SPORT Aerobatics
February 2018
OFFICIAL MAGAZINE of the INTERNATIONAL AEROBATIC CLUB

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Where else could you experience the power and perils of high flying, artistic brilliance, drama, and redemption?

*— Zinnia Kilkenny*

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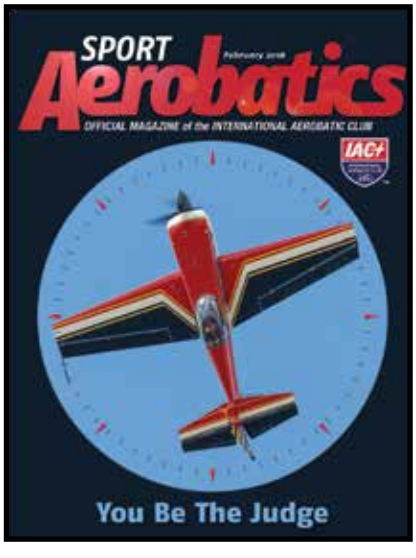


## COVER

Craig Gifford, IAC 433504, in his Panzl S-330 at the 2016 Nationals. Photo by Evan Peers.

SPORT Aerobatics
OFFICIAL MAGAZINE of the INTERNATIONAL AEROBATIC CLUB

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 *Sport Aerobatics* (USPS 953-560) is owned by the International Aerobatic Club, Inc., and is published monthly at EAA Aviation Center, Editorial Department, P.O. Box 3086, 3000 Poberezny Rd., Oshkosh, WI 54903-3086. Periodical Postage is paid at Oshkosh Post Office, Oshkosh, Wisconsin 54901 and other post offices. Membership rate for the International Aerobatic Club, Inc., is $45.00 per 12-month period of which $18.00 is for the subscription to *Sport Aerobatics*. Manuscripts submitted for publication become the property of the International Aerobatic Club, Inc. Photographs will be returned upon request of the author. High-resolution images are requested to assure the best quality reproduction. **POSTMASTER:** Send address changes to *Sport Aerobatics*, P.O. Box 3086, Oshkosh, WI 54903-3086. CPC 40612608

# Nominations Sought for IAC Board of Directors

Own your destiny with action. Help lead the IAC into the future by nominating a colleague or yourself for a position on the IAC board of directors. Officers and directors consider a wide range of information and data affecting the sport of aerobatics and set the direction for the organization for years to come.

The International Aerobatic Club is accepting nominations to serve on its volunteer board of directors. The IAC has an open election process with nominations for candidates accepted directly from the membership. There are five positions open to be elected: president, secretary, and three board members. Elected candidates serve a two-year term beginning at the IAC's annual general meeting in Oshkosh in July.

We hope to receive a record number of nominations with a view to having a diverse, talented, and dedicated pool of candidates to draw from to lead the IAC's activities and policies.

The deadline for nominations is April 14, 2018. Visit *www.IAC.org* for complete nomination procedures and forms.

**SUBMISSIONS:** Photos, articles, news, and letters to the editor intended for publication should be e-mailed to *editor@iac.org*. Please include your IAC number, city, and state/country. Letters should be concise, polite, and to the point. All letters are subject to editing for clarity and length.

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*www.iac.org/yellow-pages*

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# President's Page

## Oshkosh — The box is ours, again

MIKE HEUER, IAC PRESIDENT, IAC 4

**The important news this month** is the U.S. National Aerobatic Championships will return to Oshkosh in 2018. It was a difficult decision that split our board 50-50 in the final tally of voting on December 6, 2017. The board held a special meeting that evening by telephone, and all 15 of our directors were present for the call, which was newsworthy in itself and indicative of the importance of this issue for all of our officers and directors. Because of the tie vote, I was called upon to break the tie, and I voted in favor of Oshkosh.

At our board meeting in early November, the officers and directors had reviewed and considered all of the reports we received from Nationals contest officials, volunteers, competitors, and members from across the nation. In addition, we received an excellent and comprehensive bid from Union City, Tennessee (KUCY), to host the Nationals. Union City has been home to many regional aerobatic competitions in the past organized by IAC Chapter 27, and last year, the U.S. Unlimited Aerobatic Team used the airport for its training camps leading up to the World Aerobatic Championships in South Africa last September. My thanks to Jo Ann Speer, KUCY airport manager, for making the trip to Oshkosh to present the bid personally. Jo Ann does a marvelous job in supporting aviation in bringing more activities to her airport, and I know that many future competitions as well as training camps will be held there in the future.

There is no question that we had startup problems this year in Oshkosh. However, I often make the analogy that no pilot can expect 10s on every figure in his or her first time in competition. We are always trying to improve in that never-ending quest for perfection. So it is with organizing a contest the size of Nationals in a brand new location. That said, our files are now full of information and ideas as to how to make 2018 the best ever, and we have the full support of EAA Chairman and CEO Jack J. Pelton, who made a personal visit to our board meeting in November to tell us of his and the EAA staff's commitment to making Nationals succeed. Jack is a man of his word, and our executive director, Lorrie Penner, will also help make it happen because of her strong connections with her colleagues in Oshkosh.

I am also delighted to announce that John Smutny of Auburn, Washington, will serve as the contest director for the 2018 Nationals. John knows what he is getting into, as he directed the 2013 Nationals in Texas. He has been an IAC member for more than 20 years and has flown in two dozen contests since 2006, but most importantly, he knows how to handle a complex and fast-moving air operation due to his other experience as an air show "air boss." John brings great leadership skills to this job and shares the commitment of the IAC leadership to upgrading and improving this contest every year. He has a number of ideas of his own in addition to building positively on what was done in 2017.

Nationals will also be the site for the selection of the U.S. Unlimited Aerobatic Team. This group of pilots will represent the United States at the World Aerobatic Championships in 2019. The WAC will be held in Châteauroux, France, at the same site as the 2015 event. It was a superbly organized contest, as the French have huge support from their national federations as well as the government and large companies who have aviation connections. I expect it will be a great and beautiful championships.

On a sad note, many of us lost a good and longtime friend with the death of Giles Henderson, IAC 159, on December 2, 2017. Giles lost his life in a skydiving accident, another of his many passions in life. I first met Giles in 1968, and he is the only pilot who competed in IAC's first sanctioned aerobatic contest in Lansing, Illinois, in May 1970 and at the most recent U.S. Nationals in Oshkosh. In those early years, he was indelibly identified with his beautiful clipped wing Cub. He flew Sportsman like the airplane was on rails and won countless competitions over these last four and a half decades.

Giles won the L. Paul Soucy Trophy four times — a record that is unmatched — and was inducted into the International Aerobatic Hall of Fame in 2012. A quiet and thoughtful man, he was mentor to many pilots over the years and deeply devoted to aviation. We will miss him, as I have always thought of him as the iconic grassroots pilot as well as a friend to our family. IAC

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

## Harold Krier's Historic Chipmunk Donated to Air Power Museum

The Air Power Museum (APM) proudly announces the addition of a rare and historic de Havilland Super Chipmunk, once owned by air show great Harold Krier, to its collection. Since 1946, several nations have used Chipmunks for training military pilots, but this two-seat aerobatic trainer, N6311V, was designed to be the first monoplane to represent the United States in world aerobatic competition.

Harold served as a flight engineer on bombers during World War II, and afterward he learned to fly and fell in love with aerobatics. By the mid-1950s Harold was performing in a clipped-wing Cub and later in a modified Great Lakes biplane plus a biplane of his own design: the Krier Kraft. Think of it as a cross between the Great Lakes and a Bücker Jungmeister. With an introduction from his friend and fellow air show pilot Frank Price, Harold toured the country in Bill Sweet's National Airshow, where he remained until his death in a test-flight accident in 1971.

Harold claimed top prizes in the AAA Aerobatic Championships from 1958 to 1960, and the trophy was retired in his name in 1966, the same year the Chipmunk appeared with the U.S. team in international competition in Moscow.

Harold realized that to compete internationally, he needed a slick monoplane. Enter the Chipmunk — with serious modifications.

Harold clipped and metalized the Chipmunk's wings, lengthened the ailerons, redesigned the tail, beefed up the airframe, and hung a 200-hp Ranger engine on the nose. Thus, the first aerobatic monoplane to represent the U.S. in international competition was born, and the innovations in Harold's Super Chipmunk set the standard for most future competition monoplanes. Considering the huge amount of engineering that went into creating the Super Chipmunk, it's a credit to Harold's love of aerobatics that he gave away all the modification data to anyone who wanted to copy it. Art Scholl and Skip Volk gladly took up his offer and kept the Super Chipmunk in the game long after Harold's death at age 49.

Given this airplane's history, it's easy to see why APM is so pleased to receive the gift of Harold's Super Chipmunk from Todd and Jo Peterson (well-known aerobatic and air show pilots in their own right) of El Dorado, Kansas. The Chipmunk and related artifacts/memorabilia will eventually be displayed, along with Frank Price's Great Lakes biplane (the first U.S. entrant in the modern world aerobatic contest in 1960), which was donated to the APM in 1984 by then-Christen Industries Pitts test pilot Mel Barron, and is currently on display in the main museum hangar.

These two aircraft, along with the APM's collection of Duane Cole's personal memorabilia, will form the centerpiece of the future Earl Adkisson hangar at the APM.

A major fundraising effort to restore the Great Lakes to flying condition, and to build the foundation for and reassemble the Earl Adkisson hangar, will be announced in the coming weeks.

## Mike Heuer to Step Down as IAC President

IAC President Mike Heuer has announced he plans to step down from the IAC presidency no later than March 19, 2018, citing personal health issues. Mike has served as IAC president since the summer of 2014 and previously served in the position from 1981 to 1990. Mike has devoted much of his adult life to volunteer positions within the organization. He has served in virtually all IAC officer and director positions since the club was founded in 1970 and carries IAC membership number 4. His father, Bob Heuer, was the first president of the organization.

Mike plans to continue his work as IAC's historian and the U.S. delegate to CIVA. He will also serve as assistant contest director, alongside contest director John Smutny, for the 2018 U.S. National Aerobatic Championships in Oshkosh. Mike will also continue writing for *Sport Aerobatics* magazine, IAC's flagship publication.

Mike's aerobatic career started in 1965 when he attended the Antique Airplane Association's annual fly-in in Ottumwa, Iowa, and witnessed one of the few aerobatic contests in existence at the time. It spurred him on to learn aerobatics, and he flew his first contest in Monroe, Louisiana, in 1968 in a Ryan ST-A. Over the years, he competed in the Sportsman, Intermediate, and Advanced categories in a Pitts S-1S, Pitts S-2B, and an Extra 230. Mike was an airline pilot for nearly 30 years and retired in 2007. He has devoted most of his time since retiring to IAC and sport aviation activities and served as president of CIVA for 26 years as well. He has served on the EAA board of directors for a total of 17 years.

The IAC board of directors will select an acting president to serve out the rest of Mike's term when it meets in Oshkosh March 17-18, 2018.

**Harold Krier's highly modified de Havilland Super Chipmunk.**

The staff at APM feels honored that the Petersons have chosen the museum to display this historic aircraft, as well as continue to keep Harold's legacy in the aerobatic/air show industry alive for future generations.

For more info about the Chipmunk, Harold Krier, Todd and Jo Peterson, and the Air Power Museum, visit *www.AntiqueAirfield.com* and the museum's Facebook page at *www.Facebook.com/antiqueairfield*.

## IAC Collegiate Program Champions Announced

IAC Collegiate Program Chairman Jordan Ashley would like to congratulate and thank all participants in the 2017 competition. Results from the 2017 IAC Collegiate Competition are calculated for both team and individual categories.

The top performing teams are as follows:
1. Metropolitan State University of Denver (84.92%)
2. University of North Dakota (83.62%)
3. United States Air Force Academy (82.25%)

The top performing individuals are as follows:
1. Sam Robinson, MSU (82.01%)
2. Jarod Hulse, MSU (80.07%)
3. Alex Tally, UND (78.32%)

For a complete list of competition results, visit *www.IAC.org/collegiate-series-results*. IAC

# Judges Program Report

by Wes Liu, IAC 10467

2017 was another year where our volunteer judges school instructors, national judges, and regional judges all continued to display their dedication and enthusiasm for our sport. Yet, it has also been a year of change for the Judges Program. With the goal of improving the quality of judging, the 2017 Judges Revalidation and Currency (R&C) Exam emphasized deep knowledge of the rulebook criteria for the contest judging of figures. The questions were designed to motivate our judge friends to review sections of the rulebook that might not have been looked at for some time. We all take some of our basic knowledge for granted. In 2017 the first-attempt pass rate for the R&C Exam was 80 percent, and a review of the answers offered insight into some weaknesses in judge knowledge. This is guiding the focus of the commentary offered in the monthly *National Judge Bulletins*, the judges refresher presented at the U.S. Nationals, and the 2018 R&C Exam. The remaining 20 percent of the judges were provided additional training and passed the exam on their second attempt. While listening to competitors throughout the season, I observed that the weakness of our judge friends in grading complex figures is well-known and is being taken advantage of.

