



SPORT

JULY/AUGUST 2024

AEROBATICS

OFFICIAL MAGAZINE OF THE INTERNATIONAL AEROBATIC CLUB

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BUILDING &
COMPETING IN A

VAN'S RV-14



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COVER

ON THE COVER:

Steve Thorne in his homebuilt Vans RV-14. The plane is decked out in WWII trainer livery in a paint scheme by Evoke Aviation. The design mimics the warbirds Steve flies at the Canadian Aviation Museum, Windsor, Ontario, Canada. Photo by Trent Wilson

ABOVE:

Alexandar Coats takes Brooks Mershon's Sukhoi SU-26M on his first flight as a Sukhoi "driver" in the Borrego Springs aerobatic box in California. Photo by Shane Short

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Some Tips on Flying Rolling Turns

BY JIM BOURKE, IAC 434151



About Rolling Turns

Elsewhere in this issue, the IAC's Judge Chair, DJ Molny, will be explaining to judges how to score *rolling turns*. These figures are just as hard to fly as they are to judge, so I thought it might help pilots out to hear some tips on how to fly them.

These are tips, not a recipe, because of the space I have available.

Preparation

In a rolling turn, the elevator and rudder are constantly moving "out of phase," which is a lot like patting your head and rubbing your tummy at the same time.

You probably already figured out that if you can't do great turns and great rolls, you are going to have a lot of trouble blending these things together. A great roll drill is to fly three continuous rolls at about one-third deflection on a straight line, both right and left. Don't even bother with rolling turns until you can do that step and stay on a straight line, with a feeling that you are simply rotating your body on the roll axis about your solar plexus. If you feel unbalanced, discontinuous yaw loading during this exercise, you aren't ready for a rolling turn. If you have a lot of altitude change, you aren't ready. If you leave your heading and return to it, you aren't ready. If you feel the need to rush, you aren't ready. And if you have to play catch-up anywhere during the rolls, you aren't ready. **Like everything else in aerobatics, first perform everything in isolation and then in combination.**

When you can do that well, you should also practice super slow rolls. I recommend 12 seconds per roll. Again, make sure you are staying on heading and make sure you aren't feeling any weird side loads or any of the other things I already mentioned.

Before I fly any rolling turns in competition, I first walk through them on the ground and prepare myself for what I will be *seeing, feeling, and doing* in the air. I select landmarks on the horizon that will help me ensure I'm pointed in the right direction every time I am upright and inverted, and I think about what the control inputs will be throughout the turn.

Focus on the Roll Rate

The primary best advice I can give to a pilot struggling with rolling turns is to focus on the roll rate. Since rolling turns

require almost constant aileron pressure, it is the easiest control to get right, and since the other controls are dependent entirely on roll orientation, it's also the most important.

At the beginning of the rolling turn, you will be applying rudder in the direction of the turn. Typically, this application of rudder will cause some roll command, so use subtle pressure on the aileron at the beginning. After the turn initiates, establish the needed aileron pressure, and from there, only make small changes in pressure as needed to keep the roll rate constant.

You will be moving the elevator control up and down smoothly during the rolling turn. Make sure you aren't adding and removing aileron pressure incidentally with the elevator movement.

Make the Turn Big

After a lot of practice, you can make your rolling turns nice and tight, but start big. The tighter the rolling turn, the faster the controls must move and the more precise they need to be. On the other hand, if you use the entire box for rolling turns, you will find them relatively easy.

Another advantage of making the turn big is that it helps with balancing the elevator and rudder inputs. The elevator is a much more powerful control than the rudder, so a rookie mistake is to set the size of the turn according to the elevator. No! It is the *rudder* authority that determines the minimum radius of the turn.

Remember, however hard you pull, that's how hard you are going to have to push! There's another argument for bigger rolling turns! Set the radius to a size that is comfortable for a negative g turn.

Keep Your Speed Under Control

With a lot of figures, speed is your friend. Not so much with rolling turns. A speed of around 120

knots works great for a nice rolling turn. If you get too slow, it's easy to snap roll the airplane by accident. If you get too fast, you might find the rudder control becomes heavy. That said, high-speed rolling turns can be a lot of fun, and it's good to try new figures at various speeds to see what works for you. But whatever speed you choose, try to keep it constant throughout the figure.

Baby Pull, Monster Push

Everyone I've coached through rolling turns has heard me say, "Baby pull, monster push!" on the radio. It's typical for pilots to try to rely on "up" elevator to make the turn happen. This tendency is the control we are all most comfortable with; it's the most comfortable control to manipulate physi-

cally, and our bodies respond better to positive g than negative or side g. But for the rolling turn to be round, we simply must push as hard as we pull. I find the mantra "baby pull, monster push" helps.

Watch Your Altitude

Start the rolling turn with the nose high and keep it high throughout the turn. Losing altitude in a rolling turn is a no-no, both from a scoring perspective and from a safety perspective. I once saw a pilot lose 1,000 feet in their first outside roller. They had no idea! So, practice your rolling turns nice and high and watch carefully to make sure you are in good shape before lowering them to box altitudes.

I'm out of space already! Want to talk about rolling turns? Or anything else?

Reach out to me at president@iac.org. See you next issue! **IAC+**



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Aerobatics Around the World

BY LORRIE PENNER, IAC 431036



THIS YEAR AT EAA AIRVENTURE

OSHKOSH 2024 the IAC's theme is "Aerobatics Around the World."

Jordan Ashley, the IAC AirVenture chairman, started planning at the end of last year. Along with the various volunteers who have pitched in to make your experience great, Sara Arnold, IAC secretary, has set up some meet and greets with our IAC members who are performing in the air show during the week.

While you are enjoying the air conditioning and checking out the merchandise in the store, you can talk to Rob Holland, Patty Wagstaff, Vicki Benzing, RJ Gritter, and Jeff Boerboon Tuesday and Thursday.

Our IAC Forums Chair Michael Church has organized a wonderful forum lineup including covering four of the foreign-built aircraft on display around the building. You won't want to miss Rick Volker and Brooks Mershon's forum "How the Sukhoi Was Born" or Gail Schipper's forum "Bücker — The Stradivarius of Biplanes." Canadian Steve "Flight Chops" Thorne will be

No matter where you find yourself on your aerobatic journey, whether you are flying, volunteering, building, or tinkering with your airplane, there is a place for you to be involved and help the sport grow.

presenting "Building, Flying, Competing in an RV-14," and Aura Aero (France) is sharing the "Flight Qualities of the New Integral."

If you can't make AirVenture this year, you can read Steve Thorne's article in this issue of *Sport Aerobatics* covering his experience building and flying the RV-14. An article for Gail Schipper's forum on her Bücker Jungmann and Brooks Mershon's Sukhoi SU-26 will appear in later issues of the magazine.

Flying your airplane into Oshkosh this year? You can find helpful information, including a printable sign for your window, on our website about parking your aircraft across from the IAC building. Also included is a link to the EAA's free 32-page booklet that outlines all arrival/departure procedures, radio frequencies, Wittman Regional Airport details, and much more. Visit IAC.org/AirVenture.

Elsewhere in this issue, it's all about rolling turns in Jim Bourke's President's Page and in DJ Molny's Judge's Corner column. You will get a perspective from the pilot's view and the judge's view. Other helpful articles from your fellow IAC members include Malcolm Pond's article on "Right and Wrong Ways to Jack Up an Airplane" and Tom Myers' article "Oil Separator Quick Release."

We've had some requests for more information on flying different types of aircraft. Besides the already mentioned RV-14 article, Wes Liu shares his experience with his new-to-him Sukhoi. Good news for some of you, Wes said, "The good news from my transition from the Pitts to the Sukhoi is that landing the Sukhoi is much easier than landing the Pitts."

No matter where you find yourself on your aerobatic journey, whether you are flying, volunteering, or tinkering with your airplane, there is a place for you to be involved and help the sport grow. **IAC+**

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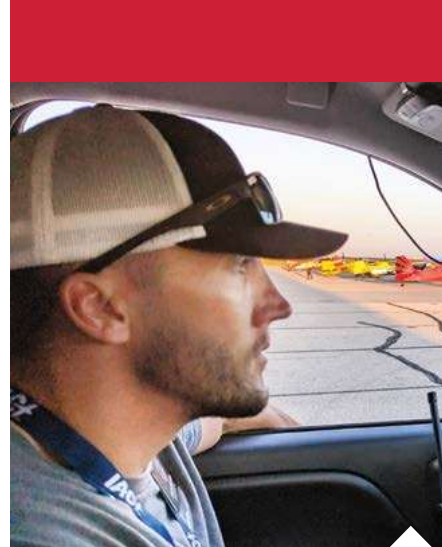
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U.S. National Aerobatic Championships Update

BY SHAD COULSON, IAC 440759



GREETINGS, MEMBERS OF THE IAC. Spring is in the rear-view window, and the 2024 contest season is in full swing. I, like many of you am happy to get back into the contest box and spend time amongst dear friends, many of which we only have the pleasure of seeing at IAC events.

Planning for the 2024 U.S. National Aerobatic Championships (aka Nationals) began before the conclusion of the 2023 contest. We have assembled a great team of volunteers, many of whom are returning from last year and were instrumental to the success of the 2023 contest. That team is hard at work organizing and finalizing the various elements of this year's contest. Keep an eye on future issues of *Sport Aerobatics*, *In the Loop*, IAC social media channels, and the Nationals section of the IAC website for additional information in the months to come.

During my short time with the IAC, I have noted our reliance on the same group of core judges and volunteers. It is my hope to continue building a more robust cadre of judges and volunteers in the coming years to allow those who have served so devotedly to take some time away or to enjoy the sport and contest in other capacities if they so choose. Let me use this opportunity to challenge each of you to get involved in

your regional contest or at the upcoming Nationals. Begin building your knowledge base as a judge, scorer, registrar, volunteer coordinator, contest direct, etc. We will need your knowledge, participation, enthusiasm, and support in the future if we hope to continue the legacy of the IAC and the Nationals in years to come.

The 2024 Nationals will once again be held in Salina, Kansas. Official contest dates are September 22-27. Practice dates will be September

18-20 (unofficial) and September 20-22 (official). Discounted hotel rates have been negotiated with the Hilton Garden Inn, Courtyard by Marriott, and the Hampton Inn. See Nationals Bulletin 1 for more detail on these rates and contact information for each hotel chain. The Nationals' planning team has elected not to negotiate discounted rental car rates with a particular vendor for the 2024 contest. There are several items that led to this decision, and we apologize for any inconvenience this may create for you. We have notified the rental car companies on-site



at KSLN of the contest and recommended additional inventory be available to support participants and volunteers.

Contest registration is open! As always, registration and payment are required to reserve a practice slot on the official practice days (9/20-9/22) via the IAC website. Practice on unofficial practice days (9/18-9/20 until noon) will be coordinated on-site or via email with Gary DeBaun and Jeff Granger, who do an exceptional job keeping us safe and on schedule each year. Please see Nationals Bulletin 1 (located at IAC.org/nationals) for detailed information on the unofficial/official practice days as well as the registration fees for 2024.

Fundraising for the contest continues. To those companies and individuals who have graciously supported the IAC and the Nationals contest in the past, thank you! We hope you'll consider continuing your support once again this year. If you would like to learn more about

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sponsorship opportunities, or to donate, please contact the Nationals treasurer, Robin Simmons, at acronats@outlook.com. The IAC is a 501(c)(3), and donations are tax-deductible. Nationals provides a unique advertisement opportunity to companies. Sponsors will be featured in the contest program, on the contest website, and in *Sport Aerobatics* magazine.

I am honored and humbled by the confidence entrusted to me by the IAC board of directors and the members of this community. I'm looking forward to serving as the contest director once again and building on the success of the 2023 contest. There are few things I value in life more than my free time. I will be the first to acknowledge that a week away from the various personal and professional commitments we all juggle to attend the IAC Nationals can be a difficult task to navigate. I hope many of you will choose to attend, and we look forward to welcoming many of you to Salina in September. **IAC+**

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2024 IAC AirVenture Forums Schedule



A FANTASTIC LINEUP OF aerobatic and unusual attitude forums throughout the week have been confirmed. This year's theme is "Aerobatics Around the World." You won't want to miss four forums on internationally built aircraft: "Bücker — The Stradivarius of Biplanes," Canadian RV-14 — Building, Flying, Competing," Aura Aero's training aircraft, "Flight Qualities of the New French Integral", and "How the Sukhoi Was Born."

There are additional forums presented by builders, competitors, and Master CFIs. There is something for everyone who has an interest in everything aerobatic!

EAA AirVenture Oshkosh 2024 will include a full roster of forums in the IAC's Vicki Cruse Educational Pavilion at the IAC Aerobatic Center. The forums are scheduled daily from Tuesday, July 23, through Friday, July 26, 2024, and run for approximately one hour and 15 minutes each.

TUESDAY, JULY 23

- 8:30-9:45 a.m. Speaker: Budd Davisson, TOPIC: Choosing your First Aerobatic Airplane
- 10:00-11:15 a.m. Speaker: Gordon Penner, TOPIC: Getting Started in Aerobatics
- 11:30 a.m.-12:45 p.m. Speaker: Dagmar Kress, TOPIC: Aerobatics and Aerodynamics
- 1:00-2:15 p.m. Speaker: Gail Schipper, TOPIC: "Bücker — The Stradivarius of Biplanes"

WEDNESDAY, JULY 24

- 8:30-9:45 a.m. Speakers: Nina Stewart and Colin Armistead, TOPIC: Starting & Growing a Collegiate Aerobatic Team
- 10:00-11:15 a.m. Speaker: Lorrie Penner, TOPIC: *Sport Aerobatics* — International stories
- 11:30 a.m.-12:45 p.m. Speakers: Phillip Gragg and Nate Ruedy, TOPIC: Sequence Design: Intermediate with less than 300HP
- 1:00-2:15 p.m. Speaker: Steve "Flight Chops" Thorne, TOPIC: Building, Flying, Competing in an RV-14

THURSDAY, JULY 25

- 8:30-9:45 a.m. Speaker: Mike Kloch, TOPIC: Upset Recoveries: How and Why
- 10:00-11:15 a.m. Speakers: Brooks Mershon and Rick Volker, TOPIC: How the Sukhoi Was Born
- 11:30 a.m.-12:45 p.m. Speaker: Michael Church, TOPIC: Falling in Style — Do You Enjoy Spins?
- 1:00-2:15 p.m. Speaker: Michael Lents, TOPIC: Strategy and Perspective From World Competition

FRIDAY, JULY 26

- 8:30-9:45 a.m. IAC Annual Membership Meeting
- 10:00-11:15 a.m. Speaker: Mike Goulian and Rob Holland, TOPIC: Golden age of monoplanes
- 11:30 a.m.-12:45 p.m. Speaker: Pete Muntean — CNN, TOPIC: Why Reporters Get Aviation Wrong
- 1:00-2:15 p.m. Speaker: Aura Aero — Nils Hansen and Stephan Fiegal, TOPIC: Flight Qualities of the New French Integral



2024 IAC AirVenture Meet and Greets

JOIN US AT THE IAC AEROBATIC CENTER while you are at EAA AirVenture Oshkosh and meet IAC members who are performing in the AirVenture air show. The pilots have all participated in IAC contests, and most got their start with the IAC before going on to

careers in the air show or air racing worlds. Enjoy the air conditioning in the building, and check out the IAC merchandise while you wait.

10:00-11:00 a.m., Tuesday, July 23 Vicky Benzing

1:00-2:00 p.m., Tuesday, July 23 Patty Wagstaff

10:00-11:00 a.m., Thursday, July 25 Rob Holland

11:00 a.m.-12:00 p.m., Thursday, July 25 RJ Gritter and Jeff Boerboon

2024 Officer/Director Elections

CANDIDATE PROFILES

VOTING FOR THE 2024 OFFICER/DIRECTOR candidates began on June 26 and will close at 6 p.m. CDT on July 23. All votes must be cast via electronic ballot. The ballots will be tabulated by the IAC Ballot Certification Committee chair, and the results will be announced at the annual meeting of members, which will take place at 8:30 a.m. on July 26 in the Vicki Cruse Educational Pavilion at the IAC Aerobatic Center during EAA AirVenture Oshkosh.

The following are abbreviated profiles of the candidates. For full profiles, please visit [IAC.org>2024 board election](https://www.iac.org/2024-board-election).



Robert Armstrong for PRESIDENT

I have been a member of the IAC since 1980 and currently serve as a director. I have previously served as a director, the vice president, and the president. In addition, I have competed at all categories of IAC competition, and I also have had the privilege of competing in CIVA world events 11 times, nine as a member of the U.S. Unlimited Team.

The IAC is a member organization that exists to help and encourage the safe and enjoyable learning and participation in the art of aerobatics. It is not limited to pilots, and many of our members are the critical volunteers that make a club such as ours operate. These volunteers are the core of the club. The ranks start with the chapter members who volunteer to chapter officers and continue with the new members who sit in the sun and help the volunteer judges at a contest. All are to be recognized as the internal structure that makes the IAC work. Of course, it is not the full extent of the IAC volunteers. The pilots who compete in the annual CIVA world events are volunteering their time and money as well. Having worn that hat myself, I will work to find proper management for them separately from the IAC.

The current leadership has spent a tremendous amount of time with many revisions to internal policies and procedures that have functioned well for our 50 years. A recent item that was proposed was to research discontinuing the print version of our *Sport Aerobatics* magazine. *Sport Aerobatics* has been the premier print magazine for aerobatics and a prime member benefit since the beginning of the IAC. This proposal came from a discussion of the IAC budget, with the solution entertained being transitioning to a digital version. After the IAC Spring Board meeting the following notice was added to the IAC website, "...the IAC Board of Directors decided to pause the transition to digital for the time being. This will allow further exploration and discussion of available options and the pros and cons of publishing in digital format. No change is expected at least until the end of 2025." I feel losing the hard copy of *Sport Aerobatics* magazine would be a tremendous loss to the membership. As president, I would not continue pursuing this item.

All members get to vote. Please take the time, and I will welcome your support.



Jim Bourke for PRESIDENT

With gratitude for the honor of serving as your IAC president for the past four years, I am thrilled to announce my candidacy for re-election. As a passionate advocate for aviation and aerobatics, I have dedicated myself to advancing our shared vision of excellence within the International Aerobatic Club.

I've been through some life changes this term. I now call Scottsdale, Arizona, my home. My children, Haley, Raymond, Kara, and Camma, are all on their own now and thriving with Haley settling in Miami, Florida, Raymond taking a new job as a software engineer for Boeing in St. Louis, Missouri, and Kara and Camma exploring all that the Portland, Oregon, area has to offer. I remain an active competitor, aerobatic judge, and coach.

Throughout my tenure, I have championed a culture of proactive problem-solving, encouraging our members to tackle challenges with creativity and determination. Drawing from my experience both in glider and power competition aerobatics, I firmly believe that there is no problem that IACers cannot solve when they work together.

Under my leadership, the IAC has thrived, achieving financial stability and bolstering our ranks with enthusiastic volunteers across all critical areas. Despite facing obstacles, our vibrant and dedicated board of directors has consistently risen to the occasion, finding solutions through constructive dialogue and strategic thinking.

Looking ahead to 2024, I am excited by the opportunities that lie before us. As we confront new challenges, from the rising costs of print publication to regulatory threats, I am confident in our collective ability to overcome adversity. Together, we will continue to push the boundaries of excellence and uphold the legacy of the IAC as a beacon of innovation in aerobatic aviation.

I am deeply grateful for the warm relationships I have forged within our community and eagerly anticipate the opportunity to connect with those I have yet to meet. With your support and trust, I am committed to leading the IAC toward a brighter, more prosperous future for all.

Thank you for your consideration and support.



Sara Arnold for SECRETARY

Fellow IAC members,

I have had the pleasure of serving as your secretary these past four years, and I am running to serve you for another term.

Aviation and aerobatics have been a part of my life since I was little, flying with my father. I also have had the pleasure of later in life flying and competing against other pilots in competitions. My first competition was in 2014, and ever since, I have tried to become more involved every year. I have been everything — from being on the corners, recording on the line, serving as contest director, scheduling webinars, writing articles, and facilitating the American Champion medallion. Most recently, I have joined the EAA AirVenture Oshkosh, IAC Merchandise, and Nationals planning teams.

My full-time career is a project engineer at the Des Moines International Airport, and prior to that position, I was an airport operations supervisor. Both jobs have helped me keep on top of the ever-changing climate of aviation along with being able to handle multiple projects within the safety guidelines that are set. In 2018

I founded the Women in Aviation Heartland Chapter, and in 2019, I was able to have the governor of Iowa sign a proclamation for the Girls in Aviation Day to be October 5.

