
SPORT
Aerobatics
JULY 2016
OFFICIAL MAGAZINE of the INTERNATIONAL AEROBATIC CLUB
IAC
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•Pitts s-2C
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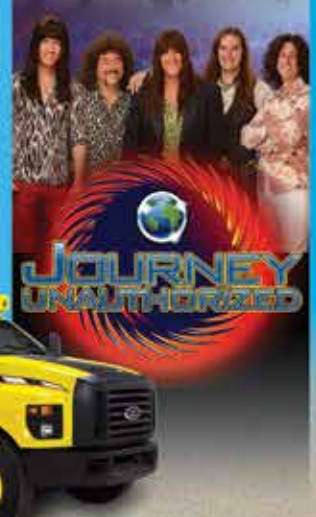

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. . . I find the Pitts' personality is happy and playful. Perhaps the aircraft equivalent to a MINI Cooper S—grins and giggles. The XtremeAir is more of a Porsche 911—an uber-performance machine with a serious demeanor. Wouldn't it be great to have a hangar with both?

—Blair Mohn

FEATURES

LIZ STOKES

COVER

The original Sbach 300, now known as the XtremeAir XA41, flies over Oshkosh during an air-to-air photo shoot. Photo by Jim Koepnick.

DEPARTMENTS

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EDITOR'S LOG

BY REGGIE PAULK

AirVenture

Everything you hoped it'd be

THE JULY ISSUE OF SPORT AEROBATICS magazine is often referred to as the Oshkosh handout issue. Although many of you reading these words will be unable to attend AirVenture, you may rest assured that you'll be able to attend in spirit within the pages of this magazine.

If you've never attended AirVenture but have it on your bucket list, I can assure you it's bigger than you've imagined—and that's its allure.

Last year, we celebrated the 70th anniversary of the Pitts; this year, the theme is "Grass Roots to the Top of the World." The plan is to have 16 large panels in the IAC's pavilion dedicated to pilots who began their competition careers at the bottom and worked their way up to world champion status. Even if you're unable to attend, we'll be sure to share with you their stories. The people of the IAC—especially those who've dedicated much of their time and effort to the sport—are interesting characters with wonderful life stories.

This year will mark the ninth time I've made the pilgrimage to Oshkosh for the grand show. Back in 2008, when I first attended, I was left awe-struck by the sheer grandeur of the event. It literally took me a couple of years to get used to what AirVenture is and what it represents. Even now, I'm still taken aback by the sheer size and scope of the event. There are still many undiscovered treasures waiting for me to experience.

As for the IAC, so many positive changes have occurred over these years that it's hard to keep track of the improvements. The pavilion is amazing. What was once a tent on grass has become the Vicki Cruse Pavilion, where people can sit in the shade on a concrete pad and enjoy the myriad seminars we give throughout the week. The front of the IAC's building is now covered in glass and invites all who pass to come take a look at the world of aerobatics. In 2017, we'll hold Nationals in Oshkosh—the IAC will have the airfield practically to itself. That should prove to be an amazing experience.

If you've never attended AirVenture but have it on your bucket list, I can assure you it's bigger than you've imagined—and that's its allure. I read about Oshkosh for decades before I was able to attend. When I finally did, it was everything and more I'd hoped it would be. If you are at AirVenture, stop by the IAC—we'll be there. *IAC*

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

PRESIDENT'S COLUMN

BY MIKE HEUER, IAC PRESIDENT, IAC 4

President's Page

Government relations at work

In the May issue of this magazine, we reported on the extensive work our IAC government relations volunteers do on our behalf and the areas in which they have been working intensely. EAA's government relations staff has also been highly cooperative with our people and bring their considerable resources to bear on problems that affect us all. We are very fortunate to be a part of the EAA family.

One issue that has surfaced but was not reported in the May issue was the emergence of a problem with ADS-B "out" equipment. For those who do not follow these developments closely, ADS-B stands for automatic dependent surveillance—broadcast, and ADS-B "out" equipment will be required in the future of all aircraft operating in airspace in the United States that requires Mode C transponders. Therefore, a lot of aerobatic airplanes will be equipping with this new technology. Many general aviation aircraft owners have already purchased the equipment, and airplanes are operating today with these electronic devices onboard. The ADS-B equipment requirement is part of FAA's NexGen plan for American airspace. ADS-B "in" equipment will not be required but provides useful information for pilots, which many will elect to use.

Here is the rub. Though ADS-B "out" will not be required until January 1, 2020, if you do have it in your airplane, it must be compliant with FAA standards (see FAR 91.227). The problem is the equipment specifications are not sufficient to accurately report aircraft position, speed, and so on during advanced aerobatic flight. Therefore, an aircraft owner could be in violation of that FAR and may receive a "letter of finding" from the FAA.

From our committee's review of the standards, it is obvious that aerobatic aircraft of the type we operate, which exert greater than 5*g*'s during flights and speeds of less than 400 knots, were not included in the specifications by the FAA when planning for ADS-B implementation.

All of us in the IAC know that aerobatic flight results in rapid changes in speed, acceleration, position, and altitude. Multiple rapid rotations, vertical climbs and descents, and quick changes in altitude, orientation, and trajectory are all routine elements of what we do. Aerobatic operations "quickly outstrip the ability of current ADS-B equipment to keep up, resulting in system integrity noncompliance," according to a paper submitted to EAA by Wayne Roberts, the IAC government relations committee's vice chair.

Where do we go from here? Many of you want to get on the bandwagon early to avoid a last-minute rush before the January 1, 2020, deadline. Also, for those equipping with both ADS-B "in" and "out," there are benefits to be derived in the way of information displays in the cockpit. The technology is becoming more widely available, and the prices are coming down as more options are offered. But you should be aware that you may be noncompliant with FAA standards and may hear from them if you have the ADS-B "out" equipment in your airplane and fly intermediate or higher aerobatics. We have documented this in our paper submitted to EAA.

EAA's working relationship with the FAA can be felt on many fronts. One of the working groups they participate in is called "Equip 2020." It was set up by the FAA and the industry to work on exactly these sorts of problems. Our EAA representatives now have the documentation and data in hand to address this issue. For now, however, we are in limbo, though the FAA and Washington are well aware of the problem, as it has been raised with them directly as well. I look forward to the working group's discussion and proposed resolution.

What the IAC will do in the meantime remains to be decided. An application for an exemption for aerobatic practice areas and special provisions in contest waivers may be in order. What we must do is what is best for the majority of our members to protect them from unintended consequences.

ADS-B "out" is coming, and for some is already here. We want to keep you "in the box" on this one and promise further action. More news to follow when we have it. ***IAC***

Please send your comments, questions, or suggestions to *president@iac.org*.

Editor's note: This article originally appeared in the August 2015 issue of *Light Aviation* magazine. It is reprinted here with permission.

LIZ STOKES

The DR-107 One Design

A sprightly and affordable aerobat

BY PHIL BURGESS

Aerobatics as a sport is constantly evolving. As new aircraft types with ever-increasing performance become available, the rule book has had to change to include ever more demanding aerobatic figures with which to challenge pilots. Gone are the days when you could compete at Unlimited level in a Stampe! Of course, it's not just Unlimited level that has changed; there are five competitive levels in the U.K., and each has grown to include tougher figures to keep these events demanding enough to be meaningful.

