BICENTENNIAL AIR PAGEANT
1783-1983

FLIGHT 200

SEPT. 24-25, 1983

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WELCOME

The University of Illinois welcomes you to the 1983 Bicentennial Air Pageant. We hope that you will enjoy the show and become more familiar with Willard Airport and the facilities it provides for the community.

1983 marks the 200th anniversary of manned flight. The Air Pageant commemorates the first Montgolfier hot air balloon flight which occurred near Paris, France in November 1783. This extraordinary accomplishment served as a spark to the creative imagination of men and women around the world and has, in the brief span of 200 years, lifted man from earth to the sky and into space.

The University of Illinois' celebration is part of a national recognition of this bicentennial year. President Reagan, Honorary Chair of the United States Air and Space Bicentennial Committee, views the activities planned throughout the country as providing America with the opportunity to honor our nation's many contributions in the field of aviation as well as to reflect upon our national and international heritage in this domain.

The program outlined for the visitor to the Air Pageant takes as its theme the chronological development of flight and offers acts and displays that highlight the major stages of this development. Again, we welcome you to the Pageant and ask you to join us in this celebration of 200 years of manned flight.

Robert L. Ayers, Chair
Bicentennial Air
Pageant Committee

TABLE OF CONTENTS

Welcome ...................................................... 1
Map of Airport ........................................... 2
Schedule of Acts .......................................... 3
Civil Air Patrol Activities at Willard Airport ......... 4
History of the Institute of Aviation ..................... 5
Programs at the Institute of Aviation ................ 6
"Balloons" ................................................... 7
"Giders" .................................................... 9
"The Santos-Dumont Demoiselle" ...................... 11
"World War I Aviation" .................................. 12
"Barnstorming" ........................................... 14
"The Spirit of St. Louis" ................................ 15
"World War II Fighters" ............................... 16
"Piper Cub" ............................................... 19
"Parachutes" ............................................. 20
"McDonnell Douglas F-4 Phantom II" .................. 21
"Helicopters" ............................................. 23
Celebrate 200 Years of Manned Flight!

As FLIGHT 200 takes off today from Willard Airport, "THOSE MAGNIFICENT MEN" will roar and soar across the skies in their flying machines. "Those Magnificent Men" are none other than Giles Henderson, Earl Adkisson, and Wally Parks, the stars of Midwest Air Shows. Their flying machines include a replica of a 1908 French Demoiselle and a Clipped Wing Piper Cub. Henderson, a prize winning aerobatic and precision flyer, will perform over two dozen maneuvers in smoke in his Clipped Wing Club. Earl Adkisson will thrill each of you with a stunning two-foot handkerchief pick-up from his Demoiselle and a comedy routine reminiscent of the Keystone Cops, with fire trucks, police, flashing lights, and sirens. Stuntman Wally Parks, who opens the show with a stirring parachute jump (complete with U.S. Flag and national anthem), will later leave you breathless as he transfers from a speeding truck to a rope ladder dangling from the Clipped Wing Cub piloted by Giles Henderson, and later performs a high altitude skydive.

Among the other performing acts will be Charlie Wells and his "ballet in the sky," executed in his beautiful orange and white Pitts Special; Jim Leahey will pilot a 220 Stearman through a series of aerobatic maneuvers that brings his craft within 200 feet of the ground; Rudy Frasca demonstrates the aerobatic agility of his WWII aircraft; and "Whatcha" McCollum will demonstrate jet aircraft capabilities with a high performance take-off, climb, slow pass with gear and flaps extended, and a maximum cruise pass.

Be sure to visit the static displays on hand which are representative of aircraft that have had a significant impact on aviation such as the J-3 cub, PT-17 Stearman, the P-51 Mustang, the T-6 Texan and many others. Following its fly-by and landing, the flying replica of Charles Lindbergh's "Spirit of St. Louis" will also be displayed.

Prior to and following its fly-by, the 1931 Stinson Tri-Motor will be available for you to purchase a ride in. The Stinson Airliner was one of 52 built in the early 1930's by the Stinson Aircraft Corporation and had such luxury features as a privy with hot and cold running water and plush upholstered seats when it served Century Airlines, a forerunner to American Airlines. Only two such aircraft are left today, making it one of the most valuable privately-owned antique airplanes in existence.

Today, the aircraft is as stunning as it was a half century ago. It has a 60-foot wingspan, is 43 feet long, and its three 225 horsepower Lycoming engines carry it along at a cruising speed of 100 miles an hour. The Stinson has an all-metal structure with a fabric covering. In the 30's, it carried a pilot, ten passengers, mail, baggage and served South Bend, Detroit, Toledo, Cleveland, Chicago, Springfield, and St. Louis. A flight from Chicago to St. Louis took two hours and 40 minutes. Tickets are on sale for $18.00 for cabin seats (pilot's compartment $24) as the plane makes 15-minute tours over all of the air show site. Riders are encouraged to bring a camera, for all seats are window seats.

