

The *Starduster* Magazine

Vol. 29, No. 1, January 1999

Published for the biplane builder, the biplane owner, and the aviation enthusiast



In This issue –

- The Wild Blue Yonder –6
- The 1913 McCabe Biplane –15
- What You Can't See *Can Hurt You* –23, 24
- The Art of Flying Tailwheel –33

Published by –
Stolp Starduster Corp.
129 Chuck Yeager Way
Oroville, CA 95965

The *Starduster* Magazine

Stolp Starduster Corp.

129 Chuck Yeager Way
Oroville, CA 95965-9200
530.534-7434

530.534-7451 (FAX)
takeoff@starduster.com
For technical help
tech@starduster.com

President

Les Homan

Secretary

Mary Homan

Office Manager,

Sales Manager

Ken Nowell

Consultant

Bill Clouse

BCPREZ1@AOL.COM

The Starduster Magazine

Editors

Clay Gorton

801.292-0127

cgorton@burgoyne.com

Glen Olsen

801.292-2708

801.943-2931 (Home)

Regional Editors

Oscar Bayer

Arroyo Grande CA

Max Bennett

Buffalo NY

Charles Glackman

Evansville IN

Chuck Krabbenhoft

Sabin MN

Fred R. Myers, III

Conyers GA

Harry Mackintosh

Wimbledon England

Front Cover

Max Bennett's Starduster Too
N76GS in Flight

Inside Back Cover

Ray Siefker Flies His Award-
Winning Starduster Over The
Hills of Northern Oregon

Table of contents

- 3 President's Message
- 4 Verne Reynolds Dreams
- 6 Don Mortensen Reminisces About the Wild Blue Yonder
- 7 The Fulfillment of Bob Caravas' Childhood Dreams
- 10 Meet Lloyd Lambert

Correspondence

- 11 Letters from—
 - Jerry Acord ■ Patrick E. Barrett ■ Ron Walker
 - Galen A. Michael ■ Ray Siefker ■ Harry Mackintosh
 - N.E. Garvey ■ Chuck Krabbenhoft ■ Justin Chambers
 - Dan Benkert ■ Bob Caravas
- 13 From the Internet
- 15 A Bit of Biplane History

Tech Tips

- 17 How To Rig a Biplane
- 18 Self Locking Nuts
- 18 Fuel Valve Note

19 Photos of Outstanding Airplanes

Safety

- 23 Failed Controls in a Hammer Head
- 24 Stuck Controls on an Approach
- 25 To Prepare For Winter Flying
- 26 Locked Brakes Cause an Upset
- 27 The Safety Equation
- 29 CO₂ Poisoning In An Open Cockpit Biplane
- 30 Carb Ice a Real Threat

32 Schedule of Coming Events

Odds And Ends

- 33 *Sport Aviation* Showcases Acroduster, Stardusters
- 33 The Art of Flying Tailwheel

38 Order Forms

This magazine uses material submitted by its readers. The articles printed do not necessarily represent the views or opinions of *The Stolp Starduster Corp.* or *The Starduster Magazine*. The Corporation and the Magazine assume no responsibility nor liability for the accuracy of the printed material.

Presidents Message

Les Homan, President, Starduster Corp.

It's getting to that time of year when open cockpit flying is slightly more challenging. It is also that time of year to plan adventures. One of the things that needs to be done is to plan adventures and to carry them out. It is far too easy to think and not to act. Don't be one of those people sitting beside the fire next winter listening to great adventures; be the one talking. Adventures are many things to many people. To one Starduster aviator it may be flying to that pancake breakfast for the first time; for another, a trip to Bartlesville in early June then to Alaska and back. To a builder it may be finally getting it up on the gear or installing the engine. Some adventures just happen and can bring lots of memories. But if you check, I believe you will find, adventure is made more often than it just happens. A good adventure has a mixture of ingredients.

Planning—It may be down to the smallest detail or just a general idea.

Preparation—Getting the charts, finding where to get fuel and where to stay.

Practicing—Doing lots of touch and goes, making the airplane do what you want, feeling comfortable, figuring out that GPS.

Aircraft—Making sure your aircraft is ready for the adventure, oil changed, annual complete, maintenance up to date.

Weather—Checking with FSS and getting to know what and how to find out the info you need.

Division—For a great adventure this is one of the most important points. A trip from California to Kitty Hawk sounds like a big thing to do. A trip from the San Francisco Bay area to Reno is nothing, 180 miles, less than two hours. I just *divide* a long trip. Turn the adventure into lots of little adventures. A short trip in the realm of comfort is just the first part of an adventure. With proper planning and preparation the big becomes small and the small has many tales to tell. In that first leg you will have concerns and find pleasures. As the number of legs increases, concerns decrease and change and pleasures increase. Lots of small stories are better than one big one. Small adventures lead to larger adventures and memories are made.

At the end of the year I always look back and think to myself, what adventure did I miss this year that I may never get to take part in again. I try not to leave any unfilled spots. One thing to remember, adventure is terror recalled in tranquility. Terror is defined as anything outside of what we feel comfortable with and tranquility is defined as sitting around the safe, comfortable fire, swapping stories.

Keep the windshields clean and the exhaust pipes warm.

Happy New Year from Les and Mary Homan



THE STUFF OF DREAMS

By Verne Reynolds, Mt. Vernon, WA

We're often told, "You can't go back . . ." The way it used to be isn't the way it is, anymore. That first love can't be recaptured, the old home place has changed, everything sags with the passage of time.

Well, maybe. Maybe some stuff can't be had again. But the half-hidden memories are there, and the hint of some perfume or a wisp of a forgotten song can assure us that some things never leave us. It just happened. To me. Again.

It all started in 1972, more than a quarter century ago. I was the lucky guy who found a brand new STARDUSTER that had just been finished by a craftsman who was lured to employment out of the country. He left it for sale with a friend of his, and I became the owner. The story of that encounter and my first solo was the subject of an article in the July 1997 STARDUSTER magazine. But the N number the builder had chosen just didn't seem to fit my personal bias.

So I searched, and requested, and finally obtained N1923S. Why was that so special to me? First of all, I was born in 1923. That was, uh, oh . . . quite a while ago now (like 75, plus, if you add it all up). Then, the S, Sierra, meant I could jiggle with the 1923 jargon, when "23 Skidoo" was equivalent to today's "Cool", which replaced "Groovy", which replaced "Bitchin", which replaced "Oh you Kid", which replaced . . . Anyway, you get the idea. So, 23 SKIDOO was born, with my special color scheme. And N1923S was painted on the DUSTER. And it came to live with me, and absorbed me, and tickled me every time I called in for clearance at Santa Monica, where I became affectionately known as SKIDOO.

Then, the shifting winds of time caused me to sell N1923S to another Californian, who erased my coveted paint scheme in favor of his own design. Saddened, I thought 23 SKIDOO was gone forever, even though I was a little relieved when he repainted the DUSTER. It would have pinched for me to see the plane in its original colors and have it absent from my life. But then, the winds shifted once more; I bought SKIDOO back from him. He blew an oil seal on the downwind at Santa Paula

and decided he would never fly it again.

And so the love returned. N1923S was back where it belonged, and we picked up the romance where we had left off five years before. At Solvang, Skylark Ranch and 23 SKIDOO and EAA Chapter 491 became my haven of sanity in an otherwise topsy-turvy world. It never left me, never dimmed, the joy that came from opening the hangar door and knowing that SKIDOO was my willing partner, willing to forgive, forget, and join me in the frolic of sun drenched ecstasy.

But the winds shifted yet again, and I sold SKIDOO to a partnership of men in Texas. Much later on, I drove there once to see my aging friend, to sit in the cockpit one more time, to remember the feel of our time together.

Then it was gone. I lost contact. I knew they had sold the airplane, but I didn't know where it was. I think I didn't want to know, for fear it might call me back to try and recapture that elusive, vigorous time of life with the stuff of dreams to beckon me.

Then it happened. In a surge of circumstance, I subscribed again to the STARDUSTER magazine. In the first issue I examined, I stumbled onto the story that Clay Gorton had written about buying a DUSTER in California and flying it home to Salt Lake City. My heart leaped up in recognition; that was MY old Serial Number; that was MY old N number; I had found the traces of N1923S! SKIDOO was still alive and well, and living in Bountiful, Utah! With yet another new paint design!

I was elated! I rushed to the telephone and called the new owner . . . and learned the terrible news that the airplane had been destroyed in a freak landing mishap. No pilot injuries, thank Goodness, but now SKIDOO was broken and could never taste the gossamer of cloud again. A thousand miles away, I sorrowed.

Then another shift of wind and SKIDOO was reborn! A new wing, a new rudder, a new engine and propeller, and the gossamer welcomed back that smiling Phoenix to the company of eagles.

I yearned to see N1923S again! To sit in the cockpit one more time, to touch the familiar, to feel

the rush. Then, Oroville open house last spring invited all of us to the DUSTER reunion. SKIDOO was there, and so was I. And my new wife, who had never flown in a biplane, who watched me cavort and then weep with the sweet sadness of reconnecting. Her first ride was with Glen in SKIDOO. And then we wept together.

We had our own STARDUSTER by then. I had only recently bought N8331A from John Renquist, but I hungered for more than the beautiful bird that John had built. I hungered for SKIDOO.

Miracles happen. Sometimes, we call them acts of Providence, or coincidence, or gifts of love. Sometimes they come to us slowly, sometimes in a surge, sometimes they are planned. Usually they overwhelm us with an unexpected generosity. It happened to me when I received a call from my new friend, Clay, in Bountiful. He said something to the effect, "... the other owners and I have decided to give you back your stuff of dreams. You will have your old N number, 1923S, if you apply for it through the registration office in Oklahoma City. We have released it to your name ..."

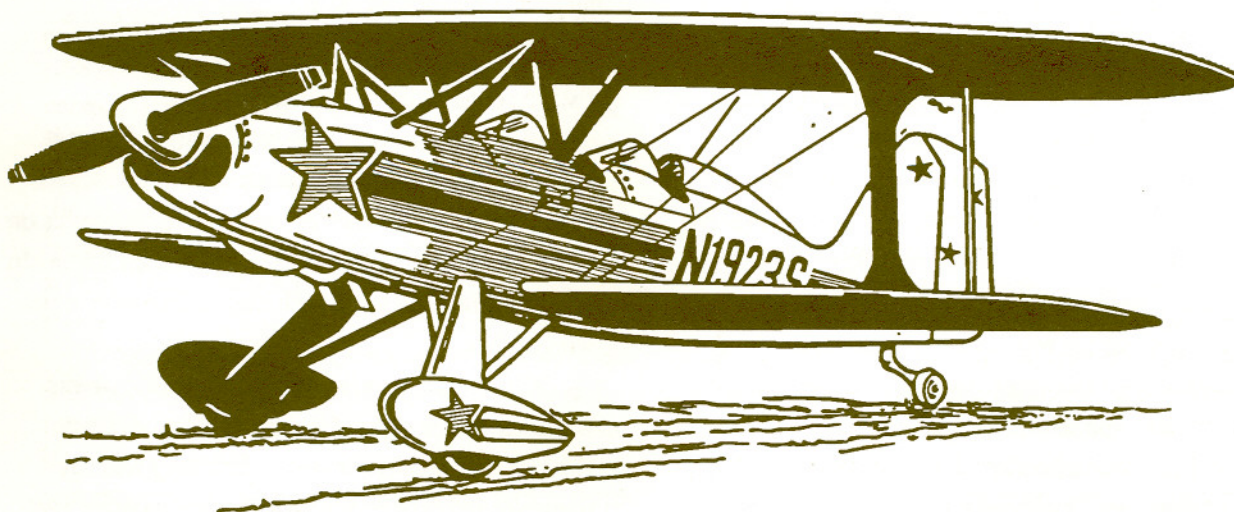
How much hunger and happiness can you handle at 75? The Funny Farm can wait. Geezerhood can be put on hold. The Old Codgers Club must do without me, at least until SKIDOO is unveiled on the tail of my new DUSTER. But it seemed to me I'd better hurry.

However, Oklahoma City was not in a hurry.

Red tape and bottlenecks are invented there. But finally, finally, they wearied of my calls and my pleading and my gnashing. They relented. They sent me that little bitty piece of paper that said, "O.K. Verne. You can do it now. You can remove the N8331A and redecorate with N1923S. And then you can go play nit-pick with your local FAA representative until he finally can't find any more nits. And then you can unleash your beast to race the wind past mountain tops and tie the clouds together with silver threads of music ... you and 23 SKIDOO ..."

It happened just that way. Only one little glitch. I was so absorbed in that first flight that I forgot to call in as STARDUSTER 23 SKIDOO. It didn't occur to me until I was safely back in the hangar, tap dancing my way into history, reliving the crispness of an early memory. Then it struck me. I had forgotten. A plague had settled in upon me. The curse of age, the sag of intellect, the wooze of septuagenarianism. Rats! Fie upon me! Forgive me, SKIDOO! I'll never make that mistake again!

