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# Oklahoma Aviator



Vol 20, No 2

Your window to Oklahoma Aviation...Past, Present, Future

February 2002

## The Windecker Eagle- Part 2 Development of the Production Prototype

by Mike Huffman

Last month, we talked about how, in March 1968, I came to be employed at Windecker Research in Midland, TX. This installment takes up the story from there.

At the time I joined, Windecker Research was located in a small shop behind a Ford dealership in Midland (at the corner of Windecker Drive and Fairfax Avenue-- both dirt roads!). The company was growing quickly; Ken Smith had been brought in as president and was hiring engineering people from Cessna and Beech almost daily. The production airplane design had evolved to incorporate a retractable gear and a 285-hp Continental IO-520 engine, aimed at direct competition with the Beech Bonanza. The company was just getting started designing and building the production "test articles"-- the airplanes that would be used for FAA certification testing.

Within the first week or two after I arrived, the company planned to lay up a set of fuselage halves. Because the epoxy resins began to cure within about three hours of mixing, the whole company (perhaps twenty people) pitched in.

We worked around the long, deep fuselage half molds, first applying the N-numbers, then spraying the finish paint layers and ultraviolet protection layers, and then proceeding with successive layers of glass cloth, non-woven unidirectional fibers, and resin.

My job was to mix the resin and inspect the layups to assure they met the design drawings.

Once all the layers were complete, we installed a plastic sheet to form a vacuum bag and



*The Windecker Eagle N802W during certification flight testing, with test pilot Bill Robinson at the controls. Note the tufting on the wing root and empennage. In contrast with the pre-production airplane, this one had retractable gear.*

hooked it up to a vacuum pump to force out air and excess resin. Because the prototype molds were "leaky" and because the plastic sheet had to be seamed to fit the curves, we sometimes struggled to achieve 10-15" Hg vacuum pressure before the resin started to cure.

The wing construction consisted of five fiberglass spars distributed across the chord of the wing, solid polyurethane filler blocks between the spars, and pre-molded skins produced in female molds. The wet-wing fuel tank sat between one pair of spars.

The foam filler pieces were made by running polyurethane foam blocks through a custom-made "shaper" machine, which included a motor-driven roller

shaped to the airfoil contour and covered with abrasive material. As the foam block was pushed through the shaper, it was "machined" to the airfoil shape. This method worked because the wing planform was rectangular and not tapered.

The spar webs were made from flat, pre-cured fiberglass laminate about 3/32" thick that we produced in 4' x 8' sheets on flat tables. At the top and bottom of each spar were the spar caps, which consisted of a wet layup of fiberglass roving to fill triangular-shaped bevels in the foam filler blocks. In practice, the wing skins were built first; then the spar web/foam filler/spar cap assembly was built. Next, the assembly was bonded to the bottom

skins. Then, after completing the fuel tank area, the top skin was bonded in place.

The wing center section consisted of five channel-cross-section spars to match those in the wing, with appropriate provisions to mount the retractable gear and other system components. The center section was pre-assembled in a jig, bonded into the fuselage, and then a pre-molded belly skin was bonded on the bottom.

By January 1969, we had finished the "flight test article," the first Windecker Eagle N802W (S/N 001). And, by that time, we had moved into a brand-new, spacious manufacturing facility at the Midland-Odessa Air terminal (now the headquarters of the Com-

memorative Air Force-- CAF).

Shortly after we moved into the new building, the whole company took a trip to Marfa, TX to a gigantic ranch owned by Bill Blakemore, one of the principal investors in the company. To illustrate its size, the ranch had a 13-mile-long asphalt road that led from the highway to the ranch house!).

There, we all pitched in to dig up many different varieties of native cactus growing on the ranch. We loaded up the plants in a semi-trailer, drove back to Midland, and planted them as landscaping around the new building.

By then deep into the type certification program, the company was growing. All of us worked very hard-- 60 hour weeks were the norm and there were several instances when we worked 24 or 36 hours straight to maintain our certification schedule. However, we enjoyed what we were doing and had a feeling of being on the cutting edge of important developments.

Meanwhile, on the personal side of life (what was left of it after working 60 hours a week), my family was getting acclimated to living in the desert-- quite a culture shock. There is nothing mediocre in West Texas-- everything is big in one sense or another. When it is dry, it is really dry. But when the rains come, you'd better man the Ark! Classic 50,000-foot anvil-shaped thunderstorm clouds build and are visible fifty miles away or more. It can rain four or five inches in an hour. And, since Midland had no storm sewers, the streets would literally fill up curb deep with water all over town.

*continued on p. 8.*

# Letters To The Editor



Dear Mike,

Page 2 of the January 2002 issue shows that you like airport-dog stories. Mine is a classic, and TRUE (except for slight adjustments which protected the players from FCC/FAA action).

It's been published only once-- in the members-only STATICLINE newsletter of my fine old club, Aircraft Pilots of the Bay Area. This is my permission to re-publish:

"At our sleeper airports, UNICOM base stations provide amusement for the under-employed. Pilot call-ins include questions such as, 'Is the truck there?' or 'Can somebody open the hangar door?' For amusement, our FBO used finger signals to teach his dog Goldie to bark into the microphone in the office (one bark for 'affirmative,' two barks for 'negative')."

"Goldie loves to fly, and soon graduated to using the handheld microphone in his Skylane. Back at the base station, idle louts learned to ricochet Goldie around the cockpit by putting meow sounds and cat-fight sounds out the speakers of the Skylane. Other pilots adopted Goldie's

code by barking into the microphone; others just said, 'Woof, woof.' A local rancher introduced 'Moo' and 'Moo-moo' to claim cow-in-cockpit status for his AgCats.

"When fads turn silly, they die. Goldie now snoozes under the desk and the airways carry only standard pilot gibberish. The question Goldie could never answer was this: in a crew consisting of a dog and a jackass, which of you flew left seat? Flying is still fun in Nevada."

The reference to Nevada is because I commute (in my Mooney MSE) between homes there and San Francisco, the latter being where you list me as a subscriber. Why I subscribe: I was born at Waynoka and go there in the Mooney two or three times per year.

I got a hug from Amelia Earhart in 1929, but as Bob Richardson said at the end of HIS dog story, "Ah, but that is another story..."

I enjoy the Oklahoma Aviator very much and congratulate you on its steady improvement.

Cordially,

Dennis C.B. McDaniel

[Ed: Well, actually, Dennis, a lot the "other story" you mentioned about Amelia Earhart is, by coincidence, covered in this issue-- turn to page 6!]

## IAC Chapter 10 Hosts Make-A-Wish Flight



Saturday, January 12 was a red-letter day for 16-year-old Sarah Wilkins. Since her early teens, she had known she wanted to learn to fly airplanes. However, deciding that her family could not afford it, she put such thoughts to back of her mind.