IN ORDER OF APPEARANCE

AMERICAN FLAG JUMP
GLIDER DEMONSTRATION
DEMOISELLE DEMONSTRATION
STEARMAN DEMONSTRATION
"SPIRIT OF ST. LOUIS" FLY-BY
CLIPPED WING CUB DEMONSTRATION
STINSON TRI-MOTOR FLY-BY
AIRPLANE/CAR TRANSFER
WW II AIRCRAFT
ARMY NATIONAL GUARD UH-1
HELICOPTER DEMONSTRATION
PITTS AEROBATIC DEMONSTRATION
AIR NATIONAL GUARD F4 FLY-BY
(Saturday Only)
COMMERCIAL JET DEMONSTRATION
HOT AIR BALLOONS
CIVIL AIR PATROL
ACTIVITIES AT
WILLARD AIRPORT

The University of Illinois Institute of Aviation is proud to sponsor the local squadron of the Civil Air Patrol (CAP). CAP is the civilian auxiliary of the United States Air Force. All members are volunteers with no military obligation and receive no pay. CAP was established in the Office of Civil Defense on December 1, 1941 to organize and direct the activities of volunteer airmen who made their time, airplanes, and equipment available for wartime tasks. CAP volunteers flew anti-submarine coastal patrol, target towing, search and rescue, cargo missions, and courier service and performed other national defense services during World War II. CAP was transferred to the War Department in 1941. On July 1, 1946 CAP was chartered by Congress as a benevolent, non-profit, private corporation by Public Law 476. In 1948, Congress made CAP a permanent civilian auxiliary of the United States Air Force under the provisions of Public Law 557.

CAP is organized nationally according to regions and by state ("Wings"). Each wing is made up of several "Groups," which are further organized, at the local level, into "Squadrons." The local squadron (Part of Group 9 of the Great Lakes Region), is commanded by Steve Lehockey and was constituted in December 1982. The squadron, which meets weekly at Willard Airport, currently has 14 members made up of "Seniors" (over 18 years of age) and "Cadets" (13-21). Membership in the Civil Air Patrol is open to both males and females.

An important goal of the Civil Air Patrol is to provide aviation and aerospace education to its members and to foster civil aviation in local communities. This goal is met through speakers at the weekly meetings and field trip activities. In addition, the local squadron regularly participates in practice search and rescue missions to prepare for assisting in actual emergencies.

For additional information on the Civil Air Patrol and how to become a member, contact Steve Lehockey at 333-3162.
History of the Institute of Aviation

- May 8, 1943. The 63rd General Assembly passed and Governor Green approved Senate Bills 41 and 42, which authorized the University of Illinois to purchase land and construct an airport.

- January 26, 1944. The University of Illinois Board of Trustees approved an agreement with the United States federal government relative to the operation and maintenance of the University of Illinois Airport.

- May 31, 1944. Airport construction began.

- October 26, 1945. Dedication of University of Illinois Airport.

- 1945-1946. Mr. Allen Bonnalle served as the first director (half time with the University and half time a Vice President of United Airlines).

- 1946. Staff Air Transportation in Service (SATS) was inaugurated to serve the University of Illinois with a Cessna 140 and an Ercoupe. Later, the Beechcraft Bonanza, the DC-3, and other aircraft were added.

- May 8, 1946. The Institute's first class of 25 students began pilot training in 10 Aerocrea Champion aircraft under chief flight instructor Joseph W. Stonecipher.

- 1946 to 1968. Dr. Leslie A. Bryan, Director of the Institute of Aviation, fleet expanded to 30 aircraft; 35 airport buildings were erected to house and support additional airport activities.

- 1948. The Aircraft Maintenance curriculum was approved; the first class of students graduated in 1950.

- 1948. University of Illinois Department of Psychology established an Aviation Psychology Laboratory at the airport with Dr. Alex Williams as the Head. The Lab achieved international recognition in the field of Human Factors research.

- 1954. Start of scheduled airline service by Parks Airline (later to become Ozark Airlines).

- 1960. The Airport Terminal Building and the FAA Control Tower were constructed.

- October 18, 1961. The University of Illinois Airport was renamed The University of Illinois-Willard Airport in honor of Arthur Cutts Willard, U of I president from 1934 to 1946.

- September 1968. Retirement of Dr. Bryan and succession as Director by Ralph E. Fixman, who had been the first full-time flight instructor for the Institute.

- 1968 to 1980. The Institute of Aviation, while continuing to expand its mission of education, research, and service within the University, becomes a major airport serving the community and the needs of public aviation.

- 1968. The Aviation Research Laboratory (ARL) was established as part of the Institute of Aviation with Dr. Stan Roscoe as Head. From 1968 until 1977, the activities of ARL centered on Human Factors research in cooperation with the Department of Psychology and the College of Engineering.


- 1976. Pilot Training acquired two Piper Arrow. Later, another Arrow and two Piper Lances were added. These complex single-engine aircraft support Pilot Training's commercial and instrument programs.

- 1978. The Terminal Building was expanded and renamed the Administration Building.


- 1980. Retirement of Professor Fixman and appointment of Dr. Henry L. Taylor as Director of the Institute of Aviation.

- 1981. Air Traffic Controllers Strike. Ozark terminated Chicago O'Hare and Washington, D.C. service and established St. Louis, Lambert Field as their major hub. Briti increased their flights to O'Hare.

- 1981. The ILLIMAC engineering prototype simulator was completed and its use as an instrument trainer and laboratory research tool was demonstrated.


- 1982. The FAA approved the Institute of Aviation's use of the PLATO computer system to administer Private Pilot exams.

- 1983. Piedmont Airlines initiated service to their Dayton hub.