This arms race has seen a proliferation of high-performance monoplanes in recent years, all using state-of-the-art construction techniques in various ways. They all have one thing in common, though: They all come with an eye-watering price tag and huge running costs, keeping them out of reach of the average pilot. As new designs emerge, it becomes possible to buy the older ones secondhand, and we see them filter down into the more junior levels of the sport, with people believing they need to spend more to improve their scores.

At the Advanced National Aerobatics Championship this year, an impressive array of such machines supported this trend, with one notable exception. Unlike the other aircraft in the competition, the machine that won the National Championship title didn't have a six-cylinder engine, wasn't built in some sterile factory, and didn't require a second mortgage to operate. It was a DR-107 One Design!

I've owned G-RIHN since 2009, and since then, I've campaigned to great effect at Intermediate and Advanced level competitions, amassing around 50 medals and many trophies. I even won the Queens Air Race Challenge trophy in 2011, flying a timed aerobatic sequence against faster and more powerful machines. Sure, there's a measure of pilot skill involved (that's what the game is all about), but the key to my success has without a doubt been this incredibly capable yet affordable airplane. Thank you, Dan Rihn, for bringing the One Design into the world!

Back in the early 1990s there was much discussion in the United States and the International Aerobatic Club about the direction the sport was heading, and a strategy was developed to try to make it accessible to a wider community of pilots. Of key concern was the ever-increasing cost of competitive airplanes and the dwindling number of competitors. The concept of a new class of competition was drawn up with the aim that all the aircraft would be the same, therefore removing any advantage that wealthier pilots, who might be able to spend more money on their machines, might have. To make the concept appeal to a wider range of pilots, a relatively low-cost but high-performance airplane was needed, and so Dan Rihn stepped forward to design a machine that would meet this specification.

Coupling his expertise as a Northrop Grumman design engineer with his considerable experience building and modifying aerobatic aircraft, Dan expertly crafted a prototype that first flew in 1993. A large number of experienced aerobatic pilots were allowed to fly it, and after incorporating a few minor changes, Dan made the drawings available to homebuilders. This is where the concept of the One Design ran into a problem. Homebuilders being homebuilders, it soon became apparent that few examples would be built exactly to specification, with various minor modifications and "improvements" being incorporated, precluding the idea of a contest devoted purely to one single type.

The original concept involved a stock Lycoming O-320 engine driving a fixed-pitch propeller, and in this configuration the type is very light and well-balanced, but perhaps most importantly it is eminently affordable. Many builders opted for larger engines and constant-speed propellers, which added some performance but also added to the overall weight, complexity, and operating costs of the machine. The extra weight is all forward of the center of gravity, so it becomes necessary to operate in the forward end of the envelope, which is less

than ideal for the aerobatic purist in pursuit of such things as perfect spin entries, flick-rolls, and dynamic freestyle handling.

All airplanes are born of compromise, and increased vertical penetration and acceleration from slow flight are the main benefits of fitting larger engines and constant-speed props, even though those benefits require one to sacrifice ideal center of gravity. What is perhaps more debatable is whether the average pilot could put these benefits to any tangible advantage during a competition flight and whether they are worth the extra cost.

I have been very fortunate to have flown the three examples pictured here, each of which has a different engine and prop combination. The red airplane has a 180-hp engine driving a fixed-pitch prop, the green one has 160 hp and a constant-speed prop, and the blue machine has 200 hp and a constant-speed prop. We were also able to carry out some rudimentary performance comparisons in flight to try to settle this debate. To gauge vertical penetration, we flew line abreast at the max level speed of the slowest aircraft. We then all pulled smoothly to the vertical, applied full power, and waited to see who would go the highest before doing a stall turn and recovering. Interestingly, the red and green aircraft went to about the same height, with minor differences probably being attributable to having slightly different weights at the time. The blue aircraft went up farther and probably topped out at 100 feet or so higher.

With constant-speed props, the blue and green aircraft can accelerate quicker from low speed, which is useful when fiendish sequence designers put a high-start speed figure after a low-exit-speed one. With a fixed-pitch prop, it takes more time and distance to achieve this without descending, and positioning can be compromised when you're flying for a panel of judges. It's also easy to over-speed the fixed-pitch prop in a dive, so your throttle hand is constantly on the move throughout an aerobatic sequence. Every time you move the throttle, an additional rudder input is required, and all of these extra inputs reduce the available brainpower for planning the perfect execution of the next figure.While this was hardly a scientific test, the irrefutable evidence is that the 160-hp green machine used less fuel to carry out this mission, which I take as a clear victory for my airplane—sorry, guys! As it doesn't have a fuel-flow gauge, it is difficult to give accurate figures, but I reckon that I use about 40 liters per hour flat out for aerobatics and less than 30 liters per hour in a 130-knot, 2250-rpm, 22.5-inch-manifold-pressure cruise. The fuel system is contained in the forward fuselage and has a 50-liter tank that gravity feeds a 30-liter "acro" tank. This provides a good measure of utility—I recently flew 100 miles and then spent eight minutes displaying at full power, followed by another 100-mile return transit before landing with a 25-liter reserve on board. Many other types are limited in this regard as aerobatics aren't permitted when they have fuel in their wing tanks, and their small acro tanks dictate that they should land soon after a display.

Other differences between the three examples featured here are a little subtler. Builders have the option of fitting a one-piece, side-hinged canopy, which may be a little less draggy than the sliding canopy detailed on the plans. The side-hinged canopies would be damaged if opened in flight, and the lack of a fixed windscreen may be a hindrance should you feel the sudden urge to try a spot of parachuting. Again, builders have to choose between performance and utility. The fuselage and tail surfaces are built from welded steel tubes and incorporate stainless steel bracing wires. Spruce stringers, an aluminum turtledeck, and fabric covering complete the


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rear fuselage, with aluminum panels covering the fuselage from the seat back to the firewall. Two-piece carbon/glass fiber cowls envelop the engine and feature a variety of inlet configurations to suit the particular engine on each aircraft.

Several different styles of wing root and undercarriage fairings are in use, and they've been incorporated into the design to counter reports of buffeting when pulling high *g*. Although much has been written on this subject in the United States, I haven't experienced this phenomenon in these three machines. I often wonder if this is a problem of piloting technique rather than a genuine issue, and I'd be keen to see some hard evidence, perhaps from wind-tunnel testing, as to which is the best type of fairing.

The wing features a tapering, solid spruce or Douglas fir main spar, ply ribs, and ply skins, with optional glass-fiber molded tips. The wing is finished in lightweight glass cloth, which can support an extremely durable paint finish. The ailerons are push-rod actuated, with all hinges and bearing points assembled with adjustable rod end bearings and ball races. This results in a very strong and reliable control system that has a minimum of backlash and friction. The ailerons themselves are built up from spruce and ply and are fabric-covered. They are mass balanced and, as a result, are surprisingly heavy for their size. Some examples feature aluminum ailerons, which are much lighter, resulting in lower mass balance weights being required and therefore having lower inertia in the control circuit.

