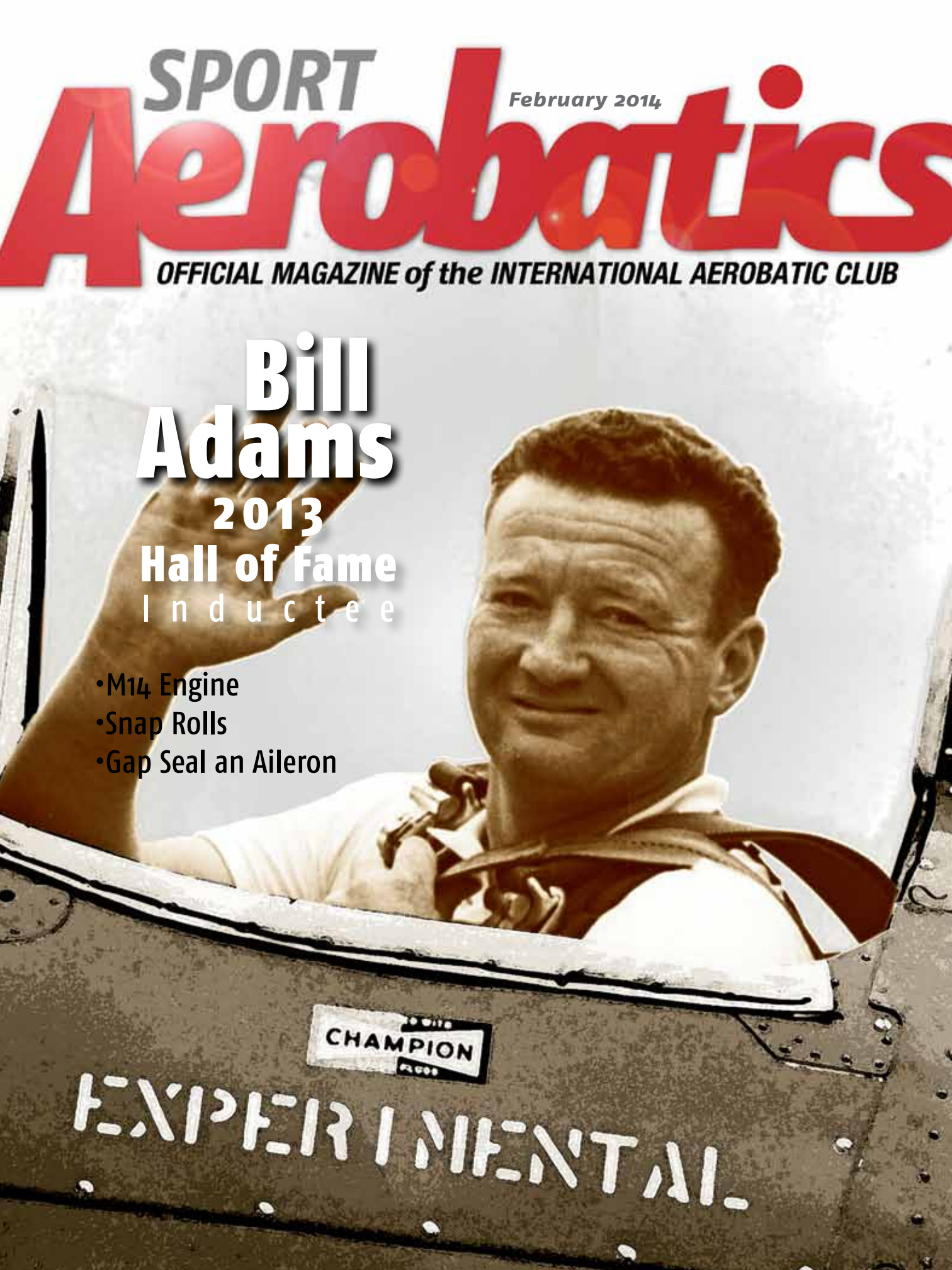
SPORT Aerobatics
February 2014
OFFICIAL MAGAZINE of the INTERNATIONAL AEROBATIC CLUB

Bill Adams

2013 Hall of Fame Inductee

- M14 Engine
- Snap Rolls
- Gap Seal an Aileron



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SPORT Aerobatics

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—Bill Adams Jr.

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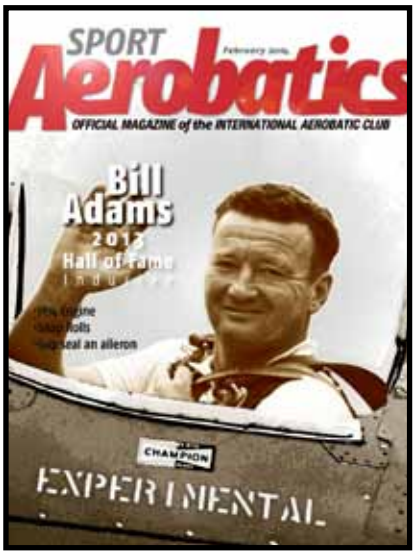

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Bill Adams waves from his 450 Stearman.

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SPORT Aerobatics
OFFICIAL MAGAZINE of the INTERNATIONAL AEROBATIC CLUB

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:
Bill Adams Jr.
Monty Barrett
Gary DeBaun
Steve Johnson
Reggie Paulk
Dan Rihn
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**

"YouTube" and historic footage

HOF inductee shows off skill

Every year, the IAC inducts one member of the aerobatic community into its Hall of Fame, and I've had the honor of interviewing either the inductee or the inductee's family, in the case of their earlier passing. This year, I had the pleasure of learning about our newest inductee, Bill Adams, from his son and namesake, Bill Adams Jr.

Bill Adams was instilled with a passion for flying from a young age . . .

As with all of our previous Hall of Fame honorees, Bill Adams was instilled with a passion for flying from a young age and pursued that passion with unrelenting vigor throughout his life. If you have an opportunity, visit YouTube and search "Bill Adams air shows." You'll be rewarded with classic films—some color, others black-and-white. His early years as a crop duster are immediately apparent as he hugs the ground and trees during a routine that could be pulled off only by a true genius of Stearman flying. One commentary by a television announcer who's obviously a former World War II aviator puts his flying into perspective. The announcer is dumbfounded by the skill demonstrated—quite a compliment from someone from the "Greatest Generation."

In 1966, Bill Adams died at the controls of his Stearman after a broken crankshaft sent a propeller blade through the flying wires of his left wing. Bill Jr. was only 17 years old at the time, and his father's memory has not diminished—he's still a larger-than-life hero to his son.

You might notice a familiar name on one of our stories this month—Monty Barret. Monty is the founder of Barret Performance Aircraft, also known as BPA, and has done an enormous amount of work on the M14 radial engine that powers many prominent airplanes—including the Pitts Model 12. It took some arm twisting, but I was able to get a great article about this unique engine, and I hope you enjoy reading about it as much as I did. Thank you, Monty, for taking the time to invite us into your world for a little while.

Snap rolls, to many, are an enigma. Steve Johnson dives into the world of snaps this month on his piece by the same title. I appreciate him taking the time to show them from his perspective, and hope it helps you understand them just a bit better. Of course, there's nothing like stick time to help clarify things, but having good conceptual knowledge goes a long way toward final understanding.

Have a wonderful February and I'll see you next month! *IAC*

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

DOUG SOWDER
COMMENTARY / **IAC PRESIDENT, IAC 14590**

Freedom to fly

Yes, things change . . .

Back in the day, when I started flying lessons at Felts Field in my hometown of Spokane, Washington, the airport had no security fence. There was a line of logs separating the gravel parking at the FBO from the ramp area, evidently placed there to keep a runaway car from hitting any airplanes, as well as to provide a convenient place for airport bums to sit and watch the traffic. After several years as an unofficial landing field, Felts had been officially named a municipal airport in 1920, and received its current name in 1927. The art deco terminal building with a vestigial control tower on top was a leftover from the airline, airmail, and National Guard days of the 1930s. By the time I arrived, the terminal housed a café and, upstairs, a flight service station (FSS). I never saw any activity in the old tower.

I think back on those times fondly and often, but with no remorse for the present or the future.

Things were pretty simple. Park on the gravel, meet the instructor, preflight one of the C-150s, which at that time were all pretty new, and taxi out for takeoff. If I was feeling daring, I'd stop at the shorter "grass" parallel runway and go from there. One thing I didn't really like was my instructor's insistence that I always call the FSS prior to taxi and again prior to takeoff. It was preparation for the future. I also was to call FSS when returning, but as headsets evidently hadn't been invented yet and the radios were a bit sketchy, one often didn't really know the results of the check-in.

I was working that summer between high school graduation and the start of engineering school in the fall, and I only got about two-thirds of the way to my pilot certificate. When I drove out for my first lesson the following June, things had changed. The instructor, for one. Another great guy, as was my first one. The parking lot was still gravel, and the "grass" runway was still dirt, but . . . something new . . . a fancy new control tower. Just more complication, I figured, not only because of the radio thing, but there were light signals to learn now that there was someone there to operate them. Still no headset. The vacuum tubes in the radios were a year older. The carbon microphones must have lost some carbonation. I wasn't crazy about the new order of things.

I think back on those times fondly and often, but with no remorse for the present or the future. Of course, I learned radio procedures, and I could actually see some benefit in the tower's efforts to keep airplanes separated. I was traveling quite a bit with my dad in a Cessna 310 in those years, to all corners of the United States, so I learned a lot about flying "in the system" and became comfortable with it. And I still love any opportunity to hand-prop a Cub and putter around at 70 mph.

