The Starduster Magazine

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

Oshkosh/Wautoma '98 Grand Champion, Acroduster N34LG
Glen Olsen, Sandy, Utah

In This issue –

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President's Message

Les Homan, President, Starduster Corp.

I must start out by letting everyone know that if your Starduster magazine is late it can only be blamed on me. I am the one who has held up the works. Too much work and flying. A lot of air has passed under the wings since the last issue. One of the many high points was flying 9116Y to Wautoma/Oshkosh this year. I had very little time to relax, last minute items of getting the guys driving the motor home to Oshkosh, and Saturday noon July 25th was well appreciated.

Leaving Oroville I headed directly east and spent the first night in Thermopolis, Wyoming. A good chance to unwind and think about flying. Sunday found me low and not so slow crossing Wyoming, South Dakota and Minnesota. As I was dodging hay bales, horses and high lines it gave me time to reflect. Aviation, in general, has moved from days of fun and adventure to a fast paced, rapidly moving, faster and higher stressful endeavor. In our type of aircraft we get a chance to live life differently. Most jobs and lives are very stressful these days. Biplane aviation is an escape into those days when life was more important.

I listened to 122.75 for a while—a window from my world into the world of the fast, highflying hurried folks. It was sad to realize these people are in such a hurry to turn one more escape into just another fast paced stress riser. I turned the radio off and went back to counting sheep. When was the last time you passed over a farmhouse and a ground-bound soul stopped and waved? A wag of the wings and smile follows at both ends—recognitions and memories minor, but two strangers sharing life's little pleasant moments together.

Oshkosh and Wautoma were outstanding. I am still amazed at the number of people that do not know that Starduster is still around. Weather played a critical part in getting home. I like to fly in the rain but my prop did not. If you are thinking about installing a wooden or composite prop on your Starduster study the options very carefully. This prop was key work, a composite prop with a wood core. It was supposed to work in some rain. Well I shredded the outer coatings down to the wood. It kept on ticking and got me home, but needs repairs. I pulled the RPM back and was in rain for about 1.2 hours.

I have been talking to people about the GREAT BIPLANE ADVENTURE. Some other ideas have come up, one based on December 2003, and terminating the adventure in Kittyhawk, North Carolina, to coordinate with the Wright Brothers first flight.

I will let you know more about racing in Reno in the next issue. 9116Y won Bronze in the Biplane event this year. I understand the biplanes will be back next year and with open slots in the Biplane event this year, if you have ever thought of racing this is the time to do it. Let me know if you want to give it a try and I will get you in touch with the proper people.

We are working on getting better deliveries on parts at the shop. Prices in our competitors catalogs are really going up. We are working on keeping our prices below all competitors and still keeping the doors open. Now is the time to buy before prices go higher. Fuel tanks in one or our competitor's catalogs have increased almost 25% since their last catalog. Buy from Starduster, best quality, and best prices.

Les Homan

Northwest EAA Fly-In—Arlington, WA, July 8-12

The Starduster presence was noted again this year at the Arlington, WA fly-in. Category awards were given to Ray Siefter, Albany, OR, Champion—Starduster Too, N1YW; Wayne Ensey, Albany, OR, Champion—Acroduster II, N94WE; and Verne Reynolds, Mt. Vernon, WA, Best Workmanship—Starduster Too, N8331A.

The Oshkosh/Wautoma EAA AirVenture Experience—1998

Starduster Fly-in—Wautoma/Oshkosh, July 30-Aug. 1, 1998

For the sixth year in a row the Starduster Corp. sponsored a Starduster gathering at the Wautoma Airport in conjunction with the Oshkosh Convention. And for the first time in six years, the Starduster Corp. sponsored a booth at Oshkosh. President Les Homan had his Super Starduster on display, and his wife, Mary, with the help of George Frazier and John Burg, manned the booth that offered Starduster information and paraphernalia.

Although Stardusters began arriving at Wautoma as early as Tuesday, July 28, the official Wautoma Fly-in was scheduled for the following Friday through Sunday. Most of the pilots enjoyed the Oshkosh experience during the middle of the week, and the remainder of the time was spent mostly at Wautoma enjoying the freedom of flying their airplanes and swapping stories and yarns about the most beautiful biplane in the world.

One of the main activities on Saturday and Sunday was giving rides to townspeople and to Young Eagles. As a result, 33 young people had their first experience of flying in an airplane—and what better airplane for a first flight than a Starduster!

The traditional banquet and business meeting was held Sunday evening at the Oakridge restaurant in Wautoma, where the food as usual was great and there was plenty of it. The business meeting was conducted by Pres. Les Homan. In addition to detailing the company's business status and plans for the future, Les proposed that next year the Starduster pilots plan to fly from Wautoma in to Wittman Field at Oshkosh for one day of the event.

The traditional annual Starduster awards were given to the following: Grand Champion to Glen Olsen for his Acroduster N34LG; first place to Jim Smith for his Starduster N387JS; second place to Max Bennett for his Starduster N76GS; and third place to Mike Guarino and Clay Gorton for their Starduster N1923S. (See photos front cover and page 19.) The True Grit award was given to Chuck Krabbenhoft, and the award for the longest distance flown to the event went to Oscar Bayer, who flew in from San Louis Obispo, CA. An outstanding service award was presented to George Frazier for his outstanding support and tireless efforts in supporting the Starduster activity at home and on the road.

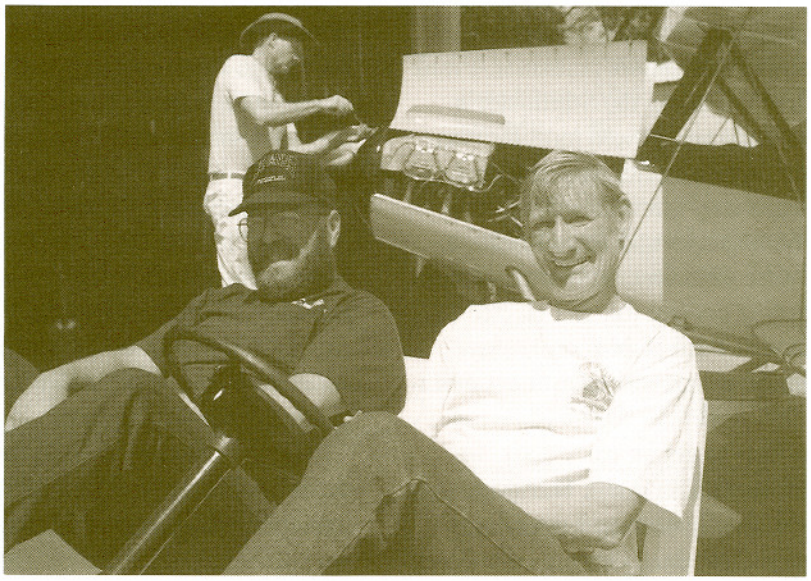
The Starduster banquet would not be complete without Larry Rydberg, to the accompaniment of his banjo, singing "Stardusters In The Sky." The attendees enthusiastically joined the chorus of what has become the theme song of the Starduster banquets. A copy of the song is found on page 12.

Wautoma FBO Hosts 7th Annual Oshkosh/Wautoma Starduster Fly-in

H. Clay Gorton, Ed.

The Wautoma airport, located 40 miles west of Oshkosh, WI, boasts a 13-31 3,300 X 60 asphalt runway and also an 8-26 2,270 X 175 turf runway. The Stardusters use almost exclusively the turf runway, which runs in front of the row of hangars and the FBO office. The Starduster experience is not really complete without the setting of a turf runway to add to the character of the legendary and classic open-cockpit biplane. During the fly-in pilots and townspeople alike pull their lawn chairs up alongside the runway to watch the action—the pilots discussing building experiences and performance characteristics and the towns-people awed by the thrill of flight and hoping that someone will give them a ride.

However well situated and well appointed the Wautoma Airport is, it would still be just another airport if it were not for the FBO operator, Jack Mullenmaster, and his crew. Jack outdid himself this year as the fly-in host. His hangar was always open and his tools available to anyone who needed to work on his airplane; he prepared a 40-lb. beef barbeque on Saturday, with corn-on-the-cob and all the trimmings, free to all fly-in participants. His two lovely daughters, provided transportation to motels and restaurants in Wautoma and to Wittman Field in Oshkosh.



One component of the traditional Wautoma Airport hospitality, however, was missing this year. Dick Larsen, who owns the hangar next to the runway has always opened his hangar to all visitors, providing lawn chairs, refreshments and sparkling conversation. However, this year he came by only to greet everyone and then retire because of a severe respiratory infection.

Greyson Grey, who works for Jack as a mechanic, was more than helpful, lending a hand where needed. At least three airplanes were in the shop while at Wautoma. Steve Niec, who substituted for the weatherman by providing fog for the general area from his fly-bys and low-level rolls over the runway, lost an exhaust stack during one of his maneuvers. Efficient repairs were made on the spot.

The yellow Starduster flown by Mike Guarino and Clay Gorton had suffered some cracks in the aluminum baffle and fiberglass nose bowl en route to Oshkosh. The baffle was stabilized and Grey did an excellent fiberglass repair job on the cracked nosebowl.

The repair experience that had the personal involvement of Jack Mullenmaster himself, however, was in determining the source of the starting problem in Glen Olsen's Acroduster. Glen suspected a dead battery, so Jack provided a new battery hooked up to jumper cables to try to start the engine. Don Brock, who accompanied Glen from Salt Lake City in the Acroduster, managed the jumper cables and Glen was in the cockpit to control the starter switch. Jack and Oscar Bayer, seated in lawn chairs nearby, provided the sound effects. As Don was preparing to attach the jumper cables Oscar said to Jack, "I wish we had a couple of firecrackers and we could have some fun." Jack responded, "Oh, I've got a package right here!" (Jack actually had a package of firecrackers sitting on the ground by the side of his lawn chair. Talk about a well supplied FBO!) So, at the proper moment, Jack lit a firecracker and as Don touched the hot cable to the starter the firecracker went off. Glen started out of the cockpit and Jack said, "Why don't you try it one more time before you get out?" So they went through the procedure again, and the second time, at the moment Don touched the cable to the starter, another firecracker went off. Not only is Jack's FBO well supplied, but his timing is impeccable.

An Air Adventure to Airventure

Oscar Bayer

This year's Oshkosh convention called "AIR-VENTURE" started on July 29, and I wanted to be in place a couple of days before. So I planned my departure in my Starduster Too, N490B, for the Saturday before to allow three days of flying to arrive on Monday the 27th. I had planned to take my oldest son Tim with me, and would pick him up in Vernal, UT on the way to the show. Tim is a Helicopter pilot and was flying on a contract out of Vernal doing Air Attack on fires in the forests of north-eastern Utah. As luck would have it, he had a bicycle wreck a few days before I was to pick him up—broke his shoulder.

Plan 2 involved Frank Rezich, a local area friend who is a long time aircraft pilot/mechanic specializing in antique and classic machines. Frank had assisted me in overhauling the Starduster's engine a few years back and I owed him! He was ready to go on short notice so the only change I needed to make was a stop out of San Luis Obispo, CA, my home airport, at Paso Robles to pick him up. We were experiencing our usual summer night and morning coastal fog so I elected to position the airplane at Paso Robles on Friday evening and we would get an early start next morning.

Despite our efforts to get an early start, we only made it off the ground at 0830. Our route out of Paso Robles was mostly eastward over the Tehachapi Mountains, south of Edwards Air Force Base and into the Barstow/Daggett airport for our first fuel stop. Just as a note, a couple of old fellows like Frank and I can only take a couple of hours of open cockpit flying at a time, then its time to take a break before proceeding on. Out of Daggett we followed Interstate 15 north-easterly across the desert into Nevada, crossing just south and west of Las Vegas over part of Lake Mead, and then landed at Mesquite for more fuel. A call to a local Casino got us a ride down the hill from the airport for lunch and then a ride back up to the airplane. We continued to follow the Interstate over St. George, Utah past Zion National Park, (and a few rain showers), Cedar City and on to pick up Interstate 70 through a pass, past Big Rock Candy Mountain, and landed at Richfield, UT. Although we had only flown 5.5 hours we decided to call it a day. The local FBO offered hangar space for the night and a courtesy car to go to town.

Once again our early start on Sunday ended up being about 0830, but we vowed to do better on Monday! We continued following Interstate 70 eastward until clear of mountains, then turned northward flying up over Price, UT and on into Vernal, UT for gas and some lunch. I had hoped to find son Tim hanging around but finally found that he was off for the day exploring in Dinosaur National Monument. We got back in the air and continued on northward along the east shore of Flaming Gorge Reservoir to just short of Rock Springs, Wyoming where we turned east along Interstate 80 and soon landed at Rawlins, WY for fuel and a pit stop.

We continued flying east out of Rawlins, passing over 7218-foot Morton Pass in the Laramie Mountains before flying out over the great plains and into Alliance, Nebraska where we quit for the day, having flown 6.1 hours. The FBO folks at Alliance drove us into town to a motel after we bedded down the airplane.