Aileron spades are standard in serious aerobatic machines. These small devices protrude forward of the aileron hinge line to provide an aerodynamic assistance to lighten the stick forces. By adding various shims and adjusting their size and position, one can adjust the spades to trim the airplane in roll and alter the stick force gradient over the range of deflection. Competition pilots spend many hours perfecting this setup, tailoring the handling to their own preference. My own setup produces a genuine roll rate of 360 degrees per second at VA, and although some claim to have achieved 420 degrees per second, I find that to achieve such a roll rate, some control centering, breakout force, and general feel have to be sacrificed. I'm more concerned with accuracy for competition flying and having the aircraft offer as much assistance as possible to free up my limited brainpower.

The elevators have a similar aerodynamic assistance in the form of servo/trim tabs. The rigging geometry is designed to give much more assistance when pushing negative *g* than when pulling positive *g*. This keeps stick forces roughly symmetrical when pushing and pulling, and well matched to the aileron stick forces. In flight, the controls are very light in pitch and roll, and only the smallest movements of the stick are required to guide the aircraft around the circuit or to transit from A to B. Pitch stability is affected a great deal by the center of gravity and, when loaded with overnight bags and other junk in the turtledeck, the aircraft becomes even lighter to the touch. Care must be taken, as only the smallest control inputs are needed and can produce a rapid pitch change at any airspeed.

Handling reports in magazines are often very subjective and depend a great deal on the relative experiences of the writer and reader if phrases like "light controls" are to have any meaning. To try to put it into context, imagine flying the average club trainer and then stepping into something like a two-seat Pitts. This is pretty much how I progressed into aerobatics a few years ago, and I'll never forget the highly responsive controls, the excess of power, and the overwhelming sense of freedom while poling this rocket ship around the sky.

A similar magnitude leap in performance awaits those who venture further and try a single-seat Pitts, but the jump from any Pitts to a One Design is of an entirely different scale. It reacts so quickly to control inputs and can change direction so abruptly that it corners like it's in a cartoon. Even in a Pitts there is a barely perceptible delay when moving the stick, as the airframe flexes a bit and the flying wires begrudgingly take up the slack under *g*. Not so in the One Design. If it weren't for the feeling of the *g*-force through the

seat, you might believe you're playing a low-budget computer game.

Having said that, the One Design is not difficult to fly, but you must be aware of the control inputs you are about to make. It's important to think in terms of stick position rather than stick force, and this is especially useful when flying close to the stall. Imagine we are pulling out from a vertical dive. As the stick force doesn't build rapidly as speed increases and you apply more *g*, it's very easy to keep pulling harder and harder, expecting the pressure in the palm of your hand to keep increasing. Once you realize that the airplane stalls with the same stick position regardless of speed, it's easy to avoid making this mistake. Although it's happy to fly with an impossibly high angle of attack, the drag increases exponentially as we approach the stall and it's therefore not an efficient use of energy to corner in this manner when we only have a limited amount of height or horsepower to replace it with.

When the high-speed stall does occur, all the controls remain effective in their normal sense and the only indication is a very light airframe buffet followed by a sudden divergence from your previous flight path. It's a bit like cornering in a car and instantly developing serious under-steer when you hit a patch of black ice. If flying out of balance, it will drop a wing, but with the proper footwork this can be avoided. The 1*g* stall occurs at about 55 knots in upright level flight, resulting in a high rate of descent rather than a pronounced nose drop. To recover, a large forward stick pitch input is needed to reattach the airflow to the wing.

Trying to regain the pitch attitude from prior to the stall before the airflow reattaches will result in a further stall and more height loss despite the ASI winding up through 90 knots. It's quite obvious when the airflow reattaches, as it will be accompanied by a small bump through the airframe as normal service is restored. If attempting a stall in the climb at full power, bringing the nose ever higher will eventually result in a stall, at which point there is so much control authority left that full back stick and some balancing work with the feet can pitch the aircraft all the way around in a kind of micro-loop before diving to recover.

Approaching to land, 80 knots is about the minimum speed to use; any slower and a tail-wheel-first arrival is likely. A gentle sideslip works well on finals, though it is necessary to add 10 knots, as the ASI will overread in the sideslip. The main undercarriage legs consist of a one-piece aluminum spring unit that gives a ground angle that is much more nose-down than the stall angle. For this reason, you are definitely still flying even when all three wheels are on the ground, so pulling back on the stick at touchdown will load the tail spring and launch you back into the air. Slight forward stick is needed on touchdown to avoid skipping and bouncing down the runway. Small control inputs are essential after landing because even at 65 knots, with full aileron the One Design will roll faster than a Pitts S-2A at 165 knots!

Taxiing is easy with a gentle weave to clear the blind spot ahead of the nose. There's plenty of weight on the tail wheel, so at low speed you can brake really hard without running the risk of nosing over. This gives you a lot of confidence when taxiing, but it's best to keep sharp turns down to a low speed because the risk of a ground loop is always there. The view from the cockpit is better than in a Pitts; there is very little airframe out there to get in the way of your sight lines, and the wingtips seem impossibly close. The adjustable seat back accommodates a variety of pilot shapes, with your legs positioned over the top of the main spar and feet raised up high. Unlike with a Pitts, full aileron control can still be achieved even if you've got generously proportioned

thighs like mine, and the cockpit is proportioned to easily accommodate pilots who are 6 foot 2 or taller. The instrument panel is fairly small, limiting the number of redundant gauges that can be fitted, which helps keep things simple and light.

The One Design is often compared to other aerobatic types as people try to work out where it fits into the grand scheme of things. In my estimation at least, and in overall terms comparing performance versus cost, they are top of the pile of the four-cylinder aerobatic aircraft that are available in the United Kingdom. There are a good many others in this group that cost more to own and operate but at best offer only similar overall performance, such as the Pitts S-1, Laser, Extra 230, and Edge 360. For this reason the One Design certainly offers the best bang for the buck. In other countries, One Designs are even competing successfully at Unlimited level with the help of some very talented pilots. We'll have to wait and see if there will ever be a contest purely for aircraft of this type, as they are still fairly rare. Even with this aspect of the design aim

yet to be realized, the One Design has now earned its place in the food chain in its own right, and it's definitely here to stay.

Phil Burgess, One Design G-RIHN

The majority of the build took place in Canada, and with about 90 percent done and 90 percent still to do, the airframe was imported to the United Kingdom and completed by James Brown. After around 50 flying hours, the original engine and fixed-pitch prop were replaced with a brand-new Lycoming/Titan ECI AEIO-320 and MTV-11C prop, a lightweight starter and alternator, Sky Dynamics crossover exhaust, and Airflow Performance fuel-injection system delivering around 160 hp. This results in a climb rate of 2,150 feet per minute at max all-up weight.

The machine was purchased at the end of 2009 and stripped to prepare for the coming aerobatic season. New cowlings and various fairings and fuselage panels were built to reduce weight and drag, and the new color scheme and sponsor logos were applied. All of this was achieved with just hours to spare, meeting the deadline of the first Intermediate contest of 2010—which was promptly won!

This aircraft has an analogue instrument fit with separate engine gauges used for ease of maintenance. As with most serious aerobatic aircraft, the sequence cardholder dominates the panel, which also doubles as a mount for an easily upgradable tablet PC running GPS nav software. USB charging is incorporated into the electrical system, as is a stereo audio feed to spice up the transit flying to comps and displays. G-RIHN also has an awesome smoke system for extra visual impact at displays.

