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The Windecker "Eagle": Forerunner of Today's Composite Airplanes

by Mike Huffman

Of all the developments in general aviation aircraft over the last quarter-century, perhaps the most important and pervasive has been the increased use of composites for aircraft structures. This revolution was fostered by decades of experimentation by aircraft homebuilders, including "first-generation" aircraft such as the KR-series, the W.A.R. Replicas, the EZ's and all their variants, the Quickie's, the Dragonflies, and many others. Most of those designs were characterized by hand-formed, solid foam cores covered with wet fiberglass layups, using common "E-glass" cloth and room-temperature-cure resins.

As the technology advanced, the airplanes became more sophisticated, including examples such as the Glasair series. Smooth-finished molded components became more common, as did vacuum-bagged sandwich construction, and the use of more exotic materials such as high-strength S-glass, carbon fibers, Kevlar, and improved resins.

Now, composite general aviation aircraft are moving from the homebuilt arena into the certified production arena, with examples such as Lancair and Cirrus (of which 1000 are on order and 100 have already been delivered!) The requirements for FAA certification, efficient/cost effective manufacture, and ease of maintenance have produced yet further improvements in construction materials, designs, and manufacturing methods. The day of the composite general aviation aircraft is truly here.

What is sometimes forgotten is that this revolution began over thirty years ago with the development of the first FAA-type-certificated all-composite aircraft in history, the Windecker Eagle. The Eagle incorporated many of the features of today's certified composite aircraft and was definitely ahead of its time.

This is the story of my involvement with Windecker, and the beginning of my aviation career. These experiences were some of the most meaningful and interesting of my working career and their effects endure even today.

The pre-production fixed-gear prototype of the Windeckecker Eagle. Photo reprinted with permission from Flying Magazine, April 1968.

It was January 1968. I had graduated from engineering school a year-and-a-half earlier, was working for General Motors in Detroit, and was almost finished with private pilot flight training at a little grass strip near Pontiac, MI (now the site of a General Motors assembly plant.)

In graduate school, I had become interested in flying, but having no money at the time, was forced to postpone it until after graduation in June, 1966. My first lesson was in early August, less than two months later. Since I could only afford about one lesson every weekend or two, and since Michigan weather often plots against flying-- especially in winter-- it would be a year and a half before I finally got my ticket.

In the meantime, I had become "eat up" with airplanes and flying. Often during the winters, there would be two- or three-week stretches where the weather made it impossible to fly. Although I never noticed, my wife said I got grumpy during those times (me, grumpy???) and, for her own protection, took to suggesting that I go to the airport at every available opportunity.

And, you know what?-- I'll have to admit that, after a flight lesson, the world took on a happy glow. Driving home afterward, I'd find myself deeply peaceful and satisfied-- humming sweetly and serenely, with God in his heaven and all right with the world (apparently also much easier to live with!).

During that same period, I was getting disenchanted with the cold, miserable climate in Michigan and New York, where I had then lived for seven years. I was yearning to get back to the Southwest-- Oklahoma or Texas. So I engaged the services of an employment agency in Oklahoma City.

I was secretly hoping to find an engineering job in aviation. One of my interviews was at the Aero Commander plant in Bethany. The interviewer explained that they did not have any positions available, but noticing my background in plastics and composites, offhandedly mentioned that their former vice-president, Ken Smith, had recently joined a small company in Midland, TX that was developing an all-composite airplane. He thought the company name was something like "Wind-Acre." It was an interesting conversation, but it easily slipped to the back of my mind.

The employment agency, as they are wont to do, set up some weird and off-the-wall interviews for me-- anything to collect their "pound of flesh." I gamely followed their plan,

continued on p. 6.

From Mike...

The Oklahoma Aviator has been getting some good press lately! People seem to be enjoying reading what our contributors have to say. Back in September, we reported to you that Bob Richardson's article "Oshkosh in Your Blood?" had been reprinted in the official AirVenture 2001 program.

Now, I'm happy to say that the same thing has happened twice more. First, Earl Down's column in our September issue about his escapades flying the ultralight pattern at AirVenture 2001 entitled "The Old Oak Tree" was reprinted in the November issue of the EAA *Experimenter* magazine. Don't you love Earl's writing?-- I am privileged to be able to read his columns before the rest of you do.

Then, in the Fall 2001 issue of *To Fly*, published by Paul Poberezny's Sport Aviation Association, I was honored to find one of my columns reprinted-- one from way back in May 2000 that talked about the "good ol' days" of aircraft homebuilding.

We thought you might be interested in seeing how they looked.

EXPERIMENTER

November 2001

Surviving Oshkosh and the Old Oak Tree

(Reprinted by permission from The Oklahoma Aviator)

by Earl Downs

Earl Downs, twin brother of SkyStar President Ed Downs, does his impersonation of Ed in the ultralight pattern at EAA AirVenture Oshkosh 2001.

Assuming his normal personality, Earl poses with his Kitfox Lite named Ace. He named it that because the very first airplane he ever wanted to build was a Corben Baby Ace. "When I finally was able to build an airplane, Ace seemed like the perfect name," Earl said.

It was that time of year again; time to make my religious pilgrimage. You know what I am talking about—a trip to the world's largest combination

scooter. I could sense when it was approaching and could even hear the sound of its motor over the sound of my own engine. The little red scooter

Dozens of little planes lined up to fly. I had stayed up all night and tormented myself with thoughts of my children as teenagers (those thoughts turned out

TO FLY

From Mike....

by Mike Huffman, SAA 1236

As I write this, Barbara and I have just returned from Sun 'n Fun - her first time at a large fly-in. I have attended many previous years and my perspective may have become a bit jaundiced, but seeing it through her eyes gave me a fresh look.

I was reminded of the time long ago when I first became interested in flying, of afternoons spent at a little grass strip in upstate New York, sitting at the end of the runway seeing, hearing, and even smelling the airplanes coming in for a landing twenty or thirty feet above my head. The fluttering, whistling sound of a windmilling propeller gliding by was exciting and magical. In those days, before I could afford flying lessons, I would have enjoyed just being able to sit in an airplane on the ground!

Then in the mid-60's, I could afford flying lessons and a Private Pilot rating. Very quickly I gravitated toward homebuilt airplanes and fly-ins. Over the intervening years I have designed, built and/or restored perhaps fifteen airplanes. I joined EAA in 1967, started my first homebuilt the following year, and went to Oshkosh first in 1970.

As Barbara and I toured the Sun 'n Fun convention grounds, I became aware once more just how much sport aviation has changed in that time. My memory (I wonder if it is accurate) of that first Oshkosh was that there was a greater variety of homebuilt airplanes, most of them truly built from plans. John Monnett (of Sonerai, Monerai and Sonex fame) was there with a modified Jeannie's Teenie. John Dyke had his futuristic Dyke Delta. There were Jodels, Cassutts, Breezes, Taylor Monoplanes, EAA Biplanes, Stardusters and many others. There were "roadable aircraft"...combination automobiles and airplanes.

Some of the craft present were admittedly of questionable design and workmanship. One in particular was a high-wing

Letters To The Editor

Dear Mike,

Our Tulsa chapter of the Confederate Air Force (now known as the Commemorative Air Force) has not been really very active these past several years, however, this has all changed over the past several months. A year ago February only two people showed up for a monthly meeting. Last month, at a monthly meeting/veterans dinner, we had nearly 50 people in attendance.

