



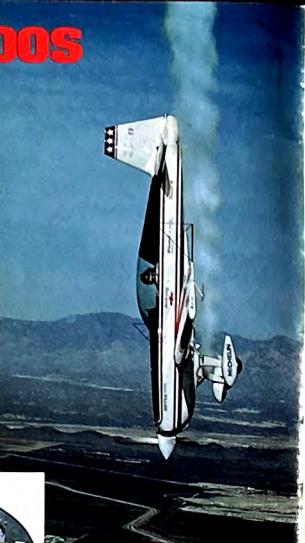
# Sport Aerobatics

MARCH 1994

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# Sport Aerobatics

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## In This Issue...

- 4 Organization Leadership
  - 5 President's Page by Linda Hamer
  - 6 Re-birth of a Champion by Steve Starvakkis
  - 11 USA Aerobatic Team Contributors
  - 13 Lines & Angles by Mike Heuer
  - 15 Going Gray by Ron Saglimbene
  - 17 Why be a Judge? by Ken Larson
  - 19 IAC Annual Business Meeting, August 2, 1993
  - 20 Competition News
  - 21 Letters
  - 22 Roar of the Rockies by Glenn M. Mattiotti
  - 28 The New Airspace Classifications and Aerobatics
  - 29 Human Factors - G-Loads and Sport Aerobatics by Fred G. DeLacerda
  - 31 The Acid Mesh Problem Re-visited by Allen R. Silver
  - 35 Calendar of Events
  - 37 IAC Achievement Awards
  - 38 Hammerheads by Ron Saglimbene
  - 39 Classifieds
  - 39 Advertiser's Directory
- 15
- 17
- 22

## On The Cover:

Steve Starvakkis, IAC #11805, and his Zlin 50. Steve writes a superb feature in SPORT AEROBATICS about this classic aerobatic aircraft and its characteristics. The aircraft pictured is a 1977 Zlin Z-50A. (photo by Richard E. Satchell)



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# President's Page



by Linda Hamer

## Going Full Circle

Plans, Practice and Projects in 1994. I have always felt that plans are important. A good plan should be attainable. Plans are more likely to be successful if written down. I know many of you have, or will formulate a plan for a successful '94 season. Perhaps you would like to move up a level in your competition. Your plan may be to improve your level of performance. The point is to have a plan, make a commitment to it, and follow through.

As your President my plan is to continue to bring all of us closer together through greater communication and fulfillment of your aspirations in aerobatics. A broader scope for IAC is essential for continued growth. The membership renewal surveys being received indicate "grass roots" emphasis is desirable and necessary. They further indicate a wider variety of information needed in our magazine.

Make plans now to prepare yourself and your bird for the upcoming season. Today I flew with an aerobatic student over the beautiful snow covered midwest. It felt great to experience the sensations that only aerobatic pilots can relate! It was evident the long winter had taken its toll on the two lethargic pilots inside. You know what I am talking about. A good friend once called this the "roided" season. Now's the time to work at improving your "g" tolerance, before the contest season is in full swing.

Your IAC Board of Directors will be meeting during the first weekend in March to make plans for the many

IAC activities this coming year. Plans for a new look for the magazine will be forthcoming, starting with the April issue which should be on time once again. We apologize for the lateness of the February and March issues. An IAC Editorial Advisory Board has been established with a Managing Editor and we will be switching to EAA for layout and design. We do need your help though in securing additional articles for the magazine. The current backlog of articles is almost exhausted. We feel certain you will be pleasantly pleased once the new plan is fully implemented.

I wish to take this opportunity to thank Wes Schmid for all the previous work he has done with the magazine in the past. I also wish to thank our former editor, Mike Heuer, for his longtime contribution.

IAC's 25th Anniversary project is being formulated. My thanks to Doug McConnell for accepting the chairmanship of this anniversary project. We plan to keep you informed through the magazine. If you are interested in helping with this project, please let us know. I'm sure there are many of you who have some great nostalgic memories which you could share with the membership. Write them down, send them in to the IAC Executive office, and we'll be pleased.

I would like to encourage you to continue with the challenge of inviting new guests to your next chapter meeting. I know many of you have accepted this challenge. One of

our Midwest chapters just hosted a special meeting for prospective IAC members. Rumor has it they are still busy with the signup of new members. Some response to this effort in your next newsletter would be appreciated. Remember, we can always use "new hires".

Looking back, can you remember when you were the new competitor or new judge at the contest, or when you did that first loop and roll? How about that first time the volunteer coordinator asked you to serve as a boundary judge?

A teleconference was held during this past month with representatives of FAA regarding their proposal for standardization of box placement at contest sites. They felt guidelines of uniformity would be helpful for their inspectors when issuing contest waivers. Comments covering the excellent standards of IAC in this area were provided. The outcome of this teleconference has not been determined, however, I feel there should be no major changes. I will advise you further in the April issue.

Letters received from you addressing policies and directions of IAC have been coming in. Although there has been little time for replies of late, I haven't forgotten. Transitions always take valuable time. In order for IAC to continue its vitality, we need to continue to work to reach more people interested in our sport. They bring with them an enthusiasm and quest for aerobatic knowledge. That knowledge, folks, we have!

# Re-Birth of a Champion



Steve Stavrakakis'  
Super Zlin 50

Photo by Richard Vander Meulen

by Steve Stavrakakis IAC #11805

By now most of you have had the opportunity to read David Byrne's first flight article on Mira Slovák's Zlin 50 in the June '93 issue of Sport Aerobatics. This article was of extra special interest to me, for I had very recently finished a complete rebuild/restoration of my own Zlin 50, and had just flown it for the first time just a few days prior to the article coming out! But I'm getting ahead of myself.

Many of you may know me or recognize my name, not from the contest world, but rather as an air show pilot with a love affair for Zlin aircraft. My last Zlin, a beautiful 526F model two seat Trener, was featured on the cover and in the pages of the September '92 issue of Sport Aerobatics. If you recall that article, you'll remember me mentioning the many wonderful traits that make a Zlin a Zlin! Ask anyone who's had the pleasure of spending any extended period of time in a Zlin, any model, and they'll tell you Zlins just seem to look, smell, and feel like an aircraft should! My love affair

with my 526F lasted nine wonderful, trouble free years, in which time I learned much about the joys and challenges of precision aerobatic flying. We reluctantly sold our 526 to make room and finances for our newest Zlin, featured in these pages. By the way, I'm pleased to report that our coveted 526 went to an excellent home in Ellensburg, WA, where it continues to be pampered and enjoyed in the hands of it's new owner, IAC member and competition pilot Mitch Travis.

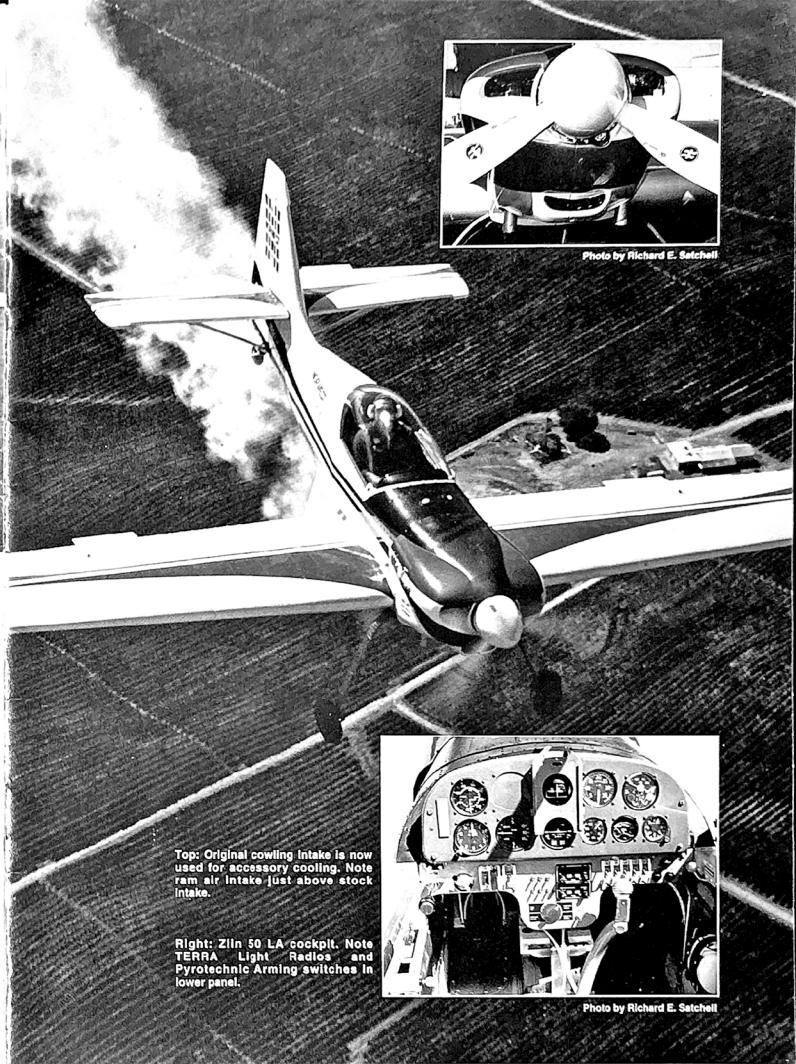
You may recall in my last Zlin article that I briefly mentioned the latest model in the long Zlin line, the Z-50 series. Designed as a totally new aircraft in 1975, Z-50's were the first monoplane to successfully challenge the Pitts dominance in world level competition aerobatics, and later went on to become the aircraft "to beat" throughout the 70's and 80's. Along with winning several European Championships, Czechoslovakian pilot Ivan Tucek won back to back World Titles in '78 and '80, followed by fellow countryman Petr Jirrus who won the

world title in 1986.

Having been bitten by the Zlin bug long ago, I had always longed for a Zlin 50. Several years ago, I had put the word out around Europe in hopes that a used machine may surface at a reasonable price, but the only responses kept coming from the Moravan Factory, who were more than willing to sell me a complete new one, or a new one less engine, etc. Either way, the thought of paying over \$125,000 for a single place aircraft that was no longer a world competitor just didn't pencil out. Especially in the air show world where breaking even is a successful year!

Finally, in a small Trade-A-Plane ad back in 1992, my interest peaked again. After several late night phone calls to a mysterious man with a very heavy accent, I was able to locate a Z-50. Several hundred dollars in phone calls, and a trip half way around the world later, I was able to secure ownership of a Zlin 50. You'll note the unique way that I avoid using the word bought. For no

Photo by Richard Vander Meulen



Top: Original cowling intake is now used for accessory cooling. Note ram air intake just above stock intake.

Right: Zlin 50 LA cockpit. Note TERRA Light Radios and Pyrotechnic Arming switches in lower panel.

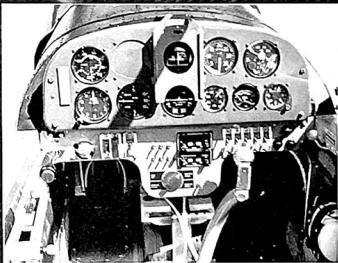


Photo by Richard E. Satchell

part of the purchase process of my aircraft was as simple as "buying it!" It would take far too much space in this magazine to explain the details, other than to say, just because someone runs an ad and offers an aircraft for sale, does not mean that they are the owner and legally able to sell it! (especially in the Eastern Bloc countries right now!) After going all the way to Romania, I learned that the "Seller" was already before the courts for illegally selling government aircraft on the black market in the past. As the government officials put it, there were "no Zed 50's for sale!" End of discussion! Finally, after a ten day roller coaster ride in which I owned and didn't own this aircraft at least half a dozen times, and the price changing at least as many, I was able to purchase YR-ZAT. (I had to agree to purchase several surplus gliders and write a statement to be used in court against the black market broker as enticement to sell me the Zlin.)

Those of you involved in the world level competition scene back in the '80's are unknowingly already familiar with my new Zlin. Along with being part of the Romanian National Aerobatic Team, ZAT was also part of the "FORMATIE DE PATRU," Romania's famous "Flight of Four" Demonstration team. You may also recall a Zlin 50 that suffered severe damage after ground looping back at the WAC held at Bekescsaba, Hungary in August of '84. This is the aircraft! During one of its competition flights, the right rudder cable broke! The Romanian pilot was able to fly a decent approach sans rudder, but ground looped on roll-out. The resultant damage consisted of the

titanium landing gear being completely torn from under the fuselage. The firewall, fuselage, cowling, and prop were extensively damaged, and the wing suffered cosmetic damage in the form of surface dents. Needless to say, the Moravan Factory issued an immediate 25 hour inspection/replacement of all Z-50 rudder cables. ZAT was trucked back to Romania where it sat in a partial state of disrepair, being cannibalized for parts, until I rescued her in October of '92.

After a three month delay (created by the mechanics only making \$30 per month), ZAT was finally crated for the 45 day overseas voyage to California. The rebuild started immediately upon its arrival in February of '93. What I had hoped to be a matter of converting brakes, adding a smoke system, and painting, turned into a major rebuild! Upon closer inspection, it became quite apparent that most of the parts on the aircraft were faulty or broken parts that had been traded from one of the other team planes! It didn't take long to decide that every nut, bolt, and system would be disassembled, inspected, cleaned or replaced, then put back together. This dictated the replacement of every cable, from rudder to throttle, most of the pulleys, and the majority of the instrument panel. The empennage fabric was also stripped and replaced with Stein HD 2X2 using the Stits process. Several items, including batteries, radio, brake cable assemblies, and induction air box were missing in their entirety! I was shown all of these items when bringing it to their attention in Romania, but apparently the \$200+ I left in tips wasn't

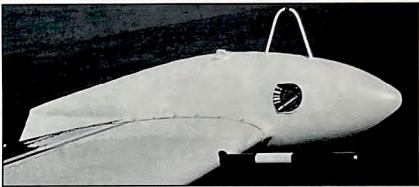
enough for them to remember during packing!

To solve these problems, we made several originally unplanned improvements. The missing induction system was replaced with a BPA Cold Air Induction and ram air, pushing the AEIO-540-D4B5 Lycoming's stock 280 hp up to around 275. The missing English Varley batteries were replaced with Gel Cells, and both placed on the front battery station between the front rudder pedals, allowing a smoke oil tank to be placed behind the seat on the rear battery's original shelf. The missing single Becker radio was replaced with a pair of TERRA Lights, TX-760 Comm and TRT-250 Transponder and encoder. The missing brake cables that operated the manual drum brakes proved to be a tougher challenge. To convert to hydraulic Clevelands, we first had to mate a set of Cessna weld-on axles to custom milled backing plates. After much fitting and modifications, we were able to get a set of 5000x5's to work. Then our attention had to go up top. I had to remove the entire rudder pedal assemblies and re-engineer the triangulation of a set of Piper master cylinders so that the original toe brakes would work. This too was a job that seemed to take more than one try to get right!