Like most pilots, I subscribe to a number of publications, including magazines and newsletters both by mail and online, and I read the aviation news. What has struck me for a good many years is the gloom and doom that I hear from some pilots, and see in many pundits' columns. You'd think that we are using up the last few free air molecules in the atmosphere and suffering mightily at the hands of the faceless powers of evil. I swear that every time the mail carrier brings a certain one of my aviation newspapers, reading the first two pages should make any rational person abandon any hope of ever flying for fun. Don't those writers realize that what they do to sell subscriptions may

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

well be a self-fulfilling prophecy? The letters to the editor are, if anything, even worse. What's with the gloom and doom? Do these people actually fly?

It happens that I own an Extra 300L. It's a 1,300 nm flight from Felts Field to North Texas Regional Airport for the U.S. Nationals. Every September I get up on, usually, a Friday morning, have breakfast with my wife, Pat, drive to Felts Field, load up the Extra, and fly to Texas. The tower folks show up at 7:00 a.m., so I usually get to chat with them when I taxi for takeoff. I don't feel it's too much of an imposition to hook up with Spokane Departure as I head east over Mullan Pass. Those Rockies are big hills, and it's nice to have company. I normally stop at Sheridan, Wyoming, for fuel. There's an automated weather observing system (AWOS) for weather. Sometimes UNICOM responds to my calls from 20 miles out, other times I'm just transmitting in the blind. I land at a nice, well-maintained airport with a great FBO, gas up, have some coffee and a Snickers bar, taxi out, take off, and set a GPS direct course for Goodland, Kansas, at whatever altitude I want. Occasionally I'll call Flight Watch for a weather update, although my very affordable portable GPS with NEXRAD weather is really good and shows me any temporary flight restrictions that may be around.

Same story at Goodland. Great people who are always happy to see me, gas up, another Snickers bar, set a GPS direct course for North Texas Regional (KGYI) and away I go. True, there is a complex of military operations areas around Vance Air Force Base. I can choose to stay mute and fly beneath or around them, but I'm usually happy with the winds at altitude so I call ATC, talk with some helpful folks, and fly right on through with friendly traffic advisories. I call the tower approaching KGYI. They're always helpful, fitting me in to the pattern with those lucky pilots already there practicing. I land, unpack the plane, organize my rental car, and look around for some friends to have dinner with. It's an enjoyable and satisfying day.

Yes, things change, and not always for the better. But most all of us love to fly. We have a wonderful airspace system in this great country; we have a great infrastructure of airports, big and small, many with nearby motels, restaurants, courtesy cars, and good times to be had. Enjoy it, and share the joy! *IAC*

11th FAI World Advanced Aerobatic Championships
in Dubnica nad Vahom, Slovakia.

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2013 IAC Hall of Fame Inductee

Bill Adams

by Reggie Paulk with Bill Adams Jr.

On Friday, July 22, 1966, 17-year-old Bill Adams Jr. was trying to hand-prop the 450-hp R-985 radial engine on his dad's Stearman biplane. But at just 140 pounds, he couldn't get enough "oomph" to swing the big propeller. He switched places with his dad and sat in the cockpit while Bill Sr. got the airplane running.

"I remember that like it was yesterday," recalls Bill Jr. "He's sitting in the cockpit with the engine idling. He said, 'Be a good boy and stay out of trouble.'"

Those were the last words Bill Jr. would hear his father say—the next day, Bill Adams died while performing during a dedication ceremony at the Valparaiso Porter County Airport in Indiana after the crankshaft failed and a propeller blade cut the flying wires on his left wings.

At the time of his death, Bill was one of the best-known acts in the air show business. His fame was garnered at the helm of an airplane that earned a reputation as such a difficult trainer during World War II that it was dubbed the "Yellow Peril." Anyone with experience flying a Stearman would be awed by Bill's dazzling low-level performances in his big white and red biplane.

Bill's is a story like so many others of his time. Born in Watertown, Wisconsin, on October 11, 1925. His parents soon acquired a farm and he learned the value of hard work early on.

"I don't know how they did it," says Bill Jr. "His parents were really poor. But they scraped up enough to buy a farm. It was 43 acres, and they did everything. They lived off food they grew themselves and had cows, chickens, ducks—everything."

By the age of 14, Bill's brother Dave knew he was hooked on airplanes. On the eve of World War II, while plowing the fields on his father's farm, Bill would gaze into the sky as military pilots would perform maneuvers overhead—getting into trouble for not finishing his work.

At age 16, Bill earned his private pilot certificate in a J-3 Cub while working on the farm during the mornings, and then driving 45 minutes to Milwaukee to work the second shift for A.O. Smith from 2:00 p.m. to midnight. He quickly earned his commercial certificate and began crop-dusting in converted Stearman biplanes.

"He did a lot of crop-dusting for Cliff Duscharm out of West Bend, Wisconsin," Bill Jr. begins. "He would build Stearmans up from scratch up there and spray DDT. He built up thousands of hours crop-dusting in Stearmans. Of course, if you get real good at flying a Stearman, you can pretty much fly anything after that."

In 1948, Bill saw Marion Cole and the Cole Brothers Air Show performing. After that, he knew he wanted to do the same. He sold a Waco UPF-7 he owned and purchased a Stearman so he could seriously begin practicing aerobatics. Bill Jr. remembers the airplane, even though he was very young.

"It was my 4th birthday party," he says. "I remember Dad picking me up and setting me on the bottom wing of the Stearman. When he bought it, they totally stripped the airplane, the wings were off, and the fabric was off. They rebuilt it from the ground up."

Bill's first air show was performed as part of the Cole Brothers Air Show at Boscobel, Wisconsin, during the summer of 1952. During 1953-54, he flew both a solo act and a dual act with


BILL ADAMS


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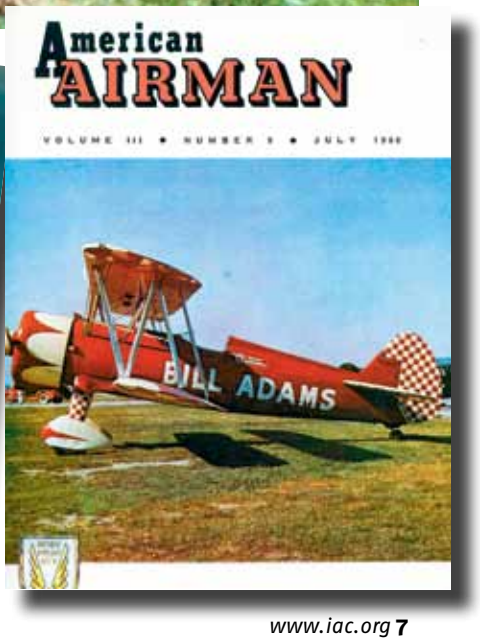
American AIRMAN
BILL ADAMS

COURTESY EAA ARCHIVES

Marion Cole. In 1955, Marion left the show to fly corporate and left Bill's performance as the headlining act, where he would remain until 1962.

In the winter of 1958, Marion Cole sat at the kitchen table with Bill and his family, talking about his Stearman.

"He sat at our kitchen table in my dad's chair," remembers Bill Jr. "We sat across from him, listening to all the reasons why my dad should buy his Stearman. My dad always liked Marion's Stearman because it was 200 pounds lighter and a little faster than his. It had a filled-in center section and was a single-seater, like my dad's."

COURTESY EAA ARCHIVES

Bill Adams 450 Stearman
Cole Bros. Air Circus

COURTESY EAA ARCHIVES

Bill ended up buying Marion's Stearman. It had been sitting for three years and needed refreshing, so it was completely re-built. Spoilers were added to the top and bottom wings for improved snap roll performance; a one-piece cowling was bolted to the firewall; lower wing fairings were added; the fuselage was metalized past the cockpit, and then he painted his name prominently on the side. Sporting the new modifications, the plane would now dive easily to 240 mph. Even though it only had one seat, that didn't prevent Bill from taking his son aloft.

"If I ever had to ride with my dad coming back from West Bend," says Bill Jr., "I'd have to sit on the floor where the front seat would normally be. There was a little smoke tank there, and I'd sit on some cushions against the smoke tank. It only took eight minutes to fly back from West Bend to Capitol Drive, so it wasn't a long flight. My dad was a famous air show pilot in his day, and I don't remember ever

COURTESY EAA ARCHIVES

From left to right: Doug Cameron, Announcer; Lee Marlin, Wing Rider; Brian Osgood, Aerobatic Pilot; Bill Adams; and Don De Baker, Stunt Man.

being upside down with him."

In the winter of 1962, Bill parted ways with the Cole Brothers to start his own show. They had to decide on a name, so Chet Chamberlain and Bill Jr. were pressed to the task.

"We were at this little sod airport," Bill Jr. begins. "It was a little pub in Brookfield, Wisconsin, called Aero Park—now it's a golf course. They were trying to come up with a name and a logo for his new air show. Chet said, 'Let's do Bill Adams Air Show.' My dad thought it sounded kind of vain, naming an air show after himself. He was thinking something like 'Checkerboard Air Shows.' I was about 12 years old, sitting at this bar, and I said, 'I agree with Chet.' I decided to vote against my dad. Here I am, having the luxury of sitting there while we're creating this name and logo, and he reluctantly went along with it. To me, it sounded great because Chet's whole point was that everyone knew who he was from all those years with the Cole Brothers."