So, was it worth it? Yes, I think so. Could I really go back and taste the flavor of how it used to be? Maybe not. Who will care when the smudge carries me away and the N number has no meaning to the next owner? Maybe no one. Maybe that's not important. Maybe the important thing is simply that I cared enough to try, and the trip was the golden fleece.



Ed. Note: This is a drawing of the original '23 SKIDOO. See photo of the new '23 SKIDOO on page 20.

THE VIEW FROM UP THERE

Lt/Col Don M. Mortensen

179 TFG. Mansfield Lahm Airport, Mansfield, Ohio

This article was written in response to a request for an article for Lt/Col Mortensen's squadron's year book. It is reprinted here by permission of the author. Don spent five years on active duty and 20 years in the Air National Guard and the Air Force Reserve, retiring in 1978. Don retired with over 3,000 hours flying time. He started out as a B-47 pilot, and has over 600 hours in the B-47. He then transitioned to fighters and has most of the remainder of his time in the F-100, although he has also flown the F-84 and the C-123. Don had never been licensed in civilian aircraft until he joined with Mike Guarino, Glen Olsen and Clay Gorton in buying the Starduster now called the UTAH-TOO.

One of the singular experiences airmen enjoy is the unusual weather phenomenon encountered while airborne. For instance, I have observed the icy, gilded footprints of contrails materialize in the frosty air high above the northern regions of North America, near the arctic circle. There, the northern lights formed great, undulating curtains on either side of the aircraft that extended from high above us all the way to the ground. They took on the shape of vast, glowing corridors and great hallways which made us seem small and insignificant as we flew between them.

I have raced the great, red ball of the sun westward to the horizon as it slipped into its final resting place for the night. And watched in fascination at the magnificent green flash,¹ as it flung its final rays of light upward into the darkening sky. A curiosity of nature rarely witnessed by those anchored to the ground.

I have seen silvery ribbons of rivers stretching out for hundreds of miles, glistening like neon lights in the haze of an early morning flight and reflecting the colors of a brightening, eastern sky.

And far from the ambient effects of ground lights, I have flown formation with the moon and the stars, where my eyes could penetrate the deep blackness of the night sky and travel millions of miles into space.

I have watched as the erie glow of St. Elmo's fire danced and cavorted across the skin of my aircraft, first on one side and then on the other.

I have lifted off rain-soaked runways, with limited visibility, punched up through layers of stratus clouds and burst into bright sunshine and clear blue skies. I have played in clouds, between clouds, over and under clouds, unrestricted by anything except my own limitations and gravity.

Nowhere but in the air can one see the many faces of weather and the unlimited opportunities to develop such an intimate relationship with the wonders of it. But there are encounters where one is grateful for just the memory and nothing more.

One such encounter happened when a flight of four of us were returning to Mansfield from a deployment to Homestead AFB, in southern Florida. The weatherman had told us that there was an active front midway through the flight that we would encounter, but thought we could get above it or circumnavigate it. It was one of those times when you wished the weather man would have to fly the route he had just briefed you on.

Well, he was right, we hit it just as forecast. What he didn't realize was that it had developed into a major storm and formed a solid line miles on either side of us, precluding our going around it. In addition, the tops were high above us by the time we got there.

Major Ray Sarafin was flying lead with his wingman to his right. I was lead of the second element, which put me on his left wing and my wingman to my left. Ray had been in contact with the flight center and was being vectored to the

area of the front where there was less activity and turbulence. With the information from center, Ray decided to try to punch through. Obviously, that was the only thing we could do if we were going to get home, so he signaled us to tuck in tight and hang on while we penetrate the dark insides of the towering, cumulus clouds.

As we tucked in, overlapping wing tips and lining up wing lights with helmets, I locked my eyes on the lead aircraft and saw Ray drop his head to transition to his instruments. Just then, there was a bright flash and I saw a ball of lightning roll off lead's wing towards me. At the same time, I felt a sizeable electrical shock shoot up through my hand gripping the throttle, that went all the way to my shoulder. It startled me and I remember thinking, "Whoa! Are you sure we want to do this?" Then we went IFR and there was no turning back.

After a couple of minutes of what seemed like a wild roller coaster ride, we punched out the other side and settled down for a smooth ride to home plate. I asked the others if they had felt anything or seen the lightning ball when we got on the ground. None had, but all remembered the lightning. I must have been loaded with positive ions that day.

1. Ed. Note. *The Green Flash is a phenomenon associated with the setting sun. Under proper atmospheric conditions the last limb of the sun visible above the horizon may appear as a bright green. The effect is due to the prismatic effect of the atmosphere that bends the blue end of the sun's spectrum into the ground, while the red end remains overhead. The effect is only visible when the sun sets over a distant horizon and only lasts for fractions of a second. However, the green flash may be observed for several seconds from a speeding jet at high altitude climbing into the sun.*

Bob Caravas' Starduster Too

Reprinted from *Sportsman Pilot*, August 1998

(See photo, page 19)

Remember how you used to have to turn in your books each spring at the end of the school year, and how frantically you flipped through the pages erasing all the airplanes you had drawn in the margins so you wouldn't be charged for damage? Well, Bob Caravas was one of our fellow page margin artists and he recalls that all his dream planes had beautifully curved lines, with elliptically shaped wings and tail surfaces. So ingrained in his aesthetic sense were these shapes, in fact, that decades later when he walked down the showplane line at the Watsonville, CA fly-in and saw a Starduster Too for the first time, he instantly recognized it as the embodiment of all his childhood dreams. He knew then he had to have one, but he certainly did not know how long and ardu-

ous the journey would be before he and his Starduster Too would arrive on the showline at Merced '98 and have the photos taken that you see here.

Bob is originally from the San Carlos, CA area, just down the peninsula a way from downtown San Francisco. Like most kids growing up in the 1930's pilots were his heroes and flying was what he wanted to do when he grew up. He thought he was on his way to a career as an Air Force pilot when he was accepted for the aviation cadet program in 1943, but had his class cancelled before he could get to the flight training phase. The war was ending and he was not interested in any of the non-flying assignments being offered him, so he opted for a discharge and returned to civilian life a very disappointed young man.

Deciding that a career as an airline pilot might be a good alternative, Bob learned to fly in an Aeronca Champ in 1947 and began working his way toward a Commercial license. He had never really investigated the job requirements beyond the need for a Commercial ticket, so was shocked when a United recruiter told him he was competing against ex-military pilots with thousands of hours of four-engine time and really wouldn't be considered with his grand total of less than 200 hours of light plane flying. After a similar turndown by TWA, Bob went to work as a welder for an aerospace company and spent the next 28 years building, among other things, radar units and parts for the Apollo space capsules. Some of his work made it to the moon and back.

Unfortunately, that company closed its doors in 1977. He took a job with another company, but it lasted just eight years before undergoing changes that put him out of work again. Thoroughly disgusted with the roller coaster ride so characteristic of the aerospace industry, Bob pulled up stakes in 1988 and moved his family to Grants Pass, Oregon and opened his own certified welding business, Aero Welding. He's been at it ever since, but considers himself "semi-retired" today.

Bob saw the plane of his dreams at Watsonville in 1973 and bought the plans soon afterwards. He had been out of flying for a number of years and had taken up taxidermy as a hobby, along with hunting and fishing, so he began selling his taxidermy equipment and supplies to finance the purchase of materials to build his Starduster Too. That carried him only so far, however, so he had to seek other ways to finance the project. Fortunately, that came easily enough, in the form of welding jobs for fellow homebuilders. Being a certified aerospace welder and familiar with lightplane structures opened a lot of doors for him, the most significant of which was as a hook-up with a machine shop in San Carlos that was doing subcontract work for Christen Industries during the start-up phase of the Christen Eagle program. Bob welded up the tail feathers and other small components for the first 20 Eagles built—everything except the fuselages which were too large to fit in his small home workshop. When the orders for

Eagles began surging in, Frank Christensen had to create his own in-house welding department. But the subcontract work Bob had received for the first batch of them pretty well got him over the hump on his Starduster Too—and perhaps more significantly, pointed the way to his own future business.

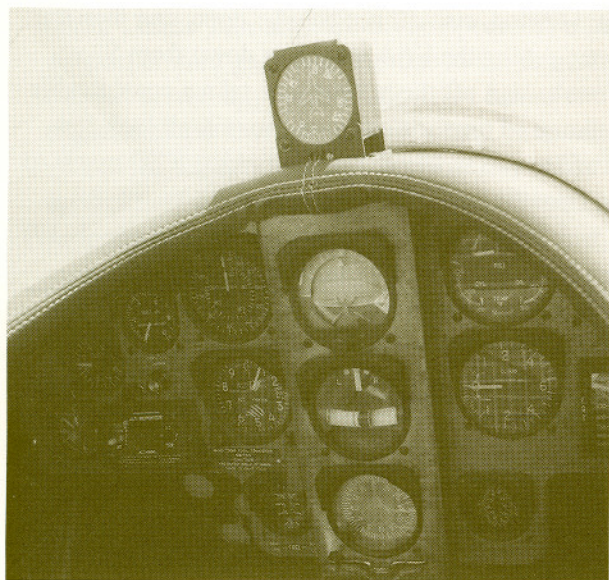
Because he had to pinch pennies on his project, Bob did all the work on his Starduster himself, except for the fiberglass parts. Because they are so uniquely shaped and so define the looks of a Starduster Too, Bob purchased the fiberglass nose-bowl, wheel pants and turtledeck from the Stolp Starduster Corporation, as almost all Starduster builders have over the years.

Throughout the long construction phase, Bob stuck very closely to the plans, deviating only in the choice of material for the wing leading edges and in the addition of what he calls "whistles and switches." The plans called for .016 aluminum leading edges—which Bob felt was too thin and prone to dents. He was in correspondence with Dr. Jim Young at the time, whose Starduster Too "Big Red" would be Grand Champion at Oshkosh a year or so down the line, and learned that Jim was taking a page from Ken Rand's KR-1 and KR-2 construction methods and was making his leading edges out of foam, Dynel cloth and epoxy. Jim used solid blocks of foam and subsequently had the heat from the sun deform the leading edges just a bit. In an attempt to avoid that problem, Bob used two foam blocks, an upper and a lower, to form his leading edges. This left an air space between them, and seems to have kept the heat down sufficiently so that his leading edges are remaining nice and smooth.

Some of Bob's "whistles and switches" included landing and taxi lights, an extended portion of the rear seat instrument panel to allow room for gyro instruments, rear view mirrors like those on a Stearman, and a handhold to assist the front seat passenger in climbing up on the lower wing walk. He also added rudder trim and stops for the ailerons to avoid the possibility of their linkage getting jammed over center and locking them up.

Bob initially intended to follow the lead of a fellow builder at Grants Pass and find a runout

engine he could overhaul. However, after seeing how many parts the friend had to discard because of AD notes and excessive wear, he decided to buy a new 180 hp Lycoming IO-360 81E instead. He also bought a Hartzell constant speed propeller to make better use of the horsepower.



Bob designed his own upholstery, but had it sewn by a professional upholsterer. The material is the same as that used in his Cadillac. He also designed his red and blue on basic white paint scheme . . . about 15 to 20 times, he says, before he came up with something he felt he could not improve upon. The airframe was covered with Stits (now Poly Fiber) fabric and finishes, and Bob highly recommends the process. Stick to the instructions in the manual, he says, and a good job will be the happy result.

Bob has a NAV/COM radio and a transponder in the airplane and a Christen wobble pump to back up the engine-driven fuel pump. One of his two fuel tanks has a flop tube for inverted flying.

When finally completed in August of 1997, N49BC had an empty weight of 1,355 pounds. That's a little heavy, Bob concedes, but is mainly a reflection of all the little cockpit vents, access doors, special work on the cowling to make it smoother, etc., but they were things he wanted and enjoyed making, so he doesn't regret an ounce they added to the plane's weight.

Having invested so many years of his life in the project and having been out of the cockpit for so long, Bob wisely asked a friend, ex-Navy pilot Hal Averyt, to make the first flight. Hal and several other qualified pilots subsequently wrung out the Starduster during its test period, and Bob got himself checked out in the airplane. It cruises at 120 mph, climbs at 700 to 800 fpm and is more than capable of withstanding any acrobatic maneuver he can put it through, he says.

Bob attended his first fly-in in the Starduster Too—Merced '98—in early June of this year and came away the winner of the Best Biplane - Open trophy. Just a little something to go with those dreams that started in grade school.

MEET LLOYD LAMBERT

By Oscar Bayer, Regional Ed.