Cosmetically, I hated to paint over the factory's triple anodized finish, but there were too many dents needing filling and repairing not to. The entire aircraft was stripped of its original orange trim, which is almost solid on the bottom of the aircraft, and made touchy by the thousands of rivet heads everywhere! For paint,



Above: The beautiful Zlin 50 LA "Wild Thing", shown here with long range fuel tip tanks installed.



Above Right: Titanium landing gear and new 500X5 Cleveland wheels and brakes. Tube following gear leg is oil breather line.

Right: Wing tip fuel tank for ferry flights, increase fuel capacity from 15 gal. to 43. Huge pitot tube also shown.

we decided on the Sikkens base-coat/clear-coat process using Sikkens Urethane paint, (as found on everything from Lexus cars to our Stealth fighters!) I chose a 00 White Base applied as Diamond White Pearl Metallic with the factory stripes replicated in Sapphire Blue and Burgundy Red Metallics, followed by two coats of clear. The end result is a 'Show Car' quality finish that added less than fifty pounds to the aircraft, (with additional paint and smoke system, dry weight is now 1325 lbs.) In the same area, all graphics have been made from computer generated vinyl, including the new aircraft's new "Wild Thing" name on the cowlings.

The rest of the modifications have been minor, and were made as personal preferences for our airshow work, such as a panel mounted pyrotechnic arming station for firing the on-board daytime pyrotechnics I use in our "Wild Thing" airshows. Another mod was to the throttle lever. From the factory, Zlin 50's have a couple of cleverly placed tabs that tie the throttle lever to the prop control. This assures full flat prop pitch in full throttle power settings, a great idea! The down side was the tab that acted in reverse, thus increasing pitch as you decreased the throttle. This was fine for setting

the Zlin up for cruise settings, but a real pain when reducing the throttle for spins and tail slides while performing. The removal of the rear (low speed) tab was a quick and easy fix that eliminated the annoying prop surges previously encountered, giving me full, individual control of the Hoffman prop.

As far as operation of the Z-50, I'm glad to report very few bad characteristics. The tailwheel is spring loaded to the straight position, but will full swivel once broken loose by side load. A feat easiest accomplished by using a combination of forward stick and throttle to unload the tail for turns, then load the tail for straight tracking. The worst part of the tailwheel is the erratic path it always seems to take when pushing the aircraft backwards into the hanger! This, combined with the drag created by the toe-in on the main gear can make manual ground handling a real pain. Speaking of the gear, all three corners are made of titanium. As you know, titanium has few rivets when it comes to strength. The price you pay is an aircraft that upon touchdown would rather do anything than settle to the runway! Luckily, the stall (and touchdown) speed is in the neighborhood of 65-68 mph, and roll-out is true and straight with only minor rudder

inputs. But due to the gear's tendency to bounce, repeatedly, I defy anyone to wheel land a Z-50 consistently, if at all! The other thing you'll notice when landing a Z-50 is the howling from the tires. In an unloaded position, the gear bows the tires into a severe toe-in configuration. This works great for slowing the aircraft on Europe's grass aerodromes, but makes the tires howl like a dog being heat when landing on paved surfaces. We even shimmed the gear as straight as possible, but still get the howling until the aircraft has completely stopped flying and has totally settled on to the gear. As you can imagine, tire wear is considerably more than I experienced on my old Z56 Zlin!

Dave did a very accurate job of describing the acro characteristics of the Z-50, so I won't repeat all of it, only add a few observations of my own. The one piece, all metal wing, while being very strong, and a dream at slow speeds, is not very fast! I have found the 'Economy Cruise' of 60% (2250 rpm) to produce speeds of around 136 mph. Bump the power and fuel burn up to 75% (2450 rpm), and the speed is still only about 150 mph! Not very fast when compared to the current wave of carbon fiber acro-ships out there today! When you consider the Z-50's have



The "Wild Thing" as it looked coming out of the overseas container, Feb. '93.



The Classic lines of the Zlin 50. Empennage is fabric covered, remainder of aircraft is aluminum.

thousands of rivets, with heads the size of cocktail peanuts, a cowling bigger than most of the houses I saw in Romania, and gear hanging out in the breeze with no wheel pants, it's amazing they go as fast as they do!

The previous article also mentioned the use of direct link servos on all control surfaces instead of the more common spades. Having flown aircraft with both, I can only say, "they each have their good and bad points!" In cruise, the servos trail their respective control surface, doing nothing to adversely effect the neutral stability of the aircraft. (We have photos of 'hands-off' formation flying in the Z-50, not something I would recommend in an aircraft with normal spades!) In the case of the ailerons, the downfall comes in the increased stick pressure required to initiate the roll. Once moving, stick forces are as light as an aircraft with spades, but the first input from neutral seems to be more. Personally, I like it. The Z-50's stick is not as light and sensitive as our Super Ultrabat was, yet it is much lighter than the Zlin 526 was. A nice middle of the

road feel, again not the feel of today's modern day acro-ships, but not bad for a nineteen year old design!

All a competition note, Z-50's have the potential of being judged poorly due to their physical characteristics. I learned this after extensive practice and viewing of video tape. It was best explained to me by a world class competitor as follows, the Z-50's tall vertical fin in combination with the low wing, make its rolls appear to barrel, especially when going vertical. Roll around the spinner, and the wing will barrel, roll around the wing, and the fuselage, extenuated by the huge cruciform tail will barrel! I'm sure glad I'm an airshow pilot that can hide this trait with smoke and pyro! However it may be a concern to consider for those of you in the competition arena.

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# LINES & ANGLES

By Mike Heuer

## IAC BOARD MEETS IN OSHKOSH

The IAC Board of Directors met at the EAA Aviation Center in Oshkosh, Wisconsin on March 5th and 6th for its spring meeting with many important topics on its agenda. A few highlights of the meeting:

\*\* IAC Treasurer Mike Heuer reported a net income of a little over \$9,000 for 1993. Our net cash position continues to grow with it standing at about \$140,000 as of January 31st. This compared to about \$125,000 a year ago and \$85,000 two years ago. The Treasurer's proposed budget was approved by the Board and projects a net income of about \$18,000 in 1994.

\*\* IAC Executive Director Iris Birdsong reported about 110 judges have certified for 1994 as of the meeting date. 22 contests were scheduled so far and advertising billings for SPORT AEROBATICS are very strong with just over \$5,200 invoiced in February. Judges Schools have been going well.

\*\* The Board voted to move on a new IAC Membership Directory once again, with the Harris Publishing Company approved as the supplier.

\*\* Plans are moving ahead to build an IAC Pavilion at the Sun 'N Fun site in Lakeland, Florida. The Board authorized up to \$60,000 for this project.

\*\* A new "managing editor" position has been created and filled by Iris Birdsong. She will be assisted by an editorial advisory board, consisting of experienced IAC members who have expertise in various technical, specialized areas. EAA will take over the design and layout of our magazine in their publishing department in Oshkosh.

\*\* The report of the Contest Director for Fond du Lac '94, Rich Stowell, was received. Rich has done

an excellent job of organizing the event well ahead of schedule. Sailplane flying will begin on Friday, August 5th, this year, to minimize conflict with the powered aerobatic competition schedule.

\*\* U.S. Nationals Contest Director Mike Heuer resigned and recommended Ben Lowell for the position in 1994. This was approved by the Board.

\*\* The Rules Committee recommendations for 1995 rules changes was adopted with only one minor change. Those proposals will be published in the near future for member comment.

\*\* The Unlimited Four Minute Free Program will no longer be counted in U.S. Team selection. This will take effect at the 1995 U.S. Nationals. A total of four flights will be flown for Team selection: Known, Free, and two Unknowns.

\*\* The next Aerobatics Hall of Fame induction will take place in 1995.

\*\* Emphasis will be placed on attracting new people to IAC in 1994. ACTION '93's principle focus was improving renewal rates and was immensely successful, under the chairmanship of Doug McConnell. IAC will turn outward this year through a program of advertising.

\*\* The One Design newsletter will no longer be published and distributed by IAC, for liability reasons. IAC will be publishing rules for the class in 1995 but does not endorse any particular design.

\*\* IAC will propose that the 1996 World Aerobatic Championships be held in the United States. A site selection committee will consist of Linda Hamner, Howie Stock, Mike Heuer, Brian Becker, and Bob Davis. Interest has already been expressed by Oklahoma City and Fond du Lac.

\*\* The Board will most likely meet on November 4, 1994 in Orlando in

conjunction with the meeting of CIVA. CIVA President Mike Heuer has proposed that this meeting be held in the U.S. but that remains to be approved by the CIVA's Bureau (executive committee).

## RICH STOWELL - SW REGION CFI OF THE YEAR

IAC's Secretary of Fond du Lac '94 Contest Director Rich Stowell was recently named as the 1993 Southwest Region Flight Instructor of the Year. The Chief Aerobatic Instructor at CP Aviation in Santa Paula, California, Rich not only teaches but writes and helps produce videos. Congratulations, Rich!

## EXTRA NEWS

In the very nice newsletter we receive from Extra Flugzeugbau GmbH, the company announced the Extra 300S had received FAA certification.

Extra also announced the development of an interesting electronic G-meter, with LED and LC displays. Price is 1,782 DM.

## AVIAT SERVICE BULLETIN IN PITTS S-1 AND S-2 AIRCRAFT

IAC recently received a copy of Aviat Service Bulletin No. 22 which deals with flop tube hose assemblies and fuel sight gauge tubes.

The bulletin calls for inspection of the flop tube due to recent problems with Aeropique hose. It also calls for inspection of the clear fuel sight gauge tubes which should be replaced if they have gotten hard and dry or discolored.

Owners of these aircraft should contact Aviat for details.

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# Going Gray

by Ron Saglimbene  
IAC #13464  
554 Lee Court  
Wyckoff, NJ 07481-1325

Coping with "G" forces during aerobatics is one area that all of us seem to pick up along the way. Usually, it becomes a concern after the first time we experience "grayout". The scenario usually involves practicing a looping maneuver and holding the positive "G" a little longer. Gradually, your field of vision begins to narrow until you are looking down a tunnel with only the area immediately in front of you clearly visible. Everything else is gray. Ease off the back pressure generally returns everything back to normal.

Once you're on the ground, you reflect on what happened and either you find someone who can teach you how to prevent it from happening again, or you might consider giving up aerobatics and joining a bowling league.

Before you start dusting off your bowling ball, the good news is that it would be pretty hard for us to get into any serious trouble considering the "G" levels we are exposed to and the time it takes to perform even the most intricate figures in the FAI Catalogue. At around +6Gz, there's generally enough time to unload before early stage grayout turns into anything more serious. The thing that will vary is the length of time it takes

before we begin to experience these symptoms. If we want to compete in anything but the most basic levels, we have to learn ways to increase our "G" tolerance and not to lose the tolerance level we have achieved.

The easiest way to increase you "G" tolerance is to practice frequently. There are many ways that your body acclimates itself to "G" exposure, but without frequent re-exposure, these reflexes will diminish rapidly. If you can practice every other day or better, your tolerance will probably max out. If your flying is limited to once a week, it's like starting from scratch. Practice frequently, if you can.

Anti "G" straining also works well. A good safe technique that works for me includes three steps. First, just before you start to pull, press your feet hard against the rudder pedals. At the same time, take a deep breath. Second, tighten your abdominal muscles like you would if you were starting to do a sit up. Third, let out a hard, long, "bronx cheer" as you are pulling through maximum "G". With a little practice, this procedure should buy you a few more seconds before the "grays".

Staying in reasonable physical shape also helps. Aerobatics is physically demanding. Anyone who is serious about

Dale Donelson of Westlake Village, California pulls his airplane to vertical near Santa Paula. CP Aviation's Super Decathlon, piloted by Rich Stowell, was used as the photo plane.

(photo by Konan Ase, Tokyo, Japan)



competing should consider some form of regular aerobic exercise. Conversely, if you're tired, or sick, or recovering from an illness (even a minor cold or flu), your "G" tolerance will be shot to hell.

It's also important to recognize that we can do things to adversely effect the "G" tolerance we have developed. There are some obvious "don'ts" that should be mentioned.

Don't eat a big meal, or hard to digest foods right before you fly. Your body will shunt blood to your stomach and away from other vital organs to digest that meal. A good rule of thumb is to allow at least an hour between a good sized meal and your flight. A snack is O.K., but you

might want to think twice about scarfing down those hamburgers or that sub before you go up to fly your sequence.

Don't allow yourself to become dehydrated. On hot days, drink LOTS of fluids! It doesn't matter what kind. Force yourself to drink. Don't rely on thirst to be your signal to drink. When the temperature is above 90 degrees, or when you're in the sun constantly (like on the judge's line), you should be drinking a minimum of two QUARTS an hour - probably more. Wear white or light colored clothes. Wear a hat. Soak your head and shirt with water. By doing this, you can cut down on the amount of sweat that your body has

to produce, and you will be a lot more comfortable.

Don't "overpractise". You will start to lose "G" tolerance after multiple flights on the same day, especially if you are pushing negative. Once you feel yourself getting "sloppy," or forgetful, call it a day.

Don't forget to fly a line between each figure. It's easy to spend too much time in a high "G" environment by combining the looping portions of two figures. Begin and end each figure on a +1"G" horizontal line. That will allow a few heartbeats of blood to make it to your brain and reset your "G" clock back to zero. This is important to remember, especially during competition when you're getting close to the border of the box and you want to get in that last figure and avoid a penalty. Sometimes, like on a hot day, it's safer to take the "out."

Don't pull positive "Gz" immediately after prolonged exposure to negative "Gz." This generally isn't a problem within a figure, but it can be. Remember that going from -4 to +4 "Gz" is the same as pulling +8"Gz." Grayout will come on faster, and your margin of safety also is less. Be sure to check out your Freestyles and especially Unknowns before you fly them.

Don't continue to pull any "Gz" once you start to experience grayout during a figure. Unload immediately. Just as the time it takes before you experience grayout can vary, the time between grayout and loss of consciousness (GLOC) can be altered by the same factors. The bottom line is that grayout never killed anyone, but GLOC has. Don't risk it.

As I said before, every figure in the Aresti catalog can be done safely without experiencing grayout. If you find yourself getting the "gray" every time you try something, you're probably doing it the wrong way. Find someone who can teach you how to do it the right way.

Going gray is something that we as aerobic pilots should avoid. When we begin to grayout, we're playing it pretty close to the edge, but we're not there yet. Think of going gray during a maneuver the same way you would think of a stall warning going off during a turn from base to final when you're landing. In both instances, knowing how to react will save your bacon. Fly safe.

## Why be a Judge?

by Ken Larson



"But other than that Mrs. Lincoln, did you enjoy the play?"

Why would anyone go to the trouble of becoming a Judge? To qualify as a Regional Judge you must have attended an approved Judges School, have served as an assistant to a grading Judge in at least 40 flights in the past 18 months, pass an oral or written examination conducted by two current Judges, and be approved by the IAC. To remain current you must pass a written exam each year and meet other minimum requirements regarding being an active, grading judge.