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Programs Available at the University of Illinois Institute of Aviation

The Institute of Aviation's academic program consists of curricula in Pilot Training, Aircraft Systems Training, and Avionics. Applicants must meet general University of Illinois admission requirements in addition to specific requirements of the Institute of Aviation. Information pertaining to these requirements and the fees associated with the various offerings may be obtained from Professor Omer Benn, Head of Pilot Training (217-333-2127) and from Dr. David DePue, Head of the Aircraft Systems Department (217-333-3035).

Program Descriptions

**Professional Pilot.** This program directs the student through a series of courses designed to be compatible with baccalaureate degree programs of the University of Illinois. Upon successful completion of the first two years, the student should be able to transfer into another college of the University to complete the baccalaureate degree.

**Aircraft Systems.** This two to three-year curriculum covers the theory and operation of the entire aircraft as a system. Students qualify to test for the FAA airframe and powerplant mechanic certificate. Coordinated programs exist at the University of Illinois-Urbana-Champaign campus which permit a student to complete a baccalaureate degree.

**Combined Professional Pilot/Aircraft Systems.** This three-year program allows the student to combine flight courses with courses from the aircraft systems program, enhancing the overall aviation credentials of the curriculum's graduate. Most students continue at the University of Illinois for an additional two years to earn a baccalaureate degree.

**Avionics.** This one-year certificate program focuses on the theory and operation of aircraft communication and navigation equipment. Applicants must have first completed two semesters of selected electronics course work which is offered at most community colleges. An arrangement with Parkland Community College allows its transfer students to qualify for an Associate in Science degree.

**Flight Curriculum.** Students in most University of Illinois colleges can take flight courses as electives. A proper sequence of flight courses selected in this manner can also lead to employment in aviation.
Balloons

Two brothers, Jacques Etienne and Joseph Michel Montgolfier, are credited with making the first balloon to successfully carry a man. Their invention grew from initial observations that smoke rises and floats in the air. Legend has it that in 1783, Joseph Montgolfier was drying a taffeta shirt in front of a fire, holding it open so that the heat of the fire could fill it. When he let go of the shirt, it shot up to the ceiling! Thinking that it was the smoke from the fire that had caused the shirt to rise, Joseph and his brother then experimented with larger spheres of fabric and paper filled with smoke, but they soon learned that the lifting properties of smoke were due to the heated air.

In September of 1783, the Montgolfier brothers sent up the first balloon to carry living creatures, containing a duck, a rooster, and a sheep. Such experimentation was necessary to prove that the upper atmosphere could support life. The flight lasted eight minutes and the animals landed safely. On November 21, 1783 the first manned balloon flight took place. The balloon, built by the Montgolfiers, was named Le Reveillon and was launched from the Chateau de la Muette on the outskirts of Paris. Nearly a half-million spectators watched as J. Pilatre de Rozier and his friend Francois Laurent piloted the balloon and landed without difficulty ten kilometers away.

The official recognition of 1783 as the Bicentennial year for manned flight is based not only on the work of the Montgolfier brothers but also on the general flurry of activity that occurred that year. While the Montgolfier brothers were experimenting with hot-air balloons, another Frenchman, Jacques Charles, was testing hydrogen balloons.

Charles, a professor of physics, had discovered a way to sew animal skins together, seal them with shellac, and fill them with "flammable air" (hydrogen). Public reaction to early testing was not always encouraging to the inventor: when the first Charles gas balloon landed in a farmer's field, the local peasants thought that it was an alien creature and called in the parish priest who exorcised it before the villagers pitchforked it to death! Undaunted by such setbacks, Charles made the first manned flight in a hydrogen balloon on December 1, 1783. In less than two hours, the balloon was carried more than twenty-five miles across the Paris countryside.

How Does It Work?

A balloon is an airtight bag that rises in the air because it is filled with light gases. Early balloon bags were made of silk or cotton cloth sprayed with rubber to make the balloons airtight. There are several kinds of balloons. Some are used to carry weather-forecasting instruments, others carry passengers through the air, and some are used as observation balloons.

Three principal gases are used in balloons: They are hydrogen, helium, and coal gas. Hydrogen is the lightest of all gases and has the greatest lifting power of the three. The earliest balloons were filled only with heated air. Hot air rises because it is only about half as dense as cold air. The duration of the flights were short because the air in them soon cooled.

Controlling a balloon is possible by making it lighter so that it will rise, or heavier so it will descend. After a balloon is launched, it will rise until the air is nearly as thin and light as the gas in the balloon. It then can be made to go down by dropping sand or other ballast. The balloon can be made to go down by opening a valve on the top of the bag and releasing some of the gas. Just before landing, some ballast is thrown out so the balloon will not hit the ground too hard.
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GLIDERS

The glider on display is presented courtesy of the Illini Glider Club, sponsored by the University of Illinois Department of Aeronautical and Astronautical Engineering. For further information on gliders and on the club's activities, contact Professor Al Ormsbee at 333-2242.

A German, Otto Lilienthal, was the first man to successfully learn the art of flight from the birds and to make numerous successful glider flights. In 1891 he constructed his first successful glider using peeled willow rods covered with waxed fabric. It was shaped very much like a pair of large bird's wings, with a fixed tail section. During the next five years, he built many successful gliders, both monoplanes and biplanes (one and two pairs of wings). Lilienthal's greatest problem was that of control, as he did not have any moveable control surfaces on any part of the glider. All control was accomplished by simply shifting his weight fore and aft and/or side to side, just as some modern hang glider pilots do today.

