SPORT Aerobatics
January 2014
OFFICIAL MAGAZINE of the INTERNATIONAL AEROBATIC CLUB

- Jason Flood
- Five Sequential Steps
- Nonflying Awards

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SPORT Aerobatics

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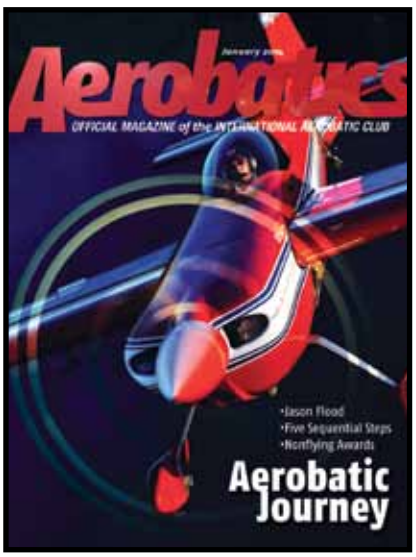

THE COVER

Mark Nowosielski sweeps the late afternoon sun with his propeller in this striking shot of his Edge 540. Photo Credit: Mark St. Pierre.

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PUBLISHER: Doug Sowder
IAC MANAGER: Trish Deimer-Steineke
EDITOR: Reggie Paulk
EDITITOR IN CHIEF: J. Mac McClellan
SENIOR ART DIRECTOR: Olivia P. Trabbold

CONTRIBUTING AUTHORS:
John Morrissey, Mark Nowosielski, Reggie Paulk, Lorrie Penner, Allen Silver, Doug Sowder

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

ADVERTISING
Sue Anderson *sanderson@eaa.org*
Larry Phillip *lphillip@eaa.org*

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*

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

Looking ahead

and trigonometry is not dead in aerobatics!

Happy New Year! We are officially past the shortest day of the year, which means every day from now on is just that much longer. As we continue our swing around the sun, I look forward to putting the chill behind and welcoming the warmth of spring. Until then, though, we may content ourselves with thoughts of flying in shirtsleeves . . .

You'll notice we have a contribution from the IAC's president and resident weather balloon expert this month.

We're running an update on Jason Flood. You may remember Jason from the story of his near-fatal airplane crash two years ago. I spoke with him in Oshkosh this year and have to admit that I think he's come a long way during his journey of recovery. To see the photos taken at the scene of the accident is to wonder at the fact that he can walk—let alone fly. He even won the Northeast Regional Championship flying Intermediate this year. After witnessing his dogged determination first-hand, I think the future holds good things for Jason Flood.

John Morrissey gives us his "Five Steps" this month. I think it's a wonderful guide, and it distills his decades of aerobatic flying, coaching and judging into a form that's concise and to the point. I think it would be worth tearing out of the magazine and keeping in a pocket or flight bag as an occasional reference to stay on track throughout aerobatic flight training.

You'll notice we have a contribution from the IAC's president and resident weather balloon expert this month. I, for one, am glad to see his voice in the magazine after a long absence. Doug had the thankless job of being the official wind recorder at the World Aerobatic Championship in Texas this year. As you may know, the weather at the Worlds was less than ideal and gave Mr. Sowder a considerable workout at his lonely station way out at the north end of the field. He gives a detailed description of the procedures and equipment used in his column. Trigonometry definitely is not dead in aerobatics!

I promised Joy McKinney I'd send the following message:

On behalf of WAC 2013, I would like to express my thanks to everyone who volunteered. It was my pleasure to meet and work with all of you.

Joy McKinney,
Volunteer Coordinator,
WAC 2013 *IAC*

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

DOUG SOWDER

WAC Is Different

Clarification of the variables

Those of us who attended WAC 2013 at North Texas Regional Airport (KGYI) this past October, or followed WAC on the Internet and other social media, are aware that WAC does not operate in quite the same way as either a typical IAC regional aerobatic contest or the U.S. Nationals. I think that many will find the differences to be very interesting.

World air sports are governed by rules set forth by the Fédération Aéronautique Internationale, or FAI, based in Lausanne, Switzerland. The world championship contests with which most of us are most familiar are the World Aerobatic Championships for Unlimited power aircraft and the World Advanced Aerobatic Championships for power aircraft. While IAC contests are run according to IAC rules, world championships use FAI rules, also referred to CIVA rules; CIVA is the aerobatics commission of FAI. While IAC and FAI/CIVA rules are very similar, the differences in procedures can be interesting, or confusing, depending on your perspective. While IAC contestants are individual pilots, pilots at a world championships compete as individuals and, for most, as part of a team. Additionally, the organizers may also allow hors concours ("HC," or non-competing) individual pilots to fly. These pilots' flights are graded and their results tabulated, but their standings are not an official part of the contest.

Flight programs are much the same as you'll see in an IAC contest, but with some differences in procedures. The first flight, Program 1, is always the Known Compulsory, or just "Known," program. It's the same sequence that Unlimited and Advanced pilots fly in every IAC or international contest in a given year. Pilots are launched one at a time; there is no holding in the air. In the Known, each pilot has the box for a 10-minute period from ground launch to exit wing-wags. During those 10 minutes, the pilot can practice any figures, and fly safety figures, but he or she must at some time signal the beginning of the actual sequence. This is why we may see pilots seemingly fly a few figures of the Known prior to beginning the sequence, and fly a few more practice figures afterward, using up those 10 minutes. If a pilot takes an interruption during the sequence for any reason, the clock is stopped until the pilot signals resumption of the flight. The international jury and the board of judges may disqualify from any further flight programs any pilot(s) judged not capable of safely flying the remaining programs.

Program 2 is the pilot's own Free program. Only the two or three practice figures prescribed by the rules may be flown prior to beginning the program, but the pilot has 15 minutes from ground launch to complete the Free. Following the Free, the international ("contest") jury will disqualify from participation in Programs 3, 4, and 5 any pilot(s) who score less than 60 percent of possible in the Known and less than 60 percent of possible in the Free, calculated separately.

Program 3 is the first Free Unknown program. Teams and/or individual pilots create "Free Unknowns" using 10 figures submitted by the teams, plus up to four connector figures. Submitted Free Unknowns are made available to all pilots, who may choose the best one to fly. The same 15-minute time frame used in the Free also applies to both Free Unknowns.

Program 4 is the second Free Unknown, prepared and flown in the same manner as the First Unknown. However, a mandatory 25 percent cut of the field, based upon the combined results of Programs 1, 2, and 3 will be introduced. This cut can be up to 50 percent if weather or other unforeseen circumstances so require.

Program 5 is the "4-Minute Free" or "Final Freestyle," in effect a separate contest for which from 10 to 20 pilots are selected by the international jury in consultation with the contest organizers according

continued on the next page

Please send your comments, questions, or suggestions to: *dsowder@aol.com*

continued from page 3

to certain criteria and priorities. It is interesting to note that Program 5 has priority over Program 4, and if weather forecasts predict that all programs may not be completed, Program 5 will be flown before Program 4.

Very briefly, the following world champions (WCs) are selected: Unlimited WC in the Known, Unlimited WC in the Free, Unlimited WC in the Unknown Programs (total of Unknown 1 plus Unknown 2), Unlimited WC in the Final Freestyle, Overall Unlimited WCs in male and female classes (total score of programs 1 through 4), Overall Unlimited WC (total score of programs 1 through 4 regardless of gender), Men's Unlimited WC Team (total score of top three male pilots in programs 1 through 4), Women's Unlimited WC Team (total score of top three female pilots in programs 1 through 4), and, in the event that fewer than three teams of two or more pilots from one gender compete, the Unlimited World Champion Team, regardless of gender, based on the three highest scoring pilots of the "mixed teams."

Clearly, the operation of a world championship is a bit more complex than that of a typical IAC contest.

And then . . . there's the weather. It's complex, but I'll try to be brief. There is no flying in precipitation. FAI/CIVA rules allow a free break if the cloud base height is below 1,050 meters, but there is no flying if CBH is below 800 meters. Then there's the wind. At IAC contests, we do not measure the wind. At world championships we do. Keep this in mind: 1.0 meter per second (m/s) = 1.95 knots. Wind limit on the surface is 12 m/s, with a maximum crosswind component of 6 m/s and a maximum tailwind component at the surface of 3 m/s. At 500 meters AGL, the maximum wind component on the main axis is 12 m/s, with a max crosswind component of 8 m/s. Twelve m/s is about 23 knots; not unusual in most parts of the United States. The international jury, with concurrence of a majority of team delegates, may relax the above wind limitations if necessary.