Grassroots aviation is where I am the happiest as I enjoy the pure excitement of seeing people realize what they are capable of and finding a new love of aerobatics. The camaraderie at camps and competition is the heart of this club. I will continue to do my best to represent those beginning in the sport and stand for clear rules and safety.



Monique Hartmann for SECRETARY

Hello! I am Monique Hartmann, a fellow aviation enthusiast from sunny Florida. After many years as communications director at the U.S. Nationals and president of IAC Chapter 138, I'm throwing my hat in the ring for the IAC board secretary position. With more than 19 years of volunteering at IAC contests, I've seen a lot and care deeply about where we've been and where we're headed as a club. I have a broad spectrum of interests, from grassroots initiatives to supporting our U.S. Unlimited and Advanced Aerobatic Teams.

My perspective is from a nonpilot volunteer, which I feel is a great addition to our board. I have enjoyed being a part of the contests' volunteer ground crew for many years and believe I am ready to contribute where I can on our IAC board. I would love the opportunity to represent our IAC members and work with our board to continue the work IAC is doing. Thank you for considering me.



Doug Bartlett for DIRECTOR

I have been a member of the IAC for 20 years, and I am a president emeritus for the club. I started at the chapter level in Chicago with Chapter 1. It was there that I ran contests in Aurora and Peru, Illinois, and served the local chapter as a treasurer and president.

When asked to become active at the national level, I ran for the position as treasurer and served for three years. At the untimely passing of then President Vicki Cruse, I stepped into the position of IAC president and served for three years from 2009 to 2011. After stepping away from the leadership role for several years, I was asked by the board of directors in 2018 to be the vice president in support of President Robert Armstrong. I was re-elected to that position by the members and served two additional years. I served as the contest director for the U.S. National Aerobic Championships in 2007 and again for the 2021 U.S. National Aerobic Championships.

I worked my way up the ranks as a competition pilot from Sportsman to Unlimited, but those days have passed with my last competition being in 2018. Most recently, my efforts have been in supporting and coaching local pilots in Wisconsin and Illinois.

I am passionate about grassroots aerobatics and understand it is the foundation of our club. Further, I believe safety is job No. 1 at the IAC. The *IAC Policy and Procedure Manual*, rules, and historic protocols have made the club a cohesive and safe organization over its first 50 years. I know the way to provide future world-class competition pilots is to encourage fun and safe activities along with competition at the local levels. The stronger we make the base of the pyramid, the stronger the top will be. Both levels are important.

Over the last two election cycles, the members have elected several grassroots pilots back onto the board of directors. The aerobatic enthusiasts and grassroots members (over 90 percent of our members) are now again properly represented at the board level. I believe my re-election to the board will provide experience and stability to the IAC along with giving the grassroots members a continuing strong voice. I am asking for your support by voting for me as a director to our board.



Shad Coulson for DIRECTOR

I joined IAC Chapter 62 of Arizona in 2017 and was immediately intrigued by the flying and captivated by the community. I have continued to compete since and have represented the United States at two World Advanced Glider Aerobic Championships. While I have enjoyed the competition, it is the people and the many friendships I have forged that keep me coming back.

In addition to various roles in regional contests, I currently serve as the IAC Glider chair and as a member of the IAC Sequence Committee. In 2023 I was given the honor of serving as the contest director for the 2023 U.S. Nationals in Salina, Kansas. My focus during last year's contest was to bring the community and fun back to Nationals. With the help and support of the amazing volunteers and the members who attended, the 2023 contest was a success. I look forward to serving once more as the contest director (CD) for the 2024 U.S. Nationals.

As the CD of the U.S. Nationals, I had the unique opportunity to interface with many of our members about the contest and the status of our club. Many expressed feelings of being unrepresented, unheard, and concerned about the IAC not evolving with the sport or supporting the current membership. The overwhelming response centered around the fact that many did not find the IAC to be fun anymore. As a member of the board, I hope to provide fresh perspectives and ideas that will help to restore the interest and participation in the IAC. I will explore and promote ways to enhance the support of our membership, chapters, and regional aerobatic contests.

It would be an honor to be your representative on the board of directors and to be a voice for all members, especially grassroots members. I pledge to be available and accountable to the membership and will seek out your feedback and ideas on ways we can improve our club, support our community, and promote our beautiful sport. Please vote in this election; it is your opportunity to help shape the future of the IAC.



Rob Dumovic for DIRECTOR

I am a seasoned competition aerobatic pilot and professional flight instructor with more than 20 years of aviation experience in all levels of teaching. I own Spread Aviation, specializing in aerobatic instruction for aircraft owners and am a designated pilot examiner, and an upset prevention and recovery training advocate. With a proven track record of safety and promoting aerobatics to the aviation community through social media channels, I bring a wealth of knowledge and a unique perspective from my background in grassroots aerobatics to strategic decision-making and governance necessary to hold a board of directors position with the International Aerobatics Club.

In my role as an assistant chief flight instructor for a Part 141 school, I have helped to mentor aerobatic students and organize their attendance at a variety of contests around New England from as early as 2014. I have been a supporter of IAC Chapter 35 by volunteering at contests and practice days throughout the Northeast, even being featured in local newspapers during International Aerobatics Day. My YouTube series “Flight to a Championship” was well received by audiences and continues to be an example of the realities of the sport.

I hold a Bachelor of Science in flight technology from Kent State University and have enriched my expertise through work with Rich Stowell, Spencer Suderman, and Michael Goulian. Committed to lifelong learning, I have also completed training at industry powerhouses such as Flight Safety International, and give designated pilot examiner seminars for local flight schools and Southern New Hampshire University.

An active board of directors member of the Society for Aviation and Flight Educators (SAFE), I contribute to the advisory board, helping the organization navigate through critical transitions and leverage opportunities for growth and impact that benefit its membership. My experience will be a benefit to the membership as a director on the board of the IAC.

I am passionate about grassroots aerobatics, and he is eager to bring my expertise in critical thinking and governance to the International Aerobatic Club board of directors. With a strong commitment to ethical leadership and sustainable business practices, I am dedicated to fostering an environment of accountability and innovation within the boardroom.



Marty Flournoy for DIRECTOR

Fellow aerobatic enthusiast,

I would like your support to continue the process of building our club to be more inviting to a wide range of pilots and those aspiring. My experience in competing and safety piloting in over a hundred contests with competitive pilots is that most started at a grassroots level. Then many worked their way up having an IAC chapter mentor, and most shared an aerobatic airplane.

Those members in the IAC with two-place aerobatic airplanes have the key to the ultimate aerobatic promotional weapon and are important to our recruitment of new members and growth.

My vision for our IAC is to put emphasis on member recruitment and continue to build alliances with aviation schools and CFIs to encourage more young aspiring pilots to join the IAC as “the authority on safe precision aerobatics.” We have a great safety record and can help avoid the risk of pilots learning by trial and error.

I am active in mentoring and training new judges by hosting and teaching annual judging schools to ensure our regional contest runs both fairly and efficiently.

My background with IAC includes:

- Twenty-eight years of regional contest experience volunteering in all roles, including as recorder, boundary, judge, contest director, volunteer coordinator, and CFI safety pilot in 100-plus events
- Regional and Nationals judge for 22 years
- U.S. Advanced Aerobatic Team member in 2012, 2014, 2018, 2020, and 2023
- CIVA judge team at the World Aerobatic Championships – Unlimited in 2015, 2017, 2019, and 2022



Doug Jenkins for DIRECTOR

I am humbly asking for your vote to continue serving on the IAC board of directors. Having served on the board the last two years has been enlightening. I am certainly not the best at the job, but I believe I have made some positive impact. I hope I have been and will continue to be a voice for all IAC members. With each decision the board makes, I attempt to assess from every perspective ... the noncompetitor member, the volunteer-only participant, the elite world-class pilot, and those of us who compete and do the best we can in the middle categories!

Those are often diverse and divergent views, with competing priorities and needs, and reconciling them is not always easy. My own personal perspective, of course, informs my decisions. As most of you know, I fly in Intermediate at the regional contest level only, and I tend to look at issues from that perspective. For better or worse, that is the viewpoint I bring to the table. I also attempt to strongly support those who, for whatever strange reason, show up and volunteer to make IAC contests possible while not flying themselves. Without these folks, a lot of contests would simply not be possible.

I greatly value the enjoyment, challenge, friendship, and feeling of accomplishment that flying at an aerobatic contest gives. I would like as

many people as possible to have that experience. The IAC is the mechanism to make that happen, and the IAC board of directors steers the ship that is the IAC. I feel privileged to have a seat at that table, thanks to your support two years ago. If you believe I should continue in my role, please vote for me again, and I will do my best to represent all of you fairly and equitably for another two years.

If you would like to know anything else about my history or my vision for the future, please contact me at bagsf15@yahoo.com.

Thanks for considering my candidacy.



Joe McMurray for DIRECTOR

My name is Dr. Joe McMurray, and I am a board-certified oral and maxillofacial surgeon with more than 30 years of experience and in full-time practice. Since I was a young boy, like many of you, I have always harbored a deep love for airplanes. Growing up on a U.S. naval base in Pensacola, Florida, in the early '70s, I was fascinated by the sight of a Blue Angel F-4 positioned in front of the base. I used to ride my bike to the airfield and watch the Blue Angels for hours. However, during high school career week, I learned that my poor eyesight and height would prevent me from pursuing a career in naval aviation. As a result, my career path took a different direction.

Despite this circumstance, my passion for aviation never waned. In 2000, I ventured back into aviation, obtaining my private pilot certificate in 2001.

I approached flying with a professional's discipline, acquiring new ratings over time: IFR, commercial, CFI, ATP, and finally SES.

My unexpected journey into aerobatics began with an upset prevention and recovery training course, leading me to view the sport of aerobatics from a different perspective.

I've been actively involved in fostering community engagement through aviation. I co-founded "The Food Truck Fly-In" at San Martin Airport in California. My aim is to bring a distinct perspective to the IAC, focusing on fresh ideas, community relations, advocacy, and collaboration. I believe in exploring how the IAC and the aerobatic community can enrich the communities around them.

Submitting Your Application for Certificate of Waiver

BY THE IAC GOVERNMENT RELATIONS COMMITTEE

AS THE FLYING WEATHER ARRIVES across the United States, many of you will start the process for getting your own aerobatic box or practicing or having a contest. This article is a quick read with resources to get you on your way in completing the Application for Certificate of Waiver, commonly known as the 7711-2, and getting all the paperwork needed for your FSDO.

Preparation

All the information needed to submit a Request of Waiver is available from the FAA at its National Aviation Events Program website — www.FAA.gov/About/Initiatives/Airshow — where you will find two expandable boxes, one for aerobatic practice areas and one for aerobatic contest boxes.

There was a new version of the 7711-2 published in 2023, so make sure you have the latest copy to send in. Review your completed, blue-ink-signed FAA Form 7711-2 Application for Certificate of Waiver for completion. Blue shows up clearly in scanned documents.

Review your supporting documentation for completion and accuracy. While the FAA's documentation often says they want 7711-2s submitted only 90 days before the requested date, they really want the paperwork 120 days before.

Whenever possible, the submission should be made in PDF form, in its entirety, for ease of FAA review.

Cover Letter/Submission Email

Submission of Form 7711-2 to your local FSDO is done via email. A list of the primary email for each FSDO can be found at IAC.org/FSDO-Contact-List. Once you've submitted your paperwork to your FSDO, you can follow up with a phone call a few days later. FSDO phone numbers can be found at FAA.gov/About/Office_org/Field_Offices/FSDO.

Your cover letter and submission email are as important as the accuracy and completion of your application. The desk manager reviews the email, not the application, and forwards the application to the next aviation safety inspector (ASI) in their queue. The ASI assigned to your application may have never processed a Form 7711-2. Your cover letter and submission email are your opportunity to guide the ASI to the correct start point in their guidance for their review and approval of your application. With this goal in mind, you would like your guidance to the ASI to appear in both your cover letter — included as a PDF — and your submission email. It is possible the submission email will not be forwarded to the ASI, only the



John Smutny, IAC Government Relations Chair

attached data package, and any guidance you provide would be lost.

Here is an example of a submission email/cover letter (use the terms appropriate to your application):

To whom it may concern:

Attached is my completed and ink-signed FAA Form 7711-2 Application for Certificate of Waiver for (aerobatic contest box, ACB/aerobatic practice area, APA/short-term aerobatic practice area, APA) and supporting documentation. This is not an application for an air show. *If the application is being made for an ACB or APA for a coaching weekend, specifically mention the following:* "This is an IAC-sanctioned event." *If the requested waived airspace is located at or near an airport, specifically mention the following:* "The XXX Airport management has been notified of our intentions."

Guidance for review and approval or rejection of FAA Form 7711-2 is found in the following places:

Order 8900.1, Vol 3 Ch6 Sec4 for Aerobatic Practice Areas, activity code "1232."

Order 8900.1, Vol 3, Ch6 Sec5 for an Aerobatic Contest Box, activity code "1233."

Further guidance is provided in Order 8900.1 Vol3 Ch6 Sec1 Figure 3-202 "Aviation Event FSDO Checklist."

This guidance can easily be accessed on the FAA website at www.FAA.gov/About/Initiatives/Airshow.

The above example wording should convey to the ASI you have investigated and familiarized yourself with the requirements of the waiver you are applying for, and you are attempting to make the review process simple.

The above-referenced materials are listed specifically, because Order 8900.1

Vol3 Ch6 Sec1, where the ASI normally would begin their education on approving the application, does not reference ACBs or APAs clearly; it is only in a note.

Supporting Documents

Supporting documents should be submitted along with Form 7711-2. Make it easy for the ASI to locate the documents and organize them for future reference.

Supporting documents as required are as follows:

- Cover letter including a statement, if necessary, that you have notified airport management and are working with them to promote a safe operation at or near the airport.
- If you're applying for a long-term APA, you must complete the Environmental Information Document (EID) available at the FAA National Aviation Events Program site link in the letter above. That approval process is 40 days; make sure to factor it into your timeline.
- Current incident response plan if you're applying for an ACB.
- Graphical location of your waived airspace on Google Maps, Google Earth, and current sectional. Google Earth has a 3D box maker at <https://amsama.com/flightpath/acroBoxMaker.html> and CIVAnews.com/Draw-A-Contest-Box-Using-Google-Earth/.

Aerobatic practice areas not co-located with an airport may exceed the size of the box marker tools and should be drawn on Google Earth, Google Maps, ForeFlight, etc. A snip tool or screenshot can be taken for image submission with your application.

The IAC Government Relations Committee continues to strive at creating a smooth process for requesting Certificates of Waivers from FSDOs across the country. At any time you run into difficulty or have questions about the process, contact one of us and we'll help you out. **IAC**

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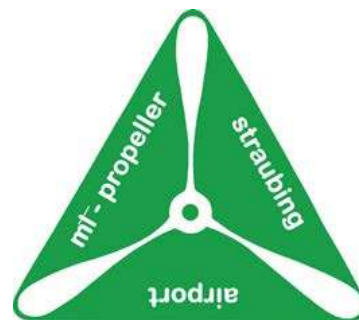
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L. Paul Soucy Trophy Winner

BY WAYNE FORBES, IAC 441269

I HAVE BEEN IN AVIATION since I was 19 years old. My father was a private and instrument-rated pilot; flying with him when I was a child inspired my passion for aviation. I started out in A&P school in 1988 and began my pilot training shortly after. I did all of my pilot training at Emery Aviation College in Colorado and graduated in 1990 with my commercial certificate, instrument rating, CFII, and MEI. Then I went to Florida to build time flight instructing. As soon as I had 1,000 hours in my logbook, I moved to Alaska and began a 10-year bush pilot career.

While flying in Alaska, I bought my first airplane, a 1974 Citabria. It came with floats, skis, and wheels, and I spent hundreds of hours flying that airplane all over the state. In 1995 I earned a Bachelor of Science degree in aviation and space. In 2000 I began my airline career. I am currently an airline pilot (captain on A320 and A321) and have accumulated over 30,000 hours of flight time. I hold an ATP, CFI-I, MEI, SES, and A&P/IA, as well as type ratings on the BE1900, CL65, B737, B757, B767, and A320.

I have always had an interest in aerobatics but kept putting it off for one reason or the other, until finally in 2020, I bought a Super Decathlon and a month later competed in Sportsman. Around the time of my first competition, I was introduced to Dagmar Kress and the Metropolitan State University of Denver (MSU) Aerobatic Team. Dagmar has been a mentor, coach, and great friend since that time. The MSU team flew my Super Decathlon for training and competition for the next three years, and I worked with members as a coach along with Dagmar Kress and Nick Slabakov.

After my first ride in an Extra 330LX, I was hooked and knew I needed more airplane. I bought my Panzl S-330 from Bob Freeman in 2021 and talked



him into coaching me as part of the deal. Bob has been a mentor, coach, and friend since. I feel fortunate to have met and worked with some of the most accomplished and talented people in aerobatics. Without a doubt, the best part of being involved in aerobatics and the IAC is the people I have had the privilege to know.

As far as my aspirations for aerobatics, my plan is to take it one year at a time and enjoy the thrill of competition and the amazing people involved in the IAC. I am moving up to Intermediate this year and have been enjoying the new challenges involved with it.

The L. Paul Soucy Trophy was conceived and donated by L. Paul Soucy of Louisville, Kentucky. Mr. Soucy was one of the first members of the IAC and the board of directors. The purpose of the award is to recognize the IAC competition pilot who achieves the highest percentage of points possible during a calendar year and who also competes in three or more contests, one of which is the U.S. National Aerobatic Championships.

Wayne participated in three contests flying in the Sportsman category in 2023 to qualify for the award:

- 2023-09-24 2023 U.S. National Championships – Powered, second place with an overall score of 85.29%
- 2023-08-12 Ben Lowell at USAFA Airfield – Powered, first place with an overall score of 89.19%
- 2023-07-15 High Planes Hotpoxia Fest, first place with an overall score of 85.38% **IAC+**



2023 U.S. National Aerobatic Championships. (left to right): Wayne Forbes, 2nd place; Phillip Gragg, 1st place; Chris Rudd, 3rd place.



Gather up your friends and family, pack your blanket or lawn chairs, and settle in to an outdoor movie experience that is one-of-a-kind! Relax and unwind while watching blockbuster and classic aviation movies on a five-story high screen.

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Top Gun
(8:30 p.m.)

**SUNDAY
JULY 21**

A Million Miles Away
(8:30 p.m.)

**MONDAY
JULY 22**

Fighter Squadron
(8:30 p.m.)

**TUESDAY
JULY 23**

Toward the Unknown
(8:30 p.m.)

**WEDNESDAY
JULY 24**

Fire Birds
(8:30 p.m.)

**THURSDAY
JULY 25**

Captains of the Clouds
(8:30 p.m.)

**FRIDAY
JULY 26**

The Blue Angels
(8:30 p.m.)

**SATURDAY
JULY 27**

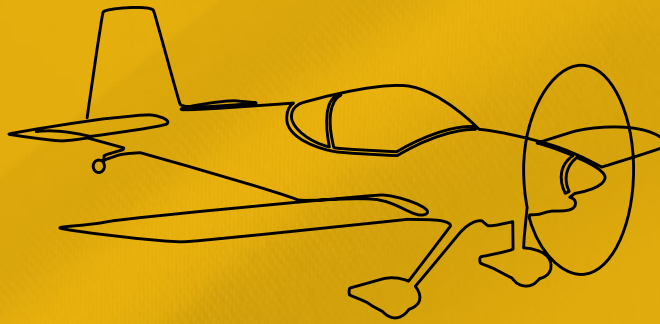
The Right Stuff
(8:30 p.m.)



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Canadian Homebuilt – Van's RV-14

BY STEVE "FLIGHT CHOPS" THORNE, IAC 442843



A RATTY PHOTO THAT HAS been in my wallet for nearly 25 years represents the physical manifestation of a flying goal that would ultimately take two decades to achieve.

It was 2001. I had recently completed my Bachelor of Arts degree and managed to become a private pilot between film studies classes. “Ink jet” was the latest and greatest in-home office printer technology, and I proudly printed a wallet-sized image from the initial marketing campaign for the Van’s Aircraft RV-7 product launch.

In 2024, I’m proud to be a current RV-14 pilot and owner. (The RV-14 was introduced in 2012 and is the big sister of the RV-7.) I still carry that old picture as a reminder that dreams can come true. The once glossy photo paper is beat up, having outlived several leather wallets, has been drenched more than once after rainy film shoots that saw my pants get soaked through, and was completely submerged from me falling in the water fully clothed while trying to tie off the fishing boat on a slippery dock during a storm. But I love that it is still in my wallet. I made sure to show it to my daughter Evelyn, who was 9 years old at the start of the kit build, to help illustrate to her that it is important to set goals and work toward them. She is now 15 and loves flying the airplane with me!