Meanwhile, she developed osteosarcoma-- bone cancer-- which necessitated replacing one her knee joints and portions of the adjacent bones with a stainless steel implant.

As a result, Sarah's case came to the attention of the Tulsa office of the Make-A-Wish Foundation of Oklahoma, one of 80 such chapters worldwide that grant wishes to children with life-threatening illnesses such as cancer and cystic fibrosis.

As with each child, Sarah was assigned two volunteers, who interviewed her to find out what her wish might be.

Sarah asked for an airplane ride.

The volunteers contacted Rex Niver at the Tulsa Technology Center at Jones/Riverside airport. Rex, in turn, contacted Dr. Guy Baldwin of the International Aerobatic Club (IAC) Chapter 10. Niver and the IAC chapter eagerly took the project to help Sarah's wish come true.

Bright and early Saturday morning January 12, Sarah and her father Ivan arrived at Riverside. With help from a ladder, Sarah easily climbed into the back cockpit of Dr. Baldwin's newly-acquired WWII Canadian Harvard trainer. After some preliminary instructions for Sarah,

they were off! Right from the start, Guy allowed Sarah to handle the controls and she quickly got the hang of it. Next came a roll and a loop, which Sarah enthusiastically enjoyed. All too soon, it was time to return to the airport.

Meanwhile, other wheels were turning. Rex Niver and Bill Christiansen, owner of Christiansen Aviation, were working out a plan to help Sarah take flight lessons, and Dr. Baldwin was working with the FAA to get her a medical certificate. And Patti Barker, President and Executive Director of Make-A-Wish of Oklahoma, was planning to get Sarah a leather flight jacket, part of any pilot's required wardrobe!

Says Ms. Barker, "I love it when a child really steps outside the box and individualizes his or her wish, as Sarah did. Many of our younger children want to go to Disney World, but we had one girl who wanted to meet Pat Benatar. Another boy wanted to fish with Jimmy Houston."

For more information, contact Make-A-Wish at 918-712-WISH or visit [www.makeawishok.org](http://www.makeawishok.org).



**Sarah's big day!** Left to right: Dr. Guy Baldwin, Sarah Wilkins, and Ivan Wilkins.

# Clint McHenry, Long-Time Aerobatic Champion, Visits Tulsa

By Charles Harris

On January 18, Tulsa was extremely fortunate to host a visit by the famous American aerobatic competition pilot and air show performer, Mr. Clint McHenry of New Smyrna Beach, FL. Dr. Guy Baldwin prevailed on Clint to discuss his aviation career and aerobatics with eager audiences.

In the afternoon, Clint spoke to the Spartan School of Aeronautics management staff, instructor corps, and student group. Clint took them back to his airport-kid days, piloting a stock Stearman in the summer of 1946 at age 19, and on to joining Eastern Airlines in 1953 as a DC-3 copilot. According to Clint, flying DC-3s in those days was still essentially "seat of the pants" flying. He traced his 35-year airline career through flying pressurized R-2800-powered Martin 404s, on to the Constellations and Super Constellation, to Boeing 707s, and beyond. Among the audience of mostly 19-22-year-olds, one could hear a pin drop!

Perhaps most exciting of all was Clint describing the unabashed thrill and excitement when he learned of the formation of the EAA IAC in 1970, its competitive contests, its sanctioning of aerobatics nationally, and determining that the USA had a World Team. From the first moment, nothing could contain his drive and determination to climb the IAC competition categories become a USA World Aerobatic Team member.

Later that evening, Clint joined our sport aviation group at the home of Carl and Julia Clay for dinner and good fellowship. In addition to a spectacular retracing of his aviation career, he emphasized aerobatics and unusual attitudes with our group. He showed his air show promo videotape, flying the Russian Sukhoi 26 with its 360-hp radial engine. Clint's flying skills are, of course, superb.

Clint's two appearances in Tulsa were magical moments. He is a very

genuine, modest, and warmly receptive gentleman. In his late seventies, Clint McHenry's character, ability, and dedication continue to enhance aviation. Some of Clint's accomplishments are listed below.

1. Retired 36-year career Eastern Airlines captain.
2. Former U.S. National Aerobatic Champion.
3. Eight-time member of the U.S. World Aerobatic Team.
4. EAA International Aerobatic Club Hall of Fame Inductee.
5. Top ten finisher in the World Aerobatic Championships.
6. Long-term aerobatic coach to U.S. National Aerobatic Champion and world-famous air show performer Patty Wagstaff.
7. Former President of the United States Aerobatic Foundation, the fundraising entity for our U.S. World Aerobatic Team.
8. A 33-year professional aerobatic performer who flew for more than 2 million people in a single year.
9. Aviation and aerobatics lecturer at the Smithsonian Museum in Washington, DC.
10. Importer of the Russian Sukhoi aircraft and German Extra aircraft.
11. U.S. World Aerobatic Team coach.



**An evening with an aerobatic champion and gentleman.** Left to right: Dr. Guy Baldwin, Charles Harris, Clint McHenry, and Brent Kitchen

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## Up With Downs



Earl Downs

### Are You Ready?

The year was 1968 and I was chief pilot for a large flying club located on Burbank Airport in Southern California. Burbank (then called Lockheed Air Terminal) is situated in the sprawling urban area north of Los Angeles known as the San Fernando Valley. This flying club had a fleet of thirty-two airplanes, which included several Cessna 150s that were used in its FAR 141 training school. One of my duties was to perform student progress checks.

This day was a typical sunny and warm L.A. day with the usual layer of dirty brown smog hanging over the basin. In those days, we would commonly take our students south over the Hollywood Hills and use the Santa Monica coastline as our practice area-- there is too much congestion and air traffic to do that now. My student was well along in

his training and the session was normal until we were returning to the airport.

The student was flying and talking to Burbank tower as we approached the airport. I was looking down at the homes and swimming pools that dotted the Hollywood Hills landscape when I figured I had better start paying attention to the job at hand. I took a good look for traffic and then quickly scanned the aircraft instruments. That's when I noticed the oil temperature was low and the oil pressure was at the bottom of the scale! I had never before seen an oil pressure gauge indicating zero while in-flight with the engine running. It took a few seconds for this vision to register in my brain.

I took over the controls of our Cessna 150 and asked my student to help watch for traffic. We had about 5 miles of the heavily populated North Hollywood and Burbank area to cross to reach the airport. The large Forrest Lawn Cemetery was within a mile and could be used as a landing site. I had to decide what to do. A quick emergency call to Burbank tower got me a clearance to land on any runway and I decided to target the airport. A south wind would help my ground speed for a straight in approach to the north runway; it meant I would make a downwind landing and I figured that was acceptable. Another cemetery located about a mile south of the airport would serve as my alternate if I couldn't make it.