Bill's air show was probably one of the biggest in the United States during the 1960s. The air shows were advertised as tailored to fit any budget.

"If a guy just wanted to buy the parachute jumper and a comedy act," says Bill Jr., "they could split off whatever parts the airport would want to buy. Most of the time, it was the whole show. It would start at 2:00 in the afternoon and be wrapped up by 4:30. They start out circling the jumpers—the wing rider was one of the first acts. There would be a comedy act or car-to-plane transfer. There was also a ribbon pickup. No matter what show he was in—whether Bill Adams, Cole Brothers, or Bill Sweet—they would

Bill's air show was probably one of the biggest in the United States during the 1960s. The air shows were advertised as tailored to fit any budget.

close with my dad. Nobody liked to follow him because he was a noisy, impressive act. The only way I can describe it is that it was much like Jimmy Franklin would fly his Waco. Duane Cole wrote that Bill Adams flew his Stearman like a bull dog shaking a rat."

In 1938, Bevo Howard became the first pilot to fly an outside loop in a light airplane and won the National Lightplane Aerobatic Championships from 1939-41. After learning of Bill's death, he sent a letter to Mrs. Adams that read in part:

"Without a doubt, Bill was admired for his wonderful qualities and flying skill more than anybody that I know. His influence was always good, and his contributions to American and International aerobatics were appreciated literally by millions of people. I feel very keenly this loss; however, I am also grateful for having had the opportunity of knowing him and working with him."

Lindsey Parsons, who flew his Great Lakes to a fifth place finish at the 1962 World Aerobatic Championships in Budapest, Hungary, likewise held Bill Adams in high regard. In a letter to Bill Jr., he had this to say:

"Your dad was one of the pilots competing in the National Aerobatic Championship back in the winter of 1962 at Phoenix. The night the event finished, I was with several fellow competitors at the hotel bar when we struck up a conversation with Betty Skelton and Herman 'Fish' Salmon. Fish, then the chief engineering test pilot at the 'skunk works' at Lockheed and one of the contest's

judges, and Betty both said that they were far more impressed with your dad's flight than any of the others. Even though he had to be downgraded in his routine for not performing all the ballet intricacies of the required Aresti coded maneuvers. He just, 'Got down low and dirty,' and dazzled everybody with that big, beautiful Stearman. Even though I was one of the 'ballet' guys myself, I couldn't have agreed more."

Bill's flying was so popular, he was invited to join the 1964 World Aerobatic Team in Bilbao, Spain, as the team's chief mechanic—and to fly his air show routine for all in attendance. Today, anyone with an Internet connection may just search "Bill Adams Air Shows" to find a number of YouTube videos featuring Bill's unique flying style.

As an aerobatic aircraft, the Stearman is rated to +12 and -12 *g's*—and Bill put the airplane to the test every time he flew. On takeoff, he would keep the wheels just above the runway to gain speed before pulling the big Stearman into an impressive snap roll—a maneuver he first perfected. He would then perform a series of rolls, triple-snaps, and loops, all the while belching great quantities of noise and smoke from the exhaust of that big Pratt & Whitney engine, and all while skimming the wheels through the grass. He also coined another famous maneuver—the outside square loop. During this maneuver, he would fly the airplane through four hard corners, while pushing in excess of -9*g*'s! The performance was so impressive, young Bill Jr. would have to wait 36 years to see something similar.

"The first time I'd seen Jimmy Franklin fly," begins Bill Jr., "was in 1999—I'd been away from air shows for a long time because of how my dad died. The first time I saw Jimmy fly, I thought, 'Oh my God!' I thought I was watching my dad. It was at the Mount Comfort Airport in Indianapolis. He was doing an inverted spin, and I'll never forget that. I went up to Jimmy after the show and said, 'That's the best air show I've seen since 1966.' He invited us into his trailer and treated us like royalty."

In 1959, Bill Adams won the Colonel Joe Mackey Trophy for excellence in precision aerobatics in aircraft over 200 hp. In 2012, he was inducted into the International Council of Air Shows (ICAS) Hall of Fame, as well as the Wisconsin Aviation Hall of Fame. His memory still burns bright, most notably in his son's.

"When returning from air shows, usually on a Monday morning, he'd buzz the house to let my mother know he was back and to head to the airport. I would wait as long as it took to see, especially during summer months. So, I asked him if he would fly over our school sometime when we would be outside for recess. He asked, 'What time is your recess?' I told him 10 a.m. Within two weeks, just past the far end of the playground, we could hear an airplane coming. Over the riverbed, below treetop level, upside down with smoke on! I could not believe it. I was so proud, and at that moment, I was the coolest kid at the St. James Catholic School. Actually, it lasted for my last two years of elementary school." **IAC**

Vedeneyev M14 Engine

A Russian born power house

BY MONTY BARRETT
BARRETT PRECISION ENGINES (BPE)

Basic Overview

The M14 engine is a development of the IA-14 engine (290 hp) and shares some of the accessories and other features of that engine. The engine displaces 620 cubic inches, has a compression ratio of 6.3-to-1, and will run on 91/115 octane fuel. It is a notorious consumer of oil and fuel, particularly when operated at high power settings. It is a Russian-designed engine, manufactured originally in Voronezh, Russia, and now being manufactured in Romania. It was the engine of choice for several models of Sukhoi and Yak aircraft along with the Kamov helicopter and was more recently used in the Pitts Model 12 along with the non-aerobatic Murphy Moose and the Radial Rocket. Rumor has it that the engine was also used to run irrigation pumps in Russia, a testament to its durability.

Lower end assembly.

BPE fuel injection nozzle.

Stock Russian pistons (left) and BPE high-compression piston (right).

Nose case with BPE manufactured liner.

Engine Description

The M14 is a nine-cylinder, mildly supercharged engine, with a lot of low-friction roller, needle, and ball bearings. In its original configuration it was equipped with a complex carburetor very similar to the Bendix PS-5 pressure carburetor. The engine layout is similar to U.S. radial engines, and as such it is very damage-tolerant and durable. The crankshaft is of the built-up type similar to the Harley-Davidson motorcycle. The M14 uses a "pinch bolt" to secure the rear crank check to the crankpin, and this bolt is stretched at final assembly. The engine relies heavily on lock plates to secure the internal fasteners. The engine is also geared, and as such the propeller operates at a different speed than the crankshaft at a ratio of 0.658-to-1. Therefore, when the engine is running at 3000 rpm, the propeller is running at 2000 rpm (in rounded numbers). Propellers tend to be more efficient when operated at slower speeds, and they produce much less stress on the engine.

Russian power settings are different than what American engine manufacturers use, and the nomenclature can be confusing. Wide-open throttle and maximum rpm for the Russian engine is a five-minute limit. Wide-open throttle and 2400 rpm is referred to as Nominal 1 (Nom 1) power and is maximum continuous—equivalent to 80 percent of the basic power. Nominal 2 (Nom 2) power is achieved with 32 inches mercury (Hg) and 2050 rpm. Nom 2 is used for cruise climb and high-speed cruise and is equivalent to 240/360 or 66 percent power. Cruise 1 power is achieved with 29 inches Hg and 1860 rpm and is 50 percent power. Cruise 1 is used for normal cruise.

The crankcases are forged aluminum; the nose case, which houses the reduction gear, is cast magnesium; and the accessory drive case is cast aluminum as is the supercharger housing (called induction housing).

The engine is fitted with roller tappets, roller rockers, needle bearing rocker fulcrums, a generator big enough to run the city of Oshkosh (weighing in at a whopping 26 pounds), and a carburetor of which the pilot has no cockpit control of the mixture. The carburetor is an altitude-compensating carburetor and as such is equipped with an aneroid that is sensitive to ambient pressure. The engine is also equipped with two magnetos, one of which has provisions for feeding a spark through the distributor section for starting. The engine has an onboard air compressor to recharge the reservoir of air that is used to start the engine and supply motive force for brakes, and flaps on some aircraft. The spinning system (air, distributor valve, etc.) also forces some air through the lower cylinders out of starting sequence to help clear residual oil from combustion chambers and exhaust pipes.

BPE electronic ignition controllers (left) and single M14 mag (right).

Supercharger

The "blower" is a rather unsophisticated finned wheel that operates at 8.12 times crankshaft speed in the –P engine and 10.0 times crankshaft speed in the –PF engine. The wheel is sealed and vented to atmosphere to prevent engine oil from entering the induction path, very similar to the Pratt & Whitney R-985 engines. The wheel is used to help atomize fuel as it enters the

BPE ignition coil and high-tension plug wire.

Master rod.

Accessory case fully assembled.

induction system as well as provide a slight amount of boost. Some of the parts that operate the supercharger are provided lubrication through very small orifices located in the induction housing and adjoining intermediate shafts. Much improvement could be done to the blower wheel as it is rather inefficient and robs the engine of power that is not returned to the propeller. Richard Goode of the United Kingdom has provided such an improvement that boosted the maximum inlet pressure to 46 inches Hg at sea level, and the engine reportedly produces 450 brake hp (bhp) for an undetermined amount of time. The engine is known as the M14-R engine.

Cylinder, Ports, and Combustion Chamber

The cylinders are a nitrided steel with high vanadium content of a standard bore of 4.1328 inches diameter with a long skirt that barely clears the rotating system. The barrels have some choke that is achieved at assembly from the interference fit of the cylinder heat to the barrel. When assembled the head is heated, the barrel is cooled, and the two parts are joined and secured by a modified vee-type thread. The maximum overbore of the barrel is 0.008 inches because of the thinness of the nitrided layer. The thread is a modified buttress thread.