Seeing the Van’s Aircraft RV-7 when it was first introduced blew my mind. It represented everything the Cessna 172 and Piper PA-28s I had access to as a new pilot didn’t. It was sleek, had a bubble canopy and a center stick, and was aerobatic capable — as far as I was concerned, it was a personal F-16 fighter jet. (As a kid, I was a huge fan of Top Gun, and the 1986 classic Iron Eagle had a special place in my heart.) The main attraction to Van’s Aircraft, though, was that its airplanes were attainable and affordable while matching or even outclassing the much more expensive certified competition.

Having wanted to fly for as long as I could remember, it was quickly disappointing to learn



Steve's daughter Evely, when she was 9, with the new RV-14 project.



Evelyn, now 15, loves flying upside-down in the RV-14 with dad.

that the initial private pilot training teaches you to stay away from clouds and keep the wings level (or at least within a 30-degree bank most of the time, which feels level to me). My childhood dreams of flying through the clouds and going upside down would have to wait.

Another thing I learned quickly when I started flying is that airplanes are all about compromises; each model is specific to a certain mission and performance envelope. The joke many pilots tell is that you really need at least four airplanes: a fast one to fly through the clouds and go far, a slow one with huge tires or floats to land anywhere, a big one to carry stuff, and a fun one to go upside down.

The RV-14 is equipped with absolutely amazing avionics and automation, allowing for instrument flying capability with cutting-edge technology that younger me couldn’t possibly have imagined. Cruising

at 200 mph and burning about 10 gph allows for covering big distances in single flying days.

So, the “flying through the clouds” and “going far fast” boxes are thoroughly checked by this airplane.

With an aerobatic-capable airframe, I was able to design a “fun switch” into the panel to disable Garmin ESP (electronic stability and protection) so that I could check the “fun box” after getting to a contest venue and unloading 100 pounds of baggage. (Granted I’m limited to one passenger, but 50 pounds of bags each is a fair case to check off the “carrying stuff box.”)

So, while the RV-14 doesn’t cover all items on the “you need four airplanes” checklist, I think it addresses about 2.5 of them, which is amazing for a single airframe.

How did we get here? I’ve had an unorthodox flying career if you can call it that. Having started working in the film industry at about the same time as becoming a private pilot, I evolved and gained experience on both fronts for over a decade.

Then, small “set it and forget it” camera technology and democratization of digital content distribution allowed for me to start self-publishing authentic and realistic flying films, something that was seriously lacking until the dawn of YouTube. I started a channel called “Flight Chops.” (Being a casual drummer working on my “chops” and sporting a goofy moustache at the time, it seemed like a fitting brand.)

I’d planned to start making films sharing the learning process while training toward additional ratings such as instrument, tailwheel, and aerobatics, but my intention was to make it super nerdy and in a detailed point-of-view style, showing the panel and control inputs while staying out of it as a character.

A film director friend told me that I needed to put the “You” in YouTube, saying all of what I wanted to achieve could be done while also sharing the personal vulnerability by turning one of the cameras around



Steve's Flight Chops moniker came from his drummer days and a goofy moustache.

onto myself. This approach allowed for more than just putting the viewer “in the seat” with me; it allowed them to get “into my head” and share the pain and triumphs of the learning process that all aviators can relate to.

That said, I wasn’t completely sold on James’ idea until I saw the value while reviewing my Stearman training. Being able to see my face, and more importantly my eyes, was a game changer for debriefing. Beyond seeing the authentic magic that I was experiencing flying an open-cockpit warbird, it was my first time flying something where the sight picture ahead was complexity blind; it was apparent that I was not looking in the correct places at the correct times, and that really helped me fix my landings.

The channel was started in 2013. As of today, there are more than 250 episodes (having gained 65 million+ views), covering everything from zero tailwheel time to warbird checkout, culminating in my T-6/Harvard solo sign-off. I also shared the often painful journey of getting instrument rated, and I most recently documented the complete build process and then my experience of learning to fly competitive aerobatics in the RV-14.

Last year was my first season flying contests, and I captured all of it, including the training and lead-up to doing my first practice camps with a coach on the ground.

I have to admit that when my aerobatic mentor and coach, Luke Penner, first showed me the Sportsman card in 2019 and said he wanted to teach me to fly the sequence, then have me join him at a competition and compete, I thought he was nuts. To be able to fly aerobatics alone was more than I could have hoped for, but to do it precisely in a 1-kilometer cube and be judged doing it? That seemed crazy ... but the RV-14 allowed me to get there.

I’d done some intermittent aerobatic training over the years starting around 2015. Having multi-cameras showing the real-time learning



A “fun switch” disables the Garmin ESP (electronic stability protection) after arrival at a contest.



Steve tagged along to his first ever acro camp with the 2023 Canadian Aerobatic Team captain, Luke Penner. Pictured is the Canadian team coach, Aaron McCartan, who gave Steve some ground coaching.

process really allowed for a visceral debrief experience.

But to get truly good (and to condition your body for some level of g-tolerance), you need to be able to actually do it regularly.

Between some work in a Pitts S-2B and the Extra 300L, I got to a place where I had a handle on more than basic aerobatics, but I didn't have access to an airplane to practice or advance further. The RV-14 coming online changed things. After getting the "aerobatic restriction" removed from the initial limited certificate of airworthiness (a process we have to do here in Canada), Luke and I did some thorough training in breaking down the individual figures for the Sportsman.

I got comfortable enough to practice on my own to put it all together before training camps and my first competitions.

It needs to be said that the RV-14 is far from ideal for competition aerobatics. The airplane does a great job for what is described as "gentleman's aerobatics" — beautiful loops and barrel rolls all day long. But when you get into the more intense things that start showing up at the Sportsman level, the limitations begin to show.

It is heavy on the controls when going fast (especially in the roll axis) and flying left seat, thus left hand on the stick and right-hand throttle are not ideal. The sight picture is tricky flying the figures in a side-by-side seating airplane after all my initial training was in a tandem center seat, purpose-built aerobatic machine. Regardless, I love the RV-14.

The trade-off for not being perfect for aerobatics while having an amazing IFR cross-country platform that offers an awesome passenger experience is well worth it. I honestly enjoy the conversations with other competitors and "props"

that they tend to offer while acknowledging that I'm at a disadvantage from the outset due to the airframe. Despite the design limit being good to -3g, I'm happy to avoid big pushes and sustained negative g's. I plan to limit myself to occasionally pushing -1g and won't be doing tail slides or snap rolls. Thus, I'm stopping at the Sportsman class (at least until I upgrade to something like an Extra).

I'm just happy to be there and have no illusions that I'm a contender to win; I'm competing against myself, and for my first showing, I set the goal not to get any zeros and keep it in the box — and I managed to do that while scoring in the mid-70s percentages (except for my final flight at the U.S. Nationals where I got a 58 percent because of my poor entry planning and getting blown into the front of the box by the strong crosswind, but we won't talk about it). All that to say, I'm more than pleased with how the 2023 competition season went!

The stock RV-14 kit is very nearly everything I wanted, but I made some nontrivial changes during the build. We started assembly in mid-2019, and the first flight was early summer 2021.

An initial change that I knew I wanted to make from the beginning was to move the standard plunger-style engine controls from the bottom of the panel to down between the seats into a lever-style console. We worked with Aerosport Products to make the prototype carbon-fiber console for the RV-14, and McFarlane Aviation Products made custom control cables for it.

This setup has been great for formation flying and aerobatics, but it is a bit of a pain to lean precisely when cruising. The control friction needs to be set high so the levers don't "walk," and getting at the adjustment knob is hard as I have to squish my hand down beside the passenger seat to get at it. So, I just leave it and don't change it in flight. If I'm being honest, I now know that I'd like the precision of a twisting vernier mixture knob for leaning. But the console is so dang cool that I'm okay with it.

After the 2023 season competing with the airplane, I learned a few things I wish I knew during the build, and I have made further changes and upgrades.

Here are aircraft specifics for my airplane: I chose the RV-14 tail-wheel configuration, and the timing lined up to get one of the first EXP-119 Thunderbolt versions of the Lycoming IO-390. It's powered by a Hartzell three-bladed, aluminum Raptor hub with carbon-fiber scimitar blades.

INTERNATIONAL AEROBATIC CLUB SCORESHEET

Contest: 2023 U.S. National Aerobatic Championships - Powered Date: 2023 Category: Power Sportsman Program: Known Pilot's number: **13**

Item	Symbol	Cat. No.	K	Total K	Grade	Remarks	Item	K	Score
1		7.4.1.1	10	10					
2		5.3.1.1	18	100					
3		3.2.2.1 3.4.4.2	18	80		Shallow on HG			
4		2.2.2.1 5.1.1.2	18	70		Step after roll			
5		1.1.1.1 9.1.3.4	10	80					
6		2.2.1.1	4	70					
7		1.1.2.1	7	90					
8		1.1.6.3 9.1.1.5	10	85					
9		8.4.1.1 9.1.4.2	13	85		Bright wing			
10		8.5.6.1 9.1.4.2	10	70		Used low No time when low			
			14	80					

FIGURE TOTAL K = 120
BIC PRESENTATION = 130
Aircraft type: Vans Aircraft RV-14

FREE PROGRAM CHECKED BY: _____
Signature: _____ Printed Name: _____ Date: _____

Judge Name: Justin Hickson
Judge Number: (not IAC) 2
Assistant Name: Peter Bakard
Pilot Name: Stephen Thorm

IAC

Happy with the 2023 season, Steve managed to score in the mid-70s percentages at the U.S. National Aerobatic Championships.

We packed everything possible from Garmin into the panel, highlights being the GTN 750Xi IFR navigator with dual G3X Touch displays, a GFC 500 autopilot, backup G5 EFIS, and remote-mounted intercom, transponder, and Sirius XM data receiver. I've had airline

The RV-14 panel is packed with an IFR navigator, autopilot, backup EFIS, mounted intercom, transponder, and data receiver.



Assembly on the RV-14 started in Mid-2019. The first flight was early summer 2021.



Steve worked with Aerosport Products to make the prototype carbon fiber console.

captain friends tell me my little RV is more capable than their jets.

After a bad first experience having the engine not crank during the first start attempt with the stock lead-acid battery, I upgraded to an EarthX lithium-ion battery. The unexpected downside to going with a substantially lighter battery was that it contributed to a bit of a weight and balance problem that I ultimately discovered after paint — I'll explain that shortly. That aside, the EarthX has been solid and recently showed its value when the airplane started up just fine after having sat for



A photo capture from the U.S. National Aerobatic Championships video reveals an oil-dumping issue, which made it look like Steve had a full-on smoke system!

months over the winter. (During that downtime period, it was also powered up without charging multiple times for software updates, etc.)

I'd taken it offline for the winter while I worked on some snag fixes and upgrading to a partial inverted oil system, something I wish I knew I needed during the initial build. I got the air oil separator from Raven Aircraft and had custom hoses made by Aircraft Specialty, which made the somewhat daunting task of modifying my baby go smoothly. (I'd been flying as it was for over 200 hours and had been hesitant to change anything major.) But it was clear that solving my problem of oil dumping out the breather during Sportsman-level aerobatics was a must. Seeing the footage that was captured from the ground of me flying at the U.S. Nationals competition was sobering — it looked like I had a full-on smoke system at times!

The paint job was designed and executed by Jonathan McCormack and his team of artists at Evoke Aviation.

They worked closely with me to design a scheme that paid homage (without claiming to be a warbird) to the yellow bird fleet of WWII trainers that I'm proud to fly at the Canadian Aviation Museum.

The museum facility is also where we built the aircraft, and it was a privilege to watch it come together in a giant WWII training base filled with historic aircraft. I worked with an awesome team

of mentors, spearheaded by the “Burford brothers” John (who gained his PPL during the build and has since become an RV-4 owner) and Perry (who'd built his RV-7 a decade prior to the RV-14 project). It was important to me to represent the organization that has provided so many great opportunities from learning to fly formation in the Chipmunk to getting the T-6 Harvard solo sign-off. It's been an honor to fly the RV-14 to many events and have it represent the museum at locations much farther than it is practical to fly their vintage aircraft to.



Steve's solo in the Canadian Historical Aircraft Association's de Havilland Chipmunk.



Working with a team of mentors, including “the Burford Brothers,” Steve built the RV-14 at the Canadian Historical Aircraft Association.



Steve has had the opportunity to fly the RV-14 to many events, including AirVenture Oshkosh 2023.

Paint added nearly 40 pounds overall, and apparently much of it was in the tail. (Our build was fairly good, but the composite work is where the artistry really comes in; Evoke did an amazing job erasing gaps and smoothing out some of the rougher areas in the fiberglass.)

The end result was that when reweighing after paint we found that the center of gravity (CG) had moved aft nearly a full inch. The loading envelope of the airplane only has a few inches to play with, and the light nose due to the composite prop and lithium battery didn't help with the tail heaviness.

I've found that while I can load up completely with full fuel and a heavy passenger with maximum baggage, I'll burn myself beyond the aft CG limit after about 2.5 hours of cruise. It's not the end of the world to have to plan around this limitation, but it isn't something I saw coming.

As of the writing of this article, the airplane is flying again after completing the winter upgrades and a fresh annual inspection. The latest flights with the air oil separator are promising! Almost no oil was lost after running most of the Sportsman sequence figures, including repeatedly doing all of the figures that have negative g's. Before having the air oil separator, I'd expect to lose as much as a quart of oil on a 15- to 20-minute aerobatic practice flight.



The new oil separator from Raven Aircraft.

Checked out in the Canadian Historical Aircraft Association's T6/Harvard.



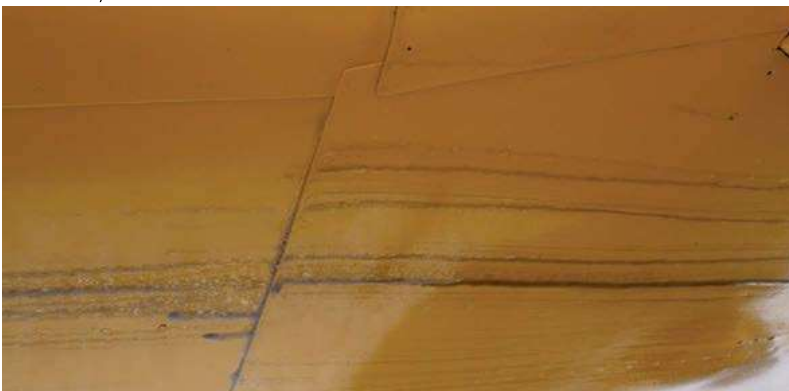
Beyond the total mess of an oil slick from the nose to the tail, dripping from the tail wheel after landing, it was unsettling to not be certain how much oil I was losing during flight. There was one training camp flight where I lost nearly 2 quarts while the coach had me banging on some of the negative figures that I was weak on, including a few others (such as the reverse half-Cuban) that I'd never practiced before. It was great fun doing those inverted 45-degree uplines ... but I lost track of estimating how much oil I was probably losing. I landed with the absolute minimum oil onboard after that flight, and I swore to not put myself in that position again.

I'm stoked to continue growing and improving as a pilot and sharing all of it while competing again with the airplane in 2024. Hope to see you at the various events! **IAC+**

Steve Thorne, is a filmmaker and a private pilot who parlayed both passions into an aviation content creation platform called "Flight Chops." For over 10 years he's been responsible for producing more than 250 episodes covering everything from tail wheel conversion training, to earning the Instrument Rating, back country, mountain flying, float planes, warbird check outs, aerobatic and multiengine training. With 1,000 hours' total time logged across more than 50 types, he holds instrument, multiengine and aerobatic ratings.



In the winter, Steve took the RV-14 offline to address an oil issue.



A total mess of an oil slick from the nose to the tail. "...it was unsettling to not be certain how much oil I was losing during flight."

U.S. Nationals 2024






September 22-27, 2024

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MAKING FRIENDS WITH A





SUKHOI

BY WESTON LIU, IAC 10467



THE AEROBATICS WORLD HAS a number of single-seat, one-of-a-kind aircraft. Some manufacturers have two-seat models that offer a cockpit like their single-seat models where you can experience similar performance. Not all do, and due to location, insurance, and owner preferences involved with those two-seaters, you can find yourself standing in front of your newly purchased single-place dream ship faced with a first flight with only the preparation that you can do by studying the manuals, memorizing checklists, and getting a detailed brief by the previous owner who has already deposited your check in the bank.

The Sukhoi 26 was designed in the late 1980s when the government of the former USSR was determined to show the superiority of the communist pilot over those of the United States and other western aviators. The Sukhoi Design Bureau and its peers were/are the equivalent of Boeing in the United States. An IAC member who visited the factory after the fall of communism reported that he thought that Sukhoi put 1,000 engineers and their wind tunnel on the project, just

like they did in designing and building the Su-25 and Su-27 twin engine jets. The result is that the Su-26 in its construction and cockpit ambience is a lot like a Soviet military airplane.

March 2022 found me standing next to the new-to-me Su-26, 800 nautical miles from home, and organizing my brain for a first flight. I am fortunate that my insurer accepted my flying résumé to provide immediate coverage, and it was all on me to do the homework required to make friends with this unique aircraft for a successful first, second, and subsequent flight, and get home.

So, what homework do you do to step into a unique aircraft for the first time without any dual training? First, as you likely know, you start by reading the flight manual. For the Su-26, a

I can report that making checklist cards that fit in your pocket are a big help when you are surrounded by newness and the acceleration of the airplane is "Oh, wow!"





gentleman named Richard Goode has been kind enough to have both the flight and maintenance manuals translated from Russian to English. The checklist procedures, approach speeds, and aerobatic speeds are stated. For flight No. 1, the first two speeds need to be memory items. If you are stepping into a U.S. experimental amateur-built, you might need to create checklists and get speeds from a previous owner or other owners of that make and model. I can report that making checklist cards that fit in your pocket are a big help when you are surrounded by newness and the acceleration of the airplane is "Oh, wow!" And it helps to write a card that lists the tasks for flight No.1 in a logical order of learning how the airplane behaves.

I spent 20 years in the Pitts Special, mostly in a 200-hp S-2A. The Sukhoi has 360 hp on tap and is even more blind for the pilot than the Pitts, if that is possible. And it is a metric airplane! Engine "turns" are 0 percent to 100 percent, not rpm. "Boost" for manifold pressure in the geared supercharged engine is in tens of kilograms/square centimeter. Let's just call those numbers "Russians." Oil pressure and fuel pressure are in kg/sq cm. Oil temp is in Celsius. This is not a Lycoming! So, what did I need to learn on flight No. 1?

The first challenge was simply starting the Vedeneyev M14P nine-cylinder radial engine. You first pull the propeller through 12 blades (four rotations) of the three-bladed MT-Propeller to ensure that the bottom cylinders are clear of oil. You do not want to encounter the dreaded "hydraulic lock" that bends connecting rods during the start. If the prop won't turn by hand, you have to undo spark plugs to drain the problem oil out. This 12-blade exercise gets the pilot warmed up for the coming flight. For a guy my size, pulling the propeller through four rotations against the engine compression gets my heart rate up, and I am ready to pull +8g in the airplane.

Engine start is by onboard compressed air, not electric. Batteries freeze in Siberia. Start involves pumping a two-position primer, for "system" (pressure carb) and "cylinder" (supercharger). To bring the engine to life, you do a multi-finger and hand maneuver to start the onboard compressed air turning the engine and

the shower-of-sparks going, and when the engine starts to fire, you turn on the magnetos. If you have set the throttle position correctly, done the right amount of prime, and gotten the magnetos on while the engine is turning, the M14P will belch some smoke and settle into a satisfying rumble at 26 percent "turns." And you get to move to the flying task list step of making friends with this unique beast. The flying task list went like this:

1. Takeoff at 100 percent turns and full throttle, then climb at 220 kph (kilometers per hour) to 4,000 feet AGL at 82 percent turns and eight "Russians" per the flight manual.
2. Level steep 360 turns left and right at climb power setting, watching the speed build. Not a slow airplane with the power on. (My airplane has been dubbed the Red Rocket at my home airport.)
3. Throttle back and slow to the planned landing approach speed of 160 kph.
4. Level 360 turns left and right at 160 kph at 30 degrees of bank.



5. Throttle back and gradually slow to find the speed that the airplane stalls at, how the airplane speaks to you when it is about to depart, and what the stall departure and recovery is like. Do this step a couple of times.
6. Throttle back up to eight Russians and have a few minutes of fun before figuring out how to land on a 75-foot wide, 4,300-foot-long runway. Discover that the Sukhoi rolls twice as fast as a Pitts and bangs your head on the canopy if you are not ready.

After six takeoffs and landings of figuring out how to fly final and seeing the runway around the round engine, we know just enough to

head for home, with stops planned on wide and relatively long runways.

