



SPORT *Aerobatics*

September 2012

OFFICIAL MAGAZINE of the INTERNATIONAL AEROBATIC CLUB

- Close Call
- Canopy Breaking Tools
- Scoring

Perfect for a First Timer



2012
AIRVENTURE
OSHKOSH
EAA

Thank You from Ford and EAA!



The partnership between EAA and Ford spans more than a decade and the connection continues to grow. Our mutual goal is to continually enhance the EAA member experience.

EAA values the relationship with Ford and Ford's support of the opening day Steve Miller concert, the nightly Fly-In movie theater, the spectacular Red Tails Edition Mustang benefitting the Young Eagles, and much more.

AirVenture 2012 was an extraordinary event and we look forward to seeing you next year!

Rod Hightower
President & CEO, EAA

Edsel B. Ford II
Board Director, Ford Motor Co.

EAA members are eligible for special pricing on Ford Motor Company vehicles through Ford's Partner Recognition Program. To learn more on this exclusive opportunity for EAA members to save on a new Ford vehicle, please visit www.eaa.org/ford.



partner
recognition
VEHICLE PURCHASE PLAN

It might sound like plenty of space, but 3,300 feet is shorter than your average runway. When you're flying an airplane that goes 180 knots, the box is very small, indeed!

—Rene Aldrich

FEATURES

- 4** **Perfect for a First-Timer** •
by Rene Aldrich

- 10** **A Close Call**
by John Morrissey

- 13** **Canopy-Breaking Tools**
by Steve Johnson

- 18** **Throwing Away High and Low**
by Doug Lovell

- 20** **A Case for Eliminating the Manipulation of Zero as a Score**
by Tom Myers



COLUMNS

- 03** / President's Page

DEPARTMENTS

- 02** / Letter From the Editor

- 22** / Tech Tips

- 31** / FlyMart & Classifieds

- 32** / Contest Calendar



THE COVER

Brad Crawford's S15 shot over the greens of Wisconsin by Bonnie Kratz.

PUBLISHER: Doug Sowder

IAC MANAGER: Trish Deimer

EDITOR: Reggie Paultk

DIRECTOR OF PUBLICATIONS: J. Mac McClellan

SENIOR ART DIRECTOR: Olivia P. Trabbold

CONTRIBUTING AUTHORS:

Rene Aldrich	Tom Myers
Steve Johnson	Reggie Paultk
Doug Lovell	Doug Sowder
John Morrissey	

IAC CORRESPONDENCE

International Aerobatic Club, P.O. Box 3086
 Oshkosh, WI 54903-3086
 Tel: 920.426.6574 • Fax: 920.426.6579
 E-mail: reggie.paultk@gmail.com

ADVERTISING

Manager/Domestic: Sue Anderson
 E-mail: sanderson@eaa.org
 Tel: 920-426-6127 Fax: 920-426-4828

Independent Business Relationship Representative:

Larry Phillip
 E-mail: lphillip@eaa.org
 Tel: 920-410-2916

Classified Advertising Coordinator:

Molly Nevins
 E-mail: classads@eaa.org
 Tel: 920-426-4887

MAILING: Change of address, lost or damaged magazines, back issues.

EAA-IAC Membership Services
 Tel: 800.843.3612 Fax: 920.426.6761
 E-mail: membership@eaa.org

The International Aerobatic Club is a division of the EAA.

EAA® and SPORT AVIATION®, the EAA Logo® and Aeronautica™ are registered trademarks and service marks of the Experimental Aircraft Association, Inc. The use of these trademarks and service marks without the permission of the Experimental Aircraft Association, Inc. is strictly prohibited. Copyright © 2012 by the International Aerobatic Club, Inc. All rights reserved.

The International Aerobatic Club, Inc. is a division of EAA and of the NAA.

A STATEMENT OF POLICY The International Aerobatic Club, Inc. cannot assume responsibility for the accuracy of the material presented by the authors of the articles in the magazine. The pages of *Sport Aerobatics* are offered as a clearing house of information and a forum for the exchange of opinions and ideas. The individual reader must evaluate this material for himself and use it as he sees fit. Every effort is made to present materials of wide interest that will be of help to the majority. Likewise we cannot guarantee nor endorse any product offered through our advertising. We invite constructive criticism and welcome any report of inferior merchandise obtained through our advertising so that corrective measures can be taken. *Sport Aerobatics* (USPS 953-560) is owned by the International Aerobatic Club, Inc., and is published monthly at EAA Aviation Center, Editorial Department, P.O. Box 3086, 3000 Poberezny Rd., Oshkosh, WI 54903-3086. Periodical Postage is paid at Oshkosh Post Office, Oshkosh, Wisconsin 54901 and other post offices. Membership rate for the International Aerobatic Club, Inc., is \$45.00 per 12-month period of which \$18.00 is for the subscription to *Sport Aerobatics*. Manuscripts submitted for publication become the property of the International Aerobatic Club, Inc. Photographs will be returned upon request of the author. High-resolution images are requested to assure the best quality reproduction. **POSTMASTER:** Send address changes to *Sport Aerobatics*, P.O. Box 3086, Oshkosh, WI 54903-3086. CPC 40612608



REGGIE PAULK

COMMENTARY / EDITOR'S LOG

Fall season under way

Full calendar of contests

IT'S SEPTEMBER, AND THAT

means Nationals are already here. What's amazing is that, by the time you're reading this, the October issue will be far along its journey and we'll be gearing up for the Nationals issue in November!

sitting out on a hot ramp in a boiling cockpit waiting for your time to fly, my hat is off to you!

In the four years I've been editing this magazine, I can't remember a contest calendar so full. Many contests have reported smaller numbers of contestants, but I'd almost bet that's because they've been spread out among so many more contests. If we'd run a full contest calendar in the magazine when the season first began, it would have filled quite a few pages. That's a good thing, and we hope this is a trend that continues into next season.

Congratulations to the Advanced World Aerobic Team and an impressive third place finish in Hungary. The logistics of being an aerobatic team member in a foreign country cannot be overstated. It takes a Herculean effort and many private dollars to fly in the Worlds, and the team is to be commended for their strong showing this year.

This year is team selection for the 2013 Unlimited World Aerobatic Championship, and it's going to be held right here on U.S. soil. If last year's competition revealed anything about these competitors, it's that the U.S. has completely changed its game. They brought a true team spirit to the table, and it's going to be something to witness moving into next year. These people are as focused and dedicated as they come, and I have high hopes for the United States taking top honors at the next Worlds. Please join me in rooting for our pilots as they compete for their spot on the team at this year's Nationals. **IAC**

**Congratulations to
 the Advanced World
 Aerobic Team and
 an impressive third
 place finish in Hungary.**

What a summer it's been. No matter where you live in the country, the words hot and dry could be used to describe the conditions we've all endured. 2010's AirVenture became known as 'Sploshkosh' because of the large amount of rain received before and during the show. This year, it could easily have been termed 'Hot-kosh.' Many people commented that it was one of the hottest ones they could remember. If you were brave enough to endure those temperatures while

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



It's your event, let's check the survey

Members weigh in with comments

LAST JUNE, I WROTE, an article for *Sport Aerobatics* magazine describing how the U.S. Nationals works, how to get there, and why you would want to go. Like many of you, I'm really looking forward to the 2012 Nationals coming up. This seems like an appropriate time to post some information collected last year.

At the banquet following the 2011 Nationals, Contest Director Vicky Benzinger distributed a short survey requesting feedback on that year's Nationals. With Vicky's permission, following are all of the questions, with a few selected responses. If you completed a survey and do not see your response, that could be a result of duplicate responses, or of the fact that I could print only a few for each question. And, I may have paraphrased in places.

Post Nationals 2011 Survey

How can we improve this contest?

1. Food: please let us know how you liked the hosted food events (1 to 5)

Sunday evening BBQ hosted by the Denison Chamber of Commerce: Avg. 3.9

Tuesday evening Lemmon Bros. BBQ hosted by ASL Camguard/ Bearfeat Aerobatics: Avg. 4.4

Thursday event at the Library hosted by The Lake Texoma Jet Center: Avg. 4.0

Friday evening awards banquet: Avg. 4.2

Specific Comments:

-Way too many awards, was falling asleep

-Nice location for banquet

-Drinks expensive

2. Hotels: please tell us how you

liked the hotel that you stayed in (1 to 5) Average of all was 4.3.

One pertinent comment:

-I have never played beer pong in a hotel lobby before. It was amazing!! One check off the bucket list! (Denison Hampton "5")

3. Website: please let us know if the website was useful to you (1 to 5) Avg: 4.4

-Scores slow to update

-Scores posted very fast

-Need more pictures

4. Communication: Did we effectively communicate during the contest? (1 to 5) Avg: 4.3

Specific comments:

-Post volunteer schedule on-line as well

-Twitter works great!

-Twitter & web site worked well

5. Contest Program: Please tell us how useful the program was for you (1 to 5) Avg: 4.3

-Never looked at it ("1")

-Great directions

-Excellent, do again

-Someone needs to "drive test" directions to places

6. Schedule: did we effectively manage time during the contest? (1 to 5) Avg: 4.3

-Always started late

-Very good, flowed very well

-(Need to) emphasize starting on time (briefings, category start times, etc.)

7. Fairness: did you feel that the contest rules were followed and that the contest was fair? (1 to 5) Avg: 4.4

-Need Fair Play scoring program for 2012!

-The glider judging seemed very inconsistent. Judges were unclear on how to grade some maneuvers (DS note: there were six comments re: judging of gliders out of 12 total comments)

-Intermediate unknown was iffy whether in beginning, ending, or in middle of a figure, it should be flown as drawn

-Sort of—some complaints on this from others. Some thought they played favorites

8. Issues: did you feel that any issues brought to the contest officials were addressed in an expeditious manner?

-FPS

-Didn't see any

-The jury made very timely and fair decisions

9. What did you like best about your experience at Nationals this year?

-The weather was wonderful. I thought it was great to have the jury on the spot to observe and calm situations before they blow up

-Meeting new and old friends

-Winning

-Laurie the photo girl

-Friendly atmosphere and willing to teach people

-Excellent overall experience

-Fantastic contest, no issues

10. What did you like least about your experience at Nationals this year?

-Long way

-Nothing

-The judging seems to be consistent

continued on page 30

Perfect for a **First-Timer**



BY RENE ALDRICH
IAC 435622

The last weekend in June, I did something I never dreamed I would do—I flew in my first aerobatic contest! The contest took place in Salem, Illinois, on what might have been the hottest weekend of the year. The temperatures may have kept some pilots away, but in any case, it ended up be-

ing a small and intimate contest—perfect for a first-timer!

I didn't approach aerobatics with a lot of enthusiasm. In fact, I was terrified. A bad experience early in my primary flight training left me with a debilitating fear of stalls and spins. To be honest, I was uneasy with anything that involved decreasing airspeed, lest it lead to a stall or spin. This fear un-

dermined my overall confidence as a pilot, and I turned to aerobatics almost out of desperation, figuring it would either cure me of my fear of stalls and spins or convince me that I really wasn't cut out to be a pilot. Surprisingly, the first time I went upside down in an airplane, I loved it!

A year later, buying my own airplane was still a way off. I had been

This fear undermined my overall confidence as a pilot, and I turned to aerobatics almost out of desperation . . .

to an aerobatic contest as a volunteer, had attended judges school, and was on my way to becoming a regional judge when my instructor asked if I wanted to fly the Salem contest in his airplane. It took me about two seconds to come out with a “Heck, yes!” and the first second-and-a-half was wasted time. My next thought was, “Oh my goodness, the contest is in two weeks. I have to get ready!”

