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# Oklahoma Aviator



Vol 19, No 7

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

July 2001

## Oklahoma Selected as SATS Team Member

OKLAHOMA CITY- The Oklahoma Aeronautics Commission (OAC) recently announced that Oklahoma has been selected for further participation in NASA-Langley's Small Aircraft Transportation System (SATS) program.

The SATS program envisions increased use of affordable high-tech general aviation aircraft, upgrades to existing general aviation airports, and other technologies to form the basis of a new national air transportation system.

This new system would make use of under-utilized capacity at existing general aviation airports away from the current "hub-and-spoke" airline terminals, airways, and altitudes. If successful, SATS will allow individual aircraft owners, air taxi operators, and fractional ownership companies in both urban and rural areas to travel from "doorstep to destination" in less time and at lower cost than via the airlines.

SATS also has the prospect of providing critically-needed relief from overloading of the existing hub-and-spoke system.

In April 2001, NASA advertised for competitive proposals from teams interested in participating in the program. A total of eight teams submitted proposals; Oklahoma was represented on two of the teams. NASA selected four of the eight teams, including one of Oklahoma's teams, headed by the Research Triangle Institute of Raleigh-Durham, NC. The other winners included teams from Florida, Maryland, and Virginia.

Until recently, the SATS program was in the visionary stages only. However, the initial SATS efforts will be built on successful technological achievements of NASA's Advanced General Aviation Transport Experiments (AGATE) program, General Aviation Propulsion (GAP) program, and other technologies and programs.

Those successes, plus mounting public pressure to relieve airline congestion, led Congress earlier this year to approve \$78 million funding for the SATS program over the next five years. Fiscal 2001 funding will be \$5 million.

The SATS funding legislation provides some unique, far-sighted stipulations. First, it outlines four main objectives of the SATS program to be demonstrated in FY2005, including:

- High-volume operations at airports without control towers or terminal radar facilities.
- Lower adverse weather landing minimums at minimally equipped landing facilities.
- Integration of general aviation aircraft into a higher enroute capacity air traffic control system.
- Improved single-pilot ability to function competently in complex airspace.

Second, it requires NASA to show progress in the first year, assess the costs

of meeting the objectives, and submit requests for additional required funding in subsequent years.

NASA is embarking on an aggressive timeline of activities to meet the objectives. On June 20, it released a request for proposals from organizations interested in managing the non-government side of the SATS program, including the activities of the four selected teams. Those proposals are due August 20 and the final selection will be made on September 30. In January 2002, planning meetings with the teams will begin and in May the teams will begin their assigned technical tasks.

NASA will facilitate the formation of a public-private alliance to encompass state-based partnerships for the execution of the SATS Program. These partnerships will participate in continued technology development, system analysis and assessment, technology integration, and flight demonstrations of

the SATS operating capabilities.

The enabling technologies for SATS began to be developed under the AGATE and GAP programs, and, as the SATS program progresses, will be refined for integration. Those technologies include:

- Integration of Highway-In-The-Sky (HITS) with synthetic vision systems.
- Simplified software-based flight controls.
- Auto-land capability for SATS-class aircraft.
- Automatic Dependent Surveillance-Broadcast (ADS-B) surveillance.
- Airborne Internet communications.
- Computational algorithms for automated traffic separation and collaborative sequencing.

Oklahoma has been involved in the SATS program for about two years. At that time, OAC Commissioner Mike Kiester happened upon a presentation by Dr. Bruce Holmes, the chief architect of the AGATE, GAP, and SATS programs. Dr. William D. Miller, III, head of the OAC, saw the potential of the program for Oklahoma and immediately got involved. For the past two years, the city of Weatherford, OK has hosted a SATS convention at the Thomas P. Stafford museum on the airport. This year's event, held in early May, featured Dr. Holmes presentation of the SATS vision, along with a diverse sample of high-tech companies exhibiting products and services with potential application to SATS.

SATS, AGATE, and GAP are outgrowths of the NASA Office of Aerospace Technology (OAT) goal to



NASA Langley's Cirrus SR-20 aircraft, which is being used for AGATE and other NASA research programs. Technologies developed under AGATE and installed in this airplane will be instrumental in SATS success. NASA Langley also has two Lancair Columbia 300's which are similarly equipped and used in the same type research..

continued on p. 8.



## From Mike...

If you read page 1, you know about NASA's Small Aircraft Transportation System (SATS) program.

Perhaps like me, you have found the program "hard to get a handle on." In the beginning, SATS presented George Jetson-like visions of families traveling to Grandma's house in highly-automated futuristically-shaped aircraft at four times the speed of an automobile. In these visions, onboard computers handle full autoflight functions from takeoff to landing. Human "operators" (with a level of experience similar to a typical automobile driver) serve as high-level "managers" of the airplane, communicating with the computer via voice commands. Real-time data is presented on "glass cockpit" displays. Automatic computer algorithms keep the aircraft heading toward its destination, out of weather, and clear of terrain, obstacles, and traffic.

In instrument weather, "synthetic vision" systems overlay a simulated view of the outside world onto the windshield surface. "Highway in the Sky" approaches are depicted as a series of boxes in front of the aircraft- all the pilot (oops, "operator") has to do is aim for the next box.

All this is done without the need for air traffic control. Furthermore, the airplane is envisioned to cost about as much as a family automobile.

Couple this with the fact that SATS has also been mentioned in the same breath as the Moeller Air Car and other even more dubious non-flying flying machines, and you have a situation that occasions skepticism, especially to those of us who have lived through a half-century of essentially no technical progress in general aviation.

The SATS program is the vision of Dr. Bruce J. Holmes, of NASA's Langley



Research Center. Dr. Holmes is one of those charismatic visionaries that you meet from time to time. His formal education is as an aerodynamicist and his early career years were spent analyzing complex flow problems for an aerospace company.

He now describes himself as a "middle-aged aerodynamicist seeking a position in the information age." I like people who poke fun at themselves.