This qualifies you to sit on the Judges lines, which is usually out in an open field subjected to flies, mosquitoes and other varmints. The weather will vary from near freezing with 20 mph winds to over 100 degrees with no breeze. You can't be thin-skinned about criticism either, because you will be told about the

'bad judging'. There is only one person that considers the judging good and that is the winner.

But, other than that Mrs. Lincoln, I enjoy judging.

The competition pilot should remind himself that Judges make the difference between a fly-in and a contest and should be willing to serve as a Judge in other categories to make this difference possible. Also where else can a pilot learn as much about what gets the good grades and bad grades as being a part of giving them? The first step in competition should be knowing the grading criteria well.

If you are interested in competition aerobatics and enjoy coming to the contests for any reason, I encourage you get involved in the Judging Program. Not only will you enjoy it, but we do need better Judges, I haven't been winning much lately.

think that being a competition pilot necessarily qualifies a person to be a good Judge, or being a non-pilot disqualifies him, but any experience in actually flying the figures in a contest would be an asset.

There are many intangibles that make being out there on the Judge's line a pleasure, it spawns a satisfying sense of responsibility and worth. If it was not enjoyable and exciting you wouldn't see the same ones out there year after year, maintaining their qualifications and spending hundreds of dollars to be there. The pay isn't that good.

If you are interested in competition aerobatics and enjoy coming to the contests for any reason, I encourage you get involved in the Judging Program. Not only will you enjoy it, but we do need better Judges, I haven't been winning much lately.

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IAC ANNUAL BUSINESS MEETING AUGUST 2, 1993, FOND DU LAC, WISCONSIN

### OFFICERS PRESENT:

STEVE MORRIS, President  
LINDA HAMER, Vice-President  
JEAN TAYLOR, Secretary

### DIRECTORS PRESENT:

LIZA WEAVER  
LOUIE ANDREW, JR.  
CLYDE CABLE  
CLYDE CABLE  
CHRISTEN MURRAY  
BRIAN BECKER  
CLYDE CABLE

President Morris opened the meeting by introducing the officers and board members present. Board members not present were Bob Davis, Edin Harvey, Mike Heuer and Mal Oross. He then introduced the committee chairmen in attendance.

### SECRETARY'S REPORT

Jean Taylor asked for Proxies to be registered at the time. There were none registered. Jean asked for approval of the minutes of the 1992 Annual Business meeting. Brian Becker made a motion to accept them and Gerry Molidor seconded the motion. Motion passed.

### TREASURER'S REPORT

Louie Andrew gave the Treasurer's report due to the absence of Mike Heuer. The report stated that the Auditor's report was printed in the July magazine. It went on to say that as of June 30th that IAC had a net income of \$1,546.00. This compares to a budgeted net income of \$9,563.00. The report stated, "Unfortunately, the administrative expenses are running ahead of budget so that the net we have achieved so far is less than we had hoped." Mike's report said that he thought Oshkosh's income was down considerably due to the newness of the building/wearing off.

Our total assets as of June 30th, was \$370,743.00. This compares with \$28,000.00 a year ago. Much of our income results from sales and as of June 30th our net income from this area was \$15,830.00. Our total income so far for this year is \$175,522.00. This is ahead of budget even though administrative expenses ran \$99,000.00. This is compared to the \$93,000.00 budgeted. Some of the items that went over budget were legal fees, advertising production and promotion and meetings and conferences. Louie said that he had the financial statement and would be happy to answer any questions.

### PRESIDENT'S REPORT

President Morris reported that he thought the membership programs were going well. He foresees the IAC membership to grow in increased numbers due to the new programs that have been initiated. He felt the One Design program was well on its way, also.

President Morris referred to a report from the Forest Agency on a problem of Pitts canopy losses. The written report was discussed. Ken Hadden said that in

1991 an article by him was published in Sport Aerobatics on a fix for the problem. A fix that he said has saved him from losing his canopy on one occasion. The question was asked if our premiums were going to go up due to recent claims. President Morris said that he had no knowledge of that happening. A representative of the Forest Agency suggested that the pilots start making sure that something get done about it. It was suggested that the article by Ken Hadden be published again. Ken said that he thought it was the May or June of 1991.

At this time President Morris made a presentation in honor of Bill Cornick on being the tenth person to achieve his all ten award. Presentations were also made to Linda Hamer, Jean Taylor and Clyde Cable for their service on the IAC Board of Directors. President Morris said that Linda Hamer had worked well with him over the past few years and was sure she would make a fine president of IAC. He thanked Jean Taylor for being so efficient with the minutes and said that she was the best Secretary serving the Board in a long time. President Morris also thanked Clyde Cable for being a man who stuck up for what he believed.

President Morris' words were given to Fred LaCerda, Doug McConnell, Gerry Molidor, Rudy Penteado, Howie Stock and Dan Rahn, by President Morris.

### OLD BUSINESS

There were no discussions at this time.

### NEW BUSINESS

Ken Hadden asked that at this time the snaps be taken out of the Sportsman sequence and he requested that Gerry Molitor take them out of the Achievement Awards. President Morris said that they are no snaps in the 1994 sportsman sequence that will be presented to the Board for approval. There was discussion on the flap regarding snaps in the Achievement Awards.

Ken Hadden also brought up the question of using a Parallelogram for boundary judging. There was discussion on the floor and a straw vote was taken with only four people in attendance in favor.

Bill Finigan brought up the question of whether there had been a board action on using video tapes of each flight at Fond du Lac. Louis Andrew said that as of the Fond du Lac contest director this had slipped by him and he apologized for simply forgetting about it. There was much discussion on the value and purpose of video taping flights and why, if it had been a Board action, that it had not been implemented. Clyde Cable stated that the intent of video taping was for the purpose of protest in the case of hard zeros. President Morris said that the minutes were not clear on the intent and implementation of video taping.

President Morris asked for a straw poll on the video taping for the Executive

Committee to go on. Discussion followed. It was the consensus of the members present that the responsibility of video taping should be up to the pilot and that it should be allowed for the purpose of protest, with no burden of cost to IAC. It was also stated that it would be a major convenience to have the Coolest Director arrange to have a person available to the pilots so do not have to persue someone else.

President Morris went on to thank the Board of Directors for their support during his Presidency. He said that it had been exciting for him to work in this position of leadership in IAC. He said that he was proud of the programs that had been implemented during his tenure. He felt the never membership programs, the One Design airplane, and the building of enthusiasm for that sport were great improvements to IAC these last three years. He hopes to renew his flying with vigor and spend more time with his family. A strong round of applause followed.

The results of the elections were then presented to the Board of Directors and membership.

They are as follows:  
• 62 votes cast  
• 32 votes unsigned  
• 11 votes unvoted  
• 6 votes unrendable  
• 1 spoiled ballot

Votes for Treasurer  
• 699 votes for Mike Heuer  
• 461 votes for Herb Hodge

Votes for Secretary  
• 602 votes for Rich Stowell  
• 537 votes for Viva Becker

Votes for Board of Directors  
• 703 votes for Becker  
• 716 votes for Davis  
• 578 votes for Gordes  
• 757 votes for Larson  
• 685 votes for Meyer  
• 909 votes for Weaver

President Morris at this time introduced Linda Hamer as IAC's new President. The newly elected President Hamer thanked President Morris for all his hard work in helping to better IAC. She also thanked him for all of his input in the recent weeks. President Hamer went on to tell of her beginnings in IAC and of her dedication to the sport of aerobatics. She stated that the original concept of the early years of IAC had not changed. She said that it is her goal to see IAC continue to grow and prosper under her leadership. She asked for a team effort to keep IAC moving in this positive direction.

President Hamer then introduced Howie Stock as our new Vice President. At this time a motion was made and seconded to adjourn the meeting.

Respectfully submitted,  
Jean H. Taylor

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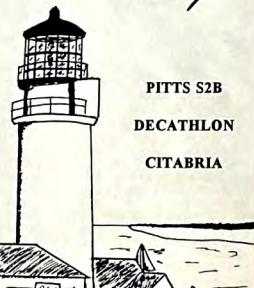
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# COMPETITION NEWS

News, Views & Contest Results from the International Aerobatic Club

**I.A.C. Chapter 38 Regional**  
June 24-27, 1993 - Paso Robles, CA - Chapter 38

BASIC		ADVANCED	
Place/Pilot	Aircraft/N-number	Total	% of Possible
1. Bill Corrick/Thousand Oaks, CA	Pitts S1B/N608BC	83.85	88.86
2. Kevin McKinney/San Jose, CA	Pitts S2A/N60CP	57.83	81.41
3. Stanley Petrie/Palo Alto, CA	Pitts S2A/N60CP	55.61	78.31
4. Larry Heard/Palo Alto, CA	Pitts S2A	27.53	38.73
<b>SPORTSMAN</b>		<b>ADVANCED</b>	
Place/Pilot	Aircraft/N-number	Total	% of Possible
1. David Vanhey/Lancaster, CA	Pitts S1B/N27235	2285.5821	82.58
2. Dave Cook/Redondo Beach, CA	CAP 10B/N800D	3270.8434	81.85
3. Devon Failey/Valley Village, CA	Pitts S2B/N260MM	2119.2855	80.60
4. Jeffrey Seauer/Saugus, CA	Pitts S2B	3179.8173	78.87
5. Stanley Petrie/Palo Alto, CA	Pitts S2A/N60CP	3033.5597	78.02
6. Marc Kranz/Passadena, CA	CAP 10B/N800D	2834.8358	74.72
7. Marc Kranz/Rancho Palos Verdes, CA	CAP 10B/N800D	2805.5789	74.31
8. Stephan Cordin/Lancaster, CA	Eagle N7729AC	2853.4801	72.31
9. Edward Schreyer/Sunnyvale, CA	Eagle N7180G	2833.4138	72.28
10. Kevin McKinney/San Jose, CA	Pitts S2A/N60CP	2188.8180	54.34
11. Michael Hanessy/San Diego, CA	Cougar N245RM	1105.7156	27.69
<b>SPORTSMAN CHEF JUDGE:</b> Roger Kaurka, Maricopa, CA; <b>SPORTSMAN JUDGES:</b> Dale Bonham, Westlake Village, CA; Maria Meyer, Quartz Hill, CA; Wayne Max, Sunrayne, CA; Marilyn Hall, Tucson, AZ; Cecilia Aragon, Berkley, CA; <b>SPORTSMAN ASSISTANT:</b> Lynn Catchell, San Jose, CA; Maurice Curran, San Luis Obispo, CA; Chris Ferguson, Sunrayne, CA; Wanda Collins, Santa Cruz, CA; Rocky Hill, MA; Janee, CA.		<b>ADVANCED CHEF JUDGE:</b> Richard Riba, El Cerrito, CA; <b>ADVANCED JUDGES:</b> Chuck Alley, Mission Hills, CA; Arlyn Cook, Alia Loma, CA; Bill Corrick, Thousand Oaks, CA; Bruce Jones, San Francisco, CA; K. B. Johnson, Westlake Village, CA; <b>ADVANCED ASSISTANT:</b> George Estes, Del Mar, CA; Steve Andrus, Aliso Viejo, CA; Steve Cummings, Cerritos, CA; Barry Baird, Tucson, AZ; Bill Branch, Orange, CA.	
<b>INTERMEDIATE</b>		<b>UNLIMITED</b>	
Place/Pilot	Aircraft/N-number	Total	% of Possible
1. Mike Mangold/Victorville, CA	Pitts S1B/N589RR	4121.2847	88.03
2. Bob Blackwell/Denver, CO	Pitts S1B/N2888H	4054.4558	85.77
3. Ken Holman/Tucson, AZ	Pitts S1B/N441Z	4088.4054	85.37
4. Dale Dossman/Westlake Village, CA	Pitts S2A/N260CP	4062.0794	85.22
5. Chris Morris/Mission Hills, CA	Pitts S2B/N260MM	4065.7388	84.98
6. Steve Baird/Tucson, AZ	Eagle N7NSMC	4048.0349	84.61
7. Steven Andrus/Aliso Viejo, CA	Pitts S1B/N260A	3894.5508	83.58
8. Eddie Shaler/Los Angeles, CA	Pitts S2B/N260A	3863.5228	83.15
9. Bill Banchero/Orange, CA	Pitts S2B/N777W	3818.0262	78.59
10. Peter Huber/Lancaster, CA	Pitts S2B/N260A	3764.2339	78.58
11. Lee Monroe/Redwood City, CA	Eagle N762CE	3758.3188	78.48
12. Lynn Catchell/San Jose, CA	Pitts S1B/N60SJ	3753.4618	78.35
13. George Estes/Del Mar, CA	Pitts S1B/N4835I	3743.1084	78.14
14. Wayne Max/Sunrayne, CA	Eagle N7181CE	3685.3355	78.03
15. Steve Cummings/Cerritos, CA	Pitts S1B/N198B	3404.8052	71.08
16. Wanda Collins/Santa Cruz, CA	Pitts S2B/N602SL	3108.0008	64.84
17. Chuck Alley/Mission Hills, CA	Pitts S2E/N105UZ	2845.4800	61.88
18. Maurice Curran/San Luis Obispo, CA	Decathlon/N132AC	2431.1063	59.75
19. Doug Jardine/Murrieta, CA	Pitts S1B/N29DZ	2181.5322	45.74
20. Ted Waterman/Cabassas, CA	Pitts S2B/N17PW	1285.7474	28.63
<b>UNLIMITED CHEF JUDGE:</b> K. B. Johnson, Westlake Village, CA; <b>UNLIMITED JUDGES:</b> Dale Branch, Ramona, CA; Clyde Cole, Berthoud, CO; Carroll Vanderzel, Grover City, CA; Roger Kaurka, Maricopa, CA; Charlie Greer, San Diego, CA; <b>UNLIMITED ASSISTANT:</b> Mike Mangold, Victorville, CA; David Shaler, Music Park, CA; Ken Kranz, Thousand Oaks, CA; Mike Davis, Cupertino, CA; Jim Newell, Burbank, CA.		<b>19th Gold Cup Regional</b> May 14-16, 1993 - Talt, CA - Chapter 49	
<b>SPORTSMAN</b>		<b>UNLIMITED</b>	
Place/Pilot	Aircraft/N-number	Total	% of Possible
1. Julie Sandman/Victorville, CA	Pitts S1B/N589RR	3387.5252	85.147
2. John Salan/Saugus, CA	Pitts S1B/N44J7	3388.140	84.440
3. Dennis Firestone/Yorba Linda, CA	Pitts S2B/N260U	3355.881	83.808



