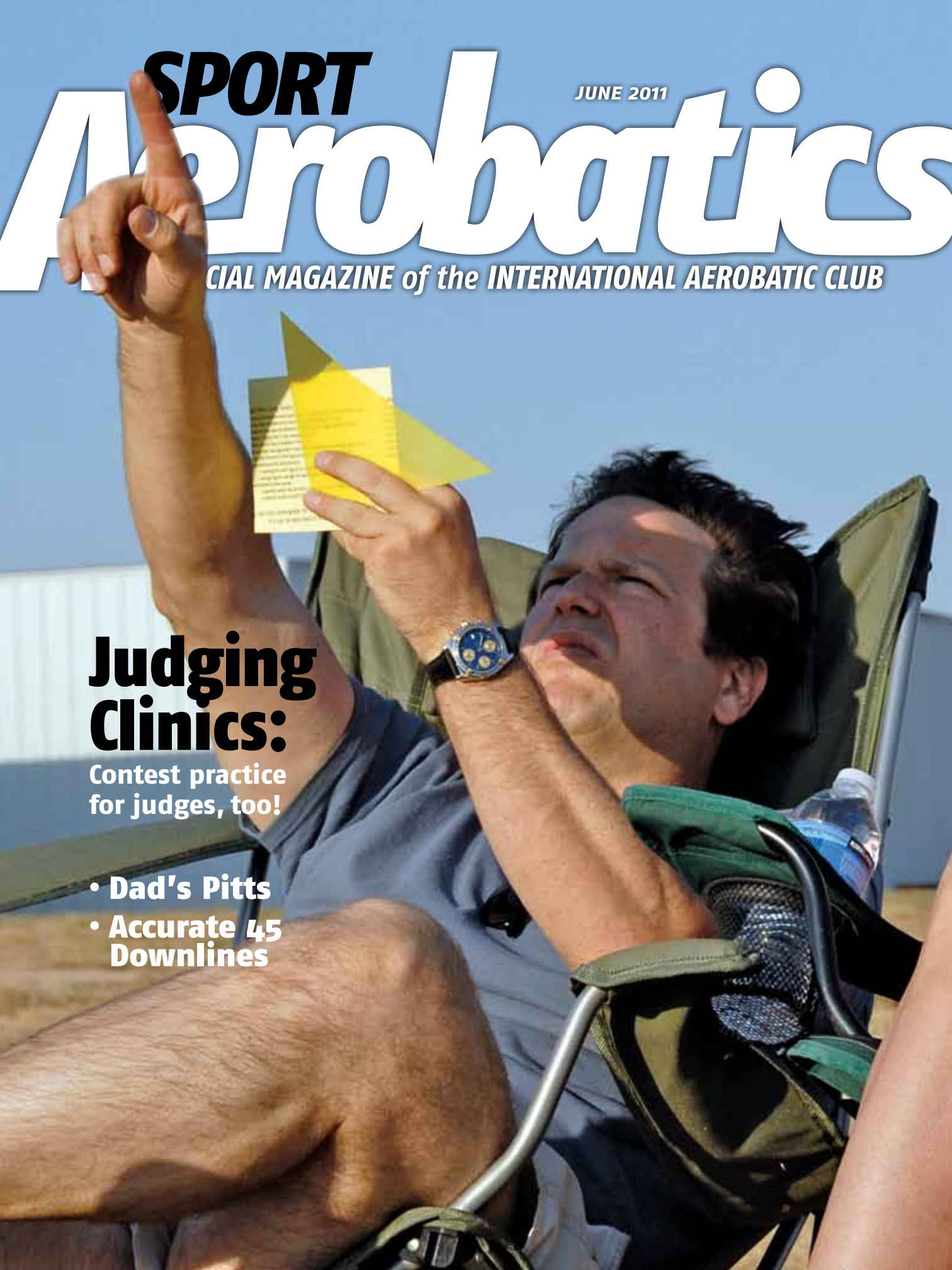
SPORT Aerobatics
JUNE 2011
OFFICIAL MAGAZINE of the INTERNATIONAL AEROBATIC CLUB



Judging Clinics:

Contest practice for judges, too!

- Dad's Pitts
- Accurate 45 Downlines

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The IAC'S new e-newsletter

SPORT Aerobatics

Vol. 40 No. 6 **June 2011**

A PUBLICATION OF THE INTERNATIONAL AEROBATIC CLUB

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My older sister, Terry, described our father's Pitts as "the most beautiful airplane in the world."
—James Doyle

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Andrew Slatkin and Colleen Keller judge figures.

Photo by Steve De La Cruz

PHOTOGRAPHY COURTESY **JAMES DOYLE**

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REGGIE PAULK
COMMENTARY / **EDITOR'S LOG**

Spring Thaw

ON JUNE 21, AT 1:16 p.m., the sun will be at its highest point of the year, marking the first day of summer. That means most of us will have gotten used to shorts, T-shirts, and a nice glass of iced sweet tea. Yes, even folks like me out in Colorado are now familiar with this Southern libation. It means competition season is well underway, and many contests have been flown. It also means there are a lot more to go, and a lot of opportunities for improvement for both pilots and judges.

We spend a lot of magazine real estate talking about what's going on inside the airplane, but competition consists of an important ground component as well. For some competitors, judging may seem just as ethereal as aerobatics once did. To that end, we are giving you two slightly different perspectives of judging to help pilots understand the process a little better and judges improve their critiquing skills.

Time in the magazine world really seems to fly by quickly. Because of deadlines, most issues are being put together about two months ahead of the print date. That means I'm staring out the window at the melting snow of early May as you're sitting in the blazing heat of the summer sun. The very next issue is the Oshkosh handout issue, and AirVenture 2012 will already be well on its way to becoming reality.

I wanted to point out to contest organizers that due to the lead times for each magazine issue, it is important to list your contest as early as possible on the IAC website so I can get it in the magazine on time. A couple of people contacted me about why their contest wasn't listed in the magazine, and knowing about the time issue set things straight.

Due to lead times for each magazine issue, it is important to list your competition as early as possible.

For those of you who've sent articles and article ideas, I want to personally thank you. It takes a lot of time and effort to sit down and put your thoughts on paper, and those who do so are taking precious time away from their other obligations. This is a volunteer organization after all. To those of you who do give freely of your time, thank you for all your dedication and support. *IAC*

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

DOUG BARTLETT

From the President

THE BOARD OF DIRECTORS met last April in Denver. After such a meeting it is always a good time to inform all members of some of the more important decisions that were made.

The biggest issue to come before the board was a review of the eligibility of awards at the U.S. National Aerobatic Championships. Prior to the discussion, the rules were very clear that only U.S. citizens were eligible for titles, trophies, and awards. After reviewing member comments, the board discussed and decided the following. The first-, second-, and third- place National trophies would remain restricted to U.S. citizens. The first, second, and third place individual flight medals given after each flight in each category would be open to any pilot regardless of nationality. The board directed me to investigate all of the special awards given at the U.S. Nationals and report back with a recommendation as to the eligibility for these awards. I have already forwarded a recommendation to the board and will contact the donors of these awards for their opinions and recommendations. I will report back to all members when a final decision on the special awards is made. This will be completed and reported to all members prior to the 2011 U.S. National Aerobatic Championships.

Over the last several years I have had the pleasure of watching gliders become an increasingly important part of the sport of aerobatics. With the economy being what it is and the rising cost of fuel, it is easy to see why gliders are continuing to become more popular. Last year the IAC board of directors approved the addition of an Advanced glider category. This category will begin in the 2012 season, and the preparations for it are underway at this time. The rulebook and scoring program are being modified, and the numerous small tasks necessary to coordinate the addition of a new category are underway. Who will be the first Advanced Glider Champion?

I am launching a project to significantly improve the website.