Neil Bigrigg, One Design G-CVII

"Keep the weight down and the performance up" was our mission goal for this award-winning aircraft build. G-CVII (107 in Roman numerals) was designed around a Superior XPIO-360 engine with a lightweight oil sump, lightweight starter and lightweight alternator, dual E-mag electronic ignition, a balanced 4-into-1 exhaust system from Aircraft Exhaust Inc., and an Airflow Performance fuel system turning a huge MTV-15 constant-speed propeller. This all monitored by a Dynon FlightDEK D-180 and all attached to an airframe that we obsessively tried to keep the weight off with the incorporation of simple lightweight control systems and extensive use of carbon fiber in all of the fairings to smooth the airflow and help make it fast. A good deal of future proofing was also incorporated into the build by the fitment of a Trig TT21 Mode S transponder and a Becker AR6201 with 8.33 kHz channel spacing.

Built over a six-year period by Mark Davies, Ian Tunstall, and me at a cost of 62,000 pounds (but who's counting?), performance surpassed all expectations, with horsepower pushing 200 and a full-power fully fine climb rate of 2,500 feet per minute at max all-up weight. It was obvious from the very first flight that we had an airplane more than capable of what it was built for, which ultimately was to replace our beloved Pitts S-2A and to take us on to win Advanced aerobatic competitions.

At 55 percent power, the straight-and-level cruise of 2100 rpm and 21 inches of manifold pressure gives 144 knots with a fuel consumption of just 26.5 liters per hour, compared to a straight-and-level aerobatic full-power setting of 2,500 rpm and 25 inches of manifold pressure, which gives 157 knots and a fuel consumption of 60 liters per hour.

Now, with almost 100 hours under its wings, it never fails to put a silly grin on our faces, either with her sheer aerobatic performance, including an unbelievable vertical penetration, or just as a time machine for going cross-country.

David Kean, One Design G-IIID

G-IIID had several owners while it was being constructed, including me, but it was expertly finished by Vernon Millard in 2005. I've have had the good fortune to own the aircraft for almost 10 years, and I think that speaks for itself. I find the performance is significantly better than the Pitts S-1S I used to own. Roll rate and visibility from the cockpit are obvious improvements. The engine is a 180-hp Lycoming with a fixed-pitch MT propeller and Ellison throttle body. It cruises at 125 knots with 2250 rpm and 25 liters per hour; 2500 rpm will produce 140 knots, but in that case, fuel flow is 38 liters per hour. The only analogue instruments are airspeed and altimeter. All engine parameters are monitored by a Grand Rapids EIS4000. A digital *g*-meter

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LASER 230

A Pilot Report

BY ROSS LOUDON

Straight and level at 160 mph and a 6*g* pull to vertical. Check the wingtip sighting devices to make sure that I am not positive or negative and there is no yaw in the upline. Watch for the airspeed to bleed off. As the airspeed nears zero, kick in full left rudder and apply only slight right aileron to ensure that the knife-edge 180-degree turn at the top is perfectly aligned from entry to exit. And then it hits me how this airplane makes the hammerhead turn look so easy. God, I love flying this plane.

The plane is the Laser 230. One of the line of Lasers that was popularized and largely developed by national and world aerobatic champion Leo Loudenslager in the '70s and '80s based on the Stephens Akro. While not terribly common or well-known, the Laser had a dramatic influence on the world of aerobatics when Leo consistently crushed the competition that was largely dominated by the Pitts Special. Over time the horsepower has increased from about 180 to as much as 300, and there are even two-seat versions flying. So dramatic was the impact of the Laser that, when Walter Extra got into the game and saw what was happening, he introduced the Extra 230, which is almost indistinguishable from the Laser. That led to the long line of modern mono-wing competition aircraft. Leo's Laser 200, also known as the Bud Light 200, is currently displayed at the Steven F. Udvar-Hazy Center in Chantilly, Virginia, part of the National Air and Space Museum. Acquiring this plane was a dream come true. As a child growing up in Reno, Nevada, I was addicted to the Reno National Championship Air Races and air show. In the 1970s, I used to watch the Red Devils formation aerobatic team (later the Eagles Aerobatic Team) featuring aerobatic greats Charlie Hillard, Gene Soucy, and Tom Poberezny as they flew their routines in their red and white biplanes. I set my goal to one day fly aerobatics in my own red and white biplane. There were many great performers at the races, but in later years Leo

Laser 230 on the ramp at Reno Stead Airport.

showed up with his Bud Light 200, taking aerobatic performances to a whole new level. Ironically, Leo learned to fly because he was inspired by a trip to watch the first Reno air races in 1964.

It was not until about 2002 when I finally realized my dream of owning a red and white biplane: I bought a Skybolt. After an in-flight disintegration during aerobatic practice in 2004, I was in need of a new plane. My budget was limited, and I was leaning toward a Pitts S-1S, but after consulting with aerobatic champion and Red Bull Air Race Champion Mike Mangold, he said that he had observed my flying and I would not be happy with the Pitts for very long and should spend the extra money for the Laser. His advice could not have been more spot on; I later owned a very nice Pitts S-1S and found that while it provides great bang for the buck, in its standard form it is not in the same league as the Laser.

Flying the Laser is pure pleasure. Equipped with an AEIO-360 with high-compression cylinders to get the 230 hp and weighing in at just over 1,000 pounds, the power-to-weight ratio keeps you performing well, even at my field elevation of 5,050 MSL and aerobatic practice box altitude of 7,000-9,000 MSL. The wing is a modern version as designed by renowned wing builder Gerry Zimmerman and built by Teebird Enterprises. It features a 25-foot span, full-span ailerons, symmetrical airfoil, wood construction and skin, carbon fiber-reinforced wood main spar, perfectly statically and dynamically balanced control surfaces with adjustable spades, and 24 gallons of cross-country fuel (in addition to the 20 gallons in the main fuselage tank). This is the same wing that is used on the two-seat version, and without quoting any of the *g* test data, it is conservative to say that the *g*-limits far exceed those of the remainder of the aircraft or the pilot.

Flying around the pattern is simple as long as you don't overtake the Cessnas. Less than 1,000 feet will get you airborne at 80 mph,

Large spades and servo-controlled trim tabs provide soft control pressures on the large control surfaces.

The black stripes that can be seen in the top and bottom of the hefty solid wood main spar are carbon fiber layers, responsible for providing a virtually unlimited wing loading capacity with nearly zero flex.

and climb-out at 100 mph produces climb rates in the 2,000-4,000 feet-per-minute range depending on altitude and throttle setting. Start your final at 100 mph and try to reduce your airspeed as you have the runway made. This can be a little bit of a challenge with the long wing, low drag, and no flaps, but it can be accomplished with a dramatic cross-control sideslip until you are over the numbers at 75 mph. Then straighten out and flare for touchdown at 70 mph. The plane wants to touch down three-point, but that will burn up a lot of tail wheels, so I usually opt for the wheel landing using down elevator as a speed brake until I can't keep the tail up anymore, then applying brakes only if needed at the turnoff.

No, it is not as easy as a Citabria or Decathlon, but it is slightly easier than a Pitts S-2B and worlds easier than the Pitts S-1S. If you decide to fly cross-country in this plane, you will appreciate the ample baggage compartment and 44 gallons of fuel. For me it is safe to say that burning 8 gallons per hour at a cruise of about 165 mph will leave me needing the restroom before the fuel pump.