The engine was still running so I decided to try and save it for last minute power if I needed it. I cut the mixture and pulled up into a near stall to stop the propeller. I headed for the airport at my best glide speed. My student watched for traffic and even located a couple more pos-

sible landing spots. Burbank tower cleared all runways and taxiways of aircraft so that I could land anywhere if I could not get aligned with a runway. As I passed over my "cemetery alternate," I restarted the engine. It was delivering power but I was now sure I could make the landing even if it quit. As we rolled out on the landing, the little Continental sputtered to a stop.

The bottom of the plane was saturated with oil. The oil temperature sensor probe had not been installed properly after the last oil change and it had fallen out. That explained the low oil temperature reading.

In my 45 years of flying I don't have an abundance of "war stories" to tell. Most of us don't have inflight problems or crises and that's why I told my story. You don't have to learn about how to handle inflight emergencies by experiencing a lot of them. When a pilot brings an inflight emergency to a successful conclusion it is usually the result of training and personal attitude acquired on the ground.

Are you prepared? You need to be prepared and stay prepared for emergencies, but not to the point that it takes the pleasure out of flying. Being prepared is all a part of risk management. Here are some ideas for things you can do to manage the risks without spoiling the fun.

1. Know your airplane. Review the operations of the various systems on a regular basis. Even a Piper Cub needs to be understood. Set up periodic training with your flight instructor or an A&P mechanic for system training and review.

2. Periodically review emergency procedures. Even though you carry checklists for emergencies, they are designed to aid a knowledgeable pilot, not act as an instruction manual when an emergency

occurs.

3. Perform a 30-second emergency review prior to every takeoff. Just sit there and do a quick "what if" mental review: what if I lose power, what if the door opens, at what altitude could I turn back for a landing?

4. If a problem does occur in flight, be prepared to change your thinking. Change the goal of your flight. Make a positive decision to take action and then constantly evaluate your decision. Fly the machine-- don't just go for a ride.

5. Practice simulated emergency landings. This can be as simple as closing the throttle when you are abeam the landing point on downwind leg and gliding in for the landing. If you don't feel comfortable with that, fly with an instructor and learn how to plan and execute a dead-stick landing. There are lots of airports where it is safe to practice these maneuvers.

6. Schedule some training in the art of aeronautical decision-making (ADM). ADM and risk management are skills that can be learned and practiced on every flight. Remember that a wise pilot is one that avoids the need to have extraordinary piloting skills.

That student I was flying with so many years ago asked me why I chose to take the actions I did. His question led me to add decision making to my bag of teaching subjects and I have included it ever since. There are many more things you can do to be prepared. Check with your instructor or with the FAA for some great reading material on the subject of ADM and risk management.

Any questions or comments? Earldowns@hotmail.com

## A Great Help, Checklists



By Dave Wilkerson

I am a Champ-driver at heart. Though I flew charter in many-motored airplanes during the 1980s, and taught complex and twin flying during the 1990s, tiny taildraggers draw me like a child to a toy store. Still, whether the airplane is miniscule or massive, we pilots forget things. Thus, airplanes have checklists.

Pilot examiners are slowly maturing regarding the use of checklists. Examiners of old, once as silent as a scream in space regarding how applicants

should use their checklists, are finding their voices.

At pilot examiners' yearly recurrent training, the Federal Aviation Administration gently but firmly reinforces good procedures determined by its studies, including checklist use. The Practical Test Standards have long stated that applicants need evaluation regarding checklist use. At the same time, the PTS acknowledges that, if not done at the proper time and place in a flight, checklist use can interfere with flying the airplane.

Sadly, we pilots often tacitly reinforce the ancient error that checklists are for rookies. Decades ago, one employer of mine actually instructed us to never let a charter passenger see us use a checklist, insisting that, "It makes them think we don't know how to do our job." His repair expenses were as phenomenal as his pilot turnover! Occasionally, examiners still find pilots performing as if a true professional does not need a checklist. The facts refute this idea.

One orphaned area of checklist use is addressed in the "pre-landing" section of the PTS. Although some Oklahoma pilot examiners learned from instructors who demanded that we land from memory, the last item in that section reads, "Completes the appropriate

checklist." Sporadically, applicants or flight instructors conclude that the FAA means the applicant should complete the after-landing checklist. However, "after landing" is a separate PTS task with its own checklist. Examiners want to see applicants use the pre-landing checklist on checkrides. More important is how pilots demonstrate their performance yearly. The latest available information shows that, in the U.S., faulty landing techniques wound almost five hundred airplanes a year-- 500!

A key to pilot skill is the ability to estimate an airplane's behavior in each given situation. Good pilot judgment includes using the checklist when appropriate. If you find that the pre-landing checklist interferes with your traffic pattern performance, re-evaluate your traffic pattern. Patterns that are consistently too busy for checklist review are too busy!

Many landing accidents stem from poor airspeed control, often because pilots used approach speeds based on takeoff weight at flight's end. Most manufacturers' checklists include airspeeds for various weights, which should guide the pre-landing check.

Remember, a quick checklist check can check your writing a huge check. Your examiner will like it, too!

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# The Airborne Demonstration Team: Oklahoma's "Band of Brothers"

by Ray Cunningham

At 12:55AM on June 6, 1944, airborne infantry paratroopers waited nervously in noisy C-47's as the aircraft carried their human cargo into history. Flack exploded all around, lighting up the deadly darkness, while tracer bullets stitched the moonless sky with warnings of death and destruction.

The 82nd and the 101st Airborne were about to be dropped behind German lines in advance of the main Normandy D-Day landing a few hours later. The weather that day was so bad the Germans would not expect an invasion, so the element of surprise was on the side of the Allies.

The paratroopers prepared to drop into a perfect manmade hell, where thousands of soldiers would pay the ultimate sacrifice.

"GET READY!" the jumpmaster yelled.

"STAND UP!"

"HOOK UP!"

"SOUND OFF FOR EQUIPMENT CHECK!"

Paratroopers throughout all the C-47s yanked on each other's straps to make sure they were secure.

"EIGHTEEN OKAY!"

"EIGHTEEN OKAY!"

The "sound offs" continued for eighteen times in each aircraft and hundreds of times throughout the formations.

What was a tight formation of C-47's became a loose formation of easy targets. Even though the Germans were surprised, they were able to put up a formidable aerial defense. C-47's fell out of the night skies like wounded angels falling from heaven.

"STAND IN THE DOOR!"