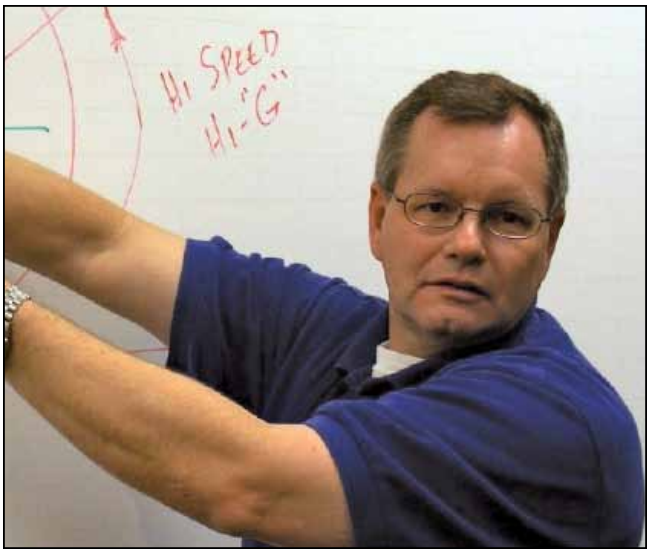
Throughout the year I chat with IAC members about many aspects of our club. One of the more commonly mentioned areas for improvement is our website presence. With just over one year left as your president, I am launching a project to significantly improve the website, making it more valuable to members and aerobatic enthusiasts alike. It is our hope to provide a much greater access to aerobatic information and activities. Further, we will work to link all chapter websites, provide a national calendar of events, and link to many other EAA activities. This project will start in June, and we will look forward to input from both chapters and members.

Elections are coming up quickly, and our members will elect several directors and officers. Please take the time to go to the website and read the reports your directors have submitted. Review the minutes to see how they voted. Talk to those running for a position and find out how they feel about issues that are of concern to you; then vote with a purpose. We have a good selection of candidates to choose from, and I am sure our board, new members and old, will continue to serve the IAC well.

In April we launched a very worthwhile activity called TechWatch. TechWatch is an Internet safety forum where anyone can identify issues affecting the safety of aerobatic flight. I want to thank the many people involved in this effort, and a special thank you goes to Hubie Tolson, who has continued to press on to ensure this forum became a reality. We would like to invite pilots worldwide to visit the site at *www.USNationalAerobatics.org/iacsafetyforum*. Although started by the IAC, this forum is designed to be used worldwide and is open to all for input and review. Like Hubie says, "Let's work together to save lives!" *IAC*

DATES FOR 2012 U.S. National Aerobatic Championships Set–At its spring board meeting, the IAC board chose the dates for the 2012 U.S. National Championships. The dates will be September 23–29, 2012.

GORDON PENNER GIVING WEBINAR on Aerobatics June 15 – A webinar is just a seminar online! If you haven't visited *www.Oshkosh356.com*, the EAA's online community, this is a great opportunity to do so. From the Oshkosh 365 home page, just click on the Webinars tab. From there, you'll see a list of available webinars and their speakers. To sign up, click on the webinar that interests you. Fill in your name and e-mail address, and a confirmation page will give you the link to visit at the appropriate time.



IAC INTRODUCES TECHWATCH SAFETY Forum – We've run this piece before, but it merits another mention. Please join IAC and the aerobatic community in helping save lives! TechWatch, a new web-based forum, is in place to help all aerobatic pilots, mechanics and manufacturers share throughout the aviation community information that may help others to recognize hazards or dangerous conditions that may arise with different aircraft. Please join TechWatch, or just browse as a guest, and share the information we all need to fly safely. The TechWatch site is *http://www.usnationalaerobatics.org/iacsafetyforum/*. Please join today and help save lives.

SHOP ONLINE FOR AEROBATIC Books, Pins, Patches, and Apparel – If you've ever wondered where you need to go to find Tech Tips Manuals, books on emergency maneuvers training, or aerobatics DVDs, you're in luck. ShopEAA.com is the place to go to find all of both EAA's and the IAC's official merchandise. Just *visit http://www.shopeaa.com/iac.aspx* to be taken straight to the IAC's home shopping portal.

LETTERS TO THE EDITOR: Isn't It About Time? Send your gripes and accolades to the editor, and we'll try to get them published. Just make sure to state "Letter to the editor" in your subject line, and look for it in a future issue. The address is *reggie.paulk@gmail.com*.

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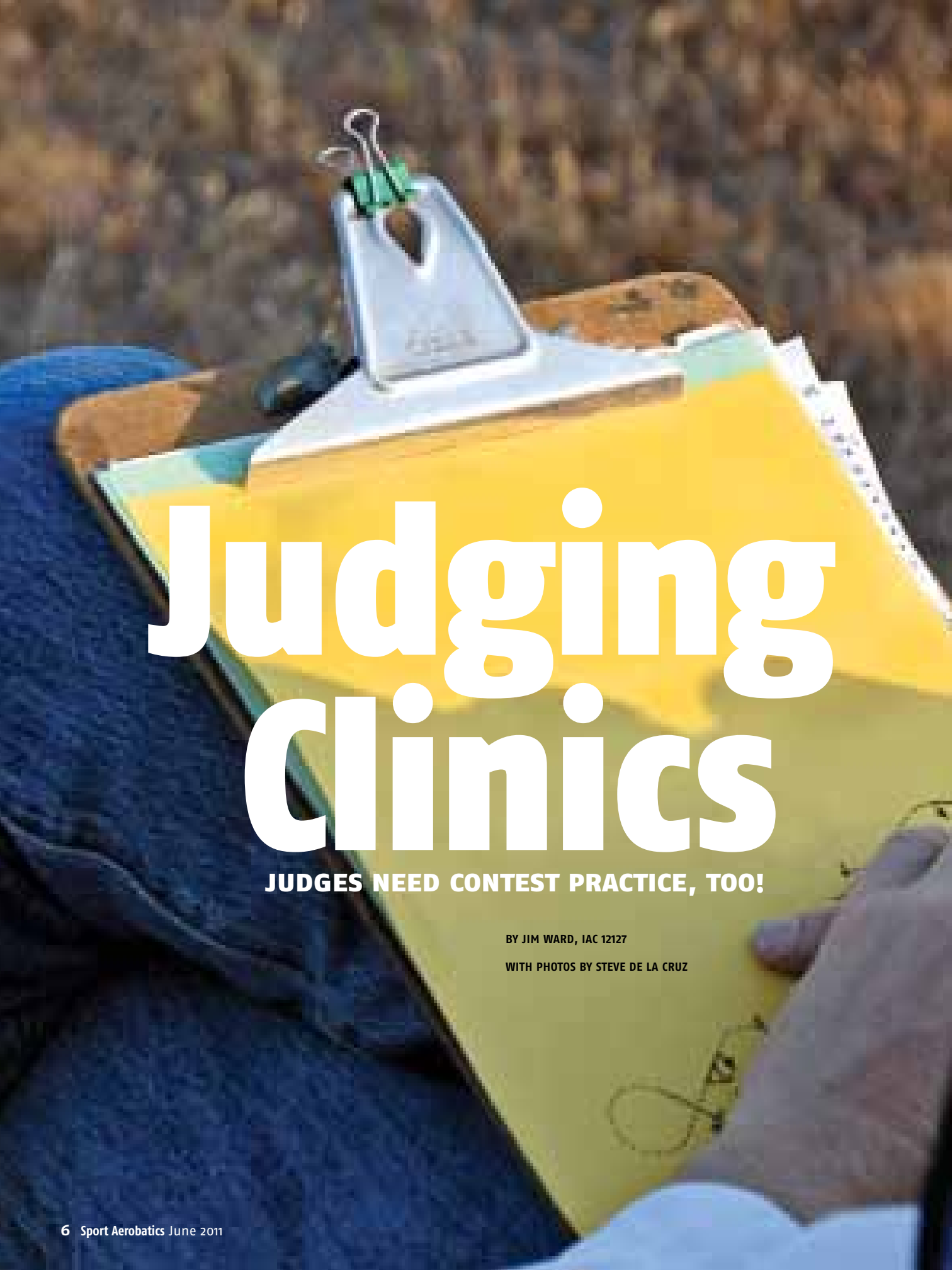


Judging Clinics

JUDGES NEED CONTEST PRACTICE, TOO!