For those unfamiliar with competition aerobatics, there are five categories. They begin with Primary and advance through Sportsman, Intermediate, Advanced, and Unlimited. Most pilots begin with Primary or Sportsman, and although I had been working on some Intermediate figures, I was definitely not prepared to enter a contest in Intermediate. Unfortunately, I wasn’t quite prepared to enter in Sportsman, either, as I had yet to fly the 2012 compulsory sequence for that category, more commonly referred to as the Known. A competition consists of three flights for each category, and Sportsman pilots have the option

of flying the Known three times, or flying their own Freestyle sequence for the second and third flights. Although I had a Freestyle that met the requirements spelled out in the contest rulebook, I had not flown that sequence, either. With two weeks to go, there was not enough time to learn both sequences, so I focused on the Known.

The first time through the sequence was awful! This gave me an appreciation for the higher category pilots, who are required to fly the Known, their Freestyle, and then an Unknown—a sequence they have never seen before and are not allowed to practice. Flying a sequence you have never seen before, even a relatively simple one, is harder than it looks. Although the Sportsman sequence is relatively straightforward and not much different than the sequence from the previous year, my nerves got the best of me, and I struggled to fly it well. At times, it seemed like the more I practiced, the worse I got. Suddenly, I was torquing off the top of hammerheads and get-

ting way off heading in half-loops. I was also struggling to get used to flying in the “box.”

The aerobatic box is a 3,300-foot square, with altitude limits depending on the category being flown. It might sound like plenty of space, but 3,300 feet is shorter than your average runway. When you’re flying an airplane that goes 180 knots, the box is very small, indeed! The Sportsman sequence is designed to be flyable by relatively basic aerobatic airplanes. For those pilots, flying the sequence requires the pilot to extract maximum performance from their airplanes. The challenge for the monoplane pilots lies in their ability to manage the excess performance provided by the huge engines and slick airframes characteristic of the breed. In other words, things happen fast. Pausing for a second or two between figures means covering a big chunk of the box, especially if the wind is blowing. I struggled to keep up at first and was generally overwhelmed by the need to not only fly the figures, but also manage



Rene (left) with her instructor, Steve Johnson.



I'd like to say the more I practiced, the more I got a handle on my nerves, but it was not to be.

my position in the box, while taking into consideration what the wind was doing and how best to present the figures to the judges. That was one area where my instructor, himself an avid competitor, gave me a tremendous advantage. I was quickly learning there was much more to competition aerobatics than just flying the figures.

The practice continued in earnest, and while I made progress on some of the errors, others continued to frustrate me. I made my last

practice flight in a local aerobatic box belonging to a longtime competitor and generally fascinating individual. I had a predictable reaction to my first flight in the box, and that was being completely convinced someone had made a serious error when laying out the box markers. It was way too small! In fact, for most of the sequence, the box markers were blocked by various parts of the airplane. That was when I started to understand why competitors often travel to the contest a

day early, as it gives them time to gain familiarity with the box and the local landmarks they can use to identify the edges of the box when the markers can't be seen. That last practice flight was also my first time being critiqued by someone on the ground, and it was good preparation for what I would be doing the following weekend—flying with a dozen or so people on the ground watching my every move.

I'd like to say the more I practiced, the more I got a handle on



Rene proudly displays her Highest Scoring First Time Sportsman and 2nd place trophies.

my nerves, but it was not to be. I thought about backing out—after all, two weeks was hardly enough time to get ready. I did realize, though, that I would probably never feel completely ready, and at some point I was just going to have to go for it and fly my first contest. My instructor was being very generous with his time and airplane, as he too was planning to fly in the contest. Instead of just going and focusing on his own flying, he also had to guide me through my first contest. I was not about to pass up the opportunity so, ready or not, I was going to fly!

One of the advantages of my first contest being relatively small was that it allowed for multiple practice flights in the box the day prior to the contest. I spent the first flight flying individual figures up and down the box axes in an effort to get familiar with the box and what landmarks I could use to continually assess my positioning. One of the great things about flying aerobatics in Illinois is that everything lines up with the sec-

tion lines. That doesn't work quite as well at home in middle Tennessee.

My second and third practice flights were spent on the sequence. I was still struggling with nerves and not flying my best, but I was at least getting a feel for flying in the box. After a pizza dinner at the airport, and a largely sleepless night at the hotel, Saturday morning dawned and there was no more practice. The game was on!

I set myself up heading north on a base leg to enter the box, go a little past the center, roll about 135 degrees, pull the nose down, three wing wags, pull level and, shoot—too far south! If you're unhappy with your box positioning, you have the option of flying through the box and re-entering, just as long as you don't start any aerobatic figures. You can do this as many times as you want, though, eventually, you'll try the judges' patience. Unfortunately, I made the decision to start my sequence anyway, and as soon as I saw the interstate, my visual cue for the west side of the box, I pulled for a

hammerhead and torqued off the top. Again! I was not off to a good start. I yanked off the power for the next figure, a 45-degree upline—yes, I pulled the power to climb!

A 45-degree line takes up a lot of the box, especially with a 330-hp airplane. Not only did I need to worry about staying in the box, I had a spin coming up and needed to start slowing down for it. I pushed off the 45 line, rolled in a bunch of bank, yanked the airplane around a 180-degree turn, and pulled the throttle almost all the way off to finish slowing for the spin. When I saw the interstate again, I closed the throttle and let the airplane stall and spin. The entry went well, but I stopped the spin a little late. Again! I also saw the wind had blown me farther south, and now I was pretty much on top of the judges. I was paying for that sloppy box entry. Oh well, not much time to think about it. Pull for the next figure, a humpty bump.

Set a vertical. Oh my goodness, my right leg, holding rudder, is shaking like a leaf! Pop it off the



Finding a cool spot to reflect before one more chance to get it right.

After all of the doubt and frustration and stress, I realized the weekend had been a blast.

top, let it float, start pulling now, harder, wings are still level, set the vertical down, forgetting something . . . oh, the power! Pull the power, quarter roll, into the box—shoot, that was a sloppy roll, and I'm still on top of the judges! Oh well, still no time to think, the 45 upline for the reverse half-Cuban takes most of the box, and I need to pull now! Pull, roll, push, float for a second, and catch my breath and I'm still on top of the judges! We did not have boundary judges, due to the heat, but I was aware of the fact that the judges had to bend their necks at unnatural angles to watch me fly. This, too, would eventually try their patience and certainly affect my presentation score. Thoroughly defeated, I wagged my wings, signaling a break, flew out of the box, came back around, and positioned myself to re-enter in the center of the box.

Deep breath, wing wag, pull for

a half-Cuban, legs are still shaking. Float a little, that was too much! Set the line, push, roll, pull, there goes the east side of the box, pull to a vertical, almost done, pull to a 45 down, set the line, half-roll, that was too much, again! Calm down. There's the runway, pull now for the loop! Put it right in front of the judges! Yeah! Slow roll, wing wags, that's it! Whew. That was sloppy, but my first contest flight was over. I had done it!

On the ground, with a little time to reflect, I knew it was clearly not the best flying I had ever done. I let my nerves get the best of me and hurried through the sequence. In aerobatics, the little details really matter, and I had given away a lot of points by being sloppy. When the scores from the first flight were posted, I was in second place, out of three. The guy in third had zeroed a figure, which can happen if

you fly the wrong figure, fly it going the wrong direction, or accumulate enough errors to reduce the score to zero. Fortunately, even if he had scored it, I would still be in second. He was also a first-time Sportsman pilot, so the award for the highest-scoring first-time Sportsman was on the line. You only have one chance to win that award.

My second contest flight was much like the first. My box entry was better, but I still torqued the hammerhead a little and stopped the spin even later. The next figure was a humpty bump—a pull to a vertical upline, a half-loop over the top, and a pull to a vertical downline with a quarter roll. Somehow, I got lost on the downline and rolled about 45 degrees, almost stopped, and then, realizing my mistake, rolled the remaining 45 degrees. A couple of the judges saw these errors and zeroed the figures, rightly so, but in a little

bit of luck, the other judges did not. A majority of the judges have to zero a figure for the zero to hold. In the end, the second flight scored better than the first, but I knew I had not flown better. I had just gotten lucky the zeros didn't stick. Frustrated and depressed, I spent hours lying in bed that night going over every little detail of my sequence, every little mistake—another basically sleepless night.

It had been hot all weekend, but Sunday morning dawned not only hot, but humid too. We learned one competitor had suffered heat illness the previous day and would be going home rather than staying and flying his last flight. Surely that was a difficult decision to make, but one that is our responsibility every time we fly, especially aerobatics.

With the airplane pulled out and ready, there was nothing to do but wait. I found a quiet part of the hangar to walk through my

sequence, letting my feet trace the flight path of the airplane in the box, while my hands moved as though they were on the throttle and stick. This is known as doing the "acro dance," and while amusing to watch, it is an excellent way to focus prior to a flight. As the first few pilots started to launch, I found some shade under the wing of the airplane and waited. One more chance to get it right.

The third flight started off well, with my first clean hammerhead of the weekend. The spin, however, was a disaster! I stopped way too late and then instinctively rolled back to the appropriate heading, thus showing the judges my error a second time! This time, the zeros held. When the flight was over, I knew the spin had been a disaster, but the rest of the flight had been pretty clean. In the end, it was my worst scoring flight, but even with the zero, the score was only a little

bit lower than the score from my first flight, with no zeros. Had it not been for the spin, it would have been a solid flight, but that is the thing about competition—there are no second chances.

When the final scores were posted, I had taken third in the last flight but was still in second place overall. Relief washed over me as my instructor gave me a big hug. My first contest was over, and I would walk away with both the First Time Sportsman award and second place overall. After all of the doubt and frustration and stress, I realized the weekend had been a blast. I had met some wonderful people, many of whom took the time to offer advice and encouragement, laughed a bunch, and accomplished something I never would have dreamed of. The only thing I could compare it to was my first solo. There is no doubt my first contest was an experience I'll never forget.

IAC

We Can Teach ANYONE to Land A Pitts

or Skybolt, Eagle, Model 12, Extra, etc.

"We emphasize stick and rudder basics."

- 39 years instructing in a Pitts.
- Specialize in low-time pilots, cross-winds and narrow, short runways
- Yeah, we teach acro too.

Accommodations Available

Complete Resort Amenities, Families Welcome.

It's Always Sunny In Phoenix



Budd Davisson's
Plus 5 Aviation, LLC

602-971-3991 • buddairbum@cox.net • Phoenix, AZ 85028



Former Students Say:

Budd is one of the best instructors I've ever flown with. He has more knowledge to share about the Pitts, and flying in general, than anyone. -Mike Melvill

...I had to dead stick my Pitts in and an old timer said "Nice save. Someone taught you well." Yes they did! Thanks, Budd. -Craig H.

My insurance company covered me, a low-time, low-tailwheel-time pilot in a single-hole Pitts largely because I went to Budd for my training. -Tom P

... the engine failed at low altitude and the accident investigators said that my fundamentals saved me. Thanks my friend. -Maynard H.

www.airbum.com

A Close Call

Fuel selector handles

BY JOHN MORRISSEY

This is a tale about a Pitts S-2S flight that could easily have ended badly. After reflecting on the incident, I thought I should tell the story to help someone else from making the same, or similar, mistake.