Enough about the history and straight and level flying qualities of this airplane. After all, you don't own a plane like this to cross-country travel or fly around the pattern on Sundays. You buy this plane to make some noise and tear holes in the air at unusual attitudes. This plane makes a hero out of an average aerobatic pilot. The balance and symmetry offered by the symmetrical airfoil and mid-wing design keeps your lines straight and visually appealing. The oversized control surfaces provide plenty of pitch, yaw, and roll authority. The wing builder claims roll rates of 450 degrees per second, but I am not physically capable of verifying this.

Let's just say it is blindingly fast. Most vertical maneuvers have adequate energy at 160 mph entry speeds, which can be easily achieved without dropping the nose. At 7,000 feet I opt for 170 mph if doing something like a triple vertical roll that requires a little more vertical penetration. The plane will do anything you ask it to without argument. If you want to stop a spin, just kick a little opposite rudder and input some opposite pitch and stop on a dime. And for those who like the lomcevak, you can expect three full end-over-end tumbles before it runs out of gyroscopic energy.

While it is true that you probably won't see this plane dominating in Unlimited competition as it once did, what you will see is that Unlimited competitors today are flying planes that have roots that can be traced back to this smaller Laser. It is a great way to enjoy all but the top end of aerobatic competition at a fraction of the acquisition and operating cost. It makes a great alternative for pilots who don't need that little EDGE or don't have that EXTRA cash. *IAC*


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Advanced or Unlimited

The Pitts S-2C and XtremeAir 41 and 42

BY BLAIR MOHN,
IAC Chapter 58 President

JIM KOEPNICK PHOTOS


JIM KOEPNICK

Bill Finagin was probably flying and selling the Pitts brand before most of us flew our first solo. For approximately $350,000, he can deliver the factory's highest-performance certified two-seater.

The six-cylinder S-2C evolved over many decades from the two-seat, four-cylinder S-2A, which received its FAA certificate in 1971. While visually and dimensionally similar, the C is a vastly higher-performing machine.

Subjectively, I noticed the C performed better with both Bill and me in the aircraft than my A performs with me alone. Checking the numbers, the total loaded aircraft weight-to-horsepower ratio is better with the two of us in the C than me alone in the A! Further, the C's roll rate is 1.5 times faster than the A's. Add the smoother, six-cylinder engine of the C, larger and more responsive rudder, three-bladed Hartzell Claw propeller, and equal-pressure-in-all-directions stick forces, and it handles like a different and more modern aircraft than the A.

White interior paint and a Lexan floor gives the C a more inviting appearance than the A, and provides improved visibility. Also improved is pilot comfort, with new air vents and separation between pilot and passenger. For the C, Pitts offers a slick "racer canopy," for passengerless flights, that reduces drag, increases airspeed, and adds a high-performance look to the profile.

Pitts aficionados will tell you the aircraft are addictive, possessing a combination of handling and mechanical simplicity that is far more engaging than the soulless competition tools of newer design. They also note that cross-country with the world framed by two wings connects the pilot to the magic of early aviation. While retaining the allure that has enchanted pilots since the *Little Stinker* was introduced, the C amps the performance without losing the Pitts' specialness.

On the other hand, if you are planning to compete at the World Aerobatic Championships, you may want to inquire about the XtremeAir 41 and 42. Thoughtfully evolved from the Extra style mono-wing aircraft and costing $400,000 to $450,000, the Thunderbolt 580-powered, all carbon fiber aircraft incorporates the most recent technology for ultimate performance. If you describe your ultimate aircraft as an FAA-certified two-seater like the Extra 330LX, but without the steel tube frame

Technical Specs: Pitts S-2C			
Engine	Lycoming AEIO-540, 260 hp	Takeoff distance ground roll	554 feet
Length x height	17 feet 9 inches x 6 feet 5 inches	Takeoff distance over 50-foot obstacle	893 feet
Wingspan	20 feet	Max demonstrated crosswind component	17 knots
Wing area	127.5 square feet	Rate of climb, sea level, minimum weight	2,900 fpm
Wing loading	13.3 pounds per square foot (normal) / 12.7 pounds per square foot (aerobatic)	Maximum level speed, sea level	169 knots
Seats	Two, tandem	Cruise speed at 75 percent power	150 KTAS/1.5 hours
Cabin length x width	6 feet 11 inches x 28 inches	Range with 30 minutes' reserve at 75 percent power	284 statute miles
Cabin height	47 inches	Fuel consumption at 75 percent power	14.7 gph
Empty weight	1,155 pounds	Best economy	6,000 feet
Maximum gross weight	1,700 pounds	Landing distance over 50-foot obstacle	2,124 feet
Useful load	545 pounds (normal)/ 470 pounds (aerobatic)	Landing distance, ground roll	1,320 feet
Payload with full fuel	371 pounds	VY (best rate of climb)	KIAS 82
Propeller	Hartzell Claw, 78 inches, composite, constant speed	VA (design maneuvering)	KIAS 134
Power loading	6.59 pounds/hp (normal) / 6.25 pounds / hp (aerobatic)	VNO (max structural cruising)	KIAS 134
Fuel capacity with 5-gallon wing tank	29 U.S. gallons (28 gallons usable)	VNE (never exceed)	KIAS 185
Aerobatic flight load limits	t +6g/-5g	VSI (stall, clean)	KIAS 53

and with a Sukhoi-style wing, the 42 is your dream come true. A similar definition applied to a single-seater will lead you to the 41.

XtremeAir appears to have combined elements of the Extra, MXS, and Sukhoi with the artistic design of Italian exotic automobiles. The appearance of the metallic silver exterior with quilted red leather interior of the 42 I flew was stunning. Admittedly, watching Debby Rihn-Harvey fly the aircraft in Intermediate at Nationals a few years ago convinced everyone that silver shows better on the ground than in competition. Nonetheless, the integration of design detail and practical engineering inside and out is unlike any other aerobatic aircraft I know.

Attention also has been lavished on ergonomics. The rudder pedals more naturally angle outward rather than the vertical position of most aircraft (they are manually adjustable for leg length). And unlike a 330SC in which I sat, the throttle lever falls comfortably to hand.

Flying the 42 with Unlimited competitor Joe Brinker in the front seat, I found the 42 to be surprisingly quiet and comfortable.

Jim Koepnick

The controls were smooth, heavier than I expected, and predictably hyper-responsive and powerful.

The only unusual control was the locking tail wheel, activated by pulling the stick full aft. To turn while taxiing, the stick must be moved forward far enough to unlock the wheel. Interesting and logical, I expect its use would become second nature with a few flights.

Also new to me were the characteristics of a Sukhoi wing. We flew loops simply by slightly moving the stick aft, leaving it there, and riding the loop while feeling the wing self-load. Similarly on the pull from horizontal to vertical, apply a very small stick deflection and grunt with no further stick deflection or the *g* meter will peg. With a 450-degree-per-second roll rate, I only used full aileron deflection at low airspeed.

The takeoff and landing were simple and normal, while the flight to and from the practice area gave the impression of a fast and relatively comfortable cross-country ride (note the advertising claims a very long, 1,050-nm range at 167 knots and 800 nm at 205 knots).