We finished 2017 with 172 judges on the current IAC judges list, about the same number as was present in 2016. That said, some of the lower-performing judge-volunteers have dropped out, and we are hopeful that the regional judges newly certified in 2018 will be better prepared for their first contests and will be high performers. The judges' training attempts to walk the line of asking for high quality while supporting both old and new volunteer judges in achieving that goal.

IAC chapters hosted 12 judges schools for the 2017 season. In addition, our dedicated judges school instructors presented four "mini" sessions of *Practical Aerobatic Judging* to help some of our friends who misjudged their training requirements and missed the spring schools achieve currency.

The IAC judges school instructors team now includes 19 of our very experienced and knowledgeable members who are local to every IAC geography in the continental United States. Between the availability of online training and the availability of qualified instructors, every IAC chapter should be able to host judge training at relatively low cost.

The use of online training, a longtime request of the IAC membership, is slowly increasing. Many chapters and judges school instructors are beginning to encourage their volunteers to view the online training as preparation for a weekend of classroom training. A few IAC chapters have transitioned to online training and one day of classroom. All comments on the online training have been positive.

One continuing issue in some IAC regionals has been a shortage of judges at contests. Correlating the calls for help with the chapters, we are seeing that chapters with proactive leadership have a healthy judge population. The chapters in the northwest United States have a surplus of judges for their contests. The chapters in the central Great Plains and the coastal Mid-Atlantic have judge shortages. One plan for 2018 is to reach out to chapter presidents to encourage them to recruit their members to become judges. Peggy Riedinger, whom many of you know as both a chapter president and a national judge, points out that judges need not be competitors or even pilots.

One aspect of some regions experiencing difficulty in filling the judges lines at their contests has been the longtime reluctance of some of our most experienced competitors to become judges. In a recent *National Judge Bulletin* I wrote, "We have some very accomplished competitors who have never been even a regional judge. I will unashamedly encourage you all to apply all of the guilt needed to pull those members through Regional Judge certification."

In 2018 we hope to make more progress toward the goals of improving the quality of judging and increasing the number of our members who are regional and national judges. My current emphasis is on video. A lot of our friends have been clamoring for more video in training presentations. The videos captured at the 2017 Nationals provide some examples of how we all need to work on getting our eyes to better see, and our brains to better add up, the little deviations from perfection that our competitor friends show us. You might find the "How Did The Judges Miss That?!" series that I have been working on interesting. They are on YouTube at *www.YouTube.com/EAAIAC*.

I look forward to seeing you all on the judges line in 2018. IAC

# Giles Henderson

## The ultimate grassroots competitor

by John Housley, IAC 433114

Giles Henderson with his 1946 J-3 Cub at the 2017 Salem Regional Aerobatic Contest.

Giles Henderson began flying at the age of 16, and in 1968, at the age of 25, he and two partners each contributed $500 to buy a stock (65 hp) 1946 J-3 Cub. After teaching himself basic aerobatics, Giles entered his first competition that year with this plane at Vandalia, Illinois, and went on to fly this same plane in air shows and aerobatic competitions for the next **49 years**, including the first IAC competition in 1970 through to the 2017 Salem, Illinois, regional aerobatic contest. He also restored and flew another grassroots aircraft, a Cassutt once owned by Pete Myers, at many contests, including the 2017 U.S. Nationals in Oshkosh, Wisconsin. Giles was among the founding members of the IAC, holding membership number 159, and was inducted into the IAC Hall of Fame in 2012.

While the traditional path for exceptional aerobatic pilots is to move from entry-level planes to those with more power and performance capability, Giles demonstrated that skill and finesse could win contests without requiring a large financial investment. Giles improved the Cub's performance by clipping the wings and increasing the engine horsepower (up to 90 hp). While flying this plane, Giles won the L. Paul Soucy Trophy (highest percentage of points possible during a contest season while competing in three or more contests, one of which was the IAC Championships in Fond du Lac, Wisconsin, at the time and now the U.S. National Aerobatic Championships). Giles flew in the IAC's Sportsman category. He won the Soucy trophy four times (1971, 1975, 1986, 1988). Giles' Cub has been recognized as having won more Sportsman aerobatic contests than any other aircraft in the world.

Giles was a professional educator, serving as a chemistry professor at Eastern Illinois University. He applied the same skills and patience used to teach college students chemical physics to help aspiring aerobatic pilots or parachutists improve their skills. Giles could translate complex concepts, whether of a chemical or aeronautical nature, so that less experienced people could comprehend them and apply the knowledge to solve other problems. Giles was a national judge and gave his time freely to help new judges and other competitors. While educating others came naturally for Giles, he also educated himself by attending IAC judging clinics.

Giles also enjoyed many other outdoor activities, such as scuba diving, visiting the Alaskan wilderness, hunting, fishing, backpacking, caving, canoeing, and skydiving. He had accumulated more than 400 jumps prior to the accident that claimed his life on December 2, 2017. He was also a ham radio operator for many years.

Giles was a past president (and other positions) of IAC Chapter 61. This chapter has hosted the Salem Regional Aerobatic Contest, held each year since 1976 — the longest continuously running contest in IAC history. This year, the contest has been renamed the **Giles Henderson Memorial Challenge**. The chapter will provide a special gift along with this year's grassroots award at the contest to honor Giles' memory and his many contributions to the sport of aerobatics. Giles was also a chapter historian of sorts, and provided interesting articles on aerobatics in the '60s, memories of the first IAC competition in 1970, memories of the first Chapter 61 contest in 1976, and insights on Marion Cole and early aerobatic competition. Links to these articles can be found on the IAC Chapter 61 website at *www.IAC61.eaachapter.org/ourroots.htm*.

We will miss Giles' cheerful smile and helpfulness, but will keep his memory alive by treating other aspiring people in whatever endeavor they are pursuing as we know he would. His example of success and happiness while flying grassroots aircraft is an enduring model for all who participate in our sport. IAC

# Judges Should Work as Hard as the Pilots

## Part 1: IAC figure judging

by Steve Johnson, IAC 20081

There was a thread on the IAC Exploder regarding presentation scores, and more generally IAC versus CIVA issues. This two-part article will try to alleviate some of the problems between IAC and CIVA, as the individual figure rules are exactly the same. The only real differences are the flight programs, with IAC using Knowns, Freestyles, and Unknowns and CIVA using Free Known, Free Unknown 1, and Free Unknown 2. I won't get into the arguments of which flight programs are better, as I see advantages and disadvantages to both. This article will focus on individual figure judging, and Part 2 will focus on sequence presentation scores, including artistry versus technicality of figures and sequences.

As an example, IAC rules require a pilot, when flying a 45-degree line, to show the judges the aircraft's zero lift axis (ZLA) on an exact 45-degree line to receive a score of 10. The ZLA is the line through the chord of the wing from the forward-most point of the leading edge to the trailing edge. The ZLA has nothing to do with the fuselage, just the wing. Judges are to reference the wing ZLA to the horizon to determine if the aircraft has set and held a 45-degree line, irrespective of headwinds or tailwinds. A Super Decathlon has the wing chord line set at about a 7-degree positive angle to the fuselage. Thus, a Super Decathlon pilot must actually hold the fuselage about 7 degrees shallow to hold the ZLA on 45 degrees. To the judges on a low-wind day, the Decathlon fuselage, the part they can easily see, will appear shallow, but the ZLA will be at the correct angle to the horizon. A Pitts S-1 will fly the same line. On the Pitts, the wings are set only about 1-2 degrees positive to the fuselage, so the fuselage looks much more in line with the 45-degree angle than did the Decathlon. As a judge, which pilot should get the better score?

On a windy day, any airplane fuselage and ZLA will appear to be *steep* to the judges when flying a 45-degree line *into the wind*, and will appear *shallow* when flying the same line *downwind*. Judges are not supposed to allow the headwind or tailwind to influence their observation of the 45-degree line of the ZLA. An IAC 1.1.2.1 figure, a 45-degree upright climbing line, will last only about five seconds. I contend that IAC judges will have a very difficult time identifying and assessing the angle of the ZLA on a Decathlon, Pitts, or any other aerobatic aircraft in the box, especially at 1,500 feet in the back of the box. Even the fuselage starts to get small when that far away, let alone the ZLA line. Judges must base their scores on the figure(s) and flight attitudes they expect to see, and *can* see and perceive, and then must reduce the score based on the errors found. This must be done for each element of each figure for the entire sequence for all pilots. Good judges must work hard to do their job well!

The last paragraph dealt with a single 45-degree upline, a 1.1.2.1 line. That is only one figure in a Primary or Sportsman sequence; all other categories won't have just a simple line. Higher-category figures will have multiple rolls on the line, or the line will be an interior piece of another, more complex figure.

Similarly, I find that some judges grade a figure based on some subjective perception of relative difficulty, meaning that Primary or Sportsman pilots who fly poorly tend to get higher scores because they are flying a lower-powered airplane, they are new to the sport, etc., so we will "help" them with this flight. These thoughts, concepts, and perceptions do not help increase the skills of the pilots flying. If we don't award accurate scores, we fall into the abyss of just handing out participation trophies. We already get our participation trophy; it's the T-shirt we get during registration! The awards must be given for flying the best figures in their best presentation throughout the several flights of a contest. Our judging here in the United States is not as critical as found at world competitions, and this hurts our pilots, even those not aspiring to world-level skills.

A pilot's position in the box shouldn't reflect on the figure scores, should it? It should! A round loop flown in the left side of the box doesn't, and can't, look as good as a loop flown in the center of the box. A round loop flown left or right of center will tend to look more vertically oval than round. Good judges can see this and will grade the figure appropriately. When a good figure is flown at the front of the box, at a natural head angle for the judges, the figure should get a better score than a figure flown at the back of the box. A pilot's contest flight is a "performance"; the pilot is trying to show the judges each figure in its best presentation, and the whole sequence in its best presentation, to show a good performance. Better aerobatic pilots try to use only a portion of the whole aerobatic box.

Think of your view as a judge when

| Fig No | K factor | J1 | J2 | J3 | J4 | J5 | J6 | J7 | CHZ | Av'ge marks | Equiv scores |
|---|---|---|---|---|---|---|---|---|---|---|---|
| 1 | 18 | HZ | HZ | HZ | HZ | HZ | HZ | HZ | CHZ | 0.00 | 0.00 |
| | | **0.00** | **0.00** | **0.00** | **0.00** | **0.00** | **0.00** | **0.00** | | **0.00** | **0.00** |
| 2 | 32 | HZ | HZ | HZ | HZ | HZ | HZ | HZ | CHZ | 0.00 | 0.00 |
| | | **0.00** | **0.00** | **0.00** | **0.00** | **0.00** | **0.00** | **0.00** | | **0.00** | **0.00** |
| 3 | 22 | HZ | HZ | HZ | HZ | HZ | HZ | HZ | CHZ | 0.00 | 0.00 |
| | | **0.00** | **0.00** | **0.00** | **0.00** | **0.00** | **0.00** | **0.00** | | **0.00** | **0.00** |
| 4 | 20 | HZ | HZ | HZ | HZ | HZ | HZ | HZ | CHZ | 0.00 | 0.00 |
| | | **0.00** | **0.00** | **0.00** | **0.00** | **0.00** | **0.00** | **0.00** | | **0.00** | **0.00** |
| 5 | 20 | HZ | HZ | HZ | HZ | 0.0 | HZ | HZ | CHZ | 0.00 | 0.00 |
| | | **0.00** | **0.00** | **0.00** | **0.00** | **0.00** | **0.00** | **0.00** | | **0.00** | **0.00** |
| 6 | 13 | HZ | HZ | HZ | HZ | HZ | HZ | HZ | CHZ | 0.00 | 0.00 |
| | | **0.00** | **0.00** | **0.00** | **0.00** | **0.00** | **0.00** | **0.00** | | **0.00** | **0.00** |
| 7 | 6 | HZ | HZ | HZ | HZ | HZ | HZ | HZ | CHZ | 0.00 | 0.00 |
| | | **0.00** | **0.00** | **0.00** | **0.00** | **0.00** | **0.00** | **0.00** | | **0.00** | **0.00** |
| 8 | 17 | HZ | HZ | HZ | HZ | HZ | HZ | HZ | CHZ | 0.00 | 0.00 |
| | | **0.00** | **0.00** | **0.00** | **0.00** | **0.00** | **0.00** | **0.00** | | **0.00** | **0.00** |
| 9 | 30 | HZ | HZ | HZ | HZ | HZ | HZ | HZ | CHZ | 0.00 | 0.00 |
| | | **0.00** | **0.00** | **0.00** | **0.00** | **0.00** | **0.00** | **0.00** | | **0.00** | **0.00** |
| Pres | 25 | 8.0 | 7.0 | Lo 0.0 | 7.5 | 3.0 | 7.0 | Lo 0.0 | OK | 4.64 | 116.00 |
| | | **7.48** | **6.64** | **6.57** | **6.76** | **4.71** | **7.26** | **6.57** | | **6.57** | **164.30** |

This sequence has been completed. FairPlay scores here are FINAL.

| | | | | | | | | |
|---|---|---|---|---|---|---|---|---|
| Judge Scores | **175.15** | **155.18** | **165.42** | **173.61** | **161.07** | **164.34** | **155.59** | |
| **Processed score total (2030 = max.poss)** | | | | | | | | **164.34** |
| Boundary | | | | | | | | **0.0** |
| Interruption | | | | | | | | **0.0** |
| High Altitude | | | | | | | | **0.0** |
| Low | | | | | | | | **70.0** |
| Minus 70 pentalties: | | | | | | | | **94.34** |
| **Final score valuation** | | | | | | | | **4.65%** |

*ACRO Version 4.2 Build: 18/08/17*

watching a sequence. A flight too far to the left or right is not as comfortable as a more center location. Too far in the back makes it difficult for the judge to see each component of a figure clearly, and being too close and/or too high is also uncomfortable when trying to judge a sequence. For the record, while too high is a deduction, being too low is a much bigger deduction. I am not suggesting in any manner that we should fly below the floors set by the IAC or CIVA rules. Our good Unlimited pilots in the United States will use a 500-foot floor, just to be sure they don't get a low call. Low calls will detract from the pilot's performance to the judges and will have a negative effect on the figures flown low, as well as the low penalty. Good pilots will fly so their performance is in an area that is easy for the judges to see without requiring the judges to turn their heads hard left or right, or to try to see what's going on way in the back of the box. As IAC judges, we need to be much more critical of box position for each figure and for the sequence as a whole.