The combustion chamber is a true hemispherical shape with a cast, flat-topped piston. The piston is fitted with no less than five rings, the compression rings being full keystone, and a sodium-cooled exhaust valve with a weird seat angle. The seat angle is 46 degrees, 15 minutes, and the valve is hard-faced and made from an investment casting and is currently *not* available as a new part. The guides are made from a bronze, and the exhaust guide is equipped with a scraper device to clean the stem of the valve. The engine itself responds very well to modifications to improve its performance and alter the fuel and oil consumption rate. One of the hot rod "tricks" that does *not* work is the porting and flow-matching that has been prevalent on the flat engines. In fact, it sometimes does not work on the flat engines either. If one wishes to detune an M14 engine, just alter the ports. They are very crude and inviting, but they are the only thing in the induction system that can provide swirl to the incoming fuel-air charge.

Modifications to the BPE M14 Engines

Normal oil consumption on these engines has been determined to be 1 quart in two hours, 1 quart per hour during acrobatics, and the brake specific fuel consumption (BSFC) varies with manifold pressure and rpm but exceeds 0.60 pounds/hp/hour at the higher

power settings. With this fact in mind, BPA developed a piston/ring combination that was aimed to improve friction loss within the engine, improve the oil control, provide some "tumbling" to the incoming fuel-air charge, and enhance the performance. The end result was a three-ring piston with a rail-expander type oil control ring. The ring package is of a very sophisticated design that has lineage to F1 and NASCAR use. The compression rings are quite thin being 1.5 mm and 1.0 mm thick. The second compression ring has a Napier hook for oil control. The oil ring is 3/16 thick and 1/8 thick when used with a nickel-sil cylinder. The piston generates a compression ratio of 7.5-to-1. *What is nickel-sil?* This is a process of applying nickel to a cylinder surface to restore the bore to a usable dimension. Because nickel is a non-wettable surface, a silicon slurry is burnished into the nickel to provide oil "wetability." It is not a new process—it has been used in Europe since WWII—and continues to this day on the more expensive European automobiles. BPE tested the process on an M14 engine the shop owns for a duration of 100 hours with temperature and power changes interposed in the test schedule. Nickel-sil is noncorrosive (won't rust) and was necessary because of the 0.008 maximum overbore limitation of the nitrided cylinder. **Do not use standard rings in a nickel-sil cylinder!** An engine equipped with BPE pistons will typically use 1 quart of oil in eight to 10 hours of operation at high power. The pistons are available with either the domed top or a flat-topped piston in the original compression ratio.

As most operators of the M14 engine have discovered, the engine has a very low oil temperature limitation. BPE discovered that most of the oil temperature is generated from the propeller reduction gear. It is handling over 600 foot-pounds of torque through six pinion gears. BPE also knew that some of the race car people have an oil temperature problem with their gearboxes, so we inquired how they were dealing with this and found out that they were using a process called "micro finishing" of the contact surfaces. The result of this is that we measured a set of pinion gears using the three-wire method, got a set of gears micro finished, measured them again, and detected no changes in dimensions. A set of micro-finished gears appear to be chrome-plated. They are absolutely beautiful in appearance, and they lower the oil temperature by a considerable amount.

There is a sleeve in the nose case that separates gearbox oil pressure from propeller governor pressure. This sleeve is subject to accelerated wear and will allow the governor pressure to "leak off" prior to controlling the propeller with the result being the propeller will not stay in low pitch, begins to "hunt," and eventually becomes uncontrollable. BPE makes a replacement sleeve that will correct this problem. The initial "fix" employed was a hard chrome and grind proce-

Low-tension ignition harness.

Supercharger in assembly.

Supercharger components prior to assembly.

Reduction gear pinion cage.

Crankshaft assembly.

dure, but this process became very expensive and has been discontinued at BPE. The sleeve is *not* shown as a replacement part in the current parts manual.

As previously mentioned, new exhaust valves are no longer available, and serviceable parts are rapidly disappearing. BPE has a repair procedure using a hard-chromed and ground stem to return to service an otherwise unserviceable part. This required a change in guide material that we have identified and tested, and have made some parts. Hopefully this will alleviate the problem for a while, but sooner or later someone is going to have to make some exhaust valves of good quality for the engine to remain as a viable, competitive powerplant.

Fuel Injection

Because of a limited ability to make field repairs and a lack of availability of parts (the carburetor facility no longer even exists), BPE began to employ fuel injection in its M14 engines. We knew the carburetor was somewhat restrictive to inlet airflow, and we knew from previous experience that a certain model of Airflow Performance fuel servo was very satisfactory, so we contacted Don Rivera at AFP and arranged for an FM-300A servo and the necessary adaptors for a

Exhaust valve and guide.

trial. This servo is very satisfactory for operation of the M14 provided it is properly jetted and has a proper air inlet to the servo. One of the downsides to this system is during cold-weather operation fuel does not evaporate well and collects by gravity in the induction housing in droplet form, forcing the cylinders into a too-rich condition wherein combustion will not occur. BPE, in association with others, developed a nozzle that much improves the fuel distribution within the engine and produces more power and more uniform temperatures. This nozzle has been thoroughly tested and is only available from BPE.

This injection system requires higher inlet fuel pressure, and BPE manufactures a spring that, when installed in the fuel pump, allows the higher pressure of 35-40 PSI. The pilot now has control of the mixture, and in test cell conditions we have operated the engine lean of peak without misfiring or roughness. We have operated the engine at Cruise 1 power as lean as 11 gallons per hour (gph).

Electronic Ignition

The magnetos for this engine are very reliable and quite heavy. Magneto parts have been historically difficult to procure. To deal with this problem and provide an improvement, BPE developed electronic ignition. To describe the system would require a lot of unavailable space, but the system is essentially self-supporting, is a "coil near plug" type, uses 14 mm automotive spark plugs of the proper heat range, is easy to install and maintain, has an advance curve tailored to the engine, and is approximately 20 pounds less in weight. Once the engine is started using battery power for the ignition, the system will provide its own power from an alternator enclosed in both timing controllers. It uses no parts of the Russian ignition system. The high-tension wiring is spiral-wound low-impedance, and radio frequency interference (RFI) is nonexistent. The system replaces both magnetos and is weather-resistant. Cold-temperature starting is improved. Provisions are incorporated in the timing controllers for electronic fuel injection to be developed in the future.

BPE has designed and constructed a dedicated test cell for the M14 engine. It is a propeller-loaded test cell that has the capability of measuring reaction torque. Once the torque and speed are obtained, the BHP is calculated by the product of torque and speed divided by 5252. Brake specific fuel consumption is calculated by dividing the *weight* of fuel consumed per hour into the BHP. For the BSFC to be entirely accurate, the fuel temperature has to be known.

All testing of the above-mentioned items were conducted in the BPE test cell using a 98-inch MT constant-speed propeller. This is an identical setup to the Voronezh test cell. IAC

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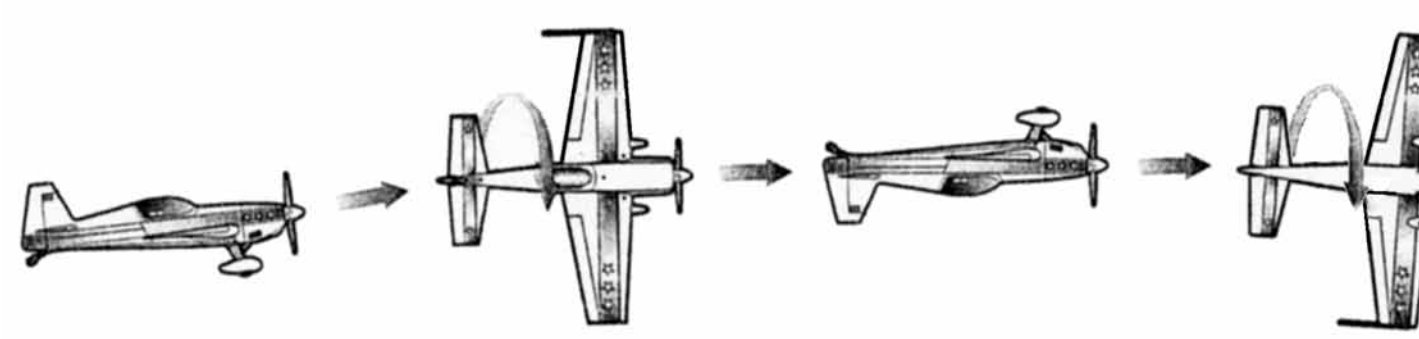
Snap Rolls

by Steve Johnson



So, you want to learn snap rolls? How do you feel about voodoo, witchcraft, and séances? Any discussion of good snap rolls tends to sound like something unworldly. Terms like buried, explosive, unloaded, hitting the wall, are all found in discussing snap rolls. And while scary sounding, when taken step by step, snap rolls are a fun maneuver to fly, even if not done very well. And, once learned, are a valuable skill to have when moving up.

There has been lots of talk throughout the aerobatic community about "category creep", the perceived phenomena of each IAC category becoming more complex and harder to fly as the years go by. Without straying into an entirely new argument, there are two big steps when moving from Sportsman to Intermediate; the first pushes and sustained negative flight, and snap rolls. In my mind, negative flight takes practice, practice, and more practice; just to get used to the sensations and in seeing the box, and the world, upside down.