Lloyd Lambert of Cayucos, California—WHERE? (just north of San Luis Obispo on the coast), is building a Starduster TOO. Lloyd bought his plans and a welded fuselage project in 1996 and has progressed to the point where he is 90% finished with only the last 90% to go. He works on his project at the San Luis Obispo County Airport in a "T" hangar which is pretty crowded, but at least under cover.

When I last visited him he had the airframe pretty much assembled except for adding the ailerons, and we discussed connecting the aileron push-rods, the proper tension of the flying/drag wires, bolt installation, how to measure the dihedral on the lower wings, etc., etc. He is anxious to get to the point where he can run the engine; a Lycoming O-320-H2AD, 160 horsepower, swinging a 66" Great American wood propeller.

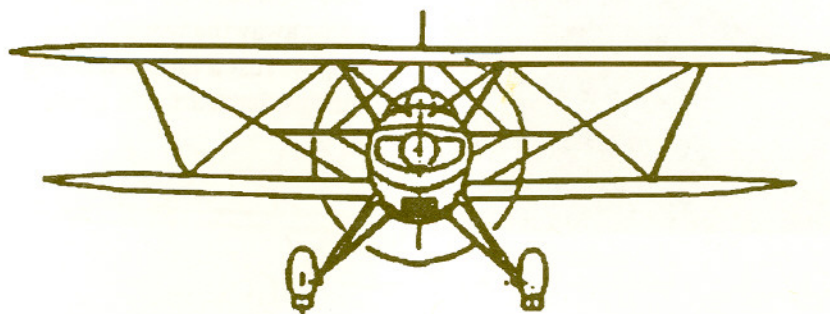
Lloyd covered the airframe using the Stits process, painting it overall Pontiac Red with Glacier White Stars. The cockpits are upholstered in a similar red and he has the required basic instrumentation but no radios as yet. His "N" number is 52LU, the LU for his nickname and the 52 for the year he graduated from the Naval Academy. He did a tour in Mine Sweepers during the Korean Police Action, and then opted for civilian life, gaining advanced degrees through a PhD in Physics,

(just what an amateur airplane builder needs).

He worked in the Nuclear Weapons program and then moved on to teaching at a New England University. Tiring of the east coast, he moved to the Central California coast and to more important things—like building a Starduster. His biggest problem is finding enough time to work on his machine while keeping his marriage afloat, (his words!) One of the innovative ideas that I liked about his aircraft is that the fuselage fuel tank cap is under a hinged cover in front of the forward windshield, one less obstacle to look around while taking off or landing.

Like most of us he has had help from other builders and would like to recognize Dan Sanders of Tehachapi, CA as his greatest source of aid. Lloyd would like to finish the project in time to fly off the restrictions and make it to the Oroville Open House in 1999, but if he is like most of us builders, he will be lucky to make it in the year 2000. That last 90%—building fillets, gap seals, weighing the aircraft, mounting the wheel covers, taxi testing, etc., all needs to be done, and then the wait getting the FAA inspector down from San Jose to sign off the project, can take a considerable amount of time. At any rate, we will all look forward to seeing Lloyd's great looking RED machine at Oroville and at Wautoma soon!

(See photo, p. 19)



Correspondence

To Glen Olsen—

You asked for it!! Received your letter on 1 Nov. about our Starduster II. It is called the Gold Duster. (See photo, p. 21.) It came from Santa Paula, CA and we acquired the aircraft from pictures and information only. A young man by the name of Justin Rizor flew it back to St. Joseph, MO (southern route) in February 1996. I had wanted a biplane for many years.

My history about flying started in 1947 in a new Aeronca Champ, but being eighteen years old and no money, that was it. After returning from the Korean war in 1953 and married with three kids, I still wanted to fly. So I worked for the Missouri Air National Guard with a great pay of \$240.00 per month. I found a 1946 Aeronca Chief for \$650.00, but told the man I didn't have that kind of money. His statement to me—"Well, go get another man." I got two men, kept it three years and sold it for \$1,172.00.

I also was commander of the local CAP unit and we had two—each Piper Super Cubs! I completed thirty-five years with the Missouri Air Guard and 10,000 hours as loadmaster supervisor on C-97's and C-130's. I was also in-flight refueling supervisor on a KC-97L.

Our Gold Duster has a 150 hp engine with approximately 550 TT on the aircraft and engine.

My fellow aircraft owner for over 40 years is James H. Davis. He started flying in 1936 and should be the oldest flying Starduster pilot at age 82. I am just a kid at 70 years, but we have a good time flying the biplane in the Spring and Fall, but we also have an extra sharp Piper Cherokee 180. We've had that for eight years.

Jim Davis was an aircraft inspector with the Missouri Air National Guard, and he served in the Army Air Corps from December 1940 to 1946. He was in China with the famed Flying Tigers and crewed a P-40 for three years. General Claire Chenault flew his airplane quite a few times.

Jerry Acord, Wathena, KS

Starduster Magazine,

This magazine is great, what with the color photos and personal experiences. Makes me want to be in the club and join in the activities. The web page is enjoyable and I appreciate the interest in all levels of ownership, not just new kits.

Enclosed is a flick of my 1964 SA-100, built by Gordon Schmidt of Great Falls, Montana. It features an O-320 150 hp engine, aluminum ailerons with push/pull tubes, a wing tank (5 gals.) And Cleveland brakes. (See photo, p. 22)

Happy Flying,

Patrick E. Barrett, Poulsbo, WA

To: takeoff@starduster.com

Saw my Starduster on your web page. When I saw the SA100 at Flabob in the late 60's I knew that was what I had to build. Lou Stolp gave me a set of the Starduster Too drawings and was a big help in modifying my airplane—great guy!

The airplane has an O-360 C2C Lyc. Christian inverted oil and a Starduster inverted main tank and two wing tanks.

I finished it in 1981 and although I have missed having another seat for my wife, I cannot seem to part with it. If I can ever find the time, I may just build a TOO. Keep the company going. The Stardusters are the prettiest biplanes I have ever seen. I am honored to have my airplane on our web page.

Ron Walker, San Carlos, CA

Dear Les,

15 Sept. 1998

I wanted to let you know I really appreciated all your efforts in completing my aircraft. The flight back to Indiana was uneventful. Blue sky, visibility unlimited, with only five knots of surface wind. My first stop was Winnemucca, NV; second stop and overnight stay was at Elko, NV. The second day I flew 8.2 hours, stopping at For Bridger, WY, Kimpall, NB and overnight at Crete,

NB. The third day I flew 5.0 hours, stopping at Galesburg, IL and on to destination at Elkhart, IN. Total flight hours were 16.7.

The engine ran well and only used one quart of oil. The engine is also running dry and smooth. (I have not checked the oil screen.) The aircraft flies like a dream. I think I have made a friend for life. Every stop drew a crowd and my landings are getting better.

I have gone to two fly-ins and have met several Starduster owners/builders. They all are asking about the canopy. Hopefully you'll be getting some orders! I do need some weather stripping for the back of the canopy. And would you also send me a parts catalog?

Also, thanks for letting me borrow your seat cushion. It helped me sit higher and made me much more comfortable on my trip back to Indiana.

Hope you did well at Reno and hope to see you at the May 1999 open house.

Happy Stardusting,

Galen A. Michael, Elkhart, Indiana

P.S. the canopy is working great and I am really happy with it.

Dear Les, 20 Sept, 1998

Starduster II, N1YW. This project took 14 months and 2000 hours to complete with the help of a friend, Wayne Ensey. The first flight was February, 1998. It was a great flight. I flew the recommended 25 hours off in time to take the plane to Oroville, CA in May, 1998 for the Annual Starduster Openhouse. With a group of pilots from Oregon, I made the flight in *MY PLANE!* It was a great flight. My plane received the Grand Champion award at Oroville. I then flew the plane to Arlington, WA in July, 1998. At the Arlington Air Show my plane received its second *award—1998 Champion Custom Built Plans.*

The plane is powered by a 200 hp Lyc. IO-360 and cruises at 140 mph on a 76x60 Sensenich prop. The covering is Stats PolyFiber and Aerothane paint.

With two awards and 67 hours of fun flying the plane I still am in awe of the fact that I built this plane in 14 months.

Ray Siefker, Albany, OR

(See photo inside back cover)

Dear Clay and Glen,

8 Nov. 1998

Thanks for your letter of October 22. I will see what I can do here with regard to contributions to the magazine.

Things go a little slowly now with Christmas holidays and winter weather. October has been wet and windy with few good week-end days for flying. I last flew my Starduster four weeks ago, and now have to do the annual inspection before I can fly it again.

I had hoped to arrange an informal Starduster fly-in this year but it will be Spring next year now. The few owners I spoke to seemed keen.

The magazine certainly is excellent. The colour photos really add to the articles. Your Starduster Too looks good, Clay. I remember you talking at Oshkosh 1996 about buying a Starduster, definitely worth it.

Sincerely,

Harry Mackintosh, London, England

Starduster Magazine,

17 Nov. 1998

Great publication! I look forward to each issue with great anticipation. (Maybe this issue will determine whether I finally switch from Lus-combes to Stardusters.) Keep up the good work.

N.E. Garvey, Floyds Knobs, IN

Dear Glen & Clay,

18 November, 1998

I just thought I would drop you a line or two and renew my subscription to the Starduster Magazine. Thanks for asking me to be a regional reporter for the magazine. I don't have much to report right now as the ground is pretty white and the air is a bit chilly for open cockpit flying.

I've found another Starduster Too that I would like to buy but I have to sell mine first. If you know anybody that's looking for a nice well-kept Starduster, have them give me a call—218.789-7250.

One more thing that I would like to clear up is that article by Mike Guarino about Wautoma where he mentions the incident with the young lady. The way I remember it—oh well, it's history. Anyway, I did give her a ride the next day. It's all part of the fun, fellowship and good humor of Wautoma.

Chuck Krabbenhoft, Sabin, MN

Dear Clay,

1 December, 1998

Thank you so much for helping and being involved in such a great program. I was really excited and enjoyed riding in Glen's Bi-wing. I plan on getting my pilot's license and hope to own my own plane. I really like flying and I even went to Space Camp in the sixth grade. I enjoyed listening to you telling stories and the techniques of some of the maneuvers. I thought it was very interesting and fascinating. Thanks again for the wonderful time.

Sincerely,

Justin Chambers, Bountiful UT

Ed. Note: Justin is another of Glen Olsen's Young Eagles. He happens to be the son of the VP for Sales of Carr Printing, the company that prints the Starduster Magazine.

Hi Clay,

30 Nov. 1998

The magazine keeps getting better each issue. Congrats on a great job. I recently spoke with Walt Parris of Winner, SD, owner/builder N398K. He and Al Ferwerda completed the project about nine years ago. It has not been flown recently and I'm not sure the time has been flown off for license. Walt is 83 years old and loves to talk about the Starduster. I sent him a copy of the magazine and requested pictures and additional info be sent to you. I've seen the airplane right after it was completed and they did a very nice job.

Dan Benkert, Rapid City, SD

Starduster Magazine,

15 Dec. 1998

Thanks for the great Magazine—sooo much better. Keep up the good work. I always look forward to it.

Bob Caravas, Grants Pass, OR

From the Internet

www.avweb.com.

CALIF. BID TO CLOSE AIRPORTS? According to the California Pilot newsletter, a bill currently sailing through the Calif. Legislature will make it easier for airports in Calif. to be closed. SB1532 allows Caltrans (Calif. Dept. Of Transportation) to release communities from their obligations to repay state grants, if Caltrans determines that the airport is not needed.

PLANES AND HANGARS DAMAGED AT RYN: Ninety-five MPH winds at Ryan Field in Tucson (Ariz.) destroyed a dozen planes. Several hangars were damaged, including the last remaining original wood hangar from the field's WWII training days.

DO YOU KNOW YOUR DESIGNATOR? As if METAR/TAF wasn't enough, now we've got to re-learn something else! To push the U.S. into line with the rest of the world, the FAA has begun encouraging pilots to use the revised International Civil Aviation Organization designator in flight plans. Come January 28, writing the correct ICAO designator into the "Aircraft Type" section of the plan will become mandatory.

SAVING SEDONA'S AIRPORT: It's one of the most beautiful regions of the country and landing at Sedona is a thrill. Sedona Airport sits atop a mesa, giving the feeling of aiming for the deck of an aircraft carrier, albeit one that is stationary with no wire at the end to grab your tailhook. Now, it appears pilots are going to have to fight for the right to continue landing there. Local aviators tell AVweb they are fighting noise restrictions they fear could ultimately be used to close the airport.

FLORIDA AND NEW MEXICO: AIRSPACE BATTLEGROUND. AOPA is vowing to fight local ordinances passed in both Coral Gables, FL, and as reported earlier, Las Cruces, NM, that affect flight operations. Coral Gables has established a 1,000-foot minimum for aircraft overflying the city, and prohibits "stunt" flying and flight training over the city. The greater problem is this. If Coral Gables is allowed to preempt the FAA in setting flight regulations, where will any city stop? AOPA has asked Coral Gables to comply with federal law and remove the ordinances.