Work on our PT-19 project is progressing nicely, and may take a major jump ahead if we are able to acquire the remains of a PT-19 that crashed at Midland last year. One of the most positive aspects of the Tulsa squadron however, is the number of young people who are becoming active. It is very impressive to watch these kids work and take on the responsibilities that they are capable of handling. Most of them started last year working on the B-24, doing things like cleaning, organizing and other small tasks, but in time ended up working with some of the top professionals in the aviation industry, assisting in cylinder changes, valve clearance checks, and gear extension test.

It just shows you that youth, if given the chance, provided the opportunity, and armed with good training, can do any job that is set before them. At present the Spirit of Tulsa Squadron has about six kids below the age of sixteen and four at or above that age who are working with us. Please come out some Saturday morning or Tuesday evening, or better still, we have our regular general membership meeting on the 2nd Tuesday of the month at Tulsa Technology, flag pole lobby, at 7PM— signs point the way to the room. Feel free to call me if I can be of assistance or answer any questions.

Sincerely,

James Dagg, Col. CAF Spirit of Tulsa Squadron, 918-224-6293, Fax 918-224-6879

PLANE POTPOURRI

Bob Richardson

George, the Airport Dog

George was a typical airport dog-- a castoff from a passing car, left behind by a family on the move, or just an unwanted pup abandoned like many before him on an airport road. He was a lop-eared mutt whose mangy and dejected appearance belied a cunning instinct for survival.

In his own way, George enjoyed life, chasing away the other strays who had the gall to set foot on his airport domain. His inner clock assured he would show up in plenty of time to devour the lunch and dinner scraps doled out to him by kind-hearted airport employees. With his winning ways, he made friends with everyone and developed a particular affection for airline ramp service workers, baggage smashers, and female passenger agents. (It was the latter who named him). George also received a lot of attention from employees of the fixed base operators (FBOs), who shared the large concrete loading ramp with the airlines. Therein lies the tale of one of George's most famous escapades.

George's sex drive was well known. More than a few pups bearing a remarkable resemblance to good ol' George appeared around the airport area.

In spite of a number of warnings about George's promiscuity, a student pilot named Jack persisted in bringing his beautiful, red, female Irish setter to the airport, where she roamed about while he practiced the art of acquiring a private pilot certificate. He seemed unconcerned that his valuable pedigreed pooch might come in contact with the wily airport cur.

Therefore, it was inevitable, nature being what it is, that George and the Irish setter would surely get together. When they did, it was in the middle of the service ramp in full view of everyone.

Jack, who had just landed, was quick to rescue his prized animal and rush her to the nearest vet's office. George was scolded and banished to sulk in the airline baggage room. Fortunately, no harm was done and Jack thanked his lucky stars. The last thing he wanted was a mess of George look-alikes; he resolved not to exercise his pride and joy at the airport anymore.

The incident was over and forgotten, or at least Jack thought so. However, in a few days, he was surprised to receive an envelope in the mail from the airlines-on its official stationery. It was an bill from the airlines, which included the following items.

STUD FEES (for George's services)-- $100.00

TIME LOST (by airport employees)-- $500.00

SERVICE CHARGE (separating dogs)-- $50.00

AMUSEMENT TAX (about 10%)-- $80.50

VETERINARY SERVICE (for George)-- $75.00

MISC. (work delays, explanations, etc)-- $80.00

TOTAL--$805.00

Happily, Jack was a good-natured fellow and enjoyed the little joke by displaying the bill prominently on the back-bar of his favorite beer joint, until it became tattered and torn.

That was a long time ago and, the last I heard, George died of old age, having outwitted man and beast for fifteen years or so. The Irish setter mothered many litters of pedigreed pups. Jack finally passed the test and got a private ticket, which he enjoyed for a lot of years. The airline expanded and moved on to a bigger and better population center (thanks to deregulation). The FBO went belly-up and filed for bankruptcy. So, I guess you could say that, all in all, every thing turned out pretty well.

Incidentally, one time George got into a real mess with a stray skunk. Ah, but that is another story…

Note our new email address: OklahomaAviator@home.com

Up With Downs

Earl Downs

Test Pilot

Those of you who follow my monthly diatribe are aware that I built a Skystar Kitfox Lite ultralight and that I market theairplane in this area. You may also remember that my brother, Ed, is president of Skystar Aircraft. Once again, Skystar has come to me for help and guidance.

In late September, I received a call from Ed. He started the conversation by relating a story about the French Emperor, Napoleon Bonaparte. It seems that Napoleon had this military advisor working for him who was considered to be sort of a dolt by all the Emperor's generals. The commander of one of Napoleons armies asked The Emperor why he kept this inept fellow around. Napoleon replied (I will translate), "I keep him here to read all of my military orders. If he can understand them, I know that all of my commanders will understand them." After Ed finished his story he explained that Skystar has developed a set of doors for the Lite (the basic kit is open sided). He asked me to assemble and install them on my Lite (named "Ace") to see how they work. I am not sure what his story had to do with me installing the new doors but I am working on it. There must be some connection!

Better yet, he said I also needed to do the test flying of the new doors. Skystar didn't have a Lite available for the flying evaluation so it's up to me. I would need to do stalls, angle of attack checks, takeoff and landings, slips and all that good stuff with the doors open and closed. I would be testing something new. Pushing the envelope! Going where no man had gone before! Step aside Chuck Yeager, now it's my turn.

After a few calls to Skystar regarding the door fabrication and installation, I was ready to fly. I recommended they use Napoleon's proof reading system before they send these kits out to experts like me. That must be why he told me the Napoleon story. I wonder what the snickering was all about that I faintly heard over the phone?

The doors open up until they meet the bottom of the wing and they also extend slightly forward of the wing leading edge. We decided to test opening only the right door during flight. If the builder wants both doors open in flight, he/she can just remove them. Of particular concern for the open door testing was how much air load would be applied to the open door at various speeds and pitch angles, and it's effect on stall behavior. With the open door extending in front of the wing leading edge, there was concern that this could cause the right wing to stall early resulting in a reduction in stall stability.

I attached a restraining cable to the right door to prevent it from hitting the wing. I also added a second cord that could be used to pull the door closed in a hurry if a problem occurred. After working up a flight test plan I was ready for the test program.

The first flight was made to see how everything worked with the doors closed. It flew about like any other plane with an enclosed cabin. Stalls were normal and slips were as good as ever. The doors improved the climb performance a bit. At the risk of offending other ultralight pilots, these doors do make flying Ace quite civilized.

Next came the open door testing. I started by opening the right door in cruise flight at about 60 MPH. The door simply floated to the half-open position and stayed there. Climbing and gliding resulted in the same reaction. The first stalls were with the power at idle. I had expected the door to rise up against the restraining cable as I increased the angle of attack, but that didn't happen. As I approached the power off stall, the door floated closed. Repeated stalls resulted in the same reaction. I wanted to see what would happen when I stalled with the door full open, so, I held it open with my right hand while I flew Ace into a deep, idle power stall with my left hand. I bet Chuck Yeager never tried that! The right wing did not stall early as I had suspected it might and the stall remained stable as I held the stick full aft and fluttered down about 500 feet. I was glad I did not have to also test spin recovery. Full power stalls did finally cause the door to go full open on its own, but the stall remained benign. Takeoffs and landings went fine with the door "floating," so I deemed the test flights a success.

I filed my report with Ed and suggested that Skystar come up with a complete winter flying kit. I also added that it was about time that ultralight flyers should be able to enjoy the advantages of an autopilot. He responded as follows:

Hi Earl,

We are coming up with a heater kit that consists of an aluminum bracket into which you place a can of STERNO. We are working on the location so the stick does not hit the can.