Snap rolls, while taking at least as much practice, have a mythical, mysterious aspect about them. Bring up snaps, or flick rolls in the British parlance, in any conversation, and you will get as many methods for performing good snaps as people involved in the conversation! I will try in the next few paragraphs to provide a small primer for learning to fly snap rolls that will score well in front of the judges. First, be sure your spin recovery technique is current! A botched snap can and will quickly degrade to an unexpected spin. These unexpected spins from bad snap rolls can be very aggravated due to the high power settings and lower angles of attack on the wing.

Start snap roll training at altitude, like any new maneuver, and an instructor in the other seat always makes things better. An instructor can help tremendously with the initial training, where spatial disorientation will occur more frequently. Once your spin training is current and you are comfortable with spins, think about what needs to happen for a proper snap roll, and what the judges want to see in a snap roll. The requirements for both are very similar, but not identical. We will start with positive snaps, as negative snaps are not required until flying Unlimited category flights, and the concepts are the same for both positive and negative snaps.

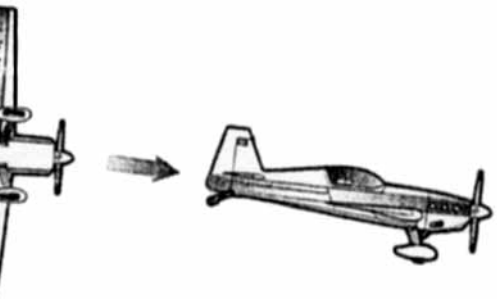
The IAC Rule Book states:

"Positive Snap Rolls represent one of the greatest challenges to judges. This is primarily due to two factors: (1) the "snapping" characteristics of different types of aircraft are unique; and (2) snap rolls

are high energy maneuvers that occur very quickly.

The judge must see two things to determine that a snap roll has occurred. The nose must depart the flight path in the correct direction and autorotation must be initiated. If the judge does not observe both events, the figure must be given a zero (0).

For a positive snap roll, the nose must move away from the wheels (Fig 8.5.35). This puts the aircraft's wings near the critical angle-of-



attack. Either shortly after the nose moves, or simultaneously with the nose movement, the aircraft must be seen to yaw, thus initiating a stall of one wing and subsequent autorotation. If any movement about the longitudinal (roll) or directional (yaw) axis is observed before the nose departs the line of flight, the figure is downgraded one (1) point per five (5) degrees.

Throughout the snap roll, the main axis of the snap roll's rotation must be in the correct plane and direction of flight. However, the type of motion (angle-of-attack and angular velocity) displayed around the main axis of autorotation differs between aircraft types (much as each type of aircraft has different spin characteristics). If the character of the snap roll changes during the figure, the figure is downgraded (See Family 9.1). A changing rate of rotation or the nose moving more onto the flight path (like a slow roll) is the most often observed change in character. But for all aircraft types, the criteria for stopping the snap roll is the same: the attitude before starting the snap roll and in the instant of stopping it must be identical and must correspond to the geometry of the basic figure on which the snap roll is performed.

Snap rolls must be observed very carefully to ensure that the competitor is not "aileroning" the aircraft around its longitudinal axis. Aerobatic aircraft with very high rates of roll can occasionally fool a judge in the execution of snap rolls. The movement of the aircraft's nose departing the flight path prior to autorotation is a good clue to the proper execution of a snap roll. As always, the competitor is given the benefit of the doubt, but if a judge is certain that a proper snap roll has not been executed, a zero (0) is given. Another common error is for the aircraft to autorotate, but to not stay in autorotation until the end of the figure. In this case, a deduction of one (1) point for each five (5) degrees of rotation remaining when the autorotation stops must be made. If autorotation ends with more than 45 degrees of rotation remaining, even if the roll is completed with aileron, the snap roll is zeroed."

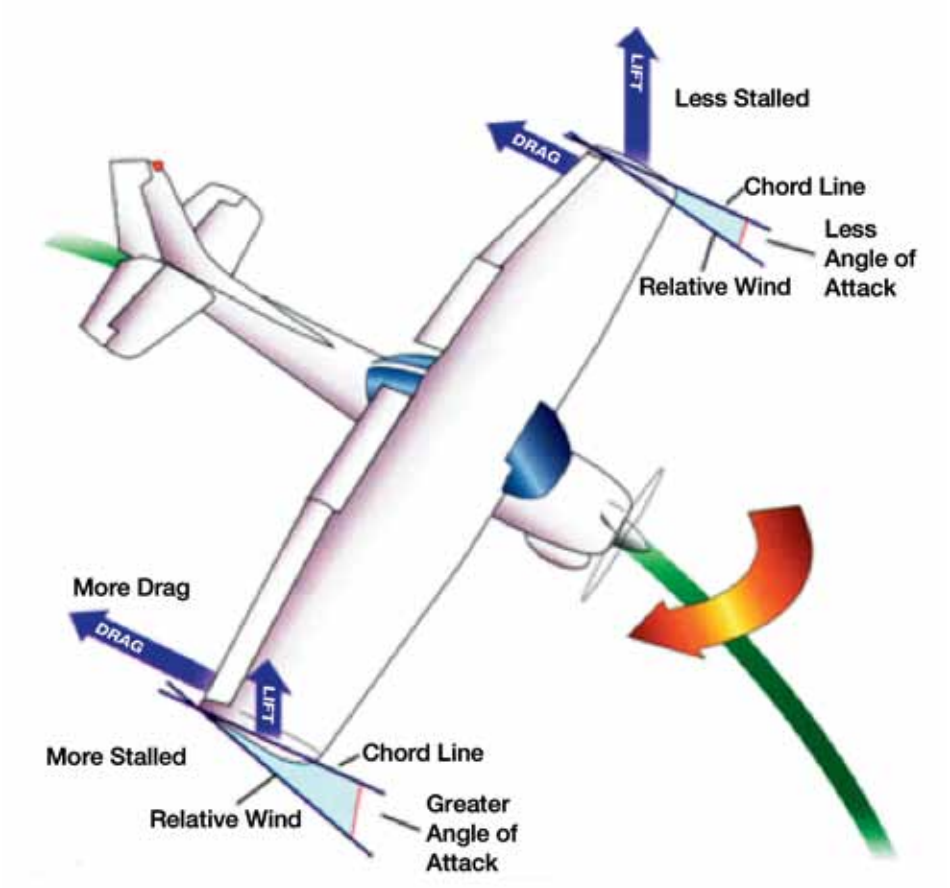
To reiterate, the judges must see the nose of the airplane move away from the line of flight in a positive direction (away from the wheels), and then the airplane must yaw and roll into autorotation. At the end of the snap, the aircraft must resume normal flight, on the original line of flight, with the wings level. We will start with a level, upright flight attitude for the first snap roll attempts, and will complete one full revolution. Unfortunately, snap roll characteristics and control inputs can vary with airspeed, line of flight, and amount of snap roll required. So, like I was told when I learned fly fishing, it takes just 15 minutes to learn, and the rest of your lifetime to figure it out! Once you master level upright snaps, the up line, down line and partial rotation snaps will require small changes in technique to show a good snap roll to the judges.

For example, snap rolls on 45 or vertical down lines require an exaggerated pull to show the nose displacement. This is especially true with 1/2 or 3/4 snaps. As said above, the snap roll is a high energy maneuver that happens very quickly, so the pilot must show the judges the pitch prior to the autorotation with some exaggeration on down lines.

So what is autorotation? In a normal spin, we stall the aircraft, then induce yaw with the rudder. The yaw causes one wing, the slower wing on the inside of the turn, to stall more deeply, and the other wing, moving faster on the outside of the turn, to regain partial lift. The asymmetric lift between the wings causes the autorotation. As long as the lift is varied from one wing to the other, the autorotation will tend to continue. To recover from the spin, we put in opposite rudder to slow the rotation, and then reduce the angle of attack with forward stick (down elevator). We will do the same thing in a snap roll, though much, much more quickly than with a spin.

Now we know what the judges want to see, so what do we need to do in the cockpit to make a snap roll happen? Snap rolls are nothing more than spins done on a horizontal (or other) line. But unlike a spin, the initiation of the snap cannot wait for the airplane to slow to a stall, we must stall the airplane at a higher than normal stall speed. Refer back to your initial flying lessons; at what airspeed will a wing stall? The simple answer is any airspeed, and the better answer is whenever the critical angle of attack of the wing is reached.

First, the elevator must be displaced, very rapidly, to cause the wing to reach the critical angle



Aircraft in right spin. High angle of attack and low airspeed on right wing, and low angle of attack and higher airspeed on left wing.

of attack, to stall the wing. Obviously, there can be some structural issues with pulling that much elevator, not to mention the G loads on our bodies. Most of our aerobatic aircraft have a maximum snap speed, and this speed must not be exceeded. Snap speeds below this maximum are legal, and safe, and most airplanes seem to have a good sweet spot at about twice the stall speed. In my Pitts S-2B, this sweet spot speed was 120 MPH, and in the MX-2, it turns out to be about 120 KTS. Obviously, we can't always be at exactly our best snap speed during contest flights, but this is a good place to start. Looking at Va, the maneuvering speed, (you do remember Va, right?) of most of our aircraft, this 2 X stall speed allows a snap speed below Va that will prevent damage to the airframe. We will use 120 MPH in our examples.