THE AIM IS NOW LAW. Meanwhile, in

New Mexico, AOPA continues to work to get Las Cruces to remove the ordinance regulating a pilot's conduct in flight at the city's non-towered airport. In June, the city passed an ordinance making AIM recommendations mandatory. Pilots are required to strictly follow traffic pattern procedures and those with radios must make the recommended calls. The airport manager has been given authority to issue misdemeanor citations to pilots who fail to comply. Despite requests by AOPA, the city isn't budging. City Attorney Fermin A. Rubio sent AOPA a brief response, "The city of Las Cruces does not intend to take any corrective action as we believe the ordinance is lawful and reasonable." The standoffs continue.

MAKING LIKE THE BIG BOYS: If you ever like to pretend your "Brand C" is more a "Brand MD," have we got an event for you! Newark International Airport, normally home to those that are bigger, faster, and heavier, is rolling out the welcome mat to GA on October 10, celebrating the types of airplanes that got this whole flying thing started. EWR is waiving all fees for the airport's 70th anniversary and is inviting GA pilots to fly in and add EWR to their logbooks. Free food and other perks as well! Be sure to register, because if you don't, fees won't be waived and you may be turned away.

IT GOT SO QUIET AND SMOOTH! We wonder if Tom Guntly of Wausau, Wis., can log this as glider time, since his Piper Comanche propeller came off at 1,500 feet AGL. Local police detective Steve Meilahn says the prop landed in the ground "like a hot knife in butter." Guntly kept his wits about him and landed at Wausau Downtown Airport.

FAA PUTS TICKETING PROGRAM ON HOLD . . . In the face of an all-out frontal assault by AVweb and leading airman alphabet groups (including ALPA, AOPA and EAA), the FAA's much-maligned plan for handing out on-the-spot airman compliance tickets has been "officially" put on hold. Known as the "98-1 Streamlined Administration Enforcement Action" program in FAA-speak, loyal readers know it as the "traffic ticket" enforcement mechanism that demands immediate closure and offers no real avenue for appeal. The hold decision came last week after top-level FAA types decided that enough of a stink

has been raised to look again at whether the program is really necessary. A July 21 meeting is scheduled to allow various parties to argue their sides. Afterward, the FAA will apparently determine if the plan will finally rest in peace or, like a phoenix, rise from the dead.

MEANWHILE, DISTURBING FAA FAQ FOR INSPECTORS RELEASED Adding fuel to this fire, the FAA late last week released a FAQ that was provided to inspectors being trained for the 98-1 program. Despite officials' repeated assurances to the contrary, this damning document specifically says that an enforcement target's refusal to agree that there was an FAR violation could be viewed as a non-constructive attitude and lead to a full enforcement action. "If a person does not agree that a violation occurred, one should question if administrative action is appropriate . . . at least one of the administrative action criteria would not be met," says the FAQ. The FAA says it wants to hear your thoughts on the proposed "traffic ticket" enforcement program. Let's not disappoint them. You can e-mail your comments to the FAA <mailto:9-anm-publicticket@hq.faa.gov>.

FAA REAUTHORIZATION BILL KIND TO GA . . . The just-out-of-committee FAA Reauthorization Bill rejects user fees and includes protection for general aviation airports. In approving the bill, the House Transportation Committee dealt FAA chief Jane Garvey a serious blow, yet again rejecting her plan to charge user fees and to split the FAA by creating a Performance Based Organization for ATC. The bill also hamstringing any FAA efforts to impose user fees, forcing the agency to prove why it needs your money.

. . . BUT WAIT, THERE'S MORE! Also included was a hodgepodge of other items, such as forcing the FAA to reverse its decision not to release airman mailing addresses (while allowing airmen to opt-out), reversing the rule ordering Alaska guides to work under Part 135, and instructions to the DOT to maintain and upgrade Loran-C throughout the transition to GPS navigation. But don't break out the Dom Perignon yet. Much as we hate being non-P.C., the large-boned lady hasn't yet sung. The bill still has to be approved by the full House, and the Senate is expected to start working on its version in July.

A Bit of Biplane History

H. Clay Gorton, Ed.



Each Oshkosh experience is an adventure. Last year the adventure for Glen and I was to fly through some pretty horrible weather on the way home. We found ourselves in IMR conditions, had a lightning strike that blew out our communication system, found ourselves above an undercast for about three hours, to mention a few. Finally, we had to put down about noon in Lexington, Nebraska. To while away the lonely hours until the weather cleared we visited the Dawson County Museum, and there found a surprising and apparently little known chapter in biplane history.

In the Dawson County Museum there is on display one of the earliest biplanes still in existence. Only eight years after the Wright Brothers first flight Emmet McCabe built two gliders with elliptical wings, joined at the tips. The first had a wing span of 24 feet and weighed 150 pounds. The second one had a wing span of 16 feet and weighed 55 pounds. The gliders were attached to a cable and pulled behind an automobile. McCabe rode the

first glider to a height of 30 feet. His younger brother, lighter in weight, rode the second glider to a height of 80 feet. With a tethered cable the boys flew the lighter glider in winds as strong as 60 miles per hour.

In 1913 McCabe filed for a patent on his unique wing style. (Note in the photo above the ailerons on the tip of the wings.) The patent was granted in 1917. The next step was to add power to the machine. This they did by installing a 40 HP motorcycle engine. Test pilot Marion Huffman first flew the airplane in January, 1914. However, because of the light engine it could only gain a few feet of altitude. Rather than installing a more powerful engine, they built a lighter airplane. The lighter version flew as far as eight miles at an altitude of 800 feet AGL.

In 1919 McCabe took flight training and obtained his pilot's license, so that he also could fly the airplane. (See a copy of that license on the next page, provided courtesy of the Dawson County

Historical Society, Lexington, NE.)

McCabe tried to interest the Navy in a pontoon version of the airplane to be used for reconnaissance, that could be disassembled and stored in a submarine. The Navy, however, was not interested,

and McCabe went on to other ventures.

Emmet McCabe died in 1957. In 1971 his wife, Mrs. Cecil McCabe, donated the "baby bi-plane" to the Dawson County Museum, where it is now on display.



Number 841

LICENSE FOR FLYING CIVILIAN AIRCRAFT.

By virtue of authority conferred by Proclamation of the President of the United States of America (No. 1432) February 28, 1918, regulating the flying of civilian aircraft, the Joint Army and Navy Board on Aeronautic Cognizance hereby issues this license to—

Name I. E. McCabe

Address c/o F.B.Cook Co., Zion City, Illinois.

to conduct flying in civilian aircraft in accordance with the following terms and conditions:

Description of aircraft Plane built by self

Identifying mark of aircraft (to be as described on reverse side of this license) 841

To be operated by I. E. McCabe

Passengers to be carried None

Territory in which to be operated (subject to U. S. and State laws) Only over open ground where there is no danger to civilian life and property from the experiments

Purpose for which flights are to be made Experimental

This license is valid from date until revoked.

(This license is not evidence of pilot's qualifications nor the reliability of aircraft used.)

Issued by direction of the Joint Army and Navy Board on Aeronautic Cognizance this 21st day of July, 1919.

THE JOINT ARMY AND NAVY BOARD ON AERONAUTIC COGNIZANCE,

Building D, Sixth and E Streets, Washington, D. C.

Captain, Air Service,
Secretary.

Tech Tips

Rigging the Biplane, Part I

By Ben Owen

Sport Aviation, Nov. 1998

The early airmail pilots had occasional problems with breaking wires due to ice build-up in flight. We rarely have this problem, but biplane rigging and wire tightness . . . that's another story! These hints and tips for rigging a biplane have been developed over a period of years. Many of the basic suggestions will also work for other aircraft.

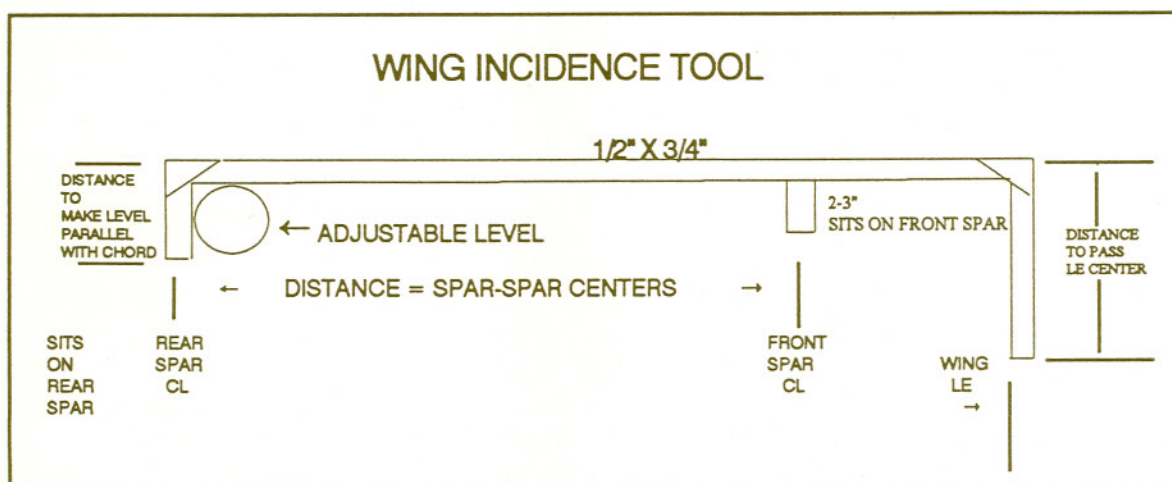
First you need to block the airplane up. Since most biplanes are of steel tube, the top longerons are generally used to level the airplane fore and aft and side-to-side. The axles themselves should be blocked up sturdily. The airplane should not be on the wheels as tires may flex and cause an erroneous reading. The tail is usually put on a sawhorse and also sturdily blocked in place and tied down.

A nice trick that has been used by many builders is to buy the particular type of bubble level with the concentric circles and the bubble in the middle. Epoxy it to a cockpit floor where it can be easily read from the outside. The concentric circle round bubble can then be read easily and used over the life of the airplane.

can be used on all four wings. An adjustable level can be placed in the corner as shown, or placed on top of the tool. The new electronic levels are accurate to within 1/10th of a degree and are very useful in rigging—would be strongly suggested.

Lower wing fittings are usually in line and you can place a rod through the front and rear fitting holes. For most biplanes the rod angle will be equal to the lower wing incidence. Corrections necessary to the fuselage fittings or wing fittings should be made at this time.

The next order of business is to position the wing center section. If you are working with a one piece upper wing, a team of helpers may be needed. The incidence of the upper wing is set using the cabane struts and the roll wires, if applicable. If there is a small center section, boards across the longeron with an adjustable camera tripod on top may help to position its incidence properly. Many cabane struts use Piper lift strut forks on the ends. They are generally used only once in the setting up



Incidence tools (see diagram) do not need to be elaborate. As much as possible the top bar should be level with the chord line. This constant chord wing incidence tool is courtesy of Curtis Pitts. It

of the wing. You may be able to establish the length of the cabane struts without using lift strut forks by using other scrap tubing to determine the exact center-to-center distance from the center

section to the fuselage cabane. These test pieces holes can then be transferred over to the streamline tubing, hopefully establishing the center section or top wing exactly. The nice thing about the lift strut forks is that they do allow you to adjust for possible wing sweep off-center, one way or the other, but once done, the built-in forks are rarely used and do add weight.

The next move is to place the upper wing in place and the more help the better. One lower wing is put in place and the interplane strut is tack-welded in place, checked again and final welded off the aircraft and reinstalled. When the interplane strut is right, landing wires can then be installed while the top wing is brought up to level on one side. The other side follows suit. At this time it's a good idea to measure from the wing tips to the rudder post to make sure that the wings are not skewed and to sight carefully down the leading edges to make sure that the fittings were properly built. Then you start the whole process of sighting down, checking

incidence, and shimming where necessary.

Famed racing pilot Johnny Livingston was an expert at this type of rigging. You could loan Johnny your airplane, he would fly it for a week and it would come back flying much better than before. You can do it too, with a little thought. You may need to release tension on some wires to place shims here and there as necessary to maintain incidence. Usually after you've got the airplane set up it will fly well, but it may need other minor adjustments. Most ailerons do tend to float up in flight. Some people like to set them down and others like to set them in line with the wings for appearance when on the flight line. As you adjust, check level and measure, you should gradually tighten up flying wires, landing wires and the tail brace wires. Wire tightness comes under the heading of art, science and opinion. Keep a close eye on the incidence . . . move the incidence tool to the surface you are working on!