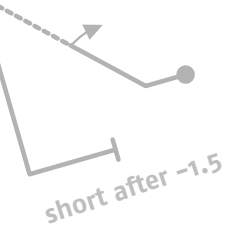
BY JIM WARD, IAC 12127

WITH PHOTOS BY STEVE DE LA CRUZ

Competition pilots go to great lengths to fly figures that earn perfect marks. In the run-up to a contest we often pump a lot of gas through our engines; pore over videos of our flights; pester family and friends for critique; even hire former aerobatic champions to coach us. So it's rare indeed that a competitor arrives at a competition totally cold, or at least without having recently practiced the Known and Free programs. Yet, in one of the great—albeit accepted—disparities of our sport, it's not unusual that a current IAC judge will take the middle seat without having scored or critiqued an aerobatic figure in several months—or more.

GRADING COMPETITION FLIGHTS IS an intense observational, quantitative, and largely objective endeavor. Apart from the *g*'s and the bruises, when done well it is every bit as challenging as flying a sequence. Many times each minute, a judge must accurately perceive, analyze, differentiate, recall, articulate, and compute. (Granted, the computation is second-grade math, but for the arithmophobes among us it lies somewhere between "difficult" and "terrifying.") When the competitor flies some unexpected figure, the judge must rapidly resynchronize with the team—usually via staccato negotiation with the assistant—all while never taking eyes off the flight. Grading is not for the undisciplined.

Believing that competition flying is best judged by individuals who've recently tuned up their eyes, found their voice, and refreshed the connection between "what they see" and "how they grade," a small cadré of judges, pilots, and contest organizers have collaborated to plan and operate informal judging clinics at many West Coast contests this season. Though we're still working out the kinks, our first two clinics—at Redlands and Borrego Springs, California—enjoyed such positive feedback that this capsule might provoke broader thinking about ways to help judges better prepare for contests.



OVERVIEW

While classroom learning and periodic reviews are an irreplaceable component of IAC judge education, there's no substitute for honing one's skills in a quasi-contest environment immediately prior to a competition.

At the core of each clinic is a pair of demonstration flights that attendees critique, just as they would a contest flight. In a debriefing following each flight we meet as peers to discuss observations, knowledge, and techniques so that each may refresh and improve the way he or she examines figures critically, analyzes and articulates errors, assigns downgrades, and computes scores.

PREPARATION

To set the stage, we recruited two experienced competition pilots at each clinic to fly demonstration sequences for us, each with different types of aircraft. At Redlands we used an Extra 300S and a Pitts S-1; at Borrego we worked with the same S-1 and an Edge 540. We consciously sought two aircraft that presented differently in the box, especially on 45-degree and vertical lines.

We wrote sequences for the demo pilots to fly containing sample Sportsman-category figures. (Using only Sportsman figures we can demonstrate about two-thirds of all downgrades prescribed by the rules. In some future clinics we'll fly the second flight using Advanced and Unlimited figures.)

Next, we annotated those sequences with the errors the pilots were to fly (Figure 1). We chose errors that we knew, from experience, that some judges had difficulty analyzing or for which they had trouble assigning proper downgrades. Our pilots

Clinic participants between figures during the first (Sportsman) flight.

were split between whether they would write a sequence card with graphical depictions of the errors alongside text (Figure 2) or rely on the text alone. Either way, one of our clinic organizers would be available in real time to coach each pilot through the sequence via radio.

We coordinated with contest directors (CDs) to allocate two practice slots near box closing time on practice day. CDs also promoted the availability of the clinic at registration.

. . . there's no substitute for honing one's skills in a quasi-contest environment immediately prior to a competition.

On the judging line, each participant would hold a clipboard with one flimsy for each flight. Our Redlands plan called for everyone to watch a complete figure, then note the downgradeable errors directly on the flimsy while the pilot took a 30-second break. If participants were familiar with the downgrade rules—not all were judges or had attended judging school—we encouraged them to score the figure. After this, our pilot would fly the subsequent figure, and so on. We'd meet at the end of each flight in seminar fashion to review each figure, error, and downgrade.

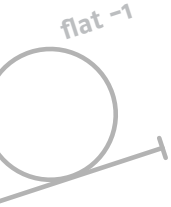
John and Kathy Howell compare notes during a break.

The author's clinic pre-flight on the judging line.

PHOTOGRAPHY BY **DEKEVIN THORNTON**

We briefed the overall plan and, particularly, the priority of noting mistakes rather than scores. We offered that some figures might be error-free, others would earn hard or cumulative zeros, and still others might contain components that a judge would consider inelegant but that were not downgradeable per the rules. Just like a contest flight.

We'd critique one flight of about 15 minutes duration with breaks after each figure, debrief for some 20 minutes, then repeat for the second flight. We also advised that we organizers would serve only as discussion moderators and rules researchers—that we enjoyed no special gift of visual or analytical infallibility. After all, we had no expectation that our pilots would make every mistake we asked, nor that they would make no other mistakes beyond the ones we programmed. Errare humanum est.



DEMONSTRATIONS AND REVIEWS

Our Unlimited-turned-Sportsman Extra pilot placed most figures near the bottom and middle of the box, leaving only the infrequent doubt about his mistakes; almost all errors we'd programmed were readily visible.

It wasn't long after we began the first post-flight discussion before we realized how deeply our participants were engaging in this exercise. Consider:

- Figure 3, the 270-degree turn shown in the accompanying sequence (Figure 1) was flown perfectly coordinated by our Extra pilot, emphasized by super-slow rolls in and out. "Blended," offered one judge to nods of agreement. "One point off for the entry, another for the exit," someone called. And so together the group talked it through: what we saw, grading criteria for turns, how to apply them, until finally a zero came into focus.

- We watched the spin entry in Figure 5 with pitch held constant while roll and yaw began in earnest. Most identified this error, which led to a discussion about marking off when the nose drop, wing drop, and yaw and don't coincide. The conversation morphed from applying a fixed deduction for "forced entry" to assessing the magnitude of the errors and downgrading accordingly.

- Our pilot flew the mistake in the 2-point roll subtly: He was careful to slow, but not stop, the roll—a frequent error when a pilot is rushing a contest flight. The first comment we heard at the Redlands debriefing was "no point, zero," but someone added immediately, "soft point." We'd hoped for that; it drove a conversation about what "soft point" meant, scoring roll rate change versus no point, how long is

From left; Howard Kirker, Iris Grunwald, and the author share a moment.

"too long" for a point-roll hesitation, and giving the pilot the benefit of the doubt.

From minutiae to philosophy, we covered dozens of other topics in our post-flight discussions; they included:

- How different aircraft present differently on the same up- and downlines; watching the Pitts fly after the Extra demonstrated that vividly.

- The importance of consistency in applying downgrades when the rules give the judge grading latitude, particularly for radius changes in part-loops.