And then, it was on. Red jump lights turned to green to signal that the paratroopers date with destiny had ar-

rived.

"GO! GO! GO!" the jumpmaster screamed.

All along the planned drop zones, thousands of paratroopers plunged into a darkness filled with tracers, burning aircraft, flack, and fear. Some of the paratrooper's chutes were destroyed, because the C-47's had too much air-speed. Others landed miles away from their drop zones, some in the middle of German SS compounds. Some landed in towns and got hung up on buildings, while others never reached the French soil alive, having fallen prey to German bullets while still hanging helpless from their chutes. The paratroopers that survived became a band of brothers whose exploits are etched in history.

Now, fast forward to September 8, 2001, to Airshow Oklahoma in Muskogee. In marginal VFR weather, an olive drab WWII Douglas C-47 sporting D-Day stripes arrived late and landed. The aircraft, was met by several men wearing WWII paratrooper uniforms.

The next day, the sun broke through and spectators lined up to tour the C-47-- by day's end, 500 people in all. Under the wings, paratroopers rigged their parachutes and related gear. All the paratroopers were armed-- some with M-1 rifles, carbines, "grease guns," Thompson submachine guns, and even a Browning Automatic Rifle (BAR). Of course, most of them were also packing a .45-caliber pistol.

As the soldiers suited up, one spectator remarked, "You guys are some real good re-enactors. You'd almost think that you are really going to jump out of that there airplane."

"We are!" snapped the senior paratrooper, "And we're not re-enactors."

*continued on p. 5.*



The WWII Airborne Demonstration at Airshow Oklahoma, September, 2001.

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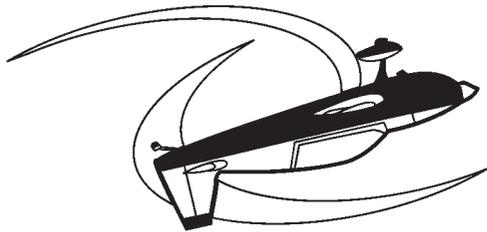
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# The Airborne Demonstration Team, cont'd

*continued from p. 4.*

We do the real thing."

And they did: 10 jumpers in full WWII combat gear jumped for the crowd, exiting the aircraft at low altitude in quick succession-- the same way it was done on D-Day. That jump on Sunday, September 9, marked the first official appearance in the U.S. of the WWII Airborne Demonstration Team (ADT) and the C-47.

Seven years ago, retired Special Forces SFC Richard Wolf founded the ADT. Finding retirement boring, Wolf got some of his old buddies together and began doing a

few jumps out of a Beech 18. Then someone decided they should dress in WWII airborne uniforms. While they were at it, they decided to carry a few weapons. Next came a few trips to England, Holland, and France to commemorate "Operation Over Lord" and "Operation Market Garden." During one of those visits, an HBO crew filmed the ADT on a couple of their jumps.

With interest increasing, ADT set up its own jump school to train new paratroopers in the fine art of combat-style parachute drops. The course consists of 50 hours of ground school and five combat jumps out of a C-47. The ground school is held at McAlester, OK and training jumps are done each month in Lawton, OK. Once a paratrooper gets his wings, he is encouraged to be a part of the team, jumping at air shows and military events throughout the U.S., Canada, and Europe..

The training is first rate and is con-

ducted to military jump school standards. Good physical fitness is a definite plus. Training jumps are conducted between 1,200 and 1,500 feet AGL, and some of the public jumps are done at 800 feet AGL. All training is done in uniform, but the first four jumps are "Hollywood" jumps (no combat gear). The fifth jump is in full combat gear.

ADT's elite paratroopers range in age from 19 to 58-- doctors, lawyers, truck drivers, police officers, and even a TV producer. ADT wants to recruit at least 30 more paratroopers this

year. The cost to join is \$105.00, which includes insurance, plus another \$50.00 for each of the five jumps.

For current or prior military personnel who are already jump qualified; a "short course" is held in Lawton on the day of the jump. The main focus is to review emergency procedures, proper exiting of a C-47, and the deployment physics of the parachutes used by ADT. Prior military personnel must provide a copy of their DD-214 form.

For more information about the ADT, contact Richard Wolf 918-423-3740, or pull up www.ampa.ws. To schedule the aircraft and the ADT for an air show or special event contact Ray Cunningham 580-355-7701.

[Ed: Don't miss next month's issue about the Oklahoma-built C-47 used by the ADT. The story will profile how the historic aircraft was located and returned to Oklahoma after a 59 year absence.]



*The C-47, with chutes unfurling.*

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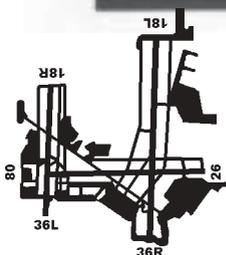
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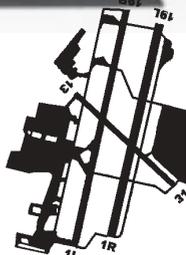
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**Richard Wolf, ADT founder, gets ready to start the jump team out the door.**

# Waynoka's Aviation History: T

by Sandie Olson, President  
Waynoka Historical Society

It was winter 1928-29 when Col. Charles Lindbergh landed his airplane in an alfalfa field about three miles northeast of Waynoka, OK. Two teenage farm boys, Roscoe and Punk Kelsey, watched him from their home across the road. As he climbed out of the cockpit, they immediately recognized the tall, slender Lindbergh, made famous by his transatlantic flight in 1927. Lindbergh was looking for land for a new airport to be built by Transcontinental Air Transport (TAT).

In early 1928, Lindbergh and three other TAT founders had drawn a map on an envelope showing a potential route that would take passengers from coast to coast in 48 hours, using a combination of air travel and rail travel. A few months later, Lindbergh finalized the route and TAT was born.

The plan was for passengers to take a night train from New York City to Columbus, OH, on the Pennsylvania Railroad. The next morning, they would board a TAT airplane and fly west, making stops in Indianapolis, St. Louis, Kansas City, Wichita, and Waynoka, arriving about 6:00PM. That night, after dinner at Waynoka's Harvey House, they would board a Santa Fe train to Clovis, NM. The following morning, it was another TAT airplane to Los Angeles, with stops at Albuquerque, Winslow, and Kingman. The fare was to be \$360 per person.

With Col. Lindbergh as its technical advisor, TAT quickly became known unofficially as "the Lindbergh Line." Lindbergh selected airplanes, pilots, and airport sites.

## THE FORD TRI-MOTORS

Lindbergh's technical committee investigated six multi-engine airplanes for the new passenger line. Lindbergh preferred the sturdy Ford Tri-Motor, dubbed the "Tin Goose," even though it was slow

and noisy. Powered by three Pratt and Whitney 400-hp Wasp engines, the all-metal plane could sustain flight with two engines. In an emergency, it could maintain a slow descent with only one engine; from 5000' altitude, it could reach any landing spot within twenty miles.