The photo above is the fuel selection panel on the S-2S in question. There are two fuel selector handles. The fuel selector handle on the left has an on/off option that allows fuel from the top 5-gallon wing tank to gravity flow into the main/rear fuselage tank. The fuel selector handle on the right is used to select the main (rear) 19-gallon tank, the auxiliary (front) 15-gallon tank, or one of the two off positions. Both the main and auxiliary tanks feed directly to the engine when selected. There is no "both" position. Note: This is not the fuel selector panel provided by the Pitts factory, but rather a modified one designed by a previous owner when the new instrument panel was installed.

The fuel selector handle on the right of the panel is attached to a long, hollow rod that goes to the fuel

tank selector valve mounted about 4 feet forward of the cockpit underneath the auxiliary fuel tank. That selector valve has two off positions, two input positions to accept fuel from either the main or auxiliary tanks, and an output fuel line to the engine that transmits the fuel filter and the electric boost pump onwards through the firewall to the engine-driven fuel pump.

Here is your task: Using the yellow fuel selector panel at left, where would you position the fuel selector lever for takeoff using the main tank? Then decide where you would position the selector lever for either of the two off positions. Finally, what position would you choose on the fuel selector panel for the auxiliary tank? After you answer the above questions, take a look at the next photo:



Now perform the same tasks using the fuel selector handle pictured above. From the fuel selector handle forward, both aircraft systems are identical. This fuel selector panel was standard on Pitts S-2S aircraft built at the factory in Afton, Wyoming. Did the fuel selector



BONNIE KRATZ PHOTOS

handle end up in the same position for your second task as the first?

Now, with apologies to Paul Harvey, here's the rest of the story.

I was about to perform a pre-buy inspection flight on a Pitts S-2S. When leading Black Hawk and then Holiday Inn aerobatic teams from 1984 to 1987 I flew a Pitts S-2S and accumulated about 800 hours in type. I was very familiar with Pitts S-2S variants.

Or so I thought.

In this Pitts the fuel selector handle is on the right side of the yellow fuel selector panel in the first photo. After performing a very thorough preflight inspection on the aircraft I noted that the fuel selector handle was loose in the rotational axis on the long rod that transmits the fuel selector commands to the fuel selector valve on the firewall. There were about +/-15 degrees of free rotational movement of the handle before the attached rod would begin to rotate, as the bolt hole through the hollow rod had elongated.

Because of that, I took extra time to carefully orient the pointer on the fuel selector handle with the solid line pointing to the 9 o'clock position on the fuel selector panel. I did not feel a detent at this position, so I moved the selector handle +/-30 degrees either side of the 9 o'clock "on" position. No detent could be felt or heard throughout that range of movement. However, there was considerable noise coming from a train passing by the edge of our airport as well as mowers in the vicinity. I just assumed the fuel selector lever was not equipped with a detent and that it was in the correct position as marked.

I started and taxied to the pre-takeoff position where I completed my normal checks plus others that I use to verify proper operation of the Bendix RSA-5 fuel control. Fuel flows at 1200 rpm and 1800 rpm were nor-

mal. As I advanced the throttle to full power for takeoff, the usual power surge of 260 horses was all there. After liftoff, my practice is to let the Pitts accelerate to its best lift over drag (L/D) speed (100 mph indicated) before starting a normal climb profile.

At about 200 feet, the engine began to surge—BIG surges. Then, the engine quit just as I began to activate the switch for the electric boost pump. The prop did not completely stop. When the boost switch was activated, the engine "caught" and began running, albeit with large surge cycles. I gradually reduced power to about 16 inches of manifold pressure and 2,300 rpm. At this point the surging continued but not nearly as severely. I now felt I had a reasonably stable engine. With this power I was able to climb at about 600 feet per minute at the best L/D speed. I continued the climb over the field to 4,000 feet above ground level (AGL), leveled off, and began to troubleshoot the problem. When I turned off the boost pump the engine quit immediately; turning the pump back on restored power with minor surging.

At that point my diagnosis was failure of the engine-driven fuel pump. Since I had plenty of altitude to accomplish an engine-out landing, I selected the auxiliary tank (both tanks were filled for the flight) by rotating the fuel selector handle to the right 3 o'clock position. The engine operation smoothed out on the aux tank so I turned off the fuel boost pump. The engine still ran with no surges. I then selected full power while still on the aux tank. I was now able to operate at full power without surges and without the boost pump while on the auxiliary tank. It became obvious the problem was certainly not the engine-driven fuel pump. Nor was it related to spark plugs, ignition issues, the Bendix fuel control, or fuel-injector nozzles. I began to consider a blockage of the main tank vent line.



BONNIE KRATZ PHOTOS

The next order of business was a safe landing—safe for me, the plane, and those living near the airport. My airport is in the middle of densely populated housing developments on the north and south, the city of Grain Valley's housing district directly adjacent to the east edge of the field and new construction on the west. I decided the risk/reward equation of landing there was not in favor of the neighborhood's residents. That having been decided, I climbed to 8,000 AGL and headed for an airport a few minutes north surrounded by uninhabited flat terrain.

The landing there from a simulated engine-out pattern was uneventful. After shutting down I spent some time in the cockpit trying to sort the problem. At this airport, it was absolutely quiet. When I rotated the fuel selector handle from Aux counterclockwise to Main, I could hear a distinct “click” as I passed the 1:30 and 10:30 positions on the fuel selector panel. In other words, I heard the click when the fuel selector handle was halfway between the right 3 o'clock position and the vertical 12 o'clock position, and then heard another click as it was halfway to the left 9 o'clock position. Further investigation revealed there were “off” clicks at both the 4:30 and 7:30 positions on the fuel selector panel.

Now compare the photo of the second circular fuel selector panel to this finding. That panel has a white triangle at the 10:30 position that points directly at the fuel selector pointer when the two indexes are aligned. That panel pointer indexing system is repeated at the 1:30 position for the auxiliary tank as well. It also has the same white triangle index pointers at the two marked off positions at 4:30 and 7:30. That fuel selector panel is the one installed by the factory on its production/certified S-2Ss. The S2-S I was flying was certified, but with a different fuel selector panel that did not have the white triangle indexers at the previously mentioned 45-degree positions. There was another contributing “gotcha” on the yellow fuel selector panel I was using. It con-

tained the wing tank selector handle where a vertical line pointed to the OFF position at 12 o'clock. The right 3 o'clock position followed a horizontal line to the ON position. This selector did not have an indented “click” at either location, and the wing tank selector handle was mounted directly to the wing tank selector valve. The factory fuel selector for the wing tank selector is also mounted directly to the wing tank selector valve, and that assembly is mounted on the right hand forward part of the cockpit just under the instrument panel.

Even though I had four years of experience in a Pitts S-2S, that S-2S did not have an electric boost/backup pump system; rather, it had a Christen wobble pump mounted on the floor of the fuselage just below and slightly to the left of my left thigh. Its fuel selector switch was mounted directly to its top, and its clearly marked and visible selector positions were: left 9 o'clock – Main Tank, forward 12 o'clock – OFF, right 3 o'clock – Aux Tank. That is where my memory assumed the tank selector handle on the yellow selector panel was oriented.

Obviously, the engine surge/failure experienced on takeoff was because the fuel selector valve was only half open, at best. Thankfully I was able to regain sufficient climb power by using the boost pump and reducing throttle and rpm when using best L/D speed. If that power had not been available, there was not enough runway left to stop and no place to go off the west end of the runway but big trees and a construction site. Not good!

The flight back to my home airport was uneventful with the fuel selector handle in the left 10:30 position for Main Tank operation.

So what did I learn, or relearn?

Never assume anything. Ever. Similarities between aircraft with identical model designators, i.e. S-2S, do not guarantee identical fuel, ignition, hydraulic, or electrical systems.

At least for that flight, fate was not the hunter. **IAC**

Canopy- **BREAKING** Tools



Get out
after a rollover

BY STEVE JOHNSON
IAC SAFETY CHAIR



Folded canopy breaker

There is a recurring thread on the IAC Exploder regarding canopy-breaking tools. Such a tool might be very handy after an emergency landing if the airplane turns over during the landing. In aircraft with sliding or side-tipping canopies,

it may be very difficult or impossible to open the canopy if you are sitting inverted in a field somewhere.

The IAC Exploder is an e-mail thread system set up and run by Guenther Eichhorn, a longtime IAC member. Guenther's website has a wealth of great information, as well as archived

threads, sorted by topic. The Exploder can be found at acro@aerobaticsweb.org. You must subscribe to use the system, but unsubscribing is easy if you no longer wish to participate.

The canopy-breaker thread has come and gone several times in the years I have been an IAC member, with



Canopy breaker showing exended handles.



Visual of breaker tools.

the same information being shared as new competitors and IAC members come aboard. First, understand that Plexiglas or Lexan canopies and side windows are very different than automobile glass. All automobile glass is tempered glass. The tempering process imposes internal stresses in the glass, making it very brittle and causing it to shatter into very small square or

rectangular pieces when broken. This reduces the dangers of being severely cut by broken glass shards in auto accidents. Automobile windshields and some rear windows also are laminated glass, with a layer of plastic between two pieces of glass. The laminations keep the large glass parts from creating other hazards.

Plexiglas is an acrylic plastic, while

Lexan is a polycarbonate plastic. Both of these plastics behave very differently than automotive or other glass. Thus, typical automobile-style glass breakers do not work well on plastic canopies or side windows. While molded canopies do have some internal stresses, they are not designed to fail or shatter, so the typical glass breakers may not work.



Above: Stowed under altimeter.

Left: Closeup of stored hammer.



What you should look for is a device that will load the canopy to its breaking point. This means a heavier device that can apply a greater load to the canopy than the small, pointed-tip automotive-style breakers. Plexiglas can be broken by first scoring it, and then flexing the plastic along the score line. So a device that will score a line in Plexiglas may be of value, if the plas-

tic can then be bent to cause the fracture. Lexan will score and break as described above, but it is more difficult; the Lexan will tend to bend a lot before breaking. So, you must bend the Plexiglas or Lexan to get it to break.

Another tool mentioned is a seat belt/parachute line cutter. The traditional parachute line cutter is called a hook knife and has a sharp blade

in a protective hook-shaped handle. The cutter is easy to use on parachute lines to stop being dragged after landing in high winds or to free line-over-parachute malfunctions. The hook knife works well cutting seat belts loose as well, if needed.

So the preferred tool would have a sharp edge to score the plastic, a heavy head or handle to provide sufficient

force to break the plastic, and a sharp knife for cutting seat belts and parachute lines.

In the Exploder thread, several people suggested using K-bar style knives, diving knives, and heavy metal rods. I do think any of these will work, given enough room to generate the force needed to break the canopy. Scoring the canopy first will make less force necessary to cause a fracture, so a strong, sharp edge on the tool chosen will be of benefit to create the scoring.

I use a Troika brand tool (see photos) similar to a Leatherman tool, which has a folding handle claw hammer, along with knife and serrated saw blades. I ground the claw side of the hammer to provide a sharper edge for scoring the plastic, and the hammer face should provide enough force to break the canopy. I have not tested my canopy-breaker on an intact canopy as my wallet won't tolerate such experiments. But I have tried it on other broken, molded Plexiglas parts, as well as

flat sheets of Plexiglas and Lexan, and the results were positive. Even using short strokes, the hammer provides enough force to break the plastics.

