

The **Indiana**

A Magazine Exploring Indiana History

Historian



Aviation in Indiana

Focus

Cover illustration: View of Lafayette, Indiana on August 16, 1859 with the balloon *Jupiter* of Professor John Wise preparing for a flight to New York that would be the first delivery of U.S. Post Office mail by air. An accident delayed the flight until August 17. Wise only reached Crawfordsville, Indiana, but it was the first official airmail (see p. 4). Photograph provided by Indiana Division, Indiana State Library.

Indiana's aviation history includes many firsts—some are provided throughout this issue. Hoosiers have been part of many other significant events and activities.

This issue provides an introduction to the rich aviation history that exists in communities throughout the state. "You be the historian," at the bottom of this page, suggests some ways that students—and other readers—can explore and document their local aviation history.

On page 3, two maps provide a 1944 snapshot-view of the effect of aviation in Indiana. The maps are part of a report that resulted in the creation of the Aeronautics Commission of Indiana in 1945.

On page 4, a three-part approach is begun in presenting aspects of Indiana's story. At the bottom of the page is a national/international timeline to provide context for the Indiana story; it continues through page 14. U.S. entries are in blue in order to distinguish the national story more easily. On pages 4-8, an Indiana timeline is printed above the national/international timeline. It highlights some of Indiana's aviation history. It provides page references to related

articles in this issue. At the top of these pages, several topics have been covered in more depth.

On pages 9-14, six Indiana historical markers relating to aviation history have been highlighted. The Indiana Historical Bureau administers the historical marker program. Six communities have commemorated and celebrated their local history with these markers. Readers are encouraged to inquire about the program. A complete list of markers is available on the Historical Bureau Web site (www.statelib.lib.in.us/www/ihb/ihb.html).

On page 15, "Selected Resources" is provided. Readers should note additional sources with individual articles throughout the issue. Readers are also encouraged to explore the Internet. Several Web sites are cited in this issue. Web sites were also located that expand on topics covered—or not able to be covered—in this issue.

The back cover illustration of Hoosier astronaut David Wolf seems to be an appropriate close to this issue, which starts with the first airmail in 1859. Aviation in Indiana will continue to make history far into the future.

The Indiana Historian
June 1998
ISSN 1071-3301
Order Number 7044

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The Indiana Historian provides resources and models for the study of local history to encourage Indiana's citizens of all ages to become engaged with the history of their communities and the state of Indiana.

The Indiana Historian (formerly *The Indiana Junior Historian*) is issued quarterly from September through June.

It is a membership benefit of the Indiana Junior Historical Society. One complimentary subscription is provided to Indiana libraries, school media centers, and cultural and historical organizations.

Annual subscriptions are available for \$5.00 plus tax. Back issues are available at individual and bulk pricing.

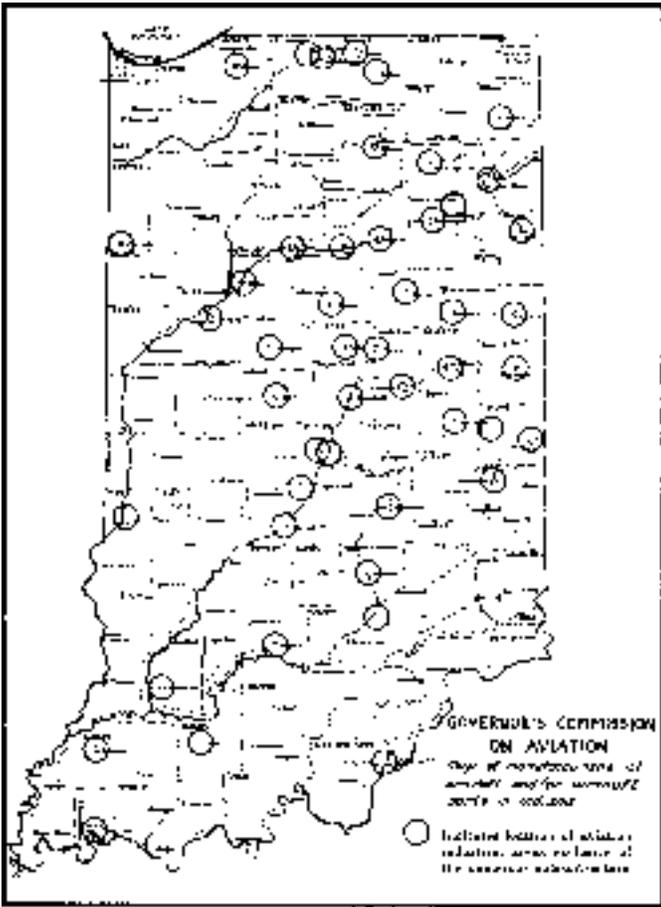
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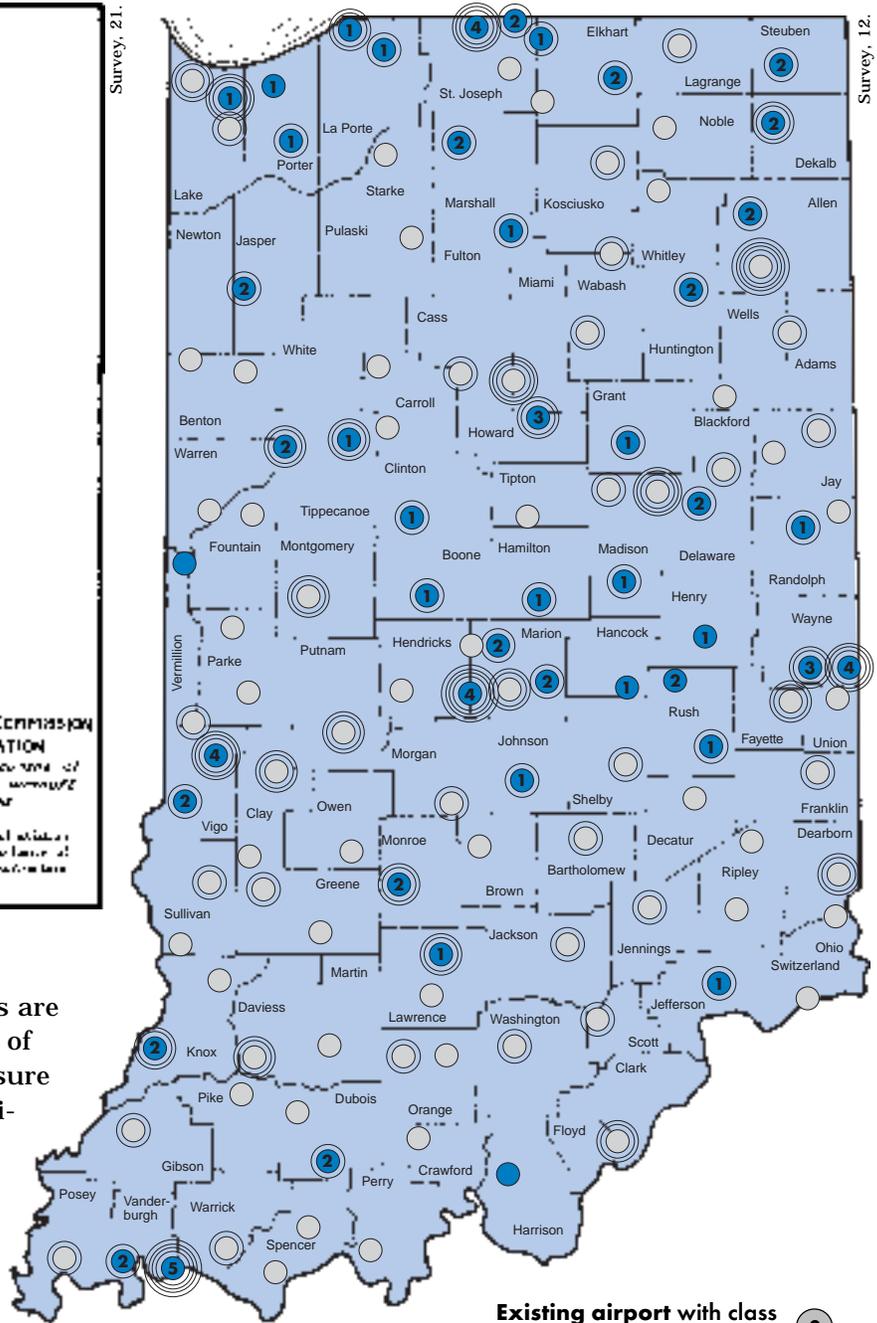
You be the historian

- Investigate which airport(s) and aviation industry(ies) have been important in your community or area. Gather available resources for preservation.
- Produce materials to make others aware of the history that you have researched: for example, articles for local publications, exhibits for local institutions, or videos or oral tapes for local media.
- Begin an oral history project to collect information from individuals involved in past and present aviation activities—pilots, engineers, mechanics, executives, etc. Include the experiences of people who flew as passengers in the early years of commercial service; explore similarities with and differences from present-day flight on airlines.
- Work with your public library—or other repository—to preserve and make available to others the resources that have resulted from your investigations.
- Select a significant site or event in your local aviation history and apply to obtain an Indiana historical marker to celebrate your local history.

Indiana aviation 1944



Survey, 21.



The report from which these two maps are taken examines the large economic impact of aviation and recommends legislation to assure its future success. The map above left indicates fifty points at which approximately 175 plants and industries are manufacturing aircraft and aircraft parts with a dollar value of approximately \$2,373,000,000 (p. 20).

The map on the right was prepared by the Indiana Economic Council to show the effect of the national plan released by the Civil Aeronautics Administration on November 28, 1944 (pp. 9-10). "Airports [in 1944] are classed from one to five, according to size of runways and other features. No. 1 is the smallest and No. 5 is the largest and best equipped" (p. 9).

Source: Survey, *Findings and Recommendations with respect to Indiana's Aviation Problems* (Indianapolis: Governor's Commission on Aviation, 1944).

- Existing airport with class size indicated in circle.** (1)
- Existing airports to be expanded: present class size indicated in circle, proposed class size indicated by number of circles.** (2)
- Proposed new airports: proposed class indicated by number of circles.** (3)

PROGRAMME
GRAND

BALLOON
ASCENSION
Trans-Continental
VOYAGE
PROFESSOR WISE
From LAFAYETTE
ON TUESDAY, AUG. 16TH.
At 12 M.
AIR-SHIP!
"JUPITER!"
For INFLATION!
At 12 P. M.
At 3 P. M.
At 3:

The first airmail

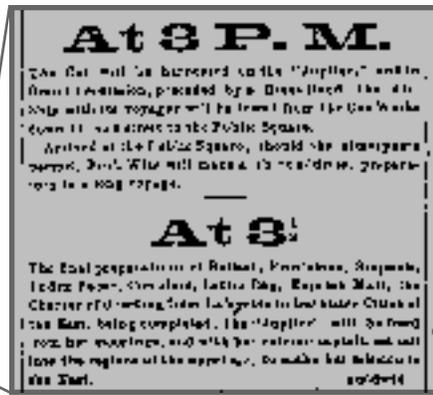
John Wise, a nineteenth-century professional balloonist from Lancaster, Pennsylvania, knew upper air currents in the Midwest blew from west to east. He believed that he could carry light mail and passengers in a balloon from the Midwest to the east coast.

The citizens of Lafayette, Indiana invited Wise to prove his theory. On August 16, 1859, thousands of people gathered to watch. The program for the day (at left) indicates the preparations and the showmanship.

An accident delayed the trip until August 17. Finally, Wise ascended with official U.S. Post Office mail—123 letters and 23 pamphlets. Wise's destination was New York City. He descended in Crawfordsville, Indiana.

The U.S. Post Office issued a commemorative stamp on the centennial of the trip, August 17, 1959.

Sources: Lafayette *Journal and Courier*, August 15, 1959; Richard B. Wetherill, "The First Official Air Mail," *Indiana Magazine of History*, 35:4 (December 1939), 390-99.



At 3 P. M.
The Balloon will be hoisted on the "Jupiter," and in about 10 minutes, preceded by a Blessing, the ascent will be commenced. The ascent will be terminated on the Public Square.
Arrived at the Public Square, aboard the airship named, "Jupiter," will be found the following persons, and with their respective appointments in a few moments.
—
At 3:
The final preparations of Balloon, Kites, Steam, and other apparatus, latter day, Royal Mail, the Charter of the flying ship, and the other articles of the ship, being completed, the "Jupiter" will be hoisted on the Public Square, and with the necessary apparatus will leave the region of the ascent, to make his flight to the East.



Testing Octave Chanute's biplane glider in Indiana's dunes in 1896.



National Air and Space Museum.

Gliders in the dunes

Octave Chanute was born in France in 1832. His family moved to America when he was seven. He was one of America's foremost civil engineers when he retired in 1889 and made Chicago his home. Chanute became interested in flight and researched and published an important book *Progress in Flying Machines* (1894).

Convinced that he could build a more stable, safer glider, Chanute and several other enthusiasts went to Miller Beach, in what is now the northeastern part of Gary, Indiana. There, in June 1896, they conducted test flights using several types of gliders.

On August 20, the group went to Dune Park, several miles east of Miller Beach, and tested three new gliders. The resulting Chanute biplane glider was the model for the Wright brothers' successful designs for their machines.

A bronze plaque placed in 1936 remains in Marquette Park, Gary to commemorate Chanute's aviation accomplishments.

Sources: Powell A. Moore, "Octave Chanute's Experiments with Gliders in the Indiana Dunes, 1896," *Indiana Magazine of History*, 54:1 (December 1958), 381-90. See also David Lester, "Bird Men of the Dunes," *Outdoor Indiana*, 48:8 (October 1983), 4-6; Web site (http://www.crown.net/~sspicer/chanute/chan_ind.html) containing many documents and images relating to Chanute.

Program from newspaper with end pulled out and enlarged. Lafayette *Daily Journal*, August 15, 1859.

Indiana aviation timeline

NOTE: Unless otherwise indicated the source of the following information is *A Salute to Indiana's Aviation History* compiled by the Aeronautics Commission of Indiana, circa 1956. References to (see p. . . .) are to this *TH* issue.

- 1859** Professor John Wise completes first airmail delivery via balloon from Lafayette, Indiana (see pp. 1, 2, 4).
- 1867** Wilbur Wright is born in a farm home near Millville, Indiana on April 16 (see p. 9).

- 1894** Lawrence D. Bell, founder of Bell Helicopter Corporation, is born in Mentone, Indiana (see p. 13).
- 1896** Octave Chanute—"The Father of Aviation"—conducts glider experiments over Indiana's sand dunes (see p. 4).
- 1910** World's first public airplane flight by a woman; Blanche Stuart Scott appears as a wing walker in Fort Wayne, Indiana.
- 1910** First licensed aviation meet in the U.S. at Indianapolis Motor Speedway (see p. 5).
- 1912** Pioneering air mail "hops" begin in Connersville,

- Rushville, Evansville, and Rockport, Indiana.
- 1918** U.S. air mail service begins between Washington, D.C. and New York City. Hoosier Bob Shank is one of the first pilots on this route.
- 1920** Aerodynamics is an option for seniors in mechanical engineering at Purdue University, West Lafayette, Indiana (Knoll, 345) (see pp. 6-7).
- 1921** Indiana's 113th observation squadron is organized, first National Guard air unit of any state.
- 1927** Bob Shank and Harold Brooks open the first private airstrip in Marion County, the Hoosier Airport

1232 Chinese use kites to send messages during war (Hellemans and Bunch, 81).	1480 Italian Leonardo da Vinci describes a workable parachute (Hellemans and Bunch, 97).	1492 Leonardo da Vinci draws his conception of a flying machine (Hellemans and Bunch, 99).	1500 Leonardo da Vinci designs the first helicopter, but it is never built (Hellemans and Bunch, 101).	1783 Frenchman L. S. Lenormand, influenced by accounts from China, is the first Westerner to use a parachute (Hellemans and Bunch, 233).	1783 August 27 In France, physicist Jacques Alexandre Charles builds the first hydrogen balloon (Hellemans and Bunch, 233).	1783 Frenchmen Jean Francois Pilâtre de Rozier and Francois Laurent are the first humans to fly using a hot-air balloon. They are airborne for 25 minutes (Hellemans and Bunch, 233).	1784 Vincent Lunardi is the first Englishman to ascend in a hydrogen balloon (Hellemans and Bunch, 235).	1793 First successful parachute jump is made from a hot-air balloon by Frenchman Jean-Pierre Blanchard (Hellemans and Bunch, 243).
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Aviation at Indianapolis Motor Speedway

Carl Fisher, who built the Indianapolis Motor Speedway, was a balloon enthusiast. In June 1909, Fisher hosted, at the Motor Speedway, the first national balloon race sponsored by the Aero Club of America.

As the photograph above shows, nine balloons were in the race. Fisher's balloon was the *Indiana*. He and his partner were aloft forty-nine and a half hours and landed in Tennessee. The balloon *New York* won the race.

A year later, the Motor Speedway was the site of the first licensed aviation meet in the U.S., June 13-18, 1910. The big news was the presence of Orville and Wilbur Wright and their team of six planes and expert pilots. Orville Wright was the first pilot to take off, his plane launched from a monorail. He circled the track twice and landed, impressing observers with his mastery. The feats accomplished in the days that followed led the newspaper to call the pilots "air

wizards." One of the Wright pilots, Walter S. Brookins, rose to 4,384.5 feet, breaking the world altitude record.

Other flyers competing included Indianapolis native Melvin Marquette, an airplane builder and pilot. There were thirty-five events, with pilots trying to set records in altitude, distance, and speed.

Sources: Jane Fisher, *Fabulous Hoosier: A Story of American Achievement* (New York: Robert M. McBride & Company, 1947); Indianapolis News, June 13, 1910; Indianapolis News articles, June 10-15, 1910.

Excerpts from Indianapolis News, June 13, 1910.

Nine balloons from across the U.S. gather at Indianapolis Motor Speedway, June 1909, for the first national balloon race.

WRIGHT FIRST TO FLY AROUND COURSE

INDIANAPOLIS MOTOR SPEEDWAY

June 13.—Aviation week at the Indianapolis motor speedway was begun Sunday before noon today, when an aerial race under the guiding hand of Orville Wright of Dayton, O., made two complete circuits of the great speed course.

Aeroplanes have been subjected to all manner of tests, such as distance, duration and high flights, but the events this afternoon were to mark their first appearance in actual competition. Following Brookins others of the Wright team, A. L. Welch and E. P. Coffey and Brookins and Ralph Johnson were to attempt five-lap flights. These attempts were to be followed by Welch and Brookins in a pursuit race of from five to ten laps. This was expected to prove one of the most interesting events of the afternoon.

- on the Indianapolis westside (Indianapolis Star, July 18, 1976).
- 1928** Curtiss Flying Service of Indiana is organized at the Mars Hill airport in Indianapolis by H. Weir Cook. Chief pilot of the women's division is Jean LaRene. Capital investment is \$250,000.
- 1930** Jennings County, Indiana is first county in U.S. to have a complete soil survey taken by airplane.
- 1930** First U.S. airline stewardess is Ellen Church Marshall of Terre Haute, Indiana.
- 1931** Weir Cook Municipal Airport opens in Indianapolis. Construction cost is \$724,000, and the airport terminal building is completed for \$125,000.
- 1936** Amelia Earhart brings her twin-engine Electra to Purdue University to be outfitted for her round-the-world flight (see p. 7).
- 1937** Willa B. Brown, previously a teacher in Gary, Indiana, receives her pilot's license. Also in 1937, she co-founds the National Airmen's Association of America to promote African-American aviation. With Cornelius R. Coffey, she starts the Coffey School of Aeronautics, which trains over 200 pilots, some of whom become part of the 99th Pursuit Squadron at Tuskegee Institute, also known as the "Tuskegee Airmen" (<http://www.netsrq.com/~dbois/brown-wb.html>) (see p. 12).
- 1940** "The Indiana Plan" for training airplane mechanics for national defense is implemented at the State Fair Grounds in Indianapolis, training up to 1,000 mechanics every 6 months.
- 1941** Over 1,500 Works Projects Administration workers begin improving 6 state airports, with

1804 Englishman George Cayley develops an instrument to measure air resistance; begins building a series of gliders setting the basic principles of aerodynamics (Hellemans and Bunch, 255).	1858 First aerial photograph is taken from balloon <i>Nadir</i> over Paris, France (Hellemans and Bunch, 329).	1877 First glider to use bird-like arched wings is developed by German aeronautical engineer Otto Lilienthal (Hellemans and Bunch, 351).	1890 Clement Alder's <i>Eole</i> is first full-size aircraft to leave the ground under its own power (Hellemans and Bunch, 371).	1895 David Schwartz builds an airship with a rigid aluminum frame (Hellemans and Bunch, 387).	1895 Russian physicist Konstantin Tsiolkovsky proposes that liquid-fueled rockets can propel vehicles into space (Hellemans and Bunch, 387).	1896 U.S. astronomer Samuel Pierpont Langley tests his steam-driven machine, flying .75 mile before crashing (Hellemans and Bunch, 389).	1900 July 2 German Count Ferdinand von Zeppelin constructs his first dirigible and flies successfully (Hellemans and Bunch, 397).
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The Purdue University Airport was laid out on a farm field west of the campus on November 1, 1930. To meet federal government regulations at the time, a circle of light-colored limestone was used to identify the landing area, and a required windsock was hung from a dead tree. In 1934, this hanger-laboratory was built, and “the airport was officially opened for business as a going concern” on September 4 (Knoll, 348-49).



Purdue News, 7:2 (April 1936), n.p.

Aviation at Purdue University

A survey of aviation in Indiana would be incomplete without noting the accomplishments of Purdue University, West Lafayette, Indiana as an aviation pioneer. A few items have been included in the general Indiana timeline at the bottom of pages 4-8 of this issue. All parenthetical page references herein are to Knoll; Web site refers to the Purdue University Aeronautical and Astronautical Engineering site (<http://aae.www.ecn.purdue.edu/AAE.html>).

- 1910** Students organize the Purdue Aero Club “to build an airplane and to assemble a collection of books on aeronautics” (341).
- 1911** Purdue Aero Club helps Alumni Association and Lafayette *Morning Journal* organize Aviation Day during Gala Week. Aviators Lincoln Beachey and C. C. Witmer, employed by Glenn H. Curtiss Exhibition Company, thrill 17,000 spectators on June 13 (341, 342).
- 1921** An Aerodynamics Laboratory is established; Mechanical Engineering seniors can choose Aerodynamics (with

- four courses offered) as an option (345).
- 1928** Two aviation courses are offered for graduate students, and the university owns three planes (346).
- 1928** Shambaugh Airport opens in Lafayette. Some Purdue students go there independently for flight training (346).
- 1930** In the summer, Purdue offers its first flight training to students. Technical instruction is given at Purdue; the flying lessons are given by Curtiss-Wright Flying Service (349).
- 1930** Purdue University Airport is created in November. The landing area is marked with a ring of limestone, and a windsock is hung on a dead tree—meeting federal requirements (348).
- 1934** A hanger-laboratory is built at Purdue University Airport; it is “officially opened for business as a going concern” on September 4, the first college-owned airport (349, Web site).
- 1935** Amelia Earhart is on staff at Purdue University as the “Counselor on Careers for Women” (351).
- 1935** Wiley Post, a famous U.S. aviator, makes an emergency landing at Purdue’s airport on April 14. Post is

- impressed with Purdue’s facilities (350, 351).
- 1935-1936** Purdue offers a credit course in flying called “Limited Commercial Pilot” (353).
- 1938** Because of the growing unrest in Europe, the Civil Aeronautics Authority establishes the “Civilian Pilot Training” program at educational institutions to ensure a pool of trained pilots for national defense. Purdue, already well established, is a leader and trains more than 500 pilots over two years (353, 354).
- 1942** Purdue Aeronautics Corporation is organized for better control of the many military flight-training programs that had been brought to the airport (354).
- 1942** Purdue’s oldest school of engineering is named the School of Mechanical and Aeronautical Engineering (354).
- 1943** In August, twenty-three students graduate with the new Bachelor of Science degree in Aeronautical Engineering (355).
- 1945** In the fall, Purdue’s new School of Aeronautics holds its first registration (355). Two chief branches are Aeronautical Engineering and Air Transportation

\$2,500,000 in federal awards and 441 student flyers in 17 Indiana colleges. Federal contracts with Indiana industry for aviation products total \$4,000,000,000.	derbolt (Republic Aviation Corporation <i>Annual Report</i> , 1943, p. 3) (see p. 11).	U.S.
1941 Herold Marting of Indianapolis is first Hoosier on active duty in World War II with an American Eagle Squadron in Great Britain.	1945 Indiana General Assembly creates Aeronautics Commission of Indiana, with a full-time director and 5 commissioners appointed by the governor.	1947 First U.S. airborne class is scheduled by Purdue University.
1943 Freeman Field, Seymour, Indiana is named for Captain Richard S. Freeman from Winamac, Indiana (see p. 12).	1946 World’s first radar-equipped control tower for civilian flying is installed at Weir Cook Municipal Airport in Indianapolis.	1947 Major F. M. Cassell, Jr. of Indianapolis flies a Sikorsky B-5A to new world’s altitude record for helicopters, 18,850 feet.
1943 On December 7, Republic Aviation’s Indiana Division in Evansville delivers its 1000th P-47 Thun-	1947 Allison-powered P-80-R Lockheed airplane is the world’s fastest at 623 mph. Allison produces over 90 percent of all production-type jet engines in the	1948 Indiana’s first independent air passenger line, Roscoe Turner Aeronautical Corporation, Indianapolis, is granted flights on two routes.
		1948 First U.S. marked air route for private flying is a part of the Transcontinental Skyway I (or

1901 G. Whitehead performs the first flight on a motor-driven airplane (Hellemans and Bunch, 399).	1901 Wilbur and Orville Wright of the U.S. fly their first glider (Hellemans and Bunch, 399).	1902 First practical airship, <i>Le Jaune</i> , is launched in France by the Lebaudy brothers (Hellemans and Bunch, 401).	1904 First airplane factory is started in France by Gabriel Voisin, Ernest Archdeacon, and Louis Blériot (Hellemans and Bunch, 407).	1908 Orville Wright makes first airplane flight that lasts an hour (Hellemans and Bunch, 413).	1909 English aviator Henri Farman makes first airplane flight of 100 miles (Hellemans and Bunch, 415).	1910 American Eugene Ely is first person to take off in an airplane from the deck of a ship (Hellemans and Bunch, 417).	1913 U.S. aeronautical engineer Igor Sikorsky builds and flies a multi-engine airplane (Hellemans and Bunch, 425).	1915 Fokker aircraft are first airplanes equipped with machine guns that can fire between the blades of a moving propeller (Hellemans and Bunch, 429).
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Amelia Earhart (second from left) went to Purdue University in November 1935 as the “Counselor on Careers for Women.” She was the first appointee to