So, slow down, set an altitude up high, and establish a speed about 20 MPH/KTS below your desired snap speed, around 100 MPH in the Pitts, then add power to accelerate to 120 MPH. We usually use full power in snaps, as the snap roll itself is a high drag, energy losing maneuver. The high power setting allows us to fly off after the snap roll. Don't try to snap the first time out. As you hit the 120 MPH mark, pull the stick only about halfway back, as fast as you can. Even faster than that. Faster! You can't pull too fast, but you can pull too slowly. The goal is to maintain straight and level flight while causing the wing to pitch to the critical angle of attack. If you pull slowly, you will climb and gain altitude before reaching the critical angle of attack. The pull must be as fast as possible. As soon as you feel the stall buffet, relax the pull, and check your altitude. You probably gained at least 50-100 feet. Try this pull and relax several times until you can do it without gaining altitude. This is the pull that must be used for each snap.

Next, decide which way to start your snap; there is a difference. Given the normal rotation of Lycoming engines, starting your snap to the right will take a finer touch, but to stop the snap, against the torque, is much easier. Snapping to the left, however, is easier to start, but must be stopped just a hair earlier since the torque is trying to continue the left rotation. At first, you may not be able to tell much difference, but as you learn to feel the sensations of a good snap roll, the differences will become more obvious.

Once you can pull quickly to the critical angle, we will add the

rudder. Again, set your altitude and speed, then accelerate to the snap speed. Pull to the stall buffet, and immediately add full rudder. As the rudder goes in, reduce the back pressure on the elevator to unload the wing and to "accelerate" the snap. The forward stick movement should be at least to neutral elevator, and maybe a hair into forward pressure. Most new snap rolling pilots tend to "bury" the snap, meaning the stall was very deep throughout the snap roll. A good snap roll should pitch to, or very near, the critical angle of attack, but leaving the wing at the critical angle during the snap roll is a deep stall, high drag regime. So we reduce the angle of attack once the autorotation starts. The whole maneuver lasts barely a second or two, hence the British term of flick rolls for snaps. The roll should "flick" as fast as possible through the rotation. The common terms are that the snap should "explode" at the start, and stop like it hit a wall. The actual feel in the cockpit is not nearly that bad, but can be very disorienting when learning snaps. So start with altitude, and an instructor!!

Here is where some of the myth and mystique comes in. Traditionally, biplanes snap great using the above technique, the 2 step, pitch then yaw style of snap roll. Stereotypically, though not always, monoplanes use a slightly different technique, of a more one-step pitch and yaw, with some opposite aileron at the start to oppose the rudder input in the beginning. If you fly a biplane, try the 2 step method. Monoplane drivers can use the 2 step method, but the pitch tends to be too little, causing zeros for "no pitch" by the judges, or too much pitch, causing the jump in altitude discussed earlier. Sukhoi pilots, these methods will work, but they are not the recommended Suk snap procedure. Find a Sukhoi instructor or friend and buy them some gas.

In seven years of Advanced competition in my S-2B, I used the 2 step method with good success, after learning the finer points of good snaps. When I first learned snap rolls in the Pitts, I would lose 20-30 MPH during the snap. I was burying the snap, holding the high angle attack, way too much. Once I learned to push the stick forward to "unload" the wing and reduce the angle of attack, I would lose only about 5 MPH. This is a good goal, and can be practiced and learned when flying solo just by looking at the airspeed indicator at the end of each snap roll.

In the Pitts, I would push the stick forward at the same time as the rudder pedal went down, and the stick should go just a little forward of neutral so you will feel some back pressure on the stick. With this stick position, all that is needed is the opposite rudder to stop the snap cleanly and nearly instantly, like hitting a wall. The acceleration of the autorotation is vital in good snaps, and the acceleration comes only from reducing the angle of attack.

Stopping the snap is easier than starting the snap, but the timing is difficult. The stop is a mostly timed event, and the roll is so fast, there are no good visual cues ahead of time. The best visual cue is about 20 degrees before wings level in the Pitts. At this point apply full opposite rudder and then elevator as needed to hold level flight. You used full rudder to get into the snap, so full rudder is required to make clean, hitting-the-wall, stops. As soon as the snap stops, get back off the rudder to maintain straight and level flight. So, in the Pitts, the snap goes like this:

- **Level flight, 100 MPH, add full throttle**

- **At 120 MPH, pull the stick halfway back as fast as possible (faster!)**
- **At the buffet, instantly apply full rudder and push the stick forward to neutral or a little more**
- **At the 340 degree point of rotation, apply full opposite rudder to stop the snap**
- **As the snap stops, neutralize the rudder, and use elevator to maintain level flight**

Potential Problems:

Climbing before the snap: not pulling the stick back fast enough, or pulling too far. Full up elevator is not necessary at all.

Buried snap, or losing too much airspeed: not enough forward stick to unload the stall, or not soon enough.

Over/under snap: timing the stops just requires doing more snaps.

Snap won't stop, or degrades into a spin: typically, too much up elevator at the stop. Unload more during the snap, or push forward stick when stopping the snap. Potentially, the stick may be too far forward, causing the airplane to transition into a negative snap. You shouldn't feel any negative G during positive snap rolls. If you feel negative G, that's probably too much forward stick.

In the MX2 I learned to use the monoplane style snap, as early on using the 2 step method, the airplane would snap, but the pitch didn't show to the judges on the ground. To fix this, I started pitching too much and climbing. The monoplane style snap requires the nearly simultaneous application of up elevator, pro-snap rudder, and opposite aileron, just at the start. This has worked for me the last few years, after I finally got rid of the Pitts style, 2-step snap muscle memory.

In the monoplane style, adding the elevator and rudder at the same time usually causes some roll and yaw during the pitch, not after the pitch as is required. To the judges, this appears that some roll starts without the autorotation, which is a down grade. To keep the roll and yaw from starting too soon, some opposite aileron is added with the other inputs. Thus, for a right snap, I pull the stick back and left while adding full right rudder. The aft stick in my MX is about 6 inches of displacement, and the same for the left aileron. As soon as the pitch attitude is set (notice not the buffet), the stick explodes forward to just forward of neutral and right about 6 inches of neutral, not full deflections in either direction. The initial position for aileron can be practiced by adding opposite aileron to keep the wings level while counteracting the rudder until the snap occurs. The airplane will still snap during these "stick positioning" exercises, so be ready as you add rudder and opposite aileron. Once this position is learned, hit it quickly for a good snap entry.

Earlier I said that in the MX I just set the pitch attitude, I don't pull to the buffet. By setting the pitch attitude, and then explosively unloading the wing with the rudder already pushed, the downward moving wing will stall. As my good friend Wayne says, "flick it and believe." In reality, showing the judges a pitch attitude, and then rapidly, explosively pushing the stick forward with some pro-snap aileron while the rudder is pushed, will stall the down moving wing, causing the autorotation. This method allows the pilot to "skip" the deep stall, high drag, high angle of attack prior to the snap, and maintains energy much better throughout the snap, allowing for a more positive stop at the end. It sounds a little complicated, and it will be at the start, but it is no more difficult than a good crosswind landing in a tailwheel airplane. Remember how impossible that seemed?

Even in a monoplane, the 2-step pitch then yaw method may be better for initial learning and getting used to snap rolls. Then refine your technique once you gain some comfort and confidence with the basic maneuver. A coach on the ground can be of tremendous help in determining if your snaps appear buried, climbing, or are rolling without autorotation.

This is what has worked for me. The differences in our airplanes make the fine tuning of snap rolls a matter of practice in front of a good coach or judging line. I find a huge difference in my own technique when flying with students compared to solo. I expect part of it is trying to show the parts of the snap by keeping the rates slower, but the extra weight and change in CG does make a difference. If you already fly snap rolls, try accelerating the snap with more forward stick, or get the forward stick in more quickly. Burying the snap is the error we see most often in upcoming Intermediate pilots. Too deep a stall, and the explosive start disappears. If you are just learning snap rolls, try the 2-step method to get you going. We can tune the finer points as we go forward.

I didn't learn any of this by myself, so I need to thank several people who beat the "good snap roll" into me. As a competition pilot, it doesn't matter what you think about the figure, it only matters what you show the judges on the ground. My coach, Tom Adams, keeps me from "jumping" or climbing in snaps. Mike Rinker and Debby Rihn-Harvey got me to understand the monoplane style for snap rolls, so the snaps look good to the judges. And thanks, Wayne Roberts, for the "flick it and believe" concept. It really does work!! IAC

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Tech Tips Manual, volume IV

Aerobatics QA
More Gaps, Gaps, Gaps

by Dan Rihn

QUESTION—How does one gapseal symmetrical ailerons? A few years ago Patty Wagstaff asked me if I had a good way of gap sealing the ailerons for her then new Pitts S-1T.

ANSWER—All of the newer Pitts aircraft come with a symmetrical aileron airfoil section. Earlier Pitts and the Eagle II use a friese type aileron. With the friese aileron it is very easy to seal the gap. Figure 1 shows the two popular methods.

The problem with sealing the symmetrical aileron is that if you use the tape method over the gap, it will stick down on the aileron when it is deflected. Then it must somehow unstick itself to allow the aileron to be deflected the other direction. I have seen methods that use baby powder on the adhesive area of the tape that needs to remain unstuck, but I never liked the way this method leaves the tape bagging out when the aileron is in the neutral position.

The best method I have been able to come up with after several experiments is depicted in Figure 2. It consists of two pieces of tape and a strip of plastic in between. The tape I use is 3M #191 clear, IV2 inches wide—the same tape I use on friese ailerons. The plastic I've found to work the best is 6 mil clear poly-film, a polyethylene film made by Poly-America. It is available at most hardware stores. I bought a piece 1 foot by 20 feet for 99 cents—the smallest piece I could buy.