Self locking Nuts & Bolts Subject to Rotation

From *EAA Technical Counselor News*, Summer 1993

There is an advisory circular on this very subject, AC 23.607-1. What it mentions is that the FAR section 23 requires that no self-locking nut may be used on any bolt subject to rotation and operation unless a non-friction locking device is used in addition to the self-locking device.

TECH. COUNS. NEWS ED. NOTE: I've seen a landing gear axle nut of the self-locking type on a

5151 recently and I also saw a self-locking nut on a Pitts with a Haigh tailwheel that had come off at Oshkosh '92. This is an important fact for Technical Counselors to remember when looking at aircraft. If there is rotation involved, and the bolt is essentially an axle, it is essential that no self-locking nut be used in that application.

Fuel Valve Note

From *EAA Technical Counselor News*, Summer 1994

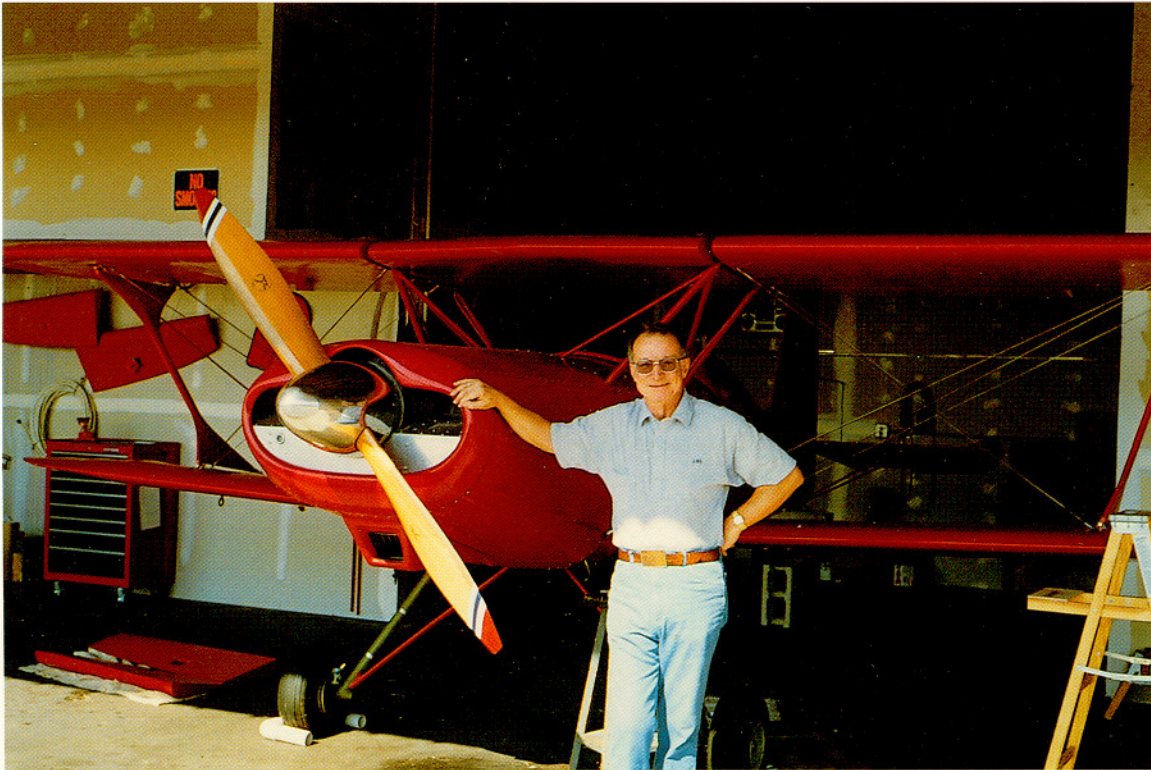
We have forwarded a letter to the Aircraft Certification Service, Aircraft Engineering Division regarding the imperial 3-way fuel valve. We have had complaints because of the need to use pliers to turn it in-flight and it being a leak source. Nat Puffer is finding that the imperial valve has

brass on brass, although it is type certified. The Weather head valve has a Delrin which swells up. The currently recommended valve seems to be the Allen valve which is anodized aluminum (this is apparently the fuel-selector valve of choice among the Cozy crowd.)



SA300 Bob Caravas, Grants Pass, OR

SA300 Lloyd Lambert, Cayucos, CA





SA100 N4WT Glen Smith, Colleyville, TX

SA300 N1923S Verne Reynolds, Mt. Vernon, WA





SA100 N70JH Jerry Acord, Wathena, KS

SA300 N53T Scott Simpson, Solvang, CA





SA100 N156S Patrick Barrett, Poulsbo, WA

SA300 Denis Roberts, Omaha, NB



Safety

A Hair Raising Hammerhead

Fred R. Myers III, Conyers, GA

Yes, there I was at 3500 feet lined up alongside the 4000-foot grass strip. Oil pressure and oil temp good. Prop set, mixture rich, power set, radios set. I announce "Aerobatic activity at Sky Ranch." A double wing waggle. I reconfirm that the airspace is clear. Airspeed 180 mph. I pull vertical to begin the first maneuver—a hammerhead turn with a 1/2 roll on the down line.

I pull the stick back, add a little right rudder and set the vertical line. I look out at the wings, equally matched slightly above the horizon. Airspeed 100 mph, another glance to the wing tips, airspeed bleeding through 60. As the Acroduster stalls with a slight rumble, I add a little forward stick then full left rudder, bringing in right aileron. The aircraft pivots, I recover and set the down line, counting "one thousand one, one thousand two." I roll 1/2 turn, a quick 2-count and pull to horizontal.

"Oh No! Something's not right! The stick is offset to the left. Something is wrong, but what?" I didn't feel or hear anything, but something is wrong here! The four ailerons are OK, the aileron struts are OK. I pull the power back and begin my descent thinking, keep what I've got and fly the airplane. Determine if I have control of the airplane; if not, I've got safe altitude to jump.

Making shallow turns I feel confident that I have full control of the Acroduster. Again I start down, thinking and wondering what broke. The aileron system is not complex—two sticks, a torque tube, belcranks, bush rods and rod ends to the aileron control horns. I announce down wind

and continue my descent, looking out to my right at the 4000-foot strip, turning to base, my altitude is slightly higher than normal. I've got one last turn and lots of altitude if anything goes wrong. I'll turn final, planning to land long since I won't slip as I usually do. Wheels touch, I'm home free. "Wow, that was sporty!"

Taxiing back I move the stick right and left and I can feel the slip. It's in the torque tube. I can see the stick slipping within the aft section of the torque tube just forward of the stick attach towers. Engine shut down, I climbed out to confirm that the aft end of the torque tube outer tube rosette welds have failed. I removed the torque tube assembly and confirmed that there was not proper penetration of the rosette welds into the inner tube.

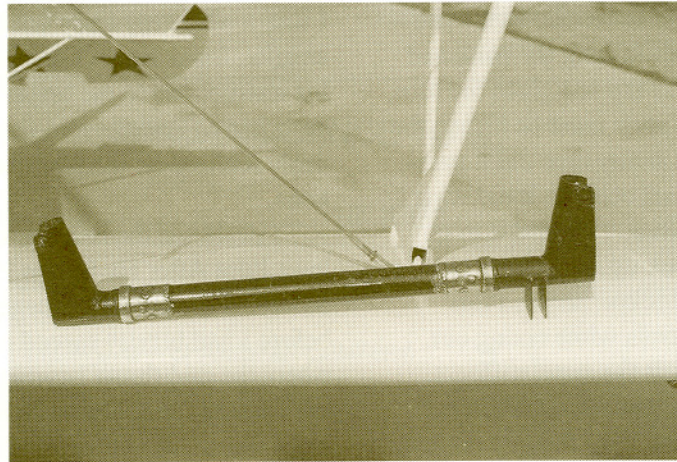
Please note that this is a modified torque tube assembly which incorporated needle bearings at the pivots. This torque tube was fabricated by an unknown source and is not available from the Starduster Corporation.

With the help of Phillip Cole, our EAA Technical Counselor and master welder, we drilled 3/8 inch holes through the outer tube and re-welded the rosettes. For safe measure, this was repeated at the forward end of the torque tube assembly. I was flying again that afternoon.

Moral of this

story—drill through the outer tube or material when welding rosettes and verify penetration. I hope this will help you in your building and flying adventures.

Editor's Note: For additional information on checking flight controls, see Clint Lowe, "Flight Control Failures," *The Starduster Magazine*, 28, 4, Oct. 1998, pp.29-30.



A Starduster Thanksgiving

By Don Mortensen, Salt Lake City, Utah

Thanksgiving Day 1998, came with a rush and so did family members looking for two things, a turkey dinner and a ride in our yellow Starduster, the 'UTAH-TOO.' I had just earned my Private Pilot's license and in my enthusiasm had promised rides to everyone, and now was payoff time. We had been enjoying unusually warm weather for November and I'll admit it looked like a great day to make good my promise.

During the walk-around inspection, I checked the flight control surfaces to see that they worked freely. Nothing unusual noted. When I lifted the elevator and let go, it dropped freely as I expected it to.

I was about to start the second flight with my daughter and two year old grandson strapped on her lap in the front seat. I noticed while taxiing out, that the stick felt stiff in the full back position. I asked my daughter if the stick was hitting anything up front. She affirmed it was hitting the grandson, but would try to hold him back further in her lap. Since this would essentially be a 'straight and level flight,' I saw no problem. We launched.

The flight went as expected and the only time I noticed any stiffness with the controls, was when doing steep turns. After establishing the bank and sucking the stick back in my lap to tighten the turn, I got the sensation that the stick must be hitting the grandson again. But never at any time did it present any problem with aircraft control. It did what I wanted it to do and went where I wanted it to go.

On the next flight, I took up an 18-year old grandson. Since he fit the cockpit better, I felt nothing unusual in the controls while taxiing out. When airborne, though, I felt the same stiffness when executing steep turns; but since the aircraft was so responsive to the controls I thought nothing more about it.

Back on the ground, we were rolling the U-TOO back in the hanger, when I noticed the elevators were in the full up position. I found I could move the elevator surface to any position and it would stay there. I thought, maybe a glove or a scarf might have gotten tangled with the torque tube or was binding somewhere else, but could see

nothing in or around the cockpit. It was something more serious, I reasoned, and called Glen Olsen, one of the part-owners of the U-TOO.

Glen, as most of you know, is intimately familiar with most aircraft and especially with the one our group owned. I met him at the hanger the next morning and slowly, by elimination, he narrowed it down to the mid-throw bearing, located where the fuselage squeezes down to a few inches, just in front of the tail assembly. Glen's cure was to get some lubricating oil into the bearing to loosen it up. We took off panels, moved tubing and wires, stretched and bent our arms and elbows in ways they were not meant to be stretched or bent, but could not reach the mid-throw bearing with any degree of accuracy from the outside.

Glen's considered opinion then was to get it from the inside. He volunteered me. After taking the backrest out of the rear cockpit, I threaded myself headfirst down through braces, crosspieces and control wires. I tried reaching it on my stomach, I tried it on my back, on my side, arms up, arms down, one arm up, one arm down. At one point, I couldn't move forward or backward. There I was—where my body got bigger, the aircraft got smaller. I was stuck. Glen had left for work, but his instructions to me before leaving were, "Try to get some oil into the mid-throw bearing." I suddenly realized he wouldn't be back until late afternoon.

I could see the headlines now: "Airplane Swallows Pilot After He Brings Broken Bird Home Safely." I did finally manage to wiggle out, but not before I had blindly spread oil all over the area where the mid-throw bearing was. But after moving the stick back and forth several minutes to help work the oil into the bearing, it didn't feel much better. I finally gave up and went home.

Glen finally solved the problem by cutting a small 2 to 3 inch hole in the fabric next to the bearing. He was then able to get a socket on the bolt to loosen the bearing and work some oil into it. It works great again, and I'm looking forward to getting the rest of the family up for a ride in the U-TOO. . . when the weather's warmer.

Winter Flying: Be Prepared, Or Else!

By Carl Petersen, president of the Citabria Owners Group

A story currently unfolding on a mail list that I subscribe to is reason to review preparations for winter flying. It seems that a group of people headed out on a flight a few days ago and have not reported in. They disappeared from radar somewhere in the Sierras. It has been cold up there and the chances of survival, for the ill prepared after a crash, are slim.

Now think about it. If you put your plane in and survived the crash, could you survive? Probably not if you haven't really prepared. One who has written well about this topic is F. E. Potts in his book *Bush Flying*. All winter flyers owe it to themselves to read what he has to say on this subject at least once.

In an airplane you can really cover some distance. Even in an Aeronca Champ you could easily be far from civilization in a very short period of time.