Comparing the two, I find the Pitts' personality is happy and playful. Perhaps the aircraft equivalent to a MINI Cooper S—grins and giggles. The XtremeAir is more of a Porsche 911—an uber-performance machine with a serious demeanor. Wouldn't it be great to have a hangar with both? *IAC*

Technical Specs: XA41			
Engine	Lycoming AEIO-580-B1A six-cylinder piston engine, 315 hp	speeds	
Propeller	MT Propeller, MTV-9-B-C / C203-20d, three-blade, hydraulic constant-speed	VNE (never exceed speed)	225 KIAS
Empty mass approximately	1,370 pounds	VNO (max cruising speed)	185 KIAS
Max empty mass	1,477 pounds	Max operating altitude	15,000 fee
MTOM & MLM		Performance	
Utility	2,200 pounds	Roll rate	450 degrees/second
Max baggage load	22 pounds	Rate of climb with 1,874 pounds VY	3.212 feet/minute
Acro II	2,200 pounds	In 4,000 feet, international standard atmosphere (ISA), at 45 percent power setting	
Acro III Unlimited (+/-10g)	1,847 pounds	Lean for best economy	167 KTAS
Total fuel capacity	72.65 U.S. gallons	Fuel flow	10 U.S. gallons/hour
Usable fuel	72.15 U.S. gallons	Distance including 60 minutes' reserve	1,050 nm V
Usable for aerobatics (Acro III)	15 U.S. gallons		
Smoke oil	7 U.S. gallons		

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Collegiate Program:
Building on a Great Foundation

BY JORDAN ASHLEY,
IAC Collegiate Program Chair,
jashley1990@gmail.com

Some say I grew up in an airplane. I was a passenger at less than 1 year old. It is something that stuck with me early on when, in 1995, I made the first trek to AirVenture with my parents (this year will be my 21st consecutive year making the pilgrimage to OSH). Those treks continued into high school as I looked for opportunities to become more involved in aviation. I took a job, as so many do, working at the local airport as a ramp rat. I spent those years learning from the old sages that frequented the daily "Liars' Club" for their morning coffee and social hour.

Working as often as I could and saving my pennies, I soloed the day before I first flew to AirVenture '08 in an Aeronca Chief. A scant two years later, I would not only be completing my CFI to teach others the joy and thrill of aerobatics, but also competing at local contests as a Purdue University student. As is usually the case when one's time comes to leave the wonderful bubble that is higher education, my days of actively competing as a student at Purdue came to an end in 2012. From there I moved on to new things, but I have always enjoyed the fellowship that comes with the group of people now reading these words.

In 2012, I was asked to chair the parking area for the IAC during AirVenture. Since that time, I have walked many, many miles around the small area that IAC has for parking, parked several hundred aerobatic airplanes, and met many hundred more IAC members, pilots, and those just interested in seeing what we enjoy doing. It has been an extremely enjoyable and rewarding few years. It's a position that, I am happy to say, I will continue to serve for the foreseeable future.

In the fall of 2015, Lynne Bowes asked if I would be interested in taking her place as the head of the IAC's Collegiate Program. I had no idea what I was getting myself into, but having been involved with the IAC as a volunteer and competitor, I was ready and looking for a new challenge. I also feel strongly that it is the involvement of young people, not just within the IAC but in aviation as a whole, that will ensure our sport and aviation continues well into the future. Lynn has done a wonderful job building the program into what it was when I took over. Under her leadership, it has grown in participation, sponsorship, and presence. I was fortunate to take over the program with such a great foundation. Since officially being confirmed as the program chair in November, I have been formulating a plan of action to take the program to the next level.

The plan for the immediate future is to grow the presence of the program, not only in the United States, but also around the world. For the time being, this will be done with the IAC Collegiate Program's Facebook page. In the future we hope to extend this reach through media and promotional materials as well. If you've not already, please take a moment to like our page. We have seen a 10 percent increase in likes of the page posts and more than a 50 percent increase in the reach or number of individuals who see our page content since January 1. We are positioning the page to be a place where relevant aerobatic and collegiate information can be found and shared. Did you know we have an astonishing 162 individuals in Brazil who follow the collegiate program page? In addition

to Facebook, we have an exciting schedule lined up for AirVenture this year, which will include a dedicated Collegiate Program space at the IAC Pavilion, which provides a location where anyone can find out more about the program.

One of the members of the Collegiate Program Committee, UND instructor Mike Lents, will be speaking on the program at one of our forums as well. Also key among the program committee is Dagmar Kress. Dagmar has a wonderful passion for aerobatics—so much so that she is in the process of forming a collegiate team with MSU-Denver. We look forward to seeing her team compete this year. Dagmar has also been gracious to be the primary sponsor of the Collegiate Program for the past few years. It is with her sponsorship that we are able to provide awards and trophy. Going forward, we will also be able to increase outreach initiatives. Many thanks to Dagmar for her support over the years and her input on the committee. A new area of outreach is a limited run of Collegiate Program merchandise that will be available for those who wish to show their support and/or participation in the program.

Looking to the future, we are planning to reignite and create pathways for schools who may have once had a formal competition team or have a few students who are interested in competing in the program. We are looking for potential flight schools who are near or willing to partner with a school or university. We are also beginning to create program-specific information and articles in this magazine for chapters to resource for their younger membership. If these are things that interest you, I look forward to hearing from you. The Collegiate Program is something that I am excited and honored to be working on. I look forward to the future of the program and serving as the program chair.

The Collegiate Program will host a gathering on Tuesday, July 26, at 6 p.m. at the IAC's Vicki Cruse Pavilion at AirVenture. We'll have a small presentation followed by a question-and-answer session. Everyone's invited! *IAC*

Tales of a Tech Inspector

Missing rudder cable cotter pins

by Tom Myers, IAC 16830

Aerobatic history has taught us that rudder cable failures can lead to particularly bad outcomes, so I am especially careful to go over them during tech inspections. This article tells the story of one of those inspections at a recent contest.

The photo shows a typical attachment between a rudder cable and a rudder steering arm. The rudder cable is terminated with a clevis fork. The clevis fork is attached to the rudder steering arm with a clevis bolt. The clevis bolt is kept in place with a castle nut. The castle nut is kept in place with a cotter pin that passes through a hole in the clevis bolt and the slots of the castle nut. The cotter pin is properly called an anti-rotation device in that it keeps the nut from rotating off the end of the clevis bolt. Sometimes a nut that includes an integral locking feature is used, but the principal is the same. In the case of a castle nut being used, there is no integral locking feature, so a cotter pin must be used as an anti-rotation device.

While tech inspecting the rudder steering arms of one particular plane, I found myself staring at something almost too unbelievable to be real. But there it was, plain as day. Not just one but both castle nuts were missing their cotter pins. Both castle nuts were loose and could be rotated by hand. In fact, the only thing keeping the castle nuts on the clevis bolts was the pavement grit in the breather oil residue in the clevis bolt threads.

I showed this to the pilot, who, to his credit, immediately grasped the severity of the situation. Fortunately, there was a repair shop at the airport, and the pilot returned shortly with an A&P wielding new cotter pins, and the situation was quickly rectified. After the contest, I followed up with the owner of the plane, and it turned out that the rudder cables had been taken off the plane for inspection during the recently completed annual inspection.