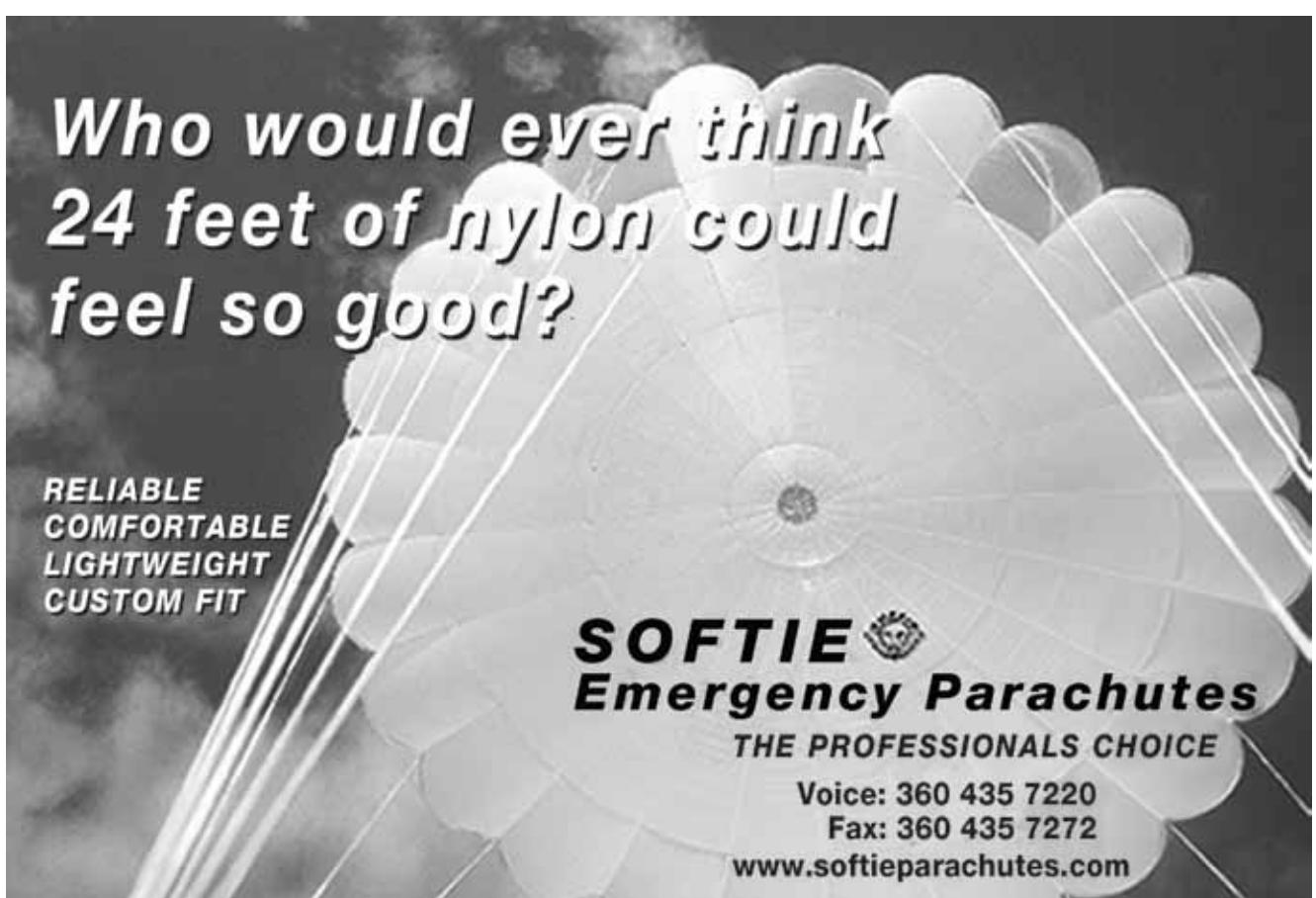
To recap, typical automotive-style window-breaking tools don't work well with plastic canopies. The spring punch points don't apply enough force to cause major fractures or voids in molded plastic canopies or flat windows. Plastic canopies need to be flexed or bent over a sufficiently large area to cause fracturing, and scoring the plastic first will help create those fractures with less force.

Once you find the proper tool, it needs to be mounted where it can be reached at all times, and the mounting must be secure enough to prevent the tool from coming loose while flying aerobatics, but easy enough to release when necessary. Hook-and-loop (such as Velcro) straps may work, but don't use tie-wraps unless you know you can physically break the tie-wrap; they are stronger than they look!

My tool came with a nylon case and a hook-and-loop flap. I made a loop of strong thread with a pin through the loop (like a parachute closing loop and rip cord pin) to hold the flap closed, as I didn't trust the holding power of the hook-and-loop alone. Be sure you test your mounting system, and a two-step system is better than relying on just one holding method. My tool is mounted just above and inboard of my right knee and is visible at all times; I can reach it with my left hand if necessary.

A canopy-breaking tool is a great device to have in an emergency. As others mentioned on the Exploder, have a full emergency plan ready before you need it. Should you bail out, or ride the airplane to the ground? Should you jettison the canopy before landing? Having the canopy-breaker is just one item in a process each of us should have developed for different emergencies. Having the right tool at the right time will create better results in any emergency situation.

IAC



**Who would ever think
24 feet of nylon could
feel so good?**

**RELIABLE
COMFORTABLE
LIGHTWEIGHT
CUSTOM FIT**

SOFTIE 
Emergency Parachutes

THE PROFESSIONALS CHOICE

Voice: 360 435 7220

Fax: 360 435 7272

www.softieparachutes.com

Throwing Away High and Low

Question of fairness

BY DOUG LOVELL
IAC Director-Northeast Region

Sometimes in aerobatics we hear suggested, as an alternative to straight averaging or "Fair Play," simply throwing away the high and low scoring judge for each pilot. The reasoning is:

1. This is done in other sports, including international Olympic sports. (see sidebar)
2. A judge who scores unfairly high or low will be caught by this procedure.

The method is intuitively appealing, especially given the spy vs. spy, east vs. west argument. In that argument, the west judge gives the west competitor maximum marks and the east competitor minimum marks. The east judge does vice-versa, giving maximum marks to the east competitor and minimum marks to the west competitor. Throw-away the high and the low scores for both competitors and, voila! All is right and fair.

That a method works in a single scenario does not prove the method is sound. Let's go beyond the east vs. west argument to consider what happens when you don't have an east vs. west scenario. When we think about the method more carefully, we find a number of problems. We'll start with the little things and get to the bigger, more complex issues.

First, if there is more than one unfairly high or low judge, the system falls flat. It fails.

Next, if there are only three judges, it leaves only one judge providing a score. If that judge is always the middle judge, then that judge decides the contest.

In a panel of fair judges, no judge wants to be the high or low judge. They want to be the middle judge. So they give middle scores. Now you've changed the scoring behavior of the judges in an undesirable way.

Finally, let's look at an example. This chart on the

right lists the pilots in rank order according to the individual judge rankings. The chart on the adjacent page shows scores and results with the throw-away high and low scheme. The gray boxes are the discarded scores. The result rank values are on the right.

Looking at the high-low discard chart we see that pilot one, the winning pilot, got their score from judges one, four and five. Pilots two, six, eight, 10 and 12 got their scores from judges one, three and four. Pilots three and nine got their scores from judges three, four, and five.

In all, on a panel of five judges, there are 10 different sets of three judges from whom each pilot can get their score. On a panel of seven, there are 21 different sets of five judges. Every pilot could get their score from a dif-

Pilot	J1	J2	J3	J4	J5	rank
P1	1	1	1	1	3	1
P2	2	3	2	2	1	2
P3	3	5	3	3	7	3
P4	7	4	4	6	2	4
P5	12	2	5	5	11	5
P6	6	10	6	7	4	6
P7	4	6	10	10	8	7
P8	10	9	12	9	5	8
P9	5	11	7	10	9	9
P10	8	12	8	4	6	10
P11	9	7	9	12	12	11
P12	11	8	11	8	10	12
P13	13	13	13	13	13	13

Pilot	J1	J2	J3	J4	J5	score	rank
P1	2803.0	2701.5	2888.0	2864.5	2732.5	2800.0	1
P2	2744.0	2604.0	2781.0	2686.5	2808.5	2737.17	2
P3	2735.5	2578.0	2722.5	2634.5	2649.5	2668.83	3
P4	2612.5	2585.0	2676.0	2563.5	2745.5	2624.50	4
P5	2442.5	2632.5	2651.5	2601.5	2548.5	2594.17	7
P6	2657.0	2429.0	2636.0	2527.0	2710.5	2606.67	5
P7	2714.5	2517.5	2566.0	2488.0	2599.0	2560.83	9
P8	2554.5	2446.0	2506.5	2504.0	2706.0	2521.67	12
P9	2674.5	2405.5	2629.5	2488.0	2583.0	2566.83	8
P10	2595.5	2395.5	2605.0	2610.0	2673.5	2603.50	6
P11	2574.0	2499.5	2599.0	2344.5	2497.0	2523.50	11
P12	2539.5	2446.5	2553.0	2513.0	2562.0	2535.17	10
P13	1192.0	1137.0	911.5	954.0	1059.0	1050.70	13

ferent selection of judges. That makes the throwaway approach seem somewhat arbitrary.

Further, consider that we place three to five judges on the line. If each of them has a 75 percent likelihood of properly ranking two pilots, when all five of them rank the two pilots we increase the likelihood that they have it right to 90 percent. When you throw two away, the likelihood goes down to 84 percent. Throwing away judges is a hatchet approach to the problem of fairness.

The last problem with throwing away the high and the low is that the system breaks the Condorcet Criterion. A system that satisfies the Condorcet Criterion guarantees that the candidate (pilot) favored by the majority will always win.

Consider pilot five. The rankings chart shows that pilot five is clearly preferred by three judges (J2, J3, J4) over pilot six, and badly penalized by the remaining two (J1, J5). The high-low discard results show that throwing away the high and the low does not help pilot five at all. It hurts. Pilot five drops two places. Consider pilot 10. Pilot 10 is very happy. A different judge (but only one judge, J2), penalized pilot 10. One judge really liked pilot 10 (J4). The high and the low were thrown out, but pilot 10 still moves up to sixth place, ahead of pilot five.

Three judges, a majority, ranked pilot five at fifth place or above. Only two judges ranked pilot 10 at or above sixth place. Throwing away the high and low judges puts pilot ten at sixth place before pilot five at seventh place—not at all equitable. Now you might think that fifth, sixth, and seventh place aren't too important; but, remember that those could just as easily be first, second, and third. Throwing away the high and the low makes a complete mess of the results.

IAC

Olympic Scoring

It isn't exactly true that Olympic sports throw away high and low scores. They do a number of things. In figure skating the ISU Judging System uses two separate scores—one from a technical specialist looking at slow motion video, and another from a panel of 12. For the 12 panel, they randomly select nine scores, then throw out the high and the low.

The United States Figure Skating Association does not do this. They use nine judges and use all nine of the scores.

Olympic diving uses a zero to 10 system, difficulty factor and straight averaging. Gymnastics uses a supervisor and an eight judge panel divided into D and E judges. The two judge D-panel decides the difficulty and overall content value for the performance, collaborating to resolve differences in their independent evaluations. The six judge E panel observes the performance and deducts for faults in execution and artistry. The scoring system throws-away the high and the low, using the middle scores. When the middle scores disagree by an amount greater than a given threshold, by table lookup, the supervisor adjudicates the scores in consultation with a jury chair and video replay. The supervisor and jury chair have a great deal of latitude to determine the score when there is lack of agreement between the middle judges. They are only looking at one set of zero to ten grades. They get to employ expert judgment and consultation with judges to decide what grade to give.