A lit can of STERNO in one's lap does not sound like fun, although it does underscore the need for an autopilot, thereby freeing your hands to beat out the fire in your lap. This fire extinguishing activity will necessitate the installation of a radio so that you can explain to others that the mad flailing of hands is actually an emergency fire procedure.

Carb heat is not an issue. As you know, for ice to form, moisture must first attach itself to a nucleus, after which condensation must take place, accompanied by freezing temperature. The presence of a nucleus is the key to our carb heat strategy. As all ground instructors know, the nucleus in question is the wall of the carburetor, which in this case, resides on a 2si engine. The 2si engine has been designed to vibrate at a rate, that, when translated to a rubber mounted carburetor, creates a vibration intensity that dissolves water to its basic molecular state, thereby preventing the formation of particulate mater. In other words, we dealt with carburetor ice at the sub-atomic level. It never had a chance.

Now, for the skis. Skate boards, my boy, skate boards. Take off the wheels, put a little loopy thing on the top to grab the axle and a couple of 1/4-inch strakes on the bottom to keep you going straight. Use a bungee to hold up the tips (stubbing a tip on landing is a bad thing) and you are set to go. Why use aircraft parts when everything you need can be had a Wally World?

Now for the autopilot. Pick up the January issue of "Model Airplane News" and take a look at page 202. Yep, autopilots! Simply use giant scale servos and you are set to go. The really good news is that the MicroPilot MP2000 can be preprogrammed to fly a set course, kind of like looking for that Benny Laden feller. You can sleep your way around the traffic pattern, sort of like flight instructing in the back seat of your Aeronca.

And if all of these solutions don't work, let us know if the BRS [Ballistic Recovery System parachute] really does the job.

Cheers, Ed

Why do I get the impression that he doesn't take me seriously?

Comments or question? earldowns@hotmail.com

EAA & GAMI Reactivate New Fuel Specification

OSHKOSH, WI - The efforts of EAA and General Aviation Modifications Inc. (GAMI) of Ada, OK, have resulted in the reactivation by the American Society for Testing and Materials (ASTM) of the 91/98 grade aviation fuel specification, which supports the development of a replacement for the current 100 low-lead (100LL) used in the vast majority of piston-powered general aviation aircraft.

The new fuel is currently being produced in limited quantities in northern Europe, giving refiners a practical template for future production.

"The reintroduction of the 91/98 specification is a huge step forward as the aviation industry looks toward the eventual replacement of lead in aviation fuels," said Earl Lawrence, EAA Vice President of Government and Industry Relations. "EAA spearheaded this effort because we want to assure our members and all aircraft owners, as well as engine and engine-control manufacturers, that they have a readily available alternative when the expected phase-out of leaded fuels takes place over the next decade. The grade 91/98 fuel can be easily produced and distributed through the current infrastructure."

EAA chaired the task group that led to the reintroduction of the 91/98 specification, which was removed in 1968. The request to reintroduce the 91/98 grade specification originally came from GAMI, to support its efforts to develop a new electronic engine control system, which it hopes will allow current high-horsepower engines to operate on an unleaded aviation gasoline *[Ed: see The Oklahoma Aviator, October 2000 for an article on GAMI's innovative engine control system]*.

"This specification can safely and efficiently serve the bulk of small-aircraft powerplants and airframes," Lawrence said. "Owners of aircraft that have engines as large as a 180-horsepower Lycoming, for example, would be able to use the fuel with absolutely no modifications needed. That covers more than 90 percent of the current general aviation piston fleet."

Lawrence added that while the reintroduction of 91/98 is not a complete solution to our inevitable loss of 100LL, it is one more important step in the effort to replace it.

Lawrence was also elected secretary of the key ASTM aviation gasoline committee (J.2), the only representative from a general aviation organization serving as an officer of this pivotal committee.

For more information on EAA and its programs, call 1-800-JOIN-EAA (1-800-564-6322) or explore EAA's World Wide Web site (www.eaa.org).

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Airshow Oklahoma Distributes Over $31,000 to Charity

MUSKOGEE - Airshow Oklahoma 2001, held September 8-9 at Muskogee's Davis Field, was not only well-attended, but was also a financial success. Despite weather problems, including low ceilings on Saturday-- which cancelled a portion of the air show-- and a severe thunderstorm Saturday evening--whose 60-mph winds damaged chalet tents and vendor displays--, Sunday saw good weather, a nice turnout, and a fine air show.

As a result, the Airshow Oklahoma Foundation was able to pay all its bills and still have enough left over to distribute over $31,000 to charity, in fulfillment of its mission.

At a December 5 ceremony in Muskogee, checks were distributed to the recipients, including the Tulsa Ronald McDonald House, Haven House, Challenge Air of Dallas, TX, and the Education Foundation of Muskogee.

The Ronald McDonald House provides lodging for families of children who are undergoing extended stays in hospitals.

Accepting a $7200 check on behalf of Ronald McDonald house was Kevin Hearn, who said, "If you have ever been to a Ronald McDonald House, you know how it can really tug at your heartstrings. We very much appreciate Airshow Oklahoma's contribution."

The mission of Haven House is similar to that of the Ronald McDonald House, except that it's lodging services are provided to families of veterans in VA Hospitals. Many VA patients do not have visitors because they are retired, are living on fixed incomes, and cannot afford hotels or other accommodations for their families. Haven House is a one-of-a-kind facility in the VA system, organized, operated, and staffed by VA employees and other volunteers. It is independent of the Veterans Administration and is totally funded through public donations.

In accepting a $7200 check on behalf of Haven House, Phyllis Derrick said, "I was so surprised when I found out how much the Airshow Oklahoma donation would be! This check actually doubles our yearly budget. We are getting ready to move across the street from the VA Hospital and will be incurring more expenses. I can't tell you how much we appreciate your donation."

Challenge Air is a Dallas, TX - based non-profit organization whose mission is to provide the opportunity for disabled children and young adults to experience the joys of flight and actually control the airplane themselves. Experience has shown that, in doing so, they realize that even with their disabilities, they can accomplish seemingly impossible things. Dr. Guy Baldwin accepted the $7200 Challenge Air check, on behalf of Theron Wright, Challenge Air's Director of Event Coordination, himself a paraplegic pilot.

Wren Stratton accepted a $9600 check on behalf of the Education Foundation of Muskogee, which provides grants to teachers for special programs they otherwise would not be able to offer in the classroom. The Education Foundation of Muskogee worked for their contribution, providing volunteers to staff the Airshow ticket-taking and gate keeping activities.

Said Stratton, "This check will go for projects that are outside the normal curriculum-- the fun things, the creative things. It is awesome! We hope to continue our relationship with the air show next year!"

Airshow Oklahoma 2002 will be held at Davis Field on September 7-8. In spite of uncertainty concerning the participation of the military, due to priorities in supporting the war on terrorism, an exciting air show is being planned.

Phyllis Derrick of Haven House (r.) accepts a check for $7200 from Marlene Smith, President of Air Show Oklahoma 2001 (l.).

ASK THE DOCTOR

BY DR. GUY BALDWIN
Senior Aviation Medical Examiner
ATP, CFII-MEI

The "Red Baron"-- Fit to Fly?

