

AUGUST 2007

SPORT *Aerobatics*

OFFICIAL MAGAZINE OF THE INTERNATIONAL AEROBATIC CLUB

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Flying the Classic Loop • The Votec 351 • RV Aerobatics

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THE COVER

Mike Goulian pilots his one-of-a-kind Extra 300SHP.

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Publisher: Vicki Cruse
Executive Director: Lisa Popp
Editor: Scott Westover
Art Director: Phil Norton
Dir. of Publications: David Hipschman
Managing Editor: Kathleen Witman
Copy Editor: Colleen Walsh

Contributing Authors:

Vicki Cruse • Alex Land
Mike Goulian • Ron Rapp
Allen Silver • Rich Stowell

IAC Correspondence

International Aerobatic Club
P.O. Box 3086
Oshkosh, WI 54903-3086
Tel: 920.426.6574 • Fax: 920.426.6560
E-mail: editorial@iac.org

Advertising Director

Katrina Bradshaw
Tel: 920.426.6836
E-mail: kbradshaw@eaa.org

Representatives:

Northeast: Allen Murray
Tel: 856.229.7180 Fax: 856.229.7258
E-mail: allenmurray@mindspring.com
Southeast: Chester Baumgartner
Tel: 727.532.4640 Fax: 727.532.4630
E-mail: cbaum111@mindspring.com
Central: Todd Reese
Tel: 800.444.9932 Fax: 816.741.6458
E-mail: todd@spc-mag.com
Mountain & Pacific: John Gibson
Tel: 916.784.9593 Fax: 510.217.3796
E-mail: johngibson@spc-mag.com
Europe: Willi Tacke
Tel: 498969340213 FAX: 498969340214
E-mail: willi@flying-pages.com

Mailing: Change of address, lost or damaged magazines, back issues.
EAA-IAC Membership Services
Tel: 800.843.3612 Fax: 920.426.6761
E-mail: membership@eaa.org

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Judson Bartlett

LETTER from the EDITOR

by Scott Westover

The Door is Open

Working on a magazine changes the way a person thinks about time. For example, as I write this "Letter From the Editor" I have just confirmed my flights for EAA AirVenture Oshkosh 2007. Meanwhile, when you read this article AirVenture will be over and summer will be starting the cool-down into fall. The good news is that many of you have an extra spring in your step having reconnected with old friends while making new ones in Wisconsin.

One of the things I am most excited about as I finalize my plans for AirVenture is the people watching. It truly is a spectacle. Pilots, aviation enthusiasts, and the generally curious all crowd into Oshkosh to mingle with thousands of airplanes and hundreds-of-thousands of other people who are doing the same thing. The spectators are as unique as the aircraft, yet we have all made the trip for the same reason: to be a part of the aviation community. When we walk through that gate we are welcomed by the realization that there is room for everyone in our temporary city.

The same spirit of diversity that keeps aviation strong is what strengthens aerobatics. We have rich characters that make up our sport, and there is room for everyone in our privileged community. This issue of *Sport Aerobatics* reflects our diversity. The Extra 300SHP on the cover, built for and piloted by Mike Goulian, represents the leading edge of aerobatic performance. After its debut at Oshkosh in 2006, this airplane has wowed crowds at Red Bull Air Races and air shows around the world. Just a few pages

away, Ron Rapp introduces us to the world of aerobatics in RVs. He asserts that RV builders and pilots, many of whom are recreational aerobatic pilots, are a group that we should be making welcome in our club. Everyone agrees that the lesson learned at AirVenture, that there is room for everyone under the aviation tent, applies to the International Aerobic Club. But inclusion does not just happen. Sometimes we have to walk over to the door, show people that it is open, and invite them in. Ron proposes that we do just that, and I believe he is on to something. Finally, Rich Stowell bridges the gap between the fire-breathing reputation of the Extra 300SHP and sleeker RV aerobatics by flying us through the proper technique to perform a loop in an RV-7.

It would be impossible to overstate the importance of reflecting the diversity of our organization through this magazine. Competition must be balanced with recreation, and elite high-performance dream machines need to share space with attainable trainers. Of course, the common elements are always safety and education.

We are part of something special. For a week out of the year, aviation gets to be the center of attention in the United States when Wittman Regional Airport becomes the busiest airport in the world. If we take that enthusiasm with us when we leave, maybe we can grow our organization by being inclusive. After all, that's how most of us discovered our g-addiction. Someone held open the door and invited us inside. Fly safely! ☺

***Sport Aerobatics* is your magazine. To submit news, comments, articles, or article ideas, please send them to:
IAC, P.O. Box 3086, Oshkosh, WI 54903-3086; or email them to tookyflyer@tds.net.**



PRESIDENT'S PAGE

by Vicki Cruse • IAC 22968
E-mail: vcruse@earthlink.net

It's Time to Get Involved

By Lisa Popp, IAC Executive Director

As I author this column as a stand-in for our esteemed President Vicki Cruse (who is in Spain competing for the gold at the World Aerobatic Championships as I write this), I am reminded that all of the great work Vicki does for this organization is done as a volunteer.

Then my thoughts turn to the many volunteers throughout this organization who help me administer the IAC's daily activities...the IAC board of directors, the committee chairmen who help me administer IAC's programs, chapter officers, contest directors, contest volunteers, special event volunteers, and many more. I stand in awe at their passion, involvement, and commitment to this sport of aerobatics. Each has a full-time professional career and a family to spend quality time with, and yet they all find countless hours in their days to help out. You are all on a pedestal in my eyes!

We've all heard the clichés. "It takes teamwork." "Together everyone achieves more." However, from this chair, I can honestly tell you the IAC stands as a shining example of volunteerism at its finest and teamwork at its optimum. Each and every one of you who is involved in this organization is an essential piece to its success. It is the combined strengths and skills from your professional careers and your personal love of aviation that you share with others that make IAC what it is today.

Speaking of clichés, here's another one for you: "Learn something new every day." In this position, I can honestly say I do learn something new *every day*. I am amazed at the aviation knowledge and flying skills of our members. The IAC is fortunate to have within its membership some of the most talented and highly skilled aviators in the world. Recently, I've had discussions with EAA and the IAC board about our vision for the

can be used to cope with many emergency situations and to get out of unusual attitudes. It is this information that we need to share with all aviators. Perhaps in the process, they might also experience more freedom in their flying as a result.

We've started this process through how-to articles in the magazine, and we also intend to transfer that knowledge to our website and future educational programming. Our goal is for all aviation enthusiasts...for all our members...to find value in the IAC, to be involved. Not to sit on the sidelines. We have allowed our members who don't fly competition, and who haven't found a home within a local chapter, to sit on the sidelines of this sport for far too long.

Perhaps you can remember from your childhood that if you were involved in some activity outside of just attending class, whether it was sports, forensics, the debate club, band, or chess, you got more out of your school experience by being involved. We'd like to see everyone involved in the IAC. To those of you leading the charge through your involvement, I offer my sincere thanks. To those of you who have not yet gotten off the bench, I urge you to come join us. If you've been away for a while, rediscover us. Share your knowledge! Each and every one of you is an essential piece of the IAC. *Get involved and help make us even better!*

*"I can honestly tell
you the IAC stands
as a shining example
of volunteerism
at its finest."*

future of the IAC. Our goal as an organization, as I see it, should be to share the knowledge and information each and every one of us holds so that in the end we all benefit.

We've been closed-mouthed about what we know for far too long. As an aerobatic pilot, you know that the techniques you've learned to manipulate your aircraft to fly aerobatics

NEWSBRIEFS

Bob Stark Named Contest Director for '07 U.S. National Aerobatic Championships

As a competitor since 1991, Bob Stark has flown in more than 50 IAC-sanctioned contests including seven times at the U.S. Nationals. He flew his first contest in what was at that time known as Basic. He continued competing in Sportsman for two years before moving up to Intermediate. In 1997, Bob began flying Advanced in a Pitts S-1S and quickly upgraded to the Giles G-202, which he continues to fly today. In 1999 Bob flew at the World Aerobatic Championships in the Czech Republic. In 2002 and 2003 he flew to a second-place finish at the U.S. Nationals before winning the Advanced category in 2004.

"With all of this contest flying, I had several opportunities to officiate at many of the contests," Bob said in a recent interview about the contest director appointment. "I became a regional judge about the same time that I started flying Intermediate, and a couple years ago I became a national judge. I have served as a chief judge at many contests across the United States including the Sportsman category at the Nationals last year."

In 2002, Bob served as an assistant contest director, assisting Phil Knight for the World Aerobatic Championships held in Lakeland, Florida. Bob added, "It is with great pride that I accepted the challenge of being the CD for the U.S. Nationals this year. I have a few plans which I believe will make the contest more interesting as well as plans for some fun events which should make this a memorable experience for all who attend. I look forward to seeing many good friends."

Rich Stowell Videos Available on DVD



Master Instructor Rich Stowell (IAC 10841), a specialist in spin and emergency maneuver training techniques for 20 years, has recently made his critically acclaimed Pilot's Video Guide series available on four DVDs. Titles include *Getting Ready for Spins, Aerobatics & Other Unusual Attitudes*, *Stall/Spin Awareness*, *Emergency Maneuver Training*, and *Basic Aerobatics*. Program run times vary from 33 minutes up to 90 minutes depending on the title.

According to flight instructor Mariellen Couppee, who created the main menus for the DVDs, "Although the excellent information contained in Rich's videos is timeless, the medium needed to be updated. Pilots now have the flexibility to navigate directly to topics of interest using their desktop computer, laptop, or DVD player."

The four DVD titles can be purchased separately, as a set, or in combination with Stowell's companion books, *Stall/Spin Awareness* and *Emergency Maneuver Training*. The DVDs are available through the IAC at www.IAC.org.

'Keep It Flying' Offers the Ride of a Lifetime



EAA's "Keep It Flying" B-17 Tour will be coming to a town near you this fall. The tour brings the beautifully restored B-17 Flying Fortress *Aluminum Overcast* to a local airport for flight experiences and walk-through tours. Out of more than 12,000 that were built, this aircraft is one of a handful of airworthy B-17s still flying. EAA invites you to reserve a seat for a flight aboard this rare WWII bomber and experience "the ride of a lifetime."