Despite arising at 0630 (mountain time), by the time we had breakfast and talked the motel manager into giving us a ride back to the airport, we still didn't get airborne until 0830! Now we were flying due east over the Nebraska Sand Hills for miles, but gradually farms appeared and by the time we got to the Elkhorn River it was all farms. We landed at O'Neill, NB for fuel, and then continued on to a small airport at Blue Earth, MN where we borrowed the "City" car, (a retired police car) and drove into town for lunch. Our last leg of the day found us flying into Wisconsin over La Crosse and then on into the Starduster home away from home airport at Wautoma, WI. We landed at 6 PM local time having flown 6.25 hours this day. The only other Starduster to arrive ahead of us was the Green and Yellow Super Starduster One belonging to Les Homan. We caught a ride into the Super 8 Motel and settled in for a week of enjoying

AirVenture '98. Our trip east took us a total of 17.8 hours and was highlighted by excellent weather for the most part.

Oshkosh '98 (AirVenture) was better than ever. First of all the weather was outstanding for a change, temperatures in the low 80's, a nice breeze blowing and few clouds to compete with the smoke coming from the war birds and the many aerobatic aircraft. Frank and I lucked out on a rental car and not wasting any time drove over to Oshkosh on Tuesday afternoon to take a look at the 'Fly Market' and to see who was around at the Red Barn (Antique Headquarters). Our Tuesday entry was good for Wednesday also, so we were back at the 'show' fairly early for a full day of looking at airplanes, exploring the exhibits and even made it through three of the four main show buildings. We got some time in with Les and Mary Homan at the Starduster tent and then left before the daily airshow ended to beat the traffic.

Thursday we traveled back over to Wittman Field to finish exploring the sales buildings and the Aero Mart, then hung around to see the air show before returning to Wautoma. On Friday I got Frank to drop me at Wautoma International Airport so I could spend the day talking Starduster with other builder/owners and had a chance to spend some time with 'Airport Ambassador' Dick Larson who has really supported the Starduster gathering at Wautoma since we started flying in there. Saturday Frank and I drove back to Oshkosh where he met some of his relatives. We spent another day looking at the War Birds, etc. and then made our way back to the Wautoma airport where the FBO folks were roasting a big hunk of beef and fed us well.

Sunday we attended the pancake breakfast in one of the hangars and then participated in Flying "Young Eagles" and other Starduster enthusiasts including company Prez. Les Homan. That night we attended the awards banquet for our type aircraft and Frank and I got the award for flying the greatest distance. Someone is going to have to come from Key West to beat me out on that award.

Monday morning found us back at the airport trying to make our usual? early morning start on the way back home. This time the weather was not cooperating. IFR conditions existed on our planned route westerly, so we opted to join with the Starduster Magazine's editors, Glen Olsen in his Acroduster and Clay Gorton in his Starduster Too, flying southwestward into Marshalltown, IO for fuel and then further to the southwest to Beatrice, NB. We then all turned more to the northwest and continued to the North Platte River, following it (by now dodging some serious rain showers) until we reached Lexington, NB where we dropped off Glen and Clay while Frank and I continued on to North Platte. Glen and Clay had plans to visit a particular museum and that's why they stopped in Lexington.

Tuesday morning turned out partly cloudy, but a weather check indicated that fairly good conditions existed on west and we should be able to fly visually without any problem. Well, we started out OK flying on top of a few scattered clouds. However the scattered deck soon became broken and we were forced to fly higher to stay on top. Soon tiring of that, we descended through a hole and continued along Interstate 80 heading for Laramie, WY. Past a small airport at Kimball, NB it became apparent that this weather would not let us continue, so we turned back to Kimball and landed to wait out the predicted improvement on west. After a couple of hours things looked much better and we mounted up and took off, now headed for Rawlins, WY. Once again, we ran into low ceilings and mist as we approached the Laramie Mountains, and now we turned back again, this time having to get a special VFR clearance into Cheyenne to beat the worsening conditions.

The group gathered in the Pilots' lounge of the Cheyenne FBO were all there for the same purpose—waiting for better weather to get around or over the Laramie Range and on past Rock Springs where only scattered clouds prevailed. A couple of guys in a BD-4, and the crews of a Super Cub, a Cessna 150 tail dragger, a Venture and a Stewart S-51, all gathered around the weather machine watching the radar returns for some good news. The folks in the Venture and the S-51 were from my home airport and had the same goal to get on west! After a good lunch at the airport restaurant, Frank and I concluded that by flying to the northwest toward Medicine Bow we might be able to sneak through Morton Pass again and get out into the Great Divide Basin.

Once more we launched into the sky. Mostly broken clouds with some light rain were pushed up against the mountains but we were able to get through the pass, and by the time we reached Rawlins the sky was clear with unlimited visibility. Our fuel stop at Rock Springs was uneventful and we soon flew on west, passing just south of Bear Lake over Logan, UT and into a small crop duster airstrip at Tremonton where I had stayed last year. We caught a ride to a nearby motel, ate dinner at Dennys and called it a day.

For the first time we managed to arise at an early hour, had a quick breakfast, caught a ride to the airport and were airborne shortly after 0730. Our route took us across the northern edge of the Great Salt Lake, then down over Wells, NV and into Elko, NV. After a quick fuel stop, we followed Interstate 80 past Battle Mountain and then flew directly to Lovelock and on into Carson City for lunch and some 100 Octane. The rest of the day was pretty routine—up over Lake Tahoe and down by Columbia, CA, a fuel stop at the old Castle AFB where the new and great Golden West EAA Regional Fly-in debuts the last weekend in September, and then into Paso Robles to drop off Frank. The last short 26 miles put me home by four PM and I had time to wipe the airplane down before my wife picked me up.

So that's the Adventure to AirVenture—13 days and some 37 hours of flying, mostly excellent weather, a few minor maintenance problems easily corrected, lots of good food (and some not so good), renewing old friendships and making lots of new ones. I already have my reservation at the Wautoma Super 8 for next year.

Oscar

Starduster/Wautoma/Oshkosh 98

By Michael Guarino, Sandy, Utah

Well, when you get around Starduster people, it's one event after another—and when you're new at this, it's nearly impossible to keep up with, much less digest all the stuff these guys are talking about. The following is a bit of the events and experiences that brought me to the point of making the biplane adventure to Wautoma. After watching Clay Gorton get checked out in "Utah Too" and listening to his stories about Oroville and other flights while I was unable to do any flying while finishing up track season at my high school, I'd about "had it!" He was doing all the flying, and I was doing all the listening. Graduation was coming where I teach the first week of June, Oshkosh was right around the corner during the final week of July, and I knew it was now or never—get back in the pilot's seat (not having flown significantly since 1970) or forget it for another year. Of course, I had to re-learn all the basics and then endure the frustration and concern from the challenge of tail-dragger flying. I was not a "happy camper." This was not an easy thing for me and I was confident to the point of cockiness prior to the first flight. Afterwards, I was legitimately worried that I would never be able to confidently handle the Starduster, or any other tail-dragger for that matter.

A few weeks went by and I can state that there are no accolades that can do justice to the patience and patience and patience of Glen Olsen when it comes to teaching aspiring pilots how to handle and enjoy a biplane. He never gives up and he doesn't allow you to either. How in the world he could smile and give praise after some of the landings he had to ride through, I do not know. He stuck it out with me, and by the middle of July, I was checked out and certified to fly the Starduster. I think someone, maybe Glen, paid off the CFI. During this period, I had seriously considered "hanging it up" with tail-dragger lessons, but somehow I got through it.

My how time flies when you're not having fun and the Oshkosh cross-country was approaching like an ominous tidal wave. Even though I was checked-out, I did not have that settling confidence that I could just wave goodby and zip off to Wisconsin. Hey, I still didn't know how to use the GPS and I didn't see any way to open a map while flying the Starduster. With Clay and me flying "Utah Too" and Glen and Don Brock in the Acroduster, I managed to get up the courage to buckle my reluctant bones into the front seat and set out Eastward . . . somewhere! I knew the mountains were in the 11,000 foot range, because I had climbed them with my cross-country team (runners) from the high school, but the plane wasn't climbing fast enough to acquire that kind of altitude. Clay followed Glen through the canyons and zip—we were over Wyoming doing just fine! Airport to airport with that tricky little GPS . . . it seemed to know just where we were heading—it was unreal. And then, wherever we landed everyone came out to welcome us.

Either they were really lonely or a couple of biplanes were just not that common. At any rate, I acted like I was some kind of real pilot with lots of big-time stories to tell . . . don't worry, I didn't give myself away. I even tried to seem like I knew where the restrooms were at these airports so it would look like I'd been there before. Hey, there are things you have to do to look like one of the guys!

After a while, I began to get the hang of the whole ordeal: The GPS was making sense and provided a lot of fun in knowing just where we were and the locations of all the other airports that I would have never spotted otherwise. By the time we reached Wautoma, (Y50), I think Clay and I could have dropped a flour sack in the middle of the runway while flying above the clouds at midnight. In fact, with all the other hotrod Starduster pilots showing their stuff, I think I just might try it next year. Of course, I really don't want to carry the extra weight of a 10 lb. bag of flour . . . Clay only allowed me one change of underwear as it was!

Well, Wautoma was a kick! I had never seen any other Stardusters but "Utah Too" up to that time. I was very cautious about not talking to other pilots because I knew so little about the particulars of the plane and had only acquired two or three hair-raising pilot stories by the time we got there. The way I see it, three or four more trips to Oshkosh/Wautoma and I'll take a chance at sitting in the circle in the FBO with the guys smack'n a few flies and swapping stories. Some of the guys had aluminum to fix, or a starter bendix to replace, or maybe load up some .30 Cal ammunition and do some low passes with guns blazing . . . cool, huh? I love it when those bullets pass through the propeller! Don't laugh, that's the aura that I was picking up just listening like a little kid . . . with nothing to say, but eyes opened in awe.

Of course the next day I went to Oshkosh and was blown away by the amount of car parking acreage. People everywhere directing, pointing, signaling; there were buses, cars, bikes, tractors, and motorized contraptions all moving like tidal flows towards some mysterious zone . . . the place where the planes were. Throngs were maneuvering to buy tickets and then, as though it was some kind of ancient ritual, they put on their hospital wrist bands and walked towards the black hole of pilot heaven. In the next few moments . . . it finally happened—planes! How could I make a decision on which direction to turn? So I did the wise thing; I went and had breakfast at some huge tent, filled with crazed, grown men with glassy eyes. The bacon, the sausage, it smelled as good as aviation fuel. Yes, sitting down with a few thousand calories really helps while deciphering the map to all the exhibits. Soon I was on my way, first just trying to know exactly where I was at, and then, trying to remember where I had been. All of this took a great deal of walking and eating—neither of which was in short supply!

If you were alive during WWII, and I was just a kid, walking into the warbird area felt familiar. Every plane was spectacular, the bombers proud and defiant, just and heroic. The shining aluminum on each ship parked motionless in its place seemed pure and noble—each skin molded, curved, and riveted to protect a place where good people lived. The canopies, with their straight barrels and bombsights, seemed to speak with deadly reality of their purpose. The wheels with their joints and hydraulics, hoses and bolts were big, willing to carry the load dutifully without complaint. The propellers were mighty and straight with their shafts penetrating the center of huge radial engines. All of this created to oppose a great evil. How could something so deadly be so radiantly majestic? These planes were the Excaliburs of the 20th century. And I was in a state of near worship and awe. Speaking metaphorically, I was and remain incapable of removing any of the swords from the rock.

When one leaves the war birds, there remains a longing that really shouldn't be. Maybe though, it is respect for the builders and flyers that we did not see or know. But fortunately, with most of the other planes displayed one does have the opportunity to visit with the builders/owners. Unfortunately, although, I am such a complete novice that I was very hesitant when it came to asking questions of the owners. When I did see a Starduster (there were 3 or 4 at Oshkosh) and noticed something unique, I attempted to inquire and glean a bit more understanding.

For Glen and Clay though, the real reason for coming to Oshkosh was actually to have the

Wautoma experience! As mentioned above, the Wautoma experience is not for "newbies". If you can't talk the talk, sit in the second row and pay attention! This positioning is perfectly within the Starduster protocol. No one notices that you are not contributing as long as you are awake and nodding in agreement now and then. I finally found out what a double and a single yoke tail wheel was . . . and then I casually walked out to the planes and checked them out.