Dr. Holmes is a big thinker. He is able to easily switch from talking about global subjects such as information theory, social trends, and historical implications of technology to the nuts-and-bolts of spread-spectrum time-domain electronic communication equipment.

For instance, he says, "The rule of any age is to waste that which is in abundance to solve human problems. In the agricultural age, we could waste abundant land to solve the need for food.

"Now, in the information age; we should imagine wasting bandwidth to solve modern problems, including those in transportation. I realize that such an approach sounds heretical to those of us in technology who learn to economize, streamline, and simplify as the basis of sound engineering practice.

"But, one look at a Saturn V can be convincing that we didn't get to the moon by economizing on ISP (specific impulse of rocket motors)."

What do you do with a guy like that? Do you believe in his rosy vision that is so incredibly far from the current reality? After all, dreamers are a dime a dozen, aren't they? Granted, some dreamers bring their vision to reality, but how do you know which ones to trust?

I have often imagined a conversation between two guys around the turn of the century (no, I'm not referring to the current century-- think 1900). One of them is Alexander Graham Bell and the other is a guy like me.

Al says to me, "I've got this idea: since we had that little occurrence with the acid in the lab, and Mr. Watson heard me in the next room over the wire, I think every home should have an electrical instrument for talking with every other home. We'll call it the 'telephone!'"

I say, "Right, Al. You mean, have a wire going to each and every house?? Do you realize how much that would cost?? How would you keep it connected-- I mean, the first tree that falls is going to take out the wire."

"No," says Al, by now getting excited, "See, we'll put the wires underground!" "Riiiiight. You're going to put electri-

## From Barbara...



Hello, OA readers! This month I have something very exciting to share with you. Muskogee's "Airshow Oklahoma" is shaping up to be quite an event - and something to look forward to at the end of the summer. Because Aerospace America in Oklahoma City is taking some time off to regroup, Airshow Oklahoma will be the state's only large airshow this year, and we are hoping that many of you across the state will load up cars, buses, vans, and motor homes with the kids and grandparents and come to Green Country to experience what promises to be a terrific air show.

Michael and I have been attending Airshow Oklahoma board meetings and trustee meetings for some time now, in order to understand what is going on, so The Oklahoma Aviator can support the air show in the best possible ways. In doing so, we have learned of many plans, including warbird demonstrations, pyrotechnic displays, military parachutists, F-15 and F-16 static displays and fly-bys, Randy Harris and his Skybolt doing aerobatics, and lots of other airshow acts, including the world-famous USAF Thunderbirds!

At last week's meeting, we had the

cal wires underground. Al, haven't you heard: water and electricity don't mix?"

Al says, "No, no, we'll figure it out!" Al doesn't understand why I can't believe in his vision.

I must admit, I've had trouble believing in the SATS vision. However, in researching the article, I've begun to change my mind. First, the enthusiasm of Dr. Holmes and his folks is catching. Second, the technical achievements of the

privilege of getting to know Theron Wright, Chief Wheelchair Pilot and Director of Community Relations for "Challenge Air," one of the charities that will receive funds from the Airshow's profits. Challenge Air takes physically and mentally challenged children and their families for airplane rides, teaching them that they can overcome their disabilities and accomplish big things with their lives.

This is especially meaningful to the children, when they see that their pilot is a paraplegic, flying the plane with hand controls. They, and their parents, are thrilled and often speechless when the pilot hands them the controls! "Imagine, me actually flying an airplane!"

Challenge Air has just awarded their first flight training scholarship to a physically disabled young man from Florida. We will be watching Challenge Air, to see how they continue to motivate kids to learn to fly.

If you would like to support the airshow, or if your business would like to get involved, just contact us at The Oklahoma Aviator office, and we will let you know how you might sponsor an airshow act, reserve a chalet tent or table for your party, or display your product or services. Various restaurants in Muskogee are offering airshow catering which can be delivered directly to your chalet or table!. What an easy way to plan a company get-together doing something we all enjoy- watching an air show!

This year's show will be held September 8-9 at Muskogee Davis Field. Tickets will be available from a number of outlets including Git-n-Go stores and others. For more information, contact us at the Oklahoma Aviator or call the air show office at 918-684-6363.

AGATE and GAP programs are significant. And third, the SATS program is now funded, receiving congressional support, and seems to be off to a well-managed start.

So I suggest giving it a chance. Let's join with Dr. Holmes in envisioning a bright new future for general aviation. What if we had not believed JFK when he established the goal of going to the moon?

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# Up With Downs



Earl Downs

## For the Love of Flight

Where does the love of flight come from? Do we fly for the love of flight or for the thrill? Is flying nothing more than a means to an end, a job to produce income? Or is the aspiration to fly the culmination of a quest? Flight may mean some or all of these things, but for many of us who have extended our knowledge into the mechanical skills that allow us to fly, it's magic. Igor Sikorsky, famed aviator and aircraft designer once said, "Aeronautics was neither an industry nor a science. It was a miracle."

I have often wondered what it was in my twin brother Ed and I that drove us to the sky. Our parents didn't fly or have anything to do with airplanes. Perhaps it was the Sunday drives to the Van Nuys airport

in our family Model A Ford to watch the P38s fly that inspired our passion. Even as a very young child I remember what a beautiful plane the P38 was. I also recall a children's picture book about the Wright Brothers. I think Ed and I must have identified with them. Paper planes, kites, balsa wood models and *Airtrails* magazines filled our room. At age ten we were finally allowed to ride our bikes to the airport. As we sat on the fence waving to the Air Guard pilots taxiing by in their P51 Mustangs, I wondered if I would ever fly one of those sleek machines. Fifteen years later I did.

Wilbur Wright said, "The desire to fly is handed down to us by our ancestors who, in their grueling travels across the trackless lands in pre-historic times, looked enviously on the birds soaring freely through space, at full speed, above all obstacles, on the infinite highway of the air."