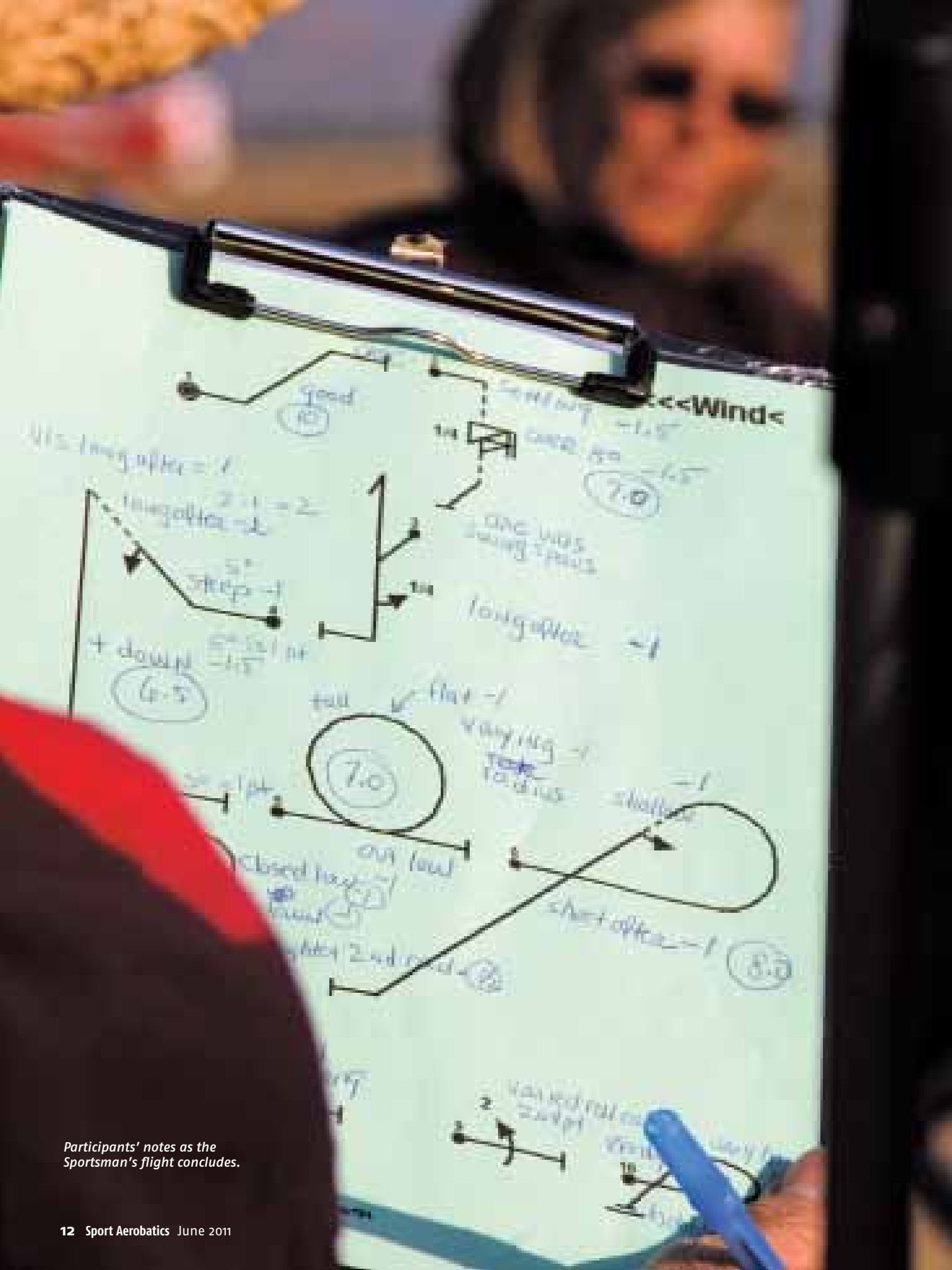
- Tracking "current score" or "total downgrades" in real time versus watching the whole figure before computing a score.

- Whether and when "out high" calls are warranted and judging difficult-to-see figures flown high in the front of the box.

Clinic participants gather for the post–Sportsman debriefing.

- Downgrading for corrected errors, such as bumping a roll or a quarter-loop.

- The effect of inflating grades to encourage competitors to return to future contests.



Participants' notes as the Sportsman's flight concludes.

Post-flight debriefings are the crux of the clinics. One of the clinic organizers serves as moderator, a role focused on encouraging peer participation, moving the discussion forward, and researching and relating rules. The relevance and quality of experience that participants take away depends both on their willingness to talk openly about what they see and how they think when grading, as well as their ability to listen and respond to others' contributions.

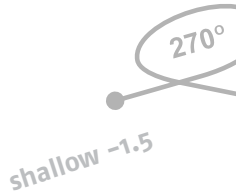
OPERATIONAL LESSONS LEARNED

Having operated only two judging clinics thus far, this informal program is still very much in "beta testing." Elements we thought would be easy, such as the timing of the two flights vis-à-vis the debriefs and even the pace at which our demo pilots flew figures, proved not to be so.

Our Redlands scheme called for each pilot to fly one figure, pause for each participant to make notes, then fly the next. We found that many judges, upon seeing any error, would look down instinctively to note it, and in doing so lose track of the aircraft. At Borrego, we paired up participants so that one would serve as caller and writer, the other as judge. Each demo pilot flew the whole sequence with occasional breaks, paused for our participants to swap roles, then flew it again. Of course, the second flights were not identical to the first, bifurcating our debriefings. Complicating matters, our pilots found it difficult to precisely incorporate two or three errors per figure when flying the sequence uninterrupted, even with real-time coaching via radio.

So, we're still searching for an optimal format. Were volunteers plentiful, we'd pair each clinic-goer with an otherwise non-participating recorder, thus

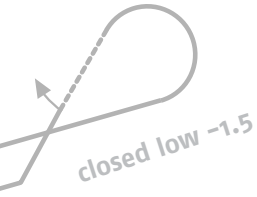
. . . many judges, upon seeing any error, would look down instinctively to note it, and in doing so lose track of the aircraft.



Andrew Slatkin and Colleen Keller at the debriefing.

allowing the "judge" to watch consecutive figures and voice mistakes to be transcribed. In a future clinic, we'll ask our demo pilots to fly stanzas of only two or three figures together, thus reducing their workload and increasing the likelihood of them flying only programmed errors. Absent abundant volunteers, we'll also arrange for our participants to work in pairs and swap roles at each two- or three-figure break. We'll try other formats as necessary until finding one that serves both pilots and participants well.

On the other hand, we've developed a workable schedule for components and the overall event. One flight through a sequence with breaks after each figure consumes less than 15 minutes. Post-flight discussion times have depended heavily on who's participating, ranging between 10 and 25 minutes. Our next clinic will cover 90 minutes, during which we'll include ample time for briefings, two demo flights, post-flight reviews, and feedback. By scheduling our demo flights with a 20- to 30-minute break in between, the box will remain available for competitor practice while participants review the first sequence.



EPILOGUE

While waiting for Redlands weather to clear on Friday, clinic organizers witnessed several conversations about judging: follow-ups on topics covered in Thursday's clinic discussions. It was apparent that, somewhere between the pub on Thursday night and Starbucks on Friday morning, several participants had been motivated to pick up the rulebook to better their understanding of grading criteria.

Which makes us wonder: Given the opportunity, would judges of all experience levels take advantage of these clinics and similar events to refresh and improve their skills? We hope to find out.

ACKNOWLEDGEMENTS

Several people have contributed ideas, time, and muscle to this undertaking. Ann Marie Ward, Tim Just, and Kathy Howell collaborated with the author on concept and planning. Kathy drove the implementation, negotiated box time, prepared handouts, recruited participants and demo pilots, briefed our pilots, and managed the box during the demo flights. Kathy also programmed some of our sequences and errors. Tim, Steve De La Cruz, and Malcolm Pond expertly flew our demonstration flights. Contest Directors Casey Erickson and Yolandi Jooste offered us box time for demo flights. And the dozen or so participants at each of the Redlands and Borrego Springs clinics were the sources of the discussions recounted here. Thanks to all.