Vancouver, WA; Jess Steen, Bellingham, WA; Bryce Cannon, Seattle, WA; Richard Gies, Graham, WA; David Waudmire, Bellvue, WA; ADVANCED & UNLIMITED ASSISTANT: Tom Elshoff, Brad, DC; Greg Peas, Ballo, BC; Chris Maselot, Thousand Oaks, CA; John Alexander, Cheshire, WA; Bryce Cannon, Seattle, WA; Rocky Hill, Bellingham, CA	2. Bob Cipoll/Vermont, CT Pitts 918/K3101Q 1567.8725 \$1.00
4. Miles Merrill/Arlington, VA Pitts 918/H30RKC 1582.4308 \$0.93	5. Bill Crawford/Boston, MA Pitts 918/H30RKC 1582.4308 \$0.93
6. Cuthbert Eichborn/Arlington, MA Pitts 92A/H31ML 1582.1182 78.04	7. John Keating/Ridgefield, CT Engie/N618VT 1582.2768 78.02
8. Les Adams/Clyburn, Ont, Canada Pitts 92C/H31ML 1581.5602 78.22	9. Patrick Tipton/New York, NY Pitts 92A/H31ML 1580.5384 78.58
10. William Conrad/American, NJ Pitts 918/H30RKC 1582.5812 77.70	11. Gary Apter/American, NJ Acrostar/9150 1585.8771 77.94
12. Jeff Kenney/Tuscar, NJ Pitts 91C/H3177J 1452.2717 78.03	13. Tim Hause/Chapel Hill, NC Pitts 91C/H3177J 1451.2973 78.07
14. Jim Chauboh/Tuckerton, NJ Pitts 92A/H3202 1450.1442 78.02	15. Walt Crecco/Mahwah, NJ Pitts 92A/H31ML 1450.0578 78.00
16. Bill Wicker/Hamilton, VA Cap 21/H205X 1455.2229 78.10	17. Jim Reiter/New York, NY Pitts 92A/H31ML 1458.2302 78.78
18. Dick Avery/West Valley, UT Bucker Junger/9000J 1582.5448 54.79	19. Bruce Junger/West Valley, UT Bucker Junger/9000J 1582.5448 54.79

## Tri State Aerobatic Championship Oct. 8-10, 1993 - Montgomery, NY - Chpts 62, 61 & 64

BASIC Place/Pilot	Aircraft/N-number	Total	% of Possible	
1. Ken Fulton/Ellisville, MA Decathlon/H275M 552.2	77.75			
2. Bill Carter/Part Jersey, NY Pitts 92A/H31ML 521.8	73.38			
3. Gregory Ray/W. Bridgeport, MA Decathlon/H5081K 511.2	71.87			
4. James Gavrovska/Amherst, MA Decathlon/H5081K 507.5	71.41			
5. Ted Haertl/Berlin, MA Decathlon/H5081K 500.2	70.42			
6. William Taylor/N. Attleboro, MA Decathlon/H250M 488.2	70.14			
7. Doug Mitchell/Saint, NJ Pitts 92A/H31ML 442.4	68.72			

**INTERMEDIATE CHIEF JUDGE:** Jerry Gordes, Newburgh, NY; **INTERMEDIATE JUDGES:** Ed Scone, Miller, NJ; Lexie Crisp, Naples, FL; Ed Morris, Norwalk, MA; Jim Parker, Jeffersonville, KY; Lexie Crisp, Naples, FL; Key Palmer, Teller City, CO; **BASIC ASSISTANTS:** Russ Bel, P. Hermann, MA; Marty Walsh, MI; Kelly, KJ, Harry Holt, West Pawlett, VT; David Beekley, Wallingford, PA; Ian Andrus, Toronto, Ontario, Canada.

**ADVANCED**  
Place/Pilot Aircraft/N-number Total % of Possible

1. Anthony Parsons/Ampangale, NY Pitts 92B/H30P 1112.2082 80.11	Sabre/9102/H228X 2505.6 82.04
2. Gary Pollock/Stevens, NJ Pitts 92B/H31CF 1128.8095 84.01	Pitts 918/H30RKC 2505.6 81.70
3. Ron Barnard/Bridgeport, MA Pitts 92B/H32ZC 1127.4450 84.74	Pitts 918/H30RKC 2505.6 81.70
4. David Beekley/Wallingford, MA Engie/N221TD 1110.8865 83.48	Pitts 92A/H30P 2504.4 81.75
5. James Ward/Kröpelin, MA Decathlon/H5030E 1104.5598 83.01	Pitts 92A/H30P 2502.7 72.11
6. Craig Lashaw/Westhampton, MA Pitts 91C/H20W 1102.4779 82.88	Hans Bokke/Dartmouth, MA Pitts 918/H30RW 2104.3 87.22
7. Emory Dunn/Weymouth, MA Pitts 91C/H20M 1091.5072 82.09	Pitts 917/H4833J 1831.8 58.50
8. Dennis Fetterly/Pembroke, MA Pitts 91C/H20M 1087.4102 81.73	
9. Sheldon Agius/Newton, MA Pitts 92B/H32ZC 1087.3181 80.29	
10. Nitro Taitz/Saratoga Springs, NY Pitts 91C/H1418 1088.8472 80.15	
11. Jason Wicker/Brentwood, CA Cap 21/H205X 1052.1209 79.10	
12. Kroy Moerman/Weyland, MA Pitts 91C/H7444 1045.7198 78.42	
13. Jack Hobart/Kennebunk, ME Decathlon/H1010 1038.9832 78.12	
14. Bill Hobart/Northeast, MA Decathlon/H2508A 1037.2504 77.87	
15. Bette Roberts/Lyndhurst, NJ Laser 200/D20.1J 1028.1579 77.14	
16. Jon Anthony/Armenia, GA Decathlon/H5081K 1004.4588 75.48	
17. George Essex/Cresskill, NJ Pitts 91C/H7037K 988.8401 74.89	
18. Derek Sharrock/Nashua, NH Decathlon/H5592 977.7323 73.48	
19. Ian Aspin/Forest, Ont, Canada/Pitts 92B/H30V 958.2709 71.88	
20. Larry Barker/Melrose, MA Great Lakes/9875 957.2018 71.58	
21. Robert Mikuta/Vincentown, PA Decathlon/H18AC 922.2928 70.08	
22. Peter Dubois/Clarkson, NJ Decathlon/H2508 920.7543 68.17	
23. Timothy Petrus/Asociativa Centro, NY Pitts 92B/H32Z 920.5733 68.17	
24. Kent Manahan/Maumelle, AR Pitts 918/H3004K 818.6336 68.10	
25. Eric Crossfield/T, Hamilton, MA Decathlon/H1454C 871.2852 65.48	
26. Robert Wissack/Tiburon, CA Decathlon/H2508 868.8514 65.28	
27. Alton Hunt/Toronto, ON RANS 10-11/DAH 848.8883 63.81	
28. Dan Karakas/Toronto, Ont, Canada Pitts 92C/STBE 800.38 60.38	
29. John Morrison/Wardwell, NY Pitts/9202WL 798.9378 55.31	
30. Bruce Everett/Lansdale, PA Decathlon/H5082K 651.1238 46.85	
31. Bob McAndrew/Hawkins Square, PA Decathlon/H18AC 0.0000 0.00	

BASIC Place/Pilot	Aircraft/N-number	Total	% of Possible	
1. Walter Penn/Martinsville, VA Acrostar/UNI5815182.0285 82.40	2. David Windmill/Brooklyn, NY Pitts 92B/N271DW 1580.7630 82.29			

**INTERMEDIATE**  
Place/Pilot Aircraft/N-number Total % of Possible

1. Bob Cipoll/Vermont, CT YAK 52/H108YK 576.323 81.45	2. Tamotsu Kotchib/Kwadansoem, Japan/Pitts 92B/H3200M 547.197 77.07
3. Arne Behr/Pacific Palisades, CA Decathlon/H50 545.338 76.81	4. Charlie Denby/Coronado, CA Staruster/H73-N 443.333 82.44
5. Larry Tyson/Corona Del Mar, CA Decathlon/H50871 414.197 58.32	6. Jack Harlan/Placerville, CA Great Lakes/R5225F 207.107 41.05

**Borrego Acrofest, 1993**  
October 15-18, 1993 - Borrego Springs, CA - Chapter 36

**BASIC**  
Place/Pilot Aircraft/N-number Total % of Possible

1. Jack Roberts/Apple Valley, CA YAK 52/H108YK 576.323 81.45	2. Tamotsu Kotchib/Kwadansoem, Japan/Pitts 92B/H3200M 547.197 77.07
3. Arne Behr/Pacific Palisades, CA Decathlon/H50 545.338 76.81	4. Charlie Denby/Coronado, CA Staruster/H73-N 443.333 82.44
5. Larry Tyson/Corona Del Mar, CA Decathlon/H50871 414.197 58.32	6. Jack Harlan/Placerville, CA Great Lakes/R5225F 207.107 41.05

**INTERMEDIATE**  
Place/Pilot Aircraft/N-number Total % of Possible

1. Paul Holland/Tucson, AZ Pitts 918/H30RKC 4282.310 85.98	2. Michael Atala/Phoenix, AZ Pitts 918/H30RKC 3297.541 82.85
3. Alyson Hahn/Pacific Palisades, CA Decathlon/H50 3206.951 80.37	4. Mike Hennessy/Toronto, ON Sabre/100/NCB 3181.102 78.42
5. Marc Corcic/Pasadena, CA Cap 10B/NCB 3180.074 78.42	6. Clark Nehring/Apple Valley, CA YAK 52/H108YK 3182.870 78.43
7. Jeff Nehring/Apple Valley, CA YAK 52/H108YK 3182.870 78.43	8. Bill Jacobson/Sequoia Beach, CA Cap 10B/NCB 3183.146 78.54
9. Marc Meyer/Huntington Beach, CA Decathlon/H5085K 3057.235 78.52	10. Randy Chapman/Cypress, CA Pitts 92B/H30RKC 3058.715 78.53
11. Jake Hussey/Anaheim, CA Decathlon/H5085K 3058.715 78.53	12. George Macrae/Toronto, CA Pitts 91C/H5081 2827.378 78.70
13. Lars de Jonghe/Corona Del Mar, CA Cap 10B/NCB 3058.715 78.70	14. Luis Rodriguez/Corona Del Mar, CA Cap 10B/NCB 3058.715 78.70

**SPORTSMAN**  
Place/Pilot Aircraft/N-number Total % of Possible

1. Jack Cipoll/Buckeye, AZ Pitts 918/H30RKC 1000.000 100.00	2. Cedars Aragon/Berkery, CA Pitts 918/H30RKC 1000.000 100.00
3. Michael Atala/Phoenix, AZ Pitts 918/H30RKC 1000.000 100.00	4. Alyson Hahn/Pacific Palisades, CA Decathlon/H50 1000.000 100.00
5. Marc Corcic/Pasadena, CA Cap 10B/NCB 1000.000 100.00	6. Clark Nehring/Apple Valley, CA YAK 52/H108YK 1000.000 100.00
7. Jeff Nehring/Apple Valley, CA YAK 52/H108YK 1000.000 100.00	8. Bill Jacobson/Sequoia Beach, CA Cap 10B/NCB 1000.000 100.00
9. Marc Meyer/Huntington Beach, CA Decathlon/H5085K 1000.000 100.00	10. Randy Chapman/Cypress, CA Pitts 92B/H30RKC 1000.000 100.00
11. Jake Hussey/Anaheim, CA Decathlon/H5085K 1000.000 100.00	12. George Macrae/Toronto, CA Pitts 91C/H5081 1000.000 100.00
13. Lars de Jonghe/Corona Del Mar, CA Cap 10B/NCB 1000.000 100.00	14. Luis Rodriguez/Corona Del Mar, CA Cap 10B/NCB 1000.000 100.00

**INTERMEDIATE**  
Place/Pilot Aircraft/N-number Total % of Possible

1. Bob Blackwood/Tucson, AZ Pitts 918/H28888 4282.310 85.98	2. Dale Donelson/Westlake Village, CA Pitts 918/H28888 4284.812 88.45
3. Kim Hebard/Tucson, AZ Pitts 918/H28831 4204.348 77.85	4. Steven Andrus/Aliso Viejo, CA Pitts 918/H28831 4104.800 85.00
5. Doug Jarrett/Murrieta, CA Pitts 918/H28830 4080.988 84.87	6. Mark Kinder/Cave Creek, AZ Engie/H200RC 4011.538 83.74
7. Julie Sanderson/Victoria, BC Engie/H200RC 4011.538 83.74	8. Tim Kjellberg/Toronto, AZ Cap 21/H205X 3984.552 82.72
9. Lee Johnson/Redwood City, CA Engie/H200RC 3984.552 82.72	10. Michael Corcic/Scottsdale, AZ Cap 21/H205X 3985.265 80.385
11. Mike Chapman/Toronto, ON Cap 21/H205X 3985.265 80.385	12. Chuck Atkin/Mission Hills, CA Pitts 92B/H30RKC 3782.728 78.182
12. Kim & Racquel/Grape, CA Pitts 92B/H30RKC 3773.770 78.054	13. Brian Eikens/Lanigan, CA Pitts 92A/74700 371.824 77.875

**UNLIMITED**  
Place/Pilot Aircraft/N-number Total % of Possible

1. Matt Chapman/Kennett Square, PA Laser 200/2320MC 7324.4 82.53	2. Jim Cipoll/Tucson, AZ Starduster/H261AN 7170.8 77.03
3. James Thompson/Kingston, MA Pitts 72T/2050T 6800.4 74.77	4. Matt Kinder/Cave Creek, AZ Engie/H200RC 6800.5 76.222
5. Marlis Chapman/Alma, MI Cap 218-2/H30 6752.9 88.58	6. Kim & Racquel/Grape, CA Cap 21/H205X 6752.9 88.58
7. Mattie Younger/Sault Ste. Marie, ON Blipane/H4-S/PAW 6702.2 85.25	8. Mark Sunderman/Kenmore, WA Cap 21/H205X 6702.2 85.25
9. George Younger/Sault Ste. Marie, ON Blipane/H4-S/PAW 6702.2 85.25	10. Edna Shales/Los Angeles, CA Pitts 918/H30RKC 6681.809 78.89
11. Mike Chapman/Kennett Square, PA Laser 200/2320MC 6681.809 78.89	12. Chuck Atkin/Mission Hills, CA Pitts 92B/H30RKC 6680.782 78.195
13. Jim Cipoll/Tucson, AZ Starduster/H261AN 6680.782 78.195	14. Brian Eikens/Lanigan, CA Pitts 92A/74700 6679.753 78.041

**ADVANCED**  
Place/Pilot Aircraft/N-number Total % of Possible

1. Mike Mongaik/Victoria, BC Pitts 918/H30RKC 6400.000 100.00	2. Barry Zimmerman/Wright, CO Rabbit/H162 6401.888 100.00
3. Michael Est/Orlando, FL Laser/H200 6427.412 100.00	4. Bob Jacobson/Sequoia Beach, CA Pitts 918/H30RKC 6428.072 100.00
5. Jim Cipoll/Tucson, AZ Cap 21/H205X 6428.072 100.00	6. Kim & Racquel/Grape, CA Cap 21/H205X 6428.072 100.00
7. Kim Cipoll/Tucson, AZ Cap 21/H205X 6428.072 100.00	8. Mark Sunderman/Kenmore, WA Cap 21/H205X 6428.072 100.00
9. Kim Cipoll/Tucson, AZ Cap 21/H205X 6428.072 100.00	10. Edna Shales/Los Angeles, CA Pitts 918/H30RKC 6428.072 100.00
11. Chuck Atkin/Mission Hills, CA Pitts 92B/H30RKC 6428.072 100.00	12. Jim Cipoll/Tucson, AZ Starduster/H261AN 6428.072 100.00
12. Bob Thiesen/Ban Diego, CA Starduster/H261AN 6428.072 100.00	13. Brian Eikens/Lanigan, CA Pitts 92A/74700 6428.072 100.00
13. Bob Thiesen/Ban Diego, CA Starduster/H261AN 6428.072 100.00	14. Jim Cipoll/Tucson, AZ Starduster/H261AN 6428.072 100.00