Here is how to install the gap seal.

First lay out the plastic sheet on a flat clean surface. Then mark and cut out strips of the proper length and width. For the S-1T cut the strips 2 inches wide; for the S-2, 3 inches wide. Before you cut out the strips measure and mark a line three quarters of an inch in from the edge. I found that

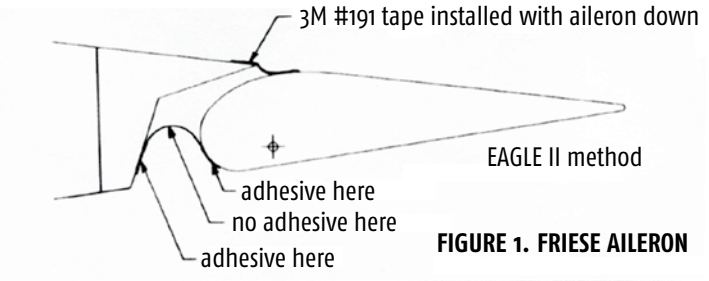


FIGURE 1. FRIESE AILERON

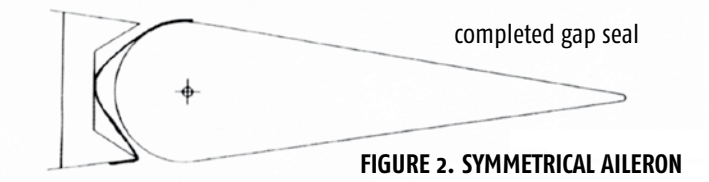


FIGURE 2. SYMMETRICAL AILERON

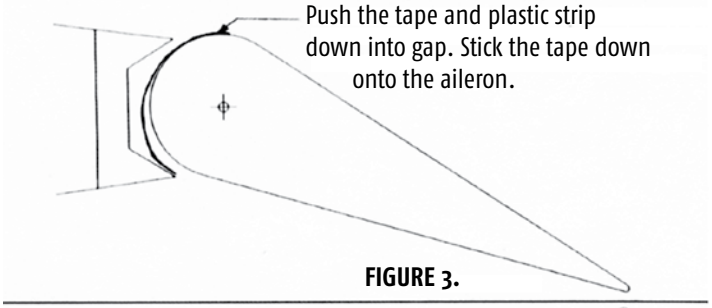
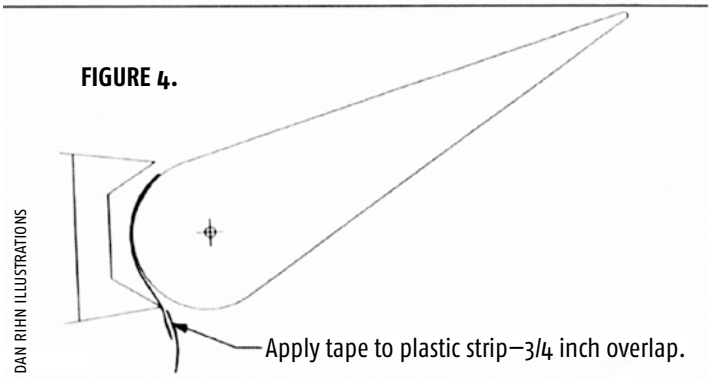


FIGURE 3.

FIGURE 4.



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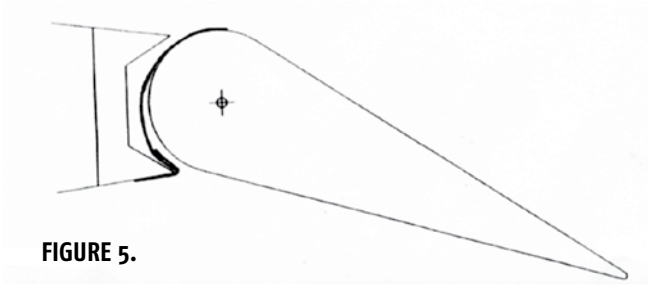

FIGURE 5.

a Sharpie Fine Line marker works the best on the plastic (available at stationery stores). The length of the strips will be determined by the distance between the hinges and the distance between the hinges and the ends of the aileron.

After you have cut out the strips of plastic apply tape to one edge of the plastic along the 3/4-inch offset line. I found working on the extra plastic a big help in keeping the tape clean and preventing it from sticking to the table.

With the aileron deflected down, slide the tape and plastic strip down from the top through the gap. See Figure 3. Try to get the tape and the plastic strip as far down the gap as possible. Then adhere the tape to the top surface of the aileron. Now move the aileron to the up position. The plastic strip should pop out through the bottom aileron gap. If the plastic does not easily pop out then use a piece of thin cardboard stock to help poke it through. See Figure 4.

Apply another piece of tape to the plastic strip —the sticky side towards the wing leading edge— again overlap the plastic by three quarters of an inch. After you have a good bond to the plastic strip move the aileron to the down position again. The plastic strip should slide up into the aileron well. Then you can stick the tape to the lower surface of the wing. See Figure 5. You should now have a very nice gap seal with no sticking or binding as shown in Figure 2.

Apply the gap to the inboard end of the aileron first. Do all the steps to get the hang of working with the material. Where the aileron tapers in thickness (the outboard end), you will have to taper the plastic strip. After a few trial and error sessions you will get the hang of it.

A list of materials and tools needed is:

- clean, flat workbench
- long, steel straight edge
- X-acto knife
- scissors
- Sharpie Fine Line marker
- several rolls of 3M #191 tape (each roll is 125 inches long)
- several feet of 6 mill poly-film

Good luck and have a happier roll rate! IAC

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

Midwest Collegiate Challenge

Friday, April 25 – Sunday, April 27, 2014

Practice/Registration: Friday, April 25
Power Categories: Primary Sportsman
Location: Seward Municipal (SWT), Seward, NE
Region: Mid-America
Contest Director: Ed Bowes
Contact Information: 402-730-3396
E-Mail: *edbowes@windstream.net*

Ben Lowell Aerial Confrontation

Friday, May 23 – Sunday, May 25, 2014

Practice/Registration: Friday, May 23
Power: Primary through Unlimited
Location: Sterling Municipal Airport (STK), Sterling, CO
Region: Mid-America
Contest Director: DJ Molny
Contact Information: 303-619-4814
E-Mail: *djmolny@gmail.com*
Website: *www.iac12.org*

Best Box in Texas)

Friday, May 30 – Sunday, June 1, 2014

Practice/Registration: Saturday, May 24 – Thursday, May 29
Rain/Weather: Sunday, June 1
Power: Primary through Unlimited
Location: Jackson County (26R), Edna, TX
Region: South Central
Contest Director: Gary Walker
Contact Information: 832-656-8314
E-Mail: *gawwalker@aol.com*

IAC Open East Championship – Ohio Aerobatic Open 2014

Friday, June 13 – Sunday, June 15, 2014

Practice/Registration: Thursday, June 12
Rain/Weather: Sunday, June 15
Power: Primary through Unlimited
Location: Bellefontaine Regional Airport (EDJ), Bellefontaine, OH
Region: Mid-America
Contest Director: Chris Keegan
Contact Information: 614-890-9711
E-Mail: *sdavis_1985@yahoo.com*
Website: *iac34.com*

Lone Star Aerobatic Championships

Friday, June 20 – Sunday, June 22, 2014

Practice/Registration: Thursday, June 19 – Friday, June 20
Power: Primary through Unlimited
Location: North Texas Regional (GYI): Sherman, TX
Region: Mid-America
Contest Director: Kathleen Kyer
Contact Information: 972-365-8767
Alternate Phone: 903-378-7827
E-Mail: *Kateflies8@aol.com*

Midwest Aerobatic Championship

Friday, June 20 – Sunday, June 22, 2014

Practice/Registration: Friday, June 20
Power: Primary through Unlimited
Location: Seward Municipal (SWT), Seward, NE
Region: Mid-America
Contest Director: David Moll
Contact Information: 402-613-5422
E-Mail: *davidmoll66@gmail.com*

Michigan Aerobatic Open

Saturday, June 28 – Sunday, June 29, 2014

Practice/Registration: Friday, June 27
Power: Primary through Unlimited
Location: Jackson County Airport—Reynolds Field (JXN), Jackson, MI
Region: Mid-America
Contest Director: Brian Roodvoets
Contact Information: 810-667-0642
E-Mail: *redfoot@usol.com*
Website: *iac88.eaachapter.org*

Green Mountain Aerobatics Contest (GMAC)

Friday, July 11 – Sunday, July 13, 2014

Practice/Registration: Thursday, July 10 – Friday, July 11
Glider Categories: Sportsman through Unlimited
Power: Primary through Unlimited
Location: Springfield Hartness Airport (VSF), Springfield Vermont
Region: Northeast
Contest Director: Bill Gordon
Contact Information: 802-585-0366
E-Mail: *wsgordon@earthlink.net*

Doug Yost Challenge

Saturday, July 19 – Sunday, July 20, 2014
Practice/Registration: Thursday, July 17 – Friday, July 18
Power: Primary through Unlimited
Location: Spencer Muni (SPW), Spencer, Iowa
Region: Mid-America
Contest Director: Dan Pichelman
Contact Information: 612-386-0352
E-Mail: *dan.pichelman@swivity.com*