I was the "wind guy," also known as "balloon boy," at WAC 2013. Here's how I did it: No one worries much about the wind at the surface; in my periodic wind report I just repeated the GYI AWOS wind and CBH, converted to meters and m/s. To measure the wind at 500 meters AGL, I launched balloons with a calibrated rate of ascent of 2.5 m/s. Using a wind theodolite (similar to a surveyor's transit) and a dual timer, I tracked the balloons. At 2 minutes 50 seconds (height = 425 meters) and at 3:50 (height = 575 meters) I recorded azimuth (horizontal angle) and inclination (vertical angle) to the balloon. This allowed me to calculate a vector from the first to the second position, take the horizontal component, assume it was at 500 meters elevation, divide by 60 seconds, and get the wind direction and speed in m/s. Along with the AWOS data, I used an Excel template on my iPad and tweeted wind reports; they are all still available if you wish to look at or follow @WACWind on Twitter. Team managers and the starters made this information available to the pilots.

There are a couple of wind-related items that can delay competition. For the first flight of the day or of a flight program, the official wind direction must be on the axis closest to the measured wind, even if it's light and likely to change direction after a couple of pilots. If wind direction changes to require a change in the official wind, the next pilot must have 30 minutes to re-orient prior to flying. If the wind goes out of limits while a pilot is flying, that pilot may repeat the flight, except in programs 3 and 4 (the Unknowns).

I hope that the information above will help to clarify some of the delays that we saw at WAC 2013, and also to increase IAC members' understanding of the differences between IAC and FAI/CIVA rules and procedures. Although there was a perception that the wind was a major problem at WAC 2013, a review of the wind tweets indicates to me that it was nowhere near as significant as the low CBHs and rain that we experienced. It's just a lot more interesting! IAC

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Back in the Saddle

Jason Flood blasted off into the skies over Oshkosh, Wisconsin, on Friday, August 2, 2013, to meet up with the photo ship for an air-to-air of his Pitts S-1S. As he was doing so, it hit him that two years prior, to the day and the hour, he'd been lying in the crumpled wreckage of the American Champion Scout he was piloting to tow banners. His shattered body lay pinned as rescuers carefully freed him from the crushed airplane.

That Jason is alive today is remarkable—that he's winning competitions and flying in air shows is doubly so, especially when you consider the major hurdles he's overcome to get where he is today. His injuries were extensive. In fact, it's probably easier to list what didn't get broken.

The impact shattered his right femur and right fibula. He fractured ribs and a clavicle, and some bones in his left hand. His left heel was so badly fractured that the surgeon described it as looking like a broken egg; his surgeon unsure of how to fix it at first. His right ankle blew apart like confetti. In addition to the fractures in his extremities, Jason also burst the third, fourth, and fifth vertebrae of his lower lumbar spine.

"My back surgeon has no idea how I could have full range of motion throughout both my legs and feet," Jason recalls. "He says it's a complete miracle. Most people who have that kind of injury are paraplegic. My nerves were like a bowl of spaghetti. They're supposed to be straight and aligned, but mine were tangled and twisted."

Twenty hours of surgery straightened out the nicked nerves. In addition to his other injuries, Jason also ruptured his spleen and left kidney, lacerated his liver, and tore his aorta. The torn aorta, a potentially fatal event in itself, was repaired with a stent after moving Jason to an-

Two years after a devastating crash

BY REGGIE PAULK WITH JASON FLOOD

PHOTOS COURTESY JASON FLOOD

other hospital. His spleen and kidney were damaged beyond repair, so they were removed.

After three weeks in an induced coma, where Jason says he "blew up like a balloon," he awoke in a strange room with a tube down his throat. It took several weeks of intense therapy before Jason was even able to get out of bed. Even one year later, when Jason had finally returned to EAA AirVenture 2012, he was still too feeble to sit in an airplane on a cross-country trip.

"On the one-year anniversary of my accident, my stamina wasn't back to normal, so I couldn't get back in the Pitts and fly it back to Oshkosh," he says. "I was asked to come out and give a talk at the IAC Vicki Cruse Educational Pavilion. To be back there three days to the year after the accident was a weird feeling, but it felt good to be back there."

After he returned home from AirVenture in 2012, Jason began taking online college courses full-time.

"I really focused on trying to get my life back in order," he says, "because I had a whole year off where I was in rehab and wasn't really doing anything with my life in a sense. I needed to find some direction, so I focused on going to school and graduated with an associate's in aviation technology. I then transferred to Thomas Edison State, which is online. I tried that for a semester, but decided working full-time and going to school wasn't for me. I'm now working toward my CFI."

Jason dedicated the winter of 2011-2012 to performing a thorough condition-inspection of his Pitts and getting back in physical shape.

"In the winter in New Jersey, we take off flying-wise," he says. "The weather isn't all that warm to go

out and fly aerobatics, so my dad and I did an extensive inspection on the Pitts. I also focused on rebuilding my body again. I was going to the gym and working out—not heavy iron—but just to get toned and fit. I worked my upper and lower body, like we need to do for aerobatic flying anyway."

Once spring began, the itch really hit and Jason started the battle to get back into competition flying.

"I did the Wildwoods Acro Blast in Cape May and came in second," says Jason. "That was my first contest since the accident. I then flew the Kathy Jaffe contest and placed fourth after messing up the Unknown. I only competed in two contests, so I wasn't eligible for the Regional Series in the Northeast Region."

After AirVenture 2012, Jason set his sights on 2013 as the year to be back into the normal swing of, "contest, contest, contest." He wanted to prove to himself that he was back in the game, and determined to make the flight to AirVenture 2013.

"This spring, I was just finishing up college classes and working toward my bachelor in aviation technology," he says. "All my main courses were complete, so I was taking fill-in classes and general electives. I was taking classes like globalization and natural disasters—none had anything to do with aviation, since I completed most of those classes for my associate's degree. Since it was all online, all I did was sit in front of my laptop all day and type. I really wanted to get back in the airplane

and earn my other certificates, so I stopped taking college courses and began working toward my CFI."

In addition to his college courses, Jason began to build up his tolerance to *g*-forces by flying basic loops and rolls. He also set some goals for the upcoming contest season.

"Before the contest season started," he begins, "I planned to fly four contests. I wanted to fly Cape May; the Green Mountain Aerobatic Contest in Vermont; Kathy Jaffe in New Jersey; and the East Coast Aerobatic Championship in Virginia. When I put my requested time off at work, it was so I could get to those contests. I wanted to fly at least three contests so I'd be eligible for the Regional Series. I wanted to fly a fourth contest in case I bombed one contest, I could recover that third contest. I had also booked four air shows."

As the springtime blossomed, Jason flew every chance he could get, taking as many as four flights per day in half-hour intervals to work his *g* tolerance back up. His hard work paid off. He flew to a fourth-place finish out of nine competitors in Intermediate at Cape May. He then went on to finish in first place out of the same number of competitors at Green Mountain, Kathy Jaffe, and the East Coast Aerobatic Championship.

"What was pretty cool," says Jason, "was that my last two contests—Kathy Jaffe and Virginia (East Coast Aerobatic Contest),—I got first on the Known, Unknown, and Freestyle. I took gold medals at both contests on all three flights. It was great to see my name at the top of the list for all three flights. That was my first time doing that."

Sprinkled among those competitions were four air shows and his trip to Oshkosh.

"To be up there [flying] on the two-year anniversary of my crash—the exact same day and time," he says. "Here I was at Oshkosh, doing a photo shoot at the exact time and hour where my life almost ended two years ago. It was remarkable. Talking about it gives me chills."

Jason's trip to AirVenture 2013 began on a blustery, cloud-covered day in Cross Keys Airport in Williamstown, New Jersey (17N). Of course, that's not what the forecast said the weather would be like.

"The night before we left," he begins, "the forecast was saying it would be beautiful and sunny. Crisp, calm—no thunderstorms in the early morning. You go to bed with wishful thinking, saying to yourself you're

Safely in the hangar at DeKalb.

not going to have any problems. Of course, you can never count on the weather until the next morning when you wake up and see what you've been dealt. We woke up and, of course, it was dreary and overcast—no blue skies.