Later on Sunday, when the Amish folks came over, and I had accumulated several hours in row two note taking, I was able to communicate most admirably about biplanes and the Stardusters in particular. They really enjoyed learning about the biplanes. They enjoyed seeing them fly over and noticed they were different than the usual aircraft. When their milking was done and other afternoon chores, they brought the family and walked over to witness the excitement first hand. You may have noticed (the pilots that were there) that they stood off to the side for 20 minutes or so until I walked over and invited them to see the planes more closely. They were delighted to be able to touch them and the husband had numerous questions about how planes flew, and how was it that these particular aircraft (biplanes) had all come to the airport on this one week. While they are not permitted to ride in airplanes (but they can take a bus or train to visit friends or relatives), the grandparents (who arrived a bit later) did see the inside of a commercial jet liner once. The three young girls shared their popcorn, which was very tasty, and Clay was allowed to hold the baby. After a few moments, Clay broke into a child's song in German (the Amish speak German among themselves, but English outside of their community) and the little tyke cuddled up as though he was family . . . I wish we could have taken their picture, but as you know, they prefer not to have their pictures taken. If I were an artist, I would draw it, for the image is still in crisp memory.

Earlier on Sunday, many of us had a Kiwanis breakfast in the Eastern-most hangar and then we put the word out that we would provide free Young Eagle rides. As has become what I consider to be the common response of most EAA pilots, everyone was anxious to offer their planes, fuel, and time. Oscar Bayer, Chuck Krabbenhoft, Max Bennett, Steve Niec, and Clay Gorton in the Stardusters, with Glen Olsen in the Acroduster combined to provide 33 Young Eagle rides plus several adults as well. Ron Rankin (Starduster builder from Washington) went up with Glen Olsen in the Acro, and possibly in a Starduster as well. Needless to say, whether youngster or adult, the response was electric—smiles everywhere, conversation everywhere, and it was all about biplanes. (I was beginning to get the message, myself).

One particular story needs to be related: A young fellow (early 20's) had flown to Wautoma in a 172 with his fiancee because he knew of the Starduster fly-in. It turns out that the previous year he had ridden with Glen Olsen in the Acroduster and remembered that these pilots and planes would be returning the following year. His girlfriend, now, was a most charming and striking young lady and she was beyond excitement when she saw the biplanes. I told her the rides were for Young Eagles and limited to kids between 8 and 17. It was my sincere (though foolish) impression that the pilots didn't need to offer any more rides beyond the 33 kids, plus parents they had already taken up. I told her that I doubted that any of the pilots had the energy to take up anymore riders, but she prevailed and I consented to check with the guys in the FBO. She followed close behind me and I quietly and with great hesitancy whispered to Chuck Krabbenhoft if he would mind taking the young lady behind me for a ride in his Duster. He leaned back to catch a glance of his requestor and with a lightning 2 - 1- 0 count-down, leaped out of his chair smiling, and casually responded "No problem, be happy to take her for a ride!" (Now we're talking sacrifice, here.) After Chuck strapped the young lady in the front seat . . . (Chuck didn't need any help for this operation), he got in the back and attempted to start the engine—and it wouldn't respond. Everyone was over there trying to get the starter to engage, but to no avail.

The effort was beyond valiant—it was heroic! After maybe 20 minutes with no success and a very sad young lady, Clay Gorton offered to take her up. When she returned with Clay, Glen Olsen took her up. And on the following day Steve Niec took her up! There I stood, an amazed Young Eagle co-ordinator, amazed by the willingness and alacrity with which our pilots unselfishly share their airplanes with complete strangers. Their no-

bility is reminiscent of the knights of old where gallantry was the order of the day and no duty was as great as rescuing a damsel in "distress."

What a week! We had rides; we had Bar-B-Q; we had shuttle rides to Oshkosh that would make Parnelli Jones proud; we had Starduster repairs; we had war stories; we had smoking fly-bys; we had hot cakes, bacon, eggs, and sausage; we had dinner and awards and good singing; we had FUN!!

Well, with weather, it took an extra day to return to Salt Lake, but "Utah Too" never missed a beat. The little yellow plane followed the GPS like a hound-dog; it was almost like an automatic pilot. I learned more in those few days about flying than any period in this novice's life. And I learned about the Starduster and its noble history. This is a fine airplane; it loves to fly and *it seems to know me when I'm in it.* That may seem strange, but I've also come to realize that I've never felt that way in any other airplane.

Stardusters In The Sky

A bold fly-boy went flyin' on a dark and windy day
His airspeed bleeding lower as he buzzed a house in play
When suddenly a bent biplane and wild eyed pilot 'ppeared
A-snappn' through the ragged sky and grimacing in fear.

Its stacks were belching fire and its wires were shrieking loud
Its ailerons were fluttering as it punched into a cloud
A jolt of fear went through him as it thundered through the sky
For he saw the pain and terror in the biplane pilot's eye.

Yippie Yi Yeaaa, Yippie Yi Yoooo, Stardusters in the sky.

That biplane pilots' face was pale and his shirt was drenched in sweat
He's workin' hard to control that plane but he ain't done it yet
For he's cursed to fly forever in that biplane in the sky
From the smokin' open cockpit he could hear that pilot's cry.

Yippie Yi Yeaaa, Yippie Yi Yoooo, Stardusters in the sky.

The biplane looped around him and the pilot called his name
If you want to save your soul from hell this flyin' ain't no game
Fly-boy keep you airspeed up and with altitude be wise
Or you'll be flyin' in your twisted wreck across those endless skies.

Yippie Yi Yeaaa, Yippie Yi Yoooo, Stardusters in the sky.
. . . That Starduster in the sky!

Oshkosh Fly-in Brings Activity to Wautoma Airport

By Scott Steuck, reporter for the *Resorter,* Saturday, August 8, 1998

Area aeronautics fans who didn't want to deal with the bustling traffic of the annual Oshkosh Experimental Aircraft Association (E.A.A.) Fly-in found plenty to appease their enthusiasm for airplanes at the Wautoma Municipal Airport last weekend.

The airport, which is directed by Wautoma resident Jack Mullenmaster, hosted the Starduster Fly-in from July 29 to Aug. 3. The Starduster Club, which currently has 275 members, is an organization for people who build their own planes from the Starduster building kit. Approximately 700 people in the United States are currently building Starduster planes.

The Wautoma Kiwanis Club also hosted their annual fly-in breakfast at the airport Aug. 1 and 2.

Pilots who weren't able to secure a location at Oshkosh or preferred the quieter Wautoma setting also parked their planes at the airport. All together approximately 60 planes, including both Starduster and E.A.A. fly-in planes, stayed in Wautoma.

During their stay, pilots shared airplane stories with interested listeners and tips with other pilots. During the Kiwanis breakfast, several pilots even put on an airshow for spectators. "This is better than Oshkosh," said several breakfast eaters after a Starduster biplane buzzed the hangar hosting the breakfast.

Mullenmaster, who has been airport director for more than one year, believes Wautoma's relaxed atmosphere is responsible for bringing so many aircraft here. "We're laid back so people can fly their airplane whenever they want to," said Mullenmaster.

He also attributes the airport's success during the E.A.A. Fly-in to the friendly setting. "We help pilots out all of the time," he said. "We help them get fixed up if they need it. They can't do that at Oshkosh."

Seventy-five-year-old Clay Gorton, a Starduster member, pilot, and magazine editor of a quarterly publication dedicated to the club, agrees with Mullenmaster. "The airport is extremely friendly," said Gorton. "Jack (Mullenmaster) is as helpful as anybody I have ever met. The hangar owners are also extremely hospitable."

Gorton also enjoys the landing strips, which include both a paved runway and a grass one, at Wautoma. "The grass runway is nice for the Starduster planes," he said. "It's very nostalgic."

The airport is currently undergoing a rebuilding process, started when Mullenmaster was hired as director. Prior to his hiring, Wautoma was without a director for almost three years. "It'll take a long time to get going again," said Mullenmaster. "Slowly but surely it's building up."

One activity that is helping to rebuild the airport is the recent initiation of an Explorer airport post. Eight local teenagers have joined the post, which meets twice a month. The teens learn about aviation, take rides in planes with several of the volunteer helpers, and help out around the airport. "All of them enjoy it," said Mullenmaster.

Another activity taking place at the airport is Mullenmaster's restoration of classic airplanes. "We do general aircraft maintenance here, but we specialize in restoring classic airplanes," he said. This includes taking the airplanes down to nothing, checking each part, fixing everything that is damaged, and then rebuilding the planes. He has completed two planes so far and is currently working on three more, which he expects to finish within one year.

Mullenmaster, who has been flying for 30 years, has been restoring planes for 20 years. "I started building model airplanes when I was a little kid and kept doing it when I got older," he said. He says he enjoys it because it's so diversified. "I always have something to do that's interesting."

Despite these positive activities, many City of Wautoma officials believe Waushara County should be responsible for operating, maintaining and financing the airport.

Mullenmaster agrees that the county should take over operations at the airport, but said they have no obligations, since the city owns it.

Correspondence

To Dave Baxter, 16 July, 1998

Dave, I promised you this pic and the caption to go with it. Fly safe, and thanks,

Dave Harvey,

N27ED sits in all its glory at Hyde Field, MD, having emerged from a couple of years' downtime following a landing accident in Texas.

Originally built in 1978 by Ed Duncan (hence the registration), "Mr. Ed" passed to an owner in Austin—Skip Waltman, who displayed it on the front cover of the January 1997 Starduster Magazine. Just after the letter was sent, however, the aircraft hit the ground harder than intended, lost both its wheels, its lower right wing, and bent its crankshaft.

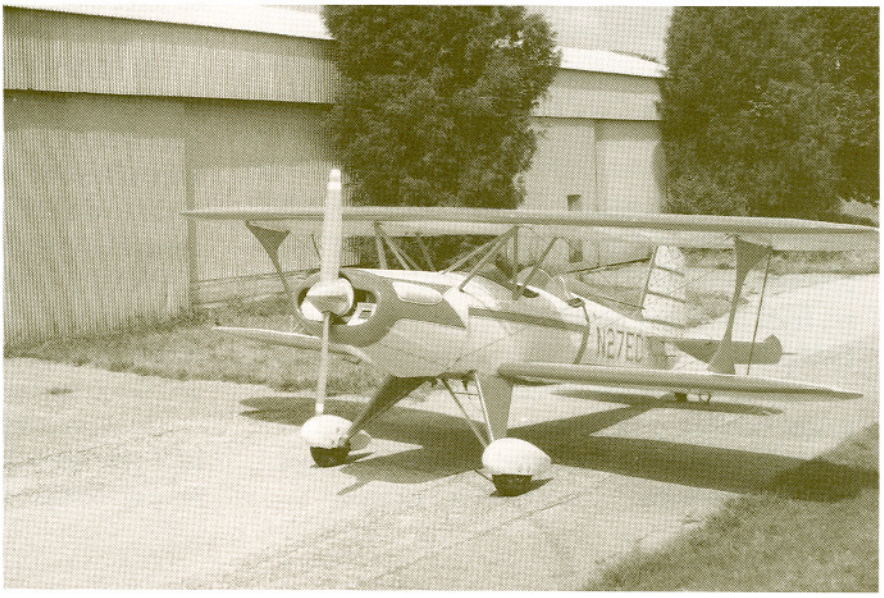
Its present owners found it looking sad and bedraggled at Joe Jenkins parts yard in rural Smyrna, DE early in the summer of 1997. Seeing nothing but beauty beneath the outward distress, the group arranged for it to be trailered to Hyde Field in June, 1997, to start the long job of bringing it back up to par. Credit for the effort clearly lies with Leon Talman, who labored many hours on metal work, painting, and general oversight of the repair effort. Like a Phoenix, N27ED gradually emerged into the sunlight again, and on April 16, Brian Miller, a locally-based Pitts driver and "bipe" expert took it into the air for its 55-minute maiden flight.

Since then, it's been in the hands of David S. Harvey, an aviation writer and ATP, who gently—with plenty of counseling from Dave Baxter—has been building the hours, finding the squawks and just plain having a blast. "The aircraft has an extremely tight feedback loop. It's got a very direct feel, has a nice roll rate, good climb rate and is comfortable," Harvey reports. "Landings demand some care and there's been a definite learning curve—you get better at it the more you do. One tip Baxter passed on—get a bigger seat cushion so you can see better just before flairing—proved very valuable."

27ED looks great, with just a bit more painting to go on the wheel pants. "Plans for the future include plenty of passenger flying, some aero, and 'doing something about a canopy' for the winter, though we don't know what yet," says Talman, the plane captain.

Meanwhile, 27ED's new parents are ecstatic that the project went as smoothly as it did. Like all such stories, lots of people gave lots of time to help out. "At Hyde I'm grateful to Gilley Aviation, the local A&P/AI shop for all their efforts. And when we call Baxter at Stolp we can always get help on anything we need," he says.

N27ED is powered by a 200 hp Lyc. IO-360, with a Christen inverted system. It also has a smoke link fitted. Empty weight after repair was 1242 pounds.



To The Starduster Magazine, 4 Sept. 1998

This was my first time at Oshkosh. I was invited to fly with Glen Olsen in his Acroduster, and we made the journey with Clay Gorton and Mike Guarino in their Starduster.