The Tri-Motor had a wingspan of 77 feet 10 inches, carried fuel for a 500-mile trip, and cruised at 100 mph. For the TAT flights, cruising altitude would be 2500 feet westbound, and somewhat higher eastbound.

Five wicker seats lined each side of the luxurious cabin. Each passenger had his or her own window with a brown velvet drapery, reading lamp, electric cigar lighter, and ashtray. The noise level made communication other than note writing impossible. A heater kept the cabin a somewhat comfortable 60 degrees.

## THE PILOTS

Col. Lindbergh's pilot recruitment committee hired thirty-eight pilots, mostly from other airlines, aircraft companies, and the military. They were the "cream of the aerial crop," with an average flying time of 3000 hours each, including an average of 500 hours in Tri-Motors. Their salary was \$300 per month, plus expenses.

## THE LANDING FIELD

On March 3, 1929, a joyous crowd of about 4,000 gathered at the Waynoka site to witness the groundbreaking ceremony and partake of the big barbecue sponsored by the Chamber of Commerce. The *Daily Oklahoman* devoted a full page to the event, proclaiming that would-be passengers were scouring the maps looking for little-known Waynoka.

The Waynoka airfield had three asphalt runways: a 2640' N-S, a 1200' E-W, and a 2000' NE-SW. It was the most brilliantly lighted field in the world, with 15-watt runway lights every 260 feet. A high intensity electric-arc flood-

light near the Santa Fe tracks threw a soft bright light over the field. Residents reported being able to read newspapers a half-mile away at night.

TAT constructed America's third-largest and most up-to-date hangar at Waynoka. The 202' x 148' building could house six Ford Tri-Motors and also included mezzanine storage space, a machine shop, administrative offices, a waiting room, rest rooms, a women's lounge, a wireless telephone station, and quarters for the pilots. Two electrically-lighted signs, each 172' x 48', were installed on the roof, spelling out "WAYNOKA."

## THE TAT WEATHER BUREAU

Under Col. Lindbergh's guidance, the TAT system included 82 weather-reporting stations and ten complete weather stations. Each city on the route had a weather station, and reporting stations were located in cities about 50 miles either side of the route. TAT's weather bureau system was about half the size of the entire United States Weather Bureau.

Of course, by today's standards, weather observations and predictions were rather crude. Meteorologists were aware of the modern air mass concept, but it had not yet been proven. They relied mostly on using balloons to measure ceilings and winds aloft and on interpreting cloud formations.

Lindbergh insisted that TAT install 2-way radios between the airplanes and the ground stations-- the only airline to have such equipment. By June 7, 1929, radio station KSY was in operation at Waynoka, at a frequency of 393 kilocycles, the first station on the TAT line to be completed.

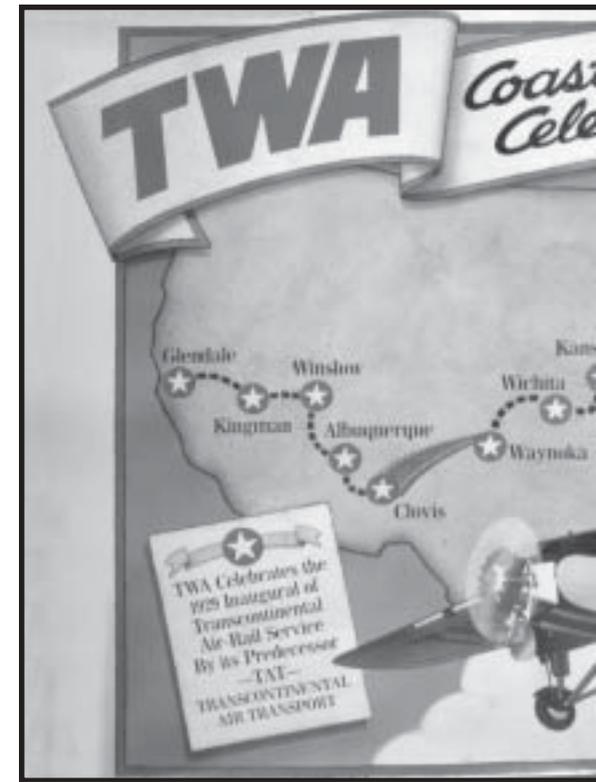
In the airplanes, radio transmitters were installed in the rear of the cabin. In low-visibility conditions, station personnel would use direction-finding equipment to locate the airplane and provide a compass heading to the station.

## THE HARVEY HOUSE AND THE TAT PASSENGER STATION

In 1910, the Fred Harvey Company had built one of their famous Harvey House restaurants on the Santa Fe railway in Waynoka. With exclusive contracts and ample support from the railroads, Harvey Houses and the Harvey Girls that staffed them became famous for high-quality railside dining. (In 1946, Hollywood immortalized the Harvey Girls in a movie by that name, which starred Judy Garland.) Near the Harvey House, TAT erected a passenger station and ticket office. The station provided a comfortable, attractive place for passengers to rest between plane and train trips.

## TAT AIRPORT DEDICATION

On Saturday, June 22, 1929, the town of 1200 went all-out to celebrate the dedication of the TAT Airport. Oklahoma's Attorney General delivered the principal address. An orchestra pro-



A latter-day poster showing TWA's roots in

vided music for the afternoon program and for a free dance in the hangar that night. Planes from Oklahoma City, Tulsa, Enid, Amarillo, Wichita, and other cities flew in for the big day.

## THE INAUGURAL FLIGHT

Col. Lindbergh and his wife, Anne, had been married less than six weeks when they spent the night in Waynoka on the way to California for the inaugural flight. The well-educated and well-read Mrs. Lindbergh described Waynoka in a letter to her sister:

"...But Waynoka! I have never been in a place like it. It is smaller than this [Clovis, NM] - has four or five paved streets and a hotel (one of the TAT men described it as 'the kind you see in an old Western movie') painted white with a large sign, 'Baths,' over the front door. One big



Waynoka's Harvey House, from an original postcard-- postage: one cent.

room downstairs for meeting, eating, registering, buying and smoking cigars, spitting, and talking. At least I presume all this - I only looked at it through the open door. We got a room at the Harvey House connected with the station and slept well in spite of two or three trains going under our window. The Santa Fe Railroad goes by there and stops. A small country crowd tumbles out to the restaurant and gets a terribly good meal.