An excellent article showed up in the July 2001 issue of *Aviation Space and Environmental Medicine* written by Doctor Henning Allmers concerning the "Red Baron." Born Manfred Freiherr von Richthofen, he was one of the most famous aviators of World War I and his fame has endured through the present. For years, aviators have talked about the details of his short career and his death. However, many people are unaware of the facts leading up to his demise. Apparently, Doctor Allmers did a good bit of research exploring the medical history of the Red Baron.

On September 4, 1915, von Richtofen was wounded while flying on a bombing mission. The event is described in his book, *The Red Air Fighter.* An enemy aircraft began firing on him from a distance of about 300 meters. In his own words, Richtofen thought "the best marksman does not hit a target at this distance." Nevertheless, he recalled taking the safety catch off his gun. Suddenly, there was a blow to his head and he was momentarily paralyzed and blinded. He noted that his arms fell down, his legs moved toward the front of the airplane and the "flying apparatus fell towards the ground." Recovering slightly, he reduced his altitude to 50 feet, trying to remain conscious. He was able to land the airplane, got out, and collapsed.

The hospital's initial diagnosis is listed as "machine gun (projectile) ricocheting from head." He underwent surgery to make sure the bullet had not entered the brain. The skull wound was not closed and bare bone was probably visible until his death.

During a visit back home, Richtofen's mother noted that he was acting quite distant and was almost unapproachable. She thought the changes were due to his having seen death so many times.

Von Richtofen was told to take a desk job, but he refused, saying he was not going to be an "ink spy" at a desk. The Germans needed pilots badly and there were no special rules concerning fitness to fly combat aircraft. The view was that if a pilot could put on a helmet, he could fly.

He went on not only to fly again, but was credited with 80 victories. While on a patrol flight, he was shot dead just two weeks short of his 26th birthday.

I mentioned the article to Doctor Warren Silberman, manager of the FAA Aeromedical Certification Branch. Just for fun, we talked about the hypothetical case of the Red Baron showing up at my office asking for a medical certificate.

Of course, the exercise was highly conjectural, since the Red Baron's medical history is sketchy, compared with the diagnostic tools, treatment regimens, and medical records of today. However, we made some general conclusions. As long as his personality changes were present, the Red Baron would not allowed to fly. Once his physician thought he was back to normal mentally, he would have to undergo a neuro-cognitive study, which would include time spent with a psychiatrist and a neurologist. Upon completion of the study, he could be returned to flying status if all personality changes had disappeared.

However, if it was determined that his skull injury had resulted in a subdural hematoma (bleeding between the brain covering and the brain itself), then he would be required to wait one year after the injury and be subjected to numerous tests before being allowed to fly. On the other hand, if he was diagnosed with a bleed inside the brain, he would be faced with an automatic five-year wait before being reconsidered for a special issuance, which would require another application and another battery of tests to make sure his brain function had returned to normal.

If you have any questions regarding this article or any others, do not hesitate to contact my office.

OASM Special Presentations

The Oklahoma Air and Space Musum at the Omniplex in Oklahoma City has the following special presentations.

To Be An Astronaut- OmniDome Theater--Mar 8-Aug, 2002. Go inside the gates of NASA to experience the rigors of astronaut training from the initial contact at a distant research outpost, through the frantic countdown of missions, to the heart-stopping launch into space. A special addition, the special short film, M*aximum Velocity: The French Precision Flying Team,* will astound OmniDome Theater audiences with the team's seemingly impossible, death-defying stunts.

Star Station One- Mar 15-16. Two special days for a very special international space exploration mission! Join Omniplex as we celebrate progress toward the completion of the International Space Station with two days of participatory demonstrations and hands-on activities. This will excite children, but also help adults learn more about this very special project.

For more information on either of these presentations, call (405) 602-3689.

ASF Skyspotter Project Goes Live On AOPA Online

FREDERICK, MD - SkySpotter, the Air Safety Foundation's free interactive education program unveiled at AOPA Expo 2001, is now active on AOPA Online at www.aopa.org/asf. The entertaining and informative program is designed to improve both the quality and quantity of weather information for pilots and the accuracy of National Weather Service (NWS) forecasts by training pilots to provide better pilot reports (PIREPs).

"If every pilot on a cross-country flight submitted just one PIREP, we would likely see a decrease in the weather accident rate," said Bruce Landsberg, ASF executive director. "At the very least, pilots would have an easier go-no-go decision to make."

Pilots wishing to become an ASF SkySpotter need only complete ASF's online training program, and pledge to provide at least one PIREP on every cross-country flight, whether that report merely confirms forecast conditions or helps correct erroneous forecasts. Successful course completion includes a graduation certificate suitable for framing.

Co-sponsored by the Federal Aviation Administration and the NWS, SkySpotter is available to all pilots. The interactive training program teaches pilots how to formulate and deliver the highest-value PIREPs, and includes official criteria for accurately reporting critical weather conditions such as airframe ice accumulation or turbulence.

In introducing SkySpotter, Landsberg noted that continued visual flight into deteriorating weather has been a leading cause of fatal general aviation accidents since aviation accident record keeping started in 1938. In 1999, ASF's Nall Report on general aviation safety listed weather as a primary factor in more than one-fifth of all fatal pilot-related GA accidents.

"From the DC-2 and DC-3 era... pilot reports have been an integral part of flying," said Captain Bob Buck, retired TWA captain and a long-time member of the ASF Board of Visitors. "[They] help save our hides-- tell what's out there so the next person can cope with it." He added that PIREPs are also used by National Weather Service forecasters to improve the accuracy of various aviation forecasts.

Pilots have long bemoaned the paucity of PIREPs, especially in areas where weather reporting stations are sparse and conditions can rapidly change. Despite efforts by the FAA and others, the lack of PIREPs has historically been worst early in the morning, just when many pilots are contemplating a "go, no-go" decision. "As pilots, we should make an effort to report the weather we find, particularly cloud tops and bases, icing, turbulence, thunderstorms, or anything unusual. These reports not only help pilots directly, but they help the weatherman report and forecast, which finally helps pilots and a lot of other people too. Weathermen have information on places that report weather, but they do not know what's in-between," Buck added.

Among other things, SkySpotter includes instruction on the easiest ways to submit a PIREP. Links to official icing and turbulence reporting criteria are included.

The AOPA Air Safety Foundation was founded in 1950 to promote general aviation safety through research and education. Since its establishment, the total general aviation accident rate has fallen from 46.6 per 100,000 flight hours to just 7.05 per 100,000 flight hours. ASF safety efforts are funded primarily by contributions from individual pilots and companies interested in promoting general aviation safety.

At 60, CAF B-24 "Diamond Lil" Due in Tulsa for Maintenance

[Editors Note: "Diamond Lil," the B-24D owned by the Commemorative Air Force (the former Confederate Air Force) turned 60 years old during 2001. Jim Gentry, of the CAF "Spirit of Tulsa Chapter" tells us that the Lil is due in Tulsa for maintenance. Originally scheduled for late November, the trip was postponed and now is expected to occur sometime in January.

In commemoration of Lil's visit, we thought we'd reprint an article written by Bob Richardson in 1993, right after Lil had turned 50.]

"DIAMOND LIL" IN HER FIFTIES

Diamond Lil is making the circuit of American cities again this year. She hasn't changed much since the last visit, except for a few more hours and a trip to Scotland under her belt.

She still masquerades as a Consolidated B-24D-- she's really an LB-30-- in her camouflage paint job, raising funds for the Confederate Air Force.

This is not to say that Lil isn't showing her age; after all, she was invited to participate in the 50th anniversary of the U.S. Air Force's operations in England. And, therein lies a small story.