A Case for Eliminating the Manipulation of Zero as a Score

Keeping our data sets large

BY TOM MYERS
IAC 16830

DOUG LOVELL PRESENTS A STRONG
case against the use of the scheme
that tosses out the highest and
lowest judge's score for each figure.

The argument I have regularly

used against this scheme is that our data set is already small. Making a data set smaller by intentionally throwing away scores pushes the remainder of the data set further

away from the ideal statistical distribution of a bell-shaped curve. The more a data set approaches a bell-shaped distribution, the more accurate the statistical assumptions

that we make about it are, and the more accurate the operations are that we perform on it. To put it in the IAC's point of view, the smaller the data set, the further away we get from being able to assume that the majority of the judges get it right the majority of the time.

determined what the scores are from multiple judges.

Another way to look at the statistical damage associated with the artificial movement upward of zeros, is to imagine if we performed the same operation downward with 10s. Let's say we had a rule that

Thus, we not only want to keep our data sets as large as possible, we want to eliminate the sources of data set skewing.

As data sets grow larger and larger, not only do any errors and biases more reliably and evenly balance each other out, but the less there is any residual effect of on the overall outcome. As data sets gets smaller and smaller, the more any errors and biases associated with each score affect the overall outcome. An unbalanced error or bias skews a data set. Thus, we not only want to keep our data sets as large as possible, we want to eliminate the sources of data set skewing.

In mathematical terms, there is no difference between zero and 10 as scores, in the sense they are both endpoints, or boundary values, or maxima and minima. The fact that zeros have so many caveats associated with them is actually quite statistically damaging for a number of reasons.

In the viewpoint offered by Lovell's article, when we adjust zeros upward, we are essentially tossing out only the low scores. We are intentionally skewing our data. The extent to which the data is skewed depends only upon what the score is from the lowest-scoring non-zero-scoring judge. That judge has now

stated minority 10s must be lowered to at most the next highest judge's score. This would be that equivalent skewing of the data at the high end of the allowable scoring span.

The most statistically correct methodology is to treat zero (and 10) like any other score. In other words, eliminate hard zeros, let zeros exist only as the accumulation of errors, and do not artificially adjust any score upward (or downward). Fly the wrong way or the wrong figure, and you get an accumulated zero error very quickly. Start rolling before a stall break in what is supposed to be a snap roll, and you get an accumulated zero error very quickly for not actually snapping.

The overall result of this idea would be the elimination of any special treatment of any individual scores, and the elimination of so called "hard" zeros. All scores would stand as is, and all scores would represent the accumulation of judging downgrades. The only additional downgrade to a pilot's point total would come from penalty points, which would be deducted due to outs, interruptions, low calls, etc.

IAC

The Winner's Propeller!

Fly the Champions' Choice!

like Patty Wagstaff
as shown here
with her
Extra 300S!!

mt-propeller



Super Decathlon



Pitts Model 12

Available for almost every aerobatic aircraft, for custom built airplanes like Lancair, Velocity, Glasair or RV and for more than 100 certified aircraft types.

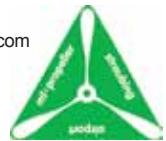
Order your custom designed propeller today!

MT-Propeller USA, Inc., Florida

Phone: (386) 736-7762

Fax: (386) 736-7696

e-mail: info@mt-propellerusa.com



MT-Propeller

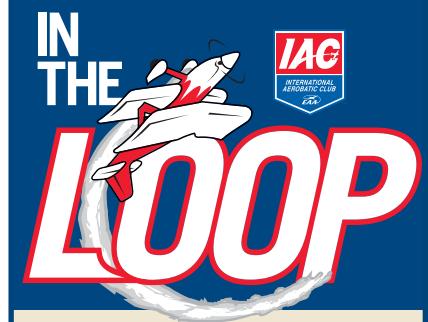
Headquarters Germany

Phone: +49-9429-94090

Fax: +49-9429-8432

e-mail: sales@mt-propeller.com

www.mt-propeller.com



Stay connected with IAC's latest member benefit, the world of aerobatics on the Web, in our e-newsletter!



To subscribe:
www.EAA.org/newsletters

TECH TIPS

A COMPARISON OF A STOCK J3 WITH A CLIPPED-WING "CUB"

BY GILES HENDERSON
EAA 53234, IAC 159
AND
AMOS TOWNLEY
EAA 53090

REPRINTED FROM THE INTERNATIONAL AEROBATICS CLUB TECH TIPS MANUAL, VOLUME I



Giles Henderson and his clipped-wing Piper Cub N-6620H.

For anyone involved in aerobatics with more than a passing interest, Giles Henderson is a name nearly synonymous with the "Clipped Cub"—the aerobatic version of the venerable Piper J-3 Cub. Giles was recently inducted into the IAC Aerobatic Hall of Fame, and will have a feature story in the January 2013 issue of Sport Aerobatics. In the meantime, please enjoy these two articles written by Mr. Henderson and reprinted in the IAC Technical Tips Manual Volume I. Giles may have a bit of gray, but his airplane hasn't changed much over the years!—Ed.

The following article was unearthed from the December 1970 issue of Sport Aviation Magazine. Considering that date, some of the names and/or owners of aircraft etc. may be presently incorrect. The technical information, however, should still be relevant.

The J3 "CUB" has been a long-time sentimental favorite of the aviation buff. Many articles, books, and even poems have been written about this aircraft. In its stock configura-

tion it has gained an almost legendary reputation in the roles of a trainer, bush plane, ranch hand, float plane, duster, and all-around sport plane. It has probably won more spot-landing and flour-bombing contests than any other type of aircraft. To top it off, it has frequently been the star of the air show. The "Stolen 'Cub,'" "Drunk Pilot," and other comedy acts flown by the late Dick Schram, Marion Cole, Bill Lumley, Dale Cites, and many others have

always been real air show crowd pleasers. The stock "Cub" has been used by National Air Shows, Henry Mallet, Cole Brothers, Bill Adams, and many other professional performers for car to plane transfers, car-top landings, etc.

The "clipped-wing" "Cub" has also been a long-time air show performer. Many of the best-known aerobatic pilots in the country including Duane Cole, Harold Krier, Bevo Howard, Pappy Spinks, Charlie Hillard, Bill and

John Lumley, Pete Myers, and Mary Gaffaney started their aerobatic careers in "clipped-wing" "Cubs".

A few ultra-high-performance "clipped-wings" have been built up for exhibition and unlimited competition. Probably the best known are N-42963 owned, built, and flown to an EAA international unlimited championship in 1966, by Pete Myers of Oak Lawn, Illinois; and N-10135, 116 built by Howard Dutton of Haverill, Massachusetts and presently owned by Bill Lacy of Chandler, Arizona. Both of these all-out machines have had their fuselages shortened, vertical fins modified, been converted to single place, and had 150-hp or better engines installed. The wings on N-42963 have undergone an evolution of changes. At this time they are Taylorcraft wings shortened to a 24-ft. span. This nearly symmetrical airfoil improves the outside capabilities of the aircraft tremendously. However, the Taylorcraft wing does not produce as fast a roll rate as the "Cub" wing of equivalent span. Also well known in both competition and air show exhibition is N-38333 built by the Piper factory for Bevo Howard, later owned by Charlie Hillard, and presently owned by Bob Copeland, also of Chandler, Arizona, Bob has converted to Taylorcraft wings also.

In the last couple of years, both experimental "Cubs" and standard category Reed "clipped-wing" "Cubs" have been active in primary competition. Table 1 lists some of the more-active competition pilots and their "Cubs".

Because of the popularity and interest in the "Cub" as both a sport plane and as a competition/air show plane, we felt it would be of interest to compare the characteristics and performance of a stock

**TABLE 1
COMPETITION "CUBS" AND PILOTS**

Registration	Name	Base	Engine
N-151A	Harold Tapley	Shaw, MS	0-200
N-188F	Dot Etheridge	Greenville, MS	0-200*
N-4413	Gary Wilson	Kaneoke, HI	C-85
N-23317	Joe Molinary	New Orleans, LA	A-75
N-30551	Jim Guzman	Dallas, TX	C-85
N-35258	Gene Olson	Crystal Lake, IL	C-75
N-3655K	Dan McGarry	Riverdale, IL	C-90*
N-41116	Jerry Spear	St. Louis, MO	C-85
N-6620H	Giles Henderson	Charleston, IL	A-65*
N-70628	Don DeWitt	Worth, IL	C-85*
N-77531	Jay Harowitz	Shreveport, LA	C-90

* Air show smoke system

"Cub" and "clipped-wing" with equivalent power. Amos Townley, owner of N-2041M, is a newspaper writer and photographer for the "Coles County Times" of Charleston, Illinois. N-2041M has been used by Bill Lumley for air show comedy acts. Giles Henderson is a chemist and member of the faculty at Eastern Illinois University at Charleston. He is a coowner with Dan Foote, also a chemistry professor at

EIU, of the "clipped-wing", N-6620H. Henderson and Foote modified the aircraft in 1968 and it has been active in both competition and air shows since.

In order to obtain a meaningful comparison of performance, the test flights were made with identical loads in both "Cubs" and were flown on the same day under identical weather conditions. The data used in this report represents an average of at least three trials. The airspeed indicators were calibrated relative

to each other using a pressure manometer. All altitude measurements were made with the same calibrated sensitive altimeter in both aircraft. Rates of climb and descent were measured with a sensitive altimeter and stopwatch beginning each test 300 ft. above or below the starting altitude and timing point to take up the lag in the altimeter. In a climb test, for example, full power was applied and the attitude of the aircraft adjusted for the desired air speed at 1700 ft. At 2000 ft. the stopwatch was initiated. The rate of climb for that particular trial could be obtained by dividing the change in altitude by the corresponding elapsed time. Table 2 compares the characteristics of the "Cubs".

Note that the take-off ground-roll requirements for the "clipped-wing" is approximately 50 percent higher than for the stock "Cub". The shorter wing raises the stall speed by 21 percent and only increases the cruise speed by seven percent. A very significant point is the tremendous loss in useful load. In fact, with a full load of fuel, the "clipped-wing" can only carry a 120 lb. passenger (with parachutes and a 150 lb. pilot).

Fig. 1 compares the rate of climb as a function of indicated air speed. At nor-

**TABLE 2
PERFORMANCE DATA**

Aircraft	Stock J3	Clipped-Wing
Engine	A-65	A-65
Propeller	Metal	Metal
Empty weight	728 lbs.	696 lbs.
Useful load	501 lbs.	404 lbs.
Wing span	35 ft.	28 ft.
Wing area	178.5 sq. ft.	143.0 sq. ft.
Aileron area:		
Wing area	.107	.134
Power loading	15.2 lbs./hp	14.7 lbs./hp
Wing loading	5.53 lbs./sq. ft.	6.69 lbs./sq. ft.
Stall speed (Power off)	38 mph	46 mph
Cruise speed (75 percent power)	70 mph	75 mph
Maximum speed	82 mph	86 mph
Take-off ground run	230 ft.	344 ft.
Normal rate of climb	560 fpm	473 fpm
Maximum glide ratio	10:1	6.8:1
Roll rate	33 deg./sec.	86 deg./sec.
Snap-roll rate		150 deg./sec.
NOTE: Above data measured with one pilot (160 lbs.), 12 gals. of fuel, and air temperature 94-100 degrees F.		

