, climbed into the aircraft, and strapped myself in tightly, the starter checked to make sure my altimeter was set to zero, and that I knew the correct frequencies to use in the holding area and in the aerobatic box.

"Have a good flight," he said, clearing me to launch into the holding area.

I took off and circled in the holding area, waiting for my turn in the aerobatic box. A strong southerly wind pushed

me north. I thought many competitors would have a hard time remaining in the box today. Fortunately, we Primary category competitors do not have to remain in the confines of the box, even though staying in the box would result in better presentation scores.

The slower I rolled, the better I could see and feel what I was doing, and how well the maneuver was progressing. I forced myself to relax and avoid the temptation to rush through the maneuver.

one worked best for me and for the Decathlon. Was spin entry cleaner with power on or power off? Should I apply rudder slowly and steadily, or should it be applied quickly and fully? I tried to increase the g-loading in my loops, trying to make them appear a little more round. I felt much

My radio finally crackled to life. It was the chief judge. "Dianna, you're cleared into the aerobatic box; good luck."

It took me a little longer than usual to get to the box owing to the strong winds aloft, but when I got there, I was in the zone and ready to fly. I wagged my wings three times to signal the beginning of my sequence as I entered the box.

My first maneuver was a one-turn spin. I entered the spin using just a touch of power and kicked in the rudder at the onset of the stall. The nose immediately began to yaw, sending me into the back of my seat with the auto-rotational force of the spin. Once three-quarters of the spin was complete, I pushed opposite rudder and brought the stick forward. The spin stopped on the heading from which it started, pointed straight down in a vertical descent. I gave the stick a 4g pull, going a little gray at the edges of my vision. As I let go of the stick, the g-forces all but disappeared, and my vision immediately returned to normal.

I was ready to fly the loop. Pulling 4g once again, I clenched my stomach muscles to help keep the blood from rushing from my head. I floated over the top, trying to keep the loop as round as possible. Then, as the speed built up astronomically on the back side of the loop, I began another 4g pull back to level flight.

I turned through 180 degrees in a competition-style steep turn. With the nose on heading, I rolled into a 60-

degree bank, turned 180 degrees, stopped the nose on my new heading, and then rolled abruptly back to level flight.

The next maneuver had been my greatest nemesis through all of my competition practice thus far: the slow roll. I took a second to relax before rolling. The slower I rolled, the better I could see and feel what I was doing, and how well the maneuver was progressing. I forced myself to relax and avoid the temptation to rush through the maneuver.

I added left aileron and rolled at perhaps half the roll rate of which the Decathlon is capable. As the aircraft approached inverted, I needed to push the nose up to keep the aircraft from descending. I could feel myself rising off the seat, momentarily hanging from the seat belts.

Once upright again, I did one more competition turn, 90 degrees this time, right toward the judges' line. Three more wing-wags, and the sequence was complete. I returned to the airport for landing.

I was ecstatic, and could hardly believe what I was hearing. This was the first time I remembered ever having won anything.

When the flight was over, I headed out to the judges' line, where I had volunteered to assist the judges by recording scores for the Sportsman competitors. Listening to what the judges had to say about other competitors is a wonderful learning opportunity.

On my way to the judges' line, I purposefully passed by the scoring room without looking at the results. I didn't know if I wanted to know how the flight went or not. I was surprised when some of my fellow Primary category competitors came up to me to congratulate me on the flight. Apparently I had won the first flight. I was ecstatic, and could hardly believe what I was hearing. This was the first time I remembered ever having won anything.

I still had two more flights to go before the final scores would be determined. With the scores of the top three pilots being fairly close, I still had my work cut out for me during the rest of the competition.

Sunday afternoon, and the airport was once again quiet. I strapped in for the flight home after bidding my fellow competitors and colleagues goodbye, promising to meet again next season. My first place trophy was stowed in the baggage compartment, and I was still more than a little amazed that I had been able to hold on to first place after all three competition flights.

This was a wonderful experience, participating in my first aerobatic competition season. Next year, Sportsman, here I come! 