Wautoma is the airfield that Glen always ties down at when he flies to Oshkosh. The only asphalt at the airport was a narrow stip in front of the FBO, a taxi way to a few hangars and a short narrow runway. Everything else was pine trees and green grass, including a very wide beautiful grass runway.

The airshow at Oshkosh started about 3:00 each day and ran for about 3 hours nonstop. This has to be the airshow of all airshows. Oshkosh is awesome! How anyone could put together such a well organized event is beyond me.

They say everyone should visit Oshkosh at least once and they are right. I think I enjoyed the Starduster Fly-in at Wautoma every bit as much because that was where my kind of flying was happening.

Don Brock, Salt Lake City, Utah

To: stardstr@pacbell.net 19 July 1998

I found the airplane! It is a highly modified Starduster One built in 1963 by Bill Leighnor. I talked to him last night. He still owns the airplane and flies it regularly. I also have a copy of Sport Aviation with it on the cover and an article inside. I will type up a synopsis of our conversation and send it out with the magazine. Should make a good "Where Are They Now?" type article for the newsletter. I did also get a partial e-mail the other day saying that the airplane was around Wichita. It is. More later.

Robert C. Rogers, Mendon IL

Ken,

Just was looking through your web page. Great to see the Starduster name still is strong. I used to hang in at the Flabob Airport in Riverside, CA and watch the construction of Acrodusters and Stardusters at the Stolp facility—Bill Clouse, Hank, Vernon and the gang, always something going on. I was there when 111TR was just done in silver. A spark from the grinder hit the fuse and a fire erupted. In about twenty seconds all fabric was gone! The tube was painted bright yellow, didn't put a blister on it! Tom Robbins didn't really ever get to fly his machine. He died in a helicopter crash in Alaska— all this a long time ago. Best regards,

Steve L. King, BEANID@aol.com

Dear Les, 6 Aug. 1998

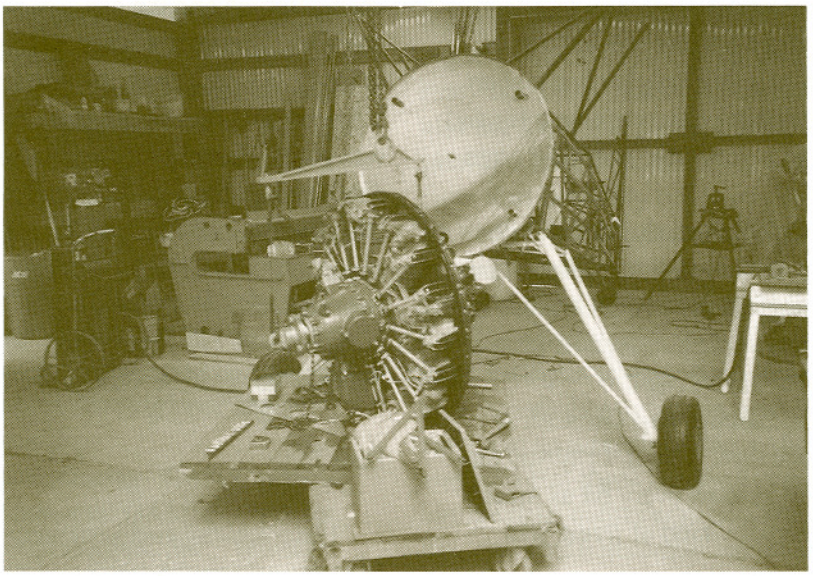
Have just finished reviewing *The Starduster Magazine*. Congratulations on putting out a fine publication! I can't imagine that any Starduster owner/builder would not be subscriber. Keep up the good work.
Sincerely,

Charles W. Harris
Chairman, National Biplane Association

Clay Gorton & Glen Olsen 15 Aug. 1998

It seems like yesterday since I committed myself to give you guys a report on my Starduster project—last May at the Oroville get together, to be exact.

My name is Lou Hagler and I am building a Starduster with a round engine, a Russian MP14, 360 hp. I don't know where or how I ever got the audacity to take on this task but I am in the middle of it, ninety percent done and ninety percent left to do.



One of the helpful hints that I can tell you about is the method that I used to eliminate fabric damage to my wings from prop wash. I am using one sixteenth plywood from the wing root to one bay outside the prop diameter.

All of the pundits tell me that this is the thing to do if you don't want damage to your wings. Now at long last the wings are ready to cover.

Presently I am working on the fuselage, welding on stringer standoffs and such. Is this fun or what!

Lou Hagler,
Langley, WA

Glen Olsen, Editor, 8 Sept. 1998
Starduster Magazine

I've finally done the great thing and left civilization (the San Francisco bay area) to come up and live in the country. Here in Mt. Aukum I am about 25 miles south of Placerville, CA and 25 miles north of Jackson, CA. Those are the big towns, I think. One of them has an airport and even an EAA chapter (512), which of course is my new chapter.

I've been an Acroduster Too builder for about three years now, with about three to go. This means I nearly have the airframe "on the gear" excepting that the landing gear still needs to be built. The project was formerly housed in a typical 2 1/2 car suburban garage (ample space for an Acroduster), but two weeks ago it moved with me to a new house in the country. Unfortunately, I have no garage and no real workshop in my new place, so the entire airplane project is holed up in my pole barn, next to the horse stalls. I am going to have to get used to building on a dirt floor. I do MIG welding, so I'll need to be extra careful to clean off the dirt first! I really enjoy the many problem-solving aspects of a plans-built project. With the Acroduster, I've become adept at figuring out how to do various procedures on a limited budget and in a small space. If any new builders would like to correspond with me about how to build wings, tail feathers, controls, etc. send them my way, or especially have them send an e-mail. I love to talk about this stuff, how to figure things out.

I got involved with flying via my Dad, who was quite an avid private pilot when I was growing

up. When Dad was 18, he figured that the thing to do was to buy a motorcycle (Indian Chief) and use it to ride out to the airport near Monroe, Michigan to take flying lessons. And he did, learning to fly in a Cub, then quickly transitioning to the Boeing Stearman. Biplanes in the blood! He used to take me flying a lot as a pre-teen and teen, in the Civil Air Patrol L-16 and Navion, and his club Stearman (N51062) of the Checkertail Flying Club out of Detroit City Airport.

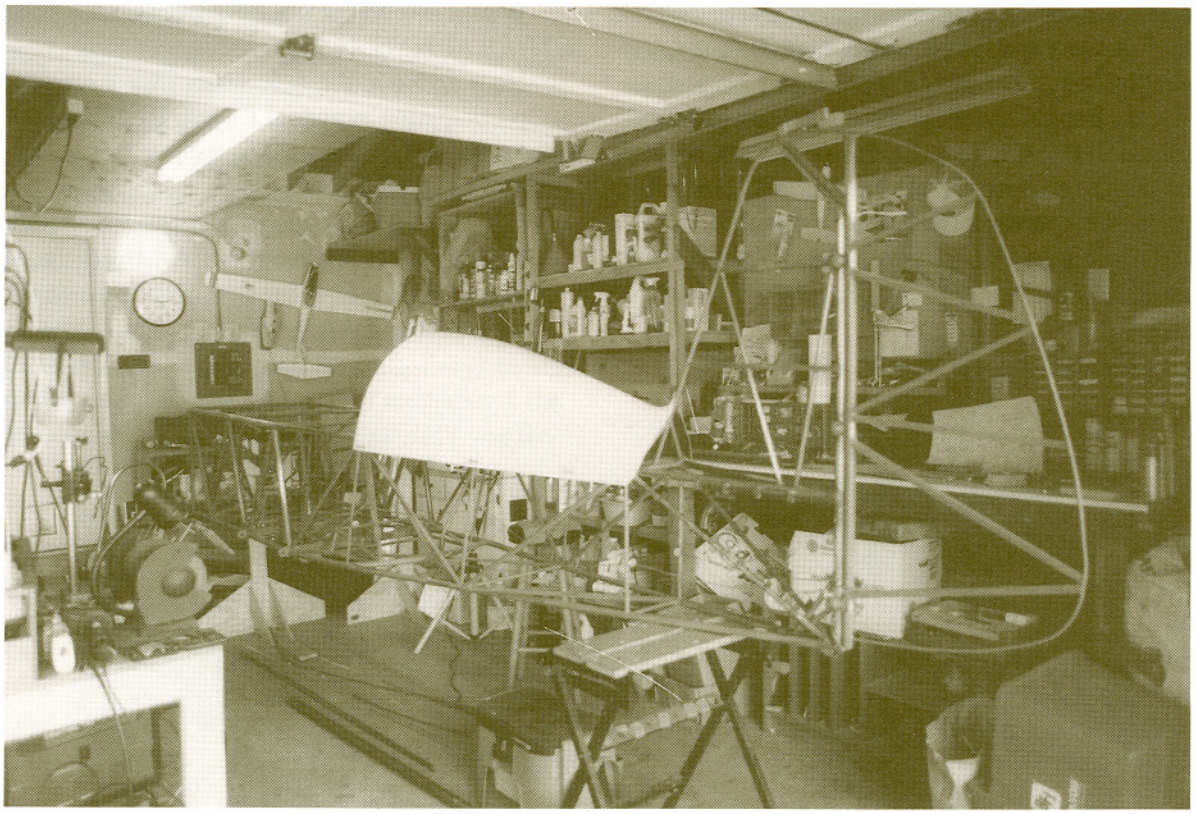
Of course, being a teen, I wouldn't have been caught dead enjoying anything Dad did, so I never learned flying then, but came out to California instead!

I was 33 years old when I realized that I had aviation in my veins, and I needed to do something about it. So I learned to fly in Petaluma, CA. Spent several years not being very proficient in Cessnas and the like, but finally decided to really learn something about flying and took up tailwheels (Citabrias, Cubs), then aerobatics. Yes, tailwheels are the ticket! I have been flying mostly Citabrias and Maules in the last couple of years. But alas here I am now near Placerville, CA with no tailwheel air planes to fly . . . help! Enclosed are a couple of SA-750 project pictures while in the "garage" phase. (See below)

The nice thing about living up here is that I'll possibly get to test fly my airplane up in Oroville. This will probably occur in the year 2001.

Cheers, and keep up the good work.

Lee McGee, Mt Aukum, CA



30 July, 1998

Hello Les, Dave, Donna, Glen Olsen and all the Starduster and Acroduster people who I dearly care about:

My name is Mike Mattei. Maybe you have heard about me. Now days I fly the Northwest Territory, sometimes at tree-top level. But we won't talk about that. Thought I would update you on N8121B. She's still flying and flying strong. N8121B had the opportunity to open the Portland Rose Festival Air show each day of the three-day air show. With my wing man beside me, Hap!, the famous Starduster pilot from Scappouse, OR, we had a great time at the show. Got to see Wayne Ensey's Acroduster II—a beautiful aircraft. The most gratifying part of this show was attending the pilot briefings. Just sitting with these pilots and being a part of the program was a dream come true. They were a great team of pilots and helped me out at every roadblock I encountered—and there were several.

Sorry I could not make the Open House, but count me in for next year. Enclosed you will find some articles that were written aobut N8121B. US West is trying to work me into more air shows.

Well, I guess I'll sign off for now. Take care, see you all soon.

Michael Mattei, Bend, OR

From *Life @ USWEST*, 2,6, July 20, 1998

OCCUPATION:

Network Tech, USWest Communications

PILOT CREDENTIALS:

Private pilot, approximately 500 hours.

CURRENTLY FLIES:

Acroduster II which he started in 1986 and test flew on July 12, 1995, "Talk about being scared to death and elated at the same time," remembers Mike. He now has flown about 200 hours in the airplane, named *Boy-N-Den* after a boyhood nickname given to him by his father, his aviation inspiration.

AWARD WON:

Boy-N-Den won "Best Open Cockpit Plans-Built Biplane" at Merced, CA airshow, 1996.

DREAM PROJECT:

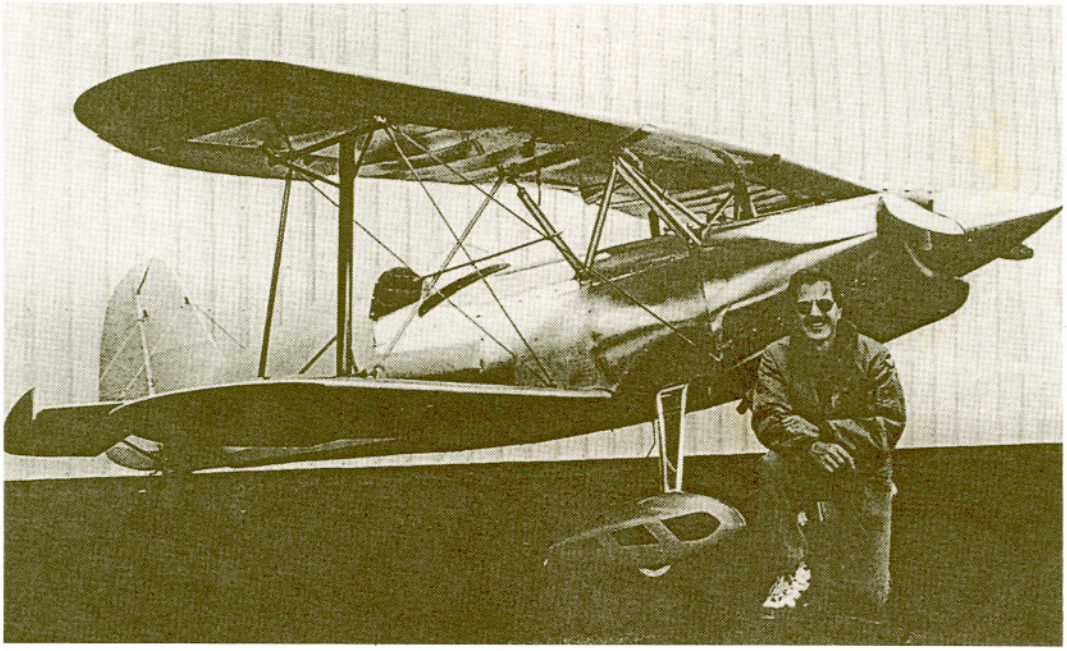
Would love to build a P-51 from a kit.