This means two very important things to you. First, you will have a very long walk out if that is your choice. Second, rescuers will have a long trek in to get to you, if and when they locate you. I believe the FAA doesn't really consider you missing until 72 hours after you were supposed to check in. Fat lot of help that will do if you are not prepared!

Pull out a sectional. Right now. Take a look at the country that is between your home airport and some of your favorite winter destinations. Do you see any places in between that might be a long walk out? Imagine yourself, in the worst conditions that winter could possibly throw at you, standing next to a plane that you just landed (emergency, precautionary, etc.). Are you going to be comfortable waiting for help? Could you survive a walk out from there?

In Alaska, I am told, it is required that you carry food and supplies for one week after your intended return date. Good advice. I also hear that this is a law that the pilots religiously abide by up there.

Staying warm

Pack a bag! Bring what you need to survive the toughest weather that winter could possibly come your way in the region that you are traveling in. For winter pack your Polartec, Gore-Tex,

Primaloft, and wool stuff. Bring lots of energy foods. There are lots of web sites devoted to winter camping and mountaineering that can describe this so much better than I can. Winter mountaineering is really where you will be after you put it in. Be prepared!

I live in Minnesota and we still have the bragging rights to "the icebox of the lower 48." I have a small duffel bag that rides around with me all winter. In the car and in the plane, it goes with. Wearing the clothes I carry I could nearly lie down in the snow to comfortably sleep, AT THIRTY DEGREES BELOW ZERO!

I have a hollowfill snow suit. I have a primaloft jacket that can go over that. I have Gore-tex bibs and a Gore-tex shell to go over it all to keep me dry. Gore-tex Gaiters, Polartec Baclava, snowmobile boots, and several weights of gloves. This year I will replace my worn out goggles and keep them in the bag. When the wind is blowing and it is really cold they are a lifesaver! I might also include my 3.1 lb two man tent and a winter sleeping bag. I may even add snowshoes.

Do you think I am getting too high tech? Remember, "cotton kills". Cotton gets wet with your sweat and stays wet. Leave it home. Silk "ain't" what it's cracked up to be. Down is by far the warmest insulation for clothing and sleeping bags but if it gets wet it is worthless. (I "soaked" a down sleeping bag in the Boundary Waters long ago in the month of July and had some miserable nights after that . . .)

Fire and first aid

If you are going to start a fire when it is really cold you will need matches, dry ones. Forget the cigarette lighter as the fuel doesn't burn worth a darn below zero. Try not to burn the maps, you may need them. You have plenty of things to burn. You won't be needing that POH soon and if an FAA guy shows up the last of your worries will be the ARROW stuff you long ago forgot about from private pilot training.

You could start a fire using the battery and some cables for spark and some of the fuel you still have in your tanks (you do have fuel in the tanks, don't you?) Be aware that the

battery creates hydrogen gas (very explosive) and that it doesn't take much gas (not as explosive as it is cracked up to be when in the open air but keep it downwind and off of your clothing/self!) This is a time to get inventive, not lie down and die!

Carry a small first aid kit. The normal stuff and then some. One of my favorites is from my horse days. Leg wraps are like ace bandages only better. They make it easy to create a makeshift splint too. If you bring a knife with you (recommended) use the wing/seat fabric for the same purpose.

Summoning help

Remember how to check your ELT? I know it has been a long time since private pilot training but this could actually be the thing that saves your life. Make certain it works before you take off! If you do put it in a field and don't actually see a place to make a phone call make certain that your ELT actuated. They don't always go off by themselves. Check it with your handheld or the aircraft radio (121.5).

OK, you are warm and dry. Can you raise anyone on your handheld VHF radio? You do carry one, don't you? 122.9 is a good bet in the country, next 122.8. Try air-to-air on 122.75 and 122.85. If the SAR folks are looking for you they will be monitoring 121.5 for your ELT. Commercial jets monitor 121.5 also. Surprise them and give them a

call. If you are in an area where pilots may be talking to a tower or approach try them on those frequencies (see your sectional). They may hear you even when the controller can't . . .

What if help doesn't come?

So, against all advice against walking out (everyone gives this advice, it makes it easier for them to find the bodies) you decide to walk out anyway.

Take the compass! The plane won't need it for awhile and there is absolutely no sense walking around in circles. Make a plan. The closest place on the map may not be the easiest, fastest, or likeliest place to get to. Pack what you need. Make a pack out of the seats if you have to.

Stuff to stay alive, stuff to find your way, and stuff to contact aircraft if available. Heck, take the ELT with you...

Leave a message in the plane telling would be passers by of your circumstances and intent. Tell the date of your "collision with a planet", your physical condition and that of any passengers, where you set off for with your compass and when. If they find the plane first this may speed them in your direction.

Oh, if you hear that my plane is down don't give up hope because of a little weather. I am probably all warm and dry, sitting next to a big fire, munching on my energy snacks, and planning my hike. Where the heck are you? You could be here, helping me decide what airplane to get next . . .

Locked Brakes

By Oscar Bayer, Regional Ed.

Scott Simpson flying his Starduster Too out of the Santa Ynez, CA airport had a mishap with his machine at the San Luis Obispo, CA airport on 9 November, 1998. After landing and turning off onto a crossing runway, Scott had the brakes lock up on him and flipped the aircraft over on its back. He wasn't hurt, but the aircraft has substantial

damage to the left upper wing, the vertical stabilizer and rudder, the aft fuselage lower longerons and of course that very expensive propeller. The engine, a 220 hp Continental, will have to be torn down as well. The aircraft, N53T, was built by John Travis and completed in June 1976. It looks like its rebuildable, but that is a decision that Scott has yet to make. (See photo, p. 21)

The Safety Equation

By Bruce Landsberg, Executive Director of the AOPA Air Safety Foundation
From *AOPA PILOT*, Nov. 1998

There is seldom a simple answer to a simple question. At a recent AOPA Air Safety Foundation seminar, a pilot came up to me to ask what the real scoop is on safe flight. He wanted to know how risky it is, as many of us do. That depends on a variety of factors. A straight answer to this question involves multiple qualifiers and more dissembling than the average politician running for reelection.

It is easier working equations with constants rather than variables, but the safety equation is almost completely variable—with one exception. How safe do you want to be? You can be perfectly safe from aeronautical mishaps by not flying, only to fall victim to an errant driver, stray bullet, or meteorite. Is flying less safe? Well, yes and no. Yes, because exposure is reduced, but no, because you're not as proficient.

Starts to sound like the famous Catch-22.

Starting with the least variable part, the aircraft is generally reliable if it is properly maintained and suited for the mission. The certification process, as much as we may fuss about it, ensures some degree of performance. Very few airplanes come apart in flight unless they are being flown outside the envelope. This is good, and we've come to depend upon it. But let's get into the variables. If the airplane is not approved for flight in icing conditions and there are icing conditions en route, then the risk has gone up—is that a function of the aircraft or the weather? The pilot has, in theory, the ability to change which airplane he flies. In practice, this usually doesn't happen, because most of us have only one airplane at our disposal and, in most cases, flight into known icing is not one of its approved operations. Weight is similar—put two moose on a one-moose airplane and the risk has gone up. Now you need to either get a two-moose machine or divest yourself of one moose. It's basic math that the aircraft is approved for flight with only so much weight on board. When that number is exceeded, the margin goes down. Place the weight improperly and things won't balance—the risk goes way up. The pilots in Alaska know a lot

about this, especially the aspects of handling moose.

Maintenance of the aircraft is essential. While it's difficult, perhaps impossible, to make a statistical correlation between the age of an aircraft and its probability of involvement in an accident, it is only logical that older machines will be more prone to failure. Corrosion, wiring, flight control cables, propellers, engines, and all other parts do not escape the passage of time. When something fails, the risk goes up—sometimes a little, sometimes a lot. Old aircraft require constant mechanical vigilance to manage the risk.

So far, we've discussed the easiest part of the safety equation—the aircraft. It is the most predictable variable; maintain it well and operate within the limits and you have managed that risk. Now let's go to a less predictable but measurable aspect, the phase and type of flight. Takeoffs and landings are the highest risk phases for an accident. Unfortunately, we haven't figured out how to go aloft or return without takeoffs and landings, so there will always be exposure. Managing the risk is easy to say but not quite as easy to do. Be proficient with crosswinds. This is the number one cause of damaged aircraft. It's tough to schedule a crosswind where and when you need it for practice, but look for the opportunities.

Use runways with adequate length. The pilot operating handbook is a good start, but it's based on ideal numbers—new airplane, new engine, test pilot with exceptional skills, etc. The ASF recommends adding a minimum of 50 percent to whatever distance the manufacturer was able to coax out of the aircraft to clear a 50-foot imaginary obstacle. Our obstacles are real and so are the consequences. One reason the airlines have very few entanglements off the end of the runway is that they've over engineered their arrivals and departures. Much time is spent figuring the worst-case scenario and then adding a margin. If an engine quits, what is the climb gradient under the worst temperature and weight combination? Pilots of single-engine airplanes can consider off-airport

options; suppose there is a tailwind or standing water on the runway.

These are all items you may have thought about, but how do they apply to this airport at this time?

Follow the appropriate pattern procedures. As you've heard many times, the midair collision threat is the greatest around airports, so keep a sharp look-out. That time when the pilot is most distracted—takeoff and landing—is precisely when the aircraft seems to demand the most.

Configuration, power setting, navigation equipment—there's always something to divert the attention. If you keep in your mind the image of two aircraft colliding, there will be no difficulty in setting priorities. Accidents occurring during a type of flight are also predictable from a statistical sense. Personal flying, the kind most of us do, is the greatest risk because pilots seem less likely to exercise good judgment than when they are flying on business or receiving flight instruction.

While in training, pilots are encouraged to do the right thing under the watchful eye of a CFI. The experience is controlled and usually with a good risk-management approach. Instructors don't like to be put in compromising situations. We suspect that pilots flying on business are more experienced and may have aircraft that are more capable. The emotional aspect may be less of a factor as well—getting to a business meeting may exert less emotional pressure than getting the family to or from a holiday location. There may be less financial pressure. After all, the company is frequently paying for their flight and the expenses, so if there is an extra night in the hotel, it's not coming out of the pilot's pocket.

Now let's get to the messier part of the mix, and weather is one part of that. Predictable? Absolutely! When VFR is needed to get home, it's two days away in the forecast; and when pilots need some basic instrument weather training, the sun shines for a week. Now, try to guess when and where thunderstorms are going to turn a hazy summer afternoon into a turbulent maelstrom. Try again when the omnipresent winter icing threat is really going to freeze the tail feathers. Daytime VFR is the safest kind of flight. Night VFR is not quite as good.

When the weather goes to IMC, then the ante goes up. For VFR pilots this shouldn't be too complex. Forecasts for marginal conditions are usually quite accurate, and it's only a short step from marginal to unflyable. It's time to look at the risk/reward equation. Are you willing to bet your life and that of your passengers on a marginal forecast and wishful thinking that the weather is not quite as bad as they say? Do you have an alternate plan, and perhaps more importantly, do you have the will to use it? These intangibles can fog the assessment of risk, if you forgive the pun.

For IFR pilots flying in IMC, all the usual questions on currency and experience come into play and, if you haven't noticed, we have slipped into the most complex part of the equation, the wild card: Us. Like the weather, pilots fit easily into general categories, and then it gets complex. There are some well-known risk factors. Pilots with a total time of less than 200 hours are at a higher level of risk than more experienced aviators because they are still learning the basics and exploring new situations. The learning curve will continue for a lifetime, but it is very steep here. Less than 100 hours in a particular make and model puts pilots in a higher risk category because they are learning about the aircraft. This risk is so noticeable that the airlines designate new captains as "high minimum." Sure, they've just come out of training and are highly proficient in the academic sense—much like the new private pilot. However, the rule says that IFR landing minimums must increase by 100 feet and a half-mile visibility above the published minimum approach until more experience is gained with the aircraft. Seasoning counts.

The one exception in the safety equation that may override the other variables is attitude. A low-time pilot with a cautious, responsible attitude will take fewer risks than the cocky mid-timer who thinks he's seen it all. Generally, the real old timers aren't too brazen because they realize that the safety equation is complex and the variables can shift rapidly. Read the accident reports, put yourself in someone else's cockpit, and most aviation survivors come to realize that dangers can be subtle.

There is one last observation that doesn't negate the value of risk management but requires some maturity to understand. There are some serious risk-takers who defy the odds and survive despite predictions to the contrary. You know the type. They fly in marginal weather, too close to the ground. They overload the aircraft, skimp on maintenance, and ignore all the other tenets of safe

flight. There are possibly thousand of pilots who regularly take risks that are statistically insane and yet they depart the planet from nonaeronautical causes. It's not fair, but that's probability. Being safe does not eliminate risk—it reduces it. We fly because of the challenge, the joy, the practicality, the romance.

The reward of flight is worth the risk. You want guarantees? Call the tax man.