There are many lessons to be learned from this event. First, never assume that just because a plane has seen recent maintenance that it is most likely to be in perfect shape. Second, include the rudder cables and attach hardware in your preflight inspection. Third, if you are performing tech inspections, this is an important area to be looked at carefully. Fourth, sometimes the margin between an uneventful flight and a serious situation can be as thin as a little sliver of wire, and thus it is so important to be ever mindful of your plane's condition. IAC

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Brilliance and Buffoonery

By Beth E. Stanton *bethestanton@gmail.com*

Thinking Outside the Box for Chapter Meeting Ideas

Doug Burr makes his first jump.

Each month I think, "Who can speak at our next chapter meeting? What topic can we cover?" Chapter 38 meets on the fourth Sunday of the month. An interesting guest speaker is a good enticement for member turnout. Also, we have pizza. During the contest season, we primarily focus on competition aerobatics and critique days. But when the season winds down, it's good to keep momentum going.

For many of our members, aerobatics makes up the majority of their flying. However, we are first and foremost pilots. To that end, our January meeting was held at the Jeppesen International Trip Planning Services' downtown San Jose, California, facility. Located on the 16th floor, it has a fantastic location directly under short final of the San Jose (KSJC) runways. About two dozen members turned out for a dual presentation. Meteorology expert Reuben Kast gave a talk outlining Jeppesen's pilot-oriented weather briefing capabilities. Flight planning expert Jeff Rupprecht (also a CFII, aerobatic pilot, and now a new member of Chapter 38, ha!) gave a talk on ADS-B, which takes effect on January 1, 2020. IAC 38 member Stanley Peters described this field trip as a "very illuminating and enjoyable opportunity." Synchronistically, there was a great pizza place right next door, so we kept with tradition for the after-meeting party.

At meetings, we've featured topics related to aerobatics such as formation flying and sky diving. We hosted formation-flying expert Tim Redden from the West Coast Ravens, a group of pilots from the western states who fly their RVs in formation at air shows and other aviation events. We had a meeting last summer at Skydive California in Tracy, California, where some of our members jumped out of a perfectly good airplane while others showed up for the presentation on recreational versus emergency chutes.

Other guest speakers and topics have included:

- Air show legend Wayne Handley
- Project manager of the Red Bull Stratos Mission, Marle Hewett
- Field trip to the Patriots Jet Team facility in Byron, California
- Reno air racer and builder Cris Ferguson flying for the judges, and chapter elders moderating a Q&A panelist discussion
- Avoiding maintenance mishaps by Dave Watson
- Bailout seminar by Allen Silver of Silver Parachutes
- U.S. Advanced and Unlimited aerobatic team member Ben Freelove discussing how to develop a personal aerobatic style
- Glider aerobatics with Guy Acheson from Williams Soaring Center

Veteran jumper John Haag

Two meetings focused specifically on safety:

- CFI and rocket scientist Pete Elgroth spoke on risk factors related to aerobatic flying
- CFI and safety director of the 2013 World Aerobatic Championships Chelsea Stein Engberg discussed safety as related to chapter critique days and regional contests

During the contest season, our meetings are critique days held at our aerobatic practice area at Tracy, California (KTCY). These are all-day, all-hands-on-deck affairs, with usually about a dozen pilots turning out. In addition to receiving valuable ground critiquing, these days serve as practice for soon-to-be and new judges. Everyone takes turns judge assisting and/or judging. It's a win-win for everyone.

We also host purely social events. Last October, with the contest season over, we met at Half Moon Bay Airport (KHAF) for a family-friendly weekend featuring pizza, pumpkin carving, pumpkin chunkin, hangar movie, bonfire, and sleepover. The crew regrouped in the morning for breakfast on the field at the 3-0 Café at the airport. The IAC 38 Holiday Party of Mayhem has become a December tradition. Activities the past three years have included indoor sky diving, electric go-karts, and gambling mini golf.

We seem to have struck a balance that combines education, support, aerobatic critique, and just plain fun and camaraderie. It's interesting to see how different members come out of the woodwork for different events. There is a core group of members who show up to every meeting and every event, no matter what. When we offer different topics, some of our members who are less competition-oriented jump aboard. This approach is attracting new members, bringing people into our sport, and provides guidance and mentorship. I'd love to get input from other chapters to share ideas and see what is working for you. Send your brilliance to *bethestanton@gmail.com*. IAC

Loading the pumpkin cannon.

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A Penny for Your Thoughts

Debris in the fuselage can be very dangerous

BY TOM MYERS, IAC 16830

Occasionally the question comes up about whether there is any real value in performing a tech inspection on an airplane before anyone is allowed to compete in it. The value was poignantly demonstrated at a recent contest, as I will explain.

The inspection of the first plane in this particular contest started with the usual pat-down of the belly, starting at the tail. The first thump of the fabric resulted in a thump-thump response from within. The pilots were standing right there and heard it too and wasted no time in breaking out the tools to open up the tail access cover. Within five minutes, a 1987 penny was deposited into my hand as a souvenir. I am being very specific when I write souvenir, because the IAC rule book specifically prohibits the bribing of contest officials. With the wayward penny removed from the plane, the remainder of the tech inspection proceeded uneventfully.

I can relate from personal experience that it is no fun when flight controls get jammed. Many years ago, while flying to the IAC Championships, I let the members of a Boy Scout troop sit in my plane one at a time while I was waiting out a thunderstorm. That day, I also learned the lesson about having people empty out their pockets before getting into the plane. Some stuff from one of the kids' pockets ended up under the seat. Since it was under the seat, the stuff escaped detection when both the tech inspector and I patted down the tail before my practice flight. The upline of my first figure hammerhead sent the stuff straight into the elevator lever arm in the tail. When I attempted to pull out of the figure on the downline, the control stick locked up. I pushed out instead, which freed up the debris and allowed me to land without incident.

By far, the No. 1 problem that I have found over the years while tech inspecting planes is foreign objects in the tail. I pat down the tail sections all the way from the seats to the rudder. I highly encourage other tech inspectors and pilots to do the same. I know you sometimes end up with a hand that is generously coated with used engine oil, but I guarantee that it is a small inconvenience compared to the benefit of the good deed that is being performed. The oil is just a good reminder that, besides a flashlight, a shop rag is a tech inspector's best friend. IAC

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CONTEST CALENDAR

Mark your calendars for these upcoming contests. For a complete list of contests and for the most up-to-date 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.

HighPlanes HotPoxia Fest (South Central)
Friday, July 8 – Sunday, July 10, 2016
Practice/Registration: Friday, July 8 – Saturday, July 9
Glider Categories: Sportsman through Unlimited
Power: Primary through Unlimited
Location: Fort Morgan (FMM): Fort Morgan, Colorado
Region: South Central
Contest Director: Dagmar Kress
Phone: (303) 887-4473
E-Mail: dagmaraerobatics@me.com
Website: http://www.iac12.org

Bear Creek Bash (Mid-America)
Friday, July 8 – Sunday, July 10, 2016
Practice/Registration: Friday, July 8
Rain/Weather: Monday, July 11
Power: Primary through Unlimited
Location: Richard B. Russell Regional (RMG): Rome, GA
Region: Mid-America
Contest Director: Mark Fullerton
Phone: 864 316 5250
E-Mail: markpcc2003@yahoo.com

Michigan Aerobatic Open (Mid-America)
Saturday, July 9 – Sunday, July 10, 2016
Practice/Registration: Wednesday, July 8
Rain/Weather: Sunday, July 10
Power: Primary through Unlimited
Location: Bay City James Clements Municipal Airport (3CM): Bay City, Michigan
Region: Mid-America
Contest Director: Brian Roodvoets
Phone: 810-338-7654
E-Mail: redfoot@chartermi.net
Website: iac88.eaachapter.org