Tour stops include:

August 14-15, Elmira, NY
Elmira/Corning Regional Airport

August 17-19, Lawrence, MA
Lawrence Municipal Airport

August 21-22, Oxford, CT
Waterbury-Oxford Airport

August 24-26, Caldwell, NJ
Essex County Airport

August 28-29, Trenton, NJ
Trenton Mercer Airport

Pre-booked flights cost \$359 for EAA members and \$399 for nonmembers. Reservations can be made by calling 800-359-6217 or by visiting www.B17.org.

Longer Parachute Repacks on the Horizon

Silver Parachute Sales & Service is spearheading an effort to extend the repack cycle of emergency parachutes from 120 days to 180 days. A notice of proposed rulemaking (NPRM) regarding the 180-day repack has just gone out for public comment. All pilots who use emergency parachutes are encouraged to comment on this NPRM.

Two years ago Allen Silver and Darin Silver, working on behalf of the Parachute Industry Association and the United States Parachute Association, petitioned for an exemption to the 120-day repack cycle. "We're discovering that the newer parachute materials perform better when handled less frequently," says Allen Sil-

ver, a master rigger with more than 40 years' experience. "Right now, 25 other countries safely use repack cycles of 180 days or longer."

Comments regarding this NPRM [identified by Docket Number FAA-2005-21829] may be sent using any of the following methods:

The DOT Docket website, <http://DMS.DOT.gov> (follow the instructions for sending comments electronically)

Fax at 202-493-2251

Mail: Docket Management Facility, U.S. Department of Transportation, 1200 New Jersey Ave., S.E., West Building, Ground Floor, Room W12-140, Washington, D.C. 20590-0001.

For additional information on the

proposal to extend the parachute repack cycle, contact Allen Silver at 510-785-7070 or visit www.SilverParachutes.com.



Master rigger Alan Silver in his workshop.

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A black and white photograph of a white Extra EA300/LP aircraft in flight, viewed from a low angle. The aircraft is performing a maneuver, with its wings tilted and a visible wake below. It is set against a backdrop of a dense forest and a road.

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Don't miss out on the EA300/LP and other exciting Extra Aircraft models at OSHKOSH in the Main Aircraft Display, 94-95!

The Votec 351

Built in Switzerland by a family with a passion for airplanes

Vicki Cruse and Thomas Skamiljic

MSW Aviation



With the 24th World Aerobatic Championships coming up (which will be in the history books when you read this), I was looking for options other than shipping my Edge to Spain for the competition. I decided to explore the possibility of finding another airplane based in Europe. This led me to MSW Aviation in Wohlen, Switzerland, located slightly northwest of Zurich, and the Votec 322 and 351. Although I ultimately accepted the generous offer to fly Chandy Clanton's Edge in the World Aerobatic Championships, the experience of being checked out in the Votec is one worth sharing.

I knew of the Votec through an introduction by Klaus Savier of Light Speed Engineering, the manufacturer of the electronic ignition system used in the planes. Klaus had visited Max Vogelsang, the designer, and had been given a ride in the two-place Votec 322. Klaus made the introduction, and in early April, I found myself on the way to Switzerland to fly the prototype single-place airplane that had its first flight in September 2006. I was picked up at the Zurich airport by Max's daughter, Susanne, at about 7:30 a.m. on Easter Sunday. We drove to Wohlen, where I met Max and his wife, Margaret, and was shown where I'd be staying for the next five days.

Later that afternoon, we went out to the airport, about 10 minutes from the Vogelsangs' house and business (the residence is above the business). Since it was Easter Sunday, many people were out at the airport. Birrfeld is a small, nontowered airport with two parallel runways, one paved and the other grass, the latter being used



The "351" in Votec 351 stands for 350 horsepower and 1 seat.

mainly by gliders and towplanes. Runway 08 is 2,000 feet long (Runway 26 is 2,250 feet long with an additional overrun) and 65 feet wide. The taxiway is about 20 feet wide.

The First Tour by Air

That afternoon I was introduced to Markus Ruesch, another Votec pilot (and friend of the family), Urs Vogelsang (Susanne's brother), and other friends of the family who came out to the airport. Since I was fighting jet lag by now, Max thought it might be good for me to go up in the two-place with Urs so he could show me the local practice areas. I took the front seat and off we went. On takeoff to the east, you must fly out past the next village and turn south between this village and the next, for noise abatement. Heading south Urs pointed out two places where I could practice, which were essentially forests between villages or farm fields. We continued south-southwest and located two more spots. Then he showed me the cooling tower for the nuclear plant as a landmark and another smokestack along the river. I was to fly north on the west side of the smokestack and river and then turn west back to the airport. If that sounds complicated to you, imagine how it sounded to me after making a long trip and flying an unfamiliar airplane. I was lost.

The next day, the Monday after Easter, we headed out to the airport late in the morning. It was a holiday in Switzerland, and even more people were at the airport, including many glider pilots and transient pilots making the most of a beautiful

day for flying. This was the day I was to be checked out in the two-place Votec 322 by Max. Prior to the flight we went over what he expected for pattern work, speeds, and altitudes. The pattern work here is much the same as in the United States, but the Swiss have a circle in the middle of the traffic pattern that is much like the traffic circle used throughout Europe. When you enter the pattern you enter the traffic circle and fly around it in a left turn until there is adequate spacing behind the next airplane to land. There is no extended downwind due to noise. Also, rpm on the downwind is no more than 2000, also to minimize noise. The prop is returned to full rpm on the base leg after a reduction in power. I found the final approach here to be very long by my standards, and the normal procedure is a slip to land, something I never practice.

After about six touch-and-goes (something I have not done in ages), I was approved to fly the plane from the back seat. After my flight with Max, I went up with Urs, with whom I flew the day before, and we went to all the various practice areas nearby and made sure I could find my way home. There are no section lines per se, but there is a river I could follow back to the west side of the airport if I got lost. This was a huge fear of mine, more so than the landings. I was not able to find the airport from the practice areas, though I tried to ingrain the landmarks in my memory. The fear of getting lost in foreign Class B airspace was slightly higher than the one of flying someone else's plane, neither of which I liked.





The 350-hp IO-580 engine delivers an impressive climb rate.

Flying the 351

I was let loose in the single-place Votec 351 that afternoon. The airplane has electric rudder pedals, and they actually came far enough aft for me to comfortably use, which is unusual for most aerobatic airplanes and a welcome surprise. Susanne uses a booster seat of sorts that moves her forward about 6 inches at the shoulders (less at the bottom), but does not raise her up in the seat. Despite being a little taller than me, her seat worked fine. The 351 does not have an adjustable seat. The seat is molded into the airplane, and you use pads to adjust your height and forward position. Future models will have a slightly taller canopy to accommodate taller pilots. Obviously this was not an issue for me.

The throttle, mixture, and prop are all on the left side panel and within easy reach. The instruments used English system measurements including the moving-map GPS, a German-made flat-screen electronic flight instrument system called FlyData that provides altitude and height above the ground information in feet. Markus thought this would help me get back to the airport if I got lost. He was partially right, but he assumed that I could find the airport on the map.

The workmanship on the airplane is incredible, the lines are clean, and the level of detail is exactly what you'd expect from a family-run oper-

ation in which almost all of the family members fly the airplane. Serious thought went into the construction and assembly of the plane to the point where the carbon-fiber fuselage shell that extends from the firewall to the vertical stabilizer is removable in less than 20 minutes, instrument panel included. Once removed, full access is available to the entire interior of the plane.

The start-up and run-up procedures were exactly what you'd expect from a Lycoming with the Light Speed dual electronic ignition, and the electronic ignition selection again shows the level of detail that went into this airplane. The 351 has plenty of power and is off the runway in short order. Due to noise abatement, the prop must be pulled back just after full power is applied. Aerobatics are not allowed over villages, and the closest practice area was about five minutes away. I took this time to look over all the engine instruments just to make sure everything was running well, and I also started making small stick movements to get used to the feel of the controls.

Aerobatics in Switzerland

Aerobic flight is not allowed before 10 a.m. The Vogelsangs are allowed one 10-minute flight per day over the airport, as long as there are no gliders flying. This flight takes place only when approved by the airport manager, and we were allowed two slots

in five days for this, with Susanne taking one and the other was not used. In the airport office, there is a sectional on which the aerobatic practice areas are located. Each practice area has a number. There are about 13 of them within varying distances from the airport. There are no marked boxes anywhere. When going out to fly aerobatics, you place a magnet over the number of the areas where you will fly so other pilots know you are there. You do not practice more than one sequence in an area, and when you are finished you move to another.

On this first flight, I flew out to area 4 and used it to try out the feel of the elevator by pulling vertical. The 351 has a shorter overall throw of the stick, and the elevator is about twice as sensitive as my Edge (my Edge has been modified to have a shorter stick throw, which makes my elevator heavier than an unmodified Edge). I realized this might be a problem for me with snaps, but I was quickly able to adapt to it, and the shorter overall movement for snaps was quite easy. I then tried some aileron rolls. Not thinking, I went after the first one like I was flying the Edge, except I pulled the nose up slightly before the roll to the left. I gave it full aileron and it went around very quickly (420 degrees per second according to MSW), but at the stop the oscillation was totally unexpected, and I hit my head on the side of the canopy. Note to self: Don't use full aileron deflection when flying any aerobatic airplane for the first time. Get the feel first, then try it.

With my five minutes or so up, I moved to aerobatic practice area 9 and tried some basic aerobatic maneuvers such as half-Cubans. I also went up to the top of the practice area, just under the Zurich Class B airspace and tried a few spins. Nothing unusual there, and the hammerheads were okay, too. Then it was time to head back and hunt for the airport.

On the ground, the instrument panel on the 351 leaves the pilot blind for any forward view, and S-turning is a must as is the case with all taildraggers. The wing is lower than on the Edge, and forward visibility out each side is much better. There is a Lexan panel in the floor for taking a peek at the contest box

marked on the ground. Landing was easy, and the plane is responsive on the ground, just as expected.

I flew two more flights in the airplane before a mechanical issue grounded it the last day I was there. By the end of the third flight I was able to spot the airport from the practice areas and find my way home. During these flights I attempted to fly the Unlimited Known without the outside snaps and did the same with my Freestyle. I was quickly able to get used to the snaps, particularly the shorter stick movement for the elevator, which I found quite nice. I did not attempt any outside snaps except for one on top of a loop, as my negative *g* tolerance was not where I would have liked it to be. I was never able to fully adapt to the ailerons. Work is currently underway to find just the right balance between stick forces and centering of the ailerons.