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Calendar of Events

2006 Contests

Saturday, April 29

Contest: Original Doc Harvey One Design Contest
Region: South Central
Location: Giddings-Lee City Airport – locator GYB, Giddings, TX
Hosting Chapter: IAC 25
Practice/Registration: TBD **Rain Date:** Sunday, April 30
Categories: Primary & Sportsman Power only. Citabria/Decathlon type only.
Contest Director: Klayton Kirkland
Contact Information: 713/791-1486 (home); email@iac25.org
Contest Website: www.iac25.org

Thursday, May 4 – Saturday, May 6

Contest: 53rd Sebring Aerobatic Championship
Region: Southeast
Location: Sebring Regional Airport – locator SEF, Sebring, FL
Hosting Chapter: IAC 23
Practice/Registration: Wednesday, May 3 **Rain Date:** None
Categories: Primary through Unlimited Power
Contest Director: Dennis Jones
Contact Information: 561/735-3470 (home); powdercoat1@aol.com (e-mail) **Contest Website:** www.iac23.org

Friday, May 5 – Saturday, May 6

Contest: Los Angeles Gold Cup Region: Southwest
Location: Apple Valley Airport – locator APV, Apple Valley, CA
Hosting Chapter: IAC 49
Practice/Registration: Thurs., May 4 **Rain Date:** Sun., May 7
Categories: Primary through Unlimited Power
Contest Director: Steve Andelin
Contact Information: 949/646-1270 (home); 949/233-0483 (cell); 949/640-5594 (fax); acrotest@aol.com (e-mail)

Thursday, May 18 – Sunday, May 21

Contest: Great Bay Aerobic Contest Region: Northeast
Location: Skyhaven Airport – locator DAW, Rochester, NH
Hosting Chapter: IAC 35
Practice/Registration: Thurs., May 18 **Rain Date:** None
Categories: Primary through Unlimited Power
Contest Director: Rob Petit
Contact Information: 781/646-5038 (home); rpetit@earthlink.net (e-mail) **Contest Website:** www.iac35.org

Friday, May 19 – Saturday, May 20

Contest: Okie Twinstaff Region: South Central
Location: Claremore Municipal Airport – locator GCM, Claremore, Oklahoma
Hosting Chapter: IAC 10
Practice/Registration: Thursday, May 18
Rain Date: Friday, May 26 – Saturday, May 27
Categories: Primary through Unlimited Power
Contest Director: Tom Culver
Contact Information: 918/496-1579 (home); 918/663-5848 (work); 918/519-2874 (cell); 918/663-4340 (fax); tculver@pdf-usa.net (e-mail) **Contest Website:** www.iac10.com

Saturday, May 27

Contest: Rocky Mountain Aerobatic Challenge
Region: South Central
Location: Sterling Municipal Airport – locator STK, Sterling, CO
Hosting Chapter: IAC 12
Practice/Registration: Fri., May 26 **Rain Date:** Sun., May 28
Categories: Primary through Unlimited Power
Contest Director: Clyde Cable
Contact Information: 970/454-5469 (home); 970/301-1292 (cell); jinnyfield@yahoo.com (e-mail)
Contest Website: www.iac12.org

Friday, June 2 – Saturday, June 3

Contest: Southeastern Aerobatic Open Region: Southeast
Location: Tara Field/Clayton County Airport – locator 4A7, Atlanta, Georgia
Hosting Chapter: IAC 3
Practice/Registration: Thursday, June 1 – Friday June 2
Rain Date: Sunday, June 4
Categories: Primary through Unlimited Power
Contest Director: Steve Haslup
Contact Information: 770/931-1631 (home); 404/829-6171 (work); 404/219-1031 (cell); 404/829-6118 (fax); shaslup@bellsouth.net (e-mail) **Contest Website:** www.iac3.org

Friday, June 2 – Sunday, June 4

Contest: Pennsylvania Aerobatic Championships
Region: Northeast
Location: Donegal Springs Airpark – locator N71, Maytown, PA
Hosting Chapter: IAC 58
Practice/Registration: Friday, June 2 **Rain Date:** None
Categories: Primary through Unlimited Power
Contest Director: JD Johnson
Contact Information: 215/526-2300 (work); 215/822-5573 (home); 267/246-1307 (cell); jjohnson@iac58.org (e-mail)
Contest Website: www.iac58.org

Friday, June 9 – Saturday, June 10

Contest: Lone Star Aerobatic Championship
Region: Southwest
Location: Grayson County Airport – locator GYI, Denison, TX
Hosting Chapter: IAC 24
Practice/Registration: Thurs., June 8 **Rain Date:** Sun., June 11
Categories: Primary through Unlimited Power
Contest Director: Barbara Boyle
Contact Information: 972/306-5851 (home); 972/342-4761 (cell); barb.boyle@verizon.net (e-mail)
Contest Website: www.iac24.org