"It all felt very, very Western: the quiet, the lack of pressure or touch with



Waynoka's TAT crew. Back row, l. to r: H.S. Long, field manager; Mae Porter, stenographer; Charles Lindbergh; W.H. Hottel, passenger agent; Chetwood Hayes, mechanic; A.I. Williams, field clerk; C.T. VanThullenar, weatherman. Front row, l. to r; E.W. Fleet, first pilot; Mechanic, name unknown; Howard Hall, second pilot; Ira Fox, mechanic; and J. Cook, mechanic.

# Transcontinental Air Transport



*Transcontinental Air Transport (TAT).*

progress (not that Western towns aren't progressive, but a small, distant country town isn't). TAT has built a magnificent field and hangar with attractive offices, the equipment being the most modern, efficient, progressive, down to the last detail. The entire town came out to see the dedication. Some townsman said there hadn't been such a crowd since the dedication of the pavement!"

The Lindberghs entertained the Waynoka TAT crew with a dinner at the Harvey House. Other times when they dined at the Harvey House, they entered through a back door to avoid attention, the citizens of Waynoka allowing them privacy.

On July 7, 1929, at 6:05 PM Eastern time, Lindbergh, in the office of California Governor C.C. Young, pressed a button that flashed a light 3,000 miles away at Pennsylvania Station. At the signal, the Pennsylvania Railroad's *Airway Limited* started its westbound journey, as a band played "California, Here I Come!"

Arriving in Columbus the next morning, the twenty or so westbound rail passengers boarded two Ford Tri-Motors for the flight to Waynoka.

In flight, clean-cut college-boy couriers served meals and saw to the comfort of the travelers. Every passenger on the full run received a solid gold fountain pen from Tiffany's and cotton balls to protect their ears from the noise. In turbulence, slices of lemon were provided, though often passengers merely opened the windows for a breath of fresh air.

Amelia Earhart, named Assistant to the TAT General Manager to encourage women to fly, was on the first westbound plane, accompanied by her good friend, Dorothy Putnam, heir to the Crayola fortune.

Arriving at about 6:30PM in Waynoka, the travelers were transported

from the airport to the Harvey House in the "Aerocar," a specially designed wood-and-fabric trailer pulled behind a car. After dinner at the Harvey House, they boarded the night train to Clovis.

In Los Angeles, on the morning of July 8, a throng of people watched Mary Pickford christen the Tri-Motor *City of Los Angeles*, with Gloria Swanson, Douglas Fairbanks, the Lindberghs, and other dignitaries in attendance. Lindbergh personally piloted the east-bound flight as far as Winslow.

A few days later on her return trip in the Tri-Motor *City of San Francisco*, Dorothy Putnam recorded some excitement: "Within the hour we've had a terrifying thrill. Our radio burned out and the fire, smoke and smell at 10,000 ft. altitude over mountains and valleys gave one to think!"

As the trips continued in both directions, Waynoka was filled with excitement and enthusiasm. Local people took advantage of flying to Wichita for shopping or to attend a ballgame. If word came that "Lindy" would be flying in, a line of cars would make its way to the airport to get a glimpse of the



*The TAT "Aerocar," used for transporting passengers between the airport and the train station.*

famous aviator. Each week, the Waynoka newspaper listed the names of TAT passengers, which included Lionel Barrymore and John Gilbert "of the movies," Ernie Pyle and numerous other reporters, government and railroad officials, airline personnel, and Will Rogers.

## TRAGEDY STRIKES

In spite of all the safety measures implemented by TAT, on September 3, less than two months after its initial

flight, the Tri-Motor *City of San Francisco* was reported missing between Albuquerque and Los Angeles. Col. Lindbergh joined the massive ground and air search. Four days later the wreckage was found on the south side of 10,000-ft. Mt. Taylor in New Mexico. All eight aboard perished.

It was a blow from which TAT never recovered. Less than two months later, a Western Express F-10 crashed into the same mountain, killing all 5 persons aboard. Passenger numbers dwindled to almost nothing. To encourage passengers, TAT advertised motion pictures to be shown in the air from Waynoka to Columbus. They boasted of Fred Harvey's fine food service. They offered radio service for passengers. They even flew their own people to swell the numbers. Finally, in January 1930, after fares had been lowered to less than \$160, traffic picked up, increasing 450%-- nearly 6,800 passengers in two months.

But TAT was losing money. The directors began to look for a merger to salvage the airline. In February 1930, Maddux Airlines became part of TAT, adding fifteen Tri-Motors to the fleet and adding a Los Angeles-to-San Francisco route.

Following the established TAT custom of naming airplanes, the Tri-Motor *City of Waynoka* was christened on a Sunday afternoon in April 1930, little more than two months after the TAT-Maddux merger. The Waynoka High School Band provided the music, while "Miss Waynoka," Ruth Goodale, performed the christening. TAT-Maddux then offered twenty-minute airplane rides to the public, charging \$3 for an afternoon flight and \$5 for a night flight.

## THE END IS NEAR

In its first 18 months of operation, TAT lost \$2.7 million. The directors realized the air-rail concept was not workable and merged with Western Air Express, to become Transcontinental and Western Airlines-- TWA. On October 1, 1930, the U.S. Postmaster awarded a lucrative mail contract to TWA, which helped subsidize its passenger operations. By the end of October, the announcement had been made that TWA would cease operations in Waynoka.



*The Transcontinental Air Transport airport located at Waynoka, OK.*

## FINAL CHAPTERS

In 1939, the huge TAT hangar was dismantled and moved to the airport in Little Rock, AR-- a WPA project. At last report, it was still in use there, as offices of the Arkansas Aeronautics Commission.

During WWII, the US Army Air Corps used the TAT airport runways for practice landings. In 1945, TWA sold the 320-acre half-section to two area farmers, Miles and Harrison Olson. The land was returned to farm use, but the Olson



*The TAT airport, as it appears today.*

descendents and many of the neighbors still refer to the property as "the airport."

Two brick buildings remain at the site-- the garage and the transformer house. The concrete apron provides a place to park farm machinery, and a hay shed has been constructed on the hangar site. One can still easily identify where the walls of the hangar stood.

Waynoka's Harvey House closed in 1937, after which the Sante Fe Railroad used it as a depot, reading room, and storage area, finally closing it in the early 1990s. After the railroad donated the building to the City of Waynoka, the Waynoka Historical Society completed a beautiful \$1-million restoration in 2000. The Transportation Museum on the second floor features TAT, Santa Fe, and Fred Harvey exhibits, with historic photos and artifacts. The museum is open Thursday, Friday and Saturday evenings and by appointment at other times. The Gift Shop sells books, videos and gifts.

On the first floor of the Harvey House, Chicken Roscoe's restaurant is open Thursday, Friday and Saturday evenings, 5:00PM to 9:00PM, featuring steaks, shrimp, chicken, hamburgers, salads-- all reasonably priced.