Vicki Cruse

The Votec 322 is the two-place precursor to the 351 and allows pilots to receive dual instruction and a check out.

An Unlimited-Capable Airplane Is Born

With a 350-hp Lycoming IO-580 up front, the power of the airplane is more than enough for Unlimited. Most aerobatic aircraft have things they do well and some things they could do better. As with most airplanes, there is always a compromise. For instance, when you have to do a

competition figure such as a P-loop up with many elements on the vertical line followed by a snap at the top of the loop where the plane is slow, the Edge is challenged, and the Sukhoi, with its ability to power through figures at slow speed, has an advantage. Using this example, I think the Votec will be able to fly at the slow speed

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better than the Edge but not as good as the Sukhoi. I do not think there is any plane better than a Sukhoi at flying maneuvers at very slow speed. It is literally a tractor in the sky.

On the other hand the Edge can accelerate much quicker off a slow line, and the Sukhoi takes more time to get up to the same speed. Again, the Votec 351 is somewhere in between, which is a good compromise. The Votec wing allows for acceleration on a downline to be more like a Sukhoi. It does not accelerate as quickly, which allows more time on the line for snaps, where the Edge requires the pilot to either pull power back or snap earlier on the line.

Switzerland afforded a great opportunity to try something new and increased my appreciation for our freedom to fly in the United States. Avgas was about \$2 per liter, which translates to about \$7.56 per gallon, and the landing fee was just under \$9 per landing. More than one person approached me about the rumors regarding user fees in the United States. Their advice was to fight it as best we can, because they know firsthand what happens when user fees are implemented.

A flight plan must be filed for each flight. Though not a flight plan under air traffic control, a flight plan with the airport office serves to keep track of who is flying and the landing fees, and to make sure the airplane returns when scheduled. Hangar space

comes at a premium, and airplanes are winched above others due to lack of hangar space and the resulting high cost. It isn't unusual for planes to be stacked in a hangar, causing pilots to move several others to get theirs out, repack the hangar, go fly, and do it all over again upon their return.

Birrfeld is a quaint little airport where many types of airplanes are flown including Cessnas, Bücker, Diamonds, and even a Glasair. It was like the United States in many ways, including the flight schools, many types of airplanes, and a love for aviation. The airport restaurant was a hubbub of activity every day, with people sitting outside watching the airplanes come and go. It seems ironic that the same community is unwilling to accept the noise away from the airport. I probably generated more complaints in four days of flying than they had all winter. No doubt the airport office staff was happy to see me leave.

Many thanks to the Vogelsangs for the generous offer to fly their single-place airplane. As time goes by, Unlimited pilots are finding themselves with fewer and fewer airplanes able to meet the requirements of flying in the category. The days of Unlimited being dominated by Edges, Sukhois, or CAPs are nearing their end, as none of these airplanes are being built today. Thanks to people like the Vogelsangs, there is hope for a continuation of the pinnacle in aerobatic competition.

The Evolution of Performance

The Votec has come a long way since being introduced to IAC members through *Sport Aerobatics* in January 2005. For those of you who may be wondering, "351" stands for 350 horses and 1 seat. The main reason why Max decided to design and build the 351 was that he wanted to apply aerodynamic and structural improvements to the 322 design.

Structurally the 351 and the 322 are the same. They both have a steel tube frame fuselage with a wing made of wood and covered with composites. However, all the weight associated with the second seat and the second set of controls has been removed in the 351, resulting in a weight loss of 50 kg (about 110 pounds). The engine is a Lycoming IO-580 that was heavily modified by Monty Barrett (increased compression ratio, modified cylinders, and a cold air induction system). A Light Speed electronic ignition system was added to the engine, resulting in about 10 percent more power. The engine drives a three-blade Mühlbauer MTV9 propeller that produces 570 kg (about 1,279 pounds) of thrust. With an empty weight of 580 kg and maximum takeoff weight of 850 kg (about 1,874 pounds), you can figure out the thrust to weight ratio easily when you are in that aircraft with just enough fuel for your freestyle program.

The wing of the 351 is the same as the one on the 322 (wood, symmetrical 16 percent profile, no dihedral, zero angle of incidence, tested to 23g, and very docile slow speed handling), and the full-span ailerons are pushrod operated. Maximum deflection of the ailerons was increased by 4 degrees to +/-30 degrees. The roll rate increased to 420 degrees per second.

On the Votec 322 a one-piece landing gear made sure that every landing is a safe one. After more than 3,300 landings on the demonstrator a small hairline crack developed. Although this crack did not compromise the structural integrity of the landing gear in any way, MSW Aviation decided that this would be improved. The new landing gear is made of two separate legs for improved damping.

So How Does It Fly?

As Vicki shared, and backed up by the experience of Max and Urs Vogelsang (designated Votec 351 test pilots), all these small changes put together make a huge difference in performance and handling. The aircraft has been flown to a top speed of 270 mph without any flutter. Over the

course of test flights the climb rates have been consistently more than 5,000 fpm, and throttling back to 75 percent power your cruise speed will be 210 mph. With full power and a 70-degree nose-up attitude you can fly turns without losing altitude or falling to one or the other side. At slow speed the Votec 351 is docile

and stall speed is 65 mph.

For more information on the Votec 322 and 351, check out www.MSWaviation.com. And if you are a proud owner of a Votec 322, all improvements of the 351 are fully compatible with your airplane, and there are already some 322s being upgraded to 351 standards. 



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finding something **Extra**

By Mike Goulian

Editor's Note: Last year at EAA AirVenture Oshkosh, Mike Goulian and Walter Extra met at the IAC pavilion and introduced Mike's new airplane, the Extra 300SHP. The design was based on the reliable Extra 300S, which debuted in 1992. This new aircraft was clearly the "next generation," and as Mike and Walter addressed the crowd, everyone wondered how Walter Extra had managed to cajole more magic out of his design team in Dinslaken, Germany. One thing was certain. Mike Goulian would require a purpose-built machine that could take his performance to the next level.

In advance of the event, Extra Aircraft issued a press release that read, in part:

"Extra Aircraft collaborated with U.S. Aerobatic Champion and top airshow performer Michael Goulian late last year to create a 'next generation' aircraft. The goal was to showcase the capabilities of the leading-edge manufacturer and to push the performance envelope to new heights...To achieve the large performance increase desired, we had to refine every last item in the aircraft with the intent of lightening the plane without sacrificing the strength of the machine..."

To the casual observer the 300SHP could be confused with its 300S cousin at first glance. Upon closer inspection, the sleeker canopy and stylized cowling and tail distinguish this one-of-a-kind aircraft. The final product is also lighter, more maneuverable, and breathes fire, powered by one of Lycoming's first Thunderbolt engines.

A year later, we caught up with Mike and asked him about the 300SHP now that he has some time in the cockpit performing for crowds all over the world. The following article was written by Mike between Red Bull Air Race events. True to his reputation, he made time for our members and eagerly shared his experience. **-SW**

Mike Goulian helped Extra Aircraft redefine performance when building his Extra 300SHP.

Designing an airplane for an unlimited imagination

Like most of us in the IAC, I am always looking for ways to improve my flying and keep my motivation high. In addition to the incredible people, flying beautiful high-performance aerobatic aircraft has always been a large part of the attraction to this sport for me.

After spending seven seasons and more than 800 hours in my Castrol Aviator CAP 232, I was looking for a change of scenery out of the windscreens. If I could transition to a new aircraft with even more performance than the CAP while keeping its legendary flying qualities, I was all for it.

In addition to the many hours of instruction we do every year, our family business, Executive Flyers Aviation, sells new Extra and Cessna aircraft. This gives me the opportunity to communicate with Walter Extra and the Extra factory in Germany on a regular basis. While talking with Walter at Sun 'n Fun and AirVenture during 2005, it was clear that we both had a desire to push the performance envelope with a new aircraft design.

In November 2005, I traveled to Germany to meet with Walter and his design team to give some input to their new single-seat design. Our meeting was very productive, and the design staff and engineers at Extra were great to work with. Even though I know little about technical aircraft design, the guys made me feel right at home.

Our goal was simple: Take the best performance and controllability traits from today's current single-seat aerobatic aircraft and mold them into the new Extra. In other words,



The Extra 300SHP combines the best traits found in today's single seat aerobatic airplanes into one Unlimited machine.

we wanted to keep the control harmony and robust structure of the Extra while incorporating the high power-to-weight ratio of the Edge 540, the amazing snap roll capabilities of the Sukhoi, and the tumbling prowess of the CAP 232. How hard could that be?

In short, the new Castrol Aviator Extra 300SHP was delivered to me in June 2006, and we accomplished

our mission. The final design incorporates a lot of new technology to achieve this goal. Just looking at the 300SHP gives some clues to the differences, but the changes are much more than "skin deep." For example, to reduce the overall weight and mass of the airframe, Extra refined the process for constructing the composite parts, which include the cowling, landing gear, wheel pants,



Mikesphoto Inc.

"The result of all of this work has produced a new single-seat design from Extra that puts the aircraft squarely in the category of world-class Unlimited aircraft."

new tail also has a much sharper radius so it will pitch easier and therefore tumble more efficiently. The center of gravity has been moved back to almost 28 percent MAC (mean aerodynamic chord) in the aerobatic configuration, which adds to the overall control capabilities of the aircraft.

On the inside, the aircraft does not have anything unnecessary for aerobatic flight permanently installed. We have done away with electric rudder pedals, panel-mounted GPS, autopilots, gyros, and other options available to the less weight-restricted Extra owner. Another unique feature of the 300SHP is the beautiful carbon-fiber torque tubes that are installed in the aircraft. They are incredibly strong, but what's most impressive about them is how much they weigh, which is nothing!