Many years ago, I frequently flew new airplanes from the Cessna Wichita factory to Los Angeles. Most often they were Cessna 150s with no radios and only basic VFR instruments. Winging westward along the old Route 66, I would imagine what the pioneer aviators must have been feeling. Had Cal Rogers looked out at these same sights during his epic flight across the country in 1911? As I crossed rivers and ridges my magic carpet took my thoughts even further back in time. These geographical obstacles of beauty would have cost our ancestor travelers days or even weeks to circumnavigate. What would they have given to share what my eyes have seen? The sky is never ending. The sky has no borders or

limits. It is timeless. When you fly, you share this endless ocean of air with all that have been there before you. Is this where the love of flight comes from? Are we being called to the sky by those who have traversed it before us?

An aviator is always learning. Each time you take flight it is the same, yet different. A new sight, a new texture to the sky, a gust of air or a slight motion at just the right time. It's always an adventure. Flying, terribly unforgiving of carelessness, requires relaxed concentration seasoned with a touch of fear. The fear, restrained by trained skill, is then transformed into the exhilaration that compels explorers forward. Excitement conceals itself in the routine of a normal flight, but is always there. Every aviator feels it. Anne Morrow Lindbergh wrote in 1935, "Travelers are always discoverers, especially those who travel by air. There are no signposts in the air to show a man has passed that way before. There are no channels marked. The flier breaks each second into new uncharted seas."

Where does the love of flight come from? It comes from every second you are supported by air.

How does one begin to pursue the dream of flight? The cost is high and it takes so long to learn how to fly. Captain Eddie Rickenbacker said, "Aviation is the proof, that given the will, we have the capacity to achieve the impossible." Ed and I saved every quarter we made mowing lawns to spend on our dream of flying. In 1956, at age fourteen, our grandmother loaned each of us \$80 to take a ten-hour flying course. We paid her back at the rate of \$10 per month. Our parents also supported

our quest. I suspect they thought it would keep us off the streets. After the \$80 was spent we could only afford a half-hour of flying every two weeks. Nevertheless, we both soloed on our 16th birthday and got our private licenses on our 17th birthday. When a beat up 1941 Taylorcraft became available for \$800, we bought it. So immersed were we in our pursuit of flight that we didn't get our drivers licenses for another year. I guess our parents were right-- flying really did keep us off the streets. What is it about aviation that makes you think you can do anything? It's the magic.

Henri Mignet, renowned French aviator and writer, wrote in 1934, "To fly! To live as airman live! Like them, to ride the skyways from horizon to horizon, across rivers and forests! To free oneself of the petty disputes of everyday life, to feel the blood renewed in ones veins - Ah! That is life...Life is finer and simpler. My will is freer. I appreciate everything more, sunlight and shade, work and my friends. The sky is vast. I breathe deep gulps of the fine clear air of the heights. I feel myself to have achieved a higher state of physical strength and a clearer brain. I am living in a third dimension."

You have to admit, those French do have a way with words!

I love to read what others have said before me. I recommend the book, *Slipping the Surly Bonds*, written by Dave English. It contains hundreds of great quotations of flight.

Any comments or questions? Let me know at earldowns@hotmail.com.

## Fill Out This Form!- Part 2

By Dave Wilkerson

### Completing the FAA Application Form 8710- Part 2

Having overcome the emotion of completing the "weight" block, the aging applicant hits another reality-slam: hair. Since Form 8710 disallows abbreviation, you must spell out your natural hair color. And no purples, oranges, or other dyed eye-candies, please. The FAA only recognizes black, red, brown, blond, or gray. Bald (er, "distinguished") pilots should enter "bald." Wigs, toupees and spray paint don't count, and distinguished won't fit.

FAA sees eye color the same way: blue, brown, black, hazel, green, or gray. (If your eyes are red, perhaps you should wait!) Again, the color is a word, not an abbreviation. For "sex", the FAA has you check "M" or "F." (1970s applicants wrote in their responses. It is simpler now!)

The pilot certificate question confuses some students. A student

pilot certificate IS a pilot certificate, so answer YES, printing "Student" in Block N. Other pilots enter whatever grade of pilot (not instructor) certificate they hold, without mentioning any ratings. A private pilot with an instrument rating will enter the word 'Private' in the "Grade of Certificate" box.

The "Date Issued" box means the most recent version of the pilot certificate. That same instrument rated private pilot enters the date posted clearly on the pilot certificate. You can also find your certificate number on the pilot certificate. Student pilot certificates begin with two printed letters (EE-, ZZ- or similar) followed by a number sequence. Enter those letters as well; FAA needs them!

Regarding medical certificates, a common misconception involves the certificate's class. First or second-class certificates thirteen or more months old are still first or second-class. Enter the class shown on the medical certificate, and the date that

the certificate was issued. The "Name of Examiner" block refers to the name of the Aviation Medical Examiner, not your pilot examiner. (It happens!)

Check "yes" in the block discussing narcotics, drugs, and alcohol ONLY if you were actually convicted. That is why the next box says "Date of Final Conviction." Below this is a signature and date space, but it is only for those applying for glider or free balloon privileges.

Most certificates or ratings require practical tests, so the box entitled "Completion of Required Test" asks what aircraft you will use, and your total time in that aircraft, as well as your total pilot-in-command time in that aircraft. Many applicants leave this blank, or repeat their total pilot-in-command time here. The FAA is statistically interested in your total PIC time in the aircraft in which you test.

Graduates of approved courses should complete the space detailing school and course information, un-

less the graduation certificate is more than sixty days old. After sixty days, pilot tests default to 14 CFR 61.

The record of pilot time is rarely confusing, except for the bottom row, where Training Device and Simulator share space. A simulator is a full-motion, massively computerized marvel imitating specific makes and models of (usually transport category) aircraft. Training Devices, on the other hand, are the "simulated simulators" normally found in flight schools and FBOs throughout the land. The FAA prefers that we enter only complete hours (no tenths) in the spaces provided. These forms are filmed for microfiche retrieval, and 9.7 easily becomes 97 using that system.