CanAm Challenge

Friday, July 25 – Saturday, July 26, 2014
Practice/Registration: Thursday, July 24
Power: Primary through Unlimited
Location: Cut Bank International (CTB), Cut Bank, MT
Region: Northwest
Contest Director: Christopher Branson
Contact Information: 503-501-1496
E-Mail: *flyhran@aol.com*

Beaver State Regional

Friday, August 15 – Saturday, August 16, 2014
Practice/Registration: Thursday, August 14
Power: Primary through Unlimited
Location: Eastern Oregon Regional (PDT), Pendleton, OR
Region: Northwest
Contest Director: Christopher Branson
Contact Information: 503-803-7167
E-Mail: *christopher.branson@comcast.net*

2014 Oshkosh Air Maneuvers Challenge

Friday, August 22 – Sunday, August 24, 2014
Practice/Registration: Thursday, August 21 – Friday, August 22
Power: Primary through Unlimited
Location: Wittman Regional Airport (OSH), Oshkosh, WI
Region: Mid-America
Contest Director: Audra Hoy
Contact Information: 920-203-9000
E-Mail: *audra_hoy@yahoo.com*
Website: *www.iacchapter1.org*

U.S./Canada Aerobatic Challenge

Saturday, September 6 – Sunday, September 7, 2014
Practice/Registration: Thursday, September 4 – Friday, September 5
Rain/Weather: Monday, September 8 – Tuesday, September 9
Power: Primary through Unlimited
Location: Olean Municipal Airport (ole), Olean,NY
Region: Northeast
Contest Director: Pat Barrett
Contact Information: 716-361-7888
E-Mail: *cbpbmb@aol.com*
Website: *IAC126.blogspot.com*

Rocky Mountain "OYSTER" Invitational Aerobatic Contest

Saturday, September 13 – Sunday, September 14, 2014
Practice/Registration: Friday, September 12
Glider Categories: Sportsman through Unlimited
Power: Primary through Unlimited
Location: Lamar Municipal Airport (KLAA), Lamar, CO
Region: South Central
Contest Director: Jamie S. Treat
Contact Information: 303-304-7937
E-Mail: *jamietreat@q.com*
Website: *www.iac5.org*

2014 US National Aerobatic Championships

Sunday, September 21 – Friday, September 26, 2014
Practice/Registration: Saturday, September 20
Rain/Weather: Saturday, September 27
Glider Categories: Sportsman through Unlimited
Power: Primary through Unlimited
Location: North Texas Regional Airport (KGYI), Sherman, TX
Region: South Central
Contest Director: Matt Tanner
Contact Information: 719-359-6381
E-Mail: *mtaviation@gmail.com*
Website: *http://nationals.iac.org/*

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BY GARY DEBAUN, IAC #4145

Anthony Oshinuga

IAC # 435544
Occupation: Pharmaceutical Engineer
Chapter Affiliation: Chapter 36 Hammer Heads San Diego California
*Age: 30
*Website: AIROSHINUGA.COM , AIROSHI.COM
*Phone: 305-321-0441

GD: Anthony, give us a brief rundown about how you got started in aerobatics.

Aviation captured my interested at the age of 5. All it took was a visit to the airport with my father as we watched planes fly overhead to land. I was captivated by objects that were capable of sustaining flight. Everything after that moment directly or indirectly served a purpose in my life as it relates to aviation; building and flying radio controlled gas powered airplanes, enrolling in classes at the University of Emery Riddle at Daytona Beach Florida, volunteering at aerobatic contests and attending the University of California Riverside to obtain my degree in mechanical engineering. My first aerobatic flight was with Norm Manary November 2010 at Flabob airport and it was an experience to remember.

GD: Where was your first contest, what did you fly and how did you do?

AO: My first contest was in 2011 at Borrego Springs California. I flew a Super Decathlon and I placed 3rd in the Primary category.

GD: I know you just bought a beautiful Cessna 170A, but is there any aerobatic mount in your future?

AO: Yes Gary, as a matter of fact I have been looking for an aerobatic plane to purchase. After speaking to my mentor and Tim Just I believe the Pitts S1S is the right plane for me. Be on the lookout.

GD: Being a newlywed, how does your bride handle your aerobatic aspirations?

AO: I've known her for 12 years, so she has known that this has been a dream of mine and she supports me every step of the way. I'm truly lucky to have her because she wants me to obtain and achieve my goals as much as I would like to see them through.

GD: Do you have any preflight rituals, like stretching, yoga, listening to music?

AO: I don't really listen to music or stretch, but what I like to do is find a relatively quiet area where I can rehearse the sequences. I like to actually imagine positioning myself entering the box even down to the wing wags.

GD: Who, if anyone has been an inspiration to you in the world of aerobatics?

AO: Robert Holland is someone in the aerobatic world that I look up to.

GD: If you could change any one thing in the IAC, what would it be and why?

AO: If I could change one thing about the IAC it would have to be adjusting contest fees. There are a lot of young aspiring pilots that would love to get involved into the sport. One of the leading obstacles that limit new pilots from chasing the dreams are the fees that comes with contest and/or rental cost of operating an airplane.

GD: Do you have any other interests or hobbies outside of aviation?

AO: I think it is so important to stay fit, so I make sure to work out (basketball, running, weights etc.) five days a week. I also enjoy traveling to different countries and immersing myself within different cultures.

GD: What is your opinion of contest banquets?

AO: I attended my first banquet March 2012 as a volunteer at the Redlands contest and it was great. It's nice to sit down and talk to some of the competitors after the contest is over.

GD: What is your favorite flying movie?

AO: Top Gun is my # 1 movie, I even own a Blue Ray copy!

IAC

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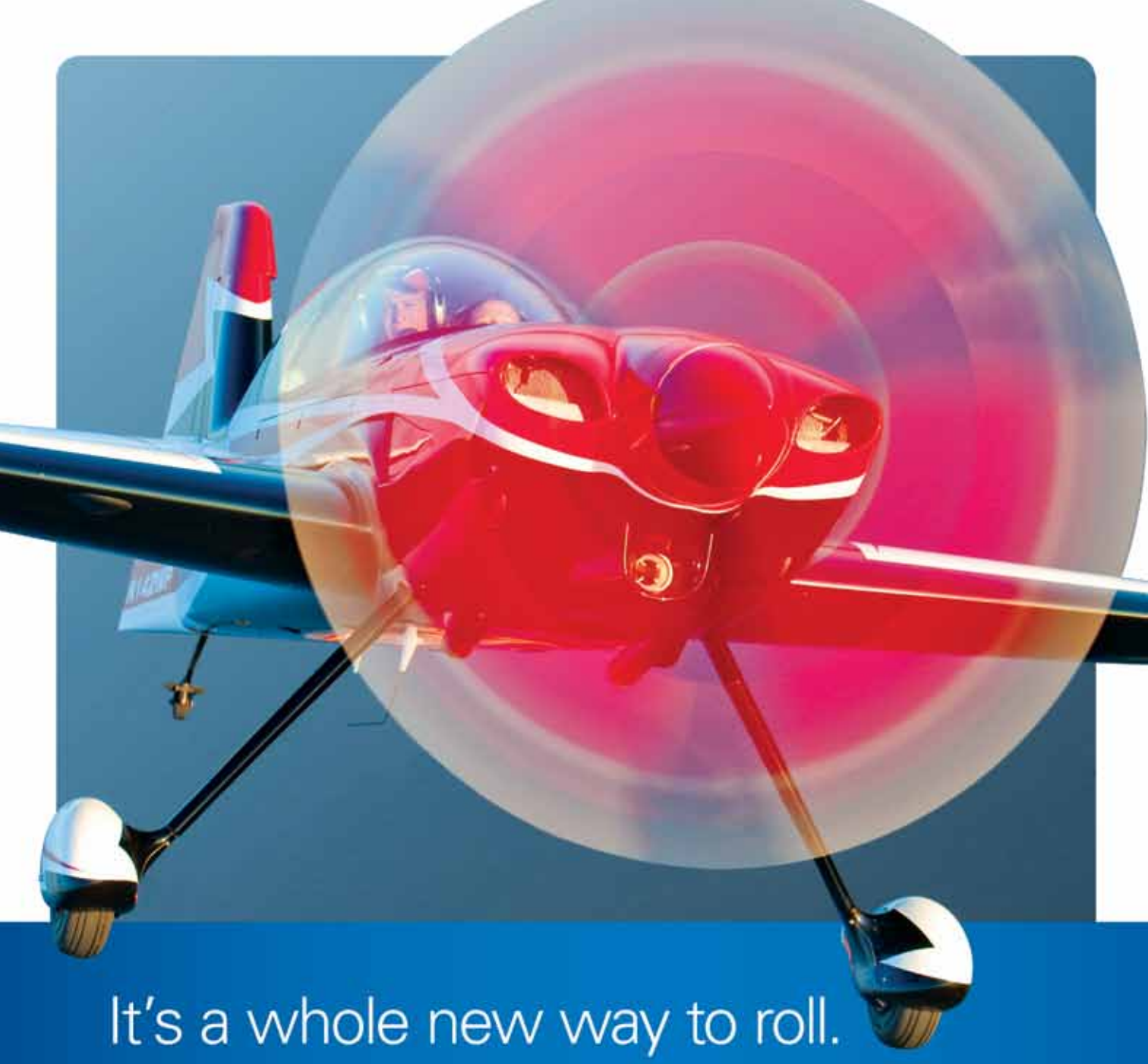

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