On the way to the airport, my dad and I were both looking at the weather and didn't think it looked good. We were checking all the reporting stations at our first two stops. New Jersey was overcast and dreary. It wasn't raining, the visibility was good—just low ceilings. Not low VFR, but not the normal sunny summertime day. We decided to go and took off. We took off and had a tailwind, which is crazy when you're headed westbound. That's never happened to me. At our first stop, York, PA (THV), it was still overcast and chilly. I was wishing the sun would come out and get nice. We did a quick turnaround, fired up, and took off. My dad was flying his RV-4 with all the baggage in his back seat. We landed at Somerset (2G9) and did another quick turnaround. Checking the weather, the forecast was still cloudy, so we decided to keep going and took off. Once we crossed the mountains outside of Somerset, it got sunny and it was nothing but sunny and blue skies the rest of the way. The sunshine popped out of the clouds and the smiles just hit our faces. That's how the rest of the trip went."

Jason's Pitts has 19 usable gallons of fuel, and his engine gobbles it up fast enough that one-hour legs are the norm. By the time they'd hit their fourth fuel stop of the day, Jason was getting tired.

"I got into the Pitts in the morning and the smiles and adrenaline were with me," he says. "I didn't really feel anything until my last stop in DeKalb County, Illinois. That's where we spent the night. We stopped around 4:30 p.m., and it was a good thing, too. The weather was deteriorating up at Oshkosh and a lot of the pilots trying to fly in ended up turning back to DeKalb. The next day, the weather from Oshkosh had descended on our location. It didn't begin clearing out until about 4 that afternoon. We decided to stay one more night in DeKalb, and head for Oshkosh the next morning.

The next morning, we headed to Dodge County airport to refuel and prepare for the arrival at Oshkosh. Once airborne, we got the arrival. We knew they were using 36 and 27, but when we got into the pattern, there was nobody in trail (extremely unusual). We flew in as a flight of two.

Once the controllers picked us up, they asked which runway we wanted. We asked for 36 and then switched to tower. I was lead and

"Of course, when you practice, you always get 10s!"

my dad was in trail to the right. We were cleared to land and told to follow a T-28 on final. I saw a T-28 over the numbers on final and began my base-to-final turn. At that point, my dad came over the radio and said I had a T-28 directly below me, which I hadn't seen. Neither did the tower. I just followed him and did a low pass over the runway to re-enter the pattern. Tower apologized and cleared me to land on the green dot, so I slipped it in and landed, turned off, and saw the IAC building. It was great to be back in Oshkosh two years after my accident."

Jason's Pitts was originally a factory-built S-1E, but it's been heavily modified into an S-1S (see Page 13). With an empty weight of only 858 pounds, and Jason's light 140 pound frame, the airplane performs quite well.

"This thing is just a crapload of fun," he says. "You strap in, and away you go. I love it."

When it comes to competition flying, the equipment is really only a small part of the calculus.

"I relate it to a mind game," Jason begins. "You can have the best, top-of-the-line airplane, but there are guys with new $500,000 Extras who finish below me in my beefed-up $60,000 Pitts. Sometimes, it's about the equipment, but more often, it's about who's inside controlling the airplane. You can be dead center in your sequence in the box, doing a great job, and all of a sudden you see your next maneuver—it could be a pull to vertical with a quarter roll to the left—and automatically your mind takes over and you roll to the right. The sequence says roll left, but you roll right. You get on the ground and ask yourself what you just did. Of course, when you practice, you always get 10s!"

Jason uses the skills he's acquired in competition flying to pursue another passion—air shows. Like competition flying, he gives his air show routines his complete concentration. Similar to a homework assignment, he gets away from the crowd and tries to go over

"Contests have helped me with many of the elements found at air shows," he says. "They help me better understand wind effects; where the crowd is; how my lines look.

all the variables that might confront him during his flight.

"I've been flying air shows since I was 19," he says. "I got my first waiver with (IAC Hall of Famer) Bill Finagin. In air shows, you start out with a level four waiver, with a floor 800 feet above ground level (AGL). A level three drops you to 500 AGL, a level two cuts that to 250 AGL, and a level one waiver is unrestricted. When you start flying air shows, you get a level four waiver. When the evaluator thinks you're capable, they drop you down. I relate the evaluation to a checkride. You perform an oral test with the evaluator, just like you would with an examiner, and then go fly your sequence for him. When I first applied, he recommended 800 feet, and I was perfectly okay with that."

As with many air show pilots, Jason credits his competition flying with helping him be a better performer in front of the crowd.

"Contests have helped me with many of the elements found at air shows," he says. "They help me better understand wind effects; where the crowd is; how my lines look. I fly air shows like I fly contests. Some pilots tell me to get away from that and others tell me that it helps gain perfection. Air show boxes are much different than competition boxes. Competition boxes are well-defined 3,000-foot cubes, but air show boxes differ depending on the waiver for the airport you're flying at. The box is either at a runway or parallel to a runway. It could be the whole length of the runway, the side of the runway where the trees are; you have to look for landmarks; it's not marked like the white markers at a competition. Flying contests has helped develop the skills to understand and recognize where things are and what to look for when flying an air show."

As for the type of air show routine he chooses, Jason says he flies a glorified Advanced sequence—trying to expand and push the envelope a bit.

The future looks bright for Jason. He now has his sights set on a place on the World Advanced Aerobatic Team at their next selection at Nationals in 2015. If he keeps plugging away with the dogged determination he's exhibited so far, he'll make it. IAC

Jason Flood's Pitts Modifications

The list

BY SHELTON STUART

All are deviations from stock S-1S as built; some things have been changed such as prop and engine overhaul.

Wing:

1. Wooden leading edges
2. Closed out center section (center cut-out removed)
3. Revised wingtips, 12-inch radius and straight back
4. Increased span 3 inches per tip, increased aspect ratio
5. Replaced small tip-rib with full-size rib
6. Custom-designed wood-pressure-balanced 3/4-span ailerons with constant-gap wing coves
7. Added ribs in prop wash area
8. Reduced dihedral, longer I-struts, longer landing wires
9. Integral screw mounts for tie-down rings
10. Built-in mount for GPS antenna
11. Minimized openings for wires, no metal cover plates required
12. Formed I-struts to airfoil, no gap seals on I-strut
13. Smoke/fuel upper wing tank

Landing Gear:

1. Factory spring gear cut 1.38 inches shorter
2. Haigh 4-inch tail wheel
3. Lamb tires, reduced weight, rolling inertia, and drag
4. Small Pitts-style wheelpants sized for Lamb tires

Tails:

1. Enlarged rudder with equal area above and below roll axis
2. Airfoil fin ribs
3. Camera-mount bushing in fin leading edge
4. Added rib between bottom rib and stabilizer
5. Rudder and elevator gap seals
6. Integral stab seal eliminates fairing strips

Firewall Forward:

1. 14-inch spinner (now 13)
2. Warnke almost constant-speed propeller (no Catto three-blade)
3. Doug Dodge two-piece cowl
4. IO-360 angle valve Dick DeMars 220 hp (now Lycon)
5. Sky Dynamics four-into-one exhaust
6. Direct ram air inlet duct
7. Firewall closes out side openings of cowl
8. Rolled bottom edge of firewall

Fuselage:

1. All sheet metal revised to 0.020 or 0.025 thickness
2. Countersunk fuselage panel screws
3. Nut plates for all fuselage panel fasteners
4. Stainless air exit duct from engine compartment
5. Revised side panels from firewall to instrument

Rudder and vertical stabilizer mods are evident on the top and center-right photos. (center-left) Pitts-style wheel pants cover a small Lamb tire. (bottom-left and center) The Lexan side and floor panels drastically increase downward visibility.

PHIL HIGH PHOTOS

panel to transition from wider firewall
6. Lexan side panels and floor panels
7. Lexan foot rails
8. Door over fuel tank filler
9. Spring gear mounts per Gordon Price configuration
10. Integral GPS mount in instrument panel (I think this is gone now)
11. Integral sequence card mount in panel
12. Fuel valve to switch upper tank from fuel to smoke supply
13. Tail wheel lock lever right-hand side
14. Eliminate unused brackets in cockpit
15. Hooker ratchet belt system
16. Seat pan increased to 0.040 thick
17. Tilted seat back, 3 inches on top
18. Wooden turtledeck shortened 3 inches, with tilted front bulkhead and high shoulder harness pass through
19. Stock canopy mounted 3 inches aft to accommodate the upper wing cut-out removal
20. Shoulder harness mounts relocated similar to S-1T
21. Clear elevator inspection panels with nut plates
22. Revised belly stringer, straight line from aft end of torque tube to rudder
23. Integral tube-style tail wheel mount
24. Streamline tube stab brace

The Reasons behind the Modifications to N901S Pitts Special

FYI-A little dated

1. Haigh tail wheel: I like it, light and streamlined. If you fly off grass or rough fields, it's not a good choice. If main gear is properly aligned, a landing can be made and brakes are not needed to make a straight rollout.