Lastly, the Fed wants to know if you have failed a test for the certificate you seek, and if the failure was within the preceding thirty days. After you answer, simply sign and date the form and it should be ready for your flight instructor's endorsement.

Have a great practical test!



# My Closest Call

by John McMurray

Like all scary flights, this one began as a routine mission. I was flying Number Three in a flight of four Stearman's ferrying from Minneapolis to Prairie du Chien, Wisconsin. The weather was warm, the sky clear, and the winds light. We took off from Anoka County airport and headed southeast. I had only to fly smoothly for Number Four and enjoy the summer air. In retrospect, everything was just too easy.

About thirty minutes out, the trouble began. A twisting in my tummy suggested something was amiss. Fifteen minutes passed before I deciphered the problem: jalapeno cheese soup. The night before we'd eaten in a nice restaurant in Minneapolis. The soup of the day was jalapeno cheese soup and, being a loyal son of the southwest, I tried a bowl to see if the "nawtherners" got it right. To my surprise, they had. The soup was delicious, with a good three-alarm flavor. Flying along in the mild summer air, a distressing intestinal gurgle announced the return of the jalapeno cheese soup.

Few things are more annoying than nature calling during a cross-country flight. This call quickly moved from annoying to desperate to emergency. Being the stalwart pilot I am, I held my peace and squirmed in the cockpit. I was solo, so no one else suffered the odorous significance of my extreme distress. I learned to my surprise that Ceconite will corrode, as the fabric on the inside of the fuselage discolored to a strange patina. I could not bring myself to examine the steel tube structure. Casting about for something more enjoyable to occupy my mind, I pulled out my chart and tracked our progress towards Prairie du Chien. In the light and variable summer breeze, our ground speed appeared negligible. Crossing a field took a good portion of an hour and there were many fields left to cross. To make matters worse, Lead kept wandering off course. We were now pointed almost due east towards the Mississippi. The other flight members expressed no concern with our erratic flight path. I gave Number Two, the official back-up navigator, a decent interval to correct this egregious error but he remained strangely silent. Finally, I could stand this unprofessional conduct no longer and calmly informed Lead that Prairie Du Chien lay at our two o'clock and he should proceed direct if he aspired to any claim of competency as a cross-country pilot.

On course for Prairie du Chien, our ground speed continued to deteriorate. I was convinced that we must land short of our destination but, strangely, the gas gauge indicated sufficient fuel to reach Prairie du Chien. Perhaps the wire had stuck in the sight glass. I jiggled the stick (VERY gently) and the wire wiggled freely in the sight glass. No, the gauge was not stuck. I compared our time airborne with the fuel remaining and discovered the clock had

stopped. Well, not quite dead stopped, but it certainly moved much too slowly. I made a mental note to write up the clock and the gas gauge. Assuming I made it that far.

I will not belabor the next hours. Suffice to say the flight stretched into an odyssey rivaling Slim's conquest of the Atlantic, with the Ceconite growing greener all the while. How the Stearman flew for so long is mystery to this day.

Finally Prairie du Chien appeared in the midwestern haze. In contrast to the howling headwind at a thousand feet, the winds on the surface were from the north at a small fraction of a knot. Overly conscientious, Lead entered downwind to land to the north. Worse, he flew a pattern worthy of a B-52 student pilot. We turned base over Illinois. Retaining my professional composure, I kept my Stearman tucked in tight on Lead's wing. I battled the sudden turbulence with rapid stabs of the controls, keeping my aircraft steady for Number Four with a herculean effort.

As Prairie du Chien reappeared in the haze following our circumnavigation of the Midwest, I realized to my horror that Lead was lined up on Runway 32. The Prairie du Chien FBO sits near the approach end of Runway 29. Getting to the FBO from Runway 32 requires rolling out to the intersection of Runway 29 then back taxiing to the FBO. Apparently designed for use by the Republic Aircraft products, Prairie du Chien has runways several hundred miles long. The taxi route from Runway 32 to the FBO covers the entire western half of Wisconsin. The situation reached critical mass and I made my decision. Turning base, I left the formation and landed on Runway 29. Landing more gently than a B-17 pilot with a planeload of wounded, I turned off at the first taxiway, taxied to the pumps, shut down and climbed from the cockpit. Greeting the FBO personnel with gracious calm, I proceeded down the hall, arriving just in time. Returning to my aircraft, I surmised a Midwest twister had passed while I was occupied, as my Stearman was parked wildly askew and the cockpit looked like a wildcat had just escaped from it. The other pilots leaned against their planes, laughing hysterically at a tale involving something call the "Green Apple Quickstep." No matter, I was on the ground, still in one piece with no unusual laundry bills ahead.

It was my closest call!

*[Editor's Note: John McMurray, Lt. Col, USAF, Retired, resides with his wife Kathy in Burkburnett, TX. John flew fighters in the Air Force, has flown Gary Conklin's T-38 jet trainer to Oshkosh the last two years, is the proud owner of a Luscombe 8E, and is now a member of the Red Baron Pizza Stearman Squadron.]*

*This article was reprinted from the Tulsa Vintage and Classic Aircraft Chapter 10, through the courtesy of Charlie Harris. So don't complain to me!*

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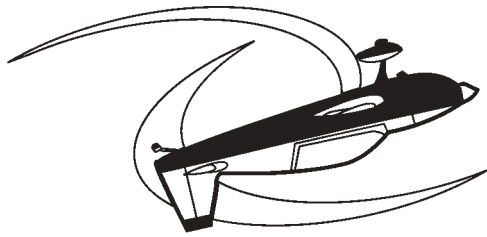
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# ASK THE DOCTOR

BY DR. GUY BALDWIN

Senior Aviation Medical Examiner  
ATP, CFII-MEI



### Prostate Cancer

This month's column combines information from an article written by Doctor Warren Silberman of the FAA Aeromedical Branch with information from *Chronic Disease Service*, a newsletter from the Oklahoma State Department of Health.