Originally, Lil was part of a batch of LB-30 Liberators destined to be delivered to British forces at Prestwick, Scotland sometime in 1941. For some reason, she did not go as scheduled and was eventually drafted into the USAAF, where she served on various U.S. missions until the end of the war.

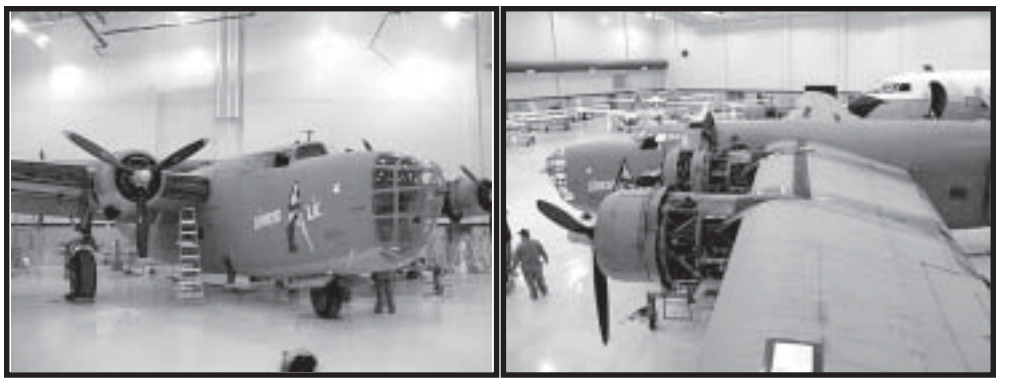
Declared surplus in 1946, Lil was sold to the Continental Can Company, which operated her as an executive transport until 1959, when she was sold to the Mexican petroleum monopoly PEMEX. Again, Lil was used in company transportation for the next nine years. Finally, in 1968, acquired by the Confederate Air Force, she was refurbished at the General Dynamics plant in Ft. Worth, TX and recertified as N12905.

Officially named "Diamond Lil" by the CAF, she continues to be a mainstay of their collection of WWII aircraft.

When selected to be one of the main attractions at the USAF anniversary, Lil once again departed for Prestwick in plenty of time to join the festivities there, only to be delayed 10 days with engine problems in Iceland. An engine change was required and Lil would be late again at her port of call in England. Diamond Lil, the oldest LB-30/B-24 survivor did finally arrive in all her glory at Prestwick a mere 51 years late.

At this point, I cannot resist a little personal note. On a warm summer day in June 1968, I traveled from the FAA GADO office at Meacham Field in Ft. Worth to the General Dynamics plant for the purpose of determining if the ex-Mexican LB-30 was eligible for a U.S. airworthiness certificate. It was a labor of love. I found her to be an excellent airplane and issued the certificate, which remained in the cockpit until it was replace by a new issue in 1990. Thanks to the yearly CAF tour, I have seen here many times.

Diamond Lil is no museum peice; she is a tough old flying machine. Lil's not the prettiest airplane around, but she has plenty of character. Hats off to all the crews who have flown and maintained her for over 50 years.



Diamond Lil undegoing maintenance in Tulsa last year.

Sport Pilot/Light-Sport Aircraft Proposal Takes Important Step

OSHKOSH, WI - The proposed Sport Pilot/Light-Sport Aircraft regulations long championed by EAA, took an important step forward this week as the U.S. Department of Transportation accepted clarifications to the proposal and sent it to the Office of Management and Budget (OMB) for final approval.

OMB's endorsement is the final step before the Federal Aviation Administration (FAA) can publish the proposal as a Notice of Proposed Rulemaking (NPRM). Although no deadline has been established for the review, it is hoped that OMB's approval will be hastened since the agency is reviewing only requested clarifications, instead of the entire package. Once that is completed, FAA may publish the Sport Pilot rule for public comment.

The entire Sport Pilot package had reached OMB earlier this year and U.S. Secretary of Transportation Norman Mineta had hoped to announce the NPRM at EAA AirVenture Oshkosh 2001. OMB requested several clarifications, however, which sent the proposal back to FAA. The agency forwarded the clarified Sport Pilot document to DOT in late September, but the formidable aviation issues that took precedence after Sept. 11 delayed approval.

After OMB approves the final version, EAA will host a joint meeting between industry and FAA personnel to discuss the proposed rule. Although there has been considerable coordination during the creation of the proposal, further discussions after the NPRM's will help identify key points of interest for the aviation industry and individual pilots.

The sport pilot certificate is designed for those who want to fly simple, lightweight, and diverse two-seat aircraft for fun and recreation. The Sport-Light Aircraft category would be a new subcategory to Federal Air Regulations (FARs) Part 21, which would enable existing and future two-seat lightplanes now used for training ultralight pilots under an exemption to the FARs to be certificated as experimental light aircraft and flown by sport pilots. The proposed Sport Pilot rule would also create a special airworthiness certification category in Part 21 that would allow manufacturers to sell new light, ready-to-fly light aircraft without the restrictive requirements of FAR Part 23 certification. More information can be found on the Sport Pilot web site (www.sportpilot.org).

Note our new email address: OklahomaAviator@home.com

Aerospace America to Host Aviation Conference

by Carl S. Whittle, Executive Director

OKLAHOMA CITY - Aerospace America, in its 17th year of operation, is branching out in 2002. Our organization has been producing award-winning airshows since 1986 and we have always had a strong interest and commitment in support of the aviation and aerospace industry. We have now decided it is time to move ahead.

Oklahoma is widely recognized for its western heritage and agricultural production, but the fact that aerospace and aviation industries lead our state's economy is almost a secret. This oversight has not been intentional-- rather, the spotlight has not focused here because the industries themselves are fragmented, without the clear-cut business roles the public expects and understands. As a result, the awareness, support, and economic development of this sharp industrial edge are lost to fuzzy thinking.

On June 13-14, 2002, we will host the premier of Aerospace America Aviation Conference and Exposition (ACE 2002) at the Westin Hotel in downtown Oklahoma City. Our organizing sponsors are vital industry leaders, and they include the National Business Aircraft Association (NBAA), the Oklahoma Department of Commerce, the Oklahoma Alliance for Manufacturing Excellence, Metro Tech Aviation Career Center, the Oklahoma Aeronautics Commission, the Mike Monroney Aeronautical Center of the FAA, the Civil Aerospace Medicine Institute, and the AOPA Air Safety Foundation.

Aerospace America can make a difference, by serving as the catalyst bringing the many facets of Oklahoma's aerospace and aviation industries together for this conference. We can put Oklahoma industry into the limelight of state and national news.

As you may know, the annual NBAA convention is so huge that only three cities in the U.S. have convention facilities large enough to host it. ACE 2002 is their first venture involving a regional program and an extraordinary opportunity for Oklahoma to be selected as host. With the success of ACE 2002, we believe the conference and exposition will quickly become a recurring regional aviation/aerospace convention-- here in Oklahoma!

Aerospace America's professional staff is putting together a tremendous two-day series of program full of topics critical to corporate aviation, aerospace manufacturers, general aviation pilots and owner, FBOs and repair stations, and municipal airports throughout our market area. An exposition of approximately 100 booths is planned, with plenty of room for more. On Thursday, June 13, 2002, we will host a luncheon for attendees and interested parties in the hotel's Grand Pavilion.

Audience will be drawn extensively from Oklahoma, plus substantial attendance from the Southwestern states and southern Midwest region. Exhibitors will be national, regional, and local companies. Attendees will be pre-qualified industry professionals, aircraft owners and pilots, municipal officials, educators, and by invitation only, the public. Press coverage will include all media, with particular invitation extended to specialized and technical space writers. Most definitely the spotlight will be focused on Oklahoma aviation.