"Patch only	ADVANCED CHIEF JUDGE: Chuck Albury, Mission Hills, CA; ADVANCED JUDGE: Bob Thiesen, Ban Diego, CA; Eddie Larue, Ken Morris, Tom Jones, Jim Parker, Chuck Albury, Mission Hills, CA; ADVANCED ASSISTANT: Mike Church, Santa Ana, CA; Steve Andrus, Aliso Viejo, CA; Bruce Larue, Ken Morris, Tom Jones, Jim Parker, Chuck Albury, Mission Hills, CA; ADVANCED CHIEF JUDGE: Chuck Albury, Mission Hills, CA; ADVANCED JUDGE: Bob Thiesen, Ban Diego, CA; Eddie Larue, Ken Morris, Tom Jones, Jim Parker, Chuck Albury, Mission Hills, CA; ADVANCED ASSISTANT: Mike Church, Santa Ana, CA; Steve Andrus, Aliso Viejo, CA; Bruce Larue, Ken Morris, Tom Jones, Jim Parker, Chuck Albury, Mission Hills, CA; ADVANCED CHIEF JUDGE: Chuck Albury, Mission Hills, CA; ADVANCED JUDGE: Bob Thiesen, Ban Diego, CA; Eddie Larue, Ken Morris, Tom Jones, Jim Parker, Chuck Albury, Mission Hills, CA; ADVANCED ASSISTANT: Mike Church, Santa Ana, CA; Steve Andrus, Aliso Viejo, CA; Bruce Larue, Ken Morris, Tom Jones, Jim Parker, Chuck Albury, Mission Hills, CA; 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ADVANCED CHIEF JUDGE: Chuck Albury, Mission Hills, CA; ADVANCED JUDGE: Bob Thiesen, Ban Diego, CA; Eddie Larue, Ken Morris, Tom Jones, Jim Parker, Chuck Albury, Mission Hills, CA; ADVANCED ASSISTANT: Mike Church, Santa Ana, CA; Steve Andrus, Aliso Viejo, CA; Bruce Larue, Ken Morris, Tom Jones, Jim Parker, Chuck Albury, Mission Hills, CA; ADVANCED CHIEF JUDGE: Chuck Albury, Mission Hills, CA; ADVANCED JUDGE: Bob Thiesen, Ban Diego, CA; Eddie Larue, Ken Morris, Tom Jones, Jim Parker, Chuck Albury, Mission Hills, CA; ADVANCED ASSISTANT: Mike Church, Santa Ana, CA; Steve Andrus, Aliso Viejo, CA; Bruce Larue, Ken Morris, Tom Jones, Jim Parker, Chuck Albury, Mission Hills, CA; ADVANCED CHIEF JUDGE: Chuck Albury, Mission Hills, CA; ADVANCED JUDGE: Bob Thiesen, Ban Diego, CA; Eddie Larue, Ken Morris,



# TOGETHER WE CAN WIN!

The team and their aircraft are ready!  
But your help is needed!

- Unlike some countries who provide financial and equipment assistance to their pilots competing in world aerobatic championships, U.S. pilots get no government support whatever.
- Each U.S. pilot is responsible not only for providing and maintaining a very sophisticated aircraft, they must also devote endless hours of practice to develop the skills required for world class competition.
- Your U.S. team needs your help! The next world competition will be held at Debrecen, Hungary, in 1994.
- Support the team. It is one of the finest ever to represent the U.S. With your help they can win.
- The U.S. Aerobatic Foundation is a non-profit organization and your contribution is tax deductible.



## AEROBATICS 1000 CLUB

For \$1,000, members receive a beautiful plaque with an autographed photo of the team, a 1994 team jacket, team patch, decals and a Friend of the Team Certificate.

## AEROBATICS 500 CLUB

For \$500, members receive the 1994 team jacket, color photo of the team, team patch, decals and a Friend of the Team Certificate.

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For \$200, members will get a team shirt, color photo of the team, a team patch, decals and a Friend of the Team Certificate.

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## LETTERS

NOTE: Do you have a comment, opinion, compliment, or complaint? Then write a letter to the Editor and we will consider it for publication here. Be sure to mark it "Letter to the Editor" as we have no way of knowing whether you intend it for publication or not.

To Whom It May Concern,

About the middle of January, I sent a questionnaire, which I thought was self-explanatory but it was not. The letter which was mailed to me by my IAC Judges as I could contact said, and I quote:

"I asked to judge in the U.S. National Aerobic Championships, would you be willing to do so, and could you spend a week at the Nationals at your own expense?" Please check one of the responses and return ASAP in the enclosed self-addressed envelope.

Thank you,  
Eoin S. Harvey  
IAC Director

The envelope was on my letterhead not IAC and the return envelope was addressed to me and not IAC. This was a survey done for my information at my expense to determine how much interest there was in judging at the Nationals. I could not answer the question as I am a committee, and from all across the country if possible. Several ideas like rotating judges have failed at the Nationals because the organizers and not the competitors have not been in favor. Surely, picking judges from broader a base across the country would not mean any objections.

I hope this clears up the misunderstanding.

Yours truly,  
E. Harvey  
524 South Tatar, Suite 4  
Pasadena, TX 77506

The President's Reply:

Apparently the confusion that resulted among the IAC Judges who were contacted arose from those that appeared to be a IAC survey. As Eoin has mentioned, this was not so. However, one additional fact should be made clear. For the past several years, when invitations have been sent out to Judges to participate at the Nationals, these invitations have been extended to ALL IAC National Judges, without exception. In addition, the IAC has invited those who can take the time and effort to attend, for which we are thankful. In addition, in 1993, ALL judges were given the opportunity to "rotate" and those who wished to do so were accommodated. However, no Judge was forced to rotate if he or she did not want to. In addition, the IAC has invited Invitations to all of its 50+ national Judges to help out at Nationals, we have done everything we can to "broaden the base" of our judging corps at Nationals.

Linda Hamer  
President  
International Aerobatic Club

Dear Mike,

I have just read the letter of Mr. Curtis Pitts that appeared in the November issue of SPORT AEROBATICS about the weight loads on my modified Pitts.

His computations and following comment are certainly right but they are based on a wrong figure of empty weight.

The empty weight was 1,024 pounds (oil

included) as indicated in the article sent to SPORT AEROBATICS. A printing error in publishing my article transformed the empty weight to 1,150 pounds giving origin to the above comment.

The airplane is now flying with a variable pitch prop at a gross aerobatic weight of 10% higher than the nominal 1,150 pounds but, owing to the remarkably high power-to-weight ratio, the actual loads on the structure are lower than the ones experienced in the original competition during years of Unlimited competition.

That poses the problems that perhaps additional landing and flying wires and the beefed up I-struts were maybe unnecessary.

In point of fact, the S-TGM team won with the Istruts and the gear fairings. I have elected on the weight as low as possible a C-G and load factors were the primary concern in the modification.

After one year of flying with the fixed pitch prop, with which the overall gross aerobatic weight was not far from the actual one of a 1,300 pounds, I have elected to go to a variable pitch prop in order to gain more vertical penetration.

The process increased, of course, the empty weight but as a side bonus it also allowed to fly smoother with lower loads which are nice for the airplane and the pilot.

With kindest personal regards,  
Giorgio Marangoni  
IAC #7500  
Milan, Italy

Dear Mike,  
Please feel free to edit and publish this letter if you wish.

I have been a member of EAA/IAC since the early seventies. I have had a V-8 powered and a twin engined and flown both in Acro for my pleasure only. I have never competed though I have been to several competitions and worked as a judge's helper a couple of times. I am probably one of many who have stayed just outside the "zone of competition". I have never been invited to the time or money or "mount" to compete. I have finally reached the point of my life where I have the time and a reasonable amount of money but, as yet, no "mount". I have never written a letter to the EAA/IAC as I have always been very happy with the competition "we" are going to produce with what we have made and the now programs that are being developed.

So much for history, on to the present. I have been watching the One Design very closely. After a thorough checkout of the aircraft at Oshkosh, I decided this would be the "mount" that would allow me to compete. I have recently moved to a new house (completely by ourselves) and are presently working feverishly on completing a workshop before winter sets in so I will be ready to go to work when the One Design is made available.

The first issue of SPORT AEROBATICS arrived with the class rules! I am one of those people that truly believe in the future of auto engines. So much in fact that I will never use an aircooled engine of any type. Restricting the One Design to a 320 Lycoming pretty much excludes me from the program.

I do not feel it would be too difficult to develop

a formula based on cubic inches or torque that would allow fair competition between air and water cooled engines. A weight penalty could also be factored in if needed. In particular case, I am looking at the 160 hp Subaru engine but it looks like there will be rotaries available in the near future also.

According to statement's appearing in SPORT AEROBATICS no one is looking for any serious amounts of One Design competitor for International competition. I am a member of the engineers at Oshkosh on alternative engines and what's already being offered. It looks to me like several engines will be here in 5 years or less.

I applaud your efforts to equalize the competition to please the public, give us a leader for International. By restricting the class to one engine and, if this class grows as much as is hoped, these 320 Lycomings will increase in cost per demand. Exactly what the One Design was designed to prevent.

Thank you for your time.

Sincerely,  
Randy C. Etchinaw  
6900 Guy Rd.  
Nashville, MI 49073

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# Roar of the Rockies

By Glenn M. Massarotti © 1992

Imagine yourself standing on the flightline at Oshkosh. Distant, on the horizon, a low rumble grows louder, and then explodes in a roar across the runway. The sound is Rocky Mountain Thunder, and it has been heard much farther away than Oshkosh. It is not, however, the sound from a thunderstorm. It's actually the roar of the Lycoming, 10-540, 360 horsepower engine in Dave Ebershoff's Skybolt, appropriately named, "Totally Awesome". This Rocky Mountain Thunder is 15 minutes of low level airshow excitement, brought to you by Dave and his airplane.

If you attended the 1992 EAA fly-in convention at Oshkosh, then you undoubtedly saw many incredible airplanes and airshow performances. But if you were fortunate enough to see the Wednesday or Thursday airshow, then you experienced a unique routine in a truly unique airplane. Dave Ebershoff thrilled the crowd with his own brand of airshow delights, which he calls "Patriobatics".

Dave began flying in 1968, training in a Cherokee 140, in White Rock, Texas. After earning his private license, he purchased a Stinson, and restored it to flying condition. Dave later moved to Colorado, but soon learned a valuable lesson about density altitude high in the Rockies. On a hot day, after a much too close encounter with a fence, Dave decided that he had to "either get more common sense or more horsepower." He opted for the latter. The Stinson was sold and Dave switched his interests to aerobatic flying.

In the Mid 1970's, Dave took ten hours of aerobatic instruction in a rented 180 horsepower Bellanca decathlon based in Boulder, Colorado. He then expanded his aerobatic skill on his own, by trial and error, as

Dave puts it, "with plenty of space between me and the ground." Shortly thereafter, Dave began renting a Great Lakes. But he wasn't satisfied with the airplanes he was flying, for several reasons. First, it's hard to perform aerobatics at such high altitudes as Colorado in a garden variety airplane, where the density altitude on a warm day can exceed 12,000 ft. Additionally, Dave had a slight comfort problem. As a former professional basketball player, he has difficulties putting his 6 ft, 8 in. frame into the standard size cockpit of most aerobatic airplanes.

If you are over 6 ft. tall, how do you find an airplane large enough to fit in, with the power needed to achieve high altitudes, and retain the capability to fly with the wheels pointing skyward? Dave's answer - build your own.

While searching for his ideal airplane, Dave considered many designs, but none seemed to meet all of his requirements. They were either too small inside, or too underpowered for the requirements of Colorado-style aerobatics. Eventually, Dave learned of an airplane designed for aerobatics, with a slightly larger pilot in mind. This was the Steen Skybolt, and shortly thereafter, he took a ride with Mr. Lamar Steen, the designer. Needless to say, Dave was impressed. A few months later, he began construction on his own Skybolt.

The Steen Skybolt resembles a Pitts Special, but on a somewhat larger scale. The first one was built in 1971 by Lamar Steen and his high school industrial arts students in Denver, Colorado. The airplane was powered by a 180 horsepower engine, and was designed to be larger than the Pitts, to accommodate a bigger pilot.

On a sadder note, Lamar Steen recently passed away. His legacy, however, remains, in all the Skybolts flying. Dave considered him a good friend and inspiration, and he will be missed.

Dave liked the Skybolt, but many modifications had to be made to fulfill his wish-list. When he would ultimately finish, the airplane would be a highly modified hybrid of the original design.

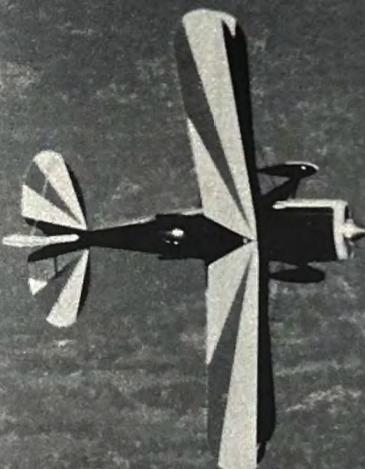
The first obstacle to overcome was the power problem. It takes a great deal of it to propel an airplane and pilot upward with significant velocity at rocky mountain altitudes. Dave located an 10-540, 300 horsepower engine, and took it to Dick Demars at Firewall Forward, in Fort Collins, Colorado. Dave speaks very highly of Dick, and credits him for boosting the engine output to 360 horsepower. Additionally, an inverted oil system was added for those extended periods when the engine would have to run upside-down.

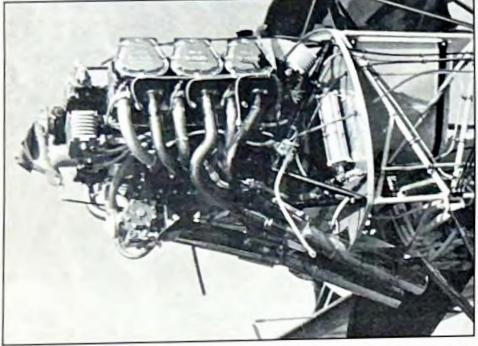
With the power problem solved, attention was focused on making the airplane suitable for Dave's large build. The Skybolt is roomier than the average aerobatic plane, he still needed more space. Consequently, the rear seat was moved aft, and set in a semi-reclining position, to help ease the effect of g-forces. Also, the rudder pedals were mounted farther forward. This provided the legroom and comfort required for aerobatic flight.