The last piece of this puzzle was to obtain an engine that would produce huge amounts of horsepower while retaining safety margins and reliability. We looked no further than the Lycoming factory's new Thunderbolt custom engine shop. Lycoming provided us with the first Lycoming Thunderbolt AEIO-580 engine, which produces a "very real" 347 hp at 2750 rpm. The Thunderbolt family of engines from Lycoming comes from many hours of development and testing on the Reno racers of Mike Jones and Jon Sharp. The cylinders and pistons for the AEIO-580 are specially built for Lycoming to increase the safety margin in this

11-to-1 compression engine. Each engine is custom built, balanced to extreme tolerances, and designed to perform at the maximum level. To protect this enormous powerplant, we use the latest piston engine oil formulation from Castrol. Castrol Aviator AD100 straight weight oil is an advanced formulation that exhibits some of the highest heat and rust protection of any aviation oil produced today.

The result of all of this work has produced a new single-seat design from Extra that puts the aircraft squarely in the category of world-class Unlimited aircraft. The power-to-weight ratio makes the vertical performance nothing short of incredible, and the snap roll and tumbling capabilities are clearly on par with the design specifications of today's elite Unlimited fliers.

Although this machine is not intended for the casual aerobatic pilot, the 300SHP is a performance animal that clearly maintains its lineage as an Extra, and that means balanced control feedback, predictable recovery, and structural integrity. I feel at home in it. And the more I fly it, the more that Walter's understanding of design impresses me. 

To keep track of Mike Goulian and to view the schedule that will tell you where you can see the Extra 300SHP in action, visit www.MikeGoulian.com. Information on Extra Aircraft is available at www.ExtraAircraft.com.

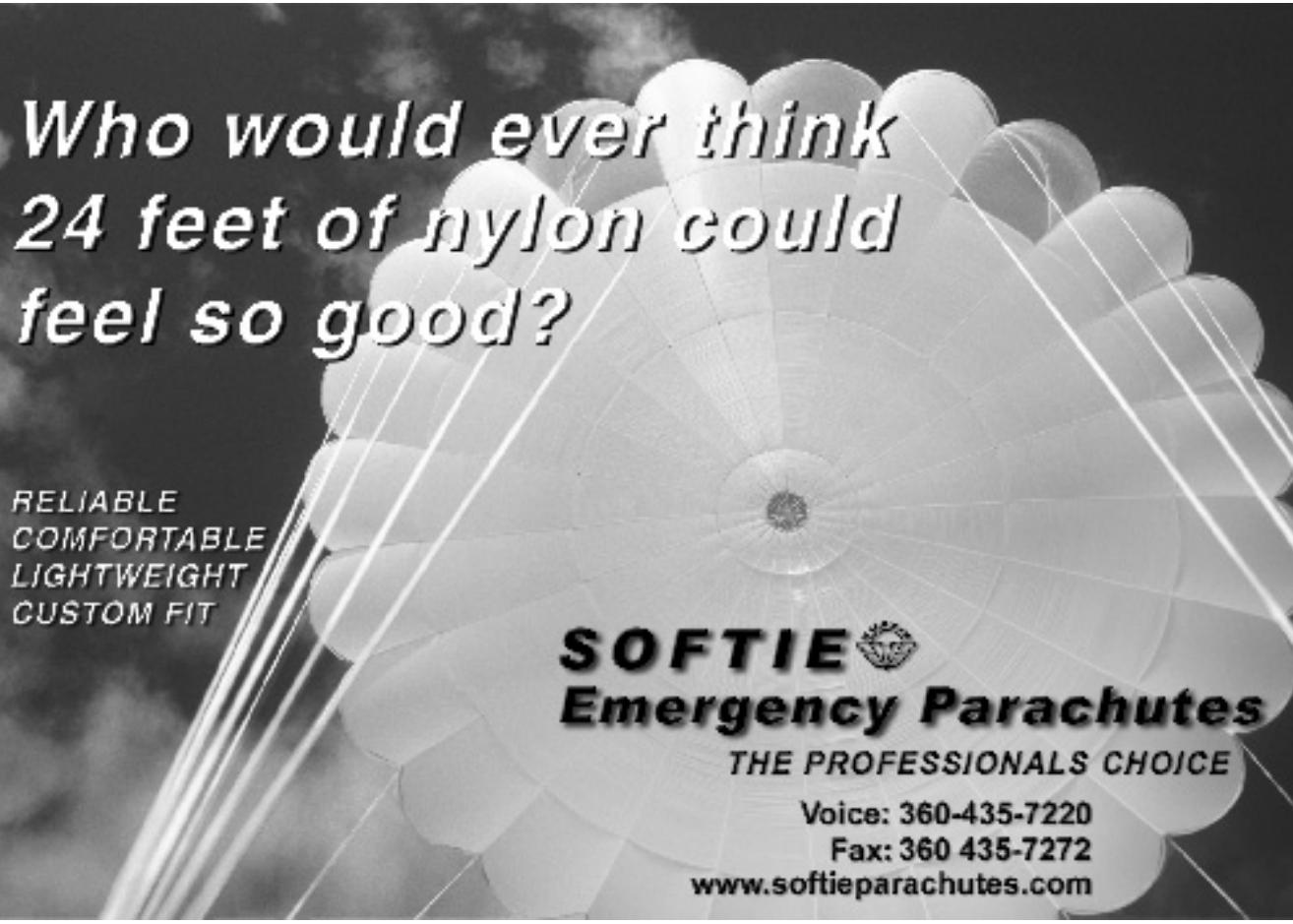
Since its unveiling in 2006, the Extra 300SHP has wowed fans at Red Bull Air Races and airshows worldwide.

turtledeck, wing and control surfaces, and the canopy frame. The new process produces parts that maintain the structural strength of the originals at a fraction of the weight. The canopy was shortened so it is similar in size and shape to the Extra 230 design. The goal here was to reduce drag and weight.

The tail design of the 300SHP is a large departure from all other Extra designs. The horizontal stabilizer is a full 18 inches narrower in span and 6 inches shorter in chord. The reduction in the horizontal chord was added back in elevator. The

IAC INFO • FIND IT FAST

IAC EXECUTIVE OFFICE	PHONE	FAX	E-MAIL
Lisa Popp, IAC Executive Director	920.426.6574	920.426.6865	lpopp@eaa.org
IAC OFFICERS			
Vicki Cruse, President	805.484.8442	805.504.3854	vcruse@earthlink.net
Allyson Parker-Lauck, Vice President	707.580.1791	—	aplauk@gmail.com
Lorrie Penner, Secretary	513.791.7331	—	smuth2@yahoo.com
Doug Bartlett, Treasurer	847.516.8189	847.875.3339	doug@Bartlettmfg.com
IAC AREA DIRECTORS			
Mike Heuer (International)	901.850.1301	720.294.5609	mike@mheuer.com
Rob Holland (Mid-America Region)	603.929.1330	603.598.3182	aerialadvantage@earthlink.net
Robert Armstrong (Northwest Region)	706.549.7583	—	rba@coraid.com
David Martin (Southwest Region)	940.779.3986	940.549.2930	pkakro@earthlink.net
Debby Rihn-Harvey (South Central Region)	281.470.8456	281.470.8456	hurricane@sbcglobal.net
Greg Dungan (Northeast Region)	301.994.0083	301.342.5003	greg.dungan@verizon.net
Tom Adams (Southeast Region)	615.384.1018	615.382.9090	pitts58ct@cs.com
Darren Pleasance (IAC Board Appointed Director)	650.212.1806	650.842.8282	darren.pleasance.1995@anderson.ucla.edu
Scott Poehlmann (IAC Board Appointed Director)	915.307.6450	915.545.6710	scott-p@tx.net
Louie Andrew (EAA Representative)	920.921.6000	920.921.0226	landrew@eaa.org
UNLIMITED AEROBATICS USA			
Norm DeWitt	650.321.8499	—	norm.dewitt@gmail.com
IAC GOVERNMENT REPRESENTATIVES			
Darren Pleasance (Western Region)	650.245.2405	650.842.8282	darren.pleasance.1995@anderson.ucla.edu
Doug Bartlett (Central Region)	847.875.3339	874.639.8838	doug@bartlettmfg.com
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User fees. Temporary flight restrictions. High fuel prices. Increasing regulation. A tight insurance market. It seems everywhere we turn these days, there's a new challenge for general aviation. And that goes double for our aerobatic community, which by its very nature has additional noise and public relations issues with which to contend. Here in Southern California, we're being relegated to ever smaller and more distant chunks of airspace in which to legally fly.

How depressing! There are days when I question whether this avocation of ours will survive. So it was with great pleasure that I accepted an invitation last April to present a seminar on aerobatics at the SoCal RV Rendezvous, a regional gathering of homebuilt RV aircraft held at Cable Airport (KCCB) in Upland, California. Fifty-seven aircraft and more than 100 people showed up at the event.

The "rendezvous" was timed well to take advantage of the International Aerobic Club's determination to be more inclusive of recreational aerobatics, and the experience reinforced

in my mind the wisdom of that shift. According to Van's Aircraft, 5,024 RV-series airplanes have been built and flown thus far. Thousands more are under construction around the country, and the rate at which they are achieving flight status is increasing rapidly as the build time drops.

Aside from the 350 RV-9/10 models, every one of those 5,024 airplanes is designed for aerobatic flight. This represents the largest aerobatic-capable fleet in the world. Compare these 5,000 RVs to perhaps the most ubiquitous competition aircraft, the Pitts. According to Aviat, approximately 700 factory-built and 600 homebuilt aircraft are in that fleet worldwide. By comparison I counted 258 Extra aircraft on the U.S. registry.

I've been involved with the RV community since a friend of mine started building his RV-7 in 2001. I pounded rivets on his plane and had a chance to watch one come together from the ground up. My general impression is that these aircraft are quite conventional and well-designed. I've flown the RV-4, RV-6,

RV-7, and RV-8. I wouldn't consider them to be well-suited for competition, primarily because the clean design, flush riveting, and careful fairing minimizes drag and the airplane builds airspeed quickly when pointed downhill. However, they are splendid for recreational aerobatics. RVs are light in roll and somewhat heavier in pitch. The feel is somewhat reminiscent of a Pitts, though the controls are not quite as heavy in the lateral axis.

Speaking of drag, an aerobatic flight in an RV will open your eyes to just how "draggy" most of our competition airplanes are! The horsepower under the cowl of an S-2B or Sukhoi is designed for vertical penetration. Speed is, to a certain extent, an enemy when you're competing. It will carry you through the box too quickly. The RV was designed for speed because it is used for cross-country transportation. Put that 300-hp engine in an RV and it will go a lot faster than any Extra 300, Edge 540, or Velox.