2. Lamb tires/Harbor City wheelpants: Light and less drag and rolling inertia. Same as Haigh, limits you to hard surface or smooth grass (I regularly fly off a very nice grass strip, I just don't go to unknown ones/rough ones).

3. Elevator/rudder gap seal: Do it! Lighter loads; much more effective surfaces.

4. Large spinner (14-inch, Grove Aircraft): Reduces drag, improves cooling, increases length of plane for judges, cost is only reason not to do it.

5. Cowling: I have a Doug Dodge cowl. Less drag, but slightly higher weight than stock. I like the two-piece, but would prefer cowl like on the One Design. My recommendation is a One Design, or S1-T, unless you just love the looks of Doug's two piece (Doug did the One Design also and the nose is very similar, but the One Design has doors for service).

6. That's it for the easy stuff. Spring gear—no more bungees—low drag, down side is it requires landing discipline, must be installed correctly, can increase weight, can produce tail buffet (several solutions, large upper cuff is my preferred).

7. Large rudder: Rudder is sized by horsepower. If you are pumping up the engine, you must pump up the rudder to achieve equally good hammerheads (S1-T is larger than S1-S is larger than S1-C). I went a little too large, and it is a handicap. I cannot get a clean snap at high airspeeds. This is really good for the plane, but sometimes really hurts the scores). I changed the shape to make the plane look longer, and to get more surface area below the neutral axis (roll axis). Tried to balance area around neutral axis.

8. Reduced dihedral: I believe this to be a benefit to hammerheads, and inverted flight. Might not be worth the change unless you are also doing extensive wing work.

9. Reshaped belly stringers: If you are re-covering, you can improve the lines (from a judge's perspective) with revised belly stringers.

10. Ailerons: Several designs available. Stock S1-T is better than S1-S and does not require much rework. I would not recommend the Ultimate (same as a long S1-T), because there is something better. Glenn Frick's S1-T, Dan Clark's Patriot, and my air-

Spring gear replaces the standard steel tube and bungee arrangement of the original.

craft all have ailerons similar to the Sukhoi, Extra, and Zivko. The Pitts factory studied Dan's to develop the S1-11B and Super Stinker ailerons. They changed the design some to get equal stick forces throughout their travel. Without (small) spades, Dan's design has light center forces with heavy forces at the last third of travel. Spades eliminate that heaviness. If you feel you have time and want to do the latest, this is the way to go with 2/3- to 7/8-span pressure balanced. Great roll rate, but adds weight. Roll rate does offset the weight increase greatly (not that much weight). A lot of work, but I would do it again.

11. Increase span/square tip: I increased the span 3 inches and squared the tip with a 12-inch radius tip bow that flowed straight back. Watch your weight. Do not reduce your span! The Ultimate wing, and several others are clipping the tips. This decreases the aspect ratio, and the higher the aspect ratio, the better the "turn rate." Turn rate really is a measurement of the ability to pull a tight radius as in loops without losing energy. Sure, Sean D. can pull tight, but he doesn't have to do anything because he has 300-plus horses up front that can keep him going. (I want six cylinders.) The square tip increased area, which helps at slow speeds and reduced my wing loading. Drag does not increase, because the stock tip is very draggy, especially when you pull. (It does look better to me.)

12. Seat tilt: I tilted my seat back to allow me to move the canopy back so I could close out the draggy center section. Easy mod, helps taller pilots, also affects turtledeck. The closed-out center section requires the canopy or the air pressure will rock your head. This produces a very clean, high-pressure airstream, which flows over the canopy and energies the tail to make it more effective.

13. Wooden leading edges: Greatly increases wing strength with a zero-weight hit possible (can actually save weight). Also solves the nail pull-out problem associated with the thermal expansion differences between aluminum leading edges and the wood wing structure. Highly recommended.

14. All sheet metal on fuselage reduced to 0.020 or 0.025 to save weight. Actually a weight push when adding the Lexan floor panels. Kids love the Lexan floors; they can see all the way through the plane. Helps on preflight inspections and acro box orientation.

15. Third rib on fin: Added rib just below top of turtledeck. This is to eliminate the drumming of the fabric in this area. This is the largest unsupported fabric panel on the aircraft and seems to get substantial abuse from prop wash.

16. Integral stab to fuselage gap seal. After covering fuselage, added a balsa gap seal between the stab and fuselage. Then covered the stab. This eliminates the metal gap seals commonly used.
17. Dick DeMars IO-360 200-plus hp high-compression engine. Power does make a difference.
18. Warnke "almost constant-speed prop": Good performance for the weight. No crankshaft worries. No rebuilding the constant speed. No power on top. Yes, I would go constant-speed plastic prop if I could afford to.
19. The mandatory items: Lightweight starter, alternator, battery combination; recessed a Garmin 95XL GPS into the panel behind the sequence card holder; Icom handheld mounted to provide the required radio.

There are more things to do if you are scratchbuilding, but if you already have a plane and are just doing mods, these are the ones to consider. The wing work is very intensive. I started with a ready-to-cover S-1S and spent 2.5 years (more than 1,000 hours of labor) getting it to flying condition with the above mods. Most of the time was spent on the wings. If you are just starting, or your wings are really old, I would be tempted to cover and go fly and build-up a superset to install in the future. Nothing beats stick time. If the fuselage is down for re-cover, then the gear, seat, and definitely the belly stringers could be updated. *IAC*

The Five Sequential Steps to Competition Aerobatics

John Morrissey
2012 Winner of the Robert L. Heuer Trophy for Judging Excellence

Most of the pieces I have written for *Sport Aerobatics* over the years have been how-to in nature. This one is from a different perspective—a look at aerobatics on a broader piece of canvas where one steps back a bit to see the total process of aerobatic competition training rather than the specifics. I suppose it could be called a "what-to" approach. The how-to approach concentrates mostly on perfecting individual maneuvers. In my experience this describes the essence of the aerobatic training I have seen in the United States over the past 38 years. Essentially it is a critique of maneuvers or performances accompanied by suggestions for improvement. It took me a while to understand that there is a difference between a good critique of aerobatic maneuvers and comprehensive aerobatic training. A good critique will tell you *what* is working well, as well as what isn't. Training will show you *how* to produce a good performance by following a proper path to competitive aerobatic competence. What I would like to offer, and without a great deal of specifics, is what I believe to be the five sequential, and essential, skill sets required for successful aerobatic competition.

Honing this craft of aerobatic competition is not for those who require instant gratification. It is a process that takes a strong desire to learn. It takes time. It takes a proper airplane. It is expensive. And it takes frequent dedicated practice. But taking the proper path to aerobatic excellence takes less time and is more economical in the long run than following false paths leading to cul-de-sacs that cause aerobatic skills to plateau early that will block the further refinement of your skill sets.

We have conducted advanced aerobatic training camps from the grass runways of Krier Field in Harold's home town of Ashland, Kansas, every May for 20 years. The purpose of those camps is to offer a path to competition competence that will allow aerobatic aspirants to realize aerobatic goals compatible with their talent, available time, and aircraft capabilities. Aerobatic success can mean different things to different folks. It does not necessarily mean being world champion. It does mean optimizing your skills to achieve your maximum potential. It means being a contender. It means being respected by your competitors as well as respecting the game of competitive aerobatics. While talking about respecting the game of aerobatics, I should mention that you only have one chance to make a favorable first impression on your judges and fellow competitors. Using a competition as a training camp by flying in a category above your skill set level will be counterproductive to that goal.