At the Unlimited level, many vertical rolls are flown to stop with the wings in plan view. For example, a pull to vertical from the x-axis, three-quarter roll, opposite half-roll to a hammerhead. After the two rolls, we should see the airplane in plan view, as if we looked straight down on the airplane while it sat on the ground. If this figure is flown center box, then a 270-degree roll and opposite 180-degree roll will make the airplane show a perfect plan view. But if this same figure is flown left or right of the judges, the rolls can't be flown at 270 and 180, or the judges' view of the airplane won't be correct; the rolls will look slightly over- or under-rolled. This must be downgraded! Judges are looking for a perfect flight from their perception. If a judge sees an over- or under-roll, it must be appropriately downgraded.

Similarly, horizontal partial rolls and roll combinations with roll stops at the 90-degree position must show the airplane in perfect plan view at each stop to avoid a downgrade. A pilot coming to a stop in a perceived over- or under-rolled position must be downgraded. Remember that just one minute shown on an analog

clock is already 6 degrees off from the vertical 12 o'clock position, and most of the errors in roll position we see are already more than that small one-minute clock angle, so the minimum deduction would be at least 1.5 points for the very slight error noted. These errors must be noted and downgraded for each and every error found in a roll in a figure.

Another similar error with rolls on any line is the stop of the roll. Each roll must stop at exactly the right attitude, cleanly, with no "wobbles" or adjusting back to the proper line. Any adjustment made during or after the roll stops or any wobbles noted must be downgraded. Again, most of these wobbles or adjustments are going to be at least 10 degrees, so a deduction of 2 points for each bad roll stop must be made. Many of our Advanced and Unlimited figures will have combination vertical rolls up and combination rolls on 45-degree lines, the tops of loops, and on the last line of a figure, giving many chances for judges to see and downgrade roll errors. Being nice to a pilot by giving better scores does not help that pilot become better. We must note every flaw and give an appropriate score; otherwise, we are only cheating that pilot.

Vertical and 45-degree lines can be difficult to judge, but even by giving the pilot the benefit of doubt and assuming the initial line is perfect, any change from that line later must be a deduction. Any line change between or after rolls must have a deduction. This is not done well at U.S. contests. Using a piece of folded paper lined up on the local horizon will show both vertical and 45 lines, yet I rarely see this done on a judging line. Any line not flown horizontally, vertically, or on the 45 must be downgraded each time it is noted. Glider aerobatics do have some different rules for lines, but this article focuses only on powered aerobatics.

Our judges need to be more critical of the presentation of an individual roll element. First, was the roll correct? Was it in the proper place in the figure? Were the start and stop of the roll clean? Did the roll stop in the correct position for each point? Did the roll "barrel," meaning it didn't roll axially? If the roll was a snap roll, was there pitch shown? Did the aircraft actually autorotate? Was the snap in the correct sense of being positive or negative? While these are just the elements to be noted for a single roll, we must also evaluate the line or curve on which the roll was flown. Was the line straight, or did the aircraft tend to climb, descend, or change heading during the roll? If the roll is within a looping figure, was the looping radius maintained correctly through the roll, or did it change? As good judges, we must be critical of each and every element of every figure. More difficult figures should generally have lower scores than simple figures, just because more complexity allows for more error.

As IAC judges, we must try to observe each figure for flaws. As the flaws are found, we must deduct points from that perfect 10. We must ask ourselves how we are doing in noting these flaws in a flight. New judges should start with lower categories to help them determine their own scoring system, first to note the errors, determine the point value for each error, and award a total score for a figure. Lower-category figures and sequences are easier to follow and have more time during and between figures to allow new judges time to make their system work. As judges start to judge higher categories, their system must be able to speed up to capture the errors and point values for each figure.

I personally decided years ago that I would only deduct points if I could verbalize the error noted. I can see positive up, short after, missed the second and third points, etc., but if I just think something looked weird, that is not a valid deduction for the figure, but may be valid for the presentation score. As I note the errors, I call the errors to my recorders and fold my fingers down for each 0.5- or 1.0-point deduction. When I hear "end of figure," however many fingers I still have up is the score I award. It works for me and is as objective as I can make it. It takes a good assistant to call the figures and help me count points and carefully watch snap rolls. Some of my recorders get hand cramps from writing so much, but pilots who don't get much coaching appreciate comments. It takes a team of assistant, judge, and recorder to watch and score a flight, and to provide good comments to a pilot.

As judges, we must do our best to see and deduct from every error noted in a figure and sequence, and award the most appropriate scores possible. This is the best way for all of our IAC pilot friends to get better, whether they want to be on a U.S. Aerobatic Team or not. Really, IAC versus CIVA doesn't matter. If we as IAC judges want to give our pilots the best value for their flights, we must provide realistic, accurate scores for each figure and sequence. I think the world judges do this better than the majority of our current IAC judges, but remember, the world judges are the Unlimited category of judging; they are probably the best judges in the world, based on their CIVA judge performance index.

I don't see any big differences between the IAC scoring and CIVA scoring; after all, CIVA uses the same judging criteria, but again, world-level judges are much more critical about each piece of each figure, the presentation of each figure, and the presentation of the entire sequence flown by the pilots. We don't have to change our IAC system to accommodate world-class or grassroots pilots, but we shouldn't allow errors of piloting to slide by just because we want the grassroots folks to be happy with their scores. When that happens, we are preventing the pilots from being able to fly to a higher level — not a category change, but to help them to be better next time. This is, after all, the goal: to show the judges the best flight a pilot can make. As IAC judges, we need to work as hard as the pilots flying to provide our best perception of a flight, using our best critical observations and comments. These scores and comments will help pilots better understand their level of aerobatic competition and will provide more positive outcomes for pilots and judges alike. IAC

# Speaking the Language

## Aerobatic judging and the recreational pilot

by Gordon Penner, IAC 429704
FAA Gold Seal CFI, Master CFI-Aerobatic, Regional Aerobatic Judge

You do not have to want to be an aerobatic judge, or even want to compete as an aerobatic pilot, to get a lot of value out of knowing the judging standards for aerobatic figures. Not only that, I will show how this knowledge also can contribute to recreational pilot safety.

Judges school is the best way to gain this knowledge, but the knowledge can be procured from online sources. The bottom line is that (a) you don't have to be a pilot to be a great judge, (b) aerobatic figure knowledge and judging knowledge are great for the significant others or friends of aerobatic pilots, and (c) the recreational aerobatic pilot who *never competes* can get a lot out of it as well. I will make a case for each of these ideas and will offer a quick and dirty overview of judging for the uninitiated.

Of course, judges school is a must for competing pilots. It is the best way to know what the judges are looking for. When I was a new competition pilot, past IAC Safety Committee Chair Steve Johnson told me something that helped me: that the pilot's job is not to fly perfectly. It is to present the *illusion* of flying perfectly. To do this, you must know what your audience wants and give it to them!

For the recreational aerobatic pilot, knowledge of the Aresti aerobatic figure language (named after Spanish Air Force Col. Jose Luis de Aresti Aguirre) is important in three ways. Aresti figures, which are not hard to read, and the standards for each maneuver help the recreational aerobatic pilot communicate to other pilots "with the same language" and the same frame of reference. This also helps pilots pass great aerobatic sequences back and forth, even if there is no thought of competition.

> . . . knowledge of maneuver standards is even more important from a safety point of view for recreational aerobats.

Second, knowledge of maneuver standards is even more important from a safety point of view for recreational aerobats. Most of the aerobatic figures — and the Aresti "difficulty factors" (or "K" factors) — that come with them were tested in the late '50s or early '60s by aircraft that had inverted fuel and oil systems. Most recreational pilots don't know that. Slick, low-drag experimental aircraft, many without inverted fuel and oil systems, have to modify the maneuvers to fly them safely.

This means recreational pilots need to know the standards and details for each maneuver so they know what standard they are modifying them *from,* and where the danger points reside. Those points will sneak up on you if you are not prepared, leading to aircraft damage and possibly the pilot's loss of active corporeal status.

Some of the best judges are nonpilots. Pilots have an extra mental burden because they are thinking about *how* to perform the maneuver as well as its quality. That is actually secondary, and it tends to get in their way when they are judging. Either a loop is round or it isn't. A line is either vertical or it isn't. Period. Nonpilots have an easier time just judging the figure as presented.

For that reason, aerobatic figure knowledge, or judges school, is good for the significant other or friend of an aerobatic pilot. In that way, there can be someone on the ground who can do some friendly critiquing, usually over a radio, which can be helpful. However, the helper must speak the language and must know what to look for.

A ground observer is essential to a pilot trying to fly the maneuvers well, as the maneuvers look different from in the airplane than they do from the ground. For example, a loop that appears round to the pilot in the aircraft will actually look tall and skinny to someone on the ground.

Here is a quick and dirty big-picture view of aerobatic judging.

The eye is amazingly accurate when it comes to judging angles and circles. In the end, aerobatic figures are mostly lines connected with looping segments, with the occasional

rotational element (slow roll, snap roll, or spin) or hammerhead rotation thrown in.

In general, the big-picture parts of the judging criteria are fairly easy. The competitor starts each maneuver with 10 points. Points are lost for any observed mistake. In general, 5 degrees of error equals 1 point taken away, and the eye easily can see 5 degrees. If a pilot is sinking 5 degrees from a level line, is 5 degrees from vertical, or stops a roll 5 degrees away from wings level, 1 point is deducted. If the pilot is 15 degrees off the desired line or roll, he loses 3 points (15 degrees ÷ 5 degrees per point penalty). There are some other things for downgrade, but the "5 degrees equals 1 point" rule is the main thing.

The critiquing for a recreational pilot would just note the error and leave off the score. Five degrees is easy to see with your eye. Think of a dial watch or a wall clock. You can see the second hand move from one tick mark to the next. Each tick mark is about 5 degrees.

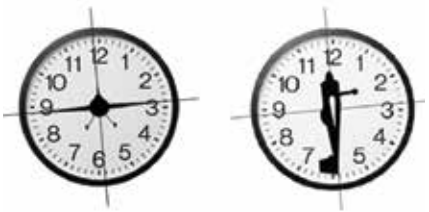

Figure 1. Remember that one minute on a clock equals 6 degrees.

The next two big-picture elements are CGT and ZLA. CGT means center of gravity trajectory. ZLA stands for zero-lift axis.

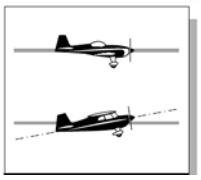

Figure 2. High speed: Level attitude, level CG trajectory. Low speed: Nose-up attitude, level CG trajectory.

Figure 3. Vertical lines judged on attitude of the zero-lift axis, not the "apparent" longitudinal axis.

When in horizontal flight, the pilot is judged on center of gravity trajectory. CGT simply means that if the airplane were reduced to a "dot" at the aircraft center of gravity, that dot would be flown along a line exactly parallel to the horizon. For the nonpilots out there, the airplane's center of gravity "dot" is about where the instrument panel is (or front seat instrument panel in a two-seater), as measured from nose to tail, and between the pilot's knees and chest in an up-and-down sense.