Friday, June 9 – Saturday, June 10

Contest: Apple Cup Region: Northwest
Location: Ephrata Municipal Airport – locator EPH, Ephrata, WA
Hosting Chapter: IAC 67
Practice/Registration: Thurs., June 8 **Rain Date:** Sun., June 11
Categories: Primary through Unlimited Power
Contest Director: John Pierson
Contact Information: 425/865-8454 (home); 425/269-7502 (work); johndpierson@msn.com (e-mail)
Contest Website: www.iac67.org

Friday, June 9 – Sunday, June 11

Contest: Heuer Classic Region: Mid-America
Location: Aurora Municipal Airport – locator ARR, Aurora, IL
Hosting Chapter: IAC 1
Practice/Registration: Friday, June 9 **Rain Date:** None
Categories: Primary through Unlimited Power
Contact Info. & Contest Website: www.iacchapter1.com

Thursday, June 15 – Sunday, June 18

Contest: Northern California Aerobatic Championships
Region: Southwest
Location: Paso Robles Municipal Airport – locator PRB, Paso Robles, California
Hosting Chapter: IAC 38
Practice/Registration: Thurs., June 15 **Rain Date:** Sun., June 18
Categories: Primary through Unlimited Power
Contest Director: Terry Lauck
Contact Information: 707/427-8516 (home); 510/245-4643 (work); 707/580-1790 (cell); t.s.lauck@gmail.com (e-mail)
Contest Website: www.iac38.org

Saturday, June 24 – Sunday, June 25

Contest: Ohio Aerobatic Open Region: Mid America
Location: Union County Airport – locator MRT, Marysville, OH
Hosting Chapter: IAC 34
Practice/Registration: Thursday, June 22 – Friday, June 23
Rain Date: None
Categories: Primary through Unlimited Power
Contest Director: Gordon Penner
Contact Information: 513/791-7331 (home); 513/520-6065 (cell); gpenner@cinci.rr.com (e-mail)
Contest Website: www.iac34.com

Saturday, June 24 – Sunday, June 25

Contest: Midwest Aerobatic Contest Region: South Central
Location: Seward Municipal Airport – locator SWT, Seward, NE
Hosting Chapter: IAC 80
Practice/Registration: Friday, June 23 **Rain Date:** None
Categories: Primary through Unlimited Power
Contest Director: Lynn Bowes
Contact Information: 402/785-1060 (home); edb bowes@futuretk.com (e-mail)

Friday, July 7 – Saturday, July 8

Contest: Okie Dust Devil Region: South Central
Location: Thos. P. Stafford Airport – locator OJA, Weatherford, OK
Hosting Chapter: IAC 59
Practice/Registration: Thurs., July 6 **Rain Date:** None
Categories: Primary through Unlimited Power
Contest Director: John Creswell
Contact Information: 580/774-9176; creswell@classicnet.net
Asst. Contest Director: Tonja Hawley
Contact Information: 580/330-0906; th7up@yahoo.com
Contest Website: www.g-loc.com/iac_59/index.htm

Saturday, July 8 – Sunday, July 9

Contest: CAN-AM Aerobatic Championships
Region: Mid-America
Location: Jackson County Airport/Reynolds Field – locator JXN, Jackson, Michigan
Hosting Chapter: IAC 88
Practice/Registration: Fri., July 7 **Rain Date:** None
Categories: Primary through Unlimited Power
Contest Director: Scott Gusakov
Contact Information: 734/426-6084 (home); 313/580-4313 (cell); pittsdriver@comcast.net (e-mail)
Contest Website: <http://mywebpages.comcast.net/iac88/>

Thursday, July 13 – Sunday, July 16

Contest: Kathy Jaffe Challenge Region: Northeast
Location: Flying W Airport – locator N14, Lumberton, NJ
Hosting Chapter: IAC 52
Practice/Registration: Thurs., July 13 – Fri., July 14
Rain Date: None
Categories: Primary through Unlimited Power
Contest Director: Ron Chadwick
Contact Information: 732/671-6089 (home); bubbaron@comcast.net (e-mail)
Contest Website: www.iac52.com

Saturday, July 22 – Sunday, July 23

Contest: Salem Regional Region: Mid-America
Location: Salem-Leckrone Airport – locator SLO, Salem, IL
Hosting Chapter: IAC 61
Practice/Registration: Friday, July 21 **Rain Date:** None
Categories: Primary through Unlimited Power
Contest Director: William Perman
Contact Info.: 636/236-8691 (home); perman@slu.edu (e-mail)