OTHER FLYING ACTIVITIES:

He is active in the Acroduster owner group, participating in annual fly-ins. Will fly in the Portland Rose Festival next May.

WHY HE JOINED EAA:

"I joined EAA for support when I was building my airplane. I like the way EAA treats the pilot and builder. You don't have to be wealthy to be part of EAA."



OSHKOSH/WAUTOMA AIRCRAFT JUDGING AWARDS

***Grand Champion*, Glen Olsen, Acroduster Too, N34LG, (See Cover)**

FIRST PLACE

Jim Smith, Davenport, IO
Starduster Too, N387JS

SECOND PLACE

Max Bennett, Buffalo, NY
Starduster Too, N76GS

THIRD PLACE

Mike Guarino
& Clay Gorton
Starduster Too, N1923S

SA300 N53OLR

Larry Rydberg
Albuqurque, NM

SA300 N42LD

Bob & Gretchen
McConnell
Naperville, IL

SA300 N85RL

Randy McKinney
Indianapolis, IN

SA300 N2LS

Steve Niec
Clio, MI

SA300 N7BT

Brooke Paulger
Saugatuck, MI

N9BR

Perry Testory
Urbana, IL

PARKED AT OSHKOSH

SA300 N96ST

Jim Stothers
Rancho Palos Verdes, CA

SA750 N94JG

Wayman Curry
Dripping Springs, TX

Skip Waltman
Austin, TX

FOR SALE

SA700 N93FF

Lee Holcomb
El Dorado Hills, CA

Correspondence, Cont.

Dear Dave, 28 July, 1998

Enclosed is the copy of Sport Aviation from April, 1965. The cover photo is of the prettiest Starduster I that I have ever seen. It is the Mirage II that I told you about in a couple of e-mails recently. With a bit of detective work, I found the builder and still current owner, Bill Leighnor.

The article and photos pretty much say it all. I think they would make a great piece in the Starduster Magazine. (See page 24) I have some update information that might go well with it.

Bill Leighnor was an aeronautical engineer by training. He worked for Cessna and Beech and got fed up with it all and started on a totally unrelated career path for 20+ years. Actually, his wife found the job for him and he loved it. He worked for Prentice Hall in the law publishing area. He said it was wonderful time with a lot of excitement and growth in the business with the attendant boom in profit sharing. He has retired from there now. Bill and his wife live in Goddard, Kansas (outside Wichita) on a private airstrip that they have developed into quite a housing project.

Since the Mirage II was built over 30 years ago, it has been recovered and had the engine replaced once. The airplane grosses at 1400 pounds with 2 VOR's and 2 COM radios and all the other nifty things he has stuffed in there. Bill has done a lot of acrobatics in the airplane as well. The only shortcoming really was the landing gear. He had to replace it with a beefed up unit after she settled on her belly one day. Bill takes full responsibility for it since he kept changing shocks instead of fixing the problem. You know how it goes, "one of these days I'm going to . . . "

Bill did use the Mirage II to test a flight recorder he developed. Apparently, the Air Guard pilots found it a bit disconcerting to find a little biplane at 14,000 feet. He did have a guy in a P-47 sneak up on him one day when he worked for Beech or Cessna. "All of a sudden I felt like someone was watching me", Bill said, "and I looked out the right window of the airplane and there he was laughing at me."

This little Starduster I is fast, too. Bill reported a trip from Albuquerque to Goddard in 2-1/2 hours. He is sure he got a piece of the jet stream at altitude.

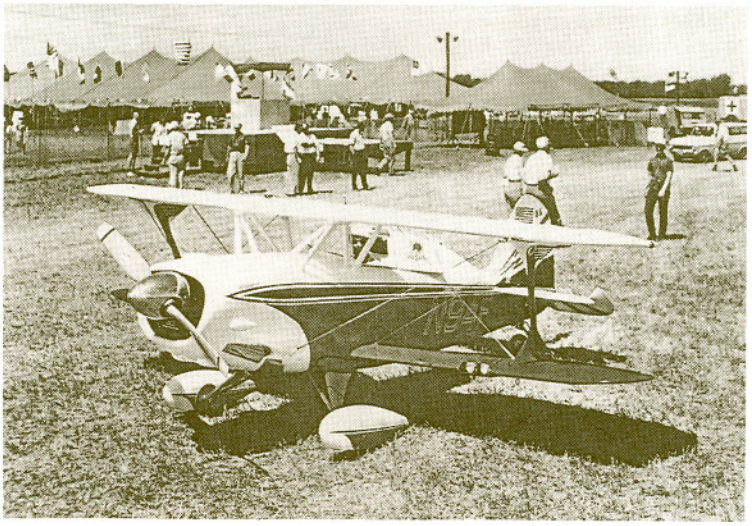
Static buildup is a problem with the Mirage II because of the slick finish. After a man walked up and touched the airplane after a particularly "electrifying" flight and was knocked on his back, Bill installed static wicks specially made up for him by a friend in the radio shop.

There you have it—a little piece of Starduster history. I hope it will find its way into the Starduster Magazine to recognize this early fine example of the aircraft.

I hope this finds you all well, happy, and busy.

Very sincerely yours,

Bob Rogers, Mendon, IL



It's No Mirage

Sport Aviation, April, 1965

For two years in a row, one of the most popular airplanes at the Rockford Fly-in has been a beautiful red and white biplane, the likes of which has seldom before been seen. Perhaps therein lies the reason for its name . . . "Mirage." Actually, one has to look twice to make sure that it is real!

How to describe it? It's smooth, flush, plush, shining, gleaming, sparkling—all of these words together do not tell the story as well as if you could just gently run your hand across any surface of the airplane.

The "Mirage II," N94F, is the end product of the craftsmanship of William C. Leighnor, EAA 8583, of 3401 N. Walnut, Hutchinson, KA, and his friends. It's obvious that it wasn't built for the cost of the average homebuilt because more than skill, hard work and perseverance went into the airplane. The total outlay is around the $8,000.00 figure. Still, it is far below what a comparable commercial product would cost.

Basically, the "Mirage II" was built from the plans for a Stolp-Adams SA-100 "Starduster." Much of the modifications result in changes of external appearance and are due to the installation of the 150 hp Lycoming 0-320 engine. Added to this is a unique engine cowling, a large polished spinner and engine exhaust thrust augmenters.

But, the most outstanding feature of the "Mirage II" is the fairing of everything on the airplane. The entire top of the fuselage is fiberglass from the cowl to the bottom of the fin. The remainder of the fuselage is fabric covered, as are the wings. The wing struts project through holes in the fuselage fiberglass shell and are perfectly filleted with fiberglass paste. This gives the impression of the fuselage, struts and wing all being one integral unit.

The cowl is a snug-fitting wrapper formed of fiberglass and with a full frontal opening. Streamlined cowl "bumps" encircle the cowl similar to that of the Cessna 195.

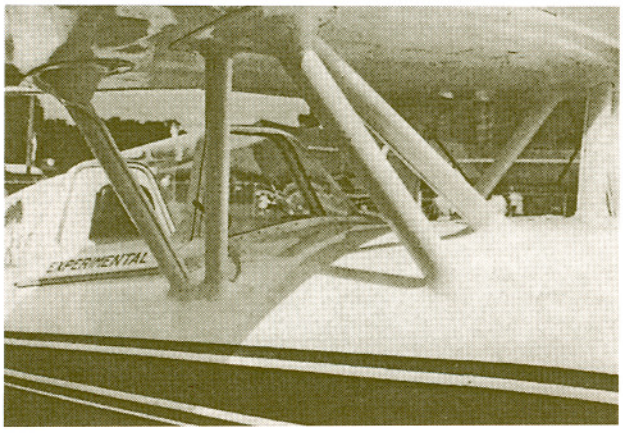
A high turtleback sweeps downward sharply to meet the fin. This provides for the headrest and trackage for the trim but relatively simple sliding canopy which did not need to be blown. It also appears to be completely weather tight.

The landing gear was modified slightly and seems to belie the bulkier size of the airplane. With the long fiberglass wheel-pants, the "Mirage II" has the appearance of a bird sitting on a perch.

This biplane is the second effort by Bill Leighnor. His first "Mirage" was a 190 cu. in. class, midget-racing aircraft. It was completed and entered the competition at a time when the big prize money was no longer put up, so it never really had a chance to prove itself. It is active as a sport aircraft in Michigan.

Showpiece that it is, the "Mirage II" can perform equally as well. It carries a full electrical system, radio and night-flying equipment, and a controllable-pitch Hartzell propeller. With that engine and propeller combination, it far out-performs most of the homebuilt aircraft.

It will be many years before the "Mirage II" ceases to be a top attraction wherever it lands, and it will continue to reap many awards for its superb workmanship, finish and ingenious modifications. Bill Leighnor and his crew deserve a lot of credit for turning out this magnificent airplane, the pride of America's homebuilt aircraft fleet!



The "Mirage II" features the most perfectly filleted struts and formed cuffs of any airplane.

Hello Clay, 5 August, 1998

Once again, congratulations on a great magazine. I was very pleased to see the reprint of the *Kitplanes* article.

Jane and I have decided to bite the bullet and retire. We will be moving to Eatonton, GA in the near future. We found a nice place on Lake Sinclair that we can almost afford. Do you have an address and/or phone number for Fred Myers and any other biplane people in the Georgia area, or should I contact Sandra at Starduster?

Say hi to Glen and Loretta and thanks again for the great magazine.
Regards,

Kenny & Jane Ware

Dear Clay, 11 Sept. 1998

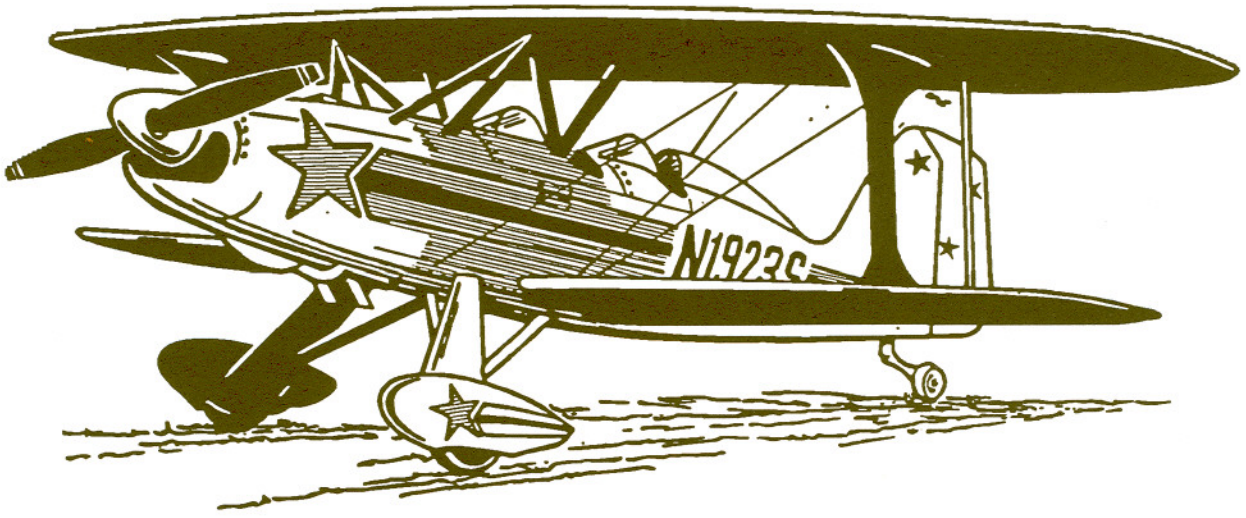
I done it! I upside downed it! I put the greasy bottom on top and, as near as I know , I lived through it! I think it must have been safe . . . now if I could just learn how to land that thing . . .