Also during 1896 on the south shore of Lake Michigan, an American engineer named Octave Chanute established a glider "base." Chanute perfected the biplane design and added several moveable "planes" or control surfaces, but the basic control was still effected by the shifting of the pilot's weight from side to side. Chanute Air Force Base at Rantoul, Illinois is named in his honor.

The Wright brothers learned a great deal from the work of Lilienthal, Chanute, and others. By 1902 Orville and Wilbur Wright had attained considerable proficiency in gliding. The glider they used had a wingspan of 32 feet and a weight of 116 pounds, larger and heavier than any other glider ever successfully flown by anyone. The key to their success was the further development of moveable control surfaces, in particular their new invention, a wing warping device. This device for the first time allowed precise control of the banking (tipping) of the wings. This glider led directly to man's first successful powered flight in December of 1903.

Today, gliders and sailplanes (higher performance gliders) still play an important part in sport aviation. At the present time in the U.S., over 19,000 pilots are licensed to fly gliders, and 7,000 of them fly gliders exclusively. Learning to fly a glider is not particularly difficult, and many fledgling pilots use their glider training to step up to other types of aircraft. The Federal government will allow a boy or girl to solo a glider at age 14, while the minimum age to solo powered airplanes is 16. Currently, some high performance sailplanes can glide over 50 feet forward for each foot of altitude above the ground, and under proper conditions can remain aloft for many hours (and in some cases for even days at a time).

In the Midwest most gliders and sailplanes are launched by being towed behind a small airplane to whatever altitude the pilot desires. The glider pilot then releases the tow rope, and is on his (or her) own to seek the most favorable atmospheric conditions to prolong the flight. Hot weather and puffy cotton ball type (cumulus) clouds are preferred. In other parts of the country, gliders are sometimes launched by either towing them behind a vehicle or by using a winch and cable to pull the glider into the air. Neither of these methods can provide as much altitude as an airplane tow.

The glider has a noble place in aviation history. Many people do not realize that the world's most sophisticated airplane, the Space Shuttle, is simply a glider (albeit a very large, fast, expensive glider) for more than 99% of each flight. Just like Lilienthal, the Space Shuttle astronauts have only one chance to land the Shuttle once it reenters the earth's atmosphere. There is no engine on the Shuttle during approach and landing to allow the astronauts to go around and make another attempt. No matter how far we have come, all airplanes are only one small step removed from their roots as gliders.
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The Santos-Dumont "Demoiselle" (1909)

The "Demoiselle" (Dragonfly) was the world's first ultra-light airplane. Displayed here at the Bicentennial Air Pageant is a replica of the original which was constructed largely of bamboo. Powered by a 28 H.P. flat twin-cylinder Darracq engine, and with a wingspan of only 17 feet, it once held the world altitude record. It was appropriately nicknamed the "Infuriated Grasshopper."

The "Demoiselle" was designed and built by Alberto Santos-Dumont, one of the most famous European aircraft "constructor-pilots" of the era. A Brazilian, he was the son of a wealthy coffee grower. In 1891, at the age of eighteen, he moved to Paris, France to study the development of the automobile. Santos-Dumont took up ballooning in 1897 and went on to build airships and to win a prize of 125,000 francs in 1901 by flying his airship No. 6 from Saint Cloud around the Eiffel Tower and back again. His interest in airplane design soon culminated in his achievement of the first sustained flight of a manned, powered airplane in Europe (November 12, 1906), flying his "14-bis" canard-type biplane.

In 1907, Santos-Dumont built his 19th airplane design, a light monoplane which he modified in 1908 and developed into No. 20, his "Demoiselle" of 1909. The first flight of the "Demoiselle" was at Bagatelle, France on the edge of Paris.

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WORLD WAR I AVIATION

World War I was a catalyst that produced great strides in aviation. When war broke out in 1914, only eleven years had elapsed since the Wright brothers' first flight. In Europe, it was not until 1906 that flights of any sort were accomplished. It is said that the real birth of modern aviation was the world's first air show at Le Mans in France in 1908, when Wilbur Wright demonstrated his airplane.

Prior to World War I, the major developments in aviation took place on the European continent, especially in France and Germany. The British exhibited a somewhat repressive and suspicious attitude toward flying as illustrated by the British War Secretary's announcement in 1910 that "aeroplanes" would not be of any possible use for war purposes.

Motor racing on English roads was forbidden, in sharp contrast to France, Germany and Italy. Consequently, England lagged behind in the development of powerful engines. A.V. Roe and other English pioneer aviators had even been threatened with prosecution if they persisted in trying to fly. As a result, some Englishmen chose to go to France to learn and to experiment. Until the government-owned factory at Farnborough started to design and build airplanes, the few machines possessed by the Royal Flying Corps of England were French in origin. The Belgian Air Force also relied entirely on France. Russia, however, bought machines from France, Britain, Germany, Austria and the United States.

The attitude among Russian military personnel toward flying aircraft was not very broad-minded. The first person to "loop the loop" was a Russian named Nesterov. Unfortunately, his efforts in promoting aerobatics were punished with a court-martial for having endangered military property and Nesterov was confined to the barracks for 30 days. Except for a few individuals, military leaders did not regard the airplane as a tool of war. Cavalrymen thought that it would scare their horses; sol-
diers of the old school distrusted airmen on general principles; and infantrymen fired at everything that flew. Early military pilots were not regarded as "heroes," but were suspected of "dodging the column."