Here are the five skill sets I have identified as essential, as well as sequential, for consistent successful aerobatic competition:

1 The basic tools of your craft—the skills you will need to be a consistently successful competition pilot. Remember, you will only have one chance to make that good first impression on the judges. Bill Thomas had a saying that summed up many secrets of competition: "The judges like straight lines, round circles, and accurate brisk rotational elements on those lines." Your basic tools include mastering these lines, angles, circles, and rotational elements for your category of competition. You will also need a good working knowledge of the rules of competition as well as a technical and visual understanding of your new language of aerobatics—Aresti. When you see an Aresti sequence as a pilot, or a judge, you should be able to immediately visualize it as it will be flown. You will need to visualize your flight program from your cockpit as well as understanding how it will be seen by the judges. You should be able to

adjust this visualization for wind. And you need to know how much box real estate and how much energy each maneuver will require.

Maneuver linkage—Once you have obtained a reasonable skill in the individual maneuvers needed for your category of competition, you will need to learn how to link them, to learn how much energy will be needed for each maneuver, and how much can be lost. Or gained. You will have to learn to balance the time, distance, and speed between maneuvers. After you have learned how to link the maneuvers of a complete sequence in the required dimensions of your aerobatic box you will need the next skill...

Box entry—You will have to develop a skill set that will allow you to achieve the proper flight path required to guarantee the requisite energy at the exact altitude, speed, and box position for the first maneuver of your sequence. That is the only time in an aerobatic sequence that you are in total control of the exact point and energy for a maneuver. That initial box entry creates a mindset for the judges, a mindset that affects your scores—for the better or the worse. The entry phase of your flight is not scored by the judges, but you can be certain it is evaluated. The two basic entry maneuver possibilities are entering high and descending to gain speed for a lower-altitude high-energy first maneuver or a high-altitude low-energy beginning to your sequence. Those two entries are further subdivided into upright and inverted entries on either the major (X) or minor (Y) axis as well as downwind upright and inverted entries on the X-axis. Once this skill set is reasonably developed we can begin to discuss...

Energy management—Think of energy in the aerobatic sense as the combination of altitude, indicated airspeed, and thrust of your engine-prop combination at any given moment during your sequence. You must understand how to maintain the energy a sequence must have for a strong finish above the lower altitude limit of the box. You must understand the relationship between *g*-loading, induced drag, and available energy. And the effects of negative *g* on energy. You must learn how to modify the tempo and *g* of your sequence to adjust your performance to the wind and density altitude of the day. This is an essential part of learning the game of aerobatics.

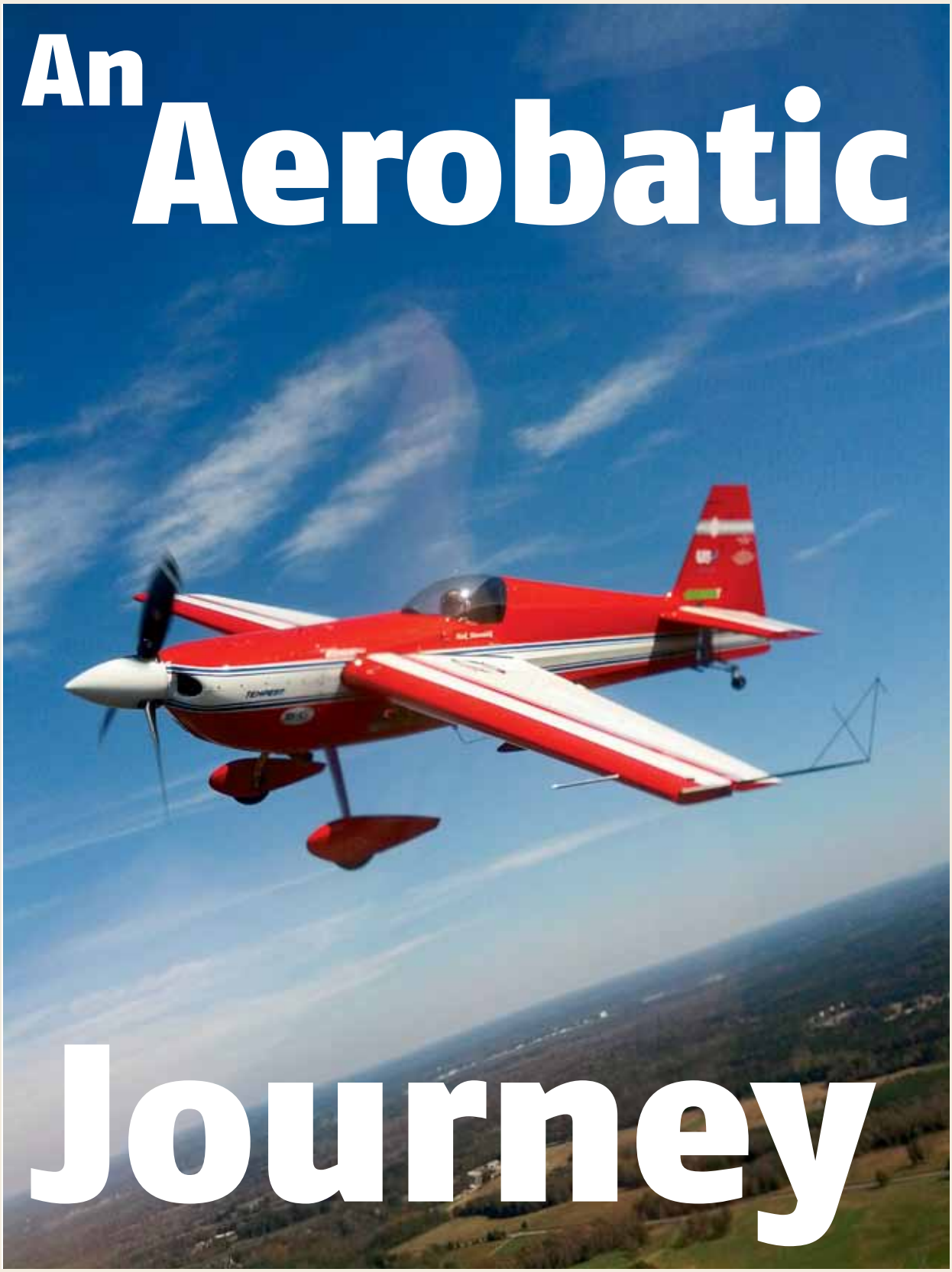
Presentation—This is the critical skill set for successful competition aerobatics. If not well in hand, all your efforts to perfect the maneuvers will be wasted. During the presentation phase you will learn how to display your sequence within the stage located inside the main box. In order to do that, the skill set of X- and Y-axis wind control must be learned and firmly in hand, unless you want to be held hostage by the wind. Additionally, you must also begin to develop the ability to establish the rhythm and tempo necessary to balance the speed, time, and distance requirements between both high- and low-speed maneuvers as well as roll positioning within maneuvers. During training you will be shown how to do this. You will also have to learn how to adjust certain maneuvers to create the illusion of perfection. During this phase you will begin to learn to trust the control of the aircraft to your hands and feet while you are totally focused on your presentation and not on the execution of individual maneuvers.

Finally the good news: Once this phase of training is complete, you will be able to consistently play the game of competition aerobatics with a reasonable expectation of a strong competitive performance while finishing near the top.

I do not pretend this is an easy task. If it were easy, anyone could do it. But it can be done. And if you do it with the correct mindset, the journey will be as enjoyable as the result.

John Morrissey was IAC Advanced Champion three times at Fond du Lac and Advanced National Champion once in a stock Pitts S-2A. IAC

An Aerobatic Journey



Article and photos courtesy Mark Nowosielski

Being involved in the world of competition aerobatics for the past seven years has been the most exciting, fulfilling, and challenging experience of my life. Even though I have only been sitting in the seat for less than a decade, the natural draw to fly inverted started when I was a small boy living in South Africa. I owe the introduction to the world of aviation to my late dad. I remember as a preschooler helping my dad with his radio-controlled airplanes, going to fly them on the weekends, and inevitably fixing them during the week. It was several years later when I attended my first air show; the look my dad saw in my eyes after watching a Sukhoi solo followed by a formation Pitts routine was going to be talked about for years to come.

I got my first taste of flying in a small airplane at the age of 12 after my dad followed his lifelong dream to obtain his private pilot certificate. Shortly thereafter, he purchased a share in a Cessna 182 that we flew for the next several years. Flying was already such a huge part of my life that it seemed logical to start taking lessons. The result was soloing on my 16th birthday and obtaining the certificate shortly thereafter.

In the summer of 1994, our family relocated to the United States and settled in the Atlanta metropolitan area. Recreational aviation took a back seat as we all adapted to life in the United States. Upon graduating high school, I enrolled in Embry-Riddle Aeronautical University as an engineering major. It took less than one semester to realize I did not belong behind a computer, so with my dad's blessing, I promptly changed my area of concentration to aeronautical science (professional pilot).