If you would like to plan a special air trip to Waynoka and the Harvey House, the Waynoka Historical Society would be happy to provide transportation from the airport. Reservations at Chicken Roscoe's are recommended but not required-- call 580-824-0710.

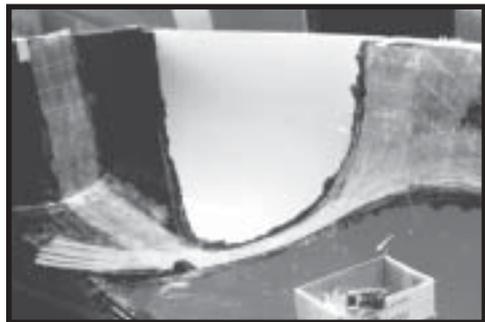
The current Waynoka Municipal Airport is one mile southeast of town, or four miles straight south of the old TAT Airport that put Waynoka in the aviation history books.

For further information, contact Sandie Olson at 580-824-5871 or sandieo@pldi.net. Visit the web site of the Waynoka Historical Society-- www.pldi.net/~harpo..

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

continued from p. 1.

Once, in August, I had attended an EAA meeting in a nearby town and was returning to Midland after dark following one such thunderstorm. Coming upon an area where water was running across the road, I had stopped to survey the situation before venturing across (flash floods through the dry West Texas arroyos are



**A fuselage half being layed up in the mold. The white area is the windshield opening, with Non-woven Unidirectional Fiber (NUF) layups around its periphery.**

notorious for taking cars and their occupants downstream quickly).

As I watched, a clump of something white floated by, illuminated by the headlights. Soon another one floated by and it looked unbelievably like a miniature iceberg! Sure enough, it was an iceberg--made of hailstones. I backed the car up and shone the headlights on the side of the road, to find hailstones piled up at least six inches deep! I have never seen anything like it, before or since.

Midland, TX is 300 miles from anywhere and it was reported that there were more airplanes per capita there than any other city. I had acquired a fourth-interest in a 1959 wood-wing Mooney (before they started rotting away) and enjoyed using it to fly to Oklahoma and Michigan to visit our relatives. Meanwhile, I had started building my first homebuilt airplane.

Another incident involving the local flora and fauna comes to mind. My mom and dad were visiting from Oklahoma and we had all gone to the airport for a ride in our Mooney. A thunderstorm had just passed through and, as I was getting the airplane out of the hangar, Dad was wandering around in the sagebrush beside the taxiway. Soon, he called me over and, with a sweep of his hand, said, "Look at that!" The ground was littered with hundreds of small frogs hopping about, apparently awakened from hibernation by the rain.

He pointed at a frog and said, "Just tickle him under the chin." Apprehensively, I knelt down and did as he suggested. I was flabbergasted as the poor little frog let out what sounded like a squeal, flopped over on his back, and died, becoming shrunken and desiccated-looking before my eyes!

Dad said, "Now just watch." I did so and, for about a minute, nothing happened-- I was looking at a very dead frog. But then suddenly, the little frog flopped back

over, his appearance quickened, and he hopped away. We tried the same technique on several more frogs and it always worked-- apparently an instinctive defense mechanism, but nonetheless startling!

A lot of the original Windecker crew and many of the new hires were native West Texans and it was an interesting process to teach them to build airplanes. One of my favorites was a guy named Joe Bob Duncan (many people in West Texas have double names). Joe Bob acknowledged that he was just an old "goat roper," but he actually was a good worker. I was just a green kid and he liked to tease me in a good-natured way.

We had a paper "traveler" that documented the building and inspection of each part; there were frequent "Inspect" steps listed, at which points the production people were required to call a QA person over to look at the part. Joe Bob was fond of calling it "Insect" rather than "Inspect": he said when he saw "Insect" on the traveler, it made him think of me.

Joe Bob had fun not only with me, but also with others. He had a glass eye and it was reputed that, at parties, he would take the glass eye out and replace it with another that had a naked lady painted on the iris!

Of course, I was not a lot more knowledgeable about aircraft manufacturing than the "goat ropers" when I started; in fact, I owe a debt of gratitude to an old FAA inspector named Jim Clark for my education. His official duties were to inspect



**The right fuselage half for the production prototype being pulled from the mold. Note the molded-in N-numbers.**

the test articles on behalf of the FAA, but in reality, he taught me how airplanes are designed and manufactured. He also "signed off" on the aviation experience requirements that allowed me to get an Airframe Mechanic rating.

Jim had a wealth of good, practical knowledge and sort of took Windecker under his wing, leading us through the certification process. In one instance, we were in the final phases of our flight test program, working on a Sunday afternoon to complete the spin testing. Jim and the FAA test pilot were there-- unheard of for FAA people to be working on a weekend!

As is standard practice for spin testing, the airplane had been fitted with a spin chute to assist in recovery from flat spins, should they occur. Unfortunately, someone accidentally deployed the spin chute while the airplane was on the ground,

dumping nylon canopy and shroud lines onto the ramp. We were thus in trouble-- the FAA required the spin chute to be packed by a certified parachute rigger before they would allow their pilot to fly. There was no chance of finding such a person in West Texas on a Sunday.

We stood around for a while trying to



**A wing static test in process. A "whiffletree" arrangement of load attach points and lever arms is designed to allow wing loads to be applied with a single hydraulic cylinder, distributing the load spanwise per the FAA requirements.**

figure out options, but in vain. Finally, Jim said to the FAA pilot, "Well, you know, a long time ago, I was a certified rigger and this chute is pretty simple. Would you be willing to fly the airplane if I pack it?" Long story short, that is what we did. Everybody just looked the other way and the incident was never mentioned again.

The first production prototype, N802W, did not make it all the way through the certification program-- on Saturday, April 19, 1969, on the last flight of the last day of aft-CG spin testing (which was also the last required flight test), the airplane crashed in an unrecoverable flat spin.

We were about six months late in finishing the FAA testing and were running out of money. Once we got word that all the tests had been successfully completed, the investors were poised to take the company public. A lot of us had stock options, and we all had visions of getting rich!

During the flight test program, I was responsible for signing off the airplane as being properly configured for each flight, and this flight was no exception.

One of the most important things to check was the installation of ballast weight. There had been plans to install a hopper in the rear passenger area for lead shot, complete with a dump valve to allow the weight to be jettisoned in an emergency, but, in the interest of time, a decision had been made not to install it.

Instead, the ballast consisted of a predetermined number of 25-lb lead shot bags lashed to the rear passenger floor with ropes. One of my tasks was to verify the amount of the ballast weight and the security of the lashings. On the fateful flight, I did so, signed the airplane off, and then went to get a haircut.