CARBON MONOXIDE POISONING

By Les Homan

Listening to a pilot explain why you cannot get Carbon Monoxide poisoning in an open cockpit plane is sort of like listening to someone explain why it is impossible to build an airplane. It happens all the time.

Where's the proof? Talk to anybody that has a smoke system installed in an open cockpit and ask him if he ever gets smoke in the cockpit, even just a little bit. In almost every case there will be a situation, maybe if the front cockpit is uncovered or there is a larger passenger in the front where some smoke will get into the cockpit. Carbon Monoxide is in the exhaust, there is no separator that breaks it out from the smoke and sends it elsewhere. Carbon Monoxide in small quantities for an hour or so, or large quantities for a few minutes can start the poisoning process. I speak from experience on this subject, having flown my Starduster Too for years. After every long trip, four or more hours of cross country, almost all the time with a front passenger, I would be out of energy and felt miserable. I added a smoke system and found that with the front cockpit covered, very little, if any smoke got into the cockpit. With the front cockpit uncovered, especially if someone was in the front seat, the smoke was terrible. It did not dawn on me until I read an article in the IAC magazine by Joan Osterude about her experiences that I learned what was happening.

Bottom line, if you smell exhaust gasses, even if you have a smoke system and notice smoke in the cockpit you can be guaranteed Carbon Monoxide is present. Even if the bottom of your plane is well sealed it does not do the trick. The next time you see someone with a smoke system, either fly beside them or have them make a low pass, normal cruise speed, and observe the flow of the smoke. It is turbulent and goes everywhere. You do not smell Carbon Monoxide, if you're lucky you feel the results in time.

I do not have the quantities of exposure that affect you, but it is not much. Symptoms include, but are not limited to, a sense of having the flu, light headedness, a headache and loss of energy. Any or all of these symptoms may be present. Check it out.

Les Homan

Ed. Note: *The Occupational Safety and Health Administration (OSHA) standard for exposure to Carbon Monoxide prohibits workers' exposure to more than 35 parts of the gas per million parts of air (ppm), averaged over an 8-hour workday. There is also a ceiling limit of 200 ppm (as measured over a 15-minute period)*

Carb Ice Demons

Howard Fried

www.avweb.com

Carburetor ice is an insidious killer, a demon which appears without warning, often when least expected. AVweb's Howard Fried provides some insight into why you might be caught out unexpectedly by carb ice, when to make use of carb heat to prevent it, and introduces some products to combat it. He also blows away some preconceived notions you may have about when to use carb heat. It isn't just for part-throttle operations.

Reader Jerry McKissack sent me an e-mail requesting that I do a column on the subject of carb ice. He wrote, "Could you do an article on carburetor ice and when to use the carburetor heat. What planes are more susceptible and why? I've heard the 150 is notorious for carb ice—why? Can you do anything to reduce it or prevent it—or is that just a fact of life in the air?"

He continued, "I've read all the books and AIM, etc. that say 'icing can occur in temperatures as high as 70 degrees F with high humidity, etc., etc.' 'Can' and 'will' are two different things. Should I take the precaution and turn it on, or simply wait and see if the symptoms occur? Can't icing occur during takeoff and climb—but we're told to not have carb heat on because it reduces power."

Jerry concluded, "I would like some of your experience along these lines."

Some answers

The purpose of the carburetor is to create a fuel/air mixture that is in the most efficient state of volatility. It does this by using Bernoulli's Principle—by forcing the air as it enters the throat of the carburetor through a narrow opening in the intake, called a venturi, into which the fuel is drawn and a volatile mixture is created. This is a result of a reduced pressure at the narrow point in the tube. A side effect of this reduction in pressure is a concurrent reduction in temperature, and if there is moisture in the air and the temperature in the throat of the carburetor is below freezing, ice can and will form.

Carb ice, like structural ice, is weird stuff. It does indeed form at unexpected times. Your infor-

mation is correct in that the Cessna 150 is particularly susceptible to ice in the carburetor. So are the older Skyhawks, those Cessna 172s with the Continental six-cylinder engine. Even newer Skyhawks with the O-320 Lycomings are much more prone to suffer from ice in the throat of the carburetor than Piper Cherokees with the same engine (the new 172R has an IO-360 fuel-injected engine).

When needed?

I believe this results from two causes: one, the Pipers are more tightly cowled, and two, the carburetor is positioned differently on the engine (next to a warmer part of the mill). You will note that in the manuals for the Cherokee series, Piper recommends that you check for carb ice in the pattern, then remove the heat. They imply that you should only use heat if you detect the presence of ice, even in a reduced power glide, whereas Cessna recommends that any time you are operating below the green arc on your tachometer, you should apply full carb heat. This is not to say that you cannot get carb ice in a Cherokee, you most certainly can, although I have personally never experienced it, while I have in a Cessna 170, 172, and 150. And, although I have never experienced it in a Beechcraft with a carbureted engine, I know of a Beech Model 95 (Travelair) with two of those great O-360 engines that was brought down by carb ice in both engines. In the Model 23 (Musketeer) series Beechcraft, the manual recommends the use of carb heat whenever needed. The problem for the pilot is knowing just when it is needed.

It is important to remember that carburetor heat is anti-ice rather than de-ice in nature. That is, it is meant to prevent the formation of ice, not to remove ice that has already formed. It is to be used as a preventative measure whenever conditions are favorable for the formation of ice, before any ice starts to form. It is not meant to get rid of ice that already exists in the throat of the carburetor. Ice can form in the carb in temperatures up to and even above seventy degrees Fahrenheit whenever there is visible moisture in the air, and as I once experienced, in clear air on a warm day.

Detecting ice

Is there anything we can do, or is it simply a fact of life for those of us who fly with which we must live? Well, it used to be “just a fact of life,” but there are two instruments available today to help the pilot. First, there is the Carburetor Air Temperature Gauge. This device operates by placing a probe in the venturi and measuring the temperature at that point in the air intake (the place where ice will form if it is going to do so). The gauge in the instrument panel in front of the pilot is color coded with a yellow arc in the zone conducive to icing, and if the needle is in the yellow arc, the pilot is to apply heat until the temp rises above the yellow arc. I have some experience flying behind this kind of instrumentation, and it works quite well.

Another carb-ice detecting device is called the Iceman Probe. I have no personal experience with this one, but unlike the Carb Temp Gauge, the Iceman Probe is said to alert the pilot to the actual formation of ice itself. It is designed to actually detect ice as it begins to form in the venturi tube of the carburetor.

The only thing I know that can “reduce or prevent it” is the application of carb heat early and often. Unless your airplane is equipped with a carb air temperature gage with a probe in the throat of the carburetor, apply carb heat if you have the slightest suspicion that conditions may be conducive to ice forming in the carburetor. I’ve even applied heat while taxiing a Cessna. (I know, I’m running the risk of having the engine ingest dust, sand, and other impurities.) I’ve also always been advised to use it all, if you are going to use it at all, because the application of partial carb heat could cause the formation of ice when otherwise it might not have done so. I have never experienced this phenomenon but I’ve certainly heard the advice enough times. Perhaps it is just an OWT (Old Wives’ Tale) with no basis in fact, but to be on the safe side I have treated it as gospel. This goes back to my earlier statement, if there is the slightest suspicion of the possibility of carb ice, I apply heat—all of it.

I never tell anyone how to fly. I explain what I do and why, and if the listener (or reader) likes the idea, he/she may adopt it. If not, it is OK by me. When using carb heat, to restore the lost power

caused by its application, I lean the mixture. Works for me. I do this on takeoff, climb, and cruise, anytime I’m using carb heat. As you pointed out, ‘can’ and ‘will’ are two different things. If it can happen, I don’t want to let it, whether it will or not. I believe in erring on the side of caution.

My experience

You asked for experiences. Well, as I pointed out above, ice is weird stuff. On those rare occasions when I’ve actually had ice form in the carburetor of an airplane which I was flying, it happened at the most unexpected times. Of course, if I’m expecting it, it won’t happen because I will have already applied heat.

On one of these occasions I was taking off in a light rain shower in a Cessna 150, with full power of course. Like you, I had been taught that you don’t get ice in the carb in a full power takeoff and climb. Therefore, I certainly did not expect to encounter carb ice. However, after climbing some two to four hundred feet after takeoff, the engine began to lose power. I applied full carb heat, and after sputtering for a few seconds, the engine regained full power operation (with the mixture slightly leaned). My reaction time was somewhat longer than it might have been because I was in a state of denial. I simply couldn’t believe that I had ice in the carburetor. After all, I had always been told that it doesn’t happen in a full power climb. But I’m here to tell you that it can happen and it does happen, because it did happen to me. There goes another OWT, shot to pieces. Just goes to show you can’t believe everything you hear.

Carb heat on takeoff

And, on this same subject of using carb heat during a full power climb, students are always told not to do so because of the loss of engine power with the addition of carb heat. My answer to this is that unless a pilot is required to get out of a short strip with an obstacle at the end of the runway, the slight loss of power won’t substantially detract from his ability to take off and climb. Also, leaning the mixture will compensate for the slight loss of power, so there’s nothing really wrong with using carb heat on the takeoff.

On another occasion, at seven thousand five hundred feet msl in a Cessna 170 (a great old taildragger), on a perfectly clear summer day (blue

skies and sunshine), my engine began to run a bit rough and gradually lose power. After trying everything else (switching tanks, etc.) I applied carb heat. Once again I was in a state of denial. It just couldn't be ice in my carburetor, but it was. Weird? I'll say. And, another OWT bit the dust. In both of these incidents the symptoms showed up at times I certainly wasn't expecting to find ice growing in the throat of my carburetor, so I was a bit slow to react properly by applying heat. Because of my policy of using full heat when I have the slightest suspicion that there might be ice around, these are really the only times I've encountered carb ice. Jerry (and anyone else reading this), I strongly recommend following the manufacturer's recommendations where carb ice (or anything else for that matter) is concerned. In fact, if you're flying one of those airplanes in which the manual advises the use of carb heat only "as needed," I suggest erring on the side of caution and using full heat anytime you have the slightest suspicion that ice might form.

Just to be safe

Reader McKissack says that during his private check ride in a PA28-151 Piper Warrior, in which

he has never experienced carburetor ice, on a long power-off glide simulating a forced landing due to engine failure, the Designated Pilot Examiner reached over and applied carb heat. Although Warriors are not particularly susceptible to carb ice, I would have done the same thing—just to be on the safe side. A power-off glide sets up an excellent condition for the formation of ice in the throat of the carburetor because the engine is subjected to substantial excess cooling. This is one reason why, during an extended power-off glide, we "clear the engine" by briefly applying power every few seconds to insure that the engine will respond when we need it to.

If I were to own and regularly fly an airplane with a carbureted engine, I would invest in either an Iceman Probe or a Carb Air Temp Gage, but since I fly a variety of aircraft, I will continue to operate as I have in the past, applying full carb heat anytime there is the slightest suspicion of the possibility of carb ice. This is what experience has taught me.

In most cases, someone else has already gained the experience you need the hard way—keep an eye out!

Schedule of Coming Events

Sun 'n Fun '99—April 11-17

Oroville Open House,—May 14-16

National Biplane Convention and Expo.

Bartlesville, Oklahoma—June 5-6

Starduster Alaska Adventure—June 7-21

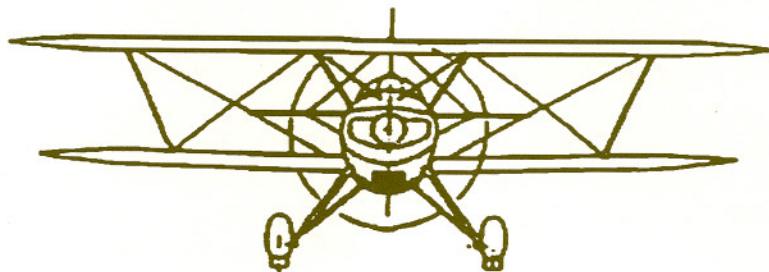
Chuck Krabbenhoft's Starduster Fly-in,

Sabin, MN—June 12

Phone No. 218.789-7250

NW EAA Arlington, WA Fly-in—July 8-12

Oshkosh '99—July 28-Aug. 3



Odds and Ends

Acroduster, Stardusters Featured in *Sport Aviation*

In the article on "Reno '98" in the Nov. '98 *Sport Aviation* are shown photos of the winning airplanes in each of the racing categories. Page 67 features a photo of the first place winning airplane in the Biplane Bronze category, a Super Starduster SA101, together with the pilot, Les Homan. This is Les's second first place win in the bronze category. (His SA101 was also on display at the Starduster booth at the Oshkosh Convention.)

Glen Olsen's perennially favorite Acroduster is pictured on page 75 with Glen and one of over 175 Young Eagles that he has introduced to the thrill of

flight. Glen has flown more Young Eagles (one at a time) than any other pilot in the State of Utah.