As the years passed . . . completing college, flight instructing, flying for the regional airlines . . .I always wondered when and how was I going to be able to get into an aerobatic airplane. With the cost of living and hefty college loans, I was unable to afford aerobatics. I continued to fly radio-controlled airplanes with my dad, attend Oshkosh every year, and dream about the day!

It was during the Oshkosh air show in 2005, sitting next to my dad in a lawn chair and drinking a cold beer, that I turned to him and said, "I think the time is here." I had just recently been hired by a major airline and had completely paid off my college debt. As much as my dad shared my zest for flying, he was always uneasy about the world of aerobatics due to the safety stigma attached. It was at that show that my dad gave me his blessing to follow my dream of full-scale aerobatic flying. We had a fantastic rest of the week looking at various aerobatic airplanes and discussed how they could fit the bill. Alas, less than three weeks later, my mentor passed away.

Another year passed as I took charge of the small family business, assisting my mom to sell the company and tie up loose ends. During this year I flew with a captain who lived on a small grass strip just south of Atlanta. Mark Sorenson invited me down to look at the airport, his hangar/home, and Yak-55M. It was this meeting that reignited the flame.

At Oshkosh 2006, in front of the International Aerobatic Club (IAC) Pavilion, stood a shiny red and white Pitts S-1C proudly displaying a "For Sale" sign. Mark Sorenson and I made a cursory inspection of the airplane on-site. With very little peer pressure, I ended up purchasing it just hours later!

I am known by family and friends for doing things a little differently than most. Purchasing

a single-seat Pitts with zero tailwheel time was no different. Over the next three weeks, I obtained my tailwheel endorsement and flew my new plane from northern Illinois to Atlanta.

Mark Sorenson introduced me to an amazing group of aviation enthusiasts who all reside on that small grass strip, Big T Airport (64GA). Steve Jenkins, a fellow airline pilot, offered to let me keep the Pitts in his hangar. Jim Crunkelton, a retired airline captain, took me under his wing, offering advice and helping me maintain the Pitts. Jim soon became my new mentor, and I am proud to have enjoyed my success thus far with him. I think it is important to note that even though aerobatics is known as an individual sport, I know that I would have never been able to get to this point without the relentless help of all my family and friends.

It was at this point that I joined the local IAC chapter in Atlanta. However, I did not fly my first contest until sometime later. I proceeded, with the help of aerobatic manuals and friends watching from below, to teach myself the art of aerobatics.

After about six months in the S-1C, with the advice of those watching me, it was recommended that I part with the C and obtain a machine capable of taking me to the next step. I sold the C model and purchased an S-1S, with a 200-hp engine and a constant-speed prop. Within a month in the new Pitts, I entered my first contest in the Intermediate category. I flew just two contests in Intermediate before moving to Advanced.

It did not take long flying Advanced figures and contests for me to realize two things. One, if I wanted to progress in the sport and win contests, I was going to have to get some professional coaching. Two, the S-1S I had purchased was unfortunately substandard and was not proving

I feel so fortunate to have had the opportunity to follow my dreams.

to be a long-term Advanced airplane. I sold the Pitts and purchased a Giles 200, making it my third aerobatic airplane in the span of three years.

With the advice of an Unlimited competitor, I contacted Nikolay Timofeev with Hi-Tech Aerobatics for some training assistance. That move propelled my flying to the next level. After about a year of training with Nikolay, I had won three Advanced regional contests and was poised to try out for the U.S. Advanced Team at Nationals the following year.

At Nationals in 2011, I managed to place second in the team selection event and proudly earned a spot on the U.S. Advanced Team. Nikolay, as a new U.S. citizen, won the Advanced category that year and became our team captain. In the year that followed, Nikolay developed a training schedule for the team composed of training camps and training contests. We shipped five airplanes to Hungary in June of 2012. After a two-week training camp in Hosin, Czech Republic, we went to battle at the Advanced World Aerobatic Championship (AWAC). Flying in a world contest is an amazing experience and provided me knowledge to apply in future world events. As a team we were able to win bronze for the United States, and individually I placed in the top 20.

After returning from Hungary, I knew I was ready to start dabbling in the Unlimited category. After a couple of training camps with Nikolay early this year, I realized that even though the little Giles would fly the figures, I needed more power to eventually win. Yet again I played in the used-airplane market, sold the Giles, and purchased my current airplane: a Zivko Edge 540.

I took ownership of the Edge in June of this year and have not looked back. Winning the U.S. National Advanced title this year consolidated the fact that I am finally in the right machine and ready to tackle Unlimited. I was offered the opportunity to fly as an independent (hors concours) at the World Aerobatic Championships (WAC) this past October. I jumped at the opportunity to fly a second world contest and learned, mostly by watching, what it takes to win at that level.

I feel so fortunate to have had the opportunity to follow my dreams. My goal for the Nationals in 2014 is to make the U.S. Unlimited Team and compete at the WAC in France in 2015.

There is so much that goes into showing up at a contest and flying well. I have been fortunate to learn many lessons the easy way, but I have also suffered many blows along the way. I want to reiterate that competition aerobatics might seem like a "solo" sport, but it is not. The lessons I have learned from others have helped me along the way. I would like to invite anyone reading this article to contact me with questions regarding aerobatics. I will be happy to share what I have learned over the past seven years and hopefully help prevent the same mistakes I have made. We are a small, tight group of elite aviators and have to be there for each other to grow the sport, and more importantly, enhance safety.

If you take anything out of this article, my biggest piece of advice is don't be scared, drop the ego, and *ask for help*.

I would like to dedicate my aerobatic adventure to my mentor, Dad, and best friend, the late Alex Nowosielski. I know he is still with me on every flight.

I would also like to thank Robert Armstrong, Jim Crunkelton, Robert Drake, Marty Flournoy, Steve Jenkins, Les Koberg, Mark Sorenson, Goody Thomas, Patty Wagstaff, Butch Walker and, of course, Nikolay Timofeev.

You may contact Mark at *av8ter76@yahoo.com*. IAC

2012 Nonflying Awards

Honoring involvement in the IAC

BY LORRIE PENNER
IAC AWARDS CHAIR

Winner of the Frank Price Cup
WAYNE ROBERTS

As vice chair of the International Aerobatic Club's (IAC) Government Relations Committee, Wayne Roberts has made a huge impact on relationships with the regulatory authorities that, in many ways, exert control over all our flying activities. He has worked extensively with the FAA to streamline applications for contest and aerobatic practice area waivers and to reduce the requirements for detailed environmental assessments at the majority of contest and practice sites. He has worked with the government relations grouping in several areas, notably at the airport in Morris, Illinois, where the local city council tried to cite a local pilot for flying legal aerobatics.

Wayne was instrumental in managing the web team, and getting our new IAC website up and running . . . a vast improvement over what we had previously. In addition to his own flying activities, Wayne runs a very successful contest in Grenada, Mississippi. On a regional level he has been known to give up flying his category to help a new chief judge and make sure the new guy got an excellent example of how to run the judges' line right. Many enjoy his emcee stints at the U.S. Nationals.

When asked, he did not hesitate to join the WAC 2013 planning key volunteer team as the waiver/government relations coordinator and worked on that tirelessly as he does on every project he touches. Wayne is one of the hardest-working volunteers you'll ever meet; he is truly a class act. His level of involvement and reach throughout the IAC community perfectly fit the criteria for the Frank Price Cup.

Winner of the Robert L. Heuer Trophy for Judging Excellence
JOHN C. MORRISSEY

John Morrissey soloed in August 1957 in a Luscombe and began what would become a long and storied career in military and sport aviation, which continues to this day.

Making his first mark as a tough, capable, and skilled fighter pilot in the Vietnam War, he first won the Distinguished Flying Cross (DFC) in the summer of 1965 flying the F-105 against targets in North Vietnam. The award of the DFC was followed by four additional bronze oak leaf clusters for valor in other combat missions, with the last in 1972 in the A-7. Retiring from the U.S. Air Force after 25 years of service, John ended his career at the rank of colonel.