I decided it was time, so I rolled to the left and dished out on the last quarter turn. Then I thought about that for a little while and decided the next one would be better. It was. Then I did a quick physical exam to see if all my body parts were still functioning. They were. "So," I thought to myself, "so if Clay can do it, then I can do it," and I looped that sucker. Safe again. I thought the second one might be better than the first, so I looped it again. And then I went home.

My body parts still seem to be intact with no new bruises, so evidently whatever I did didn't break anything. The airplane seems to be intact, also. I think that adds up to success. I'm not driven to excel at any aerobatic stuff, but it's nice to know I still can make it happen and enjoy the unusual attitudes without the panic that accompanies some other "straight and level" pilots I know.

I've been adding stars to my bird. I think it helps, but beauty is in the eye of the beholder.
Cheers,

Verne Reynolds, Mount Vernon, WA



Go Ahead, Abuse Your Engine!

John Deakin

Avweb's John Deakin is asking you to abuse your engine, or so it might seem to many until he sweeps a whole slew of old wives' tales (OWTs) off the cliff. Using digital technology for data collection and simple graphs, John supports his unorthodox engine operating suggestions with data that proves the old ways may actually be worse for your engine. Wrong may well be right! If you've been taught that you must always reduce MP before reducing RPM, you're going to be forced to rethink that notion. If you think you're helping your engine live longer by reducing MP to 25 inches after take-off, boy are you going to be amazed at how badly you've been abusing your engine. And, that's only for starters.

Disclaimer: I will be mentioning "GAMI" often in this, and subsequent columns. GAMI is short for "General Aviation Modifications, Inc.," of Ada, Oklahoma, developer and manufacturer of "GAMIjectors," and other fine modifications for big-bore flat engines. I'd like to make it clear that the principal, George Braly, and his cohorts Tim Roehl and Mack Smith are good friends of mine. While I was of some minor assistance during development of GAMIjectors, I hold no stock or financial interest (wish I did!), nor do I work for them. I do feel they make a superior product that greatly exceeds the claims they make for it. I run the first production set of GAMIjectors in my airplane, for which I paid full-bore retail, in spite of a kind offer of a nice discount for my prior assistance.

Fly it often

The three best things you can do for your engine, in my opinion:

1. Fly it often,
2. Install a modern digital engine monitor (I prefer the JPI EDM-700),
3. Install GAMIjectors.

First off, it seems pretty clear to me that flying an engine often is "a good thing," and it makes a lot of sense, with some pretty good data to back it up. Check out any junkyard, and you'll see that internal engine parts rust very quickly, some of them showing visible signs of the red stuff within hours, if left outside. We can look inside the cylinders of engines that don't run much, and see that familiar rusty film on the steel cylinder walls, and we'll also see a marked increase in iron in the oil samples. It's hard to imagine any beneficial effects from this! Seals dry out from disuse, rings take a set and stick, and oil runs off machined surfaces, leaving metal-to-metal contact for the first few seconds of the next run. I don't think there's any debate on this at all, except for degree. I happen to think letting an engine sit for days, or weeks at a time is probably the single most harmful thing you can do to an aircraft engine. (Alas, I'm as guilty as anyone!) But check out the aircraft that fly a lot, like trainers, night cargo airplanes, check haulers, etc., and you'll generally see them going to TBO, and often beyond. Considering the mistreatment and poor maintenance many of them get, about the only thing left is "flying hard, flying often."

Monitor it well

The next best thing you can do for any of these big-bores is to install a modern digital engine monitor. I think JPI makes the best, by far, and I prefer the EDM-700. This device portrays the EGT and CHT in each cylinder, both graphically and digitally (to one degree resolution, if desired) in a very simple, uncluttered way, and also shows battery voltage. With rather inexpensive add-ons, it will also show oil temperature, outside air temperature, turbine intake temperature, compressor discharge temperature, and above all, it can be equipped with a very inexpensive serial output that will feed any computer with all the data the instrument sees.

Finally, GAMIjectors are high-precision fuel injector nozzles that do what TCM and Lycoming should have done years ago. They are nearly magical in the way they balance the fuel to each cylinder, so that as you lean the mixture, all of them rise in lock-step, all peak at the same mixture setting, and all drop down on the lean side of peak together. This not only saves fuel and makes your

engine run better at rich of peak, but it allows, for the first time, the far better mode of running lean of peak, just like the big radials used to, and just like the Malibu does.

(Yes, I know, Malibu engines had problems running lean of peak.) First, there is now compelling evidence that pilots were so nervous running lean of peak, they added just a touch of fuel "to be safe," thus running CHTs far higher, which damaged their engines. Had they fully followed directions, and leaned them out as instructed, I doubt there would have been as many problems. Second, the engine was very poorly cowled by Piper. As soon as this was discovered and the nose gear door was removed and let the air get out of the cowl area, the engine cooled down, significantly. It took years and lots of toasted engines before that was discovered and fixed.

Leaning on the ground

I believe this is "a very good thing" to do. Most of these engines are set up with a very rich idle mixture, to facilitate starting when cold. This mixture adjustment applies only to the very low power settings used for taxi. In most engines, somewhere at and above about 1200 RPM, the idle mixture setting is overridden by the normal functioning of the carburetor or fuel injection control, and other factors come into play.

How rich is your idle mixture? There's a very easy way to check. You want a nice warm engine for this check, so doing it at shutdown after landing is one good time to do it. Just set an RPM around the usual RPM you use for normal taxiing (I use 900 to 1,000) and start leaning, while watching the RPM very closely. Just before the engine quits, you should see a slight rise in RPM, then a quick fall. (This is very easy with the vernier type mixture controls, a bit more difficult with the push-pull knobs.)

(Note: This is not the way mechanics set the idle mixture! They use minimum idle RPM, or as called for by the book. I'm more interested in the mixture at the engine speed I use most of the time, on the ground.)

Note the amount of rise. You may see "almost nothing" on the big radials, to 50 RPM, or a bit more on some of the flat engines. If the engine was adjusted for sea level, and you do the test at Creede, Colorado (Elev 9,000'), you'll see a very large increase, indeed! The mixture jet is a fixed size, so about the same volume of fuel will pass at all altitudes, but at altitude there is much less air, so the proportion changes to the rich side, and you really need to lean for all ground operations!

Ok, why bother leaning, on the ground? Most of these engines run ok on the ground at full rich, right? Well, not really. The unburned fuel is very dirty, and tends to foul spark plugs.

Also, over time, these unburned products work their way into the valve guides, causing them to stick, especially when cold (aka "Morning Sickness," from the first start of the day). Eventually this may lead to a valve sticking open enough that the piston will start beating on it, and that's not a good thing!

I've faithfully leaned on the ground for the past 800 hours or so, and have never once had a fouled plug, or a problem with an exhaust guide.

What's too hot?

There is now very real data to support the idea that anything over 400F can be very harmful to these engines, notwithstanding the factory limit of 460F. Modern test instrumentation (courtesy of GAMI) has demonstrated that there can be more than 150 degrees difference around the circumference of a cylinder. Single probe CHT instruments may not have the probe installed on the hottest cylinder. Even multi-probe CHT instruments may not be measuring the hottest spot on a given cylinder.

Accordingly, this business of reducing to 25" right after takeoff may be one of the most harmful things you can do to your engine. Far better to just leave it at full power (limitations permitting), or, if you have a noise problem, just pull the prop back a couple hundred RPM to keep the neighbors happy. Now, some will yell about this, based on the Old Wives' Tale that goes "Always reduce MP before reducing RPM." But look at the logic. On my 550, that 200 RPM drop amounts to a 15 hp loss. If you watch the JPI (see chart), you will see the EGT drop, the CHT will remain about the same or a bit less, and the actual pressures inside the combustion chamber remain essentially the same. Please tell me how this can be harmful to the engine? Anyone?

In fact, TCM did exactly the above, by simply limiting the RPM to 2500 on the same engine, to

satisfy the German noise requirements for Beech A-36s delivered there! They just call it a 285 hp engine, instead of 300, modify the performance data to suit, with no other changes.

On the big radials, there are times when the order of increasing/reducing MP and RPM are very important. For simplicity, a lot of that got reduced to "rules of thumb" that get used all the time (sometimes unnecessarily), and those carried over into the flat sixes as they began pulling more and more performance out of them. It may even be true of some of the flat engines with gear-driven superchargers, or turbos, but on most GA engines, it's simply a non-issue.

Leaner is better - if you can

Of course, this mode of operation is impossible without GAMIjectors, because the mixture distribution without them is so bad that the engine begins to run rough long before we can lean this much.

(Well, that's not entirely true. The injector nozzles that TCM puts in their engines are out of tolerance almost as often as they are within tolerance, so if you're lucky enough to have those nozzles in the right cylinders, you could have the same effect you'd have from GAMIjectors. If you're lucky enough to enjoy this situation mark those injectors, and make very sure they get back into the same cylinders after any work!)

This chart was derived from data taken during two flights. The first was my standard operation, leaning the engine out drastically, and climbing that way to 5,000', straight out. Second was done at full rich. Here's the data:

	Climb (ft.)	Distance (NM)	Time (min:sec)	Fuel (US gal.)
First takeoff	5,000	13.9	7:18	2.3
Second takeoff	5,000	13.9	7:15	3.1

The first one hit 5,000' at 13.9 GPS miles from the airport. The second hit 5,000' at 10.9 GPS miles, and I just flew level at 5,000' to 13.9, then noted the data. So climbing lean will take longer, but the time to get to any given point and altitude "downrange" will be very close.

Okay, that's 1.2 gallons saved in the climb to 5,000', big deal. But wait, that's only seven minutes! Project that out to a long climb to 13,000' or so, and you will end up with about seven gallons more fuel at a given point in space. That's more than half an hour's fuel saved, and is about the minimum legal reserve in my airplane! Yes, it takes a bit longer to get to altitude, so what?

I've been running my IO-550 this way for about 500 hours now, and there is every indication the engine loves this sort of thing. A number of others have more than 1,000 hours of this same operation, so it can't be too harmful. Only time will tell if this will allow longer TBOs, of course. But, I cannot see any reason why it won't.
Be careful, up there!

John Deakin

John Deakin is a 32,000-hour pilot who worked his way up the aviation food chain via charter, corporate, and cargo flying; spent five years in Southeast Asia with Air America; and joined Japan Airlines 31 years ago, where he is a 747 captain. He also flies his own V35 Bonanza (N1BE) and is very active in the warbird and vintage aircraft scene, serving as an instructor in several aircraft and as an FAA Examiner on the Curtiss-Wright C-46.

Flight Control Failures

Tips on how to avoid control system problems, and strategies for bringing home a crippled bird.

Clint Lowe

(Extracted from *Aviation Safety*, XV, 21, Nov. 1, 1995)

The pilot and his passenger climbed aboard the Champion 7GC to practice some taildragger touch-n-goes. The flight proceeded normally until the aircraft was at 400 feet on final approach. Witnesses said it plummeted straight into the ground from there. The pilot was killed instantly, and the passenger died a short time after being pulled from the burning wreckage. Investigators found that the 'up' elevator control cable had melted and come apart near a guide pulley.

The damage had occurred near the point where the positive battery cable was lying across the control cable. For some time, the cable had approached the nearby structure close enough to produce an arc to ground when the control stick was moved.

Two months later, a similar airplane crashed on takeoff 500 miles away for the same reason. One of the occupants died, and one was seriously injured.

Although we rely on the entire airplane and its systems for our safety, pilots spend an extraordinary amount of time monitoring engines and avionics, frequently because we've witnessed problems with these components. Most pilots place extraordinary confidence in an aircraft's flight control system. Few pilots encounter any trouble with the system and reasonably believe the controls are mostly maintenance-free.

Hidden from view and almost never seen except during once-in-awhile inspections by mechanics, control systems don't often show pilots how close to disaster they may have come. It's in the maintenance hangars that lips pucker to silent whistles and mechanics shake their heads. The older our aircraft get, the more whistles and shakes are occurring.