Early airplanes were light in weight due to the lack of powerful engines. The biplane construction provided the strength that was needed, considering the materials available at the time, but resulted in a lot of drag. In a way, however, this type of airplane had its advantages. Early pilots generally taught themselves how to fly and although accidents were frequent, they were not often fatal.

At the beginning of World War I, airplanes were used mainly for observing troop movements, spotting artillery, and for aerial photography. It was not long, however, until pilots started carrying small firearms and dropping grenades and pointed steel darts ("flechettes") from their planes.

Early aircraft such as the Farman pushers, the Otto biplane pusher, the Bleriot monoplanes and the Bristol Scouts, being light in weight, were well suited for observation. The French Farman was probably the first aircraft to have a machine gun mounted as armament. Roland Garras, a French pilot, mounted an automatic rifle which fired through the tractor propeller of his Morane monoplane. Although the triangular metal plate protected the propeller to some extent, there was still danger from ricocheting bullets. A Dutchman, Anthony Fokker, developed an interrupter gear which was better, for it mechanically synchronized the gun with the propeller. Now the entire airplane could be aimed for accuracy. Oswald Boelche, a German, was the first to use this new invention on his Fokker. The second to use it was Max Immelmann, another famous German ace. With the English invention of a hydraulically operated synchronizer, the airplane became a formidable weapon.

Better airplanes were developed rapidly: the Vickers FB 5 was the first ad hoc fighter; the British SE 5A (200 H.P. engine, ceiling 20,000 feet, speed of 120 mph) was built at the Royal Aircraft Factory at Farnborough, where Samuel Cody had made the first sustained flight in Britain just eight years earlier. The Sopwith F 1 "Cameo" (named for the humps in the cowling made by the two machine guns) evolved from the Sopwith line, and was considered the war's most successful fighter. Germany's best was the Fokker DV II, and the French Spad XIII evolved from the Spad XII, used by the Americans in the famed Lafayette Escadrille.

The Curtiss "Jenny," the most famous American World War I airplane, was a training plane, with more than 6,000 being built before the war ended, most of them the JN4-D model.

LEARN TO FLY
AT THE U. of I. !!!
BARNSTORMING

Aviation historian Martin Caidin has described barnstorming as flying the way that God intended man to fly, with simple rules that were loosely applied and even more liberally interpreted.

The story of barnstorming in America is essentially that of the flying circus. Like circus performers, barnstormers sought to please, to entertain, to thrill and to excite their audiences, made up of men, women and children of all ages. Skill was not nearly so important as the manner in which the performers demonstrated risks and thrills with their aircraft. The drunk act that appeared dangerous, but was not, was preferred to the perfectly executed demonstration of aerobatics which might quickly bore the unsophisticated spectators.

The great majority of barnstormer pilots and mechanics had received their training from the military during World War I. Having lived in combat conditions for several years, these pilots were not intimidated by the hazards of barnstorming. Many were also simply attempting to earn a living in the trade they knew best — flying. They flew mostly Curtiss "Jenny" biplanes left over from the scrapheap of 1918 and thrilled millions of people at large fields and isolated pastures with such acts as wing-walking without parachutes, snatching handkerchiefs from the tops of waving weeds, low level aerobatics that included deliberately scraping wingtips in the dust or "slapping" the ground in wing-tip-to-wing-tip maneuvers, smoke writing, and spectacular parachute jumps. They usually wore World War I flight suits and produced additional thrills by engaging in mock dog fights and jumping from one plane to another.

In the mid-1920's, flying schools began to spring up where one could learn to do these tricks. One of these schools was Curtiss Field on Long Island, New York. For $300, the would-be pilot could learn to assemble and fly planes. At any given time, there were probably 25 men learning to build planes. There would be wings in one building, tails in another, engines in a third. Many were killed during the learning process and for those who learned to fly properly, there were not many steady jobs. Barnstorming offered them the employment and adventure they were seeking.

American aviation history abounds with the names of famous barnstormers, including Harold Tibbets who would hang by his knees from a rope and ladder and scoop a hat from the ground when the pilot executed a low pass; Lincoln Beachey who flew under Niagara Falls, skimming the churning water by less than 20 feet in order to clear the great Niagara bridge; Mabel Cody who would balance herself on the deck of a speeding motorboat and scramble up a rope ladder into an airplane; and Bonnie Rowe, who had begun his career as a smoke-stack painter, then as an observer in a hydrogen-filled balloon during World War I. Rowe was one of the first men ever to leap from one plane to another in flight — but he did it with one hand tied behind his back! He would also hang from his toes from a trapeze swinging 1500 feet beneath an airplane.

It was not unusual for pilots to greatly overload their planes when giving rides. What would today's Federal Aviation Administration say to a man who once squeezed three eager passengers into the single seat cockpit of his Curtiss Jenny?

In the late 1920's and early 1930's, many pilots left barnstorming for airmail flying. One such pilot was Charles Lindbergh, later to become the first person to solo the Atlantic. American aviation interest then shifted dramatically toward promoting passenger travel and building the airline industry. Barnstorming had ended.