For more information, contact the organizers at *IACJudgeClinics@gmail.com* or post a note in the Unusual Attitudes forum on Oshkosh365.org. IAC

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Dr. Doyle learned to fly in his Cessna 140 but sold it to pay for the Pitts engine. He had no difficulty with the transition and never looked back.

The den was the only room large enough for assembly. If you own a Pitts S-1C or similar, it may have spent most of its gestation in someone's living room.

My Dad's Pitts

My dad had a Cessna 140 when I was very young, and I vaguely remember flying with him in that airplane. He sold it when I was 5 so he could equip his S-1C Pitts with an engine as it neared completion. I yearned to fly from then on. My older sister, Terry, described our father's Pitts as "the most beautiful airplane in the world." I took those words as a declaration of fact. **BY JAMES DOYLE**

OVER THE YEARS IT became obvious that the most beautiful airplanes are handmade. Dad's Pitts was done old school, from the original Curtis drawings. He crafted it with the help of my mom and older sisters in our home garage with a gas welder, crude bending brake, and a mini lathe among the usual workshop tools. It was a physical manifestation of his personal standards. He used to say that only "a little better than perfect" would do. The airplane was resplendent in its red, white, and navy blue dope finish—it must have had 20 coats or more. It would forever have that 'dope' smell. He painted a blue and white checkerboard pattern on the underside of the lower wings and often lamented that he never got to see his checks in flight.

He used to say that only "a little better than perfect" would do.

He drape-formed a beautiful red plastic overlay for the instrument panel based on information from a Rockford forum he'd attended. It gave the airplane a touch of class you'd never see on a modern Pitts. The glossy wooden mold he made looked like a piece of artwork to me. He added a surplus military throttle quadrant and military fighter's pistol grip on top of the stick. The biplane was fully upholstered with blue and white leather made from patterns my mother crafted, and it squeaked when he settled into the seat. This was a short-fuselage 'C,' so these accoutrements made the cockpit, shall we say, cozy. Otherwise he kept it pretty simple with no electrical system. The airplane had a wobble pump, pressure carburetor, and a fixed-pitch prop that looked cartoonish in size compared to the rest of the airplane.

I remember watching the fellow that drove the fuel truck swing the prop. He was about 6 feet 3 inches and maybe 160 pounds of pure sinew. Oak Grove airport was full of aerobatic airplanes

PHOTOGRAPHY COURTESY **JAMES DOYLE**

Doesn't every homebuilder take this picture? With four kids and a fifth on the way the Doyle home was full of activity!

My supportive mother endured the Pitts project with selfless grace. Here she is with the transmitter to my first four-channel R/C model—an Aeromaster.

without starters back then, so this guy got lots of practice! He'd put both hands on the prop and kick his leg high to the side and give it a mighty pull. Womp! The whole airplane would shake as the prop would swing around and come to a stop with a heavy oscillation. Womp! Same thing—no joy. Three tries later, he'd call for lean mixture and full throttle. My dad would affirm the request and brace for the next try. Then, like magic, the glorious sound of that Lycoming would fill the air as Dad pulled the throttle back to idle speed.

He looked like George Peppard in The Blue Max as he called for us to pull the chocks. The chin straps from his leather helmet would blow back as he'd throttle up to taxi, his eyes squinting against the prop blast flowing into the open cockpit. Five minutes later he'd blast off like a rocket and climb out of sight, leaving the airport silent again. Typically I could count on being alone for half an hour, and I roamed around and looked at planes and talked to airplane guys about (what else?) airplanes! It was a different and great time to be a kid at Oak Grove.

My dad has always placed a premium on personal achievement. Plastic model airplanes were okay, but to build something that flew was a remarkable achievement. I had a natural desire to make him proud, so I learned how to craft and trim models that flew well. It was a wonderful way to teach the value of delayed gratification. Birthdays and Christmases nearly always had a special gift from Dad, like a brand new Cox .049 Tee Dee engine or a Carl Goldberg Viking free-flight kit—something I could never afford with my allowance. They were always a challenge—always a bigger challenge. I'd say, "Wow, Dad, a Viking! We're talking dethermalizer, engine timer, and a 4-foot wingspan—this is a serious project!" I met the challenge, bolstered by his encouragement, and learned that nothing glides like a large, handmade, free-flight model. This was a special grace only a model builder knew.

Dad got comfortable with his Pitts, and flying it became routine. Sometimes he'd steal away while I played with my buddies in the neighborhood. An hour later we'd hear the familiar sound of the engine as he flew overhead. I'd shout while pointing up in the sky, "That's my dad! See the checks?!" IAC

Dr. James Doyle in his Pitts S-1C just before the test flight on October 6, 1971.

A Judging

PHOTOGRAPHY BY **STEVE DE LA CRUZ**

Perspective

BY STEVE JOHNSON, IAC SAFETY CHAIR

I have been flying aerobatic competitions since 1994, and it seems that in the last few years I have noticed that more and more score sheets come back to me with no comments written by the judges after a flight. I have also heard from other competitors that they have noticed this reduction of comments on score sheets as well. With this article, I hope to make two points: First, to provide a method of judging and critiquing competition sequences that provides good qualitative feedback to the pilot, in a manner that is easy for the judge to use and is consistent for all pilots; and second, that comments on score sheets may be the only critique of flight figures a pilot gets, especially newer competition pilots who don't know about practice days and coaches yet, so the comments are very important to the pilots!

The written score is the judge's quantitative analysis of a figure flown. That score can provide a pilot with an overall gross description of his figure relative to the perfect figure, but it doesn't help with what was specifically wrong. The comments section of the score sheet provides an area for qualitative, or descriptive, analysis of the figure. This is what is needed by competition pilots to make corrections to bad or poorly flown figures.

To begin, remember that as an IAC judge, we start with the assumption of a perfect figure. Once we see errors, we start deducting from that perfect "10" score. As a judge, I feel that I must be able to state verbally, with clarity, the errors I see that will cause deductions from the perfect 10. I don't think it is right for me to say "I didn't like that figure" and give a deduction. Obviously, there will be shades of ambiguity at times, and we have to use our best judgment and judging skills to clear up the questions in our minds. That is why we have multiple judges on the line. Each judge may see something different that causes that judge to arrive at a certain score. But as long as a particular judge maintains the same method or system throughout the category he is judging, the judging will be fair to all pilots. So, when I see a mistake I can verbalize, I say it out loud—to my recorder. When I see the mistake and verbalize it, I must also determine the severity of the mistake, how many points must be deducted for that mistake. I use the word "slightly" for 1/2-point deductions, no modifier for 1-point deductions, and "very" or "a lot" for multiple-point deductions. Sometimes, my speech will get more colorful, especially for those

PHOTOGRAPHY BY **STEVE DE LA CRUZ**

more spectacular mistakes or brain locks, but those normally end up being a zero anyway, though I do try to give good comments for the air show figures and tumbles.

By using "slightly" and "very" regularly in my spoken critique, the recorder can use her own shorthand to get these comments on paper quickly. Then, immediately after, I identify the actual mistake causing the deduction. If you have ever been on a judging line, you have heard these comments: positive up, steep before, steep after, long or short after, pinched, etc. A new pilot may not understand these comments, but when he brings his score sheets to me after the flying (along with a cold beer), I will explain what the shorthand means and the mistakes I saw to create those comments. Thus the pilot gets some written critique of his flight, and I can use the comments to help me remember what I saw. I am not the only judge on the line; there are always different opinions, and I will get back to this later.

I can even use this system when judging Unlimited. A new recorder may get behind, but I always tell them to get the score if nothing else. A good recorder, though, can easily can keep up with my verbalization through Unlimited flights.