Super D Tango (South Central)
Saturday, July 9 – Saturday, July 9, 2016
Practice/Registration: Saturday, July 9
Power Categories: Sportsman
Location: Akroville (XA68): Denton, Tx./ Slidell, Tx.
Region: South Central
Contest Director: Tom Rhodes
Phone: 214-202-7008
E-Mail: tom@tomrhodes.com

The Corvallis Corkscrew (Northwest)
Friday, July 15 – Saturday, July 16, 2016
Practice/Registration: Thursday, July 14
Rain/Weather: Friday, July 22 – Saturday, July 23
Power: Primary through Unlimited
Location: Corvallis Municipal Airport (CVO): Corvallis, Oregon
Region: Northwest
Contest Director: Jim Bourke
Phone: 541-231-6077
E-Mail: jtbourke@gmail.com
Website: www.iac77.com/contests/corvallis-corkscrew/

Green Mountain Aerobatics Contest (GMAC) (Northeast)
Friday, July 15 – Sunday, July 17, 2016
Practice/Registration: Thursday, July 14 – Friday, July 15
Glider Categories: Sportsman through Unlimited
Power: Primary through Unlimited
Location: Hartness State Airport (Springfield) (VSF): Springfield, Vermont
Region: Northeast
Contest Director: Bill Gordon
Phone: 802-585-0366
E-Mail: wsgordon@earthlink.net
Website: IAC35.aerobaticsweb.org

CanAm Aerobatic Challenge (Northwest)
Friday, July 22 – Saturday, July 23, 2016
Practice/Registration: Thursday, July 21
Glider Categories: Sportsman through Unlimited
Power: Primary through Unlimited
Location: Cut Bank International (KCTB): CutBank, MT
Region: Northwest
Contest Director: Robert Harris
Phone: 503-550-1496
E-Mail: flyhran@aol.com
Website: www.iac77.com

East Coast Open Championship (Southeast)
Friday, August 12 – Saturday, August 13, 2016
Practice/Registration: Wednesday, August 10 – Thursday, August 11
Rain/Weather: Sunday, August 14
Power: Primary through Unlimited
Location: Everett-Stewart Regional Airport (UCY): Union City, TN
Region: Southeast
Contest Director: Mike Rinker
Phone: 731-796-0849
E-Mail: mdr@vaughnelectric.com
Website: www.iac27.org

Kathy Jaffe Challenge (Northeast)
Friday, August 12 – Sunday, August 14, 2016
Practice/Registration: Thursday, August 11 – Friday, August 12
Power: Primary through Unlimited
Location: South Jersey Regional Airport (VAY): Lumberton, NJ
Region: Northeast
Contest Director: John Fellenzer
Phone: 845-978-0511
E-Mail: jdf@fellp.com
Website: IAC52.org

Beaver State Regional Contest (Northwest)
Friday, August 12 – Saturday, August 13, 2016
Practice/Registration: Wednesday, August 10 – Thursday, August 11
Glider Categories: Sportsman through Unlimited
Power: Primary through Unlimited
Location: Pendleton Regional Airport (PDT): Pendleton, OR
Region: Northwest
Contest Director: Sean VanHatten
Phone: 1-541-480-7456
E-Mail: seanvanhatten@gmail.com
Website: www.iac77.com

Doug Yost Challenge (Mid-America)
Friday, August 19 – Sunday, August 21, 2016
Practice/Registration: Thursday, August 18 – Friday, August 19
Power: Primary through Unlimited
Location: Spencer Municipal (KSPW): Spencer, IA
Region: Mid-America
Contest Director: Justin Hickson
Phone: 651-338-3345
E-Mail: jhisbatman@yahoo.com
Website: www.iac78.org

Upper Canada Open (Mid-America)
Saturday, August 20 – Sunday, August 21, 2016
Practice/Registration: Friday, August 19
Power: Primary through Unlimited
Location: Saugeen municipal (CYHS): Hanover Ontario
Region: Mid-America
Contest Director: Ryan Chapman.
Phone: 416-388-5850
E-Mail: ryangkc@hotmail.com

Rocky Mountain House Aerobatic Contest (International)
Saturday, September 3 – Sunday, September 4, 2016
Practice/Registration: Friday, September 2
Power: Primary through Unlimited
Location: Rocky Mountain House (CYRM): Rocky Mountain House, Alberta, Canada
Region: International
Contest Director: Dave Barbet
Phone: 403-875-3467
E-Mail: dbarbet@telus.net
Website: www.aerobaticscanada.org

Hill Country Hammerfest (South Central)
Saturday, September 3 – Sunday, September 4, 2016
Practice/Registration: Friday, September 2
Rain/Weather: Monday, September 5
Power: Primary through Unlimited
Location: Llano Municipal (AQO): Llano, TX
Region: South Central
Contest Director: Jeffery Poehlmann
Phone: 512-423-5333
E-Mail: jeffery@texas.net
Website: iac107.org

Happiness Is Delano (Southwest)
Saturday, September 3 – Sunday, September 4, 2016
Practice/Registration: Friday, September 2
Rain/Weather: Monday, September 5
Power: Primary through Unlimited
Location: Delano Municipal Airport (DLO): Delano, CA
Region: Southwest
Contest Director: Stephen De La Cruz
Phone: 7609636426
E-Mail: fj40cruzer@me.com
Website: http://www.iacchapter26.org/

Apple Turnover (Northwest)
Friday, September 9 – Saturday, September 10, 2016
Practice/Registration: Thursday, September 8
Power: Primary through Unlimited
Location: Ephrata Municipal Airport (EPH): Ephrata, WA
Region: Northwest
Contest Director: Patrick Lavielle
Phone: 2062268738
E-Mail: patricklavielle@gmail.com

East Coast Aerobatic Contest (Northeast)
Friday, September 9 – Sunday, September 11, 2016
Practice/Registration: Friday, September 9
Power: Primary through Unlimited
Location: Warrenton Fauquier Airport (HWY): Warrenton, VA
Region: Northeast
Contest Director: Adam Cope
Phone: 703-623-9445
E-Mail: adam.cope@signatureflight.com
Website: https://www.facebook.com/IAC-Chapter-11-68851751698/events

Ace's High Aerobatic Contest (South Central)
Saturday, September 10 – Sunday, September 11, 2016
Practice/Registration: Friday, September 9
Power: Primary through Unlimited
Location: Newton City (EWK): Newton, KS
Region: South Central
Contest Director: Ross Schoneboom
Phone: 316-519-2079
E-Mail: schoneboomr@prodigy.net

U.S. National Aerobatic Aerobatic Championships 2016 (South Central)
Friday, September 23 – Friday, September 30, 2016
Practice/Registration: Friday, September 23 – Saturday, September 24
Rain/Weather: Saturday, October 1
Glider Categories: Sportsman through Unlimited
Power: Primary through Unlimited
Location: North Texas Regional Airport/Perrin Field (KGYI): Denison, TX
Region: South Central
Contest Director: Gary DeBaun
Phone: 612-810-6783
E-Mail: b747inst@aol.com
Website: https://www.iac.org/us-national-aerobatic-championships-2016

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