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THE SPIRIT OF ST. LOUIS

The "Spirit of St. Louis" was both an airplane and a public phenomenon. The Spirit was a silver, high-winged, single-engine airplane piloted by Charles A. Lindbergh. The phenomenon was the spirit of man against time, distance, and nature that climaxied in the first trans-Atlantic solo flight.

Airplanes and the art of flying were invented, tried, and proven all within a twenty-year period. Design improvements were implemented at a dizzying rate while time and distance records were set and broken literally overnight. Many prizes and contests were offered as incentives to pilots everywhere to further the industry. Some were won, many were not.

The biggest incentive to boost commercial aviation came from a New York hotel owner, Raymond Orteig. On May 22, 1919, less than 16 years after man's first flight, Mr. Orteig offered a cash prize of $25,000 to the first person to cross the Atlantic in either direction between New York and Paris. The challenge was met by a 24-year-old pilot who flew the mail between Chicago and St. Louis. His name was Charles A. Lindbergh.

The first thing that Lindbergh needed to do was get an airplane. And the first step in getting an airplane was to get money. About $15,000 was needed for this venture, and he contributed $2000 out of his own pocket. The balance came from a group of St. Louis businessmen who had faith in the industry, a strong spirit of adventure, and trust in a man about the same age as manned flight.

With the needed capital in hand, Lindbergh approached several aircraft manufacturers, all of whom turned down the offer to build the airplane. So Lindbergh made an offer to a small, lesser-known company called Ryan Airlines, Inc. of San Diego, California. Ryan accepted his offer and designed and built the Spirit of St. Louis according to Lindberg's specifications.

Aircraft Specifications
Spirit of St. Louis

Model: Ryan NYP
Manufacturer: Ryan Airlines, San Diego, CA
Cost: $10,580
Wing Span: 14.02 M (46')
Length: 8.41 M (27' 7'')
Height: 2.99 M (9' 10'')
Weight:
Gross 2329 kg. (5153 lbs.)
Empty 975 kg. (2150 lbs.)
Engine:
Wright Whirlwind J-5-C, 223 H.P.

The quest for the Orteig Prize lasted eight years and brought tragic failures. Four people had died along the New York to Paris route; two coming from Paris to New York were reported missing; and three more were injured on take-off. But people kept trying. The public became aware of the stiff competition between plane manufacturers and pilots and the Orteig Prize became a coveted award.

Aviators from around the world scrambled to be the first off the ground. Because of an eligibility clause in the prize contract, Lindbergh was one of the last pilots given authorization to enter the contest. His take-off date was set at almost one month later than another strong contender. But weather delays forced all pilots to remain on the ground for the month Lindbergh needed to meet the eligibility requirements. The weather finally cleared, and Lindbergh left New York for Paris on May 20, 1927. He arrived in Paris on May 21, 1927: 3610 miles from home, 33 hours 30 minutes and 29.8 seconds later.

For his efforts, Charles A. Lindbergh was awarded the Congressional Medal of Honor, the Distinguished Flying Cross, several more awards from different countries, cash prizes, endorsement contracts, an honored position in Aviation history, and the respect of people all over the world for his skill and bravery.

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WORLD WAR II FIGHTERS

World War II fighter aircraft have achieved a glamour that seems to appeal almost universally to current pilots. Rudy Frasca’s Curtiss P-40E “Kitty Hawk” and his General Motors FM-2 “Wildcat” participating in today’s show are excellent examples of this class of aircraft. (And don’t miss the P-51 on display courtesy of Mr. and Mrs. Mark Foutch.)

In the mid-to-late 1930’s, fighter aviation was unimpressive. In the United States, some general aviation aircraft, notably the Beechcraft F-17 Staggerwing biplane and the Howard DGA, could outrun U.S. Army fighters. Our best were the Grumman F-35 (which led to the development of the P-47) and the Curtiss P-36 (which, with a V-12 inline, liquid-cooled Allison engine installed, became the P-40).

Foreign fighter aviation, with the exception of Germany’s equipment, was not impressive either. The Japanese had developed one of the world’s great fighters in the “ZERO” (Mitsubishi A6M2 ZEKE-SEN), but they kept it hidden away from public view until it gave us some awkward surprises operating against U.S. Navy F4-F’s. The Russians were operating low performance biplane fighters in Spain in the mid-1930’s and entered World War II with little fighter strength. The Germans had completed development of the ME 109 (Messebach BF 109) and the twin engine ME 110 by 1939, opening the war in Poland with those fighters.

England was fortunate in that the Supermarine/Rolls Royce group of aircraft builders had created a racing machine called the Supermarine S.6B. This was a high performance, twin float, racing seaplane powered by a V-12 Rolls Royce engine of 1030 horsepower. This inline, liquid-cooled powerplant was carefully streamlined into a slender low drag fuselage. The aircraft won international speed records in 1929 and 1931, exceeding 400 mph in level flight. This basic airplane with its beautiful, elliptical wings eventually, and fortunately, became the Spitfire of 1940.

The British were also involved with the North American Aircraft Company in the development of the P-47 and placed an order for this aircraft when the U.S. Army failed to buy it. This was another fortunate circumstance.

Although German fighter pilots had been active in Poland, the big opening event for World War II fighter aviation was the Battle of Britain in the Summer of 1940. The Germans were attempting to area-bomb British targets which were defended by the British Spitfires and Hurricanes. The best German fighter was the ME 109 (with the twin-engined ME 110 a poor second). The FW-190 was not yet operational.