All of the planning above can apply to transitioning to any of the single-seat aerobatic airplanes that we fly. Our friends who transition from a Decathlon to a single-seat Pitts are able to obtain dual instruction in an S-2, but the reality is that moving from an S-2 to an S-1 is another step up. Many friends who have made that step report thinking right after their first S-1 takeoff, "I have to land this thing!" The good news from my transition from the Pitts to the Sukhoi is that landing the Sukhoi is much easier than landing the Pitts. The Sukhoi's titanium gear legs absorb energy and track straight without much rudder input.

The Sukhoi has a small but enthusiastic pilot community, and there is actually a large community of Yak M14P engine owner operators who share information. There are multiple shops that support that community. With the advice of other Sukhoi pilots, including Rick Volker and Hubie Tolson, once the airplane was home, the next challenge was exploring aerobatics. It is an airplane that is built to fly to +12g and -10g and likes to do snap rolls.

Making friends with the Sukhoi, or any new airplane, best starts with rolls. Doing a John Morrissey roll drill of left roll, right roll, left 2 points, right 2 points, left 4 points, right 4 points, at 270 kph, you learn that the aileron forces are so low that to stop crisply you need two hands on the stick. With the fast roll rate, trying to stop one-handed will make you bobble. Now I know why in the videos the Russians have two hands on the stick.

When learning to fly a single-seat aerobatic airplane, you are wise to think like a test pilot. Break down what the building blocks are of information that you need to approach each new flight maneuver to be successful.





Snap at 270 kph are best described as violent, but the airplane likes to snap — another two-hand figure. It is better to do snap rolls at 210 kph until you get the timing. Much easier. After rolls, move to spins.

Before trying figures that might devolve unintentionally into a spin, you need to know what spins look like, how this airplane behaves, and how to exit an inadvertent upright or inverted spin. The Sukhoi stall break is sudden with little warning at about 110 kph. The surprising aspect is that you can almost power out of a spin. The rudder is hugely effective, and once you identify the direction of rotation, rudder will stop that rotation promptly. But try spins before moving to hammerheads, humpty bumps, and avalanches in a new-to-you ship.

I had heard that the Russian pilots hammer into the wind. The Sukhoi rudder is large enough and the moments of the MT-Propeller

low enough that this airplane is happy hammering either way. And the 102-inch MT will pull you up the vertical line farther than you need.

When learning to fly a single-seat aerobatic airplane, you are wise to think like a test pilot. Break down what the building blocks are of information that you need to approach each new flight maneuver to be successful. Write it down. That planning allows a pilot to step into an aircraft like a Sukhoi and be both safe and have a lot of fun. There are a number of single-seat aerobatic ships out there that you can transition into with the right attitude. For me, “making friends” with the Sukhoi is a great challenge. *IAC*

Wes Liu is a retired engineer with 1,200 Pitts hours and now 100 Sukhoi hours. He has flown 20 different types of aircraft from Cubs to King Airs. Wes has served as an IAC chapter president and chair of the IAC Judges Program and is a current chief judge. Having flown in the Intermediate category since 2008, Wes has earned a Bronze Aerobatic Dedication Lifetime Award with more than 56 contests flown. He has participated in the IAC Achievement Award Program and has earned Primary and Sportsman Smooth and Stars patches, as well as an Intermediate Stars patch. From 2014 to 2021, Wes has placed in the top three in the Regional Series (Northeast), winning the regional title in Intermediate in 2015.

The Sukhoi Arrives in the United States

COMPILED FROM *SPORT AEROBATICS* ARTICLES
BY **LORRIE PENNER**, IAC 431036

THE LEADING DESIGN AT the 1984 World Aerobatic Championships (WAC) was the Zlin, followed by the Yak, CAP, Extra, and a new design called the Sukhoi Su-26 — all monoplanes. The Sukhoi, a factory prototype, was heavy

and showed the signs of last-minute rushing. It had to be flown carefully to avoid running out of altitude in the box, but the veterans who attended WAC '84 recognized the potential of the design. Its size, noise, flexibility, and lines made it an ominous presence.

Two years later the Su-26 dominated the 1986 WAC, having gone through a number of refinements. Brian Becker, IAC 4399 of Pompano Air Center (PAC) and a former IAC board member, was at WAC '86 and was impressed with the performance of the Sukhoi. "It was clear by that time that the Sukhoi was going to be one of the top three aircraft in the world arena," Brian said. "The vertical penetration and roll rate were phenomenal."

"It was clear by that time that the Sukhoi was going to be one of the top three aircraft in the world arena," Brian said. "The vertical penetration and roll rate were phenomenal."



John and Brian Becker. 1988 photo by Mike Fizer for AOPA.



This photo used in a Pompano Aerobatic Center ad showcased the Pitts Special and Sukhoi SU-26/SU-29 used at the flight center for Basic through Unlimited aerobatic instruction and critique in the 1990s.

Consequently, when Brian got a call in 1988 from Jeff Barrie, asking him if he'd be interested in a marketing arrangement with the Sukhoi Design Bureau, Brian listened closely. Jeff, who had been a military attaché to the Soviet Union, was taking advantage of the potential of *glasnost* (opening up) and *perestroika* (change in economic priorities), byproducts of the restructuring of the Soviet Union (although no one knew at that time how far the changes were really going to go — including Mikhail Gorbachev, the president of the Soviet Union).

Brian and Jeff created PAC Moscow, one of the first companies ever set up in Russia with foreign ownership. Though there were incredible obstacles to overcome, Brian persisted and pulled off a major coup at EAA Oshkosh 1989. The first two Sukhois developed for the relationship were flown into

Oshkosh aboard a huge Aeroflot An-124 transport. It caused quite a stir.

The single-seat Sukhois did well. A couple years later, the Su-29, a two-place version, came on line. Then in 1992, using new technology incorporated in the Su-29, the Sukhoi Design Bureau introduced the Su-31.

There were several Sukhois at WAC '94, and they continued making their way into a lot of the teams' lineups as well as air show flightlines.

At the 1996 SUN 'n FUN fly-in, the Sukhoi fleet included about 25 Su-26s, 45 Su-29s, and 15 Su-31s. These were all distributed through PAC.

POMPANO AIR CENTER

PAC dates back to the early '70s. Founded by the late John Becker and run by his son, Brian Becker, until January 2001.

PAC started out as a typical FBO and were the first dual Cessna/Piper dealership. However, like the atypical leadership at its helm, the company soon started carving out a niche market by catering to special aerobatic interests. It led



the world in Pitts sales, was the Extra Aircraft dealer for the Americas, and did the impossible in setting up a worldwide distributorship (PAC Moscow) of Sukhoi aerobatic aircraft with a contract exceeding \$12 million. **IAC+**



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The U.S. Aerobatic Team will be challenging the world's best pilots at the 32nd FAI World Championships in Poland. Your contribution shows your support for the U.S. Team's quest for gold.



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INTERNATIONAL FLAIR AT THE IAC AEROBATIC CENTER EAA AIRVENTURE OSHKOSH 2024

This year's theme at the IAC Aerobatic Center during AirVenture is "Aerobatics Around the World." A number of our IAC members are flying their foreign homebuilt or production aircraft to park around the IAC Aerobatic Center. In addition, four of the IAC members are scheduled for forums: Gail Schipper, "Bücker — The Stradivarius of Biplanes"; Steve Thorne, "Building, Flying, Competing in an RV-14"; Brooks Mershon and Rick Volker, "How the Sukhoi Was Born"; and Nils Hansen and Stephan Fiegal, "Flight Qualities of the New French Integral." See the forum schedule on pages 8 and 9.



DUNCAN KOERBEL – EXTRA SX



GAIL SCHIPPER – BÜCKER JUNGMAN



RICK VOLKER – MARCHETTI SF260

BROOKS MERSON – SUKHOI SU-26M
PHOTOGRAPHY BY SHANE SHORT





STEVE THORNE – VANS RV-14



ROBERT ARMSTRONG – CAP 231
PHOTOGRAPHY BY TOM COLE



ANTHONY SPENCE – YAK 50



AURA AERO – INTEGRAL (TOP PLANE IS THE R MODEL, WHICH IS AEROBATIC.)



MARK MEREDITH
PHOTOGRAPHY BY DAVID ECKERT





Mike Mathews with his 1980 SNS-7 Sorrell Hiperbiplane "MAKO."

A chat with two **Hiperbiplane** pilots and builders

BY LORRIE PENNER, IAC 431036, EDITOR



Joel Howard with his Hiperbipe SNS-7, tail number N918RA, which he completed work on in 2022.

WHEN YOU WALK ONTO the EAA AirVenture Oshkosh grounds, you expect to see lots and lots of airplanes. Depending on your interest, you may wander over to the Warbirds area and see those stately World War II-era American military fighters, trainers, and bombers. Or you might take a gander at the Vintage aircraft to see the living history of aviation. Then there are the light-sport aircraft that enable you to experience a simpler world of recreational flying.

Whatever your interest, there's always an aircraft or two that catches your attention. Something that is different or captures a sleek beauty that is hard to define. I've always been more interested in the sporty aerobatic aircraft. Many AirVenture-goers pause for long periods of time in the IAC aerobatic area in appreciation of the look and capabilities of the various models of aerobatic aircraft. It allows them to dream about looping, rolling, and spinning through the sky.

Sometimes we have aerobatic-capable aircraft park in the IAC area that we don't necessarily see often and

have never seen in the "wild." The Hiperbipe always attracts a big audience with a lot of questions.

I sat down with two Hiperbipe builders and pilots at EAA AirVenture Oshkosh 2023 to ask questions about their unusual aerobatic airplanes.

Q. Lorrie: Joel, you have a beautiful, shiny new Hiperbipe here at AirVenture. Tell us about the airplane.

A. Joel Howard: I recently finished up on the construction in 2022. It was a partial build for me. The previous owner had worked through less than half of the project. It took me about nine months to complete the airplane. My first test flight was in January 2023.

Q. Lorrie: What interested you about the Hiperbipe?

A. Joel: Two things: I saw my first Hiperbipe at AirVenture years ago; then there was a local guy who bought one, and that piqued my interest further. Later on, I saw Mike Mathews in a YouTube video that he made with the Experimental Aircraft Channel. In the video, he said that this airplane is like a Swiss Army knife. [It does a little bit of everything.] After that video, I had to start looking to see if I could figure out what this thing was.

Q. Lorrie: Have you had other aerobatic aircraft? If so, what made this the better choice?

A. Joel: I had a Christen Eagle and a few other airplanes. The Hiperbiplane had more to offer for me because it has a bigger fuel capacity. The sport biplanes usually don't hold enough fuel. The Hiperbiplane is comfortable and roomy, so cross-country trips are a pleasure to fly. I mean, I can camp out of my airplane.

"...the airplane is an all-around great-handling airplane. It does what you want it to do. Feels extra safe. Very honest Visibility is great"
— Joel Howard

Q. Lorrie: What was it like to learn to fly the Hiperbiplane?

A. Joel: My biggest first thing for me was the pilot position doesn't sit on the centerline. [The cockpit is a side-by-side seating configuration rather than tandem in most aerobatic aircraft.] This was a little bit intimidating to me at first, especially doing rolls. I wasn't used to

being displaced to the side instead of sitting in the center of the airplane.

But honestly, the airplane is an all-around great-handling airplane. It does what you want it to do. Feels extra safe. Very honest, very honest. Visibility is great, so you don't feel like you're going to break anything. After I flew off the first five hours, I started getting upside down.

Q. Lorrie: Who was your instructor for aerobatics?

A. Joel: Some of my aerobatic flying is self-taught. However, I did get my buddy Greg Shelton, who was in my wedding, to give me some instruction.

Q. Lorrie: What are your aspirations in aerobatics?

A. Joel: Well, I have a 14-year-old son who is into aviation right now, and he comes first. So, I don't have as much free time as I'd like. He is signed up for all AP classes, and this year he's going to be a freshman. He's going to do it right [his education].



Joel's Hiperbiplane adorned with the EAA 70th Anniversary logo.



Joel's cockpit panel has a minimalist appeal.



Joel's Hiperbiplane shines in the sun at 2023 EAA AirVenture Oshkosh.



Mike's "Mako" is faster upside down than it is right-side up.

Q. Lorrie: Is there an informal or a formal community of Hiperbipe pilot/builders that you are a part of?

A. Joel: We have a friend named Jason Rasmussen who has kind of gotten us all together. It's been a couple of years ago.

We have a great Facebook group. Jason started that for us, and it's taking off and done great. It's a private group with the name Sorrell SNS-7 Hiperbipe Owners. Jason lets everybody join in because we are trying to spread the word about the Hiperbipe.

A. Mike Mathews: He [Jason] bought one of the pretty well-known airplanes. Several Hiperbipe guys have owned it, so it's pretty well known in the fleet. But he came out of a Super Cub. I gave him a transition checkout.

Q. Lorrie: Jason was on the list of those bringing their airplane to AirVenture; is he here?

A. Mike: No, Jason sold his airplane for a home-building review. They actually wanted to use my airplane for the review. So, Erik Edgren is instructing in that airplane. It's in Iowa now. He's [Erik] a great guy. We've talked for hours on the characteristics of the airplane.

Q. Lorrie: Many people who stop here at the IAC wonder what it is and about the design of the Hiperbipe.



Mike's cockpit panel was updated in 2020 along with the engine, prop, paint, and graphics.

A. Joel: You just don't want to mess with it. I think it's perfect the way that it is. He [Hobie Sorrell] was way ahead of his time. Most people think it's a Wittman or a Tailwind with this extra set of wings.

A. Mike: It's a 50-year-old design. Thunderbird Aviation now supports the airplane. You can buy kits for the SNS-7 Hiperbipe (the aerobatic deuce coupe), the SNS-8 Hiperlight (the ultralight), and the SNS-9 Hiperlight (a two-place experimental/light-sport aircraft).

Q. Lorrie: I understand the designers of the Hiperbiplane were Hobie Sorrell and his sons, John, Mark, and Tim. What do you know about them?

A. Mike: They built it to go against the Pitts Special in competition. But they wanted it to be a more practical airplane, too. One that you could comfortably do cross-country in and still compete in Intermediate-level aerobatics. And I think they hit the nail on the head. Joann Osterud used to do air shows in them. She set the world record for outside loops in a Hiperbiplane.

Author's note: See the sidebar article, "Hiperbiplane—The Swiss Army knife of airplanes," for details on Joann's accomplishment.

A. Joel: My understanding was that the design was going to be a kit airplane. They were trying to be the RV before people wanted to do the RV thing. It's kind of the best way to explain it.

Q. Lorrie: Do you know how many completed Hiperbipes there are in the United States right now?

A. Mike: Well, it's funny, I was just talking about that the other day. Probably around 20-30 in flying condition. So, we don't know the ratio of kits sold versus airplanes that were plansbuilt.

A. Joel: I'm not sure about the answer to that. I think there were 100 sets of plans sold and about 50 kits ordered.

Author's note: In the Sorrell SNS-7 Hiperbiplane Owners Facebook group, Travis Brown, Hiperbiplane owner and administrator for the group, posted a list of all the known completed Hiperbipes in the world. On the list were 58 aircraft, three of which were listed with tail numbers registered in the United Kingdom and two registered in Canada.

Q. Lorrie: Walking around your airplanes, they feel similar or larger in size than a Decathlon. What propeller and engine do you have on your Hiperbipes?

A. Joel: You get so much more bang for your buck in performance than [with] a Decathlon. The engine on my Hiperbiplane is a Lycoming IO-360. I have mine pumped up to 205 hp.

The prop is a Hartzell two-blade, and Mike has the same.

A. Mike: Mine has an angle-valve IO-360-C1C fully inverted 225-hp Lycoming. It's high compression (9.5-to-1). So, with a heavier motor than what Joel has, I'm making more horsepower. We rebuilt the airplane in 2020. Engine, prop, avionics, interior, paint, and graphics.

Yes, we currently have the same prop, but I'm going to a GT Propeller soon. It's a nice product.

Q. Lorrie: How did you get interested in aviation and aerobatics?

A. Mike: You know, I have been flying my whole entire life. Starting from a kid with remote-control (RC) airplanes.

A little bit of aerobatics was self-taught in the beginning in a Hatz biplane and riding around with friends. I finally got some instruction from Craig Teft, Absolute Aerobatics LLC in Las Vegas, flying a Pitts Special. I became a Pitts transition instructor shortly after taking instruction from Craig.

Q. Lorrie: Mike, have you competed in your Hiperbiplane?

A. Mike: I haven't competed. I do give aerobatic instruction to guys who are in competition, but I don't actually do it myself. I've been busy on the weekends ... flying NASCAR guys around for 17 years. So that really eats into my time.

Somehow, I've become the Hiperbiplane instructor for all the guys in the work fleet too. I've checked out several guys that were either starting kits or building kits or buying airplanes. All it took to become the go-to guy was one little video.

Q. Lorrie: Tell us about the video you made.

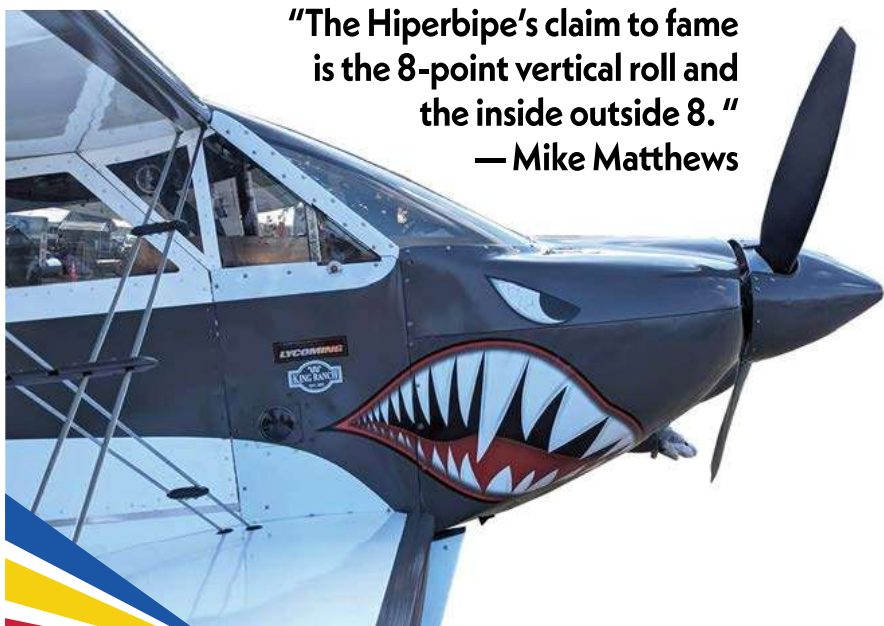
A. Joel: He did his own video for YouTube, Hiperbiplane SNS-7 Shakedown. It's a great instructional video. Then there was another one that he did with Experimental Aircraft Channel.

A. Mike: There's really not that much out there, and we needed more content. So, the Shakedown video shows some numbers and things and "how I do it" type of video on my 1980 SNS-7 Sorrell Hiperbiplane "MAKO".

When I learned to fly the Hiperbiplane, there really wasn't anyone out there. I just kind of had to teach myself.

A. Joel: Same thing for me — nobody around teaching in the Hiperbiplane.

"The Hiperbiplane's claim to fame is the 8-point vertical roll and the inside outside 8."
— Mike Matthews



Q. Lorrie: Mike, how long have you had your Hiperbipe, and what's your experience with it so far?

A. Mike: I bought my airplane in October of 2019 from a guy named Bernie Kramer in Alexandria, Louisiana. The airplane was originally built in Illinois by Frank Posta in 1980.

The condition of the plane wasn't great; the motor was trashed. Bernie had been out flying aerobatic competitions and blew a "jug" clean off, and it separated from the case. He was in his late 70s, maybe older. I don't think he wanted to deal with the overhaul cost.

I spent about 10 months cleaning it up and stripped a bunch of weight out of it. Engine avionics, interior paint graphics, re-covered the belly, removed the shag interior — basically, brought it into the 21st century.

The airplane didn't always have its current paint scheme. It always had the base color of white, but had some other graphics on it. I had some previous experience with painting aircraft, just small stuff, so I just shot the paint job in my driveway.

I wanted to put a hammerhead [shark] on the plane. But the mako is the fastest shark in the ocean, so I went with it. I didn't apply the graphics for the shark, but I did draw the graphics. I live in NASCAR country, and there are a lot of vinyl guys down there that wrap the race cars for some of the best in the world. This was an easy project for them.

The paint job of the shark's mouth isn't for everybody, but the kids love it. And that's what it's about for me — getting the kids interested in aviation. I got some stickers made and hand out a bunch of them.

Q. Lorrie: What are some of the Hiperbipe's best features for you?

A. Mike: This airplane was designed as wide as a Cessna 182. When I get in here with big guys, we don't even touch elbows. There is a boatload of room in them. And how many times have you gotten in some of these small kit planes? They're just tiny, and it's not comfortable.