About an hour later, as I walked back into the plant, on our plant public address system I could hear the FAA test pilot

shouting over the radio for the Windecker pilot, Bill Robinson, to bail out. Obviously, this grabbed everyone's attention and we listened for whatever was to happen next. Within a minute or two, the FAA pilot relayed that Bill had indeed bailed out at the last minute and his parachute was open. Meanwhile, the airplane, still in its flat spin, had impacted on a county road, narrowly missed a passing car, and had bounced into the bar ditch at the side of the road. Of course, my immediate fear was that the ballast had broken loose and shifted aft.

We all jumped into vehicles and, guided by the FAA pilot's directions, sped to the crash site. When we arrived, Bill Robinson was sitting on the ground beside the wreckage. Curiously, he was missing one shoe.

Bill explained what had happened: on the last test, the spin had gone flat. He unsuccessfully tried several recovery techniques and then tried to use engine power to get out of it, but with the long narrow fuel tanks, all the fuel went to the outboard ends of the tanks and the engine quit.

All this time the airplane was losing altitude rapidly and there was only one option left: the spin chute. Bill reached for the deploy mechanism-- a cable strung from the rear of the airplane-- but in the confusion grabbed the release cable, running parallel to it. At that point, he had only one choice-- to bail out.

He unbuckled his harness and pulled the rip hinges on the cabin door, but the door stayed in place, even as he pushed on it. So, he leaned as far as he could to the right and then rammed the door with his shoulder. The door came off and Bill's momentum carried him out of the airplane and over the leading edge of the wing. The problem was, one foot was hung in the door frame. With his free leg, Bill pushed against the leading edge of the wing and his foot came free, leaving his shoe behind. At the point his chute opened, the FAA pilot estimated Bill was less than 2000 feet above the ground.

As Bill's story concluded, I apprehensively walked over to the wreckage and was immensely grateful to find the ballast still lashed securely in place. The airplane had hit in a flat attitude and, although destroyed, was amazingly intact-- the fuselage halves had split down the middle, but the cabin area was almost untouched. The wings were still attached to the fuselage, but the horizontal tail was broken. The rudder had sheared off vertically at its hinge points. Someone later estimated the crash forces to have been more than 55 Gs.

[Editors Note: This is the second in a series of three articles about my involvement with the Windecker Eagle project. Once more, I would like to say thanks to Ted Windecker, the son of Dr. Leo Windecker for his help.]

**Next month, read the conclusion of the story!**

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For a free listing of your event, email us at [OklahomaAviator@cox.net](mailto:OklahomaAviator@cox.net) or call 918-527-0429. 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 jmasek@tulsacounty.org	
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
May 3-4	Small Aircraft Transportation Systems (SATS) Exposition	Thomas P. Stafford Airport Weatherford, OK	Ordis Copeland- 580-774-4505 ordis@nts-online.net	For more info, go to <a href="http://www.weatherford-ok.org">www.weatherford-ok.org</a> or <a href="http://www.SATSExpo.com">www.SATSExpo.com</a>
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.
Mar 23	13th Annual Mary Kelly Wild Onions and Eggs Fly-In Breakfast	Tenkiller Airpark Cookson, OK	John Sevieri- 918-457-4183 jsclyde@aol.com	Those wishing to stay overnight may camp on the field or opt for a room at the Cookson Log Cabin Motel- 918-457-4116
Apr 4-6	35th Annual National Conference on Aviation and Space Education (NCASE)	Crystal Gateway Marriott Arlington, VA		
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!
Apr 13-16	Annual Spring Conference, Oklahoma Airport Operators Association, and South Central Chapter, American Assoc of Airport Execs	Doubletree Hotel 6110 S. Yale Tulsa, OK	Debra Coughlan- 918-838-5018	This year's them is "Securing Our Future."
Apr 27	Angel Flight Annual Fly-In Meeting and Barbeque	Jones/Riverside Airport Jenks, OK	Doug Vincent- 918-749-8992 DougieVin@aol.com	To be held at the pavilion-- NE corner of the airport. Open to the public-- come learn about Angel Flight!
May 31-Jun 1	16th Annual Biplane Expo	Frank Phillips Field Bartlesville, OK	Charlie Harris- 918-62208400	Forums, static displays, seminars, workshops, exhibits. All airplanes and pilots are encouraged to attend. Biplane crews and NBA members get free admission.
Jun 10-14	Tulsa Community Collge Aviation Careers Academy	Tulsa Community College 6111 E. Skelly Drive, Tulsa, OK	youth@tulsa.cc.ok.us	For 9th - 12th grades. Exposure to aviation careers. Includes 3 hours flight time.
Jun 13-14	ACE 2002- Aerospace Convention and Exposition	Westin Hotel Downtown Oklahoma City	Betsy Fry, Exhibit Manager 405-722-4706; ShippieOK@aol.com	Premier regional aviation & aerospace business-to-business convention. Approx. 100 exhibits-- call to reserve space.

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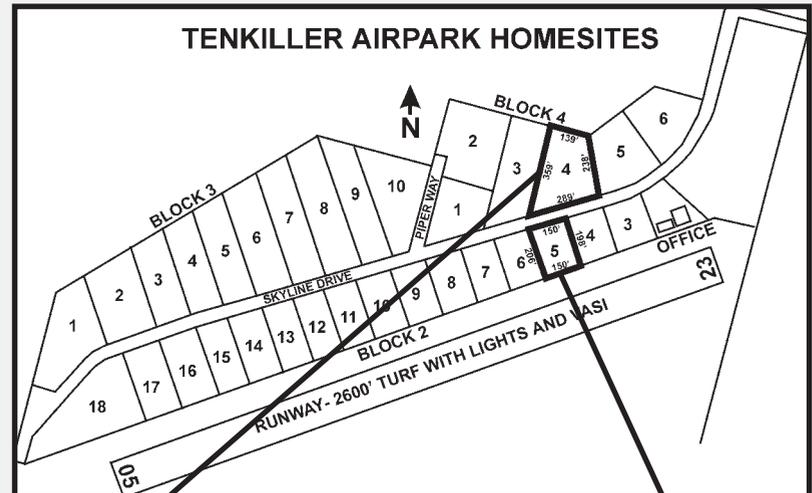
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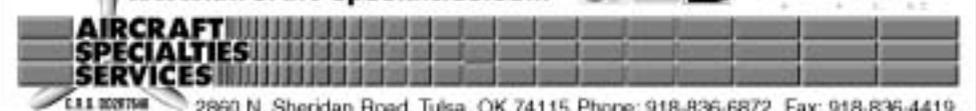


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