While I am verbalizing the comments to the recorder, I am bending fingers down on one hand. I bend a finger halfway for 1/2 point and all the way for 1 point. Multiple points off require me to put multiple fingers down. At the end of the figure, the fingers left tell me the score. And yes, sometimes I have had to look at my fingers to see what the score really

I don't think it is right for me to say "I didn't like that figure" and give a deduction.

was. If I get below a 5.0 in score, then I start raising fingers back up, as at 5.0 points off, all of my fingers will be down. When the figure is completed, I open my hand to start scoring the next figure.

I teach this system to new assistants and new judges when they ask. Most do like it after they get used to it. Give it a try with some lower category flights, and then try it with higher categories when you are comfortable. Things do happen, and sometimes, as a judge, we may miss part of a figure, or points get lost in the sun. Assistants can help, and if we have to, we can give an "A" score so our score is averaged with the rest. But these issues should be in the minority for most flights. Give this system a try. I think you will find it makes your scoring as a judge easier and more consistent between pilots, and you will help another pilot, and yourself, become a better competitor using the comments the judges provide.

We can never fix all of the mistakes; that is one of the joys and frustrations of competition aerobatics.

Most newer aerobatic pilots have not had ground coaching or been to many practice days yet. The only feedback they get is the comments on score sheets from their flights. Here is a method for pilots to turn those great new comments into a good qualitative critique that can be used to correct issues in future flights. When I have comments on the score sheets for my flights, I review the comments for each figure in a semi-formal way. To start, I look at Figure 1, and only Figure 1, for the comments from all judges. If a majority of the judges gave me the same comment, I write that down on a separate piece of paper. When I get conflicting comments, for example positive up and negative up for the same

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figure, these cancel out until a majority of judges have the same comment. Then I go to Figure 2. On the separate piece of paper I again write down the comments that come from the majority of judges for Figure 2. I go through each figure in this manner, writing down only the comments that come from the majority of judges. When I have gone through my entire sequence, I have the new piece of paper with only the majority comments written down. There are usually only one or maybe two main comments that are similar throughout the sequence. These are the mistakes I try to correct in my next flights. We can never fix all of the mistakes; that is one of the joys and frustrations of competition aerobatics. But if one mistake shows up throughout a sequence, and we can fix that one mistake, our scores in the next flight will increase.

For example, suppose a sequence has a hammerhead, a wedge, and a humpty bump. Each of those figures has a vertical upline as a component. If a majority of the judges called positive on the upline in those figures, resetting the sight device or changing the sight picture will fix those portions of the figures next time. The comment "pinching the tops of loops" applies to all loops: full loops, half loops, half- and reverse-Cuban-eights, and full eights. Fixing the pinched-top issue will increase the scores on all these looping figures.

As pilots move up in the categories, the comments may become less specific, and probably judges will have fewer areas of agreement in critiquing figures. This is good! The judges have fewer big or gross mistakes to critique, so the pilot is flying better. But it is also bad, in that the pilot must make more precise corrections, and maybe only to specific figures. This is where good ground coaching and practice days can help. By concentrating on one figure during

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The author in his MX-2.

a practice flight, a pilot can learn the subtleties of that figure for his flying style and airframe, without worrying about the next figure or box positioning. Once the figure is learned, then it can be flown in the sequence to determine how it fits with the other figures and the energy requirements needed.

Just to recap, comments on the score sheets are the judges' main method of communicating those qualitative problems with the figures flown, and they are the best method a pilot has, at that time, to learn of the problems and correct them. So please, judges, make the comments. You know you want them when you fly. After a contest, a pilot can take the comments from all the flights, use the method described earlier to find the one to two main issues to fix, and go to a coach for more one-on-one training to eliminate the issues found. This will help new pilots move up in the categories when they are ready, without the frustration of not knowing why they don't score better. Comments on the score sheets are important; so judges, do your jobs and give the pilots the information they need to become better. Grow our sport through better communication to new pilots so they have more fun and come back again. IAC

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ALLEN SILVER

Sun 'N Fun...nel

I RECENTLY RETURNED FROM the Sun 'N Fun International Fly-In & Expo in Lakeland, Florida, and had a very nice turnout for my IAC-sponsored bailout seminar. No more dusty hot tents. The brand new Florida Aeronautical Academy building is fantastic. A special thanks to Jim and Jean Taylor for helping set up my presentation.

I managed to survive the tornado. It passed over and all around the exhibit building I was in, wreaking destruction to so many aircraft and displays. Fortunately no one was seriously injured or killed. I thought the exhibit building I was in was going to end up in Kansas with Toto. Being from California, I'm used to the earth going up and down, sideways, and rolling like a wave, but not going around in circles. For those old enough to remember, it was definitely an "E" ticket ride. No matter what Mother Earth throws at us, I find pilots are very resilient.

However, you manage to make the same costly errors over and over. What I'm referring to is purchasing used pilot emergency parachutes from many different sources without having them inspected as to their airworthiness. I've said this many times before, but it apparently is worth repeating: *Do not buy a used parachute without having a parachute rigger look at it*. Most parachute riggers are more than happy to inspect it for free. Remember 20 years' service life is all that each manufacturer wants to see their equipment in service. That's a maximum, if you take good care of your expensive cushion. It could be a lot less if you mishandle or abuse your parachute.

It is important that you understand the following. I'm talking about the entire assembly, not just the parachute inside. Everything should be removed from service in 20 years. That means the harness and container also. I hear the following all the time: "I hardly ever use it, and it looks just like new." I don't care where you've stored your parachute or how new it looks, it needs to come out of service in 20 years. Even though there are no laws or rules in the United States saying this is mandatory.Many countries around the world have laws that require you to remove the entire parachute assembly from service in as little as 15 years. If you still decide to get your old parachute packed and have to use it, I can only hope I'm not standing underneath you, if you have to make an emergency bailout. So, if you can find a rigger, in the United States, who doesn't care what the manufacturer wants, then go for it. Personally, I would be looking for a new rigger. Even though your parachute will probably never be used, it's a chemical product and will weaken over time (20 years) no matter how well you take care of it. Many years ago when I was chairman of the rigging committee for the parachute industry, I asked the manufacturer for guidelines. The 20 years we came up with (at first) was kind of a stab in the dark, but it turned out to be a good and accurate number. Most parachutes that seem to have problems are at leaste25 years old. This gives you a safety factor of approximately five years. This is just like the safety factors built into your aircraft to keep you and your passengers safe. No one wants to fly his aircraft until it starts to fall apart in the air, so a safety cushion has been built in to keep you safe. The same is true for your parachute.

A couple of other factors that help weaken your parachute are excessive UV damag, and excessive heat from leaving your expensive cushion in a hot place like your aircraft or car trunk during the hot and sunny summer months. Remember, your parachute doesn't need direct sunlight to cause UV damage. An overcast day will work just fine.

I've seen many older parachutes usually around 25 years and older pull apart like a wet tissue. The damage is almost always invisible to the naked eye. Non-destructive pull tests randomly done on your parachute fabric may

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help detect weak areas, but these tests can very easily miss them. Your parachute is a giant piece of nylon, and doing occasional pull tests in random areas and having that area pass is useful, but it only tells you the area that you tested passed. I've done tests where the fabric failed. What I did next was test several areas surrounding the area that failed, and they passed. This led me to wonder how many other parachutes that I tested and passed were bad just a few inches away. Unless there were other problems, the common denominator these parachutes had was they were always old parachutes, in excess of 25 years of age. This is why the manufacturer's recommendation of a 20-year service life on your parachute is a good one. *One that you can live with.*

Remember, I have a lot of articles and past "Ask Allen" columns on my website that will help make sure your life preserver lasts the full 20 years. Go to them and refresh your memory. You probably will find something you've overlooked or forgotten. If you have questions, don't hesitate to contact your rigger. You can also always call or e-mail me.