I have flown a wide variety of Sportsman-level maneuvers in RVs,

and they perform remarkably well as long as the energy is properly managed. Spins, aileron rolls, loops, Immelmanns, Cubans, hammerheads, barrel rolls, and the split-S are easily done in an RV within a +3.5/-1g range. This is well within the designer's stated design limits of +6/-3g (and ultimate load factors of +9/-4.5g). Airspeed limits such as V_{NE} , V_{NO} , and V_A are high enough that RVs can fly through these maneuvers without danger of over speeding the aircraft. Throttle management, unusual attitude training, and a clear understanding of the RV's slippery aerodynamics are key to safety in these birds. As is the case with any other aerobatic flying, proper instruction is critical to safety.

Unlike certificated airplanes, RVs come in many flavors. Builders choose from many different combinations of engines, props, canopy styles, landing gear configurations, etc. Much like a Citabria, Stearman, or Cub, most of them do not have inverted fuel or oil systems, so I will modify maneuvers like the half-Cuban by rolling upright as soon as the 45-degree inverted

On the way home, I couldn't help but marvel at the strength and energy in the RV community. We could use a little of that in our local IAC chapters—and there are 5,000 of them out there, so let's start recruiting!

point is reached in the loop. Remember, we're just talking about recreational aerobatics. These airplanes are not going to fly competition. These pilots simply want to be able to safely perform basic figures.

On the topic of safety, my primary goal at the SoCal RV Rendezvous was to encourage RV pilots to seek out quality instruction before attempting aerobatics in their aircraft. This is smart advice for any aspiring aerobic pilot, but it's especially true with the RV for two reasons. First, the aforementioned sleekness of the airframe. And second, builders are often out of the air completely for several years while they focus on construction. Their Phase One flight

testing may have been prepared for with recurrent flight training, but very infrequently does that training include aerobatics. Yet aerobatics must be included in the flight testing if aerobic figures are going to be added to the approved maneuvers in the airplane's operating limitations.

On the way home, I couldn't help but marvel at the strength and energy in the RV community. We could use a little of that in our local IAC chapters—and there are 5,000 of them out there, so let's start recruiting! And if you have the opportunity to take an aerobic flight in an RV, don't pass it up. I'll bet you'd be pleasantly surprised with what those little kit planes are capable of. 



The SoCal RV Rendezvous provides a chance to discuss all kinds of topics related to these unique aircraft – including flying aerobatics.

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flying the classic loop

By Rich Stowell,
MCFI-A

We described our primary controls as “maneuver motivators” in the first installment in this series. Since then we have devoted separate articles to two of those controls and the corresponding maneuver each inspires: the normal upright spin, during which rudder inputs are the main event, and the aileron roll, during which aileron inputs are our primary focus. Other actions are certainly involved, but they are relegated to supporting roles. Let’s now look at the third fundamental maneuver we can do in an aerobatic airplane: the loop.

The classic loop, of course, is a vertical turn; consequently, airspeed and *g*-load will vary throughout the maneuver. Similarly, a level "360" is simply a loop performed in the horizontal plane and is typically characterized by constant airspeed and *g*-load trends. Yet elevator is the motivating control surface in both cases. And for all of the things we ascribe to our elevator inputs (angle of attack, airspeed, *g*-load, stalling), we routinely regulate pitch to bend and shape our flight path. The featured airplane performing our basic loop is a 210-hp RV-7 equipped with a constant-speed propeller but lacking inverted fuel and oil capability.

"Hold on a minute," many who fly RVs, or Glasairs, or other so-called slippery-yet-aerobatic-capable airplanes exclaim, "ya gotta be careful when pointing downhill, as airspeed can accelerate out of sight in a big hurry!" While it's true that an aerodynamically clean airplane can pick up speed rather quickly it is equally true that a Decathlon or even a Pitts will accelerate beyond V_{NE} (never exceed speed) when pointing the nose well below the horizon, if you are passive or tentative during the pullout that is. Proactively manage your pitch inputs, however, and you'll find that excessive speed is not the foregone conclusion that some automatically assume.

G-LOAD AS SPEED BRAKE

Back in "Basic Stall Review" (June 2006), we introduced the *Vg* Diagram. A key operational relationship was established between airspeed, *g*-load, and the aerodynamic and structural limits of an airplane. The stall constrains us on the lower-speed end of the spectrum, whereas the design *g*-load typically becomes our operating limit on the higher-speed end. Optimizing the loop will require that *g*-load and airspeed trends mirror each other as follows: as airspeed increases, increase the *g*-load; as airspeed decreases, decrease the *g*-load. But if we allow airspeed and *g*-load trends to converge (e.g., decaying speed with rising *g* on the front side of a loop), an accelerated stall is in the offing.

On the other hand, allowing airspeed to increase without a commensurate buildup in *g* (say, during the back side of a loop), or escalating the

g too rapidly, will negatively affect the exit conditions: the loop closes lower and faster than it started in the former instance; it closes higher and slower, or possibly even encounters a stall, in the latter. Judicious manipulation of *g*-load as airspeed changes will make the flight path conform to the desired arc of the loop.

THE INSTRUMENTS

The loop is performed using outside visual references throughout. Even so, the airspeed indicator, altimeter, and *g*-meter provide useful feedback that we can use to refine our loops. We certainly won't be staring at the instruments during the loop itself. We will, however, compare the readings before and after the fact. Beginning and ending airspeeds should match, for instance. So, too, should the altitudes. And the *g*-meter, which we'll reset between attempts for now, should register a peak load of +3.5*g* and close to zero *g* as the minimum.

To develop an awareness of symmetry during the maneuver, the sensations on your body during the pullout should be equivalent to the sensations on your body during the pull into the loop. If the feel was noticeably different, then the entry and exit *g*-loads were not equal and the loop was asymmetric. Keep adjusting the pulls during subsequent loops until the pull in and the pull out have a comparable feel and the *g*-meter displays +3.5.

SETUP

The nice thing about a constant-speed prop is that we can set it and forget it during the loop. In the featured RV-7, we'll configure the engine and prop at 24-squared. This yields 145-150 knots in level flight at 4,000 feet mean sea level. No need to gain additional speed for the loop in this case.

Fixed pitch fliers, unfortunately, must coordinate power changes with their pitch inputs to maximize efficiency and to prevent possible engine over-speeding. Power management would go something like this: Establish level flight at 2500 rpm. Check the airspeed. Listen to the ambient engine noise. If airspeed decreases below this value (as it does during the first half of the loop), rpm and ambient engine noise will decrease as well. Thus, we want to increase power smoothly as we bend the flight path skyward. If airspeed increases (as might be required in a pre-loop dive to gain the recommended entry speed and during the second half of the maneuver), ambient engine noise and rpm will likewise increase. Thus, we must reduce power continuously as airspeed increases beyond the level flight speed. The pilot takes on the role of constant-speed prop governor. With some practice, you can keep the rpm fairly constant throughout most of the loop. But if you're going to err with your throttle movements, it's better to reduce the power too much whenever heading downhill rather



Courtesy Roch Stowell

Upon entering the loop, sight down the left wing as you pull into the maneuver.



Note the g-meter at the apex of the loop. Ease the stick forward to float a bit across the top of the figure.

than not enough. And upon completing the loop, avoid shoving the throttle forward indiscriminately. See where you are rpm-wise first.

Okay, back to our RV-7. Knock out a couple of horizontal loops to clear the area and then we can take it vertical.

ENTRY

Initiate the loop from level flight by pulling the stick straight back. The amount of displacement necessary to generate +3.5g will vary from airplane to airplane. Lower-performance airplanes usually require greater displacement of the elevator control than higher-performance airplanes. What's more, we need to appreciate the difference between stick movement and stick force.

We want to find a suitable blend of pitch rate and stick position that yields +3.5g as early in the start of the loop as possible. Initially pulling too softly often results in the stick moving a long way but never attaining the desired entry g. But don't jerk the stick back abruptly either, which could spike the g-load well above our target. Move the stick smoothly, firmly, and purposefully. You need to pull harder and feel heavier in your seat than you do in a steep turn (at least at the beginning). Now freeze the stick where it is! That's right, you're going to generate +3.5g by the time the stick reaches a particular spot in the cockpit. Now adjust the force you are applying to the stick so the stick position does not change.

If we can keep the stick frozen in

essentially one place, airspeed and g-load will take care of themselves as the airplane carves out the front portion of the loop. Each time stick position varies from the ideal spot, however, the smooth curvature of the loop will have a kink in it. More force on the stick than necessary, for instance, will cause it to move farther aft. The result: the radius of the loop shrinks, the second quarter of the maneuver becomes pinched, and the probability of encountering an accelerated stall increases (g-load and airspeed trends may be converging!). On the other hand, releasing too much force on the stick too soon will allow it to move forward. The result: the radius expands, the second quarter of the maneuver flattens out and grows vertically, and you could run out of the steam needed to get up and over the top.

The front part of the loop does go by quickly. So in reality, you won't be holding the stick in one place for very long. And managing the elevator isn't the only thing you have to do, either. Turn your head to the left at the same time you pull into the loop. Sight straight down the wing and focus on a point on the horizon. Not only will this allow you to see your progress, but it will also give you feedback about the airplane's pitch rate to inverted. If you continue to look over the nose instead, the featureless blue visual field (well, here in Southern California anyway) will provide little or no feedback; consequently, the tendency will be to relax the pull, sapping

the airplane's energy. Look down the left wing; make it pivot continuously toward inverted.

THE APEX

The top portion of our loop begins when the cord line of the left wing is 20 degrees from level, inverted flight. Do two things now: look back over the nose and slide the stick forward until you feel a little light in your seat. The objective is to float gracefully across the top. But it's important to look over the nose before you push. You've got to see where you are to know how quickly or how slowly to move the stick away from your body.

Did you look forward too soon only to see the nose still well above the horizon? Slowly, very slowly ease the stick forward. Did you look forward a bit too late only to see the nose collapsing rapidly toward the horizon? Get that stick moving forward quickly. If you look forward and see little or no blue sky between the nose and the horizon, forget about the push! You missed it. Move directly to the exit inputs.