FULL POWER RATE OF CLIMB

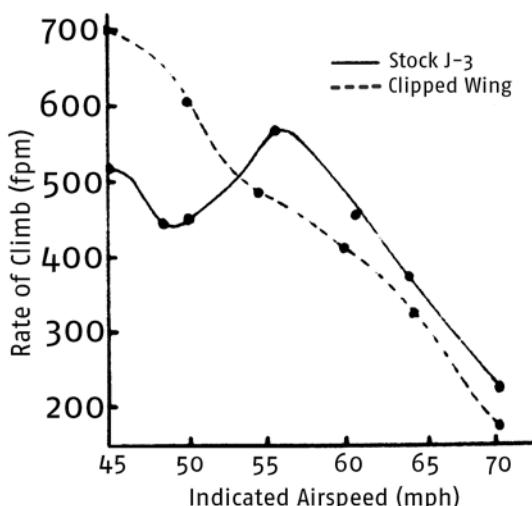


FIG.1

POWER OFF DESCENT

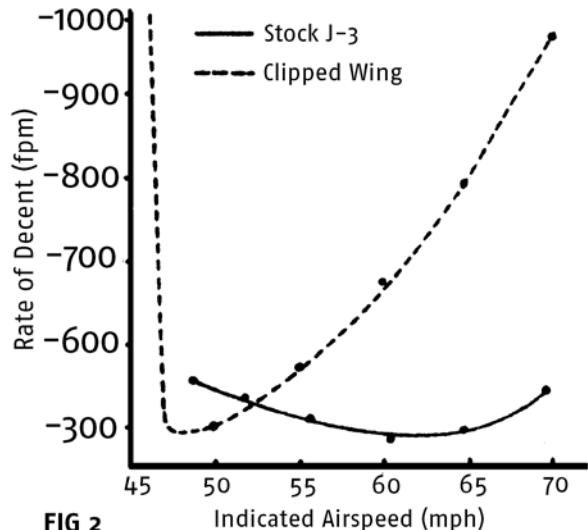


FIG. 2

MAXIMUM GLIDE zero wind, power off

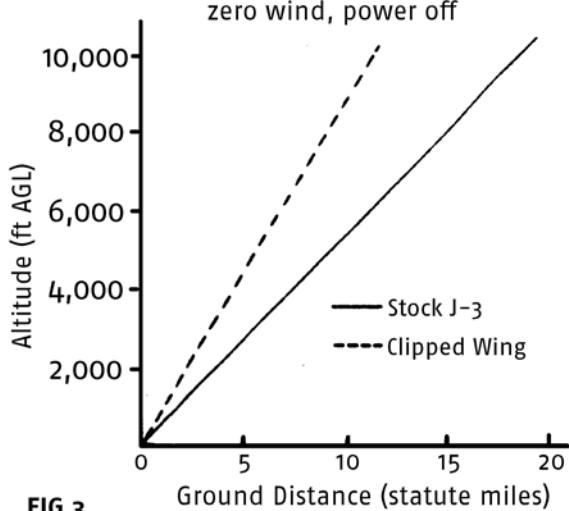


FIG. 3

AIRSPEED & POWER AT CONSTANT ALTITUDE

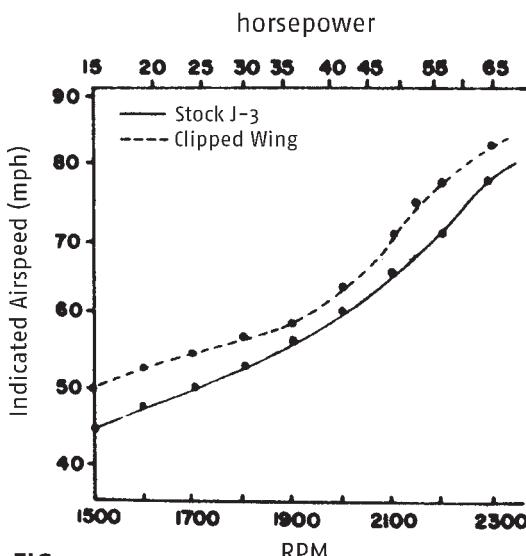


FIG. 4

mal climb configuration (full power and 56 mph IAS) the stock "Cub" has a substantially better climb rate. The difference is much more dramatic when both aircraft are at gross weight. It is interesting to note that at extreme pitch attitudes, right on the verge of stall, the "clipped-wing's" performance is better. Naturally climbs in this range are normally considered abusive to the engine and potentially unsafe. Fig. 2 and 3 clearly reveal that without power the "clipped-wing" "falls out of the sky" in contrast to the stock "Cub". Shortening the wings does not improve the air speed very much. Fig. 4 plots air speed as a function of horsepower and engine rpm.

By conventional standards, the stock "Cub" clearly has higher all-around performance and is a far safer airplane than the "clipped-wing" with an equivalent engine. However, this very significant sacrifice in performance (particularly useful load) is compensated by a large increase in structural in-

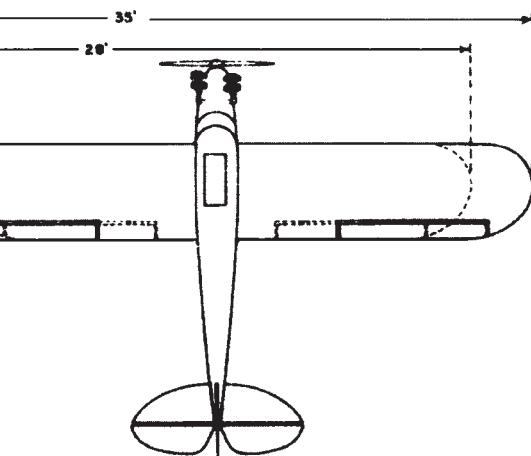
tegrity due to the larger struts, fittings, and shorter coupling. From an aerobatic standpoint, the "clipped-wing" has far better aileron and rudder response resulting in a high increase in roll rate (See Table 2). Practically the entire trailing edge of the "clipped-wing" is aileron. Barrel rolls and slow rolls can be completed with only a fraction of available aileron travel. In experienced hands, the "Cub" can hold its own in Primary competition, even with the little 65-hp engine. There is no question that it is handicapped with the small powerplant, but contest records speak for themselves.

Many of the performance deficiencies can be greatly improved with larger engines. However, this invariably raises the modification costs substantially. In fact it is not at all uncommon that the powerplant, inverted system, propeller, cowl, and engine mount will cost considerably more than the rest of the entire airplane.

The "clipped-wing" "Cub"

offers a compromise between aerobatic capability and a more general sport aircraft. Certainly the "clipped-wing" Taylorcraft is a far more efficient aircraft with considerably more aerobatic potential. However, the "Cub" offers a two-place configuration.

In conclusion, we hope we have pointed out the rather severe sacrifices in clipping the wings of the "Cub". The consistent appearance of "clipped-wing" "Cubs" in "Trade-A-Plane" vouches for the dissatisfaction of many owners. Typically the air show buff goes home from the fly-in with a great deal of enthusiasm and determination to saw the wings off his "Cub". After the modification, he discovers that he doesn't really enjoy aerobatics and that the loss in performance was far



Comparison of the wing spans of the stock J3 and the Clipped-wing.

greater than expected. He can either go to a larger engine or sell. If he has lost his enthusiasm for aerobatics he probably elects the latter.

Our advice is either to buy an already modified "Cub" (which is almost always far cheaper than modi-

fying one yourself) or, if you insist on cutting up your own stock "Cub", at least be certain that you know what you will wind up with. As scarce as good "Cubs" are becoming, it seems a shame to cut the wings off and then decide that's not what you want after all.

The authors would like to express their gratitude to Co-Air, Inc. of Coles County Airport at Mattoon, Illinois for the use of a calibrated sensitive altimeter and, in particular to Earl Adkisson, EAA 1476, owner and operator of Tuscola Flying Service

at Tuscola, Illinois for his interest, encouragement, and technical advice. Earl, well known in the Midwest for his 1908 French "Demoiselle" replica and an original gull-wing design, supervised and assisted in the modification of N-6620H.

IAC



HOOKER HARNESS

Featuring Ratchet Seatbelt System Dealer for Strong Parachutes

Commercial • STC Kits • Sport Aerobatic • Military • Quickie

The Hooker Harness Aerobatic System consists of a military style shoulder harness, dual military style seat belts, a crotch strap, a four piece pad set, and a stainless seat ratchet tightener. Benefits of the Aerobatic System:

- 1) Great mechanical advantage
- 2) Pulls up to 700 lbs of pretension
- 3) Easy to operate/quick adjustment
- 4) Small enough to fit most aerobatic aircraft
- 5) Numerous different configurations available

Hooker Custom Harness
324 E. Stephenson St.
Freeport, Illinois 61032
Phone: 815-233-5478
FAX: 815-233-5479
E-mail: info@hookerharness.com
www.hookerharness.com



HARVEY & RIHN AVIATION INC.

101 AIRPORT BLVD. LAPORTE, TX 77571 (281) 477-1675

AEROBATICS
Basic through Unlimited
Competition & Sport
Safety & Proficiency
Basic & Advanced Spins

MAINTENANCE FACILITIES
We specialize in
Fabric
Tailwheel
Aerobic Aircraft Repair

Pitts S-2B
Super Decathlon
Citabria

Owned and operated by Debbie Rihn-Harvey

IAC Yellow Page Directory

Executive Office Manager Trish Deimer-Steineke

Sport Aerobatics Editorial Office Editor . . Reggie Paultk

Board of Directors

President	Doug Sowder
Vice President	Open
Secretary	Jim Ward
Treasurer	Bob Hart
Northwest Reg Dir	Klein Gilhousen
Director	Darren Pleasance
Mid America Reg Dir	Bruce Ballew
Northeast Reg Dir	Doug Lovell
Southeast Reg Dir	Tom Adams
International Dir	Debby Rihn-Harvey
Southwest Reg Dir	Vicky Benzing
South Central Reg Dir	Lynn Bowes
Director	Norm DeWitt, UAUSA
NAA Representative	Jonathan Gaffney
EAA Representative	Louis Andrew Jr.