Fortunately, few accidents have been caused by flight control problems. According to NTSB, there were 41 reportable accidents in the past 10 years. However, about 120 potential flight control problems are reported by mechanics to the FAA each year. Not surprisingly, the factors involved in most other aircraft problems are the same with flight controls: improper maintenance, poor operating technique, neglect and weather. Here are some of the leading problems:

- **Corrosion:** Brought on by exposure to moist environments, chemicals and coastal operations, corrosion degrades cables, bearings, cable attachment points and other metal components of the flight controls. In one case, only three months after an annual inspection, a Beech A35 Bonanza was observed to make a steep climb on take-off, turn sharply to the left and then spiral to the ground. All three people aboard the airplane died in the crash. Investigators found that the right rudder cable had separated. The failure occurred where the cable passed under a fuel tank. The cable had almost been consumed by corrosion; only a few strands of wire remained, displaying overstress failure.
- **Wind:** Since aircraft controls are designed to withstand wind stresses from one direction (the relative wind), high wind exposure from other directions can place a lot of stress on pulleys and pulley brackets, cable attachment points and other system components. If control surfaces are exposed to winds without control locks in place, additional pounding of control stops and shock-loading of the entire system also can cause problems.
- **Improper rigging:** Improper control rigging and cable tensioning can accelerate wear of control system components. Lack of lubrication can deteriorate bearings on pulleys, control tee components and various bushings. These problems increase the possibility of premature wear and/or frozen pulleys, cable end bearings and attachment hardware.
- **Excessive force:** Using excessive force or 'snapping' controls to their stops during quick maneuvering can wear or break control stops and place excessive tension on control cables. In one case, a Cessna 150 Acrobat pilot, who'd been observed pulling back hard on the yoke during every take-off, probably never knew that his habit had damaged a bellcrank and clevis to a point where the clevis hung on a bulkhead. His final moment came in a left spin with the elevator stuck in the 'up' position shortly after takeoff.
- **Improper routing:** When old control cables are reinstalled after maintenance, or when new cables are installed, they can be improperly routed. The cables then can rub against one another or against portions of the airframe. The results are cable wear, fouling and/or fraying. One crop-duster per-

forming the first flight of his newly rebuilt Ag Cat found, right after liftoff, that the mechanic had rigged his elevator cables backward. He suffered only minor injuries in the subsequent crash, but his aircraft had to be returned for another complete rebuild.

■ **Modifications:** Antennas, strobe lights and other 'added' components can come in contact with control cables, resulting in electrical arcing and/or wear. In one case, following the installation of an autopilot, the owner of a Piper Aztec noticed that the stabilator briefly stuck nose-down during the check flight. But, the incident did not recur for awhile and apparently was forgotten. Later, ATC would report that the pilot's radio transmissions had halted abruptly only seconds before the aircraft nosed into a lake. Both people aboard the aircraft died. Investigators found that the 'up' stabilator control cable had 'worked' against the side of a pulley, wearing and then fracturing the pulley. The cable then 'rode' under the edge of the pulley, jamming it.

Though most of an aircraft's flight control system is hidden from the pilot, a surprising amount can be determined about the health of the system without opening a panel. Each flight should be considered an opportunity to discover potential problems. Here's what to look for (and, as always, any recommendations offered by the aircraft manufacturer take precedence):

■ During your preflight inspection of the control surfaces, grasp each surface lightly with your fingertips and move it slowly through its travel. 'Feel' the surface through its entire travel. If you detect any resistance or hesitation anywhere, there may be trouble brewing, and you should contact your A&P.

■ Wait for a quiet moment on the ramp and listen to the control system while moving each flying surface. You should hear no unusual noises, such as scraping, grinding or other odd sounds. If something seems amiss, ask permission to try the same check on another, similar airplane.

■ Follow the movement of each flying surface as far as you can see. On most aircraft, you can check the cable attachments at the elevator and rudder bellcrank, as well as the pushrod attachment to the ailerons. Ensure that the cotter pins are in place and that lock nuts are used for all portions of the visible control system.

The inspection should continue after you board the aircraft. Every checklist contains something similar to 'controls free and correct.' (Had the pilot of the Ag Cat performed this one simple check, he probably would have noticed that his elevator was not hooked up properly.)

In high-corrosion or dust environments, more frequent lubrication of your flight control system components may be in order (consult your A&P to help determine your aircraft's needs). Using a good-quality spray lubricant (available through your FBO or A&P), you can refresh most of your pulleys in a couple of hours between inspections. Most of the pulleys in your aircraft probably can be reached through inspection panels on the outside of the aircraft. A more thorough lubrication of the pulleys can be accomplished by removing the seats of your aircraft to gain access to panels under the carpet and by removing the empennage access cover in the baggage compartment.

A very important and often over-looked danger is the presence of foreign objects in the vicinity of flight controls. Probably the most likely means of having a frozen flight control is through contact with a misplaced or lost bolt, tool, camera, etc. You can do a lot to reduce this hazard by ensuring that loose objects are secured away from control systems. If they are not needed, it is best to get them out of the airplane altogether.

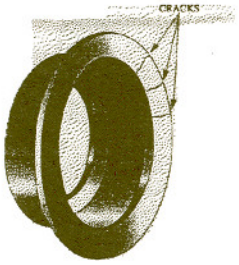
Editor's note—A Case In Point

During the re-build of our Starduster Too after an upset on the runway, some bent cross members on the fuselage had to be straightened and strengthened by welding. At one location near the right side of the seat in the rear cockpit, the rudder cable rubbed against a rough edge of the cross member. Several months later, when Mike Guarino was getting some dual time in with Glen Olsen, as he was about to enter the aircraft he did an unusual thing. This Starduster is entered from the left side only, but Mike approached the right side and looked down along the inside of the fuselage. There he saw the rudder cable that had been rubbing against the rough edge of the cross member, and it was so frayed that only a few strands of cable were holding it together! It is very possible that it would not have lasted for one more flight. The plane, of course, was immediately grounded, the offending rough spot eliminated and the cable replaced. But for the influence of a kind providence, N1923S could have been yet another statistic.

Cessna; Model 172N; Skyhawk; Brake Disc Cracks; ATA 3242

Three cracks were discovered by visual inspection of the main landing gear brake disc (Cleveland Brakes, S/N not provided). The cracks radiated across the disc and extended completely through the disc. (Refer to the following illustration.)

The submitter stated that this is the third cracked disc that he has found this year.



Cessna; Model 172R; Skyhawk; Loose Rocker Shaft; ATA 8530

Due to a rough running engine, the pilot made a precautionary landing. A technician inspected the aircraft and discovered that the number 3 cylinder was dead. The valve cover was removed to find the intake and exhaust rocker shaft loose and one retaining nut inside the valve cover. The aircraft had been returned to service approximately 2 hours earlier. The log book showed that all of the push rod seals were replaced due to oil leaks. The oil seals were all replaced; but upon reinstallation of the rocker shaft, the mechanic used star washers to secure the plain nuts in place. The Continental engine manuals call for a nut lock (P/N 50186). Twenty-four new locks were installed on all rocker shaft retaining nuts and "crimp locked" as required.

In this case, the problem was found and corrected with no harm done. However, this is a good example of why substitution of parts should not be done. Under different circumstances, this same failure could have resulted in a very serious situation

Pitts; Model S-2A; Engine Failure; ATA 801 I

While maneuvering in a flat spin, the engine failed. All attempts to restart the engine failed, and the aircraft crashed.

During the accident investigation, it was found that the starter bendix would not engage, and the fuel filter had accumulated numerous metal particles. The submitter speculated that placing a "Teflon" ring around the "flop tube" (P/N 2-6502-013) would prevent the "flop tube" from scraping the metal and would eliminate metal particles from entering the fuel filter.

Powerplants and Propellers

McCauley; Models 71093, 72415, 761101, 780630, and 810915; Possible Incorrect Oil Viscosity; ATA 6114

In accordance with Airworthiness Directive (AD) 91-15-04, all affected systems that have a two-bladed constant speed propeller with a threaded retention hub are required to be inspected for cracks and modified by filling the hub with "dyed" oil. This includes propellers with feathering capabilities.

It has been discovered that since 1993, a propeller overhaul shop has been filling all McCauley oil-filled propeller hubs that are installed on reciprocating engines with the wrong weight of oil. An FAA safety recommendation stated that the propeller shop had been misinterpreting the instructions given in the McCauley service information referenced in AD 91-15-04. Since this discovery, there have been reports of other propeller shops misinterpreting the appropriate oil weight.

It is recommended that all owners and operators of suspect propeller hubs verify that each hub is filled in accordance with McCauley Service Letter 1998-2, dated January 23, 1998. This should be accomplished during the next scheduled maintenance and/or inspection.

PROPER CROSSWIND LANDING

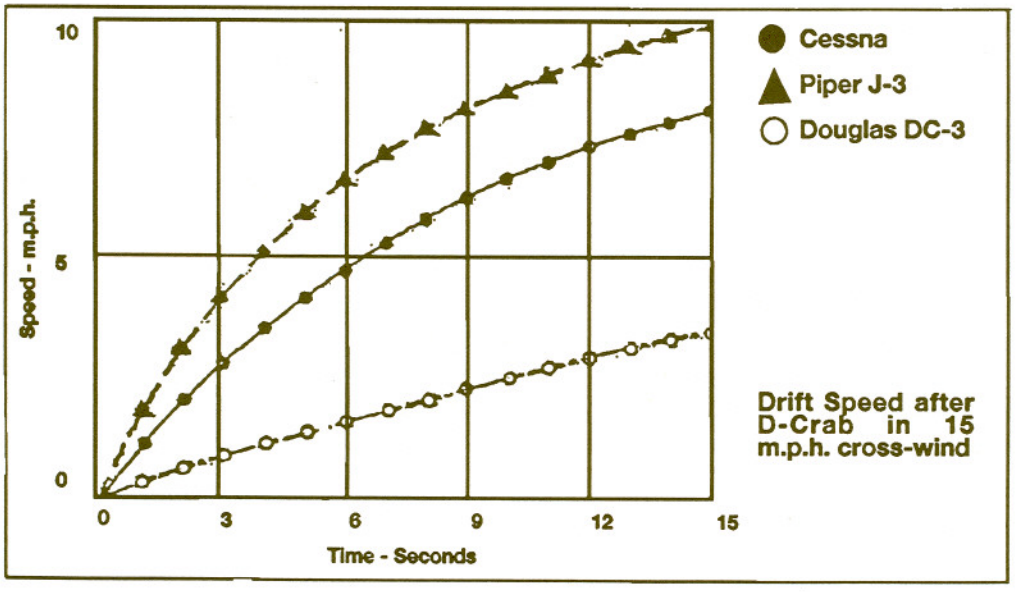
From *Canadian Flight Publishing Company Flight Safety Book Bulletin 276*

There are a large number of pilots who believe that they can safely land an airplane using the crab technique. Most of these pilots are believers because they use the technique and successfully get away with it year after year. Their definition of safety is that if they didn't crash the airplane, they must be doing something right. This, of course, is not true because they are not thinking about those occasions when they had a close one and nearly wrapped the airplane in a ball. They also ignore the excessive strain that they have repeatedly placed on the landing gear. There are two other reasons why they believe in the method:

1. They have a strong belief that they can accurately predict the instant of touchdown. (That they actually cannot is beside the point.)

2. They believe that after the crab maneuver is performed during the flare for the landing, there is some time period before the airplane starts drifting to the side. They have no idea how long (or short) this instant in time is, but nevertheless believe that it exists. The believers will never be convinced otherwise without some kind of concrete proof being presented to them. Now, there are two kinds of proof that can be offered, and each has its merits. The first kind of proof is the relevant analogy: find a similar situation and use it. The first useable one that comes to mind is the question of how quickly does an airplane start drifting to the side when a takeoff is made in a crosswind and no correction is attempted? In other words, a crosswind takeoff made without lowering the wing prior to leaving the ground. The answer is that the airplane starts drifting instantly. There is no delay time or short period. We've all made that kind of takeoff - if unintentionally - and have experienced the instant drift. The second kind of proof that one may use is analytical or mathematical and is a bit more difficult to come by.

First, the equations are found to be non-linear differential equations and therefore are difficult to solve. A different approach is to use the digital computer to effect a simulation that will give us the equivalent of a solution. This is easily done using a personal computer. Before discussing the result, I would like to point out that the two variables that distinguish various airplanes from each other in this regard are gross weight and side area (fuselage and tail) which the wind pushes against. Thus, once the computer program has been written, one can obtain results for any airplane by providing the area and weight of the airplane in question. In my particular simulation, I obtained results for three airplanes: The J-3



Cub, the Cessna 170, and the DC-3. These results are shown in the accompanying graph. These results should be interpreted as follows. Let's use the curve given for the J-3 Cub (topmost curve). The graph simply says that if we have a 15 mph crosswind, and at time zero we accomplish a perfect crab (i.e., kick out the crab), the Cub's sideways velocity will start at zero and will pick up 4.2 mph at the end of three seconds, and 6.56 mph at the end of six seconds. So you see, the airplane does pick up side velocity immediately after crab. You can also see that if the pilot incorrectly estimates his touchdown by six seconds (easy to do in a Cub in turbulence), he will have accumulated a 6.5 mph crosswind before touching down. This is why the crab method does not work in light airplanes. The pilot who thinks that this is trivial has never landed a Cub in an appreciable crosswind. If this landing were on a hard surface, this kind of error is enough to precipitate a ground loop and may result in totalling the airplane. If we now return to the graph, we see that for the slightly heavier Cessna 170, the results are much better, or more benign. The side velocity at six seconds is only 4.75 mph. If we look at the curve for the DC-3, we find that the side velocity gained at six seconds is 1.8 mph. So you see the reason for the difference of opinion between the flight instructors (teaching in light airplanes) and the airline pilots flying today's Boeings. With enough weight, the questions indeed become trivial. To sum up; What crosswind technique is right for one type of aircraft may be wrong for another. I once heard of a Boeing 707 captain who liked the wing-down method so much that he used it on the first jet airliners. That is, he used it until one day he scraped the wing tip and that put a stop to the wing down method of counteracting drift when flying the big jets.