The Hiperbipe has large baggage compartments. Something the Pitts guys wish they had. They can barely take an extra pair of underwear with them.

The Hiperbipe's claim to fame is the 8-point vertical roll and the inside outside 8. And its inverted performance is stellar. I have 11 gallons of inverted fuel. I can literally flip my airplane upside down and fly for as long as the fuel lasts. I don't even have to retrim when flying inverted. The airplane just stays there, and it's faster upside down than it is right side up. **IAC+**



The new Hiperbipe SNS-7 introduced in the 1973 issue of Sport Aerobatics.

Hiperbipe

The Swiss Army knife of airplanes

BY JONATHAN APFELBAUM, IAC 433983

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INSPIRED IN PART BY the graceful lines and elegance of the Beech Staggerwing, Hobie Sorrell and his sons John, Mark, and Tim began designing a series of homebuilt biplanes in the late 1960s and early 1970s. Some of the early aircraft were too small or underpowered and weren't exactly great performers. John recalled flying an early "bathtub" design with his brother Mark when they were 11 and 13. He said, "Its engine was too anemic for any of the larger adults to fly! Can you imagine that happening today? 'Have fun flying the bathtub, kids. Don't bust any TFRs.'"

Hobie's first design was called the Guppy, followed by the Biggy Rat, which was powered by a converted 125-hp Lycoming GPU engine and controlled with flaperons. Learning from these designs and flying experiences, he pursued further development with a new set of goals. He wanted an aircraft capable of aerobatics with an enclosed cabin, room for two, and the ability to travel in an efficient manner, and he wanted to be able to get into his one-way-in/one-way-out 900-foot strip. The evolution of these aircraft eventually led to the Hiperbipe SNS-6. The name and model number were derived as follows: Hiperbipe is shortened from HIGh PERFORMANCE BIPLANE, and SNS-6 is from Sorrell Negative Stagger, Model Number Six. The first Hiperbipe design made its first flight in the early 1970s. John Sorrell, having just returned from active military duty in Vietnam, jumped right into the flight-testing phase.

There is an old saying that the B-24 was the crate the B-17 came in. Along those lines, one could make a similar statement that the Sorrell SNS-7 Hiperbipe came in the box in which a Pitts might arrive. Given its



JONATHAN APFELBAUM

unusual lines, it is an aircraft that generates strong feelings among its viewers. The design speaks to some people but others, well, not so much. One thing is certain: The unique design creates an instant curiosity of onlookers anytime the plane lands. Longtime owner Guy Barrow wryly comments, “It’s not the same as everyone else’s airplane. People pop up from all over the airport to check it out when you land somewhere. What usually follows is a series of questions, starting with “What the heck is that?”

Tubing, Wood, and Fabric

The Hiperbipe frame is constructed with 3/4-inch square 4130 steel tubing, tapering straight back to keep the fuselage at a constant width, which gives it its unusual profile. The Sorrells felt the use of square tubing made fitting the metal together easier than using round tubing. This framework also gives it a 42-inch-wide cabin, allowing side-by-side seating for two and room for up to 80 pounds of baggage. The wide, flat bottom of the fuselage creates an all-flying fuselage (or lifting body) and actually allows for smaller wings.

Each wing is all wood, with stressed plywood skins built around three spars. Originally, these were built with resorcinol (resorcinol-formaldehyde) glue. It’s a great adhesive that tolerates water and UV exposure, but it doesn’t fill in gaps like modern epoxy resins, and it requires close-fitting joints. The twisting moment arm of the interplane struts caused cracking issues in the wings, which led to the Sorrells having to issue a bulletin to inspect resorcinol wings for evidence of delamination. Each wing has a full-span flaperon controlled by torque tubes that are routed through the leading edges to keep the control systems out of the wing panels. The entire airframe is then covered with fabric.

A delightful, unusual feature is that the upper cowl is continuous with the windshield, which is hinged at the top. That means when you lift the top cowl up, it brings the windshield with it, allowing access behind the instrument panel. Remember the last time you tried to work on your panel? After a few expletives and trying to contort yourself around and under everything in your way, I’m sure at some point you found yourself thinking, “This would be so much easier if the windshield wasn’t here!” (Okay, that might have been the second or third thought you had, but we’re keeping this article PG.) The mechanic in all of us can appreciate that the Hiperbipe design allows the maintainer to easily lift that pesky windscreen away, making access to a tight area so much easier!

The original had spring-steel Wittman-style gear legs, although the most recently built Hiperbipe incorporates titanium gear legs, which cause the nose to sit noticeably higher than the earlier models.

An Airplane for Everything

The Sorrells wanted a cabin-class airplane that not only could do aerobatics but also be a cruiser and have all-around utility. It sure sounds to us like it delivers well on all accounts it was designed for. With a comfortable four-hour endurance at 160-mph cruise, one can cover some serious cross-country distances in comfort. The side-by-side seating is more enjoyable for some than tandem seating. (Typically, the spouse or partner gets tired of watching the back of their pilot’s head.) And it is relatively roomy for a smaller biplane. In fact, it’s as wide as a Cessna 180 cabin! The luggage capacity means that you and a passenger can bring more than a toothbrush while traveling and enjoy the trip with a few sets of clean clothes and toiletries. Fuel capacity is approximately 38 gallons, some of which is in a 12-gallon header tank utilized for aerobatics.

Looking at the aircraft, one might think with its large flat sides that crosswind capability might be a challenge. Everyone we spoke with actually



Guy Barrow in the yellow Hiperbipe, tail number N265HB, and Doug Eastman in tail number N278HB.

described it as having very good crosswind performance. Rounding out the design is its great STOL performance; it can easily get into a 1,000-foot runway, or shorter with practice. Not many traveling aircraft can make that claim, even without the aerobatic forte.

When talking with folks about their airplanes, we always ask about not only the positive features and things they love but also the negatives. What don’t they like, or what would they change? Across the board, everyone we spoke with wouldn’t change much, if anything. More power is always desirable, of course, and everyone wants more horses under the cowl. The cabin can be noisy at times, so better soundproofing is a consideration when building and restoring. Some people aren’t enamored with the square fuselage and the unique cosmetic appearance.

The most recent Hiperbipes have been built with slightly larger rudders, giving them more vertical fin in the slipstream and yaw authority, so some pilots may consider retrofitting their aircraft at some point. There has been some consideration of decreasing the wing size, depending more on the lifting body of the fuselage, but no one has tried a clipped wing ‘Bipe ... yet, anyway. Overall, these are rather small changes that are by no means a deal-breaker with the overall design.

A few years ago, John Sorrell and his friend Wayne Sargent completed the newest fledgling ‘Bipe, incorporating numerous upgrades. Being the highest-performing Hiperbipe, it weighs 1,212 pounds empty, flies at 144 knots at 24 square, and holds 80 pounds of baggage. Adding electric trim, powering it



JULIA APFELBAUM

with a stroked Lycoming IO-360, building larger flaperons as well as tail feathers, and adding servo tabs, they have ideally created the most robust 'Bipe yet! By all accounts, it's an absolute delight to fly!

Thinking Outside the Loop

Here's a historic footnote that some might find interesting: In July 1989, Joann Osterud broke the world record for outside loops in her modified Hiperbipe, affectionately named Supernova. Encouraged by the previous record holder, Dorothy Stenzel, who set the record of 62 outside loops in 1931, Joann performed 208 (yes, 208!) consecutive outside loops. This achievement eclipsed Stenzel's record, as well as the unofficial record set by Hal McClain of 180. Why 208? Well, Joann was going for 200, but one of her favorite songs was playing

through her headset, the Bernie Leadon/Gene Clark tune "Train Leaves Here This Morning," performed by the Eagles, and she didn't want to stop until it was finished.

Speaking of history, Sorrell Aviation was founded in 1958 and produced between 50 and 100 Hiperbipe kits, as well as parts for the Pitts S-11B (Super Stinker), before it ultimately closed its doors in the 1980s. Nevertheless, enthusiasts continue to keep the design flying, and in 2002, Thunderbird Aviation in Michigan acquired the rights and tooling for the SNS-8 Hiperlight and later for the SNS-7 in 2013.

You might not be able to have absolutely everything in an aircraft, but the Hiperbipe gets pretty close. The best description we've heard to describe it is that it is the "Swiss Army knife of airplanes," with a tool for every job or the capability for almost every mission. To learn more about this unusual design, visit ThunderbirdAviationMI.com.

SNS-7 Hiperbipe Specifications

Wing Span	22' 10"
Length	20' 10"
Height	5' 11"
Wing Area	150 Sq Ft
Engine	Lycoming IO-360
Fuel Capacity	38 Gallons
Empty Weight	1236 LBS
Gross Weight	1911 LBS
Wing Loading	12.74 LBS/SQ FT

Performance

Maximum Speed	225 MPH
Normal Cruise	160 MPH
Range	500 Miles
Stall Speed	49 MPH
Service Ceiling	20,000 FT

Equipment can be added at the customer's request but prices will depend on the price and availability at the time of purchase. Radios and GPS units are also available.

The SNS-7 Hiperbipe is the fire breathing big brother of the SNS-9. It was designed to compete in the sport aerobatic class, while at the same time being a comfortable weekend or cross country aircraft.

<http://www.thunderbirdaviationmi.com/sns-7.html> **IAC+**

Jonathan Apfelbaum learned to fly before he could drive and has his private pilot certificate as well as seaplane, glider, and instrument ratings. When not at his day job as an emergency physician, he can be found tinkering on his homebuilt GlaStar. **Julia Apfelbaum** is a U.S. Navy veteran with a career working on electronics for E/A-6B Prowlers and E/A-18G Growlers. She's a private pilot who finished her A&P certificate in 2021. When not flying her 1955 Cessna 180, Julia is restoring a 1947 Stampe SV-4C. She is the lead photographer of Distant Thunder Aviation. KitPlanes - Full article by Jonathan and Julia Apfelbaum <https://www.kitplanes.com/hiperbipe/>

Oil Separator Quick Release

BY TOM MYERS, IAC 16830



LIKE MOST OF US, my airplane has a Christen inverted oil system. The system includes two main components: the Model 803 oil separator and the Model 802 oil valve. Normally, the Model 802 oil valve does not need much maintenance. The Model 803 oil separator, however, does require routine maintenance. This article is about how I made that routine maintenance much easier and much faster to accomplish.

Multiple sets of piston rings are used to seal the cylinder combustion chambers as the pistons translate through the cylinder bores. Piston rings slide on a thin layer of oil. Byproducts of burning aviation fuel include exhaust gases, water in the form of steam, and oil vapor. Piston rings normally seal the combustion chamber well but not absolutely perfectly. Due to the temperatures and pressures involved, there is a small amount of leakage of these combustion byproducts into the engine crankcase. Over time, high and potentially destructive pressures could build up in the crankcase if these combustion byproducts are not allowed to vent to the outside atmosphere. Thus, engine crankcases have a breather port.

An oil separator provides a chamber for the oil vapor to condense and return to the oil sump. Steam and exhaust gases escape to the outside atmosphere through a drainpipe down to either the bottom of the engine compartment or through the fuselage to the tail. Some oil does escape through the vent pipe, so having the vent pipe exit the aircraft at the tail keeps the belly much cleaner over time.

An inverted oil separator includes an additional internal valve. Without the internal valve, the oil sump could drain a lot of oil out through the drainpipe while the aircraft is flying inverted. The separator's internal valve allows the engine breather port to become the oil return port and the engine sump port to become the engine vent port during inverted flight. Far less oil is lost through the drainpipe during aerobatics thanks to this valve.



An overall view of my oil separator in place, mounted to the firewall inside of the engine compartment.

However, for the valve inside of the oil separator to work well, it must be kept clean. When enough oil residue and combustion byproducts build up inside of the separator, the internal valve gets bogged down as it transitions back and forth between its upright and inverted positions. As a

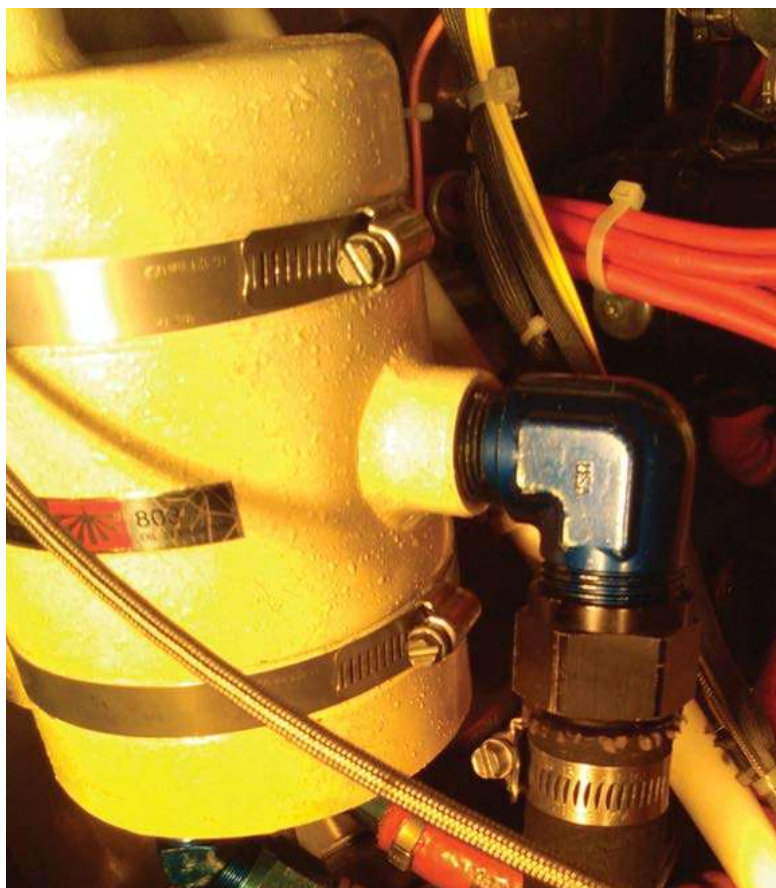
When I first bought my airplane eight-plus years ago, cleaning out the oil separator was a real project I needed to come up with an easier way.



The top of the oil separator and the new fittings. The blue fitting attached to the separator top is a 3/4-inch male NPT to 1-inch (-16) male AN flared aluminum 45-degree fitting, XRP part number 982317. The black fitting attached to the 1-inch ID aviation MIL type 6000 oil hose is a 1-inch (-16) female AN flared to 1-inch ID hose nipple aluminum 45-degree normal-profile fitting, Earl's part number 674616. The fitting is secured to the hose with a standard aviation rotary hose clamp.

result, a little oil can escape out of the separator drain port during each attitude transition. The result is increasing oil consumption during aerobatics.

Typically, I see nothing or just a little condensed water dripping out of the tail drainpipe of



Shows the side of the separator and the new fittings. The blue fitting attached to the separator side is a 3/4-inch male NPT to 1-inch (-16) male AN flared aluminum 90-degree fitting, XRP part number 982217. The black fitting attached to the 1-inch ID aviation MIL type 6000 oil hose is a 1-inch (-16) female AN flared to 1-inch ID hose nipple aluminum straight fitting, Earl's part number 670116. The fitting is secured to the hose with a standard aviation rotary hose clamp.

my airplane after I land. When I start to see oil dripping out of the drainpipe, I know it is time to clean out the oil separator. It is easy enough to tell the difference between dripping water and dripping oil by rubbing a little between two fingers. There is a noticeable difference between water with a little oil in it and oil with a little water in it.

When I first bought my airplane eight-plus years ago, cleaning out the oil separator was a real project. The top and side fitting coupled directly to clamped hose fittings. Clamped hose fittings are not easy to remove or insert. It involves warming up the hose and wrestling the fittings out or in. I usually end up cleaning out my oil separator two or three times a year. I needed to come up with an easier way.

Fortunately, the oil separator is on the non-pressurized sump portion of the engine oil system. It means that whatever solution I come up with does not have to be able to withstand the 80 or so PSI at which the pressurized portion of the oil system nominally runs. In addition, the bottom fittings of the separator were already a set of standard aviation



The bottom of the separator and the standard aviation fittings. The blue fitting attached to the separator bottom is an MS20823-10D 1/2-inch male NPT to 5/8-inch (-10) male AN flared aluminum 45-degree fitting. The oil hose is Parker Stratoflex type 156 with a 5/8-inch (-10) female AN flared straight end fitting.



Two inexpensive open-ended wrenches that I purchased and slightly modified (chopped short) with an angle grinder to loosen and tighten the new flared fittings within the available clearances of my engine compartment. I use a second wrench to assure that I do not disturb the sealing of the separator NPT threads.

AN (Army-Navy) flared and MS (military standard) fittings that are easily loosened and tightened with a 1-inch open-ended wrench. I only needed to come up with solutions for the top and side fittings.

I also benefited from the fact that while flying in the upright attitude, there is no oil in the top or side fittings. Even if there was a leak in my solution while flying inverted, I could roll upright and continue to fly without further issues.

At first, I did not make much progress in finding a solution to the problem. I pored through a lot of aircraft part catalogs. I was unable to find a combination of AN or MS fittings that would allow for flared fitting couplings between the oil separator and the hoses in the space that I had available or without replumbing a large swath of the engine compartment.

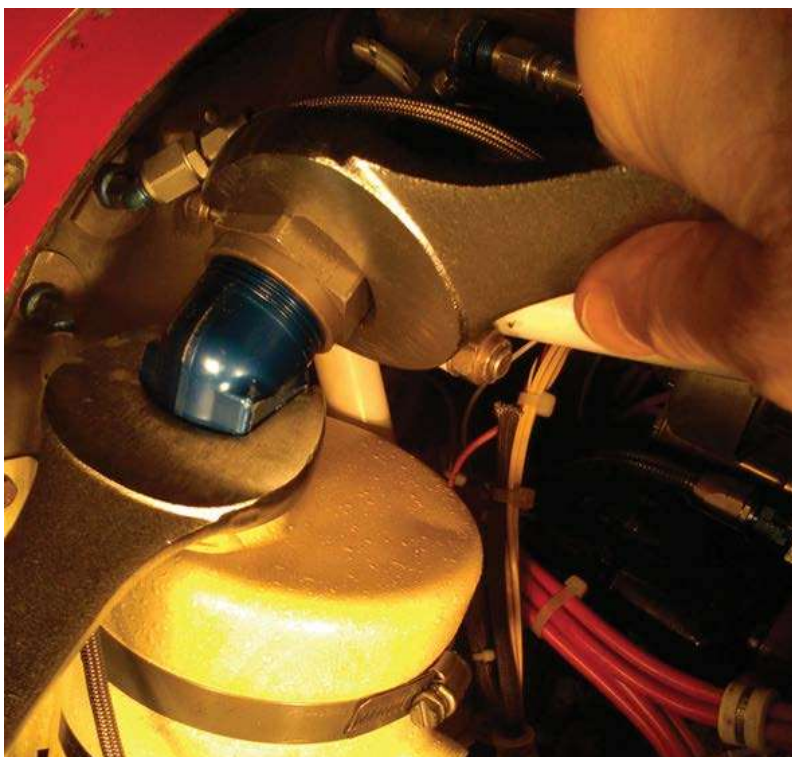
The aha moment occurred a few months after I bought the airplane. I was hanging out with a buddy of mine in the pits at the Sears Point race-track. He drives an open-wheeled formula car in Sports Car Club of America (SCCA) races. As you can imagine, we compare a lot of notes concerning our individual pursuits. I took the opportunity to look carefully at the plumbing inside of his car. His car has to stand up to the same sorts of punishing conditions as my airplane, so I considered it a great chance to learn something useful and applicable.

No surprise — his car was full of the same AN and MS hardware you will find in any aircraft. However, his car was also full of hardware manufactured to AN and MS standards in configurations I did not see in any aircraft AN and MS component catalog. Welcome to the world of race car components.

As soon as I got home that day, I started downloading and reading race car plumbing catalogs from cover to cover. Transitions to and from AN flared fittings appeared to be a piece of cake. You can do it this way. Or this way. Or that way. I quickly went from no choices to almost too many choices.

What I ended up doing was buying a couple of combinations of fittings that looked like they would work. With the actual parts in hand, it became easy to see what would work the best and

At first, I did not make much progress in finding a solution to the problem. ... The aha moment occurred a few months after I bought the airplane. I was hanging out with a buddy of mine in the pits at the Sears Point racetrack. ... Welcome to the world of race car components.



The wrenches on the separator top fittings.

what would not. I was careful with the unused parts and was able to return them as a result.

I installed the fittings shortly thereafter during my first annual inspection. I am happy to report that I have had the fittings in the airplane for more than eight years now, and they have performed flawlessly. It takes me less than half an hour to remove the separator, flush it out thoroughly with solvent, and reinstall it.