ACE 2002 is just the beginning. Our goal is an entire week of meaningful events to be known as "Oklahoma Aerospace Week." We have invited Oklahoma City's Kirkpatrick Air and Space Museum to coordinate their Hall of Fame induction ceremonies as the kick-0ff to Aerospace Week. Aviation Career Days for high school students has been expanded and will include new elements for educators. The week will culminate at Will Rogers World Airport in the exciting public celebration of flight, Aerospace America International Airshow.

Aviation professionals with whom we've spoken about our plans have voiced similar reactions across the board: "It's about time someone did this in Oklahoma." People are ready for it. The industry is set to take part. Exhibit sales already have begun and companies are eager to be involved.

Aerospace America International Airshow Inc is a 501 (3)(c) nonprofit organization established to promote aviation and its related interests in Oklahoma, including education and career training, safety, professional development, military recruiting, and more. Our all-volunteer airshow for the public is only a part of the picture.

I hope ACE 2002 is an opportunity for you and that you'll be involved.

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ACE

Aviation Conference & Exposition

2002

EAA 2002 Sportair Workshops

EAA is providing the opportunity for aircraft builders and restorers to develop the necessary skills for their projects through more than three dozen SportAir Workshops held throughout the country in 2002. The EAA SportAir Workshops, developed by recognized aviation authority Ron Alexander, feature instruction and guidance in skills needed to build or restore aircraft.

Over the past two years, thousands of people have participated in the EAA SportAir Workshop series. Popular with EAA members and aviation enthusiasts, the workshops are one-, two- and three-day sessions filled with hands-on teaching and experience

Alexander developed the SportAir Workshops in 1993 and incorporated them as an EAA program in early 2000. He continues a leadership role as Director of EAA SportAir Workshops, overseeing course development as well as instructor selection and training.

Registration fees vary from $99 to $359, depending on the session. For more information or to register for any EAA SportAir Workshop, call 800-967-5746 or visit the SportAir web site (http://www.sportair.com/).

EAA SPORT WORKSHOP SCHEDULE 2002

Subject to change without notice

DATE	LOCATION	SUBJECTS
Jan 11-13	Griffin, GA	TIG Welding
Jan 18-20	Corona, CA	RV Assembly
Jan 18-20	Griffin, GA	RV Assembly
Jan 19	Oshkosh, WI	Test Flying Your Project
Jan 19-20	Oshkosh, WI	Basic Sheet Metal, Composite Construction, Electrical Systems, Fabric Covering, Intro to Aircraft Building
Feb 8-10	Griffin, GA	TIG Welding
Mar 1-3	Griffin, GA	Advanced TIG Welding, RV Assembly
Mar 1-3	Oshkosh, WI	RV Assembly
Mar 23	Dallas, TX	Test Flying Your Project
Mar 23-24	Dallas, TX	Basic Sheet Metal, Composite Construction, Electrical Systems and Avionics, Fabric Covering, Gas Welding, What's Involved in Kitbuilding?
Mar 22-24	Corona, CA	RV Assembly
Apr 20-21	Watsonville, CA	Sheet Metal, Composite Construction, Fabric Covering, What's Involved in Kitbuilding?
Apr 27-28	Pittsburgh, PA	Sheet Metal, Composite Construction, Fabric Covering, Gas Welding, What's Involved in Kitbuilding?
May 3-5	Griffin, GA	TIG Welding and RV Assembly
May 31-Jun 2	Griffin, GA	Advanced TIG Welding
Jun 7-9	Corona, CA	RV Assembly
Jun 21-23	Griffin, GA	TIG Welding
Jun 21-23	Frederick, MD	RV Assembly
Jul 12-14	Griffin, GA	RV Assembly
Aug 9-11	Griffin, GA	TIG Welding
Aug 16-18	Griffin, GA	RV Assembly
Aug 17-18	Arlington, WA	Basic Sheet Metal, Composite Construction, Fabric Covering, What's Involved in Kitbuilding?
Sep 14-15	Denver, CO	Basic Sheet Metal, Composite Construction, Fabric Covering, Introduction to Aircraft Building, What's Involved in Kitbuilding?
Sep 20-22	Corona, CA	Lancair Assembly
Sep 20-22	Griffin, GA	TIG Welding, RV Assembly
Sep 27-29	Corona, CA	RV Assembly
Oct 4-6	Griffin, GA	Advanced TIG Welding
Oct 5-6	St. Louis, MO	Sheet Metal, Composite Construction, Fabric Covering, What's Involved in Kitbuilding?
Oct 18-20	Oshkosh, WI	RV Assembly
Oct 19-20	New Hampshire	Sheet Metal, Composite Construction, Fabric Covering, What's Involved in Kitbuilding?
Nov 2-3	Minneapolis, MN	Sheet Metal, Composite Construction, Fabric Covering, Introduction to Aircraft Building, What's Involved in Kitbuilding?
Nov 8-10	Griffin, GA	TIG Welding
Nov 9-10	Griffin, GA	Finishing & Spraying Painting, Gas Welding, Sheet Metal, Sheet Metal Forming
Nov 23	Corona, CA	Test Flying Your Project
Nov 23-24	Corona, CA	Sheet Metal, Composite Construction, Fabric Covering, What's Involved in Kitbuilding?
Dec 6-8	Griffin, GA	RV Assembly
Dec 6-8	Corona, CA	RV Assembly
Dec 6-8	Griffin, GA	TIG Welding

Windecker "Eagle": Forerunner of Today's Composite Airplanes, cont'd

continued from p. 1.

getting discouraged but hoping to find some suitable job that would allow me to move back to "God's country."

One of the weirdest interviews was at the Johnson & Johnson plant in Sherman, TX. The white-shirted interviewers first took me into a conference room with a long mahogany table and thick, plush carpeting. They asked me questions like, "What are your goals, son?" and soberly told me, "We're not offering you a job-- we're offering you a career!"

"Whoa," I thought, "This is some high-powered place-- I can't wait to find out what they manufacture!" Well, the next step was a plant tour. Turns out what they manufactured were various textile products. We walked past machines that cut gauze into square surgical wipes, wrapped each one, and packaged them a dozen per package (not 11 nor 13-- surgeons keep track of the number of packages opened and "close up" the patient only when they have accounted for all the wipes).

At that point, my mind was saying, "I guess this could be interesting..."

Next, they showed me their "pride and joy," a massive machine almost a block long. At the input end, rolls of various kinds of textile materials were feeding in. As we walked toward the output end, all manner of complicated operations were done to the materials, toward the manufacture of I-knew-not-what.

As we arrived at the output end, I experienced a sudden and horrific revelation as to what the product was. Now, I won't be explicit about it-- let's just say that it is needed "periodically" by women and never used by men. (Aw, heck, it was sanitary napkins!)

At that point, a paradigm shift occurred deep in my consciousness: I just could not see myself as a Kotex engineer! In the epiphany that followed, I knew at a deep level that my new job would have to be associated with airplanes in one way or another.

On leaving the interview, I went straight across the street to a phone booth, dialed information for Midland, TX, and asked the operator for "an aircraft company called Wind-Acre." Surprisingly, she knew of the company and was able to give me the number (in those days, long-distance information operators actually lived in the towns they served). By then, it was after 5:00PM and, as luck would have it, Ken Smith, the new president, answered my call.