During construction of the airplane, Dave learned a hard lesson about fuel systems. He had purchased a completed, 200 horsepower Skybolt to fly while building his own. After making several modifications, Dave began flying the airplane, but it was plagued with fuel problems. These problems eventually caused the engine to quit just



Dave Ebershoff, and the appropriately named "Totally Awesome", a 360 hp Skybolt shown frolicking amid the awesome beauty of the Colorado Rockies.





Top - Ebershoff's highly modified Skybolt under construction. Fuselage structure was lightened by 30 lbs. Middle - Brute power of the 6-cylinder Lycoming IO-540, 360 HP engine handles high altitude and aerobatic maneuvers with ease. Bottom - Headed for the airport for final assembly. First flight took place September 21, 1981.



short of the airport, over an industrial complex. As Dave puts it, he "ran out of airspeed, altitude, and ideas," and landed the airplane into the side of a warehouse. Sadly, the airplane was destroyed, but Dave emerged unscathed, a true testament to the strength of the Skybolt.

After witnessing the soundness of the Skybolt firsthand, Dave wondered if some weight could be saved by re-designing the fuselage to be lighter, but still maintain a high degree of strength. His hypothesis was correct. The new design was 30 pounds lighter, and quite strong. In fact, the airplane is estimated to be capable of withstanding over 12 g's.

There were many additional modifications made to the design, including lengthening the landing gear four inches, and moving it aft on the fuselage. This helped solve a problem common to Skybolts. The airplane tends to land tail first during a three-point landing, and the larger gear corrected the ailment. Also, the cause of the fuel problems in the first Skybolt was discovered - a faulty flop tube. The tube had hardened, and didn't fall to the bottom of the fuel tank. So the fuel system was re-designed to incorporate a header tank, in place of a flop tube.

Dave refers to his airplane as a "48 Extra Long Pitts". This is because many people mistake the similar Skybolt design for the well-known Pitts Special. With a wingspan of 25 feet, and a length of 20 feet, though, the airplane is much larger than a Pitts. In fact, his Skybolt sits 7 feet, 2 inches above the runway, with the wheels still touching the ground! Dave's airplane is much like its tail.

With all the changes to the fuselage structure, as well as the larger engine and new propeller, the center of gravity changed significantly. This required moving the wings to compensate for the changes. Still other modifications included adding a canopy to the rear seat. This helped warm the chill of those cold Colorado winters.

Finally, all the building and modifying was complete. N360HP made its first flight on September 21, 1981 (note the significance of the "N" number). The modifications to the seat made it comfortable for a 6 ft., 8 in. pilot to fly. The 360 horsepower, Lycoming IO-540 engine provided him with the performance he desired, and the strength and design of the airplane made it ideal for aerobatic flight. It took over 4,000



hours and four years of work to build, but Dave finally had an airplane that satisfied all of his requirements.

Dave named his Skybolt "Totally Awesome," and for good reason. With a rate of climb of over 3,000 feet per minute at sea level, and a maximum speed over 200 miles per hour, performance exceeded all of Dave's expectations. At a modest 2,450 RPM, cruise speed is 170 MPH at 10,000 feet. Symmetrical ailerons equipped with spades give an impressive roll rate of 270 degrees per second.

The airplane has won several awards, including the Oshkosh runner-up Reserve Grand Champion Award for workmanship at the 1982 EAA convention, and the National Biplane Association Grand Champion award in 1988. Also, it placed quite well at Dayton in 1987, winning the Wright Brothers Grand Champion Award.

Dave is continually improving the airplane, and most recently, has been modifying the smoke system. Currently, the exhaust system is equipped for white smoke, and new M-18 canisters supply red smoke



Top - Ebershoff viewing the Rockies from a different perspective! For airshows he uses the term "Patriotics", and performs his routine using red and white smoke accompanied with background music such as "God Bless America" and "God Bless the U.S.A."

from the wingtips. In fact, the wing smoke ports look something like missile mounts, and are constantly the subject of many questions at airshows.

The airplane has performed quite well, with one significant problem. Dave had selected a German-made, three-bladed MT propeller. During pre-flight, he began to notice clicking sounds coming from the propeller hub. After discussing these sounds with his airshow sponsor, Aero Propeller, in Broomfield, Colorado, they suggested opening the prop for an inspection. It was found that one third of the lag bolts (10 out of 30), holding the propeller blades together, had failed. Dave credits Aero Propeller for heading off a potential disaster. With the exception of the bolts, however, the propeller has performed very well.

Dave had been competing in aerobatic contests prior to the completion of "3-6-0-Hotel-Papa," and immediately took several first place awards after beginning competition in the airplane. He won many awards in the Sportsman and Intermediate class, and took 2nd place in the Intermediate class at



At 10,000 ft. Dave's Skybolt cruises 170 mph at 2450 rpm and tops at 200 mph. Rate of climb is 3,000 ft. per minute at sea level.

Fond du Lac in the early 1980's.

With an impressive competition record, and a true champion airplane, the next logical step was airshow performing. Dave began flying airshows in 1982. He says he began exhibition flying because he likes to entertain. Dave feels his desire to perform is an extension of his athletic background as a former NBA player. He enjoys the thrill of the crowd, and the excitement of aerobatic flight. When asked how a person designs an airshow act, Dave says with a laugh, "If you dive at the ground and miss, dive at the ground and miss - do that 21 times, and you have an airshow act."

Dave doesn't try to impress an audience with death-defying feats though, instead, he prefers to be smooth and

precise, and maintain a high degree of safety in his performance. In fact, Dave is an Aerobatic Competency Evaluator (ACE) for determining a pilot's competency to fly low level aerobatics. An ACE evaluator is appointed by the FAA, and all airshow pilots are required to be evaluated annually for the renewal of their low-level aerobatic waivers.

Dave's airshow is named "Rocky Mountain Thunder." Like the airplane, it is an appropriate name. The show is intense, full of color, power, and noise. Very similar to a Colorado thunderstorm.

The term "Patriotables" is used to describe Dave's aerobatic routine because he very patriotically uses red and white smoke. Dave performs to the background of such songs as Kate Smith's version of "God Bless

America," or Lee Greenwood's "God Bless the U.S.A." As he taxis in from a performance, an American Flag appears from the cockpit, and waves in the prop blast.

Dave flies about eight to ten airshows per year, and his adventures take him to such prestigious places as the EAA convention at Oshkosh, the Dayton airshow, and Sun & Fun, in Florida. Dave feels it is quite an honor to be invited to perform at these big shows. To a featured performer it is truly a tribute to his skill and showmanship.

Most recently, Dave performed at the Grand Opening airshow at Denver's new international airport. Over 500,000 spectators viewed the September airshow. Dave's routine was spectacular as usual. Other performers at the show included the Thunderbirds, the Red Arrows, and the Snowbirds.

Dave is an active member of the International Aerobatic Club chapter 12 at Jefferson County Airport in Broomfield, Colorado, where "Totally Awesome" resides during the warmer months of the year.

As for the future, Dave plans to continue flying airshows, and competing for fun. Lately, he has been installing camera mounts on various parts of the airplane, and experimenting with aerial shots from different angles. Dave hopes to capture some spectacular and original photographs.

The next time you are at an airshow, if you see a very patriotic looking airplane displaying red and white smoke, with the music of "Old Glory" in the background, chances are it is Dave Ebershoff. As the 6-cylinder, 360-horsepower engine roars across airshow circuit, remember, that's not just any sound. That's Rocky Mountain Thunder.

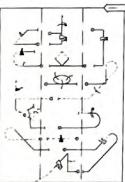
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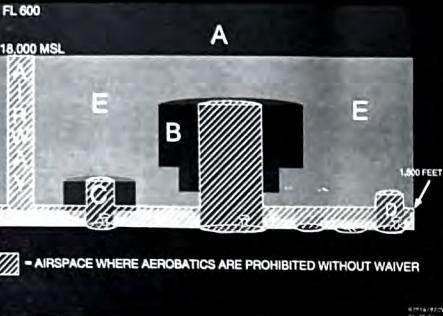


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## The New Airspace Classifications and Aerobatics

FAA recently provided IAC with the following excerpts from *FAA AVIATION NEWS* and the accompanying graphic diagram which depicts the airspace in which aerobatics cannot be performed without a waiver. These excerpts follow . . .

### AIRSPACE CORNER

**Question.** I heard that the Airspace Reclassification is going to result in a major escalation in the prohibition of aerobatics by denying aerobatics in Class E airspace. Is this true?

**Answer.** Absolutely and unequivocally NOT TRUE! In trying to ascertain how this misconception came about, we reread FAR S 91.303(c) effective September 16, 1993 and came to the conclusion that some folks are confusing "a Class E surface area designated for an airport" with Class E airspace period. Not only is there NOT an escalation, the new classes significantly increase the amount of airspace where aerobatics can be performed. For years, a major prohibition has been in control zones

which used to extend upward to 14,500 feet MSL or, in the case of Hawaii, infinity. Under airspace reclassification, FAR S 91.303(c) has been revised, and the term "control zone" has been replaced with "within the lateral boundaries of the surface areas of Class B, Class C, Class D, or class E airspace designated for an airport" discussed in the answer to the preceding question. Most of the extensions are Class E and, therefore, the operating rule becomes the 1,500 foot AGL limit, in absence of a waiver. If the extension is other than Class E, the vertical limit of the higher class and associated restriction will be as charted.

As an aside, we would like to use this forum to remind everyone that arrival extensions are established to contain instrument approach procedures to airports and are also extensions of arrival and departure paths to the airport. These areas are probably not the best place to practice that Immelmann, eight point roll, or to do spin training. Again from a safety viewpoint, while it will now be legal to perform aerobatics as low as 1,500 feet above an airport with a Class E surface area, it would certainly be prudent to determine the VFR traffic pattern altitude, and good operating practice would be to provide a vertical safety buffer between you and your fellow airmen operating in that traffic pattern. Letting others know what you are doing, via CTAF or UNICOM, is also a good idea.

What this means is that aerobatics can be performed over the top of Class B (former TCA's) which typically are 10,000 feet MSL, over the top of Class C (former ARSA's which typically are 4,000 feet AGL, over the top of Class D (former control zone with airport traffic area) which typically are 2,500 feet AGL, and over the top of Class E (former control zone at nontowered airport). Class E airspace does not have a defined vertical limit; therefore, the restriction on aerobatics would be 1,500 feet AGL [Ref: FAR 91.303(e)] in the absence of a waiver. Since only four Class B's (TCA's) exceed 10,000 feet MSL and none exceed 12,500 feet MSL, we can say that we have reduced the vertical limit of every control zone in the United States, which is another way of saying we have otherwise increased the amount of airspace that is available for aerobatics. Thanks for the opportunity to clear this up.

**Question.** What is the rule regarding aerobatics in what used to be arrival extensions to control zones?

**Answer.** The arrival extensions are controlled airspace extending upward from the surface, and they meet the definition of "within the lateral boundaries of the surface areas of Class B, Class C, Class D, or class E airspace designated for an airport" discussed in the answer to the preceding question. Most of the extensions are Class E and, therefore, the operating rule becomes the 1,500 foot AGL limit, in absence of a waiver. If the extension is other than Class E, the vertical limit of the higher class and associated restriction will be as charted.

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# HUMAN FACTORS

## G-Loads and Sport Aerobatics

### Part 2

by Fred G. DeLacerda

G-induced loss of consciousness (G-LOC) has been defined by the USAF School of Aerospace Medicine as "... a state of altered perception wherein a pilot's awareness of reality is absent as a result of sudden, critical reduction of cerebral blood circulation caused by increased G-forces." While this effect of G-load on the pilot have been researched since the days of the Schneider Cup races, the development of high performance aircraft such as the F-15 and F-16 has brought attention to G-LOC as a major factor in jet aircraft accidents. Actually, G-LOC is not new as it occurred in the Sopwith Camel at 4.5 G-loads resulting from turns of 140 foot radius at 115 mph.

With the increased performance of military aircraft, efforts have been made to improve the human tolerance for G-loads. Efforts have taken three directions; mechanical, physiological, and educational. Of the mechanical means used to improve performance, the most recent is the position of the pilot through seat-back arrangement. Various inclined seat positions are being utilized, but seat-back angles of less than 45 degrees give little G-protection. Seatback angles of 55-65 degrees do, however, provide substantial protection. Above 65 degrees there is difficulty with head position relative to visibility needed to fly the airplane. It should be noted that the position of the legs and head relative to the heart is equally important, even with 55-65 degree seatback angulation. The legs must be positioned so the heart line is as close as possible to the lungs against a partially closed glottis. This results in a noise resembling a "grunt". The straining (expiratory effort) must be maintained for 2-3 seconds followed by a breath (inspiration) of about 0.5 second so that blood is able to return to the heart. During this brief inspiration there is a rapid fall in blood pressure to the head. This strain-breath sequence must be maintained throughout the G-load.

The G-suit is another mechanical device whereby the legs and abdominal area are compressed by an air bladder system. The bladder system is activated with the onset of a G-load. The pressure of the bladders compresses the abdominal area and legs so as to reduce the vascular capacity of the lower body thereby



preventing the pooling of blood in the lower body. This increases tolerance for the onset of positive G-loads, particularly rapid G-onset.

By far the most effective technique to improve G-load tolerance has been the physiological factors associated with anti-G straining maneuvers (AGSM). The classic AGSM is the M-1, a technique where the pilot strains to force air from the lungs against a partially closed glottis. This results in a noise resembling a "grunt". The straining (expiratory effort) must be maintained for 2-3 seconds followed by a breath (inspiration) of about 0.5 second so that blood is able to return to the heart. During this brief inspiration there is a rapid fall in blood pressure to the head. This strain-breath sequence must be maintained throughout the G-load.

In the L-1 maneuver the glottis is completely closed, producing a noise much like a "grunt" as the pilot forces air from the lungs. The L-1 is found to be less irritating to the heart than the M-1. Also, it is possible to talk during the L-1, something

that is difficult with the M-1. The L-1 is usually the AGSM of choice.

The physiological basis of the M-1 and L-1 is to rapidly raise the intrathoracic pressure through forced exhalation. In both methods, concurrently with straining to expel air, the muscles of the arms, legs, and abdomen are tensed. The effort is much like straining to lift a heavy weight. Both methods are a total body effort and have a high fatigue factor. The rate and rhythm of expiration-inspiration is very important since cyclic pressurization is needed to maintain a high average blood pressure at the head. The grunt or groan-to-breath ratio is critical. A 3 second grunt or groan followed by a 0.5 breath appears to be optimal. A grunt or groan phase longer than 5 seconds results in a lowering of head level blood pressure because the increased intrathoracic pressure reduces venous return of blood to the heart. Since the intrathoracic pressure is slowly decreasing with the expiration of air in the L-1, venous return slowly takes place, but this in turn allows the blood pressure at the head level to drop. However, even with a brief inspiration time of 0.5 seconds, there is a drop in intrathoracic pressure that allows a drop in blood pressure.