Thursday, August 3 – Saturday, August 5

Contest: Hill Country Hammerfest Region: South Central
Location: Llano Municipal Airport – locator AQO, Llano, Texas
Hosting Chapter: IAC 107
Practice/Registration: Thurs., August 3 **Rain Date:** None
Categories: Primary through Unlimited Power
Contest Director: John Harlan
Contact Information: 512/259-9028 (home); jmharlan@earthlink.net

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Aerobatics 27

Continued from page 27

Friday, August 25 – Saturday, August 26

Contest: Beaver State Regional **Region:** Northwest
Location: Eastern Oregon Regional Airport – locator PDT, Pendleton, Oregon
Hosting Chapter: IAC 77
Practice/Registration: Thursday, August 24
Rain Date: Sunday, August 27
Categories: Primary through Unlimited Power
Contest Director: Greg Howard
Contact Information: 503/626-8152 (home); 360/735-9441 (work); gHoward@hotmail.com (e-mail)
Contest Website: www.iac77.org

Friday, August 25 – Sunday, August 27

Contest: Illinois State Open **Region:** Mid-America
Location: Illinois Valley Regional Airport – locator VYS, Peru, IL
Hosting Chapter: IAC 1
Practice/Registration: Friday, August 25
Rain Date: None
Categories: Primary through Unlimited Power
Contact Info. and Contest Website: www.iacchapter1.com

Friday, August 25 – Sunday, August 27

Contest: Green Mountain Aerobatic Contest
Region: Northeast
Location: Hartness State Airport – locator VSF, Springfield, VT
Hosting Chapter: IAC 35
Practice/Registration: Fri., August 25 **Rain Date:** None
Categories: Primary through Unlimited Power
Contest Director: Hans Bok
Contact Information: 508/994-5957 (home); hans.bok@comcast.net (e-mail) **Contest Website:** www.iac35.org

Saturday, September 2 – Sunday, September 3

Contest: Gulf Coast Regional **Region:** South Central
Location: TBD **Hosting Chapter:** IAC 25
Practice/Registration: Thursday, August 31 – Friday, September 1
Rain Date: None
Categories: Primary through Unlimited Power
Contest Director: Mike Torbett
Contact Information: 281/359-6320 (home); 713/780-6085 (work); 713/540-0408 (cell); mike.torbett@honeywell.com (e-mail)

Saturday, September 16 – Sunday, September 17

Contest: East Coast Aerobatic Contest **Region:** Northeast
Location: Warrenton–Fauquier Airport – locator W66, Warrenton, Virginia
Hosting Chapter: IAC 11
Practice/Registration: Fri., Sept. 15 **Rain Date:** None
Categories: Primary through Unlimited Power
Contest Director: Scott Francis
Contact Information: 703/327-3135 (home); 703/272-1064 (work); 703/618-4132 (cell); 703/359-8686 (fax); s.francis@ieee.org (e-mail) **Contest Website:** www.iac-chapter11.net

Saturday, October 7

Contest: Harold Neumann Barnstormer
Region: South Central
Location: New Century AirCenter Airport – locator IXD, Olathe, Kansas
Hosting Chapter: IAC 15
Practice/Registration: Fri., Oct. 6 **Rain Date:** Sun., Oct. 8
Categories: Primary and Sportsman Power only
Contest Director: Connie Johnson
Contact Information: 816/453-5047 (home); 816/347-1331 (work); 816/560-6404 (cell); cjohnson4532@kc.rr.com (e-mail)

Friday, October 13 – Saturday, October 14

Contest: Borrego AkroFest **Region:** Southwest
Location: Borrego Valley Airport – locator L08, Borrego Springs, California
Hosting Chapter: IAC 36
Practice/Registration: Thursday, October 12
Rain Date: Sunday, October 15
Categories: Primary through Sportsman Power
Contest Director: Michael Church
Contact Information: 949/852-8850 (work); mc@sunriseaviation.com (e-mail) **Contest Website:** www.iac36.org

Saturday, October 14 – Sunday, October 15

Contest: Rocky Mountain Invitational **Region:** South Central
Location: Lamar Municipal Airport – locator LAA, Lamar, CO
Hosting Chapter: IAC 5
Practice Registration: Friday, October 13
Rain Date: Saturday, October 21 – Sunday October 22
Categories: Primary through Unlimited Power