When being judged by CGT, the attitude of the aircraft, or whether it is nose up or nose down, *does not matter*. This rule makes sense in level flight because the aircraft would have a nose-high attitude when slow and a nose-low attitude when fast.

Add to that different wing mountings and airfoil shapes, and you can see that judging level flight by the CG dot's flight path instead of aircraft attitude makes sense. It is fair to all pilots, no matter what aircraft the pilot is flying or how fast the pilot is flying.

Looping segments are also graded on CGT. Therefore, it does not matter what attitude the pilot uses to make it happen, but the CG dot of the aircraft must make a round loop or looping segment.

In addition, when it comes to loops, the first quarter, or 90 degrees, of the loop is free for the pilot. By that, I mean the first-quarter loop is the standard by which the other three-quarters are judged. The pilots fly a loop in thirds, but we judge them by quarters. Simply put, are quarters two, three, and four of the loop the same size as quarter number one? Do all the quarters have a constant "radius," or curve, and did the loop begin and end at the same altitude?

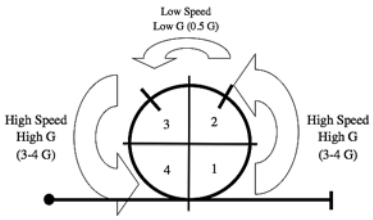


Figure 4.

Flying a round loop is a challenge to perform because the airplane is fast at the bottom of the loop and is losing energy at the top after going uphill. Or as one judging instructor put it, at the top of the loop, the airplane is running out of "Schlitz." I call quarter number three the "Downgrade Zone" because it is where energy is the lowest and the most mistakes are made.

When someone says a loop is "segmented," they are saying that one or more flat spots were observed in the curve of the loop. As a pilot, you want the ground observer also to tell you which quarter the flat segment appeared in so you can work to get rid of it.

Lines away from vertical, however, are judged by the wing ZLA, or zero-lift axis, which is roughly where the wing chord line (a *straight* line from

Figure 5. "L-shaped" loop, "egg-shaped" loop, "e-shaped" loop.

the leading edge to the trailing edge of the wing) is. By the way, that *does not* mean fuselage, or body, angle as most wings are mounted to the fuselage at a small fixed angle. For instance, on a vertical line, the pilot must keep the zero-lift axis — and *not* the fuselage centerline — vertical to the horizon. The judge must know this, which means that aircraft with a high wing-mounting angle (which usually means aircraft designed to fly at slower speeds) will have a noticeably different fuselage angle when the ZLA is perfect.

Unlike the looping segments, the pilot must *not* correct for wind when going straight up or straight down or 45 degrees up or down. In that way, all aircraft can be judged the same, even though they have different shapes and even though the wind might change from flight to flight.

So you see, judging on CGT for level flight and loops takes away differences for airplane design and differing speeds. Judging vertical lines and 45-degree lines on ZLA does the same. Smart, huh? This criterion has developed over years and years, starting in the 1930s.

Any rolls must normally be centered on a line. There are some exceptions to this, but largely this statement is true.

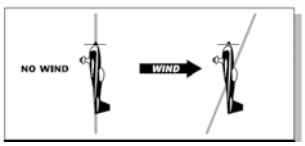


Figure 6. Forty-five degrees judged by attitude of the zero-lift axis relative to the vertical plus or minus 45 degrees.

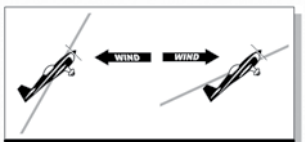


Figure 7. Forty-five-degree lines are not wind corrected (i.e., not judged on flight path or CG trajectory).

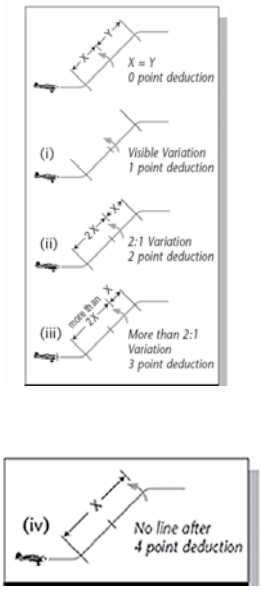


Figure 8. Errors in line length. Note: these deductions apply to errors in length of different lines within a figure that are required to be equal (e.g., square loops) and to errors in roll placement on a line.
Exceptions for gliders:
Snap rolls need not be centered on interior lines.

The CG "dot" must also draw a straight line while doing the full roll, half-roll, or hesitation roll on the line. The judging standard requires that the pilot use slow roll techniques (top rudder, or "sky" rudder, when in knife-edge flight, and a push to 1 negative *g* when inverted) to draw this straight line, even though the Aresti system mistakenly calls it an "aileron roll."

The true aileron roll, best represented by the 1 positive *g* Bob Hoover aileron roll (where on YouTube, Bob was able to pour iced tea into a glass while rolling upside down) would make a small corkscrew pattern. Even the 0*g* version of the aileron roll, called by some the "Primary roll," would also make a corkscrew pattern and would not meet the true Aresti judging standard. In the Aresti

Figure 9. 1*g* or 0*g* aileron roll — "Bob Hoover roll."

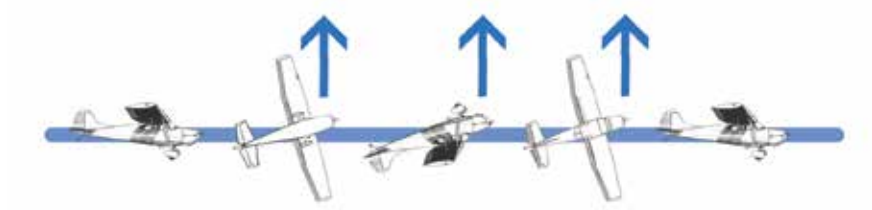

Figure 10. Slow Roll — beginning of roll is the key:
Aileron roll — pitch first.
Slow roll — "top" or "sky" rudder, then a "push" is used in place of the pitch up to keep aircraft from descending.

world, the Bob Hoover smooth 1*g* aileron roll and the 0*g* "Primary" aileron roll, as well as the barrel roll, don't exist. They are too hard to judge, so they were removed.

Here is where we get into a safety problem for recreational pilots who do not have inverted fuel and oil systems. For example, the half-Cuban-eight maneuver must be modified from standard to be flown safely.

Remember, the figures and the judging standards assume an aircraft has inverted fuel and oil systems. With this in mind, normally the pilot pulls up into five-eighths of a loop and then establishes a 45-degree downline while upside down. The pilot pushes to 1 negative *g* to hold that line, performs a half slow roll on that downline so that the aircraft's CG dot draws a straight line while rolling, flies upright after the roll continuing on the 45-degree downline (which makes the roll appear centered on the whole line), and then pulls back to level flight.

On the other hand, pilots who fly noninverted capable aircraft must *not* center the roll on the line on a half-Cuban-eight. They must start the half-roll immediately as they finish the five-eighths loop portion, they must make the downline shallower than 45 degrees, and they must start the roll while the nose is at or *above* the horizon. They also must do the half-roll as a Bob Hoover aileron roll instead of a slow roll, maintaining 0.5 to 1 positive *g* on the aircraft so the engine will not quit.

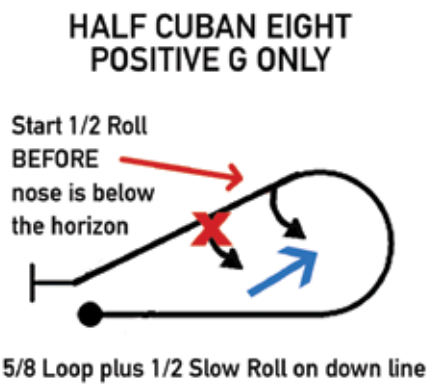


Figure 11.
Half-Cuban-eight positive *g* only.

The problem is if the pilot begins the Bob Hoover aileron roll any later than the beginning of the downline, or with the nose below the horizon when the roll is begun, he will cause the nose of the aircraft to get too low at the finish of the roll. This situation causes a too-rapid increase in airspeed — usually past the airspeed redline. Scary. At this point, the pilot usually will have an over-*g* during the recovery (if there is recovery altitude), with almost certain damage to the aircraft.

A pilot that is new to aerobatics cannot appreciate how quickly this maneuver can go bad if not done right. If the airplane is a low-drag experimental, the airspeed buildup past the redline is even faster and happens in the blink of an eye.

The half-Cuban-eight is only one example of a maneuver that can quickly go from being easy on the aircraft to damaging to the aircraft if the pilot doesn't know what he or she is doing. I hope this discussion shows how complete knowledge of the details of a maneuver — and then how to modify it for aircraft that are noninverted capable, low drag, or both — can contribute to recreational safety and enjoyment.

So, that is the quick and dirty about aerobatic figures, aerobatic judging or critiquing, and how this knowledge contributes to flying safety and enjoyment.

Wanting to fly with precision brings its own reward, whether you compete or not, doesn't it?

If so: "Ya gotta speak the language!" IAC


It doesn't matter what you see, you just have to see it for yourself.
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## Face Off

**Larry Ernewein, IAC 12058, and Greg Stringer, IAC 430482, competed in their Swiss-livery Bücker Jungmanns at the 2017 Nationals in Oshkosh. Bottom left, Larry took first place in Sportsman, hand-cranking every flight. Bottom right, Greg's Jungmann grimaces through its beautiful wooden prop, vowing for a rematch! Photos by Evan Peers.**



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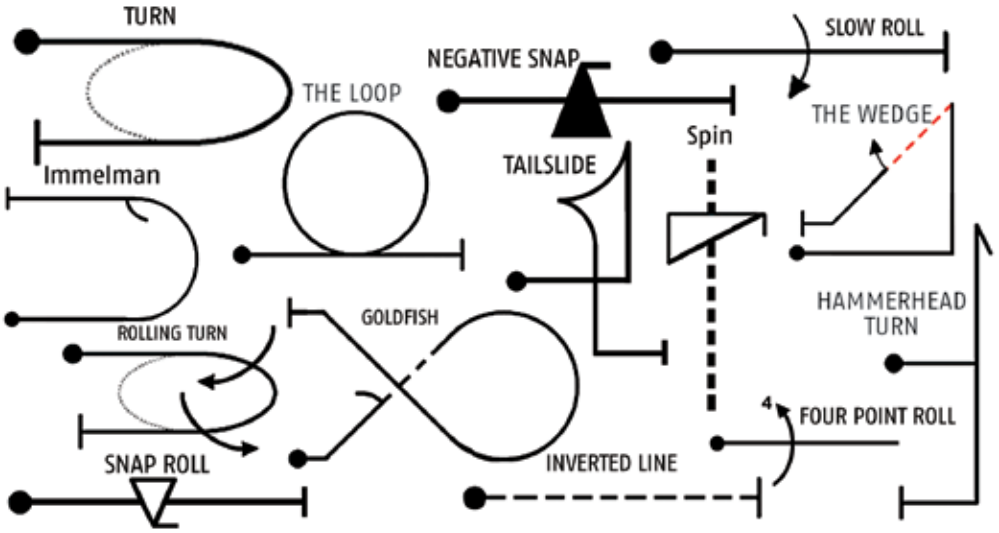



# Free Program Design

## Winning in Sportsman

by Doug Jenkins, IAC 436255

As a longtime Sportsman competitor, I often get asked by other competitors why I design and fly a Free Program. The answer is really fairly simple. First, I want to understand the process of Free design because I plan to move up someday, and a Free is required in every one of the higher categories. Second, I want to win. Here are my 2 cents' worth on how designing a well-thought-out Sportsman Free helps you meet both of those objectives simultaneously. Always remember that my opinion is offered free of charge and is worth every penny you paid for it. Your results may vary.

I flew my first season in Sporty blissfully unaware of the benefits of developing a Free Program. Consequently, my scores suffered when compared to my fellow Sportsman pilots. Finally, one of them took pity on me and told me I needed to develop a Free if I wanted to consistently have a chance to win. Once I heard this, the truth of it was immediately apparent. All I had to do to verify the data was to look at the standings. Usually, a pretty tight grouping formed after the Known, and then, as if by a miracle, some pilots distanced themselves from the herd. How? They flew Free Programs. Duh.

Knowing I needed to design a Free was a turning point in my flying. In a good way. It forced me into the *Aresti Aerobatic Catalogue*. It forced me into the IAC rulebook. It forced me to think about how a sequence of maneuvers can be best strung together in terms of feasibility, fun, and scoring. In that order.

This deep dive into the foundational documents of our sport greatly increased my knowledge base, made me a better pilot, and helped me become a regional judge. Positives all around. So here is how I proceeded. I opened up the "Good Book" (aka the IAC rulebook) and reviewed the table of contents. And there it was ... "Chapter 6 — The Free Program Design Limits and Documentation." This seemed like a good place to start.