In 1986, the Institute of Aviation Medicine of China presented the Qigong (Q-G) technique as an effective AGSM. The Q-G technique involves, first, having the whole body in state of readiness for G-onset. Second, with G-onset the muscles of the legs are set in tension followed by immediately tensing of the abdominal muscles. The tensing of these muscles is done in a sudden explosive manner. Third, during the G-load, rapid, shallow respiration is done at a rate of 50-70 breaths per second. This type of respiration involves moving the rib cage (thorax) and diaphragm slightly so as to create a pumping action of the rib cage.

This technique maintains a steady intrathoracic pressure so there is no drop in head level blood pressure as found with the breath phase of the M-1 and L-1. Testing has found the Q-C to be equally effective as the M-1 and L-1 in the improvement of G-tolerance.

Regardless of which AGSM is used, effectiveness depends upon correct performance of the particular technique. Traditionally, military airmen were taught the AGSM technique in a classroom environment. This educational method provided no way to test effectiveness of individual pilot technique. However, in the late 1970's, crashes of F-15 and F-16 aircraft with G-LOC being the probable cause, led to development of a high-G training program utilizing centrifuge rides.

The high-G training program was designed to give a better understanding of the physiologic mechanisms of G-stress and G-tolerance. The primary focus was to increase G-tolerance by improving skill in performing an AGSM. This was done by

centrifuge rides. The goal was to achieve a rapid-onset (6 G per second) to a 9-G level for a total run of 15 seconds. A simulated air combat ride consisted of an 8-second run with G-level at 3-G or higher, including 9-G peaks of 10 seconds.

At this point it is appropriate to consider the position of sport aerobatics relative to G-environment and G-tolerance training. As with the military, sport aerobatic airplanes are being flown with a G-stress level far in excess of human capability. Mechanically, a few sport aerobatic airplanes have the pilot seatback inclined to improve tolerance, but a G-suit mechanism does not exist. This means the sport aerobatic pilot must rely solely on the AGSM for G-tolerance; however, as was pointed out in the previous article (G-Loads and Sport Aerobatics, Part 1), the G-environment for the sport aerobatic pilot differs significantly from the air combat maneuvering of the military pilot.

Without the G-suit the aerobatic pilot cannot achieve the same level

of tolerance obtained by the military pilot. A correct AGSM technique can increase G-tolerance about 4 G, but a G-suit can add 4.5 G to this level. In addition, the G-loads for the aerobatic pilot vary between positive and negative within a very small time frame. A G-suit does not improve negative G-tolerance. Also, while the positive G-onset is usually less for the aerobatic pilot, there is no G-suit to assist the pilot in reacting to a rapid onset.

In view of these differences, there is reason to question if the AGSM techniques used by the military pilot are appropriate for the aerobatic pilot. Furthermore, since the aerobatic pilot learns AGSM by means of "trickle down" information and has no formal training program to develop effective G-tolerance, it is imperative that a "grass root" investigation on the subject be explored to see what the sport aerobatic pilot is doing to increase G-tolerance. That is the subject of the third article in this series on G-loads and sport aerobatics.

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# The Acid Mesh Problem Revisited



By Allen R. Silver,  
FAA Master Parachute Rigger & Examiner  
Chair of PIA Rigging Committee

Remember when all you heard about was acidic mesh? Some of you are new and may not know what I'm talking about, but a few years ago almost every parachute owner knew about acidic mesh.

Many of you may know me from the parachute safety articles I've written for your magazine. I was recently elected to chair the Parachute Industry Associations (PIA) Rigging Committee. The PIA represents most of the parachute industry in this country as well as many foreign companies. One thing the Rigging Committee tries to do is keep on top of any parachute or rigging problems that if left unattended could cause you potential problems. One such problem was acidic mesh, first discovered in late 1986. Over the next two to three years several factory service bulletins and FAA AD's were issued to correct this problem and I'm happy to say it has been very successful. The PIA has asked me to do a follow-up article on the problem.

It's been several months since any pilot has brought me a parachute to recertify because the factory service bulletin or one of the FAA AD's had not been complied with. Is that a good sign that the problem has been corrected? For the most part I feel that is very true. But the big question is whether it is still a problem? The answer to that is a resounding YES. If you have purchased the latest state of the art emergency parachute manufactured from one of the many reputable companies after January 1989 you will not have a problem with acidic mesh. All the major companies by that time had stopped using acidic mesh in the construction of their parachutes. The real problem now lies in the unsuspecting buyer who unwittingly purchases a used parachute manufactured prior to that date without having it first checked out by a

licensed parachute rigger, who has the facilities, equipment and the knowledge to positively tell you if the parachute is airyworth.

In March 1993 at a PIA meeting

in Orlando, Florida I closed out the subcommittee on the acid mesh problem. I felt the situation had been adequately addressed through the many recertification programs and through educational programs such as the articles that were published for you and your parachute rigger on how to deal with the problem.

But, I must remind you that there are probably hundreds of parachutes still out there that were set aside in a closet awaiting some future unsuspecting pilot to resurrect it not knowing the good deal they are about to purchase could be a time bomb waiting to explode on opening. The potential time bombs are still out there, so buyer beware. It's amazing, but I still have 1 or 2 people contact me a year saying they didn't know there were AD's or factory service bulletins on their parachute. For the most part they're people new to the sport. Quite often when I look at the parachutes packing data card it will tell me the paracuthe was last packed prior to all the service bulletins or AD's.

Maybe now is a good time to back-track for a bit and explain what acidic mesh is. Mesh is a material that covers the large steering openings in the back of your parachute and also dampens its oscillation. Some of this mesh was treated with a retardant, which was acidic, to meet manufacturing fire codes before it went into the construction of windows in tents. The remainder of the manufactured mesh was not treated. It actually worked out to about 65% of the mesh was treated with an acidic fire retardant and the remainder was untreated or non-acidic. Parachute manufacturers ordered X numbers of yards of this mesh to cover the openings of the parachutes they manufactured. What they didn't know at the time was when they purchased the mesh they had a 65% chance of getting acidic mesh because no one at the time knew it came in two flavors, but the industry soon learned. It was discovered that under certain conditions this acidic mesh would cause catastrophic failure of the parachute fabric that touched the mesh. I personally believe that even though acidic mesh is not desirable it had to have a catalyst to complete the material breakdown process. I feel that certain lots of parachute material that touched the acidic mesh over a period of time was the catalyst that led to the failure of the parachute material. I also believe that neither one on their own cause the problem, but when combined-look-out.

Acidic mesh had been unknowingly used in parachute construction for years—why the problem now? You see not all parachute material is the same when it arrives at the manufacturer. I'll try to make this simple by saying all (of the same type) of parachute material is basically woven the same way, but from the weaver it goes to a finishing mill. Here is where I feel the problem started. Let's say you and I own a finishing mill and my mill wants a different finish to my material than you do. So, what do I do? I add my own secret ingredients to achieve the desired results. Unbeknownst to me when my parachute material came into contact with the acidic mesh sewn into a parachute manufactured by company Z is caused that material to deteriorate over time. This may be over-simplifying the problem, and it's not proven, but that's how I see it.

Out of this came many good checks and balances. This translates

into better quality control measures, better communications between all parachute manufacturers and a much safer product for you. And, the elimination of the use of acidic mesh in parachute construction. For the most part the problem seemed to center around parachutes manufactured by G.Q. Security Parachute Co., which was out of business and unavailable for comment. But, all the other major players were affected and did not wait for the FAA to issue AD's. They voluntarily came out with service bulletins so people like you and I knew what to do and how to do it. Out of this also came an accurate means to non-destructively tensile test parachute fabric, especially adjacent to the mesh.

When I started monitoring this program for PIA I soon noticed trend. Virtually 100% of G.Q. Security parachutes that had failed the fabric pull tests had acidic mesh and were manufactured between December 1981 and July 1982. Does that mean if your parachute was manufactured before or after those dates you don't have to worry? Not at all. The FAA AD's or factory service bulletins covered ALL acidic mesh used in parachute construction. The purpose was to rid your parachute forever of the chemical fire retardant used to coat the mesh and to have the adjacent fabric that touched the mesh tensile tested for strength, before returning the parachute to you with a clean bill of health.

The 40 lb. non-destructive pull test was established and developed by PIA for this purpose. I've had canopies rip with as little as 2-3 lbs. On the average they burst about 20 lbs. The fabric pull test is important,

## ABOUT THE AUTHOR

Allen Silver owns and operates Silver Parachute Sales & Service, a Parachute Loft, in the San Francisco Bay Area. He has been an FAA Master Rigger since 1974 and in 1991 was designated as a Parachute Rigger Examiner, for the FAA.

The majority of Allen's business is devoted to providing in depth and personal parachute service to aero- and glider pilots. Soon Allen will expand his business to include the manufacture and repair of aircraft seatbelts, all with FAA approval.

He is one of the largest dealers nationwide for the Softie line of emergency parachutes by Paraphernalia, Inc. Giving lectures and safety seminars to interested groups about parachutes and emergency procedures is a service Allen enjoys and provides at no cost other than travel expenses.

Allen retired after 25 years of service with the California Air National Guard. Eighteen of those years were

spent as a survival equipment technician. This background has been beneficial in obtaining his current contracts with NASA and other aerospace companies requiring services for sophisticated and specialized parachute systems.

He has over 32 years experience and 250 plus jumps as a sport and professional skydiver. For three seasons he performed a wingwalking/skydiving routine at airshows throughout the Western United States. After retiring from wingwalking Allen hopes to remain on the airshow circuit as an airshow announcer.

Please call or write if you have questions or parachute needs. Allen is usually available Monday-Friday, 8 a.m.-4 p.m. (PST) and will be happy to help if possible.

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because you cannot see the material problem with your eye. The pull tests were the deciding factor whether you could go on to remove the acidic chemicals from the mesh, if they were present. Obviously if your parachute failed the pull tests it was to be removed from service and marked as unserviceable. If it passed the pull tests and the acidic coating had been properly removed I've never seen the problem reappear.

You must also keep in mind what

I've been describing to you applies to acidic mesh and not to a parachute that has been weakened from other sources, such as excessive UV exposure or other forms of contamination. It's very important you find a qualified parachute rigger, that you feel comfortable with, to work on your parachute.

The bottom line is, if your parachute was properly maintained and had been recertified for the acidic mesh problem by someone qualified to do so, it should be airworthy. As

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with all service bulletins or AD's there was paperwork. Once the work was accomplished it had to be annotated on the packing data card (the maintenance record for your parachute) and on the parachute fabric near the identification panel. There were only a handful of riggers or parachute lots that were authorized by the FAA or the manufacturers to recertify your expensive cushion. If, for some reason, you have not had the work done make sure someone qualified does the work.

Don't take chances. If you are not sure what has been done to your parachute I extend an invitation for you to call or write me. Educating you to survive an emergency bailout begins before you put on your parachute. You must know and have confidence that your parachute is airworthy. You must know and trust the person servicing your parachute. Finally, You and no one else is responsible for making sure the parachute that you or your passenger wears is airworthy.

I urge you to constantly review your emergency procedures. Have a preflight and postflight emergency checklist. Just having a certified parachute on may not be enough to save your life, if you don't have a clue as to how to use it. I offer free safety seminars for you and your organization and encourage you to call me for details at (510) 785-7070 Monday thru Friday from 8:00 a.m. to 4:00 p.m. (PST). Thank You and Blue Skies . . .

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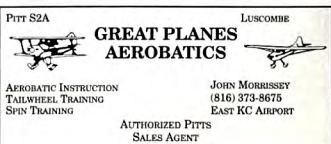
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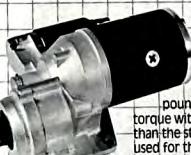
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## CALENDAR OF EVENTS

### U.S. CONTESTS

- MARCH 18-20, 1994 - EDNA, TX** - Sponsored by Chapter 25. Basic and Sportsman only. For information contact Contest Director Eoin Hirschman, PHONE: 713/472-1000.
- APRIL 1-3, 1994 - SEBRING, FL - Pompano Air Center** Sponsored by Chapter 23. Five category, Basic through Unlimited. For information contact Sue Besarick, PHONE: 305/943-6059.
- APRIL 7-9, 1994 - PHOENIX, AZ - Goodyear Air Park, Copper State Aerobatic Championship** Sponsored by Chapter 69. Four category. For information contact Curt Langenhorst, PHONE: 602/963-6420.
- APRIL 22-24, 1994 - EDNA, TX - East Texas Regional** Sponsored by Chapter 25. Four category. For information contact Contest Director Debbie Rihm, PHONE: 713/471-1675.
- APRIL 22-24, 1994 - BORREGO SPRINGS, CA - San Diego Marshalls** Sponsored by Chapter 36. Two categories, Basic and Sportsman. Practice and registration open on the 21st and 22nd until 11:00 a.m. Flying starts promptly at Noon on Friday. Early hotel reservations are a must. For information contact George Eaton, PHONE: 619/755-5042.
- MAY 5-8, 1994 - TAFT, CA - Bob Herendren Memorial Aerobatic Contest** Sponsored by Chapter 49. Five category. For information contact Contest Director Sandra Bullock, PHONE: 310/675-9679(h) or 310/297-1400(w).
- MAY 13-14, 1994 - WARRENTON, VA - Mobil East Coast Aerobatics Championships** - Contest is sponsored by Chapter 11. Basic through Unlimited. For information contact Miles Merritt, PHONE: 703/280-2829.
- MAY 14, 1994 - CHICAGO, IL - C. J. MacDonald Sportsman Only Contest** -
- May 20-22, 1994 - EPHRATA, WA - Apple Cup** Sponsored by Chapter 67. Five category. Registration and practice May 18-19. For information contact Phil DeTurck, PHONE: 206/321-6199.
- MAY 20-22, 1994 - ORANGE, MA - New England Aerobatic Contest** Sponsored by Chapter 35. Five category. Practice and registration on Friday, May 20. For information contact Contest Director Craig Leesnek, PHONE: 508/384-2975.
- MAY 22-29, 1994 - MEMPHIS, TN - Rebel Regional Contest** - Covington Airport. Sponsored by Chapter 27. Basic, Sportsman and Unlimited. For information contact Contest Director Darrin Ray. For information contact Dave Hirschman, PHONE: 800/444-6397 (o) or 901/278-1468 (h).
- MAY 27-29, 1994 - LONGMONT, CO - Rocky Mountain Region - Vande Berg Airport** Sponsored by Chapter 24. Basic through Unlimited. For information contact Contest Director Mike Jones, PHONE: 303/221-4150 (day) or 303/493-7507 (evening).
- MAY 28-29, 1994 - KEYSTONE HEIGHTS, FL - North Florida Aerobatic Championship** Sponsored by Chapters 63 and 90. Five category, Basic through Unlimited. For practice, box opens on May 22; registration begins on May 27. For information contact John Frazee, PHONE: 305/780-8698, or Ellen Dean, PHONE: 904/23-8631.
- JUNE 3-5, 1994 - MARYTOWN, PA - Pennsylvania Aerobatic Championship** Sponsored by Chapter 55. Five category. For information contact Contest Director, Dick Schauss at 717/548-9010 (o) or 717/944-9139 (h) or Larry Bashore at 717/233-8711 (o) or 717/766-3705 (h).
- JUNE 3-5, 1994 - STILLWATER, OK - 10th category contest** sponsored by IAC Chapter 9. For information contact Gerry Molitor, PHONE: 815/344-9239. (Rain date Sunday, May 15.)
- JUNE 10-12, 1994 - SALEM, IL - Salem Leavenworth Aerobatic Category contest** sponsored by Chapter 61. For information contact Mick Coleman, RR#2, Box 2413, Farmington, MO 63648. PHONE: 314/431-3327.
- JUNE 17-19, 1994 - COLUMBUS, OH - Bolton Airport 214, Red Roof Inns Ohio Aerobatic Open** Sponsored by Chapter 34. Practice and registration Thursday, June 16. Advanced, Unlimited begin flying on Friday, June 17 at noon. Contest ends at 2 p.m. Sunday, June 19. For information contact Contest Director Bill Clark, PHONE: 614/855-5685, or Asst. Contest Director Brian Howard, PHONE: 513/434-7393.
- JUNE 24-25, 1994 - MCKINNEY, TX - Chapter 24 - Basic through Unlimited** Contest. Director Daryle Dugay. For information contact Daryle Dugay, PHONE: 214/522-1274.
- JUNE 25-26, 1994 - PASO ROBLES, CA - Paso Robles Regional Aerobatic Contest** Sponsored by Chapter 38. Five category. For information contact Tom Myers, PHONE: 415/208-4444.
- JUNE 25-26, 1994 - CHICAGO, IL - Robert L. Heuer Classic 5-Category Contest** - Howell-New Lenox Airport. Sponsored by Chapter 1. Registration Friday, June 24, 1994. For information contact Gerry Molitor, PHONE: 815/344-9239.
- JULY 2-3, 1994 - MARLETTE, MI - Chapter 88** Sponsored by Chapter 88. Five category. Practice Friday July 1. Make your hotel reservations early. For information contact Contest Director Bill Clark, PHONE: 313/971-9522.
- JULY 8-10, 1994 - BURLINGTON, WI - Great Lakes Regional Contest** Five category. Sponsored by Chapter 8. Practice and