Contest Director: Jamie Treat

Contact Information: 303/648-0130 (home); 719/721-8149 (work); JamieTreat@direcway.com (e-mail)
Contest Website: <http://iac5.org>

Canadian Contests

Saturday, August 5 – Sunday, August 6

Contest: Montreal Acro Challenge
Location: St. Hyacinthe Airport – locator CSU3 (N45 36 18 W073 00 51), Montreal, Canada
Hosting Chapter: Aerobatics Canada 2 (Quebec)
Practice/Registration: Friday, August 4 **Rain Date:** None
Categories: Primary through Unlimited Power
Contest Director: John Wyman
Contact Information: 514/697-4253 (home); ac2qc@yahoo.ca (e-mail)
Contest Website: Not yet available.

2006 National Championships

Sunday, September 24 – Friday, September 29

Contest: 2006 U.S. National Aerobatic Championships
Location: Grayson County Airport – locator GYI, Denison, TX
Hosting Chapter: IAC National
Practice/Registration: Sat., Sept. 23 **Rain Date:** None
Categories: Primary through Unlimited Power; Sportsman through Unlimited Glider
Contest Director: TBD
Contest Website: Not yet available

2006 World Championships

Thursday, August 3 – Sunday, August 13

Contest: Advanced World Aerobatic Championships
Location: Radom, Poland

To support and follow the U.S. Advanced Aerobic Team's participation in AWAC, visit www.advancedaerobaticteam.com.



Irene Graves

Continued from page 3

Speaking of the Regional Series, the trophies for the 2005 contest year will be sent out this month to the Chapter presidents. Thanks to two member suggestions, the 2006 contest trophies will be made at the same time and will be sent out at the conclusion of the regional contest season, instead of the following year, making the awards much more timely. Pilots get their trophies in the same contest year!

The Members Only section of the website is undergoing a major revision to make it more useful and educational. Contest results will be moved out of this section so your Aunt Mary can follow your progress without having to use your IAC number to get into the "secret" area. We will soon be adding more articles from *Sport Aerobatics* and other educational materials. Making the site a truly educational experience is a ways down the road, but it's on the list.

IAC Policy & Procedures Manual

Major changes are in the works for the P&P manual as we call it. The unpleasantness and sheer magnitude of the job has left it off the board's agenda for too long. The board will be addressing this at the spring meeting, hopefully with plenty of coffee. Major areas needing revision include the sections covering Nationals and Team Selection, as well as other administrative sections.

This summer, members will receive

a summary of these changes to vote on for their approval. The board asks for your support of these revisions. The P&P is the document by which the IAC is run. The document has to deliver, and this year it will with your approval.

What's In It for Me?

This is the biggest question we have to answer. If you are not a competition pilot, what's in the IAC for you? Frankly, a magazine. The member surveys will help us better answer this question so we can better tailor the organization to your needs. It's no surprise the IAC continues to lose members, probably because we just

**So while it may appear
that nothing is happening
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haven't focused on the right things.

With an organization this size, it's difficult to do everything you want because the budget won't allow it. We are at a crossroads; either we grow and introduce pilots to the world of aero-

batics, or we stagnate and go back to a competitors-only club.

We have programs we'd like to implement through flight schools to introduce people to aerobatics, not necessarily competition, but flight safety through unusual attitude training. But it takes people and money, and until we figure out what you want, there is little point in trying something new. Hopefully by the time you read this, we will have more concrete answers.

I would like to see this club grow and am doing the best I can with the team I have to do it, but it won't be easy. There are a number of obstacles in the way, including the cost of flying, the cost of airplanes, and insurance issues getting out of hand. It all comes down to what you want and trying to make it happen.

So while it may appear that nothing is happening behind the scenes, we are an organization with a board that truly wants to "get things done," which makes my and Lisa's jobs even more productive. It also makes an organization that is better for all of us.

Tasks get accomplished in organizations where the board and the president work together, and where the board members are active on committees. As we go into a round of elections for board members, please consider voting for people who will get things done, and who are not simply looking to occupy a space on the board. 