Doctor Silberman recently posed a hypothetical situation to aviation medical examiners like myself: "Airman Joe comes to you with a letter from his treating physician stating that six months before, his prostate specific antigen (PSA) level was 15. Later biopsies of the prostate showed that he had adenocarcinoma (prostate cancer). He subsequently underwent a radical prostatectomy with lymph node resection. The pathology report confirmed that cancerous tissue was present in the prostate, but none was found in the lymph nodes."

His question to us was, "Should I issue an FAA medical certificate after his normal flight exam?"

Among men in the United States, prostate cancer is the most commonly diagnosed

form of cancer, second only to skin cancer. As a cause of death, prostate cancer is second only to lung cancer. Across the United States in 1999, about 180,000 new cases were diagnosed and approximately 37,000 American men died of the disease.

In 1998, the nationwide mortality rate for prostate cancer was 31.9 deaths per 100,000 males in the population. Our rates in Oklahoma were the third lowest in the U.S.- 28.0 per 100,000. Prostate cancer is about twice as prevalent in African-American men as in Caucasian men.

It is important to note that prostate cancer is a disease of older men, more of whom die *with* the disease than *from* it. It is recommended that all men over 40 have a yearly digital rectal exam (DRE) and PSA test (although the effectiveness of PSA testing is controversial). Prostate cancer is very slow growing and, with proper treatment, ninety percent of men survive the disease.

The answer to Doctor Silberman's question is that an airman who has a history of prostate cancer, but who is currently cancer-free and is receiving no treatment, is eligible for a medical certificate. After he has passed the normal flight exam in my office, I call the FAA Aeromedical Branch in Oklahoma City (often while the airman is in my office) and get an okay over the phone. I can generally hand him the certificate right then.

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



Dr. Warren Silberman, Chief of FAA's Aeromedical Branch in OKC, recently visited Dr. Guy Baldwin in Tulsa and was treated to rides in a variety of aircraft, including Ike Innes P-51 (top), Guy Baldwin's Bellanca Scout (left), Bob Webster's Air Cam (right), and Alden Miller's T-28 (not shown).



# Tulsa Air & Space Center News



by B Mann

## Newton's Third Law-- The Basis for Our Aerospace Industry!

Remember when you sat in high school science class and thought, "Wow, how is this going to help me in the real world?"

Isaac Newton's Third Law of Motion- remember that? Formulated in seventeenth-century England, it says, "For every action, there is an equal and opposite reaction."

A force is a push or a pull upon an object, which results from its interaction with another object. When you sit in a chair your body exerts a downward force on the chair and the chair exerts an upward force on your body. These two forces are called "action" and "reaction."

According to Newton's Third Law, whenever two objects interact, a pair of forces is created. The force on one object equals the force on the other and the two forces are in opposite direction. Forces always come in pairs-- equal and opposite action/reaction forces.

Consider the flying motion of birds. The bird's wings push air downwards. In turn, the air reacts by pushing the bird upwards (lift). The size of the force on the air equals the size of the force on the bird; the direction of the force on the air (downward) is opposite the direction of the force on the birds (upward).

Isaac Newton prophesied with remarkable foresight, "This is the principle which will enable mankind in later centuries to undertake flight to the stars." For generations, men have been interested in the possibility of designing aircraft based on this principle.

A demonstration of Newton's Third Law is easy. When a simple balloon is blown up and the neck is held shut, the air pressure inside the balloon is equal in all directions and the balloon does not move. However, when the balloon is released, it will fly away, moved forward in reaction to the backward jet of air. This is Newton's Third Law at work.

Propellers, jet engines, and rockets all operate on Newton's Third Law similar to the balloon example. Each one creates forward thrust by moving air or combustion gases backward. The difference

between a jet engine and a rocket is that jet engines require an outside supply of air (the atmosphere) to burn the fuel, which produces thrust. However, rockets carry their own oxygen for combustion; thus, rockets can operate where there is no air.

In a turbojet engine, the air is sucked in the front of the engine and a rotating compressor "squeezes" the air into a smaller volume, which causes it to get very hot. From there, the air is pumped into a combustion chamber, where it is mixed with fuel (often kerosene). The mixture is hot enough to ignite and burn spontaneously. The gases produced by this process come rushing or "jetting" out of the exhaust nozzle at high speed. This action causes a reaction, which pushes the engine and, in turn, the aircraft, forward.

Before the gases come out the exhaust, they pass through a turbine wheel, causing it to turn. The shaft of the turbine wheel extends to the front of the engine and is connected to the compressor. Thus, the exhaust gases also provide power to operate the compressor.

Turbofan engines are similar to turbojets except that, near the front of the engine, they have an extra set of rotating fan blades powered by the exhaust turbine, which produce extra thrust. The turbofan engine has greater thrust for its weight than the turbojet.

Turboprops are a variation of the turbojet: a large portion of the exhaust turbine shaft power is used to turn a propeller, just like those on piston-engine aircraft. Turboprop engines are particularly useful in commuter and business aircraft because they produce high thrust for takeoff and their propellers can be easily reversed to reduce landing roll. Turboprops get most of their thrust from the propellers, but the jet effect at the exhaust produces additional thrust, which is especially important at high altitudes and high speeds.

In ramjet engines, the inlet air is compressed simply by scooping in air as the aircraft moves forward at high speed. The ramjet engine is the simplest power plant ever devised. The compressor and turbine are eliminated altogether, and it has no moving parts. Compressed inlet air goes directly into a combustion chamber where it is mixed with fuel and burned. The combustion gases go directly out the exhaust without going through an exhaust turbine.

Since ramjets depend on high-speed forward motion to work, other types of powerplants (jet engines or rockets) are used to get the aircraft up to the speed at which the ramjet operates, from slightly over

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Scramjet stands for "supersonic combustion ramjet." This engine uses a specially designed air inlet to operate at speeds in excess of Mach 5. Today, there are many test vehicles achieving hypersonic flight at speeds higher than Mach 5 using the scramjet engine.