I introduced myself, related my qualifications, and told him I wanted a job. To my delight, he invited me out for an interview. There, I met Dr. Leo Windecker and his wife Fairfax. They told me a little of the history of the company.

Dr. Windecker and his wife had been dentists in Lake Jackson, TX, the town founded by the Dow Chemical Company as the home of its Texas Division. In the late fifties, Dr. Windecker, a pilot, became interested in using composites for aircraft construction. He began experimenting in his garage with combinations of fiberglass laminates and the then-new Dow invention, "Styrofoam." He likened the structural benefits of foam-and-fiberglass to bone structures in the human body, some of which have a hard outer shell and a cellular, porous core. He built several wing section samples and performed tests on them.

Encouraged by the results, he took a leave of absence from his dental practice to develop a full-size wing. Years ahead of the latter-day homebuilders, he cut airfoil shapes from foam using a hotwire, bonded them onto tubular aluminum spars, covered them with a "wet-layup" of epoxy and fiberglass, then filled and sanded them smooth. Static-tests proved the composite wing much stronger and tougher than those made from conventional aircraft materials.

The Eagle prototype on the cover of the April 1968 issue of Flying magazine. Reprinted with permission.

Dr. Windecker presented his ideas to Dow Chemical executives, some of whom were his dental patients. Seeing promise for composites in manufacturing airplanes, they approved a research grant to design and build a full-scale "production-prototype" wing.

Thus, in 1960 the Windeckers closed their dental practice and established an R&D facility on the abandoned airbase in Hondo, Texas, 60 miles west of San Antonio. Test wings were built, static-tested to over 9Gs, and fatigue-tested to the projected equivalent of 30 years of use. Next, a set of flight-test wings were built, installed on a refurbished Monocoupe 90AL- 115 and flown for the first time on October 7, 1961. The molded composite wing surfaces produced lower drag, increased the airplane's top speed, and lowered the stall speed significantly.

Drs. Leo and Fairfax Windecker in front of the Eagle fuselage "plug." Reprinted with permission from Flying magazine April 1968.

In the fall of 1961, a group of West-Texas businessmen persuaded Dr. Windecker and Dow to move the project to Midland, Texas. The following year Windecker Research was formed, funded by the Dow Chemical Corp. As Dr. Windecker developed new methods, materials and solutions, Dow Chemical Company applied for patents.

As the work progressed, Dr. Windecker's efforts began to attract attention in the aviation industry. Bill Lear approached him for a bird-strike solution to the large, pressurized windshield of the Lear Jet, then in early prototyping. In 1965, Windecker designed and built a set of molded composite wings for a Cessna 182, under contract to Cessna Aircraft Corporation. The molded-composite wings produced a higher cruise speed and lower stall speed than the aluminum wings they replaced.

Meanwhile, in the back of the shop, working nights and weekends between projects, Dr. Windecker slowly built his dream airplane, which first flew on October 7, 1967. Dubbed the "Eagle," it was a fixed-gear prototype with a 290-hp Lycoming engine. A new corporation was formed to certify and produce the airplane, licensing the patented technology from Dow.

Just about the time I arrived in Midland for the interview, the Eagle prototype was featured on the April 1968 cover of Flying Magazine. As Dr. Windecker introduced me to it, I was impressed with the smooth, curvy, aerodynamically-slick shape-- unlike the typical sheet metal, wood, or rag-and-tube airplanes common at the time. In today's world where composite airplanes are common, this may not seem impressive, but it was then. Everything was molded into the fuselage shape-- including the N-numbers on the side! Even the windshield had a soft, double curve, streamlining itself into the engine cowling and roofline (molding this part in production turned out to be quite a challenge that was never completely solved).

The Flying magazine article, written by Archie Trammel, glowingly extolled the virtues of the airplane, the technology, and the company, predicting performance numbers, cost expectations, and ease of certification far in advance of the competition. The target date for certification was quoted as November 1968 (quite optimistic, as it turned out).

My interview with Ken Smith and Dr. Windecker could not have gone better and I knew this was where I belonged. They saw that my composites experience and aviation interests were a good fit, and they hired me on the spot, as a Quality Control Engineer.

I went back to Detroit and hurriedly finished up my flight training. At the time, my wife was very pregnant with our daughter, who was born on March 10, 1968. By the end of March 1968, we had moved to Midland, with me staying in a motel for the first few weeks before bringing the family out.

[Editors Note. This is the first in a series of three articles about my involvement with the Windecker Eagle project. I would like to say a big "thank you" to Ted Windecker, the son of Dr. Leo Windecker and one of the key aerodynamics and structures designers on the Eagle project. When I decided to write this series of articles, I contacted Ted, having not seen nor talked with him in over 30 years. He graciously helped with details of the story that I had forgotten. Thanks very much, Ted!]

Next month: The development of the first Eagle production prototype.

Note our new email address: OklahomaAviator@home.com

TASM News

October 12, 2001 was a red, white and blue evening! The Tulsa Air and Space Museum inducted Brigadier General Robinson "Robbie" Risner, a Tulsa Central High School graduate and U.S. Air Force outstanding fighter pilot, as the 6th Honorary Board Member on that day. Gen. Risner was a prisoner in the Hanoi Hilton for 7-1/2 years and suffered excruciating pain and torture during his imprisonment. When asked what helped him survive, he boldly explained, "It was my belief in God, my Country, and my family that bolstered my hope."

That same evening Ben Sanders, a Jenks High School student who won 2001 'Best of Show' at the Museum's A. Blaine Imel High School Art Competition, spoke to the audience and explained the title of his winning entry, "One Nation Under God." Gen. Risner beamed as Ben spoke and everyone in the audience had their hearts touched in a patriotic way! This patriotism was a poignant display given the September 11th terrorist act and the threat to our freedoms.

This is the Museum's third year of operation and over half the visitors are children. Young people's activities include earning Boy and Girl Scout aviation merit badges, instruction in flight simulators, touring the Museum, attending aerospace day and week-long camps, building and launching rockets, operating flight simulators in the computer lab, performing hands-on activities in the Museum and taking classes in the Explorer Mobile classroom. Future interactive exhibits now under construction include Living in Space, a Space Colonization experience, and the Space Shuttle Robotic Arm.

The Museum receives no public funds and is totally supported by your generous donations and through daily operations. Your gifts continue to help the Museum expose young people to meaningful activities in math, science, and technology using an aerospace environment. To ensure the future experiences for the next generation, the Museum is asking you, your Foundation, or your company to consider a tax-deductible donation. Members of the Board are always available to answer your questions and give you a personal tour. For contributions over $1,000, the Museum has a gift of a flight experience on "Old Glory", the World War II Mitchell B-25 Bomber and an autographed copy of Gen. Risner's book, The Passing of the Night. In addition, for donations of $5,000 or more, the donor's name will be placed on a plaque next to the exhibit of your choice.

Ben Sanders, winner of the "Best of Show" is congratulated by Captain Jennifer Wise.

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Calendar of Events

For a free listing of your event, email us at OklahomaAviator@home.com or call 918-496-9424. To allow time for printing and publication, try to notify us at least two months prior to the event.