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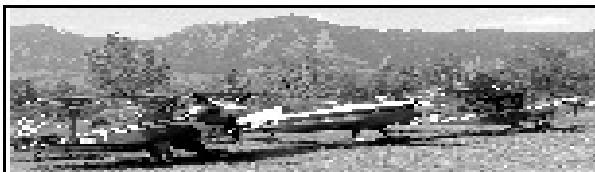
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Mishaps Data

By Bruce Johnson

MISHAPS BY MONTH												
YEAR	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP	OCT	NOV	DEC
2005	0/0	1/2	2/2	1/1	1/2	2/2	3/4	1/1	1/1	0/0	0/0	0/0
2006	0/0	0/0										

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.												
MISHAPS BY YEAR												
YEAR	1995	1996	1997	1998	1999	2000	2001	2002	2003	2004	2005	
MISHAPS	20	26	21	24	20	18	12	9	15	9	12	

As this issue went to press, air show pilot Nick Nilmeyer was killed in an accident that apparently happened while landing. Next month's issue will include the NTSB's preliminary report. While there have been no aerobatic mishaps so far this year, there have been several mishaps that have non-aerobatic factors as the primary cause. We include them as a general caution to our operations.

PRELIMINARY • Wheeler Pitts Special, N55MW

Fulton, Missouri—1 Minor Injury • February 22, 2006

At 1600 Central time, an amateur-built Wheeler Pitts Special crashed while landing at Sky-Go Farms Airport (73MU).

The pilot was attempting a visual approach to landing on Runway 27 at 73MU. Trees at the approach end of Runway 27 require a steeper than normal glidepath. The pilot said that during the approach the airplane was too slow and steep to allow him to slip the airplane to gain forward visibility. On short final, the pilot noticed an increased sink rate, "possibly [from convection] current or downdraft from slope of runway and surrounding terrain." The pilot stated that during landing, the airplane impacted an embankment, slid for about 100 feet, nosed over, and came to a stop inverted.

Sky-Go Farms Airport is a private airstrip served by runways 9-27 (1,800 feet by 60 feet, turf) and runways 18-36 (1,800 feet by 60 feet, turf). The Runway 27 approach end has a 45-degree embankment that is 1 foot below the runway surface.

PRELIMINARY • Aviat Pitts S-2B, N221RS

Severance, Colorado—2 Uninjured • March 5, 2006

At approximately 1415 Mountain time, a Pitts S-2B nosed over during a forced landing near Severance, Colorado. The pilot and passenger on board the airplane were not injured.

The pilot said the engine began running rough and then lost all power. He made a forced landing in an open field. During the landing roll the airplane nosed over, crushing the vertical stabilizer and the top of the upper wing. He said fuel leaking from the fuel tanks smelled like kerosene. The pilot said he last refueled the airplane two days earlier.

FINAL • Beech A45 (T-34), N141SW

Montgomery, Texas—2 Fatal • December 7, 2004

While maneuvering during an upset recovery training flight, the left wing separated from the airframe, which resulted in an uncontrolled descent and impact with terrain. A review of an on-board video revealed the instructor and student were performing training maneuvers that included steep turns, stalls, accelerated stalls, and unusual attitudes.

During the final maneuver, the instructor asked the student to lower the nose to "about a 140 knots"

and afterward told the student to slowly pitch the nose upward "until we're pointed straight up." The airplane was seen climbing vertically up, and visual contact with the ground disappeared. The instructor then told the student to "pull the way we just did a minute ago and pull the airplane into a stall."

A brief stall occurred, and then the airplane continued to pitch in the same direction, and its path resembled the remainder of an inside loop. As the ground reappeared into view, the aircraft was inverted.

While in a steep nose-down attitude (no sky visible in the view), the instructor told the student to "pull it into a stall right now." At that moment, the recording ended.

The left wing, left horizontal stabilizer, inboard section of left elevator, aft canopy frame, and a portion of the left wing skin were located in a wooded area approximately 0.4 miles southwest of the main wreckage.

All applicable airworthiness directives had been complied with at the time of the accident. Examination of the wing and carry-through structure revealed the structure failed as the result of extensive and widespread fatigue cracking in the -31 and -33 channels and the -3 and -85 webs. The cracks in the channels were in hidden areas and probably could not have been directly detected without extensive disassembly of the structure. However, the cracks in the webs would have been easily detected, and the crack in the forward web apparently was detected, based on the stop-drilled hole and the notes in the maintenance records.