Keep in mind that this was before the "12-figure maximum" rule change for Sportsman, and there were some ridiculous Sporty Frees out there. With no maximum number of figures, it was a game to work in every competition turn and every other low K figure until you hit the K of the Known. This seemed kind of cheesy to me, so feeling rather self-righteous, I decided I would build a "fun" Free instead of the dreaded "winning" Free.

Halfway through my second Sporty season, I finally built my first Free. It consisted of 11 figures, (remember that, at that time, there was no maximum) and after much trial and error (and error, and error) I constructed it to be fun to fly. The first step was to ensure compliance with chapter 6, verses 2 and 3 of the Good Book. I knew that I needed to include all the required elements and not repeat figures (with a couple

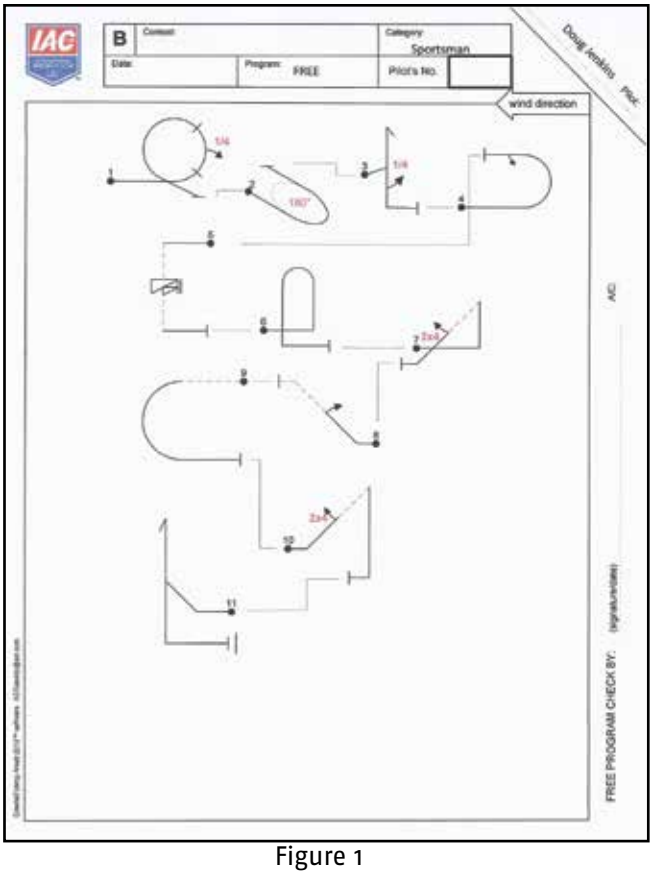



Figure 1

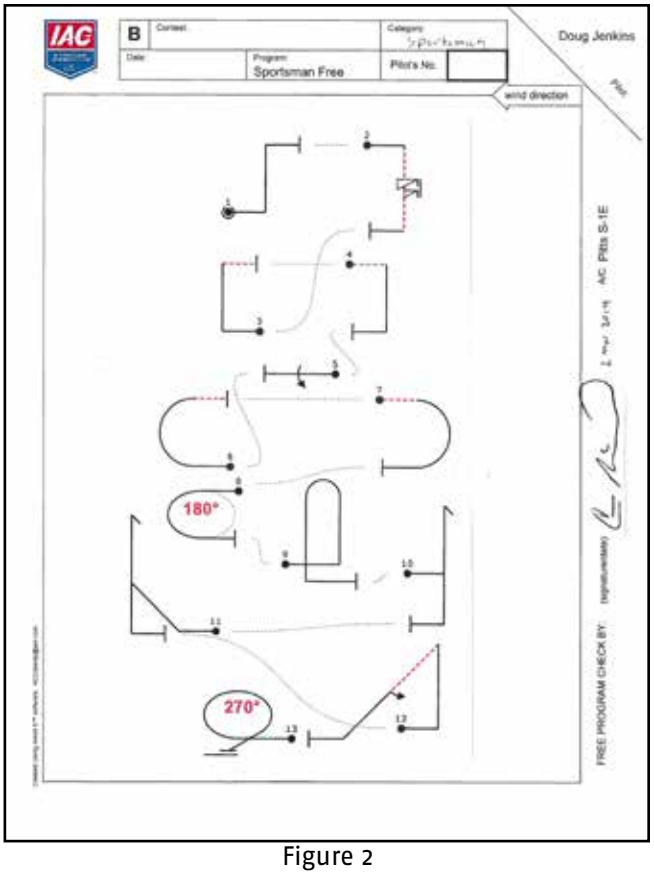



Figure 2

of very specific exceptions). That seemed simple enough. My sequence also needed to match the K of the Known. Chasing the math became something of an obsession. Many an Aresti figure was discarded because the K was just not right. As a power pilot you get to take advantage of the "floating point" to help make the math work. See paragraph 6.2 of the Good Book for more information about that.

I had a vision for the program I wanted to fly, and I flipped through the Aresti catalog looking for figures that could make it happen. What if I add a half-roll here? Is that a legal construction, and what does that do to the K? How about a 2 of 4? Yeah, that's it! You get the idea. All the time I was doing this I was learning, almost without trying to.

The second step was to make it "flyable." This was hashed out by flying my hand around my kitchen with the Aresti catalog in front of me and envisioning how maneuvers would enter, exit, and link together. This led to more discarding of figures as I realized that, for instance, I had built a sequence that never turned around so had zero possibility of staying in the same county it started in, much less the box. Other sequences had no "cross box" figures to help compensate for crosswinds. Again, I was learning without even burning any 100LL.

> This deep dive into the foundational documents of our sport greatly increased my knowledge base, made me a better pilot, and helped me become a regional judge.

The third step was to make sure the program was practical. Just because a sequence is logical in its flow, meets the rulebook's requirements, and is legal in its Aresti construction does not mean you and your airplane can fly it. A double humpty made the K work but didn't exactly go like I wanted it to. Oh, well — back to the drawing board. You have to approach flying a new Free like any other test flight: Be cautious and conservative — altitude is your friend.

After a lot of work I finally had a product I was proud of, but it was most definitely not a "winning" Free, and as a result I did not win (see Figure 1). As a matter of fact, my Free was probably more difficult than the Known. Still, the first time I flew it for judges, it felt good. I had designed and flown my own personal little air show. The quarter clover as figure 1 was an attention-getter for certain. The hesitation rolls on 45 lines, however, were just a bad idea. When I showed people my Free at Nationals that year I got strange looks, and one person actually asked me, "You're really going to fly that?" I did. It did not score well. In fact, I flew this Free at only two contests.

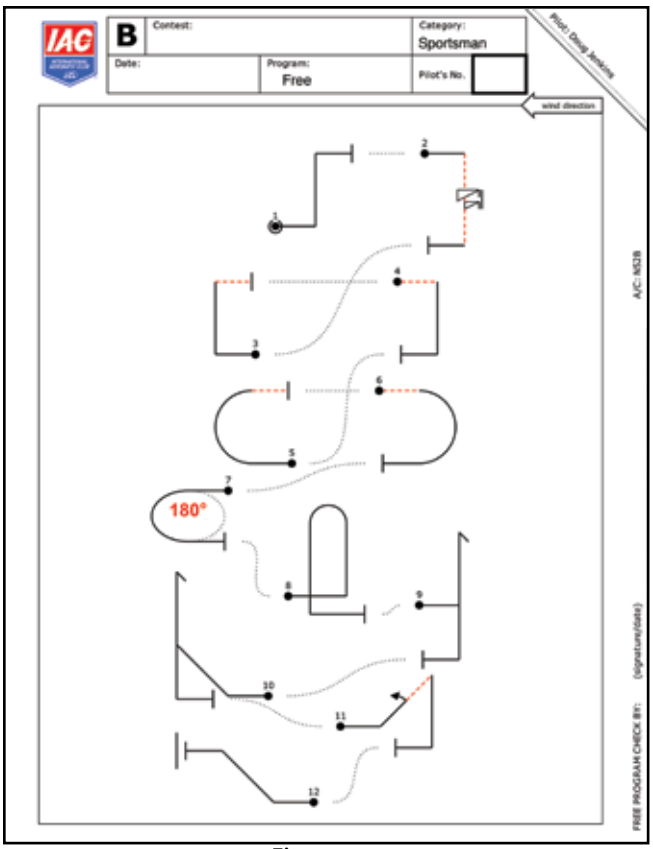



Figure 3

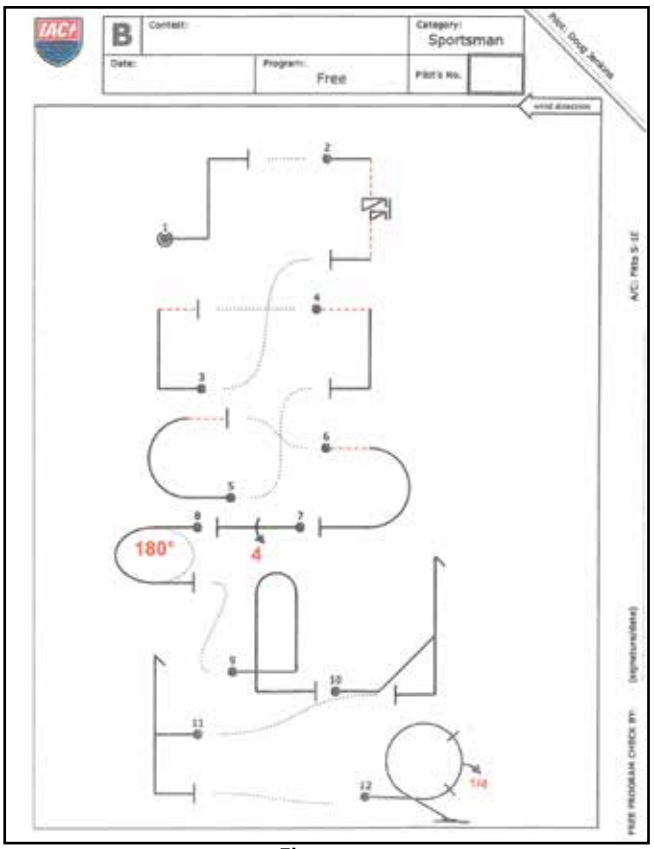



Figure 4

So far those are the only two contests from which I did not take home a trophy or medal. Coincidence? I think not. So I had met my first objective: I fully understood the process of Free design and the logic behind it. However, I had failed miserably at my second objective: to give myself a better chance to bring home a trophy.

A good friend of mine pointed out that if I was not showing up to win, I was just making a donation to the chapter. I fought this line of thought because I wanted to challenge myself. I knew that there had to be a middle ground somewhere. So I set about building a Free that was fun and challenging but still had a snowball's chance in Hades of scoring well. Because in my heart I wanted to win. This is, after all, a competition, right? To quote former NFL head coach Herm Edwards, "You play to win the game!" His point was that there is no such thing as a moral victory. You either win or lose.

I finally took to heart chapter 6, verse 1 of the Good Book, which states, "The Free Program affords each competitor the opportunity to express his or her personal skills in the design of a sequence as well as demonstrating piloting ability." For me, that pretty clearly sums up my goals when I build my Free. What do my airplane and I do well ... together? How can we best emphasize our attributes ... while hiding our flaws? This is not underhanded or an attempt to contravene the rules — it embraces them! Here is our chance to showcase everything we do well in an all-out bid to show the judges how good we are!

My second Free, in my third season, was an improvement in every way (see Figure 2). I spread the K among 13 figures instead of 11 (and the K was 13 points lower that season, too!). I maximized things we did well, like hammerheads, while totally eliminating point deduction magnets like 2-by-4 rolls on 45 lines. This Free scored *much* better. I had learned my lesson.

In my fourth season, the "12-figure rule" went into effect, and I think making that rule change was absolutely the right thing to do. Simply stated, Sportsman Frees could no longer have as many figures as the pilot could get into the K of the Known.

There it was now, in black and white in chapter 6, verse 2: "Max # of figures ... 12." It allowed you to take advantage of rule 6.1 while reining in the competition-turn-fest of years past. To meet the Known K you still need some pretty high K (for Sportsman) figures in there! This was basically what I had been doing all along. This allowed for a Free that had some zest while leveling the playing field and bringing all those with 15-plus-figure "winning Frees" back to the pack.