The Chinese used rockets as fireworks and weapons of war at least a thousand years ago, but modern development of rockets did not begin until the first half of the 20th century.

Since rocket engine carry their own supply of oxygen, they can be used in outer space, where no air is available for combustion. How-

ever, rocket engines also can be used in the atmosphere; the first plane to fly faster than sound, the Bell X-1, was rocket-powered. Rockets are important today mainly as propulsion for space vehicles.

Your high school science class probably did not go into so much detail about Isaac Newton's Third Law of Motion. However, perhaps you can see how its discovery opened up a new way of thinking, making it possible for ordinary people to use their imaginations to dream up our modern aerospace industry.

Today there are no boundaries for human exploration. Space is Cool, Science is Fun, and Education is Essential!



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# SW Bell Balloonfest 2001 is More Than Just Hot Air!

OKLAHOMA CITY- Festival fans will find a myriad of new activities at Southwestern Bell Balloon Fest 2001, August 10th and 11th at Wiley Post Airport, NW 50th and Council, including:

- Adopt a Duck- For a \$5 donation to the Regional Food Bank of Oklahoma, you'll have a chance to win a 2001 Nissan truck, a \$5,000 furniture shopping spree and thousands of dollars in other great prizes!

- The Young Eagles Program- FREE introductory airplane rides for young people ages 8-17.

- Skydiving demonstrations.

- Special shape balloons - This year's character lineup includes a Panda Bear balloon, Tony the Tiger, a 37' tall friendly dragon, a gigantic AOL computer monitor, a 7UP can large enough to quench the biggest thirst, and a smiling Lady Bug balloon.

- A Dale Earnhardt car on display.

- The famous Frisbee-catching dogs.

- The Jasmine Moran Children's Museum, Shawnee, will be making face masks, hats and jewelry, as well as a variety of other hands-on projects in the Children's Activity Tent.

- The Kuriakos Nature Center will feature live animals, a touch table, and a variety of nature related activities.

- Toys R Us Kites! Learn to make and fly your own kite from a Toys R Us bag!

- The Braum's Entertainment Stage - Welcomes "Windstock" - featuring Jimmy Lafave and some of Oklahoma City's fa-



vorite bands!

- An RV display.

- Legend Cars on display.

- Tethered balloon rides - this is your chance to rise to the occasion! Buy your \$5 ride ticket in the souvenir tent (rides on a first-come first-served basis) for a chance to float above the crowd in a tethered balloon! Rides are weather permitting and ride tickets are fully refundable.

- An air-conditioned Kids' Activity Tent - this huge tent is the "cool" place to be! Activities include: the 4-Warn Weather Team, face painting, mask making, kite making, clowns, a hot air balloon basket for climbing in and much much more!

- Kite Flying demonstrations (day & night).

- The Fire Department's Interactive Safe House.

- Safari Joe's Exotic Animals.

- and much more!

Event hours are Friday, 4pm - 11pm and Saturday, 6am - 11pm. Discount tickets and free tickets for kids age 12 and under will be available at Mathis Brothers Furniture, Tinker Federal Credit Union, and Toys R Us. Children 12 and under will also be admitted free with a Sonic Wacky Pack sack or a specially marked 7UP can. Parking is free and can be accessed off of NW 50th and Council.

Proceeds from the event benefit the Regional Food Bank of Oklahoma. For information about volunteering at the event, call the Food Bank at (405) 972-1111. For additional information about Southwestern Bell Balloon Fest 2001, please call (405) 475-7006 or visit our web site at www.balloonfest.com

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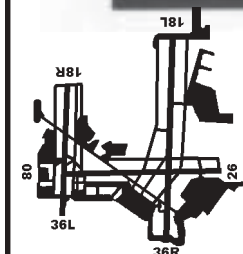
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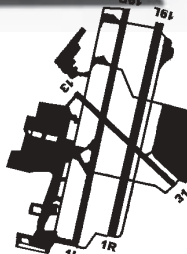
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*Chester and Jeannie Reyckert of Skiatook, with internationally-acclaimed fiddle player Jana Jae. The Reyckerts celebrated their 40th wedding anniversary on April 29 with a great party at the Skiatook Municipal Airport. Ms. Jae was the featured performer. Airplane rides were provided by Ike Innes in his P-51, Alden Miller in his T-28, and others. Chet says the party was so successful, they are going to celebrate their 50th anniversary the same way next year!*



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# SATS, cont'd

continued from p. 1.

"revolutionize aviation, specifically, to enable people to travel faster and farther, anywhere, anytime." This objective aims to reduce inter-city doorstep-to-destination transportation time by

have been made next May, Oklahoma's exact role in the SATS program will be a matter for conjecture. However, the OAC will encourage NASA and the management team to make effective use of Oklahoma's depth of aerospace

research and industrial capabilities. In addition, the state is proposing to build a new SATS demonstration airport that would be used in the required FY 2005 demonstrations.

At the very least, the OAC wants to make sure that all

Oklahoma Regional Business Airports are equipped to use SATS technologically when it becomes operational. That means primarily that runway end identifiers, visual glide slope indicators, and runway lights will be needed at those airports not so equipped.

SATS has now passed a major milestone-- initial funding by Congress-- and appears to be on its way to becoming operational. According to Mike Kiester, "With the initial round of funding in place, and with nationwide support in Congress growing, I feel it's not a matter of 'if' SATS becomes operational, but 'when.' Oklahoma wants to be in place so that, when SATS technology is fielded, we will be a testbed location."

Meanwhile, Mike Kiester is scheduled to participate later this summer in an experiment where a NASA 757 equipped with synthetic vision will make approaches to Eagle County Airport in Vail, CO. Nestled among the Rocky Mountains along I-70, Eagle County presents an acid test for synthetic vision systems, with plenty of opportunity for encountering "cumulo-granitus" if things go wrong.