The materials of the structure were in compliance with required specifications. However, the workmanship was poor as indicated by the trapped debris and damaged holes. This may have been acceptable workmanship at the time of manufacture, but these defects have since been recognized as having a large negative impact on the fatigue life of the structures. The localized damage and enlargement of the hole could have reduced the effectiveness of the inspection. The fatigue cracking in the carry-through, the rear wing spar, and the horizontal stabilizer indicate the fatigue life of the entire aircraft structure has been expended. It is strongly suspected that these conditions may exist in other T-34 airframes.

The NTSB determined the probable cause of this accident was the in-flight separation of the left wing as a result of extensive fatigue cracking throughout the wing carry-through structure.

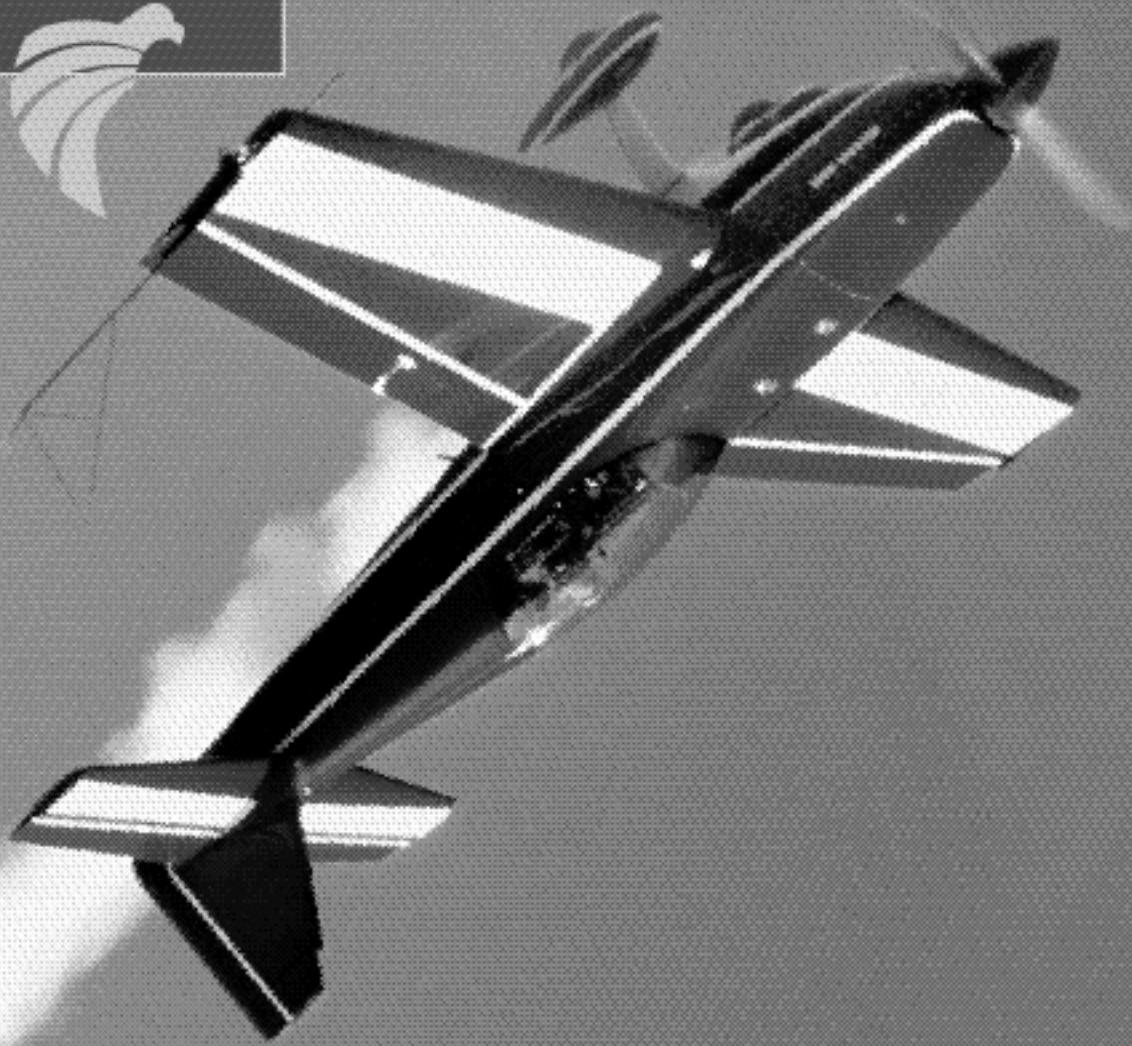


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