WHEN	WHAT	WHERE	CONTACT	DETAILS
1st Thursday	Dinner Meeting- Oklahoma Pilots Assoc dinner and meeting	Wiley Post Airport, Oklahoma City, OK	Helen Holbird- 405-942-6308	
1st Saturday 7:30AM-10:00AM	Fly-In Breakfast- Ponca City Aviation Boosters Club	Ponca City Airport, Ponca City, OK	Don Nuzum- nuzum@poncacity.net Bruce Eberle- 580-762-5735	Held rain or shine
2nd Tuesday 6:30PM	Meeting- Women In Aviation	Spartan School of Aeronautics Jones/Riverside Airport, Tulsa	Laura Yost- 918-831-5354	
2nd Tuesday	Meeting- Spirit of Tulsa Squadron- Commemorative Air Force (formerly the Confederate Air Force)	Tulsa Technology Center Jones/Riverside Airport, Tulsa	Jim Dagg 918-224-6293	Restoring 1942 PT-19. Hangar space and workers needed
2nd Tuesday	Meeting- EAA Chapter 24	Aviation Tech Center OKC Airport	Martin Weaver- 405-376-5488 pacer59f@juno.com	Start 7:00PM
2nd Wednesday 7:30PM	Meeting- Tulsa Cloud Dancers Balloon Club	Martin Library Tulsa, OK	Frank Capps	
2nd Thursday 7:00PM	Meeting- Oklahoma Windriders Balloon Club	Metro Tech Aviation Career Center, Oklahoma City, OK	Ron McKinney- 405-685-8180	For all balloon enthusiasts
3rd Saturday	Meeting- Green Country Ultralight Flyers Organization (GCUFO)	Call 918-632-6UFO for location and details	Bill Chilcoat- 918-827-6566	
3rd Sunday	Tulsa Cloud Dancers Balloon Flight	Contact Frank Capps for time/location	Franks Capps- 918-299-2979	
3rd Monday	Meeting- IAC Chapter 10	Contact Joe Masek for time/place	Joe Masek- 918-596-8860 RHR jem@yahoo.com	
3rd Monday 7:30PM	Meeting- EAA Chapter 10	Gundy's Airport, Owasso, OK	Bhrent Waddell- 918-371-5022 bwaddell@tulsa.oklahoma.net	
Saturday following 3rd Monday	Pancake Breakfast- EAA Chapter 10	Gundy's Airport, Owasso, OK	Bhrent Waddell- 918-371-5022 bwaddell@tulsa.oklahoma.net	
4th Tuesday 7:00PM	Tulsa Chapter 99s Meeting	Robertson Aviation, Jones/Riverside Airport, Tulsa*	Charlene- 918-838-7044 or Frances- flygrl7102@aol.com	*Unless otherwise planned. All women pilots including students are welcome to attend.
4th Thursday 7:30PM	Meeting- Vintage Airplane Association Chapter 10	South Regional Library, 71st & Memorial, Tulsa, OK	Charles Harris- 918-622-8400	
Feb 23 8:00AM - 4:45PM	Flying Companion Seminar- Oklahoma Chapter 99s	Metro Tech, 5600 S. MacArthur Blvd., on Will Rogers Airport	Rita Eaves- 405-942-6339 Sue Halpain, 405-789-0272, SHALPAIN99@aol.com	Advance registration of $30.00 is required by February 16th. Includes coffee and donuts and lunch. Profits benefit the Mary Kelly Scholarship Fund
Mar 8-Aug	IMAX Film- "To Be an Astronaut"	Omnidome Theater Kirkpatrick Center Oklahoma City	405-602-3689	Go inside the gates of NASA to experience the rigors of astronaut training. Includes "Maximum Velocity: The French Precision Flying Team"
Mar 13-15	13th Annual International Women in Aviation Conference	Nashville, TN		
Mar 15-16	"Star Station One"- international space exploration mission	Oklahoma Air and Space Museum Kirkpatrick Center, Oklahoma City	405-602-3689	Celebrate the International Space Station. Two days of participatory demonstrations and hands-on activities. For children and adults.
Apr 11 6:30PM	OU Student/Alumni Aviation Banquet	Commons Restaurant, Norman, OK	405-325-7344	Open to all OU alumnis. Call to get your name on our mailing list!

Embry-Riddle OKC Offers Online Certificate Programs

OKLAHOMA CITY - Embry-Riddle Aeronautical University's Extended Campus is now offering online delivery of its certificate programs in logistics, safety, and aircraft maintenance (FAR Part 65).

The logistics certificate program provides an introductory overview of the procuring, maintaining, and transporting of material, personnel, and facilities. The focus of the safety certificate program is on entry-level knowledge of aviation and aerospace safety systems. The aircraft maintenance certificate program prepares the student for the FAA general examination that must be passed before pursuing an airframe and powerplant license.

The online certificate programs are designed to help working aviation professionals anywhere in the world acquire current knowledge and skills in these fields when and where it is most convenient for them. Using web-based instructional software, students are able to download and upload assignments, check their progress in a course, access library and other research materials, and interact with professors and fellow students.

Credit may be given for coursework completed at other colleges and universities and for documented prior experiential learning. Academic credits earned in the logistics, safety, and aircraft maintenance certificate programs may be applied toward an Embry-Riddle degree.

The three online certificate programs join five web-based degree programs offered by Embry-Riddle. They are associate and bachelor's degrees in professional aeronautics; a bachelor's in the management of technical operations; a master's in aeronautical science with a specialization in aviation management, aviation operations, aviation safety systems, or human factors in aviation; and an MBA in aviation.

Embry-Riddle's Extended Campus provides opportunities for professionals working in civilian and military aviation and aerospace careers to earn undergraduate and graduate degrees. Students may complete coursework at more than 120 U.S. and European teaching centers located at or near major aviation facilities or enroll in many of the same programs through distance learning.

For more information about the three online certificate programs, call (405)739-0397, e-mail oklahoma_city_center@ cts.db.erau.edu, or visit www.ec.erau.edu.

The Oklahoma City center, part of Embry-Riddle's College of Career Education, is designed to meet the education needs of working adults. Course schedules are flexible and most classes meet only one night per week. Faculty are working professionals who specialize in teaching adults. The center is located at: 8001 Mid America Blvd, Ste 200, Oklahoma City, OK 73135.

Embry-Riddle, the world's largest fully accredited university specializing in aviation and aerospace, meets the needs of these and related industries through its educational, training, research, and consulting activities.

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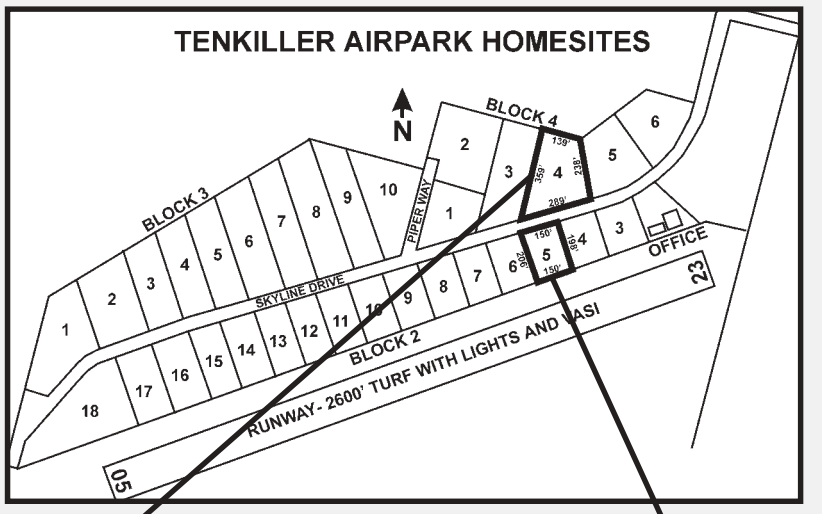

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