Presidents Emeritus

Doug Bartlett
Carl Bury
Rob Dorsey
Linda Hamer
Mike Heuer
Robert Heuer
Verne Jobst
Doug McConnell
Gerry Molidor
Steve Morris
Dr. Richard Rihn
Vicki Cruse

Program Chairman and Committees

Achievement Awards	Lorrie Penner, Chair
Aerobic Instruction	Rich Stowell, Chair
Awards	Lorrie Penner, Chair
CIVA Relations	Mike Heuer, Delegate
	Debby Rihn-Harvey, Alt Delegate
	Doug Sowder
	Norm DeWitt
	Greg Dungan
	Brian Howard
	Trish Deimer
Collegiate Program	Lynn Bowes, Chair
	Chalie Rodriguez
	Pat Anderson
	E. Allen Englehardt
	Michael Lents

Technical Committee	Tom Myers, Chair
	Bob Buckley
	Peter Jensen
	Randy Owens
	Doug Lovell
	DJ Molny
	Reggie Paultk



Contest Sanctioning	Doug Sowder, Chair Bob Hart Trish Deimer Jim Ward Vice Prez
Executive Committee	Doug Sowder, Chair Vice Prez Jim Ward Bob Hart
Finance Committee	Bob Hart, Chair Doug Sowder Vice Prez Trish Deimer
Glider Aerobatics	Klein Gilhouse,Chair
Gov't Relations Reps	Dennis Thompson, Chair, Eastern Regions Wayne Roberts, Vice Chair, At Large Bill Finagin, National Regions Phillip Gragg, Central Regions Darren Pleasance, Western Regions
Hall of Fame Committee	David Martin, Chair Bob Davis Linda Hamer Verne Jobst Gene Soucy Don Taylor Position Available
Club Historian	Mike Heuer
ICAS Liason	Bob Davis
Judges	Greg Dungan, Chair, Certification & Schools
Legal Counsel	Louis Andrew Jr.
Membership	Doug McConnell, Chair Vicky Benzing
Nominations	Lynne Stoltenberg
Online Judge Education Committee	Jim Ward
Rules Committee	Brian Howard, Chair Greg Dungan Klein Gilhouse Martha Martin Doug Sowder Mike Heuer, CIVA Delegate
Safety Committee	Steve Johnson, Chair Scott Poehlmann, Chair, Human Factors Doug Sowder, Technical Safety
Chapter Relations	Brenda Anderson, EAA Chapter Office
Insurance	EAA Aircraft Insurance Plan

IAC Directory

Contact Information

Name	Address
Tom Adams	P.O. Box 915, 6024 Earhart Rd; Springfield, TN 37172
Brenda Anderson	Chap. Office, P.O. Box 3086; Oshkosh, WI 54903-3086
Pat Anderson	105 Carnival Drive; Daytona Beach, FL 32114
Louis Andrew, Jr.	55 South Main St; Fond du Lac, WI 54935
Bruce Ballew	1636 Wildhorse Pkwy Dr Chesterfield, MO 63005
Doug Bartlett	1069 Bald Eagle Dr Unit 602, Marco Island, FL 34145
Vicky Benzing	21107 Michaels Dr Saratoga, CA 95070-5319
Lynn Bowes	200 Rock Creek Rd, Raymond, NE 68428
Bob Buckley	6090 Fescue Drive, Colorado Springs, CO 80923
Carl Bury	4 Sleepy Terrapin Lane; Savannah GA 31411-1544
Bob Davis	N1561 Linn Road; Lake Geneva, WI 53147
Trish Deimer-Steineke	P0 Box 3086 Oshkosh WI 54903-3086
Norm DeWitt	148 Magnolia Drive; Atherton, CA 94027
Rob Dorsey	1548 Copper Creek Court; Florence, KY 41042-9194
Greg Dungan	46152 Levitan Way; Great Mills, MD 20634
E. Allan Englehardt	910 Burris Avenue; Lake Bluff, IL 60044-1516
Bill Finagin	6 Romar Drive; Annapolis, MD 21403
Jonathan Gaffney	NAA Hangar 7 Ste 202, Washington, DC 20001
Klein Gilhousen	599 High Tower Road, Bozeman, MT 59718
Phillip Gragg	1929 E Spring Meadow Ln Boise ID 83706
Linda Hamer	20483 Meridian Road; Peru IL 61354-9801
Bob Hart	3019 N Ringwood Rd, McHenry, IL 60050-1324
Mike Heuer	4547 West Woodlawn Circle, Collierville, TN 38017
Brian Howard	721 West Silver Eagle Court; Tucson AZ 85755
Insurance	POB 291388 Kerrville, TX 78028
Peter Jensen	310 Ellmar Oaks Loop, San Jose, CA 95136
Verne Jobst	2921 Sterling Drive; McHenry IL 60050-2662
Steve Johnson	1128 Silverleaf Ter Nashville, TN 37221-3363
Michael Lents	5173 W Maple Ave Grand Forks, ND 58203
Doug Lovell	528 Main St Apt B Beacon NY 12508-2837
David Martin	3279 La Villa Rd, Graford, TX 76449-4559
Martha Martin	3279 La Villa Road; Graford, TX 76449
Doug McConnell	4203 E. Lake Shore Drive, Wonder Lake, IL 60097
EAA-IAC Membership	P.O. Box 3086; Oshkosh, WI 54903-3086
Gerry Molidor	5912 Whiting Drive; McHenry, IL 60050
DJ Molny	9290 Bauer Court, Lone Tree CO 80124
Steve Morris	24650 High Timber Lane; Agate, CO 80101
Tom Myers	443 Leland Avenue; Palo Alto, CA 94306-1131
Randy Owens	6585 E Fordham Cr., Anaheim Hills, CA 92807
Reggie Paulk	P0 Box 520, Tabernash, CO 80478
Lorrie Penner	7628 Plainfield Road, Cincinnati, OH 45236
Darren Pleasance	61402 Davis Lake Loop Bend, OR 97702
Scott Poehlmann	825 Wingfoote Road, El Paso, TX 79912
Dr. Richard Rihn	1101 Scots Lane, Walnut Creek, CA 94596
Debby Rihn-Harvey	10446 Carlow Lane; La Porte, TX 77571-4214
Wayne Roberts	547 Northwoods Dr, Grenada, MS 38901
Charlie Rodriguez	309 E. Industrial Park Rd.; Murphysboro, IL 62966
Gene Soucy	2951 Marina Bay Dr Suite 130-340 League City TX 77573
Doug Sowder	118 East High Dr, Spokane, WA 99203
Lynne Stoltenberg	656 Windy Acres Rd Brenham TX 77833
Rich Stowell	P0 Box 1026 McCall ID 83638
Don Taylor	6109 Copper Rose NE Albuquerque NM 87111
Dennis Thompson	6908 Railroad Blvd Mays Landing, NJ 08330
Jim Ward	2033 2nd Ave Apt 1702 Seattle WA 98121

Telephone	Fax	Cell	Email
615/384-1018		615/584-7146	fly4funta@gmail.com
920/426-6867			banderson@eaa.org
386/226-6917		386/453-4900	andersop@erau.edu
920/921-6000	920/921-0226		landrew@andrewlawoffice.com
636/778-0020			bruceballew@earthlink.net
		847/875-3339	Doug.bartlett79@gmail.com
		408/306-9128	vicky.benzing@gmail.com
402/785-1060		402/770-5966	lynn.bowes@hotmail.com
		719/277-7017	BwanaBawb@Comcast.net
912/598-8801	912/598-8802		csbury@comcast.net
262/248-6364			bdavis74@charter.net
920/426-6574	920/426-6579	920/379-0287	tdeimer@eaa.org
650/321-8499	650/281-3343		norm.dewitt@gmail.com
859/657-6340	859/657-6341		robd@dorseyaero.com
301/994-0083		240/925-0980	greg.dungan@verizon.net
847/234-2325	847/234-2325		eallanenglehardt@compuserve.com
410/263-2740	410/263-4693	410/353-2622	wbfinagin@cs.com
703/416-4888			jgaffney@naa.aero
406/586-2517		406/579-1942	kleing@qualcomm.com
225/456-6847			philiscold@yahoo.com
815/223-8596	815/223-6818		l.hamerrealty@sbcglobal.net
815/363-8967			hrtIndfrm@aol.com
901/850-1301	440/220-9006	901/230-9006	mike@mheuer.com
520/531-9151	520/844-8132	520/360-7655	BK@NewAttAero.com
866/647-4322			
408/281-8654			pmj@sbcglobal.net
815/385-7277		815/861-1300	nx211@att.net
615/662-8516		615/557-2364	gjunkie1@aol.com
701/777-4848		218/779-2725	lents@aero.und.edu
914/456-1594			doug@wbreeze.com
		817/319-5510	pkakro@earthlink.net
940/779-3986	940-549-2930		pkakro@earthlink.net
815/653-1044		708/203-6192	doug_mcconnell@comcast.net
800/843-3612	920/426-6761		membership@eaa.org
815/344-3239		815/861-9877	GMolidor@aol.com
303/799-0149			djmolny@yahoo.com
303/621-2835			N94rv@aol.com
650/328-2141		650/799-6854	tom.myers@stanfordalumni.org
714/250-1291			rdowens@sbcglobal.net
		303/552-7963	Reggie.paulk@gmail.com
513/791-7331		513/284-5076	penn.lorrie@gmail.com
		650/245-2405	darren.pleasance@gmail.com
915/307-6450	915/545-6710	512/751-7937	Scott-p@texas.net
925/938-4236	925/938-4036		Rihnairco@aol.com
281/470-8456			hurricane@sbcglobal.net
662/226-4919			wroberts@waco-eng.com
618/453-9215	618/453-4850	618/534-1105	crod@siu.edu
281/513-6590			gene@genesoucy.com
509/747-5748			dougssowder@gmail.com
979/836-2610			Ijstoltenberg@gmail.com
805/525-2037			rich@richstowell.com
505/858-0005			djt13@comcast.net
973/219-5071	908/638-8463	973/219-5071	Dtedge2002@yahoo.com
206/448-6175		603/860-4456	james.roger.ward@gmail.com

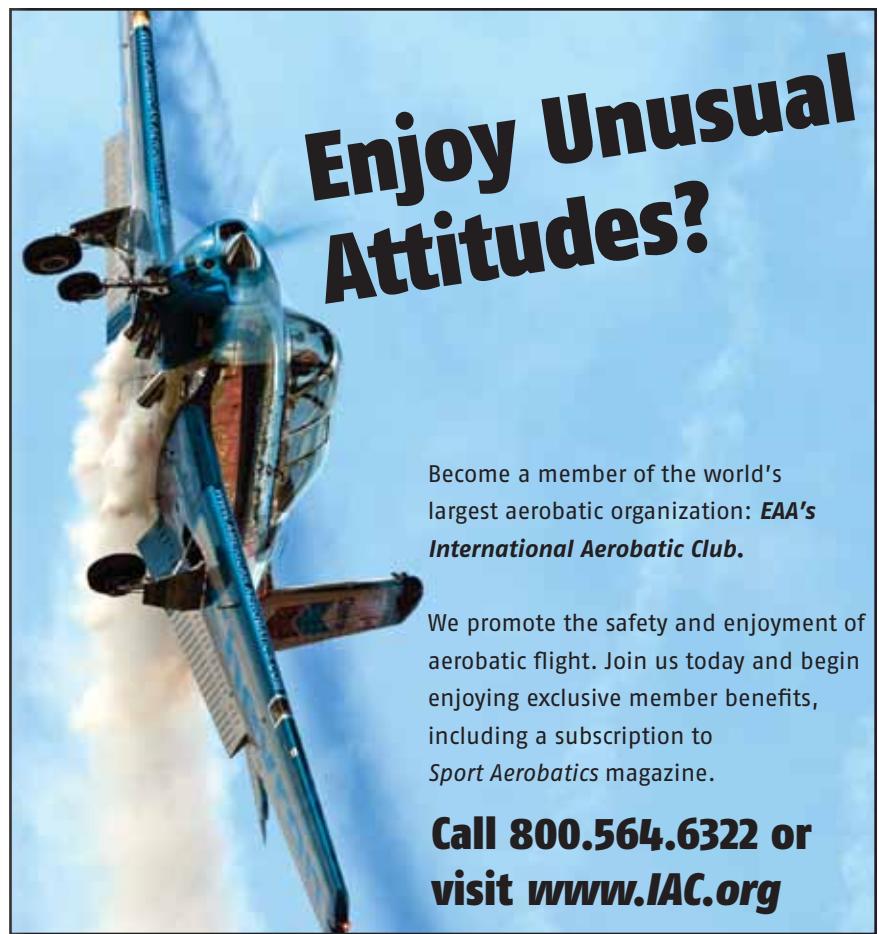
DOUG SOWDER

Continued from page 3

- tent with the "experiments." People are just not grading on criteria, and I'm fairly happy with my scores, but it's on ongoing observation
- Heat on the West side
- Limited stock of IAC merchandise
- 11. Please give us some suggestions on how we can improve the contest.**
 - Give flight medals at the Thursday night event not at the flight briefings.
 - Warm-up pilots followed by judges meeting to enhance accuracy
 - Several comments on glider judging, some want glider low lines
 - One of the best in years
 - Better displays for visitors
- 12. Do you have any suggestions for additional sponsor opportunities? Do you have any contacts within companies that might be interested in sponsoring Nationals next year (or the US Aerobatic team)?**
 - Possibly if they sponsor me in the contest as well
 - Sponsors were fantastic this year
- 13. Is there anything else you'd like to comment on?**
 - Thanks for the memories
 - More hangar space, less hangar rash
 - I don't think Mike Rinker was low
 - Great job Vicki! :)

Fifty-four completed or partially completed surveys were turned in after the banquet. In addition to the 1 to 5 ratings requested in the first eight questions, there were 174 written responses to questions, most of which were thoughtfully presented, some of which were hilarious. I wish there was room to print them all here. The bottom line to me was that a lot went right, there were very few glitches, and the 2011 Nationals was a great experience for all who were there. Your 2012 Nationals CD and his team are working hard to bring you another great Nationals; we hope to see you there!