Q: *What do I teach/tell someone who rents or borrows a parachute from me?*

A: If you run an FBO that rents parachutes to aerobatic pilots, you need to explain to that person how to properly use it. You wouldn't rent them your aircraft without a proper checkout. That goes for the parachute you offer them. But the problem is you don't know much more about that thing than the people you're renting it to. Merely having it packed twice a year is not good enough. An occasional safety seminar for you, your instructors, and renters is ideal, but not always practical. Here's a suggestion. On my website under articles is my three- part series titled "Practice, Practice, Practice.. Have everyone read it and sign a training form that they have done so. It's called CYA. This additional training along with your briefing may help protect you from a lawsuit, if something happens. That person or their relatives, in a court of law, may sue you for lack of proper training. Continuing education is a valuable training tool. Remember, safety is not an accident."

See you next time. Please keep the questions coming. IAC

Half Cubans, Accurate 45 Downlines

BY GILES HENDERSON IAC #159

Editor's Note: This article is a reprint from the *Technical Tips Manual IV* with permission from Giles Henderson.

During the Lakeside Park cookout at Fond du Lac 86, I was asked how I would manage to draw reliable 45-degree downlines without the use of reference gauges or window lines. After describing the techniques, it was suggested that the method be written up as a 'how to' article for *Sport Aerobatics*.

Since every ACA Primary and every IAC Sportsman category known sequence in the history of competition aerobatics has included the half Cuban eight and because it is a relatively high (K=16) value, it probably deserves a critical review.

We will first examine the more general problem of establishing the 45-degree down and then consider the specific maneuver.

Since the accuracy of the 45-degree angle/line is such a cardinal point in the judges' scoring, many pilots have constructed and installed some kind of sighting device. Although many find this approach very effective, let me identify some disadvantages of these devices:

They require several hours to construct and install followed by several hours of adjustment per the critique of a qualified ground observer.

These devices seem to have powerful 'diamagnetic attraction' for people. Regardless how bright you paint these devices, or how many day-glo orange ribbons you attach, someone gets pulled into them at least once a week, even when the plane is locked up in your own hangar. Their lifetime seems to be limited to how many successive bends you can make before the onset of crystallization and fatigue failure.

If the canopy/window reference lines are used as an alternative to the hardware version, we soon discover there is a problem with our eyes trying to focus a horizon at optical infinity concurrent with a reference line eight inches from our face.

Some pilots find it difficult to overcome the disorientation caused by the rotation of the inner ear as we turn our head from forward to sideways during the *g* load of the push or pull to 45-degrees.

Most pilots find it difficult to avoid getting a 'wing down' as they push or pull to the line if they are not looking straight ahead.

Small 'bobbles' or changes in pitch attitude are more likely as we rotate our head and move our field of vision from forward to sideways.

As an alternative to the sighting device, let's consider other existing references, i.e. the aircraft altimeter and the box markers on the ground. In any given sequence the entry altitude on the half Cuban will be approximately constant from one flight to the next; and will depend mostly on the altitude we initiate the sequence, and what specific maneuvers precede the half Cuban.

After rehearsing the sequence several times, we note the entry altitude is fixed within + 100 feet for the 1986 Sportsman Known. Moreover, the approximate position of this maneuver along the X-axis is also fixed from one flight to the next. However, there will be considerable variation along the Y-axis due to different wind conditions, judges' location and the pilot's 'box strategy.'

Now that we have characterized the x-coordinate and the entry altitude, we can exploit the properties of the 45-degree right triangle to our advantage. If we sketch a scale drawing of a 3300 foot box and locate the x-coordinate of the entry position, it is easy to then locate the aiming point that our nose should point at during the 45-degree downline (Fig. 1).

Recall that the height of the 45-degree triangle and the base are equal in length (Fig. 2). Therefore, the altimeter reading above ground level (AGL) is also the distance in feet from the entry point to the aiming point. Fortunately the contest officials have surveyed our box and have actually placed markers on the ground to assist us in locating our down 45 aiming point. The spacing of the box markers provide us with a reliable 'ruler' to measure the base leg of our 45-degree triangle.

Note in our example the aiming point is conveniently on the north boundary of the box. Although this won't always be the case, depending on your entry altitude, this point

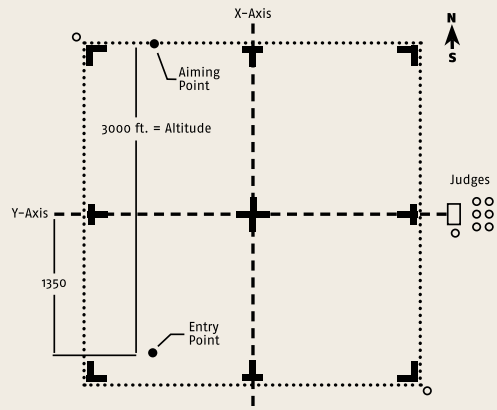

Fig 1 The southbound pilot enters the half Cuban eight 300 feet north of the south boundary at an altitude of 3,000 feet AGL. His 45-degree downline aiming point is then the north boundary. If his entry altitude had been 1350, his aiming point would be on the Y-axis.

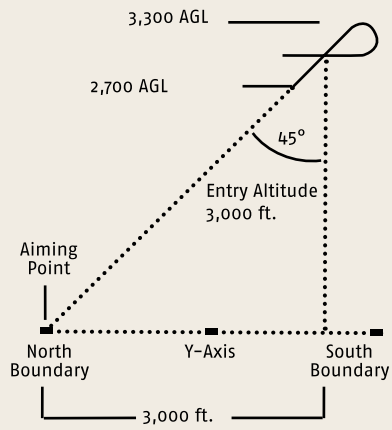

Fig. 2 The aiming point for the 45-degree downline is determined from the altimeter reading at the entry point.

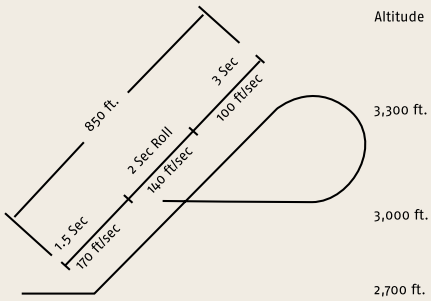

Fig. 3 To locate the half roll symmetrically on the 45-degree downline, we must compensate for acceleration; each segment of the line must be progressively shorter in duration to keep equal distance.

will always be along a line parallel to the Y-axis and can be predetermined for your particular sequence. You know where this line is in relation to the boundary markers before you ever strap on your parachute. In our example, we simply point at the north boundary before, during and after the roll on the 45-down.

Now that I have disclosed the key element of this technique, let's review the entire maneuver. We should actually use a ruler to plot the entry and aiming points on our scale drawing of the box (or aerial photo of the actual box in Fond du Lac).

During our 'hand-flying' rehearsal on the ground we should select some grooves in the ramp or whatever, to simulate the box boundaries. We should mentally locate the judges and the wind direction to formulate our box strategy. We should visualize the location of our entry and aiming points during this rehearsal using the same proportional relationships as specified in our box drawing. Once we strap in and take off, our climb to the holding pattern is our last opportunity to select the actual ground references for the aiming point for this flight, in addition to checking the wind drift and finalizing our box strategy.

Now let's suppose we have just completed the preceding (most likely center-box) maneuver and are now drawing the line between maneuvers. At this moment we want to verify our altitude and airspeed. This scan will provide the basis for any deviations required to compensate the non ideal.

We now look outside at the ground. Our objective is to simply drive the airplane upbox to the rehearsed entry point. Since every box is the same size, there are no surprises here—say 300 feet short of the south boundary.