The 12-figure rule led me to my current Free, a variation of which I have flown/designed the past three years. I say "designed" because for two seasons I was grounded due to aircraft issues. But just to keep my noggin in the game, I designed a Free that was legal and got it blessed by a judge. You can see elements of the 2014 Free in the 2015 Free (see

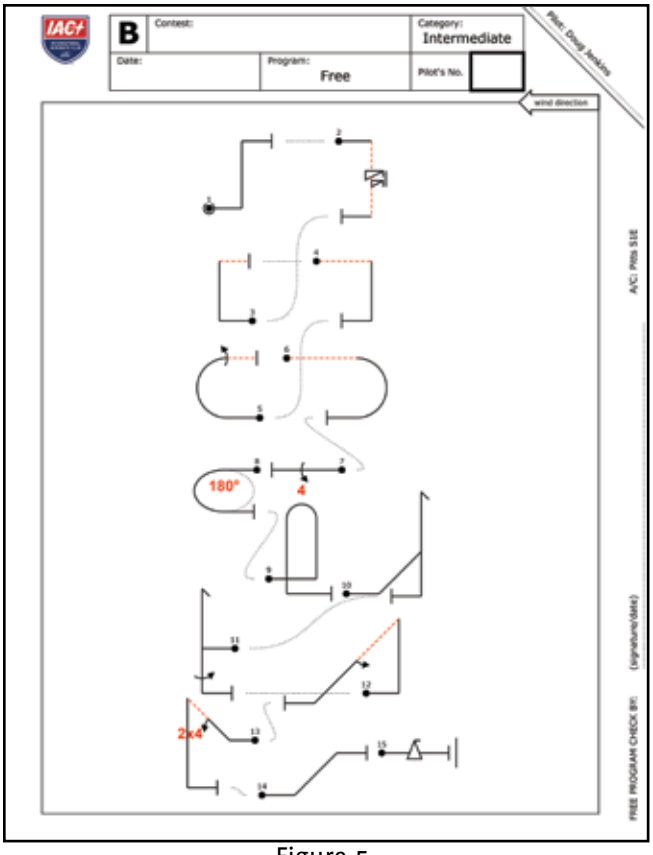



Figure 5

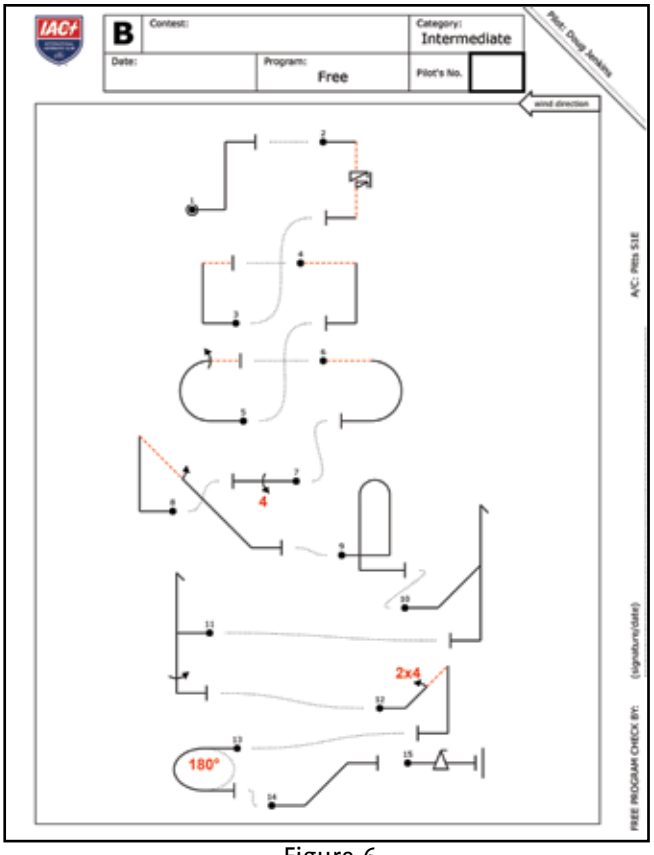



Figure 6

Figure 3). Keeping it similar from year to year, with small adjustments for K factor (six points lower in this case) seemed smart. Finally, you can see that both survive in my 2017 Free, which has also proven to be a good scoring sequence (see Figure 4). I know the quarter clover makes no sense from a scoring perspective, but I just *love* flying that figure, and I think it's a really great finale to the sequence.

Next year I plan to move up (finally). To give you an idea of how I went through the design process, here is how I got to my Intermediate Free. The first iteration should look *very* familiar (see Figure 5). I simply added a couple of rolling elements to get the K up (figures 5 and 11) and added figures to get to the 15 maximum allowable figure count. The roll on Figure 5 makes it a figure from the Known. Figures 12 and 13 are also stolen directly from the Known. I needed to get slow to snap, so that led to figures 14 and 15. I know that I already had a 4-point roll so, theoretically, I didn't need a snap, but I need to get comfortable with them, and the 2018 Known doesn't have an isolated snap, just an avalanche.

After flying version one a few times, I realized that having two *big* 45 lines downwind (figures 12 and 13) was not a great idea. This led to version two (see Figure 6). Version two corrected the 45 lines issue but moved my wind corrector (the competition 180-degree turn) too late in the sequence to be of any help if strong cross-box winds were a factor.

This led to version three (see Figure 7), which swapped some figures around to get the 180 back to the middle of the sequence. I hope this will present well in Intermediate next season.

Having gotten sidetracked into Intermediate to show the trial-and-error process, let's get back to Sportsman. Here are my general thoughts on designing a successful Sportsman Free. Some will tell you that these ideas are boring. Some will tell you that it needs to be more challenging. Good for them. As long as you are having fun and flying within the rules, all is well.

The overall goal is to find 12 figures that spread the K as evenly as possible among them while incorporating all of the requirements of 6.2 and 6.3.

Rationally determine which figures you and your aircraft do well. Look at your scores from past contests or listen to a trusted critic/coach/mentor. For my Frees I know that my Wolf Wing Pitts will set and hold a vertical line like she's on rails, and judges are hard-pressed to find an error. I also know that, for whatever reason, we fly good hammerheads together. On the other hand, my wife often tells me that my loops look like really nice cursive L's. Based on these concepts, I include a lot of vertical lines and hammerheads while omitting full loops (or anything more than a half-loop, for that matter).

If you fly a Decathlon, you might not want to include too many rolls and more 45-degree lines versus vertical lines. You get the picture.

Use the full number of available

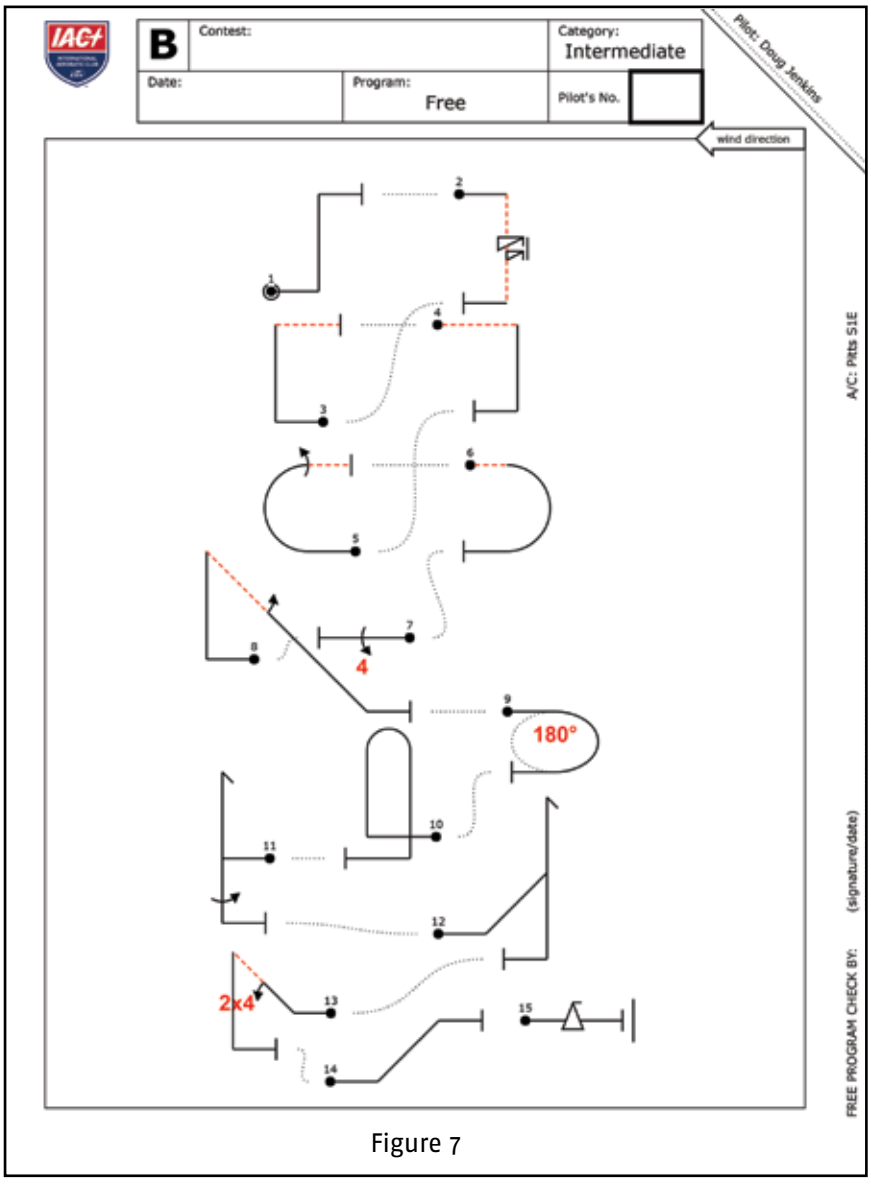



Figure 7

figures. There are no bonus points for getting to the K of the Known in the fewest figures. By using all 12 figures, you spread the K as evenly as possible so a botched figure is not the end of the world.

Make sure you use all available K. Leaving your sequence even one point shy of the available K is leaving points on the table.

Avoid downwind spins, like I had in my original Free. The entry can look wrong to the judges — like there was no stall. This will earn you a zero. Ask me how I know.

Consider the wind. Think cross-box correctors and think which figures eat up ground. My competition 180 is enough to correct for any but the worst crosswinds. Some folks prefer at least one figure that uses the y-axis to provide an additional option. Those work, too. Play to your strengths. Loops look better into the wind, and 45 lines take up *much* less geography when flown into the wind.

Consider adding figures from the Known. This can be a double-edged sword, however. You get more opportunities to practice the figure; just be cautious that "muscle memory" does not lead you into the following figure from the Known versus your Free. That will *not* go well. Again, ask me how I know.

Avoid full looping figures and any other figure that is complex and not required by the rules. These are notorious score killers. There are too many things a judge can deduct for. Half-loops are a great idea, and they meet the requirement of rule 6.3.2. Now why, I ask, would you make an already incredibly challenging sport more difficult? Why would you fly a full loop instead of a half? Why would you fly a complete square loop instead of a vertical up and a vertical down?

If you want to challenge yourself and wow the judges with an avalanche, an inverted spin, and a full Cuban-eight (with a 2 of 4 and a 4 of 8 for good measure!) in your Sportsman Free, by all means do so. Just don't expect to score as well as competitors who designed well-thought-out Frees that they enjoyed flying and who minimized the opportunities for the judges to remove points from their score.

It is not your job to land your plane, leap from the cockpit, beat your chest, and scream "*Are you not entertained?!*" at the judges. It is your job to win the game!

Professional athletes do not make their jobs more difficult just to entertain the officials. Nor do they make them more difficult just to "challenge themselves." They recognize that what they do is difficult enough by its very nature. LeBron James does not heave shots from half court with 20 seconds on the shot clock; he prefers a layup. Aaron Rodgers does not throw into triple coverage just because he can; he looks for the open receiver. So why would you, a competition aerobatic pilot, choose the metaphorical half-court shot or the triple-covered receiver? Out of some misplaced sense of pride? I know, I felt that way once, too. That way lies madness.

Some people say that it's not fair that a Free scores better than the Known, and that the "best pilot" doesn't always win, because he or she chose to fly the Known three times versus flying a Free. Balderdash. Does my Free score better than the Known? Usually. But isn't that the point? Doesn't the Free exist to give the pilot "the opportunity to

express his or her personal skills in the design of a sequence as well as demonstrating piloting ability"? And would you not expect a sequence that a pilot designed for themselves and their aircraft to score better than the Known? Who cares if the increase in score is 2 percent or 12 percent? The pilot worked for every point! If you want those points for yourself, design a Free and execute it as close to perfection as possible.

You have to earn every point on every figure from every judge! Every time I dive into the box, whether for the Known or Free program, I am taking a risk that I will fly a poor figure or commit some other infraction that causes me to lose points. That's the essence of our sport. The fact that I took the time and effort to create and fine-tune my Free should be rewarded with higher scores — if I fly well! Isn't the same true in Intermediate, Advanced, and Unlimited?

No matter how many figures are in a Free or what their K is, they still must be placed and flown well to score well! Simply creating a Free does not guarantee that you will win Sportsman at any given contest. You still need to fly well for three complete flights! If I "HZ" a figure in my Free (or simply fly a bad figure), it has the same impact as an HZ or poor score in the Known.