He adds, "I'm really looking forward to upgrading my Comanche with the SATS goodies as they come along. When my engine is ready for overhaul, I will certainly consider a GAP engine, if it is available by then."



The glass cockpit of NASA Langley's Cirrus SR-20.

50% in 10 years and by 70% in 25 years.

SATS proponents point out that, as populations spread out and technology advances, hub-and-spoke transportation systems have historically been replaced by point-to-point systems. As an example, they cite the replacement of railroads for personal transportation by automobiles. To make that possible, technological advances in automobiles design and construction were coupled with an extensive nationwide network of interstate highways, local roads, and streets. Unlike railroad trains (or by analogy, the current hub-and-spoke air traffic control system), automobiles operate autonomously without a centralized network of controllers.

On the question of affordability, SATS proponents acknowledge that the cost of a SATS-compatible aircraft will be more than a luxury automobile for some time to come. However, they point to the successes of public/private partnerships such as AGATE and GAP as a means of reducing the cost. Also, they look at the phenomenal success of fractional ownership companies who deal with business aircraft, reasoning that the same approach could work with smaller SATS-class airplanes. Another possibility they envision is nationwide aircraft rental organizations similar to those for automobiles.

Until the SATS work assignments

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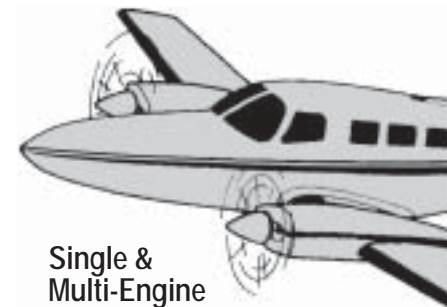
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# Frontline Volunteers: AOPA's Airport Support Network

General aviation's continuing loss of two public-use airports a month gnaws away at our air transport system, eroding its flexibility and utility.

Airport managers, local airport user groups, and courageous individuals all across the country resist anti-airport pressures. These conflicts require a great deal of political savvy and public relations skill.

The Aircraft Owners and Pilots Association, with more than 60 years of experience in airport defense and promotion, has frequently been able to help local airport defenders get their message across to politicians and the public. But often, the request for help has come too late, after airport opponents have generated a critical mass of uninformed support or moved quickly to take advantage of public apathy.

An early-warning system was clearly needed. To fill that need, AOPA formed the Airport Support Network (ASN), recruiting volunteers among AOPA members at airports nationwide. Since ASN was created in 1997, more than 900 AOPA members, most of them nominated by their fellow pilots and all meeting AOPA's standards, have signed on for one-year renewable terms as unpaid ASN Volunteers.

The ASN Volunteers' principal responsibility is to keep AOPA Headquarters abreast of political and public opinion developments that may affect their airports. They attend public meetings involving air-

port jurisdiction, reporting to AOPA. When appropriate, they participate in such meetings, presenting the general aviation point of view on contentious issues.

ASN Volunteers help promote local airport activities to enhance the airport's public image. And they give community leaders AOPA-generated information to sharpen their understanding of the airport's value to the community.

Experience has shown that the best way of avoiding crises is to keep lines of communication open. Therefore the Volunteers maintain relationships, not just with AOPA, but also with their local pilot associations, other airport groups, airport management and the community.

Pilots who want to help protect and promote their home airport should first find out if the airport already has an ASN Volunteer.

If your airport does not yet have a Volunteer, you can fill out a nomination form (on the website), either for yourself or for a fellow AOPA member who would be willing to work as an ASN Volunteer.

It's a great way to help preserve general aviation's precious airports!

*[Editors Note: Some of the 27 Oklahoma airports that urgently need ASN Volunteers are: ADH, BVO, DUA, F29, H45, LAW, MKO, RVS, SWO, WWR. See the full list on [www.aopa.org/asn/airportintro.html](http://www.aopa.org/asn/airportintro.html).]*

## *A Message from Bob Jandebour* **OAC INVITES AIRPORT PARTICIPATION IN PHILLIPS PETROLEUM SAFE FUELING WORKSHOP**

Oklahoma airports have a critical need for qualified personnel trained in safe fueling procedures. This need will become more pressing with projected increases in business aircraft traffic in the next few years.

Oklahoma-based Phillips Petroleum, one of only a handful of companies nationwide that have FAA Part 139-certified fire training programs, has volunteered to host a free, daylong workshop to train airport personnel in fuel quality control and safe fueling procedures.

Notably, Phillips is encouraging participation from all Oklahoma airports, whether or not they distribute Phillips products. The OAC and the Oklahoma Airport Operators Association (OAOA) have supplied address lists to Phillips, which is sending out the invitations. However, because of the short notice, any airport that does not receive an invitation is encouraged to attend, free of charge. Just call Phillips Petroleum at 800-234-6603 to reserve space.

On July 12, Vern Triebel of Phillips will conduct the workshop in Oklahoma City. The workshop will include classroom instruction and, in cooperation with the Will Rogers World Airport fire department, hands-on experience putting out actual fires. Fred Chambers, Training Officer with the Airport Rescue Fire Fighting (ARFF) station at Tulsa International Airport will assist in the workshop. As many as one hundred airport personnel are expected to participate.

Hopefully in the near future, in cooperation with Fred Chambers, we can offer regional two-day ARFF training programs to airport personnel and municipal fire departments that serve airport communities. This training will provide Center for Law Enforcement Education and Training (CLEET) credits to the participants.

Aviation has a bright future in Oklahoma. In the next few years, Oklahoma's airports will see significant increases in traffic, particularly from turbojet/turboprop business aircraft. These increases will place additional demands on airport facilities and operations. Runways, taxiways, fueling facilities, terminal buildings, and the types/hours of available service will need to be improved. With the availability of AIR-21 and other state/federal funds, the Oklahoma Aeronautics Commission (OAC) is busy implementing plans to make the necessary upgrades.