IAC



Enjoy Unusual Attitudes?

Become a member of the world's largest aerobatic organization: **EAA's International Aerobatic Club**.

We promote the safety and enjoyment of aerobatic flight. Join us today and begin enjoying exclusive member benefits, including a subscription to *Sport Aerobatics* magazine.

Call 800.564.6322 or visit www.IAC.org

You're **cleared** to stay connected.



EAA's **online** community

Participate...
in group discussions
and forums

Access...
personalized news,
weather & events

Connect...
with like-minded
aviation enthusiasts

 **REGISTER**
at www.oshkosh365.org

CLASSIFIEDS

AIRCRAFT

For Sale: 2000 Sukhoi SU31, low time, \$325,000; Strong Paracushion Back, make offer; Call Pete (520) 906-0770.

BOOKS

Spitfire Wingman—Col. Jim Haun's Life in Love with Flight. \$14.95 + S & H. 1-87-SQUADRON. www.spitfirewingman.com

MISCELLANEOUS

www.aerolist.org, Aviations' Leading Marketplace

PARACHUTES

Great Deals on New & Used

Parachutes. Silver Parachute Sales is a name you have trusted since 1972. When service counts, it pays to shop around. Largest dealer for SOFTIE parachutes. FAA Master Rigger and Examiner. 510-785-7070 Allen@silverparachutes.com. For prices, safety articles and other services, visit www.SilverParachutes.com

Parachute Shop, Don Mayer's Factory authorized for Strong, Squadron, Softie, National, Aviator, Used Parachutes, Repairs and Repacking, Master Riggers Services 800-872-2488, 978-433-8550, www.parachuteshop.com

SERVICES

Restoration, fabric, paint, fabrications, paperwork. With 53 completed projects, Waco's, Moth's, Champs, Lakes, Pitts etc. Test flights and delivery. Indiana 480-209-2680 sales@wildcataviation.com, www.wildcataviation.com

FLY MART

Aerobatic-Spin-Tail Wheel Fly Indiantown, FL Five Star Venue

- * Location - S.E. Florida
- * Master CFI - Aerobatic
- * Proven course syllabus
- * Super Decathlon
- * Authentic country inn

Schedule today:
Jim Alsip 772-485-6761
www.dylanaviation.com

VISITING COLORADO?



FLY WITH US!

Acro Training/Pitts Landing Instruction
★ **Pitts-2B** w/Hartzell Claw
New Attitude Aerobatics
John Blum, CFI (303) 469-7746
KBJC in Denver www.flyaerobatics.com

AEROBATIC & SPIN TRAINING
AIRSHOW & FORMATION
AEROBATIC TRAINING
Pitts S2C
Colorado Springs, Co
www.RockyMountainAirSports.com
Fly@RockyMountainAirSports.com
804-815-4891
Greg Baker MCFI-A



DENT-AIR, LTD.
FACTORY DEALER FOR PITTS SPECIAL
Located At Lee Airport
Annapolis, Maryland
Aerobatics & Spin Training
Pitts Sighting Devices
BILL FINAGIN
Hangar 410-956-0047
Fax 410-263-4893 Home 410-263-2740
E-mail wbfinaigin@cs.com

★ AcroBelt ★

5-Point Ratchet Seatbelt System
Customized To Fit Your Aircraft

Details at:

www.SilverParachutes.com
plus

- Great Deals on New & Used Parachutes
- Bailout Safety Seminars
- Complete Rigging Services
- S.M.A.K. PAK™ Parachute Survival Kits

Silver Parachute Sales & Service
Phone: 510-785-7070
Email: Allen@SilverParachutes.com

The Vertical Works

- Aerobatics
- Spin Training
- Formation
- Pitts Transition

theverticalworks.com
Scottsdale, AZ

732.865.1610

AVIATORS UNLIMITED

Aerobic & Spin Training
Tail Wheel Training
Pitts S2C /J3 Cub /Citabria
Acro & Sport Aircraft Maintenance
Johnny White
276-614-0412
www.aviatorsunlimited.us

THIS COULD BE YOUR AD!


Contact Sue Anderson
at 920-426-6127 or
sanderson@eaa.org

CONTEST CALENDAR

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

Ace's High Aerobic Contest (South Central)

Saturday, September 8 – Sunday, September 9, 2012
Practice/Registration: Friday, September 7
Power: Primary through Unlimited
Location: Newton City Airport (KEWK): Newton, KS
Region: South Central
Contest Director: AJ Hefel and Ross Schoneboom
Contact Information: Primary Phone: 316-648-5057
E-Mail: ahefel@cox.net schoneboommr@prodigy.net
Website: <http://www.iac19.webs.com/>

East Coast Aerobic Contest (Northeast)

Saturday, September 8-Sunday, September 9, 2012
Practice/Registration: Friday, September 7
Power: Primary through Unlimited
Location: Warrenton-Fauquier (HWY), Midland, VA
Region: Northeast
Contest Director: Scott Francis
Contact Information Primary Phone: 703-618-4132
Alternate Phone: 703-327-3135
E-Mail: s.francis@ieee.org

Air Capital Eagles Ace's High Aerobic Contest (South Central)

Saturday, September 8 – Sunday, September 9, 2012
Practice/Registration: Friday, September 7
Power: Primary through Unlimited
Location: Newton City Airport (KEWK), Newton, Kansas
Region: South Central
Contest Director: AJ Hefel and Ross Schoneboom
Contact Information: Primary Phone: 316-648-5057
E-Mail: ahefel@cox.net schoneboommr@prodigy.net
Website: www.iac19.webs.com/

Rocky Mountain "Oyster" Invitational

Aerobic Contest (South Central)
Saturday, September 15 – Sunday, September 16, 2012
Practice/Registration: Friday, September 14 Gliders
Categories: Sportsman Intermediate
Power: Primary through Unlimited
Location: Lamar Municipal Airport (KLAA), Lamar, CO
Region: South Central
Contest Director: Jamie S. Treat
Contact Information: Primary Phone: 303-304-7937
Alternate Phone: 303-648-0130
E-Mail: JamieTreat@Q.com
Website: <http://www.iac5.org/>

US National Aerobic Championship (South Central)

Sunday, September 23 – Saturday, September 29, 2012
Practice/Registration: Saturday, September 22
Rain/Weather: Sunday, September 30
Glider Categories: Sportsman through Unlimited
Power: Primary through Unlimited
Location: North Texas Regional Airport (KGYI),
Sherman, TX
Region: South Central
Contest Director: Aaron McCartan
Contact Information Primary Phone: (515) 570-3537
E-Mail: aaron.mccartan@gmail.com
Website: <http://www.iacusn.org/Nationals/>

Borrego Springs Akrofest (Mid-America)

Thursday, October 11-Sunday, October 14, 2012
Practice/Registration: Thursday, October 11
Rain/Weather: Sunday, October 14
Power: Primary through Unlimited
Location: Borrego Valley Airport (Lo8),
Borrego Springs, CA
Region: Mid-America
Contest Director: Gray Brandt
Contact Information Primary Phone: 970 948 0816
E-Mail: graybrandt@yahoo.com
Website: www.iac36.org

Tequila Cup (Southwest)

Friday, November 9 – Saturday, November 10, 2012
Practice/Registration: Thursday, November 8
Gliders Categories: Sportsman
Power: Primary through Unlimited
Location: Marana Northwest Regional Airport (AVQ),
Marana, AZ Region: Southwest
Contest Director: Jim Ward
Contact Information: Primary Phone: 603-860-4456
E-Mail: james.roger.ward@gmail.com
Website: www.tequilacup.org

ADVERTISING INDEX

ADVERTISER

PAGE

WEBSITE

PHONE

Aviators Unlimited	31	www.AviatorsUnlimited.us	276-614-0412
Dent-Air, Ltd.	31	WBFinagin@cs.com	410-263-2740
Dylan Aviation	31	www.DylanAviation.com	772-485-6761
EAA Insurance	BC	www.eaalowerrates.com	866-647-4322
Ford Motor Company	IFC	www.Ford.com	800-392-3673
Harvey & Rihn Aviation Inc.	25	www.HarveyRihn.com	281-471-1675
Hooker Harness	25	www.HookerHarness.com	815-233-5478
IAC Merchandise	IBC	www.shopeaa.com/iac.aspx	800-843-3612
MT-Propeller	21	www.mt-propeller.com	386-736-7762
New Attitude Aerobatics	31	www.flyaerobatics.com	303-469-7746
Para-Phernalia	17	www.SoftieParachutes.com	360-435-7220
Plus 5 Aviation, LLC	9	www.Airbum.com	602-971-3991
Rocky Mountain Airsports, LLC	31	www.RockyMountainAirsports.com	804-815-4891
Silver Parachute	31	www.SilverParachutes.com	510-785-7070
Vertical Works, The	31	www.theverticalworks.com	732-865-1610



Cubbin' T-shirts

Order by phone: 800-843-3612

75 Years of Cubbin' T-shirts

Black t-shirt with bright yellow image "75 years of Cubbin'" especially designed for IAC.

Mens

SM - 7266747802000

MD - 3000

LG - 4000

XL - 5000

2X - 6000

Ladies

XS - 7266748401000

SM - 2000

MD - 3000

LG - 4000

XL - 5000

2X - 6000

\$16.99

IAC





It's a whole new way to roll.

Introducing the EAA & IAC aircraft insurance plan with all of the special coverage IAC Members require for recreational aerobatics, aerobatic competition and practice, airshow performances and aerobatic flight schools. When you insure your airplane with the EAA Aircraft Insurance Plan you are supporting IAC.

Get your quote at **EAALowerRates.com**
or call us toll-free at 866-647-4322.



Aircraft
Insurance

Standard Category | Vintage | Aerobatics | LSA | Homebuilts | Warbirds | Sea Planes | Powered Parachutes & Trikes | Gliders | Helicopters



The IAC Insurance Program is brought to you by EAA Insurance and administered by Falcon Insurance Agency, Inc.

© 2012 Experimental Aircraft Assoc., Inc.