The Hurricane was a fine fighter with good range, but was slower than the Spitfire. It had a fabric-covered rear fuselage and some early models had wooden propellers. Its role in the Battle of Britain was to go after the slower Heinkel 111 bombers while the high performance Spitfires concentrated on the Messerschmitts. The principal weakness of the EM 109 was its very limited range (approximately 15 minutes flying time). Many were lost due to fuel exhaustion attempting to return to French bases. This weakness in the EM 109 left the ME 11’s as easy victims of the Spitfires.
In the Pacific, the Japanese ZERO proved to be a real handful, but our forces capitalized on the AVG experience and used tactics which proved successful. The principal fighters in this theater of operations were the P-38, P-40, and the U.S. Navy's Grumman F4-F "Wildcat" and later the F6-F. The P-38 "Lightning" was outstanding, as was the F6-F.

The P-38 also served well in the war in Europe. It disturbed the Germans, especially at high altitudes, to such an extent that they called it the "two-tailed devil."

The P-40 did well in North Africa, mostly in ground support roles, and P-51's were also prominent in that area.

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Wally Park's use of a Clipped Wing Piper Cub in his car to plane transfer act may not be typical of the role the Piper Cub has played over the years, but it certainly demonstrates the reputation for reliability the aircraft has earned.

Mention aviation and sooner or later nearly everyone things "Piper Cub." When William T. Piper produced his first cubs in the mid-1930's, he probably had no idea that his machine would become a household word. So common and impressive were these little aircraft that "Piper Cub" became synonymous with any small tailwheel airplane, even those not produced by Piper.

Through the years, several models of the cub were manufactured, all similar in most respects. Cubs were generally wooden and metal framed, fabric-covered tailwheel airplanes, each powered by a single small internal combustion engine. Seating was normally a tandem arrangement with a maximum seating capacity of two. Flight control was primarily by means of a stick, unlike the yoke or control wheel common in most modern aircraft.

The first cub was actually produced as a joint effort between W.T. Piper and C.G. Taylor in the early 1930's. The aircraft was initially powered by the Brownbach "Kitten" and even though the engine was not a success, it was the inspiration behind naming the aircraft "cub." This first cub, called the Taylor E-2 Cub, with 37 horsepower, was initially open cockpit until 1935 when the cockpit was enclosed and the basic cub design was born. During that same year, W.T. Piper purchased C.G. Taylor's share of the aircraft company and launched out on his own.

Piper's first independent design was the J-2 Cub, first produced in 1936. But the most famous and successful cub, the J-3 Cub, was marketed in 1938 at a selling price of $1300. Similar in design to the earlier models, with improvements, the J-3 Cub was powered by any of a number of engines ranging from 40 to 65 horsepower. By 1941, the 65-horsepower engine was the standard powerplant on a much refined aircraft.

The typical J-3 weighed less than 700 pounds, had a wingspan of 35 feet, carried 12 gallons of fuel, cruised at 75 mph and could climb to over 11,000 feet. Its docile handling qualities and forgiving nature would win it a well-deserved reputation as an excellent pilot training aircraft.

The arrival of the J-3 was well timed. In the late 1930's, the government initiated the Civilian Pilot Training Program and, largely as a result, Piper sold more than 8,000 cubs between 1939 and 1941. Surprisingly, the passive little J-3 saw extensive action in many World War II combat zones as a reconnaissance aircraft, air ambulance, and air transport. In fact, during the war, the government purchased 6,000 aircraft from Piper. Also, during the war and shortly thereafter, Piper produced thousands of cubs for civilian sales anticipating a post-war private aviation boom.

The boom, however, did not materialize and production of the J-3 ceased. In 1947 Piper closed its doors. When they reopened in 1948, the J-3 was no longer manufactured. Instead, a similar design, the 90-horsepowered PA-11 or "Cub Special" rolled from the line with a $2595 price tag. In 1949 an even higher performance model, the PA-18 "Super Cub" was first produced. Production of the Super Cub continued into the 1980's, with some models sporting as much as 150 horsepower engines. While these were fine aircraft, neither the PA-11 nor the Super Cub met with the same success as the J-3. With large numbers of J-3's available following the war, it easily became a mainstay of civilian pilot training fleets well into the 1960's.

Although no cubs are manufactured today except by special order, the era of the cub is not quite over. Many cubs still fly and it is difficult to encounter a group of any but the newest generation of pilots and not find at least one among them who learned to fly in that challenging but forgiving machine. The admirable Piper Cub still lives and has etched itself forever into aviation history.
PARACHUTES

The first recorded human parachute descent was made by French balloonist Andre Garnerin in 1797. For obvious reasons, there was little opportunity to use a parachute until the balloon was available. Ironically, the parachute was used almost exclusively for exhibitions. Although the early balloons were made of treated paper and lifted by the heat of burning straw, the idea of using a parachute for emergencies was never considered.

The advent of powered flight in 1903 gave new life to the parachute as a viable aviation safety device. But it would be many years before the parachute would shed its "stuntman" image. Even at the time of the First World War, it was believed that a free fall from an airplane towards the earth would surely result in death to anyone daring enough to attempt such a feat. It was thought that the air would be sucked from the jumper's body as he fell and that he would be unconscious or dead within seconds.

This belief was disproved, however, by Leslie Irvin who, on April 28, 1919 jumped out of a de Havilland DH-9 biplane near Dayton, Ohio and free fell for a few seconds before deploying his parachute. The parachute has never been the same since.

The barnstorming era of the 1920's saw the parachute's rapid improvement as the performance of aircraft continuously increased. Skydiving antics became a standard part of every barnstorming act.

The Second World War provided the setting in which the parachute was extensively used by the military forces in deploying troops by air to strategic locations. At this time, the classic "static-line" parachute was the standard fare: the chute is pulled from the container on the jumper's back by a rope attached to the aircraft. In addition to this use, it has been claimed that more than 100,000 lives were saved during the war thanks to the use of parachutes.

Since World War II, parachute technology has increased tremendously, and with it, so has the sport of parachuting by the general public. Today, parachuting is enjoyed by thousands of enthusiasts the world over.

The modern parachute is packed in a container not much larger than a backpack, and is designed to allow the jumper to accurately control his or her rate of descent and point of touchdown. All parachute "rigs" have both a main and a reserve chute, providing the jumper with a "back-up" chute in case the main chute should malfunction.
The Air National Guard fly-by of the McDonnell Douglas F-4 Phantom II is representative of a major military combat aircraft used by the U.S. Navy, Air Force, and Marines during the Vietnam Conflict. The experimental prototype first flew in St. Louis on May 27, 1958 and the first F-4A’s were undergoing carrier trials by February 1960. By 1961, the aircraft were being utilized by U.S. Navy and Marine squadrons.

Several early F-4A and F-4B Phantoms broke every distance and altitude record open to them. Notable among these were the “absolute speed at low level” record of 903 mph, which still stood in 1978, the world’s highest “absolute speed” record of 1,606 mph, and every “time-to-height” record up to the previous “absolute altitude” record.

The first major production version of the Phantom was the F-4B. In 1961, the outstanding all-round performance of the Phantom, which in nearly every respect exceeded the capability of specialist attack or interception aircraft of the U.S. Air Force, led to the adoption of the F-4C for the Air Force Tactical Air Command. Then followed the completely redesigned RF-4C reconnaissance aircraft, with no armament, but with extremely effective camera, radar and high frequency communications systems. The F-4D was designed for the U.S. Air Force as an all-weather attack aircraft.

A second-generation U.S. Navy fighter, the F-4J, introduced many modifications to the aircraft. In June 1967, production began on the U.S. Air Force F-4E, with J79-17 engines capable of 17,900 lbs. of thrust, solid-state radar, Martin-Baker ejector seats, and an M61 gun fitted under the nose with a 640-round ammunition drum located immediately ahead of the cockpit.

Many subvariants of the Phantom have been bought by foreign customers, notably the RF-4E and F-4F for the Luftwaffe and the F-4EJ and RF-4EJ for Japan. Most of the latter have been assembled by Mitsubishi in partnership with other Japanese companies.

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HELI OPTERS

On display for the University of Illinois Bicentennial Air Pageant is a Bell UH-1 "Huey" Helicopter, currently in use by the U.S. Army and its Reserve and National Guard units as a utility helicopter, and for troop carrier, resupply and medical evacuation. The Bell Helicopter is powered by a single turbine engine and is a favorite among military and commercial users.

The "Huey" is a far cry from the "helical screw" envisioned by Leonardo da Vinci in 1500 or from the toy launched in 1784 by two Frenchmen and which became the first heavier-than-air vehicle to fly.

The helicopter's need for greater engine power than fixed wing aircraft has slowed its development and increased its cost. As a result, the military remained the key sponsors of helicopter development through the 1950's.

The primary users of helicopters are the various branches of the U.S. military. The Army has developed heavy lift helicopters for transporting men, cargo, artillery and large motorized vehicles. The latest utility helicopter is the Sikorsky UH-60A Black Hawk. The Air Force relies on helicopters for air rescue operations in support of their fighter units and to support strategic missile sites as well as the tactical air control system. The Navy and the Marines employ helicopters in troop transport and rescue and antisubmarine warfare.

In addition to its support functions, the helicopter is gaining importance as an attack vehicle. The Bell "Huey Cobra" was designed as a delivery vehicle for attack against enemy forces and tanks and continues to be improved. The Army's advanced attack helicopter, the Hughes' AH-64A Apache, represents the latest technology in combat attack helicopters. The Apache performs sideward and rearward flight at 45 knots, 1,000-fpm vertical climbs, and zero-G push-overs into near-vertical pitch-down descents. An infrared suppressor reduces detection for the engines and the Apache is 50% quieter than the Bell AH-1S Cobra.

The introduction of small turbine engines, allowing greater power in a lighter, more compact propulsion unit, provided the needed breakthrough for commercial helicopter operations. Such operations were expanded when helicopter airlines such as New York Airways, Los Angeles Airways and Chicago Helicopter Airways were formed to connect outlying areas to major airports.

Other commercial uses of helicopters include offshore oil rig support, lumber operations, photography, law enforcement, fire fighting, pipeline/poweline patrol, disaster relief, and agricultural operations. The Hiller UH-12D, also on display, is one of the two used by the University of Illinois for helicopter pilot training and research projects. The University of Illinois has established a helicopter Orientation Course under the Extension Program to introduce helicopter operations to prospective users.
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Midstate Aviation Center welcomes all the spectators and participants in this year’s Bicentennial Air Pageant Flight 2001!