We at the OAC enjoy promoting public/private cooperation that results in win-win benefits for aviation and for local communities. We extend our thanks to Phillips Petroleum for hosting this valuable workshop.

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# Calendar of Events

For a free listing of your event, email us at [ok\\_aviator@mindspring.com](mailto:ok_aviator@mindspring.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	Women in Aviation Chapter Meeting		Laura Bash- 918-836-6886 LBash@mail.spartan.edu	
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!
4th Thursday 7:30PM	Meeting- Vintage Airplane Association Chapter 10	South Regional Library, 71st & Memorial, Tulsa, OK	Charles Harris- 918-622-8400	
Jul 9-13	AeroSpace Summer Camp- Tulsa Air and Space Center (TASC)	7130 E. Apache, Tulsa, OK	918-834-9900	For Grades 3-5. \$198/student
Jul 16-20	AeroSpace Summer Camp- Tulsa Air and Space Center (TASC)	7130 E. Apache, Tulsa, OK	918-834-9900	For Grades 5-9. \$198/student.
Jul 17 9:30AM	OASC Regional Airport Planning Meeting	Southwest Technology Center, Altus, OK	Gary Gooch- 405-325-5652 gary@ou.edu	Altus Municipal, Hobart Municipal, Hollis Municipal, Mangum-Scott Field, and Olustee Municipal Airports
Jul 18 9:30AM	OASC Regional Airport Planning Meeting	Great Plains Technology Center, Frederick, OK	Gary Gooch- 405-325-5652 gary@ou.edu	Chattanooga Sky Harbor, Frederick Municipal, Grandfield Municipal, and Tipton Municipal airports
Jul 19 9:30AM	OASC Regional Airport Planning Meeting	Red River Technology Center, Duncan, OK	Gary Gooch- 405-325-5652 gary@ou.edu	Halliburton Field-Duncan and Walters Municipal airports
Jul 23-27	AeroSpace Summer Camp- Tulsa Air and Space Center (TASC)	7130 E. Apache, Tulsa, OK	918-834-9900	For Grades 1-3. \$198/student
Jul 24-30	EAA Airventure 2001	Wittman Field, Oshkosk, WI	www.airventure.org	
Jul 30- Aug 3	AeroSpace Summer Camp- Tulsa Air and Space Center (TASC)	7130 E. Apache, Tulsa, OK	918-834-9900	For Grades 3-5. \$198/student
Aug 10-11	Southwestern Bell Balloon Fest	Wiley Post Airport Oklahoma City	Dawn Burroughs- 405-948-4000 Frank Capps- 918-299-2979	See our website-- <a href="http://www.balloonfest.com">www.balloonfest.com</a>
Aug 11 8:00AM-11:00AM	Fly-In Breakfast	Davis Field (MKO) Muskogee, OK	Greg Swartz- 918-682-6002 Terry Randall- 918-682-4101	Discounted fuel will be available
Aug 17-18	23rd Annual Okie Derby Competition	Wiley Post Airport, Oklahoma City	Phyllis Miller- 1924 Red Prairie Dr., Edmond, OK 73003, 405-844-4107	Registration prior to August 12th is \$35. Aircraft impoundment & dinner Friday night, race Saturday. Course secret until Fri night.
Aug 17-19	8th Annual Illinois River Balloonfest	Tahlequah, OK	Frank Capps- 918-299-2979	
Aug 20 7:30PM	EAA Chapter 10 Watermelon Feed and Meeting	Gundy's Airport Owasso, OK	Bhrent Waddell- 918-371-5022 bwaddell@tulsa.oklahoma.net	
Aug 25	Zenith Aircraft Open Hangar Day	Mexico Airport Mexico, MO		
Aug 31-Sep 1	Grass Roots Fly-In- EAA Chapter 1046	Ponca City Regional Airport	Jim Eck- 580-765-0723, jimeck@poncacity.net Steve McGuire- 580-762-6986, mcguires@cableone.net	All aircraft welcome, especially experimentals, classics, vintage. Free dinner Fri nite to fly-ins. PCABC breakfast Sat. Free transportation to motels. Shower/bathrooms on field for campers.
Sep 3-9	National Stearman Fly-In	Galesburg, IL		
Sep 8	Airfest, Tulsa Air and Space Center (TASC)	Tulsa International Airport	918-834-9900	
Sep 8-9	Airshow Oklahoma	Davis Field, Muskogee, OK	Debbie Black-	UASF Thunderbirds perform on the 8th
Sep 15	Golf Tournament Pre-Party Tulsa Air and Space Center (TASC)S		918-834-9900	



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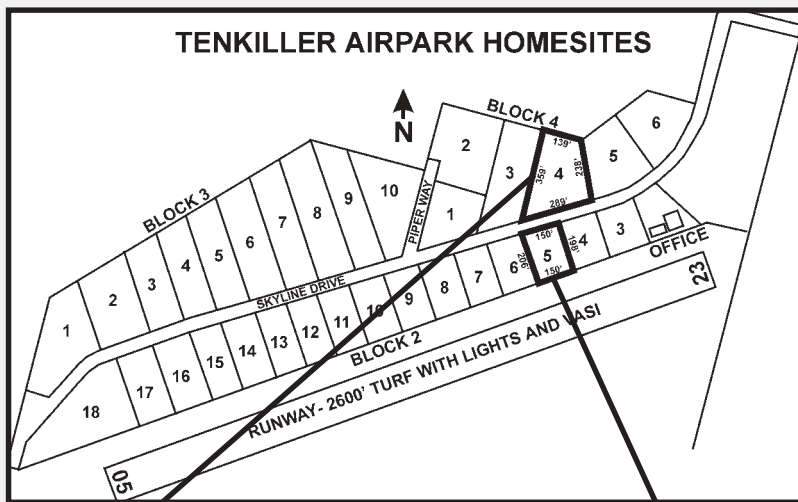
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