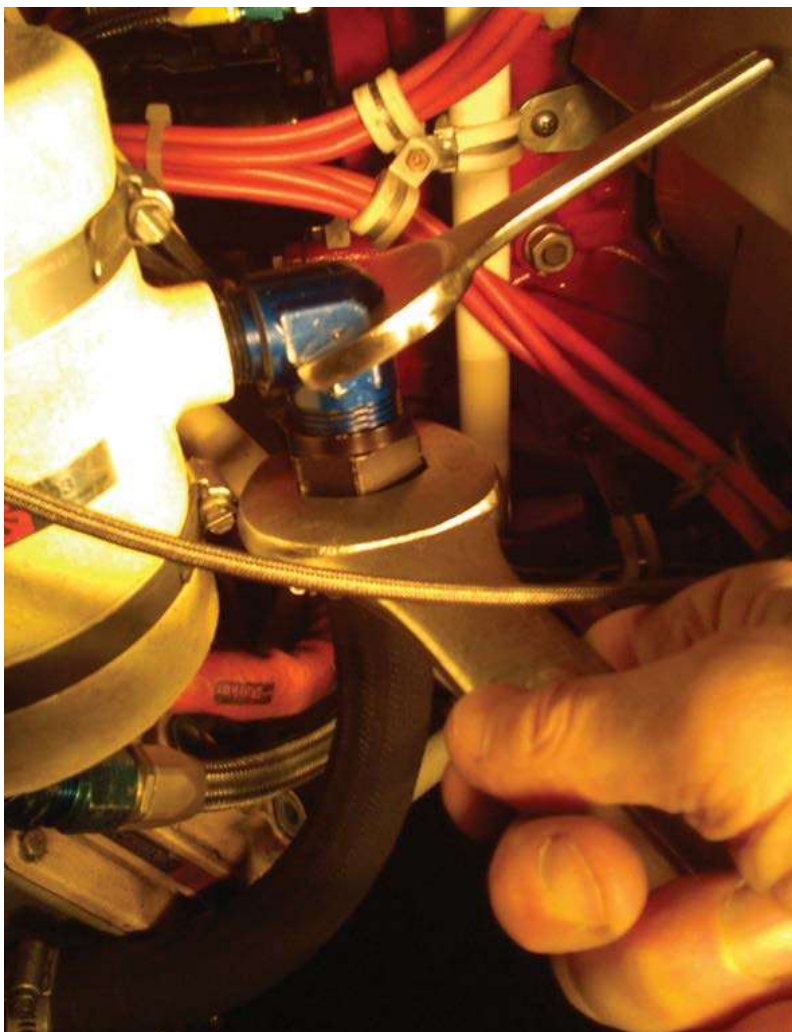
The remainder of this article documents the components that I used in my airplane. The constraints of every airplane are different. If this solution looks interesting to you, I encourage you to use this article as a starting point for how you get it done. The exact components that you choose may be different.

AN fittings are specified in sixteenths-of-an-inch increments. Thus a -16 fitting size is 16/16 inch, or 1 inch. NPT means tapered National Pipe Thread. ID is inside diameter.

XRP is Xtreme Racing Products, and its website is XRP.com.

Earl's is Earl's Performance Plumbing, a division of Holley Performance Products, and its website is Holley.com/Brands/Earls.

I purchased the fittings from ANplumbing.com. Fly safe. **IAC+**



The wrenches on the separator side fittings.

Right and Wrong Ways to Jack Up an Airplane

BY MALCOLM POND, IAC 429965

I HAVE OWNED SEVERAL AEROBATIC aircraft, including a Pitts S-2B, S-1-11, and two Edge 540s. I am mechanically inclined and enjoy working on airplanes and performing annual conditional inspections. But I have always dreaded one specific task, namely wheel bearing, brake, and tire maintenance.

Not that I am opposed to getting down and dirty, but there is no elegant way to remove the wheels and get into the grease and dirt without reciting a lot of choice swear words. Let me explain.

The Wrong Way

A previous owner of my first Edge 540 had jury-rigged 4-by-4 blocks and a wooden stand upon which he bolted a bottle jack. The Edge has a one-piece aluminum landing gear that angles down from the fuselage on each side about 45 degrees onto the axle. Four through bolts are used to attach the axle to this aluminum gear.



Figure 1. Use wheel bolts slightly longer than stock bolts to allow for the thickness of the metal plate.

There is a small place between the gear legs and fuselage that the original owner used to hoist the landing gear off the ground to inspect wheels, do tire and brake maintenance, and repack wheel bearings. The aluminum gear is gun drilled, and an AN822 fitting and braided hose send brake fluid through this drilled hole from the master cylinder to the brake. The AN822 fitting is at the bottom of the landing gear.

Out of concern that I could damage the AN822 fitting, I could not easily place anything on the bottom of the landing gear to raise the wheel off the ground. Also, there was minimal clearance from the ground to the landing gear, so I could not use a scissor jack or floor jack.

Since the fuselage tended to shift to one side as the gear was raised off the ground, the original owner's blocks and stand were not stable and could lead to collapse of the gear and bottle jack.

This was not good!

Bogert Aviation devised an ingenious method to lift angled gear legs using a fitting that would conform to the tapered gear leg and a bottle jack with various extensions. I thought this approach was just what I needed, never mind that the gear leg was 45 degrees off horizontal. To be sure, I attached a couple of C-clamps to the jack fitting to make sure it didn't come loose, and then I blithely raised the landing gear with the bottle jack, took off the wheel, and turned my back momentarily to do something else.



A one-hour maintenance task turned into three days, but everything turned out well in the end. I regreased the bearings, flushed out the brake lines, put in more fluid, and installed new brake linings.

Remember that I said the fuselage shifted laterally when one wheel was raised off the ground? Well, what could happen *did happen*. The C-clamps and Bogert fitting fell off the gear leg and the gear collapsed to the ground with a big bang, shearing off the AN822 brake fluid fitting. Then there followed a litany of swear words!

With the help of an A&P mechanic, we hoisted the airplane off the ground with a strap attached to the engine mount, disassembled the landing gear and brake fittings, and took the entire gear assembly to a machine shop. The sheared AN822 fitting was removed, pipe threads were retaped, and a new AN822 fitting was installed and pressure tested. I reinstalled the landing gear, hoses, and brake fittings.

A one-hour maintenance task turned into three days, but everything turned out well in the end. I regreased the bearings, flushed out the brake lines, put in more fluid, and installed new brake linings. These steps were done while the fuselage was suspended in midair by the hoist to the engine mount.

Another Way

I called Eric Zivko, who runs Zivko Aviation, to see what he recommended as a proper way to jack up the wheel. He said that it had always been a design problem and that there was no correct way spelled out in the pilot's operating handbook, but he recommended hoisting up the fuselage by the engine mount and weighing down one wing until the

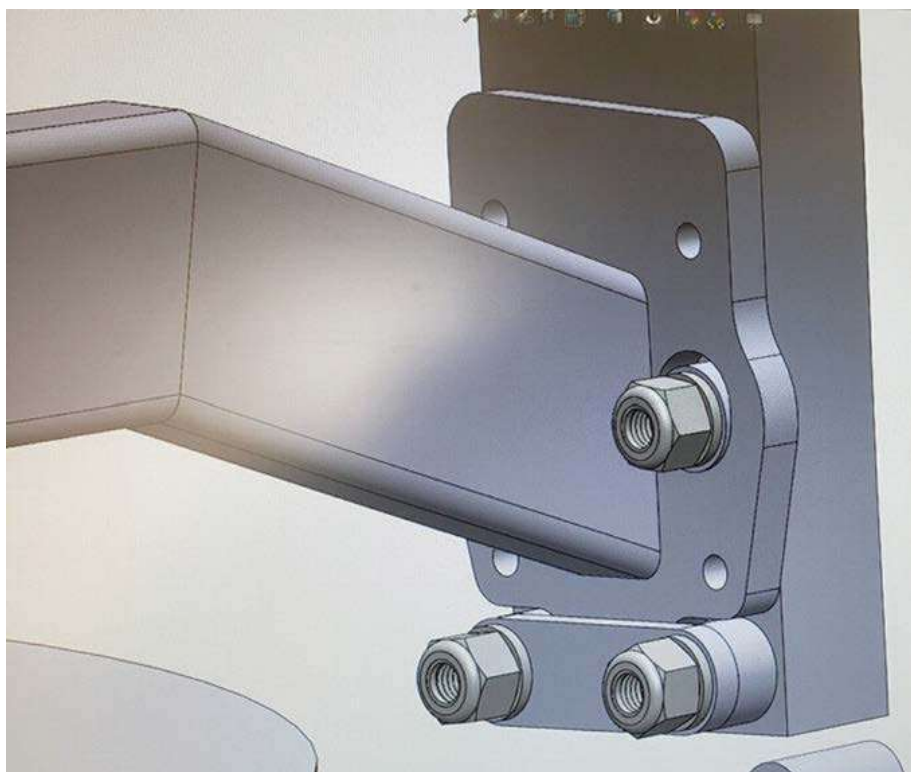


Figure 2. The lower bolts are lengthened with spacers. Matching holes are drilled into the larger plate.

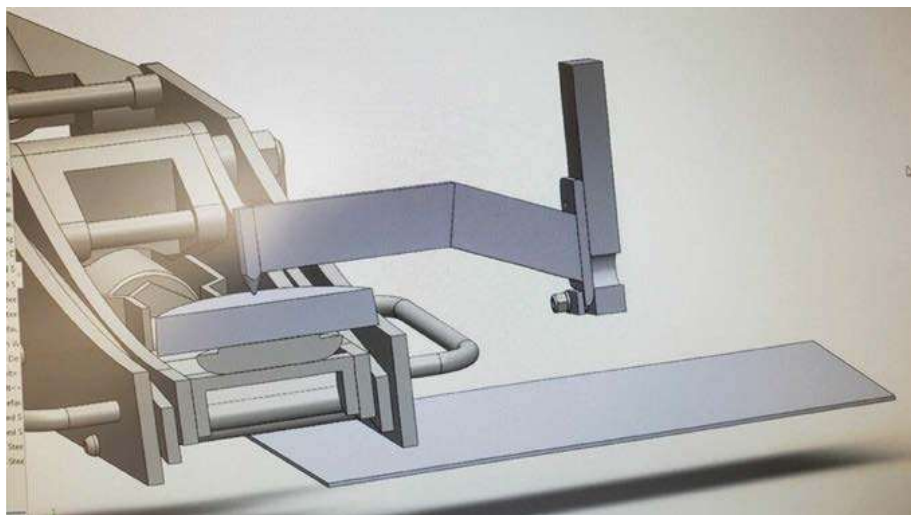


Figure 3. To remove the jack fitting, lower the jack and the fitting will slide off.

opposite wheel cleared the ground. Once it cleared, then he recommended either a block of wood or a landing gear safety stand to stabilize everything. Most importantly, he cautioned not to lift up the gear by jacking it up by the hard point tiedowns beneath the wing.

A Better Way

At a recent contest, I talked to another Edge owner, Alexander Coats, about my mishap, and he suggested something different. He fashioned a metal plate and welded a large caliber nut onto it, and he bolted the plate to the inside of the landing



Figure 4. The prototype revealed a minor problem getting the jack plate beneath the hose.

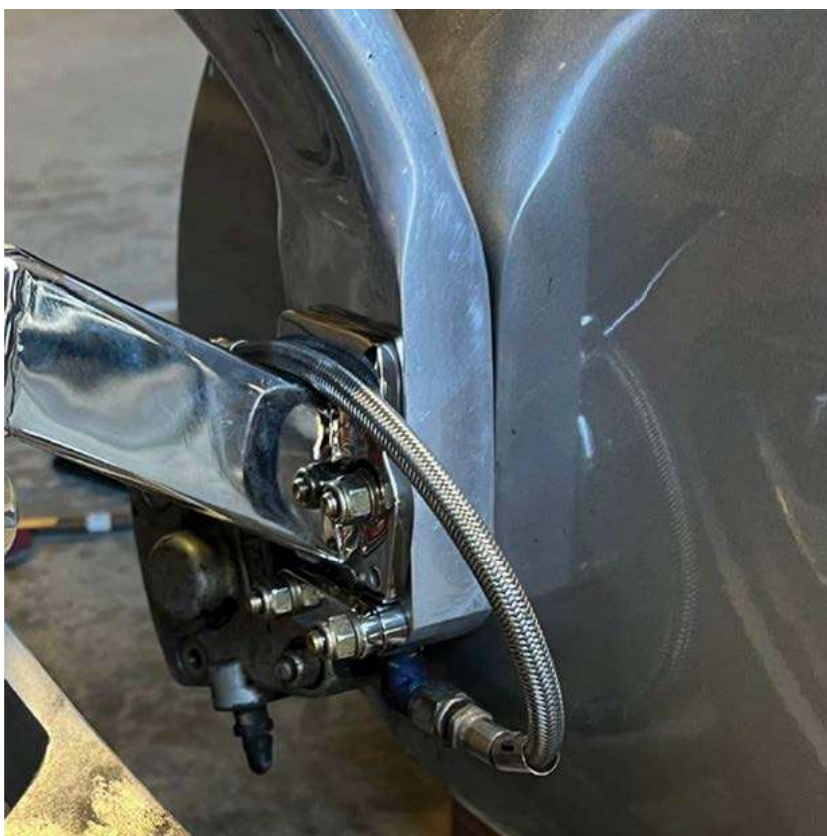


Figure 5. The resolution of the jack system resolved with a bit of filing and brake hose adjustment.

This jack system could be used on other airplanes as well; for instance, Extra Aircraft, MX, and other airplanes employing four axle bolts extending through a one-piece aluminum gear.

gear. His wheel bolts were slightly longer than stock bolts to make allowance for the thickness of the metal plate. See **Figure 1** for the location of the axle bolts, as well as the brake caliper housing and the AN822 brake fluid fitting and braided hose.

When he wanted to lift the axle for maintenance, he screwed in an appropriately sized large bolt into the welded nut plate and then placed a floor jack underneath and raised the jack.

This method would only work using a low-profile floor jack or scissor jack, not a bottle jack, because of limited clearance of the jack plate to the ground. So far, this modification has worked well for him. One concern I had was the amount of shear stress placed upon the bolt and nut plate.

My Way

What if we could use the axle bolts and a different fitting to jack up the gear? My machinist friends and I came up with another solution. See **Figure 2**. The lower bolts could be lengthened with spacers and then a small plate attached between them. The upper bolts would be lengthened and have spacers. Matching holes would be drilled into a larger plate to accommodate them.

We then designed and welded on an angled arm to this larger plate. This larger plate would fit in the space between the lower retention plate and

be flush over the upper two spacers. This hoist would be held in place by the lower bolts and plate while the upper two bolts, nuts, and spacers would be used to distribute stress as the wheel is lifted. See Figure 2.

We could easily attach or remove the welded fitting. To remove the jack fitting, just lower the jack and the fitting will slide off. The armature can be configured to any height high enough for a floor jack to slide underneath it. See Figure 3.

I have constructed a prototype of this jack system, and it works perfectly. I had a minor problem getting the jack plate beneath the brake hose, which I resolved with a bit of filing and brake hose adjustment. See Figures 4 and 5 for the jack in action.

Moreover, it is stable, and there is minimal risk that the airplane would fall

off the jack. I must warn, however, that this system cannot be used on a certificated airplane without first having Form 337 approval because of the longer bolts, spacers, and the small lower retention plate that are added to the airplane structure.

This jack system could be used on other airplanes as well; for instance, Extra Aircraft, MX, and other airplanes employing four axle bolts extending through a one-piece aluminum gear. It will not work on airplanes such as the Pitts series with tubular steel gear, unless the gear has been modified, for instance, with a Grove landing gear.

The take-home message is clear. Find a stable wheel jack system that is suitable for your airplane, and above all else, don't let your jack system fail. It goes without saying to secure the other wheels with chocks and to prop up the axle when the wheel is removed.

I invite your comments about this jack system. Be safe while you are working around or underneath your airplane. I am indebted to Dave Guthmiller and Wally Kaiser with Advanced Machining. *IAC*

Dr. Malcolm S. Pond, is a graduate of Johns Hopkins University School of Medicine and has an office in Riverside, California, where he specializes in cardiology, internal and nuclear medicine. He has been an active competitor in the Advanced and Unlimited categories for many years. Malcolm is number 41 on the list of pilots who have earned the ALL TEN award in the IAC's Achievement Award Program. He is also an aerobatic judge who averages two or three California contests each year.

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BOEING



Aerobatics Club of Norway, which is a NAK club and IAC (132) chapter. July 2-4 Norwegian Aerobic Championships. The rules for power aerobatics are based on IAC and CIVA (Advanced) official rules, as well as a separate Nordic Primary program.



Albert Aerobatics Club and IAC (137) chapter. July 13-14 Flagstaff Flyers Regional. Aerobatics are performed within the rules of both Transport Canada, as well as the governing bodies of the sport.

Our International IAC Members

MEMBERS ARE THE HEARTBEAT of the IAC, and our heart continues to beat at a healthy pace. This year our AirVenture theme is “Aerobatics Around the World,” so we’d like to take this opportunity to say thank you to all of our international members.

There are more than 400 international members in the IAC ranks as of May 2024. Some are aerobatic competitors, recreational aerobatic pilots, and aerobatic judges, and some are enthusiasts who enjoy the camaraderie and beauty of aerobatic flight.

Some of our international members have been with us as early as 1973, and 16 new international members have just joined in 2024. Whether you have been a member for many years or just joined, we want to thank you for your interest in and support of the sport of aerobatics! **IAC**

JOIN DATE	LAST NAME	FIRST NAME	CITY	STATE OR PROVINCE	COUNTRY
2016-07-17	Pazos	Bruno	Carhue		Argentina
1977-01-01	Woodward	Richard	Ingleside	NSW	Australia
1979-01-01	Pilkington	David	Brighton North	ACT	Australia
1986-01-01	Ashdowne	Rodney	Briar Hill		Australia
1991-12-20	Dick	Gerald	Biggera Waters	QLD	Australia
1992-03-29	Merrett	Andrew	Hampton		Australia
2003-10-24	Lawrence	Matthew	Junortoun	VIC	Australia
2005-08-03	Smith	Glenn	Metford	NSW	Australia
2005-12-29	Muston	Ken	Kialla		Australia
2007-08-27	Clements	Alan	Canberra	AC	Australia
2011-08-03	Canning	Warren	Kyneton	VIC	Australia
2011-08-23	Glabbatz	Timothy	Menai	NSW	Australia
2013-04-10	Brunner	Denzil	Capalaba	QLD	Australia
2014-09-10	Moller	Cassandra	Gronulla		Australia
2015-05-29	Dick	Maria	Biggera Waters	QLD	Australia
2015-06-24	Banks	Russell	Darley	VIC	Australia
2016-08-09	Crass	Robert	New Farm	QLD	Australia
2017-01-03	Reidy	Brendan	Irewarra	VIC	Australia
2017-04-17	Tu	Lachlan	Dandenong South	VIC	Australia
2018-01-08	Mebbersson	Nicholas	Brighton	SA	Australia
2018-09-04	Close	Ian	Port Melbourne	VIC	Australia
2020-02-09	Griffiths	Ian	Macedon	VIC	Australia
2020-06-29	Moshovis	Jack	Perth	WA	Australia
2020-08-23	Gordon	Michael	Richmond	NSW	Australia
2020-10-02	Clegg	Andrew	Wynnum	QLD	Australia
2021-04-23	Buchanan	Russell	Mount Helena	WA	Australia
2021-08-10	Adamson	Scott	Kardinya	WA	Australia
2022-03-24	Robinson	Scott	Fishing Point	NSW	Australia
2022-05-26	Cheam	Tristan	Frenchs Forest	NSW	Australia
2023-05-12	Anderson	James	Riverview	NSW	Australia
2023-05-12	Kime	Misty	Riverview	NSW	Australia
2023-06-12	Devlin	Patrick	Victoria	ACT	Australia
2023-06-13	Townsend	Peter	Gronulla	NS	Australia
2023-07-26	Guinan	Luka	Sellicks Beach	SA	Australia
2023-09-26	Pearson	Raymond	Fadden	ACT	Australia
2023-12-17	Delacretaz	Louis	Sassafras	VIC	Australia
2024-02-15	Hardy	Benjamin	Redbank	NSW	Australia
2024-02-24	Driver	Jarrod	Mittagong	NSW	Australia
2024-03-06	Nikolic	Stjepan	Chelsea	VIC	Australia
2024-03-25	Paterson	Dan	Mundijong	WA	Australia
2024-03-25	Johnston	Anthony	Redfern	NSW	Australia
2024-05-06	Townsend	Peter	Gronulla	WA	Australia
2002-08-19	Braunstingl	Reinhard	Graz		Austria
2003-02-12	Meltzer	Clamer Fredrik	Weigelsdorf		Austria
1986-01-01	Bodart	Jacques	LaHulpe		Belgium
1998-08-10	De Clerck	Jan	Drongen Gent		Belgium
1989-08-06	Richieri	Luiz	Sorocaba	SP	Brazil
1988-01-01	Bauke	Rolf	Blumenau	SC	Brazil
1995-02-17	Cardoso	Gilberto	S.J. Campos	SP	Brazil
1995-03-29	Engelmann	Andre	Novo Hamburgo	RS	Brazil
2008-05-08	Cardoso	Luiz	São Paulo		Brazil
1993-08-08	Torresan	Luis	Itu	AC	Brazil
2003-07-29	Bornschein	Alberto	Joinville		Brazil
2017-01-04	Starostik	William	Curitiba		Brazil
2005-12-08	Tabacnik	Marcus	Jacarei	SP	Brazil
2021-09-14	Deluqui	Marina	Boituva		Brazil
2024-02-13	T.A. Malvestio	Vladimir	Uberlandia	AC	Brazil
2009-08-21	Araujo	Bruno	Brasilia	DF	Brazil
2014-03-13	Oliveira De Oliveira	Ricardo	Porto Alegre	RS	Brazil
2020-09-15	Parrillo	Fernando	São Paulo		Brazil
2021-01-06	Markov	Veselin	Sofia		Bulgaria
1981-01-01	Crane	Miles	Calgary	AB	Canada
1985-01-01	Teeuwssen	Charlie	Sherwood Park	AB	Canada
1990-09-04	Spencer	Patrick	Calgary	AB	Canada
2000-07-26	Strzyz	Jerzy	Rocky Mountain House	AB	Canada
2001-04-05	Lockhart	Tom	Calgary	AB	Canada
2002-06-13	Sorensen	James	Calgary	AB	Canada
2003-01-04	Francoeur	Doug	Lacombe	AB	Canada
2005-05-19	Barbet	Dave	Calgary	AB	Canada
2010-02-17	Dewsnap	Philip	Calgary	AB	Canada
2010-02-19	Katerenchuk	Jason	Rocky View County	AB	Canada
2011-06-07	Harris	Neil	Airdrie	AB	Canada
2011-06-03	Brouwer	Kelly	Rocky Mountain House	AB	Canada
2012-01-05	Follinger	Ann	Calgary	AB	Canada
2012-06-05	Hockey	Burt	Falher	AB	Canada
2012-06-19	Crane	Lenora	Calgary	AB	Canada
2012-07-24	Austen	Robert	Edmonton	AB	Canada
2013-04-04	Cook	Neill	Calgary	AB	Canada
2013-08-30	Loutitt	Sandy	Calgary	AB	Canada
2013-09-05	Smith	Mike	Millet	AB	Canada
2014-05-05	van Rooyen	Frederick	Calgary	AB	Canada