Unlike many of his military colleagues, however, he showed an early devotion to civilian sport flying and purchased a Starduster Too in December 1973 and joined the IAC a couple of years later, holding membership No. 3238. He was Sportsman National Champion in 1976 and 1977. After selling the Starduster, he began a lifelong love affair with the Pitts and purchased his first S-2A in 1978 and the one he currently owns in 1979. He has logged 3,000 hours in the Pitts in competition and instructional flying. He moved to Advanced in 1979.

In the Pitts, he went on to win the IAC Championships in Fond du Lac, Wisconsin, in 1980, 1984, and 1992 and the U.S. National Championship in that category in 1994. However, never content to just fly in competition, he turned his attention and considerable organizational skills to training and coaching pilots and became the U.S. Aerobatic Team trainer in 1992 and 1994. In 1996, he was trainer and chief delegate for the team.

His last stint in competition was at the Advanced World Aerobatic Championships in Lawrence, Kansas, in 1997. He was part of the gold medal award-winning team that year with his son, Matt, and Gerry Molidor. Beginning in 1993, John began organizing training camps in Ashland, Kansas—home of Harold Krier Field, one of aerobatics' early pioneers and an inductee into the International Aerobatics Hall of Fame. Holding up to three camps a year, in the last 20 years, John has trained approximately 150 aerobatic pilots in the fine art of competition flying, many of whom have gone on to very successful competition careers.

John always felt it was important to "pay it forward" and to

build a new cadre of serious competition pilots, since the United States lacks a "farm system" found in other countries. It has been enormously successful.

With his personal skill as a competition pilot and accomplished trainer, he has also invested considerable time and energy in judging IAC competitions, beginning in 1975 when he first certified as a judge. From 1977 to 1978, he headed up the IAC's Judges Certification Program and also began chief judging as well.

He has now more than 33 years of contest judging behind him, including Fédération Aéronautique Internationale (FAI) special events, such as the Breitling World Cup of Aerobatics. It is impossible to estimate how many aerobatic competition pilots have benefited from the work he has done with coaching, with judging, and with heading up the judges' line at countless contests. He is well-deserving of the Robert L. Heuer Trophy for Judging Excellence, and it was with great pleasure that the son of Bob Heuer (Mike) presented this award to John at the 2013 U.S. National Aerobatic Championships.

Winner of the Kathy Jaffe Volunteer Award
Gary DeBaun

Gary DeBaun is an indefatigable volunteer. For the past several years, including 2012 of course, he's been a fixture at the U.S. Nationals as tech inspector and/or starter.

Besides Nationals, Gary has supported regional events in multiple roles. His primary support is centered on being chief starter. He is cited as being the most relaxing influence and the most professional starter that pilots have had the pleasure to work with. He works all day, every day, without tiring or complaint. As a starter, one must focus on safety on the ground, in the air, and in the cockpit for each competitor. He is dedicated and safety-oriented. With Gary in charge, everything just runs like a Swiss watch. He deserves some recognition for his outstanding superhuman efforts!

As a tech inspector, Gary's credentials are as good as they get. He's an IA, mechanic, airplane builder, prolific restorer, and repairman. He has been the mechanic for all sorts of mechanical woes. He has (at great expense to himself) been the most reliable, hardest-working tech inspector/starter.

Gary goes all over the country to help many regions, not just the Southwest region.

He thinks nothing of traveling from his home in Minnesota to Texas, Ohio, Florida, Southern California, or Arizona to perform his volunteer duties. He will see a vacancy on a chapter web page and just fly down and ask the contest director how he can help. He might wind up as starter but helps in numerous other ways as well, including hauling folks around town in his rental car. Always pleasant, willing to help anybody even after being in the heat all day.

Harold E. Neumann Award for Outstanding Contribution as a Chief Judge
Lynne Stoltenberg

Lynne Stoltenberg has volunteered and been a fixture at IAC's U.S. Nationals for a number of years, and she has acted as a chief judge at the U.S. Nationals for many of those years. As a chief judge, she runs smooth, efficient flights in all categories every time. She communicates clearly, keeps her eyes on the skies, and puts a pilot at ease (by the way, not all chief judges can do that). She epitomizes the spirit of the award by being recognized by her peers as a person who is known for her leadership qualities and fairness on the judging line. Lynne is widely respected for her knowledge and experience of IAC rules and judging criteria. She uses her position as chief judge as an educational opportunity for competitors and judges and believes in engaging her judges' lines in thorough preflight and postflight briefings.

Lynne chief-judged two categories at the Nationals in 2012 and acted as a grading judge for the other categories, working on the judges' line virtually all day. In 2012 she attended regional contests and held chief judge duties at IAC Chapter 107 Hill Country Hammerfest.

Lynne is an inspiring and active member of the Houston Chapter IAC 25. Full of energy, she never turns down an opportunity to help her fellow fliers and is always willing to pitch in and help out wherever she is needed.

Pitts Memorial Trophy
Jim Rust

Jim Rust is the designer of the Whirl Wind model 200C and 400C composite aerobatic propeller, as well as several other propeller models for nonaerobatic applications. Whirl Wind propellers are known for their efficiency, thrust, and smooth operation, along with elegant looks, light weight, and relatively reasonable prices. The Whirl Wind aerobatic propellers are being seen on more aerobatic aircraft every year, including that of Rob Holland, three-time U.S. National Champion.

When contacted by customers, Jim is very happy to discuss some fairly technical details of propeller and governor design and operation. His customers find him to be very helpful and a real resource to the IAC.

Whirl Wind Aviation was established in 1995 to meet the growing demand for composite constant-speed aviation propeller systems in the experimental aviation market. Fulfilling its goal of manufacturing affordable high-performance propeller systems, Whirl Wind offers a complete line of standard and aerobatic constant-speed propellers that are lightweight, durable, and best of all, made in the U.S.A. IAC

ALLEN SILVER
COLUMNS / **ASK ALLEN**
www.silverparachutes.com

Ram-air or round parachutes

I HOPE EVERYONE HAD A WONDERFUL holiday season and a happy new year. I also want to congratulate our U.S. Aerobatic Team on a job well done.

In the past few months there has been a lot of discussion on The Exploder about the pros and cons of a round pilot emergency parachute versus a ram-air one. A ram-air parachute is rectangular in shape like a sky diver uses. Also, there has been a fair amount of talk about the use of a static line to assist in the deployment of your parachute. I guess it's time for me to add my two cents' worth.

If you look back on past issues of Ask Allen, I've touched upon this subject before. Refer to articles I've written that were published in December 2006: "Should I Consider Buying a Ram-Air Parachute?" and April 2009: "How to Use a Static Line."

Let's start with the ram-air versus round canopy issue. My last save was Sean D. Tucker in 2006. He used a ram-air canopy. He has several hundred jumps and is very proficient with a ram-air parachute. He is also cool to watch fly. The chance of a pilot bailing out, fortunately, is very slim, and using a ram-air parachute can require a great deal more skill to ensure a safe landing. This may be compounded by injuries you sustained while bailing out or from the mid-air collision you just had.

I personally won't sell potential customers a ram-air parachute unless they receive some additional training. They don't necessarily have to even make a practice jump unless they want to, but they need additional training on how to fly their wing to a safe landing and how to deal with any malfunction that may have occurred during deployment. They need to sit through some form of ground school, usually at a sky diving center. I also require a letter or certificate as proof of completion. I want to make sure they've been properly trained to cope with certain types of problems that only a ram-air canopy can have. They're just a few, but you need to know how to instantly correct them or you leave yourself open for serious injury or worse.

One that comes to mind is premature brake release of one brake/steering line that can put you into a violent spin. Ram-air canopies are typically packed with the brake/steering lines stowed during opening. It's like having half flaps on your aircraft and one side suddenly releases and goes back to the neutral position. What are you going to do? Simple, just release the other brake line or pull the one that released back down to half brakes if it's not tangled around something. But suppose you can't because that arm was injured during bailout and you can't reach that line. However, you're clever and you just undo the other brake/steering line. Now your canopy is stabilized and flying straight, but you can't flare it on landing because you only have the use of one brake/steering line. Your steering has just become much more complicated. For example, if you have the left steering line in your hand, you can only turn left. A 90-degree right turn is now a 270-degree left turn. If you forgot and attempted to flare (pull down on the one remaining handle) on landing, your parachute will suddenly remind you that you shouldn't have done that. You need the use of both steering handles to flare. It will probably put you into a violent spin low to the ground. What do you do? You quickly let up on the steering handle, and the parachute suddenly tries to correct itself but you're still too low, and it stalls at 10 or 15 feet above the ground. If this sounds confusing just reading this scenario, imagine this happening to you under your parachute. That's why I feel most pilots should keep it simple (KISS) and only wear a round parachute.