Across the top of the loop, we want to slow the pitch rate down without stopping it altogether. Continue feeding the stick forward until you reach the high point of the maneuver—the level, inverted attitude—then back away from the push. Allow the stick to slide aft and let gravity take over.

We normally wouldn't look at the instruments at the loop's zenith. But if you did steal a glance in the RV-7, the airspeed indicator would show



As soon as the nose drops toward the horizon, begin the exit pull.

around 60 knots; the altitude gain, around 800 feet; and the g-meter, close to zero.

EXIT

We've completely backed off our push, and we're now allowing gravity to pitch the nose earthward. But as soon as the nose touches the horizon, it's time to bend the flight path back around to level flight. Overcome the impatient urge to yank the stick back. Instead, smoothly accelerate the stick aft until reaching the same spot you held during the front side of the loop. Now apply whatever force is necessary to hold the stick stationary, which generally requires more and more effort as airspeed increases. Don't let up until the nose swings up to the level flight attitude. Release the aft elevator all at once and fly away.

AILERON & RUDDER

The ailerons must remain neutral during the loop. Move the stick in pitch only. Even if you wind up crooked at the top, don't fiddle with the ailerons. Trying to figure out

how to correct the problem while inverted usually leads to confusion and a loss of focus on the elevator control. Just finish the loop, crooked as it may be. Evaluate what you may have done to cause the problem, and adjust your control movements accordingly on the next loop.

As for the rudder, proactively use it to maintain heading throughout the maneuver. Performing loops along a prominent reference line makes this much easier. In general, little or no rudder action is required at the start unless flying airplanes with significant gyroscopic effects, such as the Pitts. In that case, a dash of left rudder is needed.

The top of the loop is slow flight; so if the heading seems a little off there, try squeezing in some right rudder. And although neither pulling into the loop, nor floating across the top will always require corrective rudder, the last quarter of most loops in most airplanes typically needs some left rudder to preserve your alignment.

The loop is performed using outside visual references throughout. Even so, the airspeed indicator, altimeter, and g-meter provide useful feedback that we can use to refine our loops.



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SOME COMMON TENDENCIES

Problems pilots often encounter when learning the loop:

1. Crooked pulls. In the case of the RV-7, where the left-seater grips the stick with the left hand, watch out for the tendency to pull the stick aft and left. If flying with your right hand on the stick, avoid pulling the stick aft and right. Straight pulls only.

2. Inadvertently applying unneeded left rudder when sighting down the left wing. To ensure you're not bracing your feet on the rudder pedals during the entry, consciously release some pressure on both pedals as you turn your head toward the wing.

3. Pulling too softly during the entry, or too hard during the exit. Calibrate yourself to +3.5g. Hit that target early during the pull-up. Correlate the sensations with pitch rate and stick position, and try to match those sensations during the exit.

4. Accelerated stalls during the transitions between entry and apex, and between apex and exit. Relax across the top of your loop. Low speed demands a low-g environment here. If you should encounter stall buffet, it's likely as a result of too much aft elevator. Hold a general heading with quick, active movements of the rudder. Immediately move the stick forward to unstall, then gingerly ease the stick aft again to continue with the loop. Unload, reload, hold heading with rudder—do this as many times as required until the stall is fully recovered.

Remember to breathe during your loops, too! Take a deep breath and exhale (forcefully if need be to counter any symptoms of gray-out) as you enter the loop, and again later as you exit. Parachutes are required if you are not looping solo (even then, wearing a chute is a good idea). And keep Jim Taylor's words in the back of your mind: "The purpose is not to make the loop perfectly round, but to make it perfectly safe." Have fun looping—up high, of course. 

Rich Stowell is a NAFI Master Instructor-Aerobatics and the author of the new book *The Light Airplane Pilot's Guide to Stall/Spin Awareness*. His videos are now available on DVD. We hope you have been enjoying Rich's series on recreational aerobatics, and we encourage you to share your ideas for future articles. E-mail rich@richstowell.com.

LETTERS to the EDITOR



Our contributors win praise – and one member goes ballistic

To the Editor:

I just read [Rich Stowell's] article in the June issue of *Sport Aerobatics*. Thanks to Rich for writing such a clear, straightforward explanation, and kudos to *Sport Aerobatics* for publishing your series about basic maneuvers.

I'm especially glad to see more explanations that go beyond competition technique. The official catalog of figures is a necessary guide for competitors, but I fly with many pilots who just want to learn how it feels (and looks) to fly an airplane through 360 degrees of pitch and roll, to experience a wider range of g's than they're exposed to in normal flight, and to build confidence in their stick-and-rudder skills. There's no need to frustrate (and punish) those folks with competition-style flying, especially as they're introduced to aerobatics.

Bruce Williams

To the Editor:

Please send my thanks to Mark Mattioli for the carefully thought out and researched regulatory review published in *Sport Aerobatics* [June 2007]. I've been a member of IAC since 1983, and this is one of the most useful refreshers I've come across on a somewhat boring, but critical topic for all of us. I'm fortunate to live in Northern Michigan where practice areas and airspace is user-friendly, but I'm certain that this article can enlighten us all. I'm headed out to practice now, just outside the lateral limits of our airport Class E.

Brian Dawson
EAA Chapter 1021

Thank you for the kind words about the articles on basic aerobatic maneuvers and airspace issues. These topics are important to all of our members, and it's nice to see the work of our member authors is appreciated.—SW

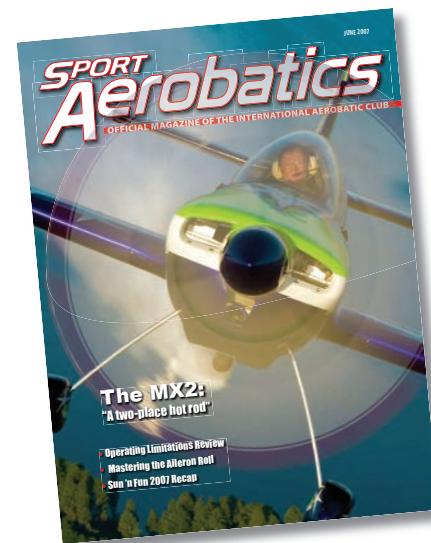
To the Editor:

I just received the April issue of *Sport Aerobatics*. Living in Africa, it's almost unbelievable that a magazine can even reach me. I would like to react to Giles Henderson's article, "Thirteen Seconds." Obviously, very few people share Mr. Henderson's confidence and skills to deal with an emergency while being six or eight seconds away from death. Bailing out, then, would become my priority in this kind of uncomfortable situation.

But I wonder, if I were the proud owner of a wonderful aerobatic flying machine, let's say a Baby Lakes (it's my soon to be wonderful aerobatic flying machine), if I wouldn't be reluctant to evacuate my pride and joy and let her be destroyed. Wouldn't I be tempted to fight a little longer to save the day (actually, the last five years of work)? And I may eventually crash while trying to bail [due to] being unable to make the proper decision at the right time?

Considering this, I realize there might be a solution that could give me a little extra time to work a less dramatic way out, and increase chances of saving my life: ballistic parachutes.

Okay, okay. I am sitting in the bush 6,000 miles away, and I can already hear some people screaming. But it is actually an opportunity to trade a very long evacuation sequence for a very short single action. And even



more, it would (partially) save my Baby. Maybe the appropriate material is not ready today, and it's likely to be a 30-pound penalty on your empty weight and a few thousand bucks on your budget. But I am sure it is worth thinking about. And no doubt the manufacturer of such accessories would be delighted to develop specialized products for our activity. Unfortunately, French civil aviation didn't agree with me, so I won't trade my back pack for a tin can full of silk. Have a safe and fun flight.

Mathieu Chassaing
Libreville, Gabon
IAC 432267

I know that Giles Henderson will be thrilled to hear that his article made it all the way to the African bush. Don't give up on your personal parachute just yet—there are a lot of pilots flying today who would not be with us had they not practiced both bailout and recovery procedures with equal vigor.—SW

"My goal is to eventually get on the U.S. Unlimited Aerobatic Team and fly in the World Aerobatic Championships."



SETTING GOALS

Is this the way to the World Aerobic Championships?

Story by, and photos courtesy of, Alex Land

In February 2007 I turned 17 years old. I got my private pilot certificate in an Extra 300L and a few weeks later flew in my first aerobatic competition in the Advanced category in a Su-26. I had waited for each of these days for many years.

Although I have been flying with my dad since I was about 5 years old, my first experience with aerobatics was when I was 12. My dad took me flying in the Skybolt he had just bought. We did a few basic aerobatics, but it was not long before Dad decided we both needed some proper instruction. We went to see Keoki Gray at Amelia Island Aerobatics Inc. in Fernandina Beach, Florida. After some ground instruction and a briefing on how the flight would be conducted, we took off in Keoki's Pitts S-2A. The first thing Keoki taught me was how to perform every type of basic spin: upright, inverted, accelerated, and flat. This was a wise choice since almost every badly botched maneuver will end up in some sort of spin. The next thing Keoki had me do was deliberately fall out of all the basic maneuvers so I could see what happened and learn to recover the airplane. We kicked the rudder too late on top of hammerheads; we held the rudder in too long at the bottom; we pulled too hard at the top of loops; and messed up lots of other maneuvers. We always used the same recovery methods. If the plane was in a spin, power back, neutral stick, opposite rudder, and recover. If it wasn't spinning, roll the wings level to the nearest horizon and recover upright. We also went over bailout and emergency landing procedures. Later he had me practice the Primary sequence and work on staying inside the aerobatic box. Keoki's instruction was very helpful, and it gave my dad and me the confidence and skill we needed to practice safely on our own. At home, we continued to practice basic aerobatics in the Skybolt, slowly working up to harder maneuvers like snap rolls and avalanches.