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2014-11-07	Palsma	Aaldrik	Bashaw	AB	Canada
2014-12-06	Watt	Jeffrey	Edmonton	AB	Canada
2016-04-02	Seaborn	Jeff	Foothills	AB	Canada
2016-04-18	Harris	Dan	Leduc	AB	Canada
2016-08-08	Watts	Mitchell	Wainwright	AB	Canada
2017-03-14	Pelletier	Allison	Airdrie	AB	Canada
2018-03-28	Sittler	Joshua	Airdrie	AB	Canada
2018-09-17	Bradford	Cody	Wetaskiwin	AB	Canada
2021-02-05	Schmidt	Joland	Lethbridge	AB	Canada
2021-05-05	Allison	Brock	Sherwood Park	AB	Canada
2022-01-06	Smith	Janice	Millet	AB	Canada
2023-03-03	Broomhall	Brandie	Calgary	AB	Canada
2023-03-26	Cook	Reece	Calgary	AB	Canada
2023-03-26	Cook	Emily	Calgary	AB	Canada
2023-03-26	Cook	Shauna	Calgary	AB	Canada
2023-03-27	Yuen	Fai	Calgary	AB	Canada
2024-04-15	Andrews	Cherie	Okotoks	AB	Canada
1981-01-01	Franko	Allan	Qualicum Beach	BC	Canada
1986-01-01	Heays	Royden	Vancouver	BC	Canada
1996-09-13	Symmans	Phillip	Vernon	BC	Canada
1996-10-21	Richardson	Donn	Coquitlam	BC	Canada
2002-02-20	Greig	Brian	North Vancouver	BC	Canada
2004-07-12	Hewson	Ken	Vernon	BC	Canada
2007-08-13	Ploch	Monroe	Port Coquitlam	BC	Canada
2008-06-16	Dreyer	Peter	Langley	BC	Canada
2009-06-25	Mitchell	Leslie	Surrey	BC	Canada
2010-03-10	Ostlund	Stuart	Vancouver	BC	Canada
2010-03-10	Baxter	Christian	Vancouver	BC	Canada
2012-05-01	Gantner	Renate	Surrey	BC	Canada
2015-03-30	McIntosh	David	Vancouver	BC	Canada
2017-08-28	Cunningham	Mark	Vancouver	BC	Canada
2018-04-16	Latter	Geoffrey	Langley	BC	Canada
2018-07-31	Dagasso	Dan	Kamloops	BC	Canada
2019-11-24	Nair	Abishek	Port Coquitlam	BC	Canada
2020-01-06	Johnston	Ron	White Rock	BC	Canada
2021-02-16	Wharf	Rob	Kamloops	BC	Canada
2021-06-03	Gatien	Bert	Kamloops	BC	Canada
2021-11-11	Sorour	Aly	Vancouver	BC	Canada
2022-06-25	St-Gelais	David	Saltspring Island	BC	Canada
2022-10-25	Norquay	Kyle	Coquitlam	BC	Canada
2023-05-05	Javier	Gavin Paul	Kelowna	BC	Canada
2023-05-05	Javier	Jose	Kelowna	BC	Canada
2023-05-05	Javier	Espirita	Kelowna	BC	Canada
2024-02-05	Wilson	Doug	Delta	BC	Canada
1974-01-01	Yacintiuk	Dave	Dauphin	MB	Canada
1983-01-01	Hamel	Robert	Winnipeg	MB	Canada
1991-03-06	Martin	Hugh	Oakbank	MB	Canada
2004-01-21	Setlack	Jonathan	Winnipeg	MB	Canada
2005-05-18	Toews	Mike	Kleefeld	MB	Canada
2012-05-17	Reeves	Dan	St. Andrews	MB	Canada
2015-03-16	Penner	Luke	La Broquerie	MB	Canada
2016-12-05	De Smedt	Joachim	Fraserwood	MB	Canada
2018-05-30	Mack	Jesse	Winnipeg	MB	Canada
2016-08-08	Bell	Jim	Winnipeg	MB	Canada
2019-06-06	Brown	Reuben	St. Andrews	MB	Canada
2020-04-15	Contos	Emily	Winnipeg	MB	Canada
2021-02-23	Lamb	David	Winnipeg	MB	Canada
2021-07-28	Multani	Atamvir Singh	Steinbach	MB	Canada
2022-08-09	Peters	Adam	West St. Paul	MB	Canada
2022-03-18	Razon	Abram	Steinbach	MB	Canada
2022-04-06	Pejsa	Robert	Moncton	MB	Canada
2023-03-09	Arlt	Andrew	Cooks Creek	MB	Canada
2023-07-13	Hildebrand	Jeff	Ste. Anne	MB	Canada
2023-08-03	Wood	Adam	Steinbach	MB	Canada
2023-08-07	Penner	Eric	Argyle	MB	Canada
2007-03-20	Gow	Peter	Pine Grove	NS	Canada
2020-08-09	Kinsner	Michael	Halifax	NS	Canada
1973-01-01	Holyk	Carole	Toronto	ON	Canada
1973-05-01	Hunt	Jay	Ottawa	ON	Canada
1979-01-01	Baldwin	Larry	Wasaga Beach	ON	Canada
1982-01-01	Pulley	Chris	Mississauga	ON	Canada
1985-01-01	Norman	Vaughan	Puslinch	ON	Canada
1986-01-01	Ernewein	Larry	Inniskip	ON	Canada
1988-07-01	Hickox	Jason	Oakville	ON	Canada
1988-08-19	Groves	Peter	Lorignal	ON	Canada
1989-11-28	Rebbetoy	Patrick	Cayuga	ON	Canada
1989-12-12	Gilbert	Darryl	Burford	ON	Canada
1990-06-14	Simmons	William	Deep River	ON	Canada
1993-06-18	McMaster	Scott	Rockton	ON	Canada
1996-10-21	Tattersall	Kenny	Portland	ON	Canada
1997-01-16	Rogers	Brent	Toronto	ON	Canada

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1997-04-17	Martin	David	Niagara on the Lake	ON	Canada
1998-04-22	Rafferty	Trevor	York	ON	Canada
1998-07-26	Hewitt	David	Woodstock	ON	Canada
1999-06-23	Kuciak	Andrea	Rockton	ON	Canada
1999-09-15	Taddeo	Bernard	Thunder Bay	ON	Canada
2000-07-18	Basham	Chris	Bolton	ON	Canada
2003-01-14	Pollock	Jim	Strathroy	ON	Canada
2003-03-03	McLeod	Pete	London	ON	Canada
2023-07-25	Babu	George	Toronto	ON	Canada
2003-08-27	Kellett	Mark	Stouffville	ON	Canada
2003-08-12	Rempel	Kelvin	Mattawa	ON	Canada
2003-09-10	Ludwig	Bill	Chatham	ON	Canada
2004-01-05	Tilker	Anne	Palmerston	ON	Canada
2004-07-27	Voermann	Nils	Oakville	ON	Canada
2005-02-15	Radius	Manfred	Toronto	ON	Canada
2006-06-12	Ernewein	Andy	Guelph	ON	Canada
2006-06-13	Tryggvason	Michael	London	ON	Canada
2007-08-21	Jones	Michael	London	ON	Canada
2009-08-19	Canton	Bill	Wyoming	ON	Canada
2009-10-03	Lightbody	Desmond	Oshawa	ON	Canada
2010-09-24	Fawcett	Kelly	Victoria Harbour	ON	Canada
2012-03-07	Pegg	Joshua	Woodstock	ON	Canada
2013-08-21	Beltaos	Terry	Burlington	ON	Canada
2014-05-15	Phillips	Charles	Markham	ON	Canada
2015-06-02	Fenwick	Glen	Sarnia	ON	Canada
2015-07-13	Chapman	Ryan	Toronto	ON	Canada
2016-04-21	Quett	Gabriel	Bracebridge	ON	Canada
2016-07-24	MacCabe	Adam	Stayner	ON	Canada
2016-08-08	Juergensen	Hans	Morrison	ON	Canada
2016-11-11	Ng	Leslie	Richmond Hill	ON	Canada
2017-09-28	Westcott	Clark	Bracebridge	ON	Canada
2018-01-29	Costello	Denis	Guelph	ON	Canada
2018-05-01	Curtis	Jarred	London	ON	Canada
2018-05-02	Lebel	Terence	Caledonia	ON	Canada
2018-09-19	Rowland	Simon	Toronto	ON	Canada
2018-12-10	Stackhouse	Timothy	Embro	ON	Canada
2020-03-16	Manson	Dale	Beeton	ON	Canada
2021-03-31	Powell	James	Peterborough	ON	Canada
2021-07-19	McAlpine	Steve	Cambridge	ON	Canada
2021-12-09	Burnard	Gregory	Thornedale	ON	Canada
2021-12-23	Colero	Michael	Toronto	ON	Canada
2022-02-28	D'Souza	Chrysell	Etobicoke	ON	Canada
2023-02-18	Persicone	Joe	Springwater	ON	Canada
2023-03-09	McGuire	Patrick	Sarnia	ON	Canada
2023-07-18	Ullano	Constantino	Burlington	ON	Canada
2023-07-27	Tregunno	Christopher	Hamilton	ON	Canada
2023-07-29	Hughes	Don	Grimby	ON	Canada
2023-07-31	Mack	Katherine	Kitchener	ON	Canada
2023-08-05	Nicolescu	Ilinca	Toronto	ON	Canada
2023-08-08	Gletski	Edward	Mississauga	ON	Canada
2023-09-05	Thorne	Stephen	Toronto	ON	Canada
2024-03-01	Rudin-Brown	Peter	Ottawa	ON	Canada
2024-04-18	Smith	Michael	Mississauga	ON	Canada
1979-01-01	Albert	Bruno	Saint-Narcisse	QC	Canada
1985-01-01	Bougie	Francois	Baie-D'Urfe	QC	Canada
1985-01-01	Goyette	Paul	Montreal	QC	Canada
2001-09-06	Wyman	John	Isle-aux-Coudres	QC	Canada
2007-09-24	Langumier	Raphael	Blainville	QC	Canada
2012-03-05	Fournier	Alain	Neuveville	QC	Canada
2012-08-21	Cuesta	Dimitri	Lachute	QC	Canada
2013-05-22	Martineau	Luc	Montreal	QC	Canada
2007-08-29	Scotto d'Aniello	Philippe	Napierville	QC	Canada
2012-06-20	Lortie	Andre	Sainte-Catherine-de-la-JC	QC	Canada
2014-05-14	Marquis	Francois	Mont-Saint-Hilaire	QC	Canada
2016-01-12	Overing	Christopher	Montreal	QC	Canada
2018-07-25	Fleury	Christian	Quebec City	QC	Canada
2019-12-08	Carre	Louis-Olivier	Rimouski	QC	Canada
2020-07-29	Vrana	François	Lachute	QC	Canada
2021-08-30	Riva	Xavier	Gatineau	QC	Canada
2022-09-21	Murdoch	Paul John	Wemindji	QC	Canada
2023-04-07	Rousseau	Pascal	Saint-Jérôme	QC	Canada
2023-07-23	Lemoine	Maxim	Pont-Rouge	QC	Canada
2024-03-19	Vicek	Christian	Montreal	QC	Canada
1998-07-09	Zubot	Victor	Lumsden	SK	Canada
2005-04-07	Carefoot	Michael	Swift Current	SK	Canada
2021-09-14	Brooke	Charles	Saskatoon	SK	Canada
2017-06-08	Bolton	Cristian	Viña del Mar		Chile
2023-07-25	Balzer	Erwin	Las Condes		Chile
2015-07-26	Jiang	Lijun	Beijing		China
2016-07-28	Geng	Xinhua	Shanghai	HK	China
2023-07-27	Zhang	Jiaqi	Beijing		China

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2015-08-21	Bornheber	Ralf	Draskovic		Croatia
2017-09-27	Nielsen	Kenneth K.	Sjnderborg		Denmark
2018-01-11	Jermiin	Martin	Frederiksberg		Denmark
2003-10-10	Bartholdi	Timo	Riihitie		Finland
2002-06-19	Kallinen	Risto	Nokia		Finland
2004-11-30	Vallas	Tero	Hämeenlinna		Finland
2012-09-04	Niemi	Risto	Lahti		Finland
2014-10-30	Luomaranta	Ari-Jukka	Kokkola		Finland
2017-05-31	Tamminen	Ari	Inkoo		Finland
2023-03-10	Caussade	Jérémy	Pyöli		Finland
1986-01-01	Paris	Patrick	Poisv		France
1988-01-01	Gonnaud	Jean	Toulouse		France
2002-03-25	McIntosh	Geoff	Embry, Pas de Calais		France
2008-10-20	Vincenti-Brown	Crispin	Cornillon-Confoux		France
2011-05-09	Gauthier	Pascal	Lamorlaye		France
2015-05-08	Gruhier	Willy	Chatillon		France
2015-07-04	Gauthier	Isabelle	Lamorlaye		France
2015-09-14	Fhal	Romain	Génissieux		France
2020-12-22	Bourdillon	Sebastien	Marseille		France
1980-01-01	Muehlbauer	Gerd	Mitterfels		Germany
1984-01-01	Hankers	Rudolf	Braunschweig		Germany
1986-01-01	Fuchs	Thomas	Neuberend		Germany
1988-01-01	Schroeder-Findk	Dieter	Duesseldorf		Germany
1988-11-30	Eichhorn	Guenther	Münster	BW	Germany
1992-02-24	Emig	Stefan	Aschaffenburg		Germany
1993-09-23	Stock	Michael	Berg-Farchach		Germany
1994-04-26	Hausser	Edkhard	Buchholz in der Nordheide		Germany
1995-01-23	Huefner	Gerald	Vellberg		Germany
1995-06-27	Phillipps	Gordon	Wolgast		Germany
1996-04-09	Giesers	Helmut	Bocholt		Germany
1997-12-30	Laudacher	Armin	Kirchheim/Teck		Germany
1998-01-28	Berndt	Rainer	Landshtut	BW	Germany
1998-02-13	Drummer	Bernhard	Lappersdorf	BW	Germany
1999-04-27	Robb	David	Munich	Bavaria	Germany
1999-07-20	Koehmann	Peter	Bargteheide		Germany
2005-05-14	Mueller	Volker	Hochheim	BW	Germany
2007-01-23	Saliger	Ralph	Koenigsbach-Stein	BW	Germany
2010-07-03	Sturhan	Ingo	Aschheim		Germany
2011-05-04	Schatz	Wolfgang	Graefelfing		Germany
2012-11-12	Kolb	Erik	Munich	Bavaria	Germany
2015-03-05	Hankers	Theo	Braunschweig	BW	Germany
2016-02-21	Diksaitis	Andrius	Bad Saulgau		Germany
2016-06-14	Berndt	Juergen	Biblis		Germany
2017-05-17	Denner	Peter	Nussloch	BW	Germany
2017-08-03	Uecker	Andreas	Bremen		Germany
2017-11-30	Albrecht	Martin	Straubing		Germany
2018-12-07	Moeller	Walter	Lohmar	BW	Germany
2019-08-19	Schiedek-Jacht	Justus	Frankenberg		Germany
2020-05-20	Sokolowski	Juergen	Woltersdorf	BW	Germany
2019-10-07	Anastasiadis	Averkios	Alimos		Greece
2017-05-21	Samuelsson	Samuel J.	Reykjavik		Iceland
2002-11-20	Sivaraman	Sabu	Chennai		India
2021-04-15	Kumar J	Aravind	Bengaluru		India
2013-08-02	Herryanto	Eris	Bambaupus, Jakarta		Indonesia
2024-04-10	O'Donnell	Paul	Enniskerry, County Wicklow		Ireland
2016-01-01	Kushilevitz	Gil	Haifa		Israel
1998-06-30	Beccaro	Alberto	Vercelli		Italy
1999-08-03	Metelli	Christian	Coccaglio	BS	Italy
2009-01-20	Giorgetti	Cristian	Forli	FC	Italy
2017-08-03	Dante	Francesco	Rovereto		Italy
2017-11-23	Perazzolli	Luca	Fraz. Mattarello-TrentoTN		Italy
2021-10-28	Fullin	Francesco	Modena		Italy
1990-01-15	Aoki	Akira	Hanno-shi		Japan
1993-07-19	Kanao	Miyako	Chiyoda-ku Tokyo		Japan
1994-08-07	Iwata	Keishi	Tokyo		Japan
1997-10-15	Okunuki	Hiroshi	Tochigi		Japan
1998-10-22	Aikyo	Shizuka	Natori	Miyagi	Japan
1999-09-28	Utsumi	Masahiro	Tadotsu	Kagawa	Japan
2000-06-15	Mase	Tadashi	Kanagawa		Japan
2003-02-07	Endo	Hiroyasu	Urayasu	Chiba	Japan
2006-08-02	Tsuneki	Miyoshi	Kumamoto		Japan
2009-01-06	Hamasaki	Takaki	Minato-ku, Tokyo		Japan
2016-04-05	Masui	Kaho	Sumiyoshi, Osaka		Japan
2016-05-06	Matsumaru	Ken	Narita		Japan
2018-11-21	Sengoku	Eiichi	Minami-Ashigara Kanagawa		Japan
2019-12-19	Ohmoto	Hiroshi	Nasushiobara-Shi	Tochigi	Japan
2005-04-28	Ross	Mark	Nairobi		Kenya
2007-02-05	Uplejs	Voldeermis Janis	Ikškile	Ogres	Latvia
2011-02-14	Brazys	Algirdas	Kaunas		Lithuania
2018-07-31	Isentyeva	Ekaterina	Luxembourg		Luxembourg
2020-04-28	Sacco	Paulo	Luxembourg		Luxembourg