Loctite on Aircraft Bolts

From *EAA Technical Counselor News*, Fall 1995

If Loctite had been available when the aircraft standards were being written in the 30's, I believe it would be used more. I have used Loctite for many years on real problem cases and have found it to work excellent. I will be referring to Loctite brand part numbers, but there are other brands of liquid thread lockers that work just as good.

Red Loctite #262 is a high strength locker for bolts you won't be removing and for use as a bearing retaining compound. It has a gap filling capacity of .007" and a full cure in 2 hours. It should be used in problem areas such as high vibration and bolts that turn. It requires more force to remove bolts with red on them, but it can be done.

Blue Loctite #242 is a medium strength lock with a gap filling capacity of .005" and a full cure in 6 hours. Partial cure is 20 minutes. This is the one that I use the most. It keeps bolts from loosening, yet can be removed easily. The rudder bar pivot bolt on my plane is below the engine and cannot be tightened or the rudder bar won't turn. The vibration had worn all of the threads off of the nut and bolt, so only the cotter pin held the castle nut on. When I replaced them, a drop of blue Loctite on the nut has kept it from vibrating.

Green Loctite #290 is a wicking locker with medium strengh. It fills gaps of .004" and has a full cure in 2 hours. It can be used on pre-assembled nuts and bolts. Just put a drop on the threads and watch it wick in. It is good for adjusting screws that you want to stay put.

Bullets for Alignment

Bud Oliver

Custom Aircraft Building Tips, Vol. 1

Many times I have shivered and cringed as I watched fellows hammer bolts into strut and wing fittings as they assemble and rig an aircraft. In many cases the assemblers are unaware of the proper techniques to use to avoid trouble. When you are holding something in alignment, such as a wing to fuselage root fitting, and then proceed to take the actual bolt that you are going to secure it with and attempt to drive it into place with a hammer, you are certain to get varying degrees of the following results (sometimes all of them): ruined bolt threads; galled bolt and fittings; bent bolt; elongated fitting holes; bent, twisted and cracked fittings; loss of paint or plating.

Two persons can assemble any plane whose component parts they are able to lift with absolutely no damage by using the following procedure. Assemble the entire plane by using bolts of at least one size diameter smaller than the bolts that you will use on the completed job. If possible, these bolts should be inserted opposite to the direction that the actual bolts will go in. In this way the entire plane will easily go into approximate alignment and the bolts will go in easily by inserting them with the fingers. Fig. 2).

Now make a bullet of the proper diameter and length for the alignment of all fittings. To make the bullet, just take an old bolt that is the same diameter that the fitting requires and grind one end to a bullet nose shape and cut the other end off square. Only the un—threaded bolt shank is used. The head of the bolt is cut off and the threaded end is used for the bullet head end so that the threads are ground away (Fig. 1).

For tight places where a long bullet cannot be used, make up a short one as shown. The bullet is given a thin coat of Parker Thread-lube or Lubriplate, or white lead and oil (to stop galling of similar metals) and inserted into the fitting in the same direction that the final bolt will go in. The bullet is then tapped in place with a soft drift and hammer until it is flush with the face of the fitting (Fig. 3). The bolt is then tapped into place. It will push the bullet out of the fitting ahead of it (Fig. 4). You may notice that I illustrated one bullet with an eye at the point. This is the cotterpin hole of the original bolt from which the bullet was made. Often there are places where the bullet cannot be driven in. In these cases you can often pull the bullet into the hole with stainless steel safety wire inserted through this hole (Fig. 5).

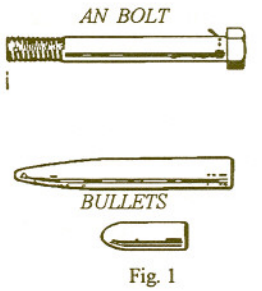


Fig. 1

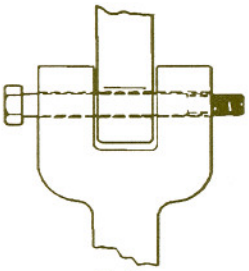


Fig. 2

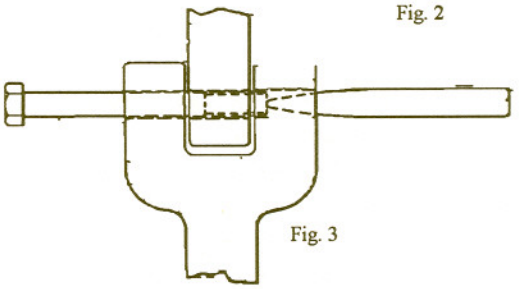


Fig. 3

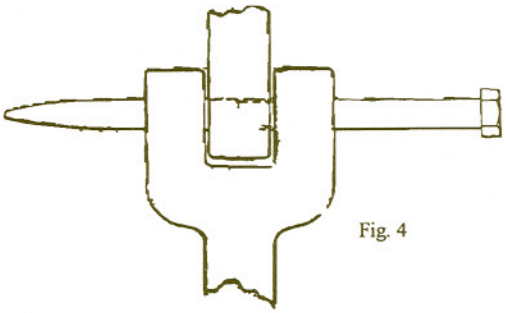


Fig. 4

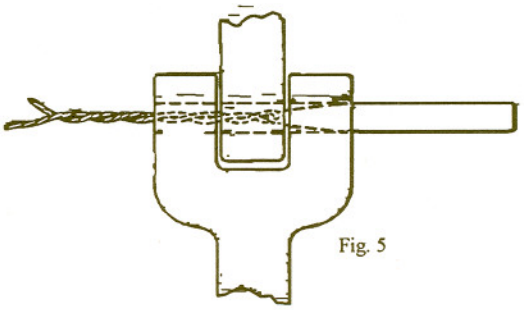


Fig. 5

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Acroduster Too project. Prefer welded or tacked fuselage in the Southwest. Call Jim, 602.935-0963. 982

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1972 Starduster Too, Continental E185-3 (205HP), 627 TT airframe, 332 TTSN engine.PS5C pressure carb. KX145 Comm, Mode C transponder, ELT, full canopy, aux. Fuel tank. $25,000. Call 520-219-5930. 984

Acroduster I (SA700) 72 hrs TTAE Lyc. O-360, fixed pitch prop, smoke, fully inverted, Ellison carb, Christen oil system, symmetrical wing, four aileron. White, blue trim, beautiful appearance, a delight to fly. Aricraft was completed at Flabob and test flown by Bill Clouse. Buyer must have 500 hours and 50 hours tail dragger time. (See photo, page 22) $24,500. Lee Holcomb, 916.933-7743. 984

Starduster Too. Completed 1989. 435 TT, 320 SMOH on 200 HP Lyc. IO-360A1A, 320 SN on Hartzell CS aerobatic prop. King KT-76A Transponder/Mode C & KLX-135A Comm/GPS/-Intercom. Clevelands, Hooker harnesses, Scott tail wheel, ACK ELT. Always hangered. Full inverted fuel and oil. A&P built. Stitts fabric. Open cockpit. $34,000. 602-580-8044 or email 71612.3110-@compuserve.com 984

Starduster Too SA300, 573 TTSN A/C, engine & prop. Lyc IO-360 (200 hp), Hartzell CS prop, Navcom, Xponder w/encoder, intercom, dual controls, always hangared. 409.774-4454. 983

Starduster Too, Low time AF, Lyc.O-360, Sensenich, Clevelands, Spring gear. $32,000. Hezter. 503.399-0809. 983

1966 Starduster SA300. 90 TTAF, 90 TTE, IO-360-A1A, 220+ hp. C/S prop. New canopy, Terra pkg. w/encoder. Christen inverted system. Everything new. $39,500 or trade for cross-country airplane. Joe. 304.245-8858. 983

1970 Stolp Starduster Too, disassembled for recovering. 500 TT. Set-up for O-470. Newer wings. Complete except engine. $14,500, obo. 513.539-9362. 983

Starduster Too biplane project. On gear, close to completion. Majority of parts to finish. $8,500. 208.452-3149. 983

Starduster Too, O-360-1AD. 450 SMOH. C/S prop, canopy, Xponder w/encoder, Narco Navcom. Heat. $33,000. 717.938-1307. 983

Starduster Too, 337 TT. Lyc. O-435 190 hp, Hartzell prop. Spring steel landing gear. Ceconite cover. $25,000. SE Ohio. 740.984-4222. 983

Starduster Too, 210 TT. 150 hp, inverted fuel & oil. Narco Com 810. Garman GPS 90. Tape player. Recent paint, leather interior. Over $10K spent on beautiful refurbish. Absolutely nice, no-excuse airplane. $34,500. Don at 319.582-1293, after 6 pm, 608.763-2707. 983

Acrocuster Too, 1981. Factory welded fuselage. IO-540, 260 hp Lyc. Full inverted system. 300 TTAF, 900 TTE. KX-125 Collins Xponder, Mode C, NAT. Intercom. D/C headsets, helmets, security parachutes. Built w/ Oshkosh award-winning expertise. Always hangared & always loved. $42,000. 760.434-0923. 983

1973 Starduster Too. 650 TT, 53 SFREman, IO-360A4M. Inverted fuel & oil. New Airflow Performance FWF. New 1996 spring gear, . Hookers. Beautiful airpane. 904.760-2524. 983

Starduster SA100. 60 TTAF since complete rebuild. O-290D Lyc. Full electric. Seat pack chute: Asking $17,000. Gene 931.635-2325. 983

'80 Starduster V-Star SA900 biplane. Lyc. O-290D 125 hp, 3" G-meter. EGT, CHT, vernier throttle, full electric, Maul tailwheel, new radio, new prop. 2-98 annual. 450 TT. 450 SMOH. Very nice. $16,000. 203.756-0340. Call after 6 pm EST. 983

Starduster Too. 69 TT. 200 hp IO-360. Hartzell prop. Com. Xponder, encoder & lights. $42,000. 503.838-2021. 983

Acroduster Too aerobatic biplane. IO-360 Lyc. 250 TTA&E. Damaged right gear & lower wing. Must be trailered. $20,000 as is. Call Fred 817.535-5130. Texas. 983

Starduster Too. 870 TTAF SMOH. Lyc. IO-360, 180 hp. C/S prop. Inverted fuel & oil. KX-155 Navcom. KT76 Xponder w/encoder. Instruments front & rear. Stereo intercom /tape player. New nav lights and landing lights. 40 gal. fuel. Spades, electric trim, Cleveland wheels & brakes. Maul 3200 tailwheel. Sliding canopy. $38,000. 615.774-3311 days. 615-774-3387 evenings. 983

'77 Starduster Too. 489 TT. 90 SMOH. Lyc. O-360 A3A. Hartzell C/S. KX 197. Canopy. Helmets w/headsets. $22,500. 206.363-5941. 983

Starduster Too, totaled. Parts available. Center section w/tank $800. Cabane struts $400. Some parts slight damage. 607.669-4401. 983

Starduster Too, beautiful aircraft. Completed 1985. 762 TT. O-360. $30,500. 501.372-3131, or 835-6703. 983

Starduster Too. Basic fuselage with seats and cabanes welded. $2500. Call Cap, 760.947-2414. 982

STOLP Starlet airframe with complete empennage, professionally welded, no damage, early model designed for VW or 65-75 HP Continental engine.
Steal it for $600.00 206-431-9732 9820

STOLP Starlet project, complete airplane with damaged fuselage, includes completed wings thru Silver, both tanks, gear with wheels and brakes, wing lift struts, everything you need. Repair fuselage, put together and fly. $1,900.00 Also have available zero time OH'd Lyc. O-235 machined for dynafocal mount. Engine will cost you extra. 206-431-9732 982

Canopy for Starduster II $200.00. Frank Johnson 805.239-3124. 982

1983 Starduster SA300, 220 TTA, 220 SMOH on 180 hp Lyc. O-360-A1A with fixed pitch prop. Looks like Pitts S2A. Recent KY197A Com, Magellan GPS. Hangared aircraft. Offers. Call Joel, 941.643-2500. 982

1981 Starduster Too. 420 TTAF. Fresh annual, 200 hp Lyc. injected engine, fresh OH, new constant speed Hartzell prop, inverted fuel/oil, full canopy, intercom w/stick switch, KY197, Nav-12, portable GPS, ELT, IFR, full panels front/rear, new lights & beacon, prize winning paint, aux. tank, 3 new tires, $42,250. Call Gordon 440.238-3053. 982

Stolp Starlet Kit, 49% complete w/factory new 60 hp Franklin certified engine, fuselage, tail feathers, gear & struts all welded. Wings & center section wood assembled. Cleveland wheels & brakes. No dope or fabric. Custom Sensenich prop. $8500. 909.734-2046. 982