One final thought: When I design and fly my Free, it's always with an eye toward presentation. My Free has flow and balance — it is symmetric in its placement, and each maneuver is flown where (in my opinion) it needs to be for the judge to best evaluate and appreciate it. If judges are bored by my Free, then they are probably bored by Sportsman in general. Most of the references to Boring Sporty Frees harken back to the bad old days before the 12-figure rule. Be that as it may, you should build your Free so that it can flow and present well. One weakness of my Free is that, if there's a strong wind, I often end up driving for quite a while to get into figure 4 and again into figure 6. I hate that, and I know that a judge may hit my presentation score. On the other hand, the judges may reward me for realizing where I was in the box and dropping the figure exactly where it needed to be. Who can know the mind of the judge?

I do know that, as a judge, when I award a presentation score, I don't simply value the nuts and bolts of flying figures, but also placement, symmetry, and flow. Strategic thought versus tactical thought. I reward those who do that well for the effort they put into it.

To wrap this all up, if you are a Sportsman pilot I highly encourage you to develop your own personal air show that entertains you and maximizes your chance to bring something home from each and every contest you participate in. If you do it right, you'll find there are multiple upsides and no downsides to the process. It will make you better. Fly fun! IAC

# The Judge's Quest for Excellence

## Moving from strategy to results

by DJ Molny, IAC 25097

During the fall of 2017, Jim Bourke took to the Exploder e-mail list to point out some serious problems with IAC judging. It's not new, but it is very important, and in my opinion there are steps we can take to improve the situation.

I believe there are many overlapping and interacting factors, and if you'll all indulge me, I'll try to unpack them. These observations have certainly been made before, so this is just intended as a way to move us from conversation to action.

### Macro Objectives

When I got involved in aerobatics in the mid-1990s, the late Mike Jones was teaching many judges schools every year. He would emphasize over and over that our job is to accurately rank the pilots — as opposed to fitting our scores into a certain bracket, conforming with our peers, encouraging newbies, etc.

To do that, judges must have a comprehensive grasp and recollection of the entire rulebook, particularly the scoring criteria in Chapters 7 and 8. While we'll never reach perfection, I believe that Wes Liu's work on the judges school material and the various exams has helped many of our judges improve.

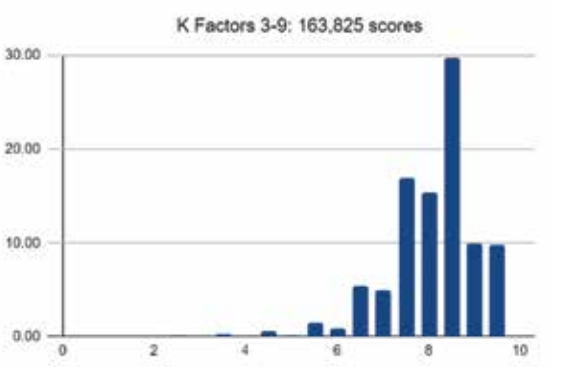
Next, judges must be able to apply all of that knowledge in the heat of battle. We've taken some modest steps in that direction, again under Wes' guidance, the requirement for practice grading (Rule 2.6.1(f)) being the most prominent example. But, as Jim has correctly pointed out, the feedback loop is otherwise nonexistent.

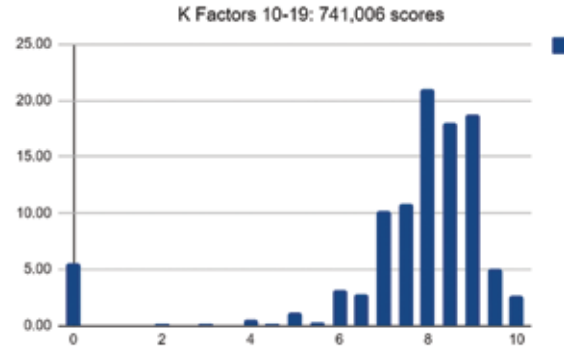
Measuring success — hell, just defining it — may be the most daunting challenge of all. Jim also pointed out that being in the majority isn't the same as being right. And there's been a lot of discussion of other statistical metrics over the years with little consensus on how to use them or if they're even appropriate.

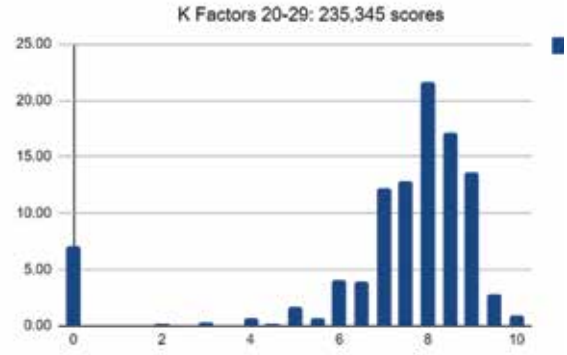
### Judges' Motivations

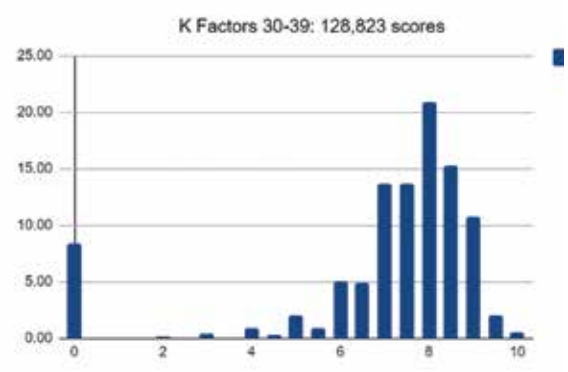
In the IAC, many competitors are judges, and the vast majority of judges are competitors. Some do it from a sense of obligation, while geeks like me find judging to be rewarding in and of itself.

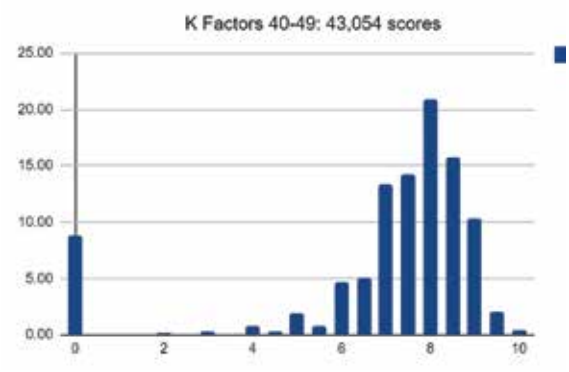
As Brian Howard has pointed out, there has always been a fear that we'll lose judges if we ask them to change the way they issue scores. I suspect that only a few would leave in a huff, and that those departures might well raise the average

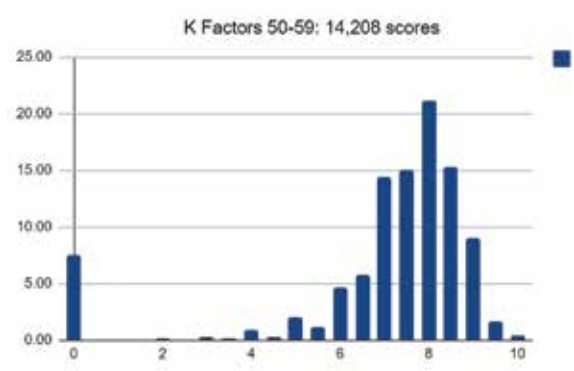


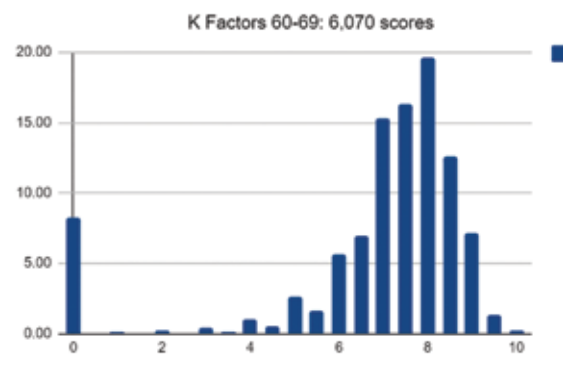






skill level. Unfortunately, we still face occasional shortages at contests so we do need to be cautious and sensitive with any possible changes.

I also think we need to do some research to find out why people become judges, what they find rewarding about it, and what they view as the negatives; then we find ways to make it more rewarding, which brings me to the next topic.

## Recognition

Let's treat judges as vital and appreciated volunteers, by celebrating them as practitioners of an indispensable discipline within the sport.

We don't compensate judges in any way and — in my experience — rarely even recognize them aside from a quick round of applause at the awards ceremony. Yes, the Robert Heuer and Harold Neumann trophies reward excellence in judging and the chief judge, respectively. But that's about it.

How about small memento gifts from contest organizers to the judges or, better yet, the judging teams? Pins for new judges? (We used to do that back in the day.) An awards system like the flight patches? Public recognition for years of service and/or total flights judged? You name it.

We should also cut the judges a little slack. There was a lot of grumbling and even vitriol from a few people after the U.S. National Aerobatic Championships videos provided proof of some major judging errors. But what standard are we holding them to? Competitors are asked to fly one or two dozen figures a day; flubs happen all the time, and aside from some friendly ribbing, nobody bats an eye. Judges have to score *hundreds* of figures per day; surely an occasional lapse is understandable.

## Mental Issues

*Bracketing*: Analysis of scores from the IAC contest database (*IACCDB.IAC.org*) showed that both figure and presentation scores consistently cluster in the 7.0 to 9.0 range *regardless*

Contests always seem to operate with a great sense of urgency, sometimes with good reason and sometimes out of habit.

*of K-factor*! Based on that, it seems clear that many judges are still grading improperly — perhaps not assigning pure "grab scores" but certainly not deducting strictly according to rulebook criteria. My intuition is that people shy away from low scores because they feel cruel and eschew 10s because they imply that the judge wasn't paying attention.

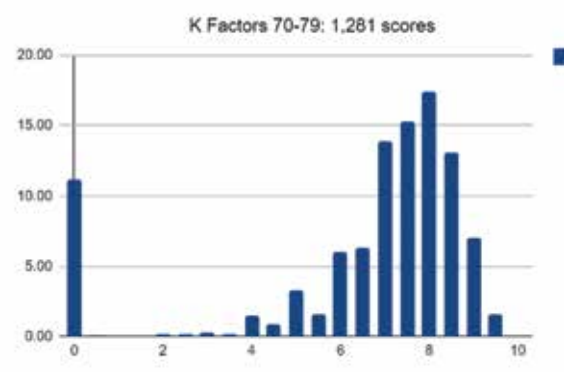
*Managing expectations*: I believe that we all go into a figure with expectations of what is going to happen, then deduct when reality diverges from that. Problems arise when something really unusual occurs (e.g., a massively off-heading tailslide at the 2017 competition), or when our expectations don't encompass all of the scoring criteria. I sometimes hear judges giving scores before a figure returns to horizontal level flight. Why? Because their real-time expectations don't include a line between figures. They know it's a rule, but that's not the same as watching for it while the figure is being flown.

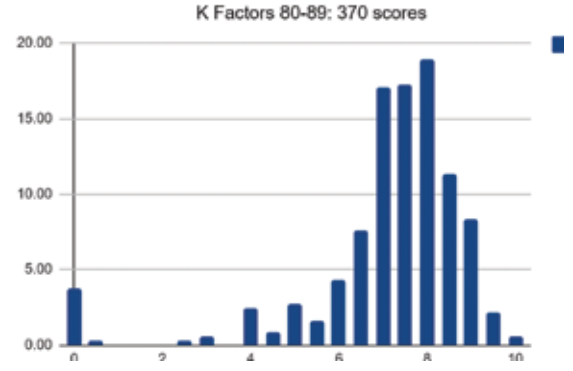
*Cognitive overloads*: A competitor leaves out a figure, your assistant botches a call, or you're watching a 90-K figure in Unlimited. It's just too much at times. This is exacerbated by the fact that many judges are only on the line a few times a year.

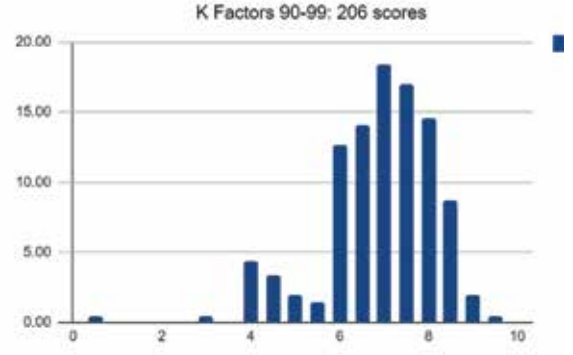
*Category inversion*: One unfortunate consequence of our system of competitors-as-judges is that pilots from the lower categories — who often haven't been judges for very long — must score the pilots in the upper categories. No surprise that it's difficult for them to keep up.