One analogy I use to explain this to a pilot is to say, "Just because you're a pilot of your super-duper single-engine aerobatic airplane doesn't mean you can fly an F-16 fighter safely." About the only thing a round parachute and a ram-air parachute have in common is the rip cord used to deploy them. A round parachute is much more forgiving. You can hang beneath it like a rag doll, and it doesn't do a whole lot to get you into trouble—especially if you're incapacitated in any way. You really need the use of both arms and hands to fly a ram-air parachute. They have a much greater forward speed, and it's best if you can flare them for landing just like you do on your aircraft. Most of the people I put into a ram-air canopy are flying at higher field elevations, like the Denver area, weigh 220-plus pounds, and would like to have the softest landing they can manage, so they get the additional training. However, owning a ram-air canopy still does not ensure you'll have a soft landing. One thing I

can assure you of is the cost of owning one, and this does not include the additional training you should receive. You can expect to pay about $1,000 more for a ram-air parachute. Check out my column in the December 2006 issue of *Sport Aerobatics*. I hope I've made my point.

Now let's discuss the use of a static line deployed parachute (refer to my April 2009 column). All my columns are on my website, if you haven't saved all your past issues of *Sport Aerobatics* like everyone else. I have mixed thoughts about the use of a static line. They are very popular in Europe, and they generally work quite well. A typical static line has about 30 feet (10 meters) of line. One end is attached to some portion of your aircraft and the other to your rip cord handle. It sounds really cool; all you have to do is get clear of your aircraft, and it opens your parachute. Herein lies the problem as I see it. When you jettison your canopy, if you have one, or your door and bail out, you have your static line playing out. About 30 feet later you have your parachute coming out in close proximity to your spinning, out-of-control aircraft. Could they entangle?

Now let's throw in the scenario that you have a passenger who is also wearing a static line-equipped parachute. You're both lucky and make it out of your disabled aircraft. This is going to be your lucky day, but you soon realize both your parachutes are opening side-by-side, and they get tangled up, causing both of them to malfunction.

Perhaps you had a great flight, and in your exuberance to exit the aircraft and tell all your waiting friends about it, you forget to unhook your static line. Oops, your parachute just deployed, and the spring-loaded pilot chute is caught in the wind and your parachute has inflated. You now find yourself bring dragged across the airport in your parachute. Your friends think it's pretty funny until they realize the danger you're in. They try to stop you, but before they can, you hit something and get all scraped or broken up.

My suggestion is that you get properly trained on how to manually deploy your parachute. Then you shouldn't have any of the above mentioned static line problems.

One place I could possibly see using a static line is when you're giving passengers a ride, and you use a static line on their parachute. Of course they still must be given a briefing on how to manually pull the rip cord as if the static line failed, and they still need to be briefed on how to steer and land the parachute they're wearing. I have several articles on my website that talk about this. You can also e-mail me, and I'll send you a copy of my bailout seminar handout material that's not on my website. This is an outline of what I teach at my seminars, which can be useful when briefing your passengers or as a refresher for yourself.

Fly safely and remember to disconnect your static line before climbing out of your aircraft. IAC

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Bruce Ballew	1636 Wildhorse Pkwy Dr Chesterfield, MO 63005
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Adam Cope	6484 Brick Hearth Ct, Alexandria, VA 22306-3308
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Telephone	Fax	Cell	Email
615/384-1018		615/584-7146	fly4funta@gmail.com
920/921-6000	920/921-0226		landrew@andrewlawoffice.com
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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
410/263-2740	410/263-4693	410/353-2622	wbfinagin@cs.com
703/416-4888			jgaffney@naa.aero
406/586-2517		406/579-1942	klein@qti.qualcomm.com
225/456-6847			philiscold@yahoo.com
815/363-8967			hrtlndfrm@aol.com
217/345-7635			ghenderson@eiu.edu
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319/377-1425			davelammers@mchsi.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
+38-1-008-5180			matti.mecklin@luukku.com
800/843-3612	920/426-6761		membership@eaa.org
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		303/552-7963	Reggie.paulk@gmail.com
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		650/245-2405	darren.pleasance@gmail.com
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281/513-6590			gene@genesoucy.com
509/747-5478		509/220-8206	dougsowder@gmail.com
		602/418-4009	msteveson@earthlink.net
979/836-2610			ljstoltenberg@gmail.com
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505/858-0005			djt13@comcast.net
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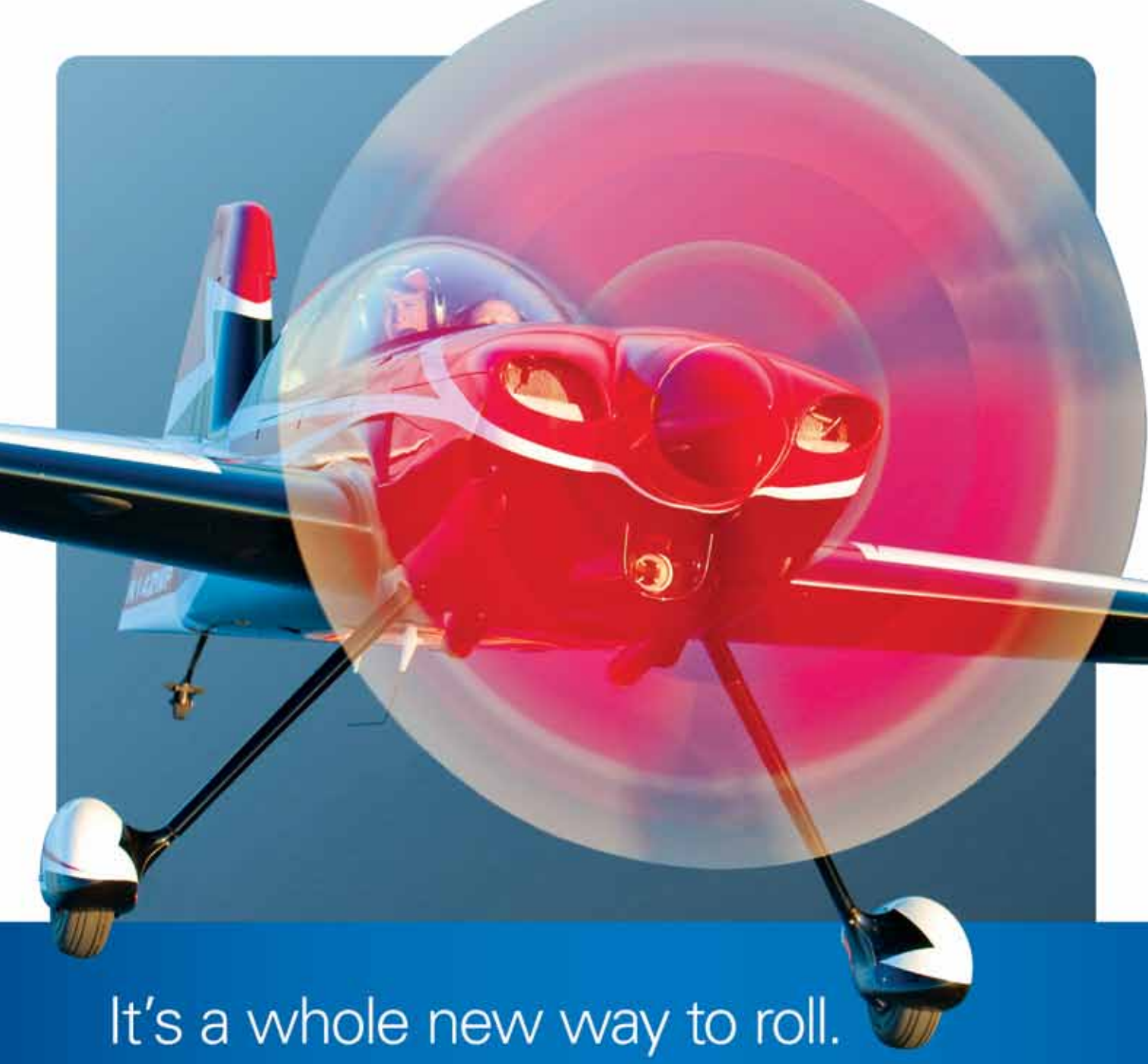

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