On page 127 is a picture of Chuck Krabbenhoff's beautiful Starduster Too, showing the airplane following his "touch up" job, which included removing the wings and replacing the fabric on the fuselage. That is one touched up airplane!

The Dec. '98 issue features on page 125 a brief article and photo of Ray Siefker's award-winning Starduster. (See Ray's letter on page 12, and a photo of his beautiful plane in flight inside the back cover of this issue of the *Starduster Magazine*.)

Why Not Fly Tailwheel?

By Rick Durden

From AvWeb, 23 Nov. 1998

Does the thought of flying a tailwheel aircraft scare the you-know-what out of you? AVweb's Rick Durden says there's way too many myths out there about how difficult a tailwheel plane is to fly. Yes, you have to pay attention, but it's just a different set of skills, and a different attitude is required, but a tailwheel is not a demon ready to bite off your head. Rick provides us some easy to follow guidelines that will keep you out of trouble when you get checked out in your favorite tailwheel airplane.

Several years ago our local sheriff tried to check out in a Cessna L-19 Bird Dog he had obtained for the county following some major thefts at local farms. It did not go well. OK, that's an understatement. He set some sort of record for groundloops on landing. He went through two instructors trying to figure out how to land the airplane without doing a doughnut during the last portion of the rollout.

Keep in mind the Bird Dog is a tailwheel, single-engine, liaison/reconnaissance airplane used heavily during the Korean War and so good it

stayed in the military inventory for a long time. (Cessna called it the model 305.)

During the sheriff's gyrations, we sat on the benches outside the pilots lounge here and watched. He would touch down smoothly on all three wheels, roll reasonably straight down the runway until he was going somewhere between ten and fifteen miles per hour and, ZAP! Around the airplane would go. It reminded us of a runaway swivel chair. The airplane never dropped a wing during the excitement. In fact, our sheriff never damaged the airplane at all. Don't get me wrong, he had a reputation as a pretty good pilot, yet he never could make three landings in a row without whistling around madly during one. It drove him, and the two instructors, nuts.

Taking bets

It got to the point some of the more cynical were taking bets as our sheriff came down final, just like my dad and others used to do at Pensacola in '44 when the Wildcats would be flown back on land after the pilots had spent months at sea doing nothing but arrested landings.

We thought that perhaps the L-19 might be rigged wrong, but some of the other instructors and experienced tailwheel pilots flew the Bird Dog without a problem. In fact, I liked it, and to this day wish I could have spent more time in it. It was one of the best-handling tailwheel airplanes I ever flew. With sixty degrees of flap travel it would do some amazing things and land quite slowly. Unfortunately, the sheriff gave up and got rid of the airplane.

There proved to be a negative side-effect to the wrestling matches our sheriff had with the L-19. The tailwheel checkouts on the rental Citabria here nearly dried up. The combination of the "demon tailwheel" articles in some of the popular aviation magazines and the memory of the whirling sheriff just plain scared off a lot of pilots. It didn't matter that Hack, of indeterminate age, but probably older than the Wrights, smoothly handled the Piper Super Cruiser he had bought new despite almost being a menace in a car. Nor did it matter that the tiny grandmother, Mary, used her Cessna 185 to make flights for LightHawk, the conservation folks, flying from some pretty primitive strips.

The newer pilots regarded tailwheel pilots as some sort of super beings. They didn't notice that the folks who came to fly the Citabria for aerobatic dual also discovered, incidentally, that tailwheel flying was a heck of a lot of fun. It seemed the mythology of the tailwheel had overcome common sense.

I enjoy flying tailwheel airplanes so the reaction of pilots bothered me. In giving tailwheel checkouts for over twenty years, I have found it to be some of the most satisfying instruction I do. That is due in part because many students show up utterly scared to death by the horrible stories they have heard about tailwheel airplanes. Some almost have a fatalism about the idea of a tailwheel checkout. To become a real, macho-type pilot they seem to think that they must learn to fly a tailwheel airplane. Yet, no matter what, they seem convinced it is going to get rolled up into a ball with them cringing inside and saying, "I knew this would happen, I just knew it."

They discover it is not that bad

Most have a heck of a lot of fun and kick themselves for not checking out sooner. However, some of them do aviation a great disservice by

spreading the tailwheel terror myth.

There are books dedicated to flying tailwheel airplanes. Most are good. But, due to their length and complexity, they seem to add to the deification of the tailwheel airplane pilot and the demonization of the airplane.

As a result, a few of us here in the pilots lounge decided to see if we could come up with some basic guidelines to apply to flying the little beasts. Just stuff to keep in the forefront of your mind, similar to the short checklists we all memorize. The idea is to give a pilot an assist when, on short final in a gusty crosswind, the mind does the "Now what do I do?" bit.

Semantics

I am only talking about tailwheel airplanes, not taildraggers. Taildraggers have tail skids, not wheels. They are extremely rare. If you have the chance to fly one, get a detailed briefing on its specialized operating practices because they tend to vary from airplane to airplane. Some are incapable of handling a crosswind, being designed when airports were open fields and all operations were into the wind. Taildraggers are beyond the scope of this discussion.

Some basic guidelines

1. You must start and stop each turn.

Because the center of gravity of a tailwheel airplane is behind the main landing gear, any turn on the ground requires the pilot to take action to stop the turn. That seems very simple, but think about it. In a nosewheel airplane with the c.g. ahead of the main gear, the pilot must take action to keep the airplane in a turn. Release the rudder pedal or brake and the airplane straightens out. Not so with a tailwheel airplane. A turn will continue and may tighten up unless the pilot does something to stop it. That basic rule must be ingrained into the pilot's consciousness. Rudder deflection is required to stop a turn. By the same token, when the turn has ended, it is necessary to stop the rudder input. Sounds simple, and it is, but it is essential to understand this on an emotional level.

2. Be alert anytime the airplane is on the ground.

Yes, I know, aviation needs more Lerts, yet being alert and wary is the key to doing well in tailwheel airplanes when on the ground. In a nose-

wheel airplane, it is not uncommon for the pilot to breathe a big sigh of relief when the gear touches the runway. It is comparable to the yahoos on airliners who unbuckle their seat belts upon touch-down at 140 knots and then smack the seat in front when the brakes or thrust reversers take hold. In a tailwheel airplane ground time is the time when things get most interesting. When the airplane starts to swerve, it will not correct itself. The pilot must stop the swerve, then make the needed correction to point the airplane back in the direction desired, and then stop the correction. Sure, the adage about flying the airplane until all of the parts stop moving may be a cliché, but many catchy little clichés in aviation tend to have evolved because they were true. It is a good one to heed.

I keep thinking of the new Luscombe owner who came to me for a checkout. I talked landings and the importance of paying attention after touch-down for well over an hour before we flew. He came down final, made one of those absolutely gorgeous landings where the tires slowly start rolling, then looked over at me as if to tell me all my warnings were so much drivel and said, "\$@%#," this is easy." The Luscombe promptly headed for the weeds. Between us we eventually got the airplane straightened out. He never made that mistake again. He was also able to check out very quickly, because he was most alert any time the airplane was not tied down.

3. Make a decision as to where you want the airplane to go at all times.

You must decide as to the route and then act on it. If the airplane turns to the left or right from where you want it pointed, by any amount at all, correct it immediately. That means two degrees of turn, not ten or fifteen or twenty before corrective action is taken. Again, a simple rule. When followed aggressively, it means the pilot is not going to bend an airplane, assuming the original plan as to where the airplane should be going was not faulty.

Tailwheel pilots get in trouble when they allow a change in heading rather than intentionally making it. This also means that you plan your turns in those airplanes where you cannot see over the nose and must make 's' turns while taxiing. While heading sloppiness may be tolerable in a nosewheel airplane, in a tailwheel airplane it will mean a

ground loop. Everyone has watched pilots who allow their nosewheel airplanes to just sort of head off in some general direction. When doing that in tailwheel birds, they get bit, then complain vehemently it was the airplane's fault. In a tailwheel airplane you pick a point well ahead of the airplane. If the nose is in the way, use points on either side of the nose, then do whatever is necessary to keep the airplane in the correct relation to the reference point(s) and going where you want it to go. That is part of the reason what you are doing is called being pilot in command.

4. Be willing to put the controls to the stops.

It is sometimes necessary to put a control surface to the stop to get the airplane to go where you want it to go. While it may be something you have only done with the ailerons while taxiing crosswind in a nosewheel airplane, you will find that a normal landing (as well as taxiing) in a tailwheel airplane means the stick or wheel will come to the full aft position. If there is a crosswind, the ailerons may need to be traveled to the stop while on rollout.

You rarely put the rudder to the stop in a nosewheel airplane, however, in a tailwheel machine the need will arise from time to time, so be prepared to do it. Additionally, on roll out, you may find that a swerve is so severe that putting the rudder to the stop will not correct things and the throttle then has to be shoved from quiet to noisy to get enough airflow over the tail to have the effect you desire. It may mean a go-around, which may also be a very good thing.

5. When in doubt on landing, make it a full stall. (This is a general rule for single-engine machines, not twins.)

If you bounce twice on an attempted wheel landing, either go around or make a full stall landing. That way you will not have to buy a new propeller or embarrass yourself more seriously.

6. If you do not like the landing, go around.

Yes, we mouth that platitude on nosewheel airplanes. With tailwheel airplanes, it is one of the quintessential truths. In all candor, it may be the difference between a little delay on getting to the tiedown and a lot of twisted metal.

As a student pilot I made one of my solo cross countries in a Piper J-3, a tailwheel airplane. I went around five or six times before landing at the destination airport because I was having a lot of

trouble with the gusty crosswind. I taxied in, shut-down and walked into the FBO to get my logbook signed. What I wanted to do was crawl in a hole because I was deeply embarrassed by my ineptitude. Of course the crowd in the office shut up and stared at me as I walked the mile or so across the room, approaching the desk, to acquire the requisite signature. I was mortified. As I turned to leave, the oldest guy in the room looked at me and said, "Going around was the smartest thing I've seen anyone do here, today." I looked at him in amazement. He smiled, walked over, shook my hand and made some comment about not forcing landings and the wisdom of go-arounds. I've never forgotten him or his advice. I've also made a fair number of go-arounds and have yet to damage an airplane on landing.

7. Land as nearly into the wind as possible.

In a crosswind there is no magic to the runway centerline. Landing at an angle across a runway may reduce the effective crosswind component. Choose a grass runway, rather than pavement. If all other things are equal, the rolling resistance of the grass on the tailwheel will assist with directional control. If no runway is sufficiently aligned with the wind for your assessment of your skill level, go to another airport or land on a taxiway which is into the wind.

You have an emergency situation if you feel you cannot control the aircraft under existing weather conditions. Think a moment; in a Kansas dust storm with sixty mile per hour winds, you wouldn't hesitate to declare an emergency and land into the wind, would you? The conditions are clearly above your ability to land with virtually any crosswind component. So, why hesitate to do so in a wind of thirty mph or twenty if those exceed your personal minimums? Remember, you are the pilot in command.

Yes, there are FBOs which rent tailwheel airplanes. Ask around, you will find where they are. Yes, you will work hard. Yes, it will be challeng-

ing. Have you ever done anything which was really, truly personally rewarding which did not take some determination and hard work?

You will discover many wonderful things: A tailwheel airplane can be landed in far worse wind conditions than a nosewheel airplane. No kidding. Generally its flight controls are more effective. However, you must plan as to how you will go about the process. With the built-in control authority carry out your plan. On a light wind day you can make turns while taxiing into the wind by deflecting the ailerons, right stick to turn left and vice versa. You will clearly understand why those instructors kept telling you about aileron corrections when taxiing.

Of course it is not easy. However, the day you do a wheel landing in a stiff crosswind, hold the downwind main wheel up until you want it to touch down, then select the point where you want the tail to come down, the level of personal satisfaction will be overwhelming. Besides, you will never have trouble landing a nosewheel airplane again.

Rick Durden is a practicing aviation attorney who holds an ATP Certificate, with a type rating in the Cessna Citation, and Commercial privileges for gliders, free balloons and single-engine seaplanes. He is also an instrument and multi-engine flight instructor. Rick started flying when he was fifteen and became a flight instructor during his freshman year of college. He did a little of everything in aviation to help pay for college and law school including flight instruction, aerial application, and hauling freight. In the process of trying to fly every old and interesting airplane he could, Rick has accumulated over 5400 hours of flying time. In his law practice Rick regularly represents pilots, fixed base operators, overhaulers, and manufacturers. Prior to starting his private practice, he was an attorney for Cessna in Wichita for seven years. He is a regular contributor to Aviation Consumer and AOPA Pilot and teaches aerobatics in a 7KCAB Citabria in his spare time.