## Impediments

The biggest quandary may be how to assess judges' performance. You can't do it in real time because it would




## Moving from Strategy to Result

| | | | | | | |
|---|---|---|---|---|---|---|
| X | Demonstrated Leadership Commitment | Clear WIIFM for all | Concrete Implementation Plan | Skills & Knowledge in place | Reinforcement | → "It's not urgent" |
| Clear, compelling case for change | X | Clear WIIFM for all | Concrete Implementation Plan | Skills & Knowledge in place | Reinforcement | → "It's not real" |
| Clear, compelling case for change | Demonstrated Leadership Commitment | X | Concrete Implementation Plan | Skills & Knowledge in place | Reinforcement | → "It's not worth it" |
| Clear, compelling case for change | Demonstrated Leadership Commitment | Clear WIIFM for all | X | Skills & Knowledge in place | Reinforcement | → "It's not going anywhere" |
| Clear, compelling case for change | Demonstrated Leadership Commitment | Clear WIIFM for all | Concrete Implementation Plan | X | Reinforcement | → "It's not possible" |
| Clear, compelling case for change | Demonstrated Leadership Commitment | Clear WIIFM for all | Concrete Implementation Plan | Skills & Knowledge in place | X | → "It's not for long" |
| Clear, compelling case for change | Demonstrated Leadership Commitment | Clear WIIFM for all | Concrete Implementation Plan | Skills & Knowledge in place | Reinforcement | → "It's working" |

interfere with their work. Video is very helpful, but isn't usually available and doesn't help much with large-scale elements such as radii. Score sheets are of little use because it's very hard to reconstruct why a judge gave a certain score on a certain figure. (Some judges give a lot of comments, others don't. But even if a judge verbalizes every single deduction, there's no way a recorder can capture them all.)

Then there's the cultural aspect. Any time you start looking at peoples' previously unquestioned work, some of them will be defensive. I see that as unavoidable but manageable if we keep things positive.

Time pressure factors in as well. Contests always seem to operate with a great sense of urgency, sometimes with good reason and sometimes out of habit.

## Potential Paths

Other disciplines may offer some ideas.

I recently watched a news story about an accomplished surgeon who wanted his game to be as good as possible. So he brought in a highly respected retired surgeon to observe some operations and then dissect (no pun intended) the performance. I know aerobatic pilots are a self-confident, hard-charging bunch, but if notoriously egotistical surgeons can handle suggestions for improvement surely we can as well. The key is to make it a constructive exercise and — like a good checkride — a learning experience.

Check pilots and sim rides are also interesting analogs. No matter how long a pilot has flown for the airlines, someone else watches and tests their performance on a regular basis. Cockpit resource management practices may also hold some lessons for us. If a contest has more than three judges available, perhaps we could assign one of them as a "floater" to look over the shoulder of the others and hold after-action debriefs.

What would the time cost be for one warm-up pilot per judges line, maybe 15 minutes? Much as I disliked watching CIVA judges give impression scores, it was clear that those flights and the subsequent group reviews helped the judges get their heads into the game.

## Facilitating Change

Of all the management how-to charts in the whole wide world, I keep coming back to this one that neatly summarizes what it takes to implement a significant change — and what happens if you leave out a step.

I offer that up as a framework for further discussions. Any plans we come up with must address all six columns.

There's plenty of room to improve judging performance, but it won't be an easy task. Wes has done yeoman's work and still just scratched the surface. Let's see what we can all do to help, be open to positive change, and push ourselves to excel in judging just as we do with flying. IAC

# Sitting Middle Seat

## My first time on the judges line

BY ZINNIA KILKENNY, IAC 437244

Traditionally in aviation, the left seat is the most coveted. On the judges line at an aerobatic contest, the middle seat is reserved for the scoring judge, and is the most challenging one to fill. Recently, I completed all the requirements to become a regional judge. I then attended a contest without planning to compete so that I'd be able to devote all of my attention to judging. This is the story of my first time "on the line" as a judge.

During the course of a contest, judges will score thousands of elements and still need to be equipped mentally for their own flights. Observing the stamina and self-sacrificing dedication of the judges whom I assisted helped guide my decision to become a judge. Inspired by these exemplar men and women, I wanted to do my *equal* share. These judges were competitors with little time or thought given to their own interests or even time given to glance at a sequence card for their upcoming flights. I wondered if the judges sacrificed aspects of their own flights in the interest of assuring their fellows received competent and consistent grading.

Additionally, over the dozen or so contests I've flown, I've noticed competitors hurrying to the window where their score sheets were posted. With eagerness and a horizontal-tracking index finger, their eyes gravitated toward specific judges' initials, then vertically down to their scores. I informally polled competitors whether they first sought the score of a judge whose feedback means the most to them. Without hesitation, their replies were a unanimous, "Yes!"

As competitors, we practice our choreographic lines, angles, rolls, and spins until they become our winning flights. Similarly, it's reasonable to surmise that judges need dedicated practice time, too. In the end, this desire to join the sunburned altruists on the line, and perhaps, one day, to be the name whose scores provoked a first look on the scoresheet, is the reason I decided to dedicate myself to the judge certification process with singular determination.

### Practice Day

The backdrop is a sunny fall day in Borrego Springs, California. Competitors from all over the globe are arriving for practice day, and my first official duties as a judge have begun.

I'm asked to score Primary through Unlimited figures for the IAC's Achievement Awards program (*www.IAC.org/legacy/achievement-awards*). This will be an excellent opportunity to practice my rhythmic commentary, and to calibrate my judging eyes before the brisk pace of the contest environment. To re-create the scenario of the judges' tent (a team of three: a judge, an assistant, and a recorder), I "volunteer" a fellow competitor to assist and record while I call out scores. This goes well, and I find myself thinking I may actually be ready to judge this contest.

### Contest Jury

Later that evening, the contest director, in consultation with the jury chairman, assigns me as an alternate member, the idea being that I'd garner valuable experience should I be needed in the future. The contest jury is the arbitration body of aerobatic events. The jury ensures the rules are applied properly and also intervenes to solve problems that arise. Alternate jurors are required to replace jurors who are involved in a protest or unable to serve due to a conflict of interest. Necessitated by circumstance, the opportunity to sit as an active juror came early the next morning. The opinion among the jurors is that there are a significant number of protests and issues. As expected, all keep a professional demeanor and at times use humor to cope, lending one juror to wittily quip, "I protest all these protests!"

While there are added workload demands, I feel that the experience of serving alongside tenured peers is one that has laid a thorough and firm foundation for future contests.

### The Best Seats

Day one of this two-day contest is underway. An ensemble of judges, assistants, recorders, and volunteers take their places. Before the first pilot enters the aerobatic box, with a hard

copy of the rulebook in hand for quick reference, I locate the most central place for my team. As any aerobatic enthusiast will agree, the prime seats are front and center on the judges line.

From the moment the first pilot enters the box, my objective is clear: be consistent in my scoring criteria until all flights in a category are completed, and have a score ready for the recorder by the "end of figure" signal. Thankfully, I'm paired with an assistant and a recorder who take their duties as seriously as their flights.

The only snafu comes when, from habit, my assistant with many years of judging experience, gets caught up in the moment, and starts judging in his head during a particularly challenging flight, and goes radio silent rather than calling the needed figures. He then regains the moment and picks up a figure out of sequence breaking my rhythmic commentary, leaving me no choice but to give a handful of A's for average. At the flight's completion, I break character and playfully dictate notes to my recorder for the comment section, placing blame "on my assistant" for lack of numerical scores. Ultimately, though, I rescind on account of my assistant being a pretty decent guy.

When I'm not judging, the volunteer coordinator makes strategic use of any breaks I otherwise would have had and assigns me to assist another judge. While I'm on the topic of assisting or calling figures, in December's Meet a Member column, the question was posed to me, "As a relatively new member, is there anything you would like to see changed?" Changed may not be the word I'm looking for, but refined comes to mind. Calling figures for a judge is truly an art form and should not be left to unceremonious routine. While timing and personal vernacular preferences may change from judge to judge, I see a benefit to standardizing.

"*Whether we call it sacrifice, or poetry, or adventure, it is always the same voice that calls.*"

— Aristotle

The highlight signaling the contest's conclusion is the spectacular 4-Minute Freestyle. Qualified competitors choreograph Mozartesque figures and combinations unfettered by the usual limitations, difficulties, or constraints of the aerobatic box. Technical merit and artistic impression reign. The honor of returning to the judges line, in the company of those whose valiant dedication inspires us all, feels rewarding.

Individually, we pick our art form, and the level and the way we commit. Yet, as with any worthwhile endeavor, immersing ourselves wholeheartedly comes with this guarantee: access to a life lived adventurously. Where else could you experience the power and perils of high flying, artistic brilliance, drama, and redemption? Well, none other than on the line from the best seat in the house — the middle seat. IAC

by GARY DeBAUN, IAC 4145


## Kevin Elizondo

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|---|---|
| IAC # | 436073 |
| Occupation | Shipping executive |
| Chapter affiliation | President of IAC 36, and I train with IAC 120. |
| Age | 53 |

**GD: Kevin, tell us how you got into competition aerobatics.**

KE: I grew up in the small town of Litchfield, Illinois, where our local airport had a practice box and lots of aerobatics going on. A friend's father finished building an S-1S (N1GB), and we all went to Oshkosh that summer, where I watched Leo Loudenslager and the Eagles fly — and I was hooked. My friend's father, Phil Sisson, went on to win numerous awards at Fond du Lac in N1GB, as well as consecutive national championships in Sportsman and Intermediate in '84 and '85, as well as the L. Paul Soucy Trophy in 1989. I hung around the airport, watching Phil, Dick Blatter, and Perry Rhoades (Sportsman National Champion 1982), and sometimes Jerry Spears, practice in the box. Perry gave me my first aerobatic ride in his Chipmunk. I joined the Air Force as a flight mechanic and was stationed down the road at Scott Air Force Base, Illinois. I learned to fly at the aero club on my days off with this old-timer named Clisten Murray. He was a great instructor, past IAC Chapter 61 president, and IAC board member.

**GD: When and where was your first contest? How did it go?**

KE: I took a break from flying for a number of years after getting burned out chasing the left seat airline job. I heard about Sunrise Aviation and met Michael Church. I heard they taught in Decathlons, Pittses, and EXTRAs. I checked out in the Pitts and took it to the Borrego, California, contest. I flew Primary and got second (out of two).

**GD: Last year (2016) was pretty good for you — run us through your accomplishments.**

KE: I was proud and fortunate to receive the L. Paul Soucy Trophy last year for the previous year's flying. I flew all five Southwest contests plus Nationals and had a pretty good year overall. It was very special to have Phil sit next to me at the awards ceremony in Oshkosh and have our names on the same trophy. I had not been back since 1981 when I watched Leo and the Eagles.

**GD: You did quite well in your Pitts S-1S. Since then you have bought Tim Just's EXTRA. What are your future goals?**

KE: To try and win a contest in Intermediate. Just kidding. I'm having fun and plan on returning to compete at Oshkosh in the Nationals again this year. Beyond that, stay tuned. Oh, that little Pitts was previously owned by Joe Haycraft, who won numerous IAC awards with it; great airplane.

**GD: What are your thoughts on returning to Oshkosh for the 2018 U.S. National Aerobatic Championships?**

KE: I plan to be there. It's a great venue for Nationals. I'm happy the board of directors decided to keep Nationals in Oshkosh. There is nothing like flying in the box at OSH.

**GD: What is your favorite figure to fly?**

KE: Snap rolls. I loved snapping the Pitts. I'm still trying to perfect the technique in the EXTRA. A couple thousand more and I should have it down.

**GD: What are your feelings on contest banquets — do we really need them?**

KE: Of course. I feel they are an integral part of the contest experience, and I always have fun.

**GD: What would be your solution to the dwindling pool of good national judges?**

KE: That's a tough question. As you well know, it takes a lot of volunteers to run a contest, and we need a way to attract judges. I felt it was a natural step

towards becoming a better competition pilot. I am still amazed at the number of experienced IAC pilots who are not judges.

**GD: If you could change anything in the IAC, what would it be and why?**

KE: Another tough one. I think we should foster an atmosphere of trying suggestions for problems, and if they do not work out, then move on and try something else. People should feel free to make suggestions and explore new ways of doing things if needed. Keep it safe and keep it fun.

**GD: Who in the sport has been an inspiration to you?**

KE: Lately, my coaches Michael Church and Tim Just. In the beginning, Phil Sisson for helping me realize it was possible to build your dream plane in your garage. Leo Loudenslager for his obsession about weight, performance, and aerodynamics and giving me something to strive for. I met his daughters this year at the Nationals banquet and let them know what an inspiration their father was. Thanks to our emcee of the evening, Tim Just — great idea to invite them.

**GD: Do you have any interests outside of flying?**

KE: Not really. I'm fortunate my wife is very supportive of my flying. During the contest season it is not unusual for me to spend Saturday at the airport with practice flights and be back on Sunday working on the plane. During the off-season I play catch up on the home projects and keeping all the promises I made to my wife. My wife and I enjoy traveling and taking the grandkids to the beach and paddleboarding around the bay. IAC

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