It was at Oshkosh in 2004 that I first met Sergei Boriak. I had the chance to fly with him a few times and get some aerobatic instruction. By 2005 my dad had decided that it would not be long before I was going to push the Skybolt to the

edge of its capabilities. We started looking for a more advanced two-seat aircraft. When an opportunity to purchase a nice used Extra 300L came up, we both agreed it was the way to go. The Extras are known for their easy handling and excellent safety record. After we got the Extra, Keoki suggested I start training more seriously with Sergei. In 2005 I was only 15 and still too young to solo. My dad had to ride through all the maneuvers whenever Sergei would critique me from the ground. Sergei would also ride with me and instruct me from the front seat. Sergei is an excellent teacher, always demanding a high level of skill and safety. He does not tolerate any carelessness, and everything has to be flown the correct way. One day I even had the chance to take Patty Wagstaff for a flight. She also encouraged me to pursue competition aerobatics. Pretty quickly I was flying at the Intermediate level and was looking forward to entering competitions as soon as I got my private pilot certificate.

In February 2006, on my birthday, I finally got to solo. My dad was certainly happy on that day, not only because he was proud of me, but also because he no longer had to ride through any more rolling circles! Now I could fly alone and be critiqued from the ground. Through 2006 I continued to work with Sergei, and I started flying sequences from the Advanced category. I know that Sergei had been telling my dad for a while that I was going to need a higher performance single-seat aircraft if I was going to continue improving my aerobatics. Sukhoi aircraft have a reputation for being excellent competition planes as well as looking and sounding awesome (I love round motors!). They are also Sergei's preference, and he could help me get the most out of one. We ended up buying a Sukhoi 26 from our friend Hubie Tolson in North Carolina, which is the airplane I am flying now.

I have now been flying aerobatics for four years and have enjoyed every minute of it. Apart from being a lot of fun, aerobatics is an excellent way to improve your piloting skills in a way no other type of flying can. I think the most dramatic way that aerobatics improves your piloting skills is by giving you a complete understanding

of the aircraft's performance envelope. For example, you quickly have an acute awareness of an approaching stall/spin condition and realize the plane can stall no matter what your airspeed. It also increases your understanding of how the airplane responds to any control input you give it in a variety of different situations, as well as raising your level of situational awareness. This could be very useful in an emergency as it allows you to fly the plane with little thought, freeing up your brain to concentrate on solving the problem.

I have been to only a few aerobatic competitions, but each one has been a lot of fun. The competition community is a great group of people, and although it is very competitive, at the end of the day everyone seems to have a good time, no matter who wins or loses. The seasoned competitors and

judges are encouraging and always ready to help a newcomer, but you have to be willing to help out as well. Volunteering is the backbone of a competition. All the participants, from newbies to National Champions, work to make each competition a success.

In the future I plan to continue my involvement in aerobatics and competitions, and I hope to move up to Unlimited as soon as I am flying well enough. My goal is to eventually get on the U.S. Unlimited Aerobic Team and fly in the World Aerobic Championships. I am learning a lot and appreciate all the help I have received along the way. Once you fly aerobatics, you'll become an "acrobaddict" like me! ☺

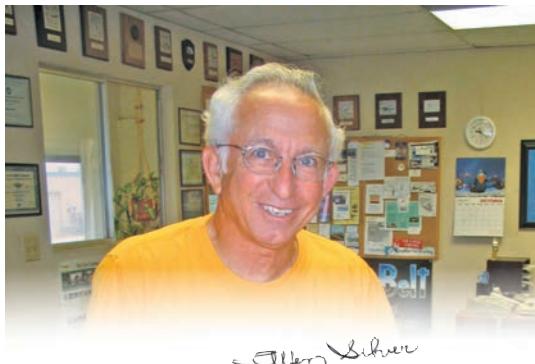
Editor's Note: To keep up with Alex Land's aerobatic pursuits bookmark www.LandAerosports.com.



Alex has been preparing for the 2007 U.S. National Championships with hopes of making the Advanced team.



The Sukhoi 26 satisfies Alex's love of round motors.



Ask Allen

A master rigger answers your questions about parachutes.

You know the old saying... "Pay me now or pay me later."

By Allen Silver, IAC 431160

Q: My parachute is showing signs of wear and abrasion near the rip cord protector flap. What can I do to prevent this and avoid a costly repair?

A: This is a common problem that I see often and have to repair. Every few weeks I get back-style parachutes in for inspection and recertification that require me to repair the rip cord protector flap that has been damaged by rubbing on the seat back. The same applies for seat packs that drop into the bucket seat of your Yak or Stearman. The cause is as easy to eliminate as the pack is to fix. The best idea is to fix the source of the problem before it needs the attention of a rigger. The culprit is most likely the seat. Any seat back or seat bottom that is made of a hard surface, whether it is smooth or rough, will create a lot of pressure (hot spots) on the material directly over the rip cord pins. In short order you will see an outline of the rip cord cable and pins showing through the material of your container. Now is the time to take corrective action.

The fix is easy and affordable. Simply cushion the area that receives the most pressure. The fix to the seat back, bottom, or both may be as simple as a thin piece of carpet remnant glued to your seat back or placed in the seat pan. Do not use a loose piece of foam unless it is covered because it will tear apart. Be creative, but do something.

You need to be proactive if you expect to get the maximum service life out of your parachute. Start before you ever place your parachute against a hard surface. Some aircraft come with cushioned seats, while other pilots have custom pads made. Some pilots have little room and want nothing behind them. They will pay the price down the road in the form of repairs. You know the old saying, "Pay me now or pay me later." In this case paying now is a better deal.

The cushion creates a barrier between the surface and your parachute. This greatly reduces the wear and tear to your container. Just as you would childproof your home to protect your family, you must do some work to protect your expensive cushion and keep it safe from damage.

Here's another hint: While you're busy padding your seat, look around for sharp or rough spots like welds or bolt or rivet heads that can also cause wear or snag your parachute harness or container. Of course, if your container is already damaged, have it repaired by a qualified rigger with the proper repair material and sewing machines. The cost is minimal and will add years to the life of your parachute.

Q: I've heard that I should check the rip cord pins when preflighting my parachute. How do I do this, and what am I looking for?

A: It's embarrassing to grab your parachute and hurriedly put it on only to have the spring-loaded pilot chute come flying out followed by some of your parachute. This can happen if one or more of the rip cord pins were to come free. The next time you take your parachute in for a repack, have your rigger show you where the pins are located and how to check them (if you ship your parachute, call and have the rigger explain it over the phone).

On some parachute containers it's rather difficult to open the rip cord protector flaps and inspect the pins, but you need to learn how to do this. Once you have figured out how to open the rip cord protector flap, here is what to look for. The pins should be in all the way up to the point where they start to flare and get bigger (see Figure 1). Just like the half-full or half-empty glass of water, decide if the pins are partially in or partially out. Then, *with your fingers only*, push them back in (see Figure 2). If the lead seal is broken and hanging loose, don't worry. It's more important to have the pins in properly. It can be resealed at the next repack. Do not shove the pins in so far that the flared part is up and over the lip of the grommet. This can create a much harder pull should you need to use your parachute in an emergency.

It should also go without saying that the rip cord pins should

Figure 1:

This pin has slid slightly out of place.

Figure 2:

Using only your fingers, push the pin back.

Figure 3:

Inspect the pin to be sure it is straight – a bent pin could restrict the pull in an emergency.



Fig. 1



Fig. 2



Fig. 3

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be straight and not bent. If a pin is bent, you need to immediately have the rip cord replaced by your rigger. In some situations this can create a no-pull situation (see Figure 3). The pins usually get bent by pilots carelessly getting in to or out of their aircraft. When your parachute is stuck on the top of the turtledeck, don't just push harder or get a bigger shoehorn. Figure out the best way to enter and exit the cockpit. It could be as simple as having one less cheeseburger at the fast food place!

Please keep the questions coming, and don't forget to make your comments heard about going from a 120- to 180-day repack cycle. The deadline for comments ends on August 20, 2007. For information, go to my home page at www.SilverParachutes.com and click on the government link and follow the directions. It's important to do this if you want to see the repack cycle extended. The complete document that my son, Darrin, and I wrote is also on the FAA website and can be reached from my website. When filing your comments, remember that you must reference Docket Number FAA-2005-21829 in all of your correspondence.

Allen Silver is the owner of Silver Parachute Sales and is always available to answer your questions about parachutes. Send your questions to Allen@SilverParachutes.com.

m i s h a p s d a t a

Compiled by Bruce Johnson

MISHAPS BY MONTH

Year	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
2006	0/0	1/2	1/1	1/0	1/1	1/0	0/0	1/0	0/0	1/1	1/1	1/2
2007	0/0	0/0	1/1	0/0	0/0	0/0	0/0	1/0	0/0	1/1	1/1	1/2

MISHAPS BY YEAR

Year	1995	1996	1997	1998	1999	2000	2001	2002	2003	2004	2005	2006
Mishaps	20	26	21	24	20	18	12	9	15	9	10	16

Numbers depict accidents/fatalities of total accidents in the U.S. by aerobatic aircraft. Accidents included are only those which occurred during aerobatic maneuvering (including air shows) or during an IAC-sanctioned competition.

As of June 28 we have observed only one aerobatic mishap for 2007. This may be due to the high fuel prices and fewer flight hours, or perhaps we are all doing a better job of adhering to safe aerobatic flight practices. If you are aware of an aerobatic mishap, please contact Bruce Johnson at bjohnsonf16@hughes.net.

Accident Date and Location: August 31, 2005, in Avalon, California

Probable Cause Approval Date: May 29, 2007

Aircraft: Avions Robin R.2160, Registration: N216RN

Injuries: 1 Fatal, 1 Minor

HISTORY OF FLIGHT

On August 31, 2005, approximately 1250 Pacific Daylight Time, an Avions Robin R.2160 airplane, N216RN, impacted the ocean following a loss of control and subsequent flight crew bailout near Avalon, California. The airplane was not recovered and is presumed destroyed. The certificated flight instructor was fatally injured, and the pilot-rated student sustained minor injuries. The airplane was operated by California Flight Center of Long Beach, California, as an instructional flight under the provisions of 14 Code of Federal Regulations (CFR) Part 91. The flight departed Long Beach Airport at 1221, and was destined for Catalina Airport. Visual meteorological conditions prevailed, and a flight plan was not filed.

The flight entered an aerobatic box over the San Pedro Channel and performed some aerobatic maneuvers. During a telephone interview with the National Transportation Safety Board investigator-in-charge (IIC), the surviving student indicated that the instructor performed a hammerhead stall, followed by a loop. At some point in the maneuver, the airplane entered a spin. The spin's rotation increased and became violent.