As our reference slides directly under the plane our vision returns to upfront and we initiate our pull just as if we were doing a loop. As we relax back pressure and float over the top our vision has moved to look out the skylight. As the horizon comes into view we make any small aileron and rudder corrections needed to maintain the exact maneuver and more important, we locate our aiming point (north boundary of the box).

Our vision remains fixed on this point as the nose continues its arc. We stop the pitch change with the nose dead on our aiming point with such authority that the aircraft almost quivers on the 45-line.

It is instructive to realize that the precision in locating the aiming point is quite liberal. In the above example we could point at the target 400 feet (1/8th of the box length) beyond the correct aiming point and our down angle would only be affected by 3.5 degrees (ARCTAN [3400]/[3000] – 45). If you now carefully maintain this angle/line, you are in fact flying with very good precision, but not with exact accuracy. However, it now becomes the burden of the judge to distinguish precision from accuracy and to distinguish 48.5 degrees from 45 degrees.

If after setting the line you recognize an error in the location of the aiming point, you DO NOT want to correct the pitch angle—not even during the roll where you can sometimes hide the correction, since this gesture is a sure confession of your sin.

The remaining elements of symmetry are to place the roll at the midpoint of the downline. Although the following detail is tailored to a 90 horsepower Clipped Wing Cub, the method may be readily adapted to any aircraft. Since the J-3 draws a loop approximately 300 feet tall, we obtain a nicely balanced maneuver if we exit the half Cuban 300 feet below our entry altitude (2700 feet).

The hypotenuse of a 45-degree right triangle with a 600-foot base is approximately 850 feet. As the aircraft comes down this line it will accelerate from approximately 65 MPH to 125 MPH (Fig. 3). It we divide the downline into three equal segments of approximately 280 feet, we should ideally traverse the first segment inverted, complete the half roll in the second segment, traverse the third segment upright and then promptly pull the nose up to the horizon.

To accomplish this we must compensate the fact that we are accelerating from about 100 feet/sec. (approximately 70 MPH) in the first segment to 170 feet/sec. (115 MPH) during the final segment. Therefore a count: a thousand one, a thousand two, a thousand three; "roll around the point" and count: a thousand one, a thousand...; pull will be about right.

So there we have it. If we have already mastered the loops and slow rolls, the half Cuban can be a fun maneuver executed with a lot of confidence. In essence, as in emergency procedures, we have worked out all of the critical elements of the maneuver before we get into the aircraft, leaving us with a very simple prescription to follow during the execution. Moreover, the method assures us of the desired quality in our lines and symmetry while eliminating the need of diverting our attention to a side view of a gauge device or worse yet, to leave the outcome to a guess and a chance. IAC

Mark your calendars for these upcoming events.

Updates at ***www.IAC.org***.

And if you're hosting a contest, post it there!

Lone Star Aerobatic Championship (Southwest)
Friday, June 10 – Saturday, June 11, 2011
Location: North Texas Regional (GYI): Denison Texas
Tel: 214-208-3523 • E-Mail: *cpIne@aol.com*

Northern Cal. Cloud Dancer Hoedown (Southwest)
Friday, June 10 – Saturday, June 11, 2011
Location: Paso Robles Municipal Airport (PRB): Paso Robles, CA
Tel: (510) 579-3407 • E-Mail: *martin@pull.gs*
Website: *http://www.IAC38.org/paso2011.htm*

Wildwoods AcroBlast (Northeast)
Friday, June 10 – Sunday, June 12, 2011
Location: Cape May County (WWD): Cape May, NJ
Tel: 717-756-6781 • E-Mail: *cwisman@comcast.net*

Ohio Aerobatic Open (Mid-America)
Friday, June 17 – Saturday, June 18, 2011
Location: Union County Airport (MRT): Marysville, OH
Tel: 574-721-4340 • Website: *www.IAC34.com*
E-Mail: *jgranger@columbus.rr.com*

Apple Cup (Northwest)
Friday, June 24 – Saturday, June 25, 2011
Location: Ephrata Municipal Airport (KEPH): Ephrata, WA
Tel: 206-359-8664 • Website: *www.IAC67.org/*
E-Mail: *JRiedinger@perkinscoie.com*

U.S./ CANADA AEROBATIC CHALLENGE (Northeast)
Saturday, June 25 – Sunday, June 26, 2011
Location: Olean Airport (OLE): Olean,New York
Tel: 716-361-7888 • E-Mail: *cbpbmb@aol.com*
Website: *IAC126.blogspot.com*

Midwest Aerobatic Championships 2011 (South Central)
Saturday, June 25 – Sunday, June 26, 2011
Location: Seward Municipal (KSWT): Seward, NE
Tel: 402-432-7124 • E-Mail: *AcroD@AOL.com*

Green Mountain Aerobatic Contest (Northeast)
Friday, July 8 – Sunday, July 10, 2011
Location: Hartness State Airport (VSF): North Springfield, VT
Tel: 802-533-7048 • E-Mail: *wsgordon@earthlink.com*
Website: *IAC35.aerobaticsweb.org*

13th Annual Okie Dust Devil (South Central)
Friday, July 8 – Saturday, July 9, 2011
Location: Weatherford-Thomas P. Stafford Airport (OJA): Weatherford, OK
Tel: 580-772-9176 • E-Mail: *creswell@classicnet.net*
Website: *www.Weatherfordairport.com*

Michigan Aerobatic Open (Mid-America)
Saturday, July 9 – Sunday, July 10, 2011
Location: Reynolds Field (JXN): Jackson, MI
Tel: 989-859-7237 • E-Mail: *donflies@chartermi.net*
Website: *www.IAC88.org*

Salem Regional Aerobatic Contest (Mid-America)
Saturday, July 16 – Saturday, July 16, 2011
Location: Salem/Leckrone (SLO): Salem, IL
Tel: 314.369.3723
E-Mail: *bruceballew@earthlink.net*

Can Am (Northwest)
Friday, July 22 – Saturday, July 23, 2011
Location: Cutbank city airport (CTB): Cutbank, Montana
Tel: 503-550-1496 • E-Mail: *flyhran@aol.com*
Website: *www.IAC77.org*

Hill Country Hammerfest (South Central)
Friday, August 5 – Saturday, August 6, 2011
Location: Llano Municipal (AQO): Lanno, TX
Tel: 512-497-9656
E-Mail: *acroguy@austin.rr.com*

Hoosier Hoedown (Mid-America)
Saturday, August 6 – Sunday, August 7, 2011
Location: Kokomo Municipal Airport (OKK): Kokomo, Indiana
Tel: 7658603231 • E-Mail: *mike.wild@comcast.net*

2011 Beaver State (Northwest)
Friday, August 12 – Saturday, August 13, 2011
Location: Eastern Oregon Regional (PDT): Pendleton, Oregon
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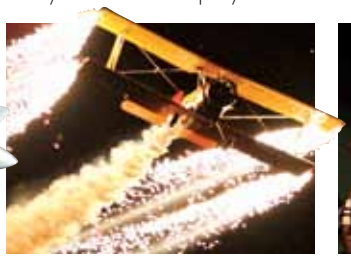
B-29 Superfortress *"FIFI"*
The first visit since 1995 for the world's only airworthy B-29 Superfortress

REO Speedwagon
Oshkosh rocks Monday during the opening day concert, presented by Ford Motor Company

eVenture
Innovation will be on display and in the air with the Electric Flight Prize Competition

Tribute to Bob Hoover
Tuesday afternoon air show featuring aircraft and maneuvers he made legendary

Tribute to Burt Rutan
His aircraft designs changed the face of AirVenture—and aviation. Special air show on Thursday



Super Saturday
Presented by Southwest Airlines featuring the Night Air Show, Daher-Socata Fireworks, and the "Wall of Fire"

Salute to Veterans
Gary Sinise & the Lt. Dan Band courtesy of Disabled American Veterans on Friday

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