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2019-07-16	Esnaurrizar	Hugo	Naucalpan		Mexico
1997-12-03	Miedema	Barry	Aerdenhout		Netherlands
2016-06-04	Van Gastel	John	Boschenhoofd		Netherlands
1989-05-12	Gwilliam	D.	Whangarei		New Zealand
1995-01-18	Brooker	Doug	Auckland		New Zealand
1998-06-10	Dickens	Lloyd	Masterton		New Zealand
1999-09-20	McCallister	John	Prembleton	Canterbury	New Zealand
2009-12-14	Tull	Morris	Rangiora		New Zealand
2013-11-08	Benns	Grant	Auckland		New Zealand
2014-09-10	Jones	Stephen	Auckland		New Zealand
2016-04-14	Rogers	Murray	Papamoa		New Zealand
2019-05-05	Lamb	William	Napier		New Zealand
2019-10-17	Jones	Lincoln	Palmerston North		New Zealand
2023-05-03	Jackson	Peter	Blenheim		New Zealand
2023-07-23	Hood	Paul	Hammer Springs		New Zealand
1991-05-08	Vassbotten	Oyvind	Blomsterdalen		Norway
2000-02-02	Thoresen	Thore	Notodden		Norway
2003-02-21	Osby	Steinar	Sandnes		Norway
2003-04-30	Lande	John Arne	Oslo		Norway
2004-03-19	Dyrdal	Ivar	Fjerdingsby		Norway
2009-01-20	Belstad	Morten	Skedsmokorset		Norway
2009-12-15	Josefsen	Frode	Nannestad		Norway
2011-04-18	Falck	Christian	Bergen		Norway
2013-05-15	Stroem	Arne	Voyenenga		Norway
2014-01-20	Henriksen	Ivar	Kjeller		Norway
2014-11-24	Oeglaend	Oeyvind	Skjetten		Norway
2014-12-13	Oglend	Erik	Oslo		Norway
2015-05-28	Johansen	Bendik	Harestua		Norway
2015-07-02	Orlien	Harald	Oslo		Norway
2017-11-21	Berg	Thomas	Skedsmokorset		Norway
2023-04-10	Hatlestad	Ola Tau	Sandnes		Norway
2023-05-18	Saraiva	Miguel	Porto		Portugal
2023-05-18	Saraiva	Nuno	Porto		Portugal
2023-05-18	Lima	Olinda	Porto		Portugal
2005-08-30	Melancon	Casey	Ras Tanura	LA	Saudi Arabia
2024-03-14	Khoo	Raymond	Singapore		Singapore
2024-04-01	Barani	Jan	Bratislava		Slovakia
2023-12-20	Resnik	Robi	Dramlje		Slovenia
2008-02-29	Boer	Michael	Modderfontein Gaut		South Africa
1973-01-01	lyssand	Bjarte	Mutxamel Alicante		Spain
2000-09-05	Bido	Joan	Vinyols i els Arcs	Cantabria	Spain
2022-08-10	Larcaba	Ignacio	Oviedo		Spain
2023-08-11	Puerto Nieto	Juan	Barcelona		Spain
1978-01-01	Engstrand	Karl	Ekslund		Sweden
1986-01-01	Mattsson	Kent	Uddevalla		Sweden
1990-03-26	Havbrandt	Pekka	Eskilstuna		Sweden
2010-09-03	Thorsen	Lars	Loberod		Sweden
2016-01-29	Allerhed	Lars-Åke	Åkersberga		Sweden
2018-07-31	Odlund	Robert	Rockneby		Sweden
2018-07-31	Norén	Per	Ås		Sweden
1988-01-01	Ryser	Jean-Pierre	Broc		Switzerland
1993-04-05	Dubouchet	John	Switzerland		Switzerland
1993-12-14	Sanche	Jacques	Mannedorf		Switzerland
1996-05-13	Gitchenko	Cedric	Neftenbach		Switzerland
2001-05-22	Ruesch	Markus	Herzogenbuchsee		Switzerland
2007-04-05	Oskanek	Martin	Dübendorf		Switzerland
2009-12-20	Luedi	Ariel	Cham		Switzerland
2010-04-28	Kohler	Edouard	Saint George		Switzerland
2013-09-24	Rohner	Hanspeter	Saint-Legier	VD	Switzerland
2014-11-13	Gaube	Ivo	Erlenbach		Switzerland
2022-10-02	Gardel	Gabriele	Ruvigliana		Switzerland
2023-05-28	Egloff	Bernhard	Unterseen		Switzerland
1975-01-01	Henning	Ronald	Chiang Mai		Thailand
2001-11-09	Sophonpanich	Charn	Bangkok		Thailand
2024-02-07	Menekse	Erdogan	Ankara		Turkey
1989-05-19	Buckenham	Nick	Sawtry, Huddington	ENG	United Kingdom
2003-02-12	Kobus	Philipp	London		United Kingdom
2004-08-04	Tempest	John	Peterborough		United Kingdom
2009-11-27	Davidson	Colin	Northwich	CH	United Kingdom
2011-03-30	Hipwell	Stephen	Brighton, East Sussex	CH	United Kingdom
2014-05-08	Terry	Gerard	Middlesbrough		United Kingdom
2014-05-27	Nichols	David	Sparsholt, Hampshire		United Kingdom
2016-08-08	Chaplin	John	Guildford		United Kingdom
2016-08-08	McLeod	Craig	Newcastle upon Tyne	CH	United Kingdom
2017-03-27	Sims	Richard	West Sussex		United Kingdom
2017-11-08	Hadland	Mark	Studham		United Kingdom
2018-12-17	Dugan	Trevor	Henley-on-Thames		United Kingdom
2020-05-14	Cooper	Tim	Chichester, West Sussex		United Kingdom
2022-04-07	DeMorgan	Matthew	Peterborough		United Kingdom
2023-11-02	Schofield	Jim	Salisbury		United Kingdom
2023-12-17	Kriek	Cornelius J.	Woking		United Kingdom



2024 IAC CONTEST SEASON CALENDAR

► IAC.org/Contests



YOOPER LOOPER



OHIO OPEN



CORVALLIS CORKSCREW

DATES	HOST CHAPTER	NAME	REGION	LOCATION	AIRPORT
July 19, 2024	77	Corvallis Corkscrew	Northwest	Corvallis, OR	KCVO
August 2, 2024	134	Yooper Looper	Mid-America	Marquette, MI	KSAW
August 9, 2024	52	Kathy Jaffe Challenge	Northeast	Bayville, NJ	KMJX
August 16, 2024	34	IAC East Open Championship (Ohio Open)	Mid-America	Bellefontaine, OH	KEDJ
August 16, 2024	CAN 3	Maple Syrup Open	International	Midland, ON	CYEE
August 23, 2024	137	Canadian National Aerobatic Championships	International	Steinbach, MB	CJB3
August 31, 2024	12	Ben Lowell Aerial Confrontational	South Central	Sterling, CO	KSTK
August 31, 2024	137	Rocky Mountain Special	International	Rocky Mountain House, AB	CYRM



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CANADIAN CHAMPIONSHIPS



Another Fun Practice

IAC Chapter 26

IAC CHAPTER 26 HOLDS CRITIQUING days at Apple Valley Airport (KAPV) and General William J. Fox Airfield (KWJF) in Lancaster, California. Most members are based in Southern California, including the Mojave Desert, Los Angeles and Ventura counties.

If you check out its Facebook page at [Facebook.com/IACChapter26](https://www.facebook.com/IACChapter26), you will see announcements for practice days monthly and lots of fun photos from those practice sessions. A recent practice day was May 19: “Another great practice event in the books. Big thank you to Mike H. for all the coaching and critiquing provided. Excited for our new member, Justin, who looked really

good practicing the primary sequence, and some of the sportsman figures. Warm welcome to Yuichi and Endo, both make a great addition to the chapter. Stay tuned for announcements regarding practice days. We hope to see you all next time!”

Despite aerobatics being a solitary competitive sport where you fly alone in the box, Chapter 26 is all about teamwork. The members all work together to be successful at this sport. They coach each other, critique, and look out for each other. They want to be regarded as good sportsmen/women who play by the rules and as the pilots to beat at every level of competition.

Chapter 26 of the International Aerobatic Club was founded in 1974. The chapter was based for many decades out of Delano, California, and held an annual contest there over Labor Day called “Happiness Is Delano.” From 2018 to 2020, “Foxy Figures” was held at General William J. Fox Airfield in Lancaster, and the chapter’s current contest home is Redlands, California. **IAC**



L to R: Chapter 26 members Brian Pham, Ramy Mattar, Dave Fedors, supporter (and former SOFIA airborne telescope Mission Director) Charles Kaminski, and new member Adam Thomason, who won Primary at the NorCal Aerobatic Contest in Tracy after regular practice and work on box presentation.



Chapter 26 member and CFI Justin Rhines in front of his Super Decathlon at Fox Field in Lancaster, CA.



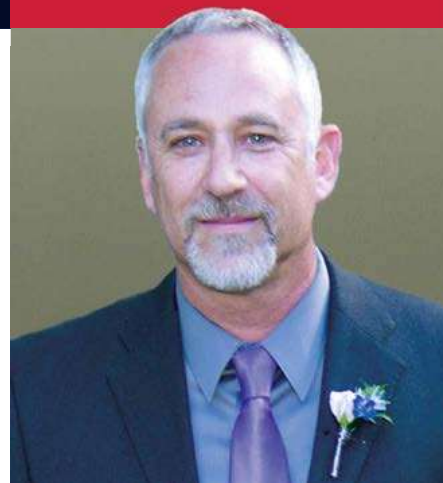
All smiles after a good morning practice before the heat set in at Fox Field. (L to R) Ramy Mattar, Sean Maloney who is interested in aerobatics, Brain Pham, Dave Fedors, Mike Hartenstine and Justin Rhines. Practice pays off as Brian took first place overall in Sportsman at the April Hammerhead Roundup in Borrego Springs amongst a field of 13 pilots.



Unlimited pilots Yuichi Takagi and Hiroyasu Endo like the challenge of honing their skills in the winds regularly blowing across the desert boxes.



Chapter 26 members Brain Pham, Scott Simmons, Ramy Mattar, Dave Fedors, Barrett Hines, Lloyd Massey and Susan Bell after a day of critiquing at Apple Valley Airport.



Judging Rolling Turns

BY DJ MOLNY, JUDGES PROGRAM CHAIR, IAC 25097

Background

AS THE NAME IMPLIES, rolling turns combine a heading change with rotation about the aircraft's longitudinal axis. They're difficult to fly well, with constantly changing control inputs and some moments of highly uncoordinated flight. They're kind of like patting your head while rubbing your stomach, but with more noise and adrenaline.

There are 80 different "rollers" in the Aresti catalog. The heading changes range from 90 degrees to 360 degrees with anywhere from one-half to four full rolls. The rolls may be in the same direction as the turn, opposite to the turn, or alternating. Finally, rollers may begin and end in either upright or inverted flight.

Here are a few examples:

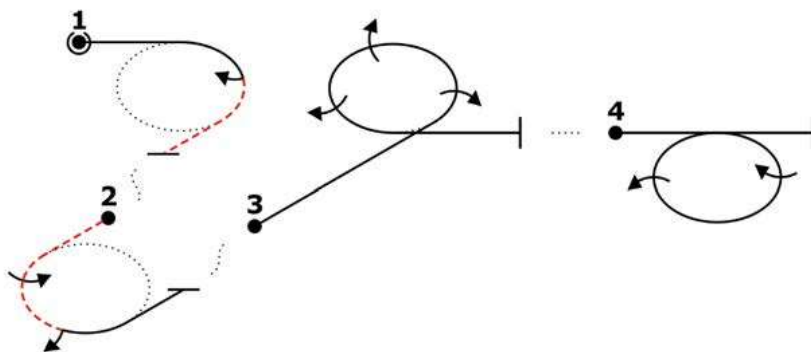


Figure 1: 90° roller, 1/2 roll to the inside

Figure 2: 180° roller, full roll inside, 1/2 roll outside

Figure 3: 270° roller, three to the outside

Figure 4: 360° roller, inside-outside

Rollers don't impose a lot of physical stress on the pilot or the aircraft, but they do require some advanced stick-and-rudder skills. For example, as the aircraft passes through knife-edge flight, the rudder and elevator swap roles, with the rudder controlling attitude and the elevator controlling the turn.

Although piloting technique is outside the scope of this article, I did receive some good advice when first learning rollers: Give the aircraft the control inputs it needs in the moment. If you try to think through each step, you'll quickly end up behind the airplane, and the downgrades will pile up equally fast.

Grading Criteria

Like competition turns, rollers must have a constant rate of turn and constant altitude, and they are not wind-corrected. In addition, rolling turns must have a constant rate of roll.

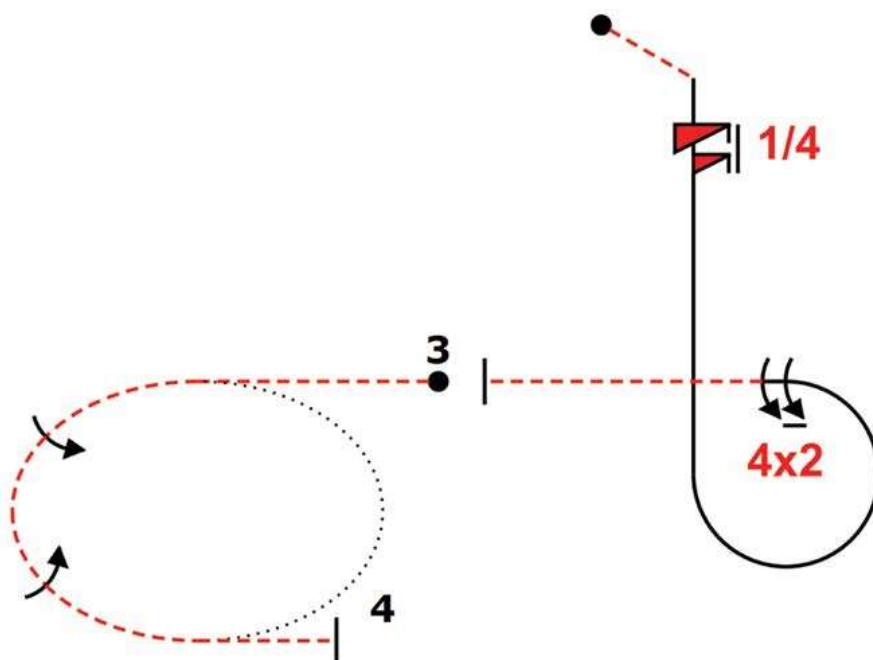
Downgrade any change in the turn rate or the roll rate by either 0.5 or 1 point, depending on the severity. Deduct 1 point if the rolling or turning motion stops completely. Changes in altitude are penalized either 1 point per 5 degrees ("1-in-5") for the climb/descent angle or 1 point per 100 feet, whichever the judge prefers.

At the completion of the figure, the deduction for any errors in heading or bank angle is 1-in-5.

If there is a change of roll direction, as in Figures 2 and 4 at left, the wings must be level at the point of reversal. If not, apply the 1-in-5 deduction.

Award a hard zero (HZ) if you observe a snap roll, any single angular error of 90 degrees or more (e.g., finishing way off heading), or a roll in the wrong direction (in versus out). Note: The deduction for starting a roll in the wrong direction is 1-in-5, not an HZ, unless and until the error reaches 90 degrees or more.

Wait, what is this about snap rolls? Sequence designers often place rolling turns after climbing figures, as in the 2024 Advanced Power Known:



That means the aircraft will be flying relatively slowly, not far from stall speed. If the pilot gets a little too frisky with the elevator while pressing hard on a rudder pedal, they're asking the aircraft to perform a snap roll. If that happens, the judges will see a sudden acceleration of the roll rate in either direction.

Practical Considerations

The most common errors will be changes in the roll rate and turn rate. It's difficult to keep those rates constant throughout the maneuver and still finish wings-level on the correct heading, so many pilots are forced to make adjustments.

Judges must not deduct for any perceived errors in heading or bank angle during the figure. The deductions for varying the roll/turn rates and not finishing wings-level and on-heading are sufficient.

Watch for the correct number and direction of rolls, and ask your assistant to do so as well. It's easy to lose track in the heat of the moment.

Last but not least, judges need to watch rolling turns even more closely than other figures. A rate change or an inadvertent snap roll can happen in the blink of an eye. **IAC+**



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My Attempt at a Flight Recorder in 1995

BY DAVID UNDERWOOD, IAC 16611



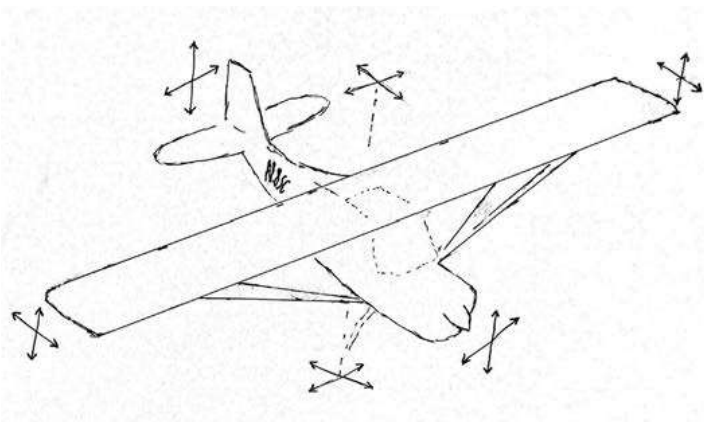
THERE WERE TWO ARTICLES in the November/December 2023 issue of *Sport Aerobatics* about aerobatic flight recorders to be used to help the pilot learn without a coach. This is not a new idea. I recently gave a one-hour talk with many slides on how I got into aerobatic flying. In it is a discussion with pictures of my attempt at such a system in 1995. I thought it might be amusing to the readers to see what was done with the technology of the time, and even though the hardware worked, why the system was never used.

As with the recent articles by Bruce Mamont and Andy Cruce, I had a Decathlon, and my scores were suffering because I felt I could not afford time or money for a coach. It was clear that GPS was not useful because the sampling time was way too slow for a figure in the box. I also wanted to record rolls. Clearly, I needed inertial sensors, and MEMs devices (micro mechanical electronic systems) were starting to be available. MEMs accelerometers appeared to be adequate for my needs, the range was okay, and the noise level was low enough to be useful. MEMs gyroscopes were too slow and too



DAVID UNDERWOOD

I thought it might be amusing to the readers to see what was done with the technology of the time, and even though the hardware worked, why the system was never used.



noisy to be useful. I could use pairs of accelerometers at some distance on either side of the center of the airplane to measure roll rate. This was done on each axis. (As shown on the right side of the figure above right.) The computer would integrate to give angle. I wrote a simulation program to see if all of this looked plausible for loops and rolls. I learned that there is a subtle problem when rotations occur that are not exactly at the center of gravity of the airplane. The obvious example is a snap. But I thought I could correct for this in software. There was an instrumented pitot tube to make cross-correlations with the inertial information.

I spent some time trying to understand if the coordinate system to be used should be Euler angles or quaternions. The Air Force uses quaternions because they do not have a singularity in a particular direction, but in my simple case this was a diversion.

The data acquisition (the left side of figure above) used a PIC microcontroller feeding into a 386 processor. The 386 had a very small equivalent of today's solid-state drive in place of a hard drive, in order to tolerate g-loads. Other chips with basically the same instruction set as the PIC but which were much faster were investigated. The screen to show results was black and white, about 6-by-8 inches.

A commercial power supply from Canada ran off 12 volts and gave all the voltages needed by sensors and PIC and 386 systems.

Basically, the project was stalling — partially because I realized that perfect 2D geometry had no cross-box wind corrections, but more importantly, it was not clear what were the most useful things to display to the pilot.

Around this time, I started to get a lot more input from other pilots and judges who were coaching me a little before contests. I started to see aerobatics as putting on a show for the judges to let them see the aspects they want to see. Some of this focused on asking, “How do good pilots deal with winds on the Y-axis?” “Can I fly a 45 downline with 10 degrees toward or away from the judges?” “Can I make subtle tilts in loops that are hard to see?” By this time in my aerobatic career, I also had a lot of experience with recovering from botched figures with stalls at inappropriate places, unwanted big rolls during falloffs, etc., in such a way that my scores were not too bad.

I flew Intermediate in the Decathlon for a couple of years and then transitioned to an Extra 200 and got more coaching. I flew Advanced off and on for about eight years. There is no room for a screen in the 200, particularly when flying at high positive and negative g-loads. My loops got rounder through a combination of muscle memory and thinking about the wind. Also, my wife, Cynthia, was an aerobatic pilot and judge, and we could coach each other, sometimes with one on the ground and sometimes with both in the airplane. This obviously helped on average, although having spouses critique each other did not always go smoothly. *IAC+*

David Underwood, Education: University of Chicago and Massachusetts Institute of Technology. Career: Formerly a physicist at Argonne National Lab and currently a physicist/CEO of Aero-Arts Inc. R&D. David has flown at the Intermediate and Advanced competition levels in his Extra 200. He was an active aerobatic judge from 2006 through 2019.

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