The student submitted a written statement regarding the event. It indicated that once they entered the aerobatic box and cleared the area, he performed a series of three loops under the instructor's guidance, followed by two flick rolls. The student described all of these maneuvers as "successful." Then, under

the instructor's guidance, the student performed a series of two spins, both of which were to the left.

The student then relinquished control of the airplane to the instructor and retrieved his handheld camera to film the next series of maneuvers. The instructor proceeded to perform a hammerhead maneuver followed by what the student believed was a loop and then a spin. The student stopped filming when he realized that they were "violently spinning towards the water." The student believed he counted seven or eight rotations to the right, but was not positive about the direction. The instructor told the student to remove his feet from the rudder pedals. The student reported that he believed he was resting his feet on the pedals, but not pressing on them. He removed his feet from the pedals and brought his knees up to his chest.

The instructor continued with his attempt to stop the spin, but then the propeller eventually slowed and came to a complete stop. The instructor then calmly said, "Let's get out of here." The instructor then jettisoned the canopy, and the student bailed out of the airplane. The student estimated their altitude at bailout was no more than 1,000 feet above the ocean.

Once clear from the airplane, the student pulled his parachute's rip cord and looked up to see the parachute open. When he looked down, he observed the airplane impact the water to his left. To his right, he saw the instructor's parachute opened and floating on the surface of the water. The student did not see the instructor bail with his parachute open floating down to the surface of the water.

PERSONNEL INFORMATION

Flight Instructor

The flight instructor held an instructor certificate for single-

engine airplanes. He was an airline transport pilot with a multi-engine airplane rating and a commercial pilot with a single-engine airplane rating. He was also type-rated in Learjet 60 airplanes. He was issued a first-class medical certificate on July 21, 2005, without any limitations or restrictions.

A review of his logbook revealed he accumulated a total of 2,309 hours of flight time. He logged about 776 hours in multi-engine airplanes, and 1,524 hours in single-engine airplanes. The flight school where he was employed estimated that he accumulated at least 250 hours in the accident airplane make and model. His logbook revealed that in the last 30 days he logged 95 total flight hours, of which 17 were in the same make and model as the accident airplane.

The instructor pilot was in the right seat during the flight.

Student

The student had a private pilot certificate with a single-engine airplane rating. His last medical certificate was obtained in September 1999. According to him, he logged about 310 hours of total flight time. The student was in the left seat during the flight.

AIRCRAFT INFORMATION

The Avions Robin R.2160 is an all-metal, two-seat airplane, built in France. The airplane is equipped with a 160-hp Lycoming O-320-A2D engine. Though it is certificated as an aerobatic airplane in France, in the United States it receives an experimental certification.

A review of the approved flight manual (AFM) revealed that when the wing flaps are retracted, intentional spins are approved; however, no baggage should be carried. The AFM indicates that the loss of altitude per one-turn spin is about 250 feet. Spins in the Avions Robin should be "entered from a power-off full stall with slight nose up attitude." The spin recovery technique listed in the manual indicates that the pilot should:

- Apply and maintain full opposite rudder.
- Maintain stick back until rotation stops (stick back position accelerates the recovery).
- Ailerons neutral.
- As rotation stops, neutralize the rudder and smoothly recover from the dive.
- After three spin turns, recovery is performed in three-fourths of a turn.

A note following the spin recovery procedure indicates that "only one action is important: Keep the rudder fully in the opposite direction!" The AFM also indicates that in spins lasting longer than three turns, the engine may stop. For four-turn spins (or more), recovery takes 1.5 turns.

Review of the aircraft's maintenance records revealed that the last annual inspection completed on the airframe/engine took place on December 22, 2004, at an airframe total time of 7,359.1 hours. On August 18, 2005, the airplane/engine underwent a 100-hour inspection at an airframe total time of

7,555.01 hours, and an engine total-time-since-major-overhaul of 1,025.1 hours. As of the morning of the accident, the airplane had accumulated 7,562.1 hours.

WRECKAGE & IMPACT INFORMATION

The airplane and engine were not recovered following the accident due to the depth of the water at the point of impact and the inability to locate the wreckage. Small pieces of debris were recovered and examined, but they were of little pertinence.

The flight instructor's parachute was recovered and examined by an FAA inspector. According to his statement, he received the parachute after it had been placed in a plastic evidence bag and recovered from the Los Angeles County Coroner's Office. The canopy and suspension lines had been cut by recovery personnel near their attachment point to the harness. The parachute appeared to be a normal deployment. The pilot chute was attached to the parachute and was fully deployed. The rip cord was not in the cord housing, but was present and appeared to be in good condition. Due to the suspension lines being cut by recovery personnel, a determination of entanglement could not be made. There were no rubber bands present in the harness, pack, or on the suspension lines. The inspector noted that the parachute had been inspected and repacked 16 days prior to the accident, on August 15, 2005.

The National Transportation Safety Board determines the probable cause(s) of this accident as follows: The flight instructor's unsuccessful recovery from a spin. The underlying reason was not determined.



CALENDAR OF EVENTS

Beaver State Championship (Northwest)

Friday, August 10 - Saturday, August 11, 2007

Practice/Registration: Thursday, August 9

Power: Primary through Unlimited

Location: Eastern Oregon Reg. Airport at Pendleton (PDT): Pendleton, Oregon

Director: Robert Toppel and Bob Harris

Phone: 503-292-6630, **E-Mail:** rboydt@comcast.net

Website: www.IAC77.org

Kathy Jaffe Challenge (Northeast)

Friday, August 24 - Sunday, August 26, 2007

Practice/Registration: Thursday, August 23

Power: Primary through Unlimited

Location: Flying W Airport (N14): Lumberton, New Jersey

Phone: 732-671-6089, **E-Mail:** bubbaron@comcast.net

Director: Ron Chadwick • **Website:** www.IAC52.org

Aspen Leaf Acro Challenge (South Central)

Saturday, August 25 - Sunday, August 26, 2007

Practice/Registration: Friday, August 24

Power: Primary through Unlimited

Location: Sterling Municipal Airport (STK): Sterling, CO

Phone: 303-410-9812, **E-Mail:** wea@allmax.com

Director: W. Earl Allen • **Website:** www.iac12.org

Gulf Coast Regional (South Central)

Saturday, September 1 - Sunday, September 2, 2007

Practice/Registration: Thurs., Aug. 30 - Fri., Aug. 31

Rain/Weather: Mon., Sept. 3 - Mon., Sept. 3

Power: Primary through Unlimited

Location: Houston Executive Airport (78T): Katy, Texas

Phone: 713-932-8400, **E-Mail:** d.clark@asepusa.com

Director: Dan Clark • **Website:** www.IAC25.com

Happiness is Delano (Southwest)

Saturday, September 1 - Sunday, September 2, 2007

Practice/Registration: Friday, August 31

Power: Primary through Unlimited

Location: Delano (DLO): Delano, California

Director: Bob Meyer

Phone: 661-822-0894, **E-Mail:** rmeyer0844@aol.com

Enterprise Rent-A-Car available at this location.

Harold Neumann Barnstormer (South Central)

Friday, September 7 - Saturday, September 8, 2007

Practice/Registration: Thursday, September 6

Rain/Weather: Sunday, September 9 - Sunday, September 9

Power Categories: Primary Sportsman Intermediate

Location: New Century Airport (KIXD): Olathe, KS USA

Director: Paul Thomson

Phone: (913) 638-6221, **E-Mail:** info@iac15.org

Enterprise Rent-A-Car available at this location.

Illinois State Open (Mid-America)

Friday, September 7 - Sunday, September 9, 2007

Practice/Registration: Friday, September 7

Power Categories: Primary, Intermediate and Unlimited

Location: Illinois Valley Regional Airport (VYS): Peru, Illinois

Phone: 815-363-8967, **E-Mail:** hrhndfrm@aol.com

Director: Bob Hart • **Website:** www.IACChapter1.com

Enterprise Rent-A-Car available at this location.

Apple Turnover (Northwest)

Friday, September 7 - Saturday, September 8, 2007

Practice/Registration: Thursday, September 6

Rain/Weather: Sunday, September 9

Power: Primary through Unlimited

Location: Ephrata Municipal Airport (EPH): Ephrata, WA

Director: John Smutny and John Pierson

Phone: 206-248-2650, **E-Mail:** johnsmutny@yahoo.com

Website: www.iac67.org

East Coast Aerobatic Contest (Northeast)

Saturday, September 8 - Sunday, September 9, 2007

Practice/Registration: Friday, September 7

Power: Primary through Unlimited

Location: Warrenton-Fauquier Airport (W66): Warrenton, VA

Director: Scott Francis

Phone: 703-618-4132, **E-Mail:** s.francis@ieee.org

2007 U.S. National Aerobatic Championships

Sunday, September 23 - Friday, September 28, 2007

Practice/Registration: Sat., Sept. 22 - Sun., Sept. 23

Glider Categories: Sportsman through Unlimited

Power: Primary through Unlimited

Location: Grayson County Airport (GYI): Sherman/Denison, TX

Director: IAC Headquarters

Phone: 920-426-6574, **E-Mail:** iac@eaa.org

Rocky Mountain Invitational (South Central)

Saturday, October 6 - Sunday, October 7, 2007

Glider Categories: Sportsman through Unlimited

Power: Primary through Unlimited

Location: Lamar Municipal Airport (LAA): Lamar, Colorado

Phone: 303-648-0130, **E-Mail:** jamietreat@hughes.net

Director: Jamie Treat • **Website:** www.IAC5.org

Mason-Dixon Clash (Northeast)

Friday, October 19 - Sunday, October 21, 2007

Power: Primary through Unlimited

Location: Farmville Regional Airport (FVX): Farmville, VA

Phone: 919-349-0057, **E-Mail:** Jwslim1@aol.com

Director: Jim Walker • **Website:** www.IAC19.org

Borrego Akrofest (Southwest)

Friday, October 19 - Saturday, October 20, 2007

Power: Primary through Unlimited

Location: Borrego Valley Airport (L08): Borrego Springs, CA

Phone: 714-743-0360, **E-Mail:** ron@rapp.org

Director: Ron Rapp • **Website:** www.IAC36.org

For current listings, visit www.IAC.org

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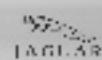
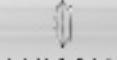
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