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**JULY 22-24, 1994 - ALLERTON, IL, MN** - Sponsored by Chapter 75. Five category contest. Registration is July 22; the airport and aerobatic box will be open for practice Monday through Friday, July 18 to 22. Contest Directors James Taylor and Phil Shauct. For information call 612/884-1809.

**AUGUST 8-12, 1994 - FOND DU LAC, WI** - IAC Championship - Registration August 6 and 7. Five category plus U.S. National Glider Aerobatic Championships. For information contact Contest Director, Rich Stowell PHONE 608/255-2037.

**AUGUST 22-21, 1994 - BILL CITY, MI** - Sponsored by Chapter 11. Five categories. Practice on Friday, August 19. Make your hotel reservations early. For information contact Contest Director Bill Clark, PHONE 313/971-9522.

**AUGUST 27-28, 1994 - SITE TO BE ANNOUNCED** - Sponsored by Chapter 11. Sponsored by Chapter 11. Registration is Friday, August 26, 1994. For information contact Gerry Molder, PHONE 815/344-3239.

**SEPTEMBER 2-4, 1994 - EDNA, TX** - Gulf Coast Contest - Sponsored by Chapter 25. Four category. For information contact Contest Director, Dan Clark, PHONE 713/596-5592.

**SEPTEMBER 3-5, 1994 - DELANO, CA** - Sponsored by Chapter 26. Basic through Unlimited. "World's Best Marked Box" Registration and practice. Friday, September 2, 1994. For information contact Contest Director Wes Seidwitz, PHONE 805/764-5717 (evenings) or 805/332-7985.

**SEPTEMBER 9-10, 1994 - LAWRENCE, KS** - Sponsored by Chapter 27. Basic through Unlimited. "World's Best Marked Box" Registration and practice. Friday, September 9, 1994. For information contact Contest Director Jim Barrett, PHONE: 913/883-2750.

**SEPTEMBER 26-30, 1994 - DENISON, TX** - Unlimited Aerobatic Championships. Grayson County Airport. Sponsored by Grayson County Airport. For information contact Contest Director, Ben Lowell, PHONE, 303/449-5291.

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## JUDGES SCHOOLS

**MARCH 5, 1994 - MEMPHIS, TN** - Sponsored by Chapter 27. For more information, contact Contest Director, Hirschman, PHONE 901/529-5874 (o) 901/278-1466 (h) instructor Herb Hodge.

**MARCH 5-6, 1994 - POUGHKEEPSIE, NY** - Dutchess County Airport Pilot's Lounge Sponsored by Chapter 52. For more information contact Fred Robinson, Lane Highway, 12528, PHONE 914/255-2168 (day) or 914/892-4429 (evening), or Russell Hunt, PHONE 914/331-6709 (day) or 914/892-4429 (evening). Instructor: Jim Gordan.

**MARCH 10-11, 1994 - PORTLAND, OR** - Sponsored by Chapter 77. For information contact Ralph Riddell, 17317-1 S E 18th Street, Vancouver, WA 98684. Instructor, Alan Geiger.

**MARCH 18-19, 1994 - LAS VEGAS, NV** - Sponsored by Chapter 77. For information contact Woody Woods, PHONE 702/254-1100. Instructor, Steve Morris.

**OCTOBER 7-9, 1994 - WEST HAMPTON, NY** - Northeastern Aerobatic Championship. Sponsored by Chapter 91. Five category. Flyby begins at 1:00 p.m. on Friday, October 7 with the Advanced, Advanced and Unlimited. For information contact Contest Director John Cornwell, PHONE: 212/493-6952 (o) or 516/423-2799 (h), or Jim Riher, PHONE: 212/736-3131 (o) or 516/553-8345 (h).

**OCTOBER 22, 1994 - EL RENO, OK** - El Reno Aerobatic Oval Dust Devil Sportsman and Basic Contest. Sponsored by Chapter 59. For information contact Contest Director Drew Stephens, PHONE 405/943-5657.

**MARCH 19-20, 1994 - TUCCSON, AZ** - Tequila Cup Regional Aerobatic Contest Sponsored by Chapter 62. Sportsman through Unlimited. Raindate March 3, flying November 4-5. Raindate November 6. For information contact Contest Director Marylann Holland, PHONE 602/887-9399.

**MARCH 26-27, 1994 - RICHMOND, VA** - Sponsored by Chapter 7. Airport Inn. For information contact Jim Stansy, PHONE 804/746-3573.

**APRIL 9-10, 1994 - LITCHFIELD, IL** - Sponsored by Chapter 61. For information contact Paul Rickman, PHONE 314/298-2537 or 314/713-1500 (g). Instructor: Cliff Morris.

**APRIL 16-17, 1994 - KANSAS CITY, KS** - Sponsored by Chapter 15. For information contact Lynn Wendl, 7509 Conser, Overland Park, KS 66204. PHONE: 913/295-5504. Instructor: Jim Stansy.

**APRIL 21-22, 1994 - BORREGO SPRINGS, CA** - Sponsored by Chapter 36. For more information contact George Eaton, PHONE 619/555-5042. Clyde Cable.

**APRIL 30 - MAY 1, 1994 - HOWELL, MI** - Sponsored by Chapter 34. Howell Municipal Airport (3ME) Contact Virginia Jacobson, PHONE 313/363-3807 (n), 920 Mant Drive, White Lake, MI 48386.

## INTERNATIONAL CONTESTS

**APRIL 14, 1994 - GRIFFITH N S W, AUSTRALIA** - Five categories. Basic through Unlimited. For information contact Liz Cook, 23 Tasker Avenue, Campsie 2194, PHONE (H) 61 2 7892836 (W) 61 2 215 6494 (F) 61 2 215 6497.

**APRIL 21-22, 1994 - LAS VEGAS, NV** - Sponsored by Chapter 77. For information contact Woody Woods, PHONE 702/254-1100. Instructor, Steve Morris.

**MARCH 12-13, 1994 - COLUMBUS, OH** - Sponsored by Chapter 34. Bolton Flying Service, Bolton Field Airport. Contact Ken Hadden, PHONE: 614/885-5685. Instructor, Clyde Cable.

**MARCH 19-20, 1994 - BUFFALO, MN** - Sponsored by Chapter 78. For more information contact Tim Layson, 5200 Winnika Avenue, New Hope, MN 55428. Instructor: Herb Hodge.

**MARCH 19-20, 1994 - NORWOOD, MA** - Best Wing Competition. Sponsored by Chapter 35. For information contact Philip Strauss, PHONE 617/769-1218 or Ed Morse, PHONE: 617/762-5920. Instructor: Ray Rose.

**MARCH 26-27, 1994 - RICHMOND, VA** - Sponsored by Chapter 7. Airport Inn. For information contact Jim Stansy, PHONE 804/746-3573.

**APRIL 9-10, 1994 - LITCHFIELD, IL** - Sponsored by Chapter 61. For information contact Paul Rickman, PHONE 314/298-2537 or 314/713-1500 (g). Instructor: Cliff Morris.

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# IAC Achievement Awards

Achievement Awards issued January 18, 1994, through February 6, 1994.

## BASIC SMOOTH:

#814 Randolph Savedge, Surry, VA  
#815 Jeff Shaw, Tempe, AZ

## SPORTSMAN SMOOTH:

#339 Randolph Savedge, Surry, VA  
#640 Jeff Shaw, Tempe, AZ

## INTERMEDIATE SMOOTH:

#356 Jeff Shaw, Tempe, AZ

## ADVANCED SMOOTH:

NONE

## UNLIMITED SMOOTH:

NONE

## BASIC WITH STARS:

NONE

## SPORTSMAN WITH STARS:

#1109 William D. Daunt, Norton, MA

## INTERMEDIATE WITH STARS:

NONE

## ADVANCED WITH STARS:

NONE

## UNLIMITED WITH STARS:

NONE

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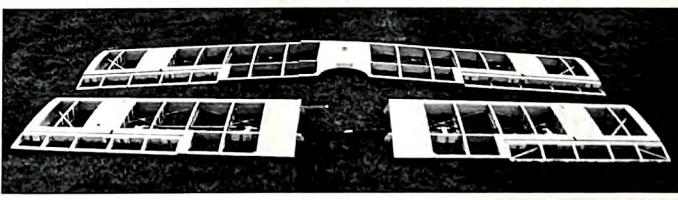
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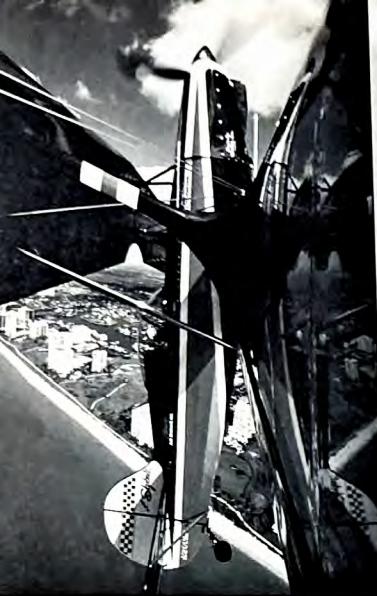
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# HAMMERHEADS

by Ron Sigmundsen

It's too cold to fly. Winter is officially here. Now is the time for armchair aerobatics. This is the first in a series of articles on aerobatic maneuvers and, with luck, this will be a continuing section in our publication. Different pilots will lend their experience on how to do basic to advanced maneuvers.

I'll kick it off with a discussion of the hammerhead, principally because I like to do them.

The maneuver can be broken down into the entry, the vertical upline, the yaw turn, the vertical downline and the recovery to level flight.

The maneuver is initiated with a 1/4 loop up a vertical attitude. The vertical up line (and back down after the turn around) is maintained by sighting along the trailing edge of the wings and keeping them the same distance from the horizon on both sides of the aircraft. Once this relationship is established, you can look off the left wing (the one you're going to turn to) in order to maintain attitude.

The heart of this maneuver is the

yaw turn. It can be taught to most pilots in a few minutes, but, it takes hours of practice to master.

Starting from the vertical upline, at full power and with rapidly decaying speed, the question is when to use rudder. It can't be done too soon or the airplane will have too much airspeed and fly over the top, like a wingover. If well executed, only 1/4 of the wingspan should define the distance between the fuselage and the vertical up line and the down line after the turn. For this to happen, minimal forward air-speed is needed when the rudder is used.

As airspeed bleeds off on the vertical upline, the torque at full power will tend to roll the airplane to the left. This has to be compensated for by gradual application of right aileron pressure. Also, forward stick pressure is increased to maintain the vertical line. If too much airspeed is lost, the ailerons will not compensate for the rolling tendency.

There are some clues that tell you when the airspeed is where you

want it. You can feel it in your butt. The vibration of the fuselage changes. Ever been in a helicopter? There is a distinct feel that, with practice, will get you within about five miles per hour of your target speed.

Aileron deflection is another clue, the amount of right aileron needed to counteract torque is related to airspeed, in a Pitts, the deflection is 1-1/2" to 2" In other aircraft it might be a different number, but, it will be consistent.

Now the turn. Left rudder is applied briskly, not kicked. Give it a chance to bite. Push it to the stop.

As the airplane begins to yaw, right aileron pressure must be increased to compensate for the extra lift generated by the outside wing and by the prop. These forces increase quickly and the aileron movement must be fast to compensate. In a Pitts S-1 the aileron must be used almost simultaneously with the rudder or the airplane will "torque off" (roll in its own wake).

As the nose of the airplane passes through the horizontal the wings should be perfectly vertical. Look down the low wing, pick a point straight down and fly the nose to that point with small changes of elevator and aileron. Just before the fuselage is vertical, push the opposite rudder to stop the turn. The lead on this push just takes practice.

If you find yourself unable to prevent rolling over on your back during the turn, reduce power. That will stop the roll. At any time, if you feel like you're losing control during the turn, pull the power, neutralize the rudder and let go or neutralize the stick. You will blow the maneuver, but recover without problem.

In a really well done hammerhead, the power is maintained throughout the turn. The fine balance between torque, airspeed and control inputs is what has to be practiced.

The vertical down line is accomplished by keeping the nose of your aircraft directly on the point on the ground you're aiming for. If you find yourself coming out of the seat, you're going negative. Conversely, if you feel yourself on the seat, you're positive. If you are going perfectly vertical there will be no "g" forces acting on the pilot until the pull to level. Also, take your time. Don't pull too soon or the down line will be too short. Wait a good three seconds after the turn before you begin the 1/4 loop to level flight.

More armchair aerobatics next month.

## CLASSIFIEDS

Ads in the "Classifieds" section have a minimum charge - \$8.00 Regular type - 50c. ALL CAPS - 55¢ per word. **Bold Face** - 60¢ per word. ALL **BOLD CAPS** - 65¢ per word. Rate covers one insertion per issue. **TERMS:** Payment in advance of insertion (with order) in U.S. funds. For ad deadlines and order placements see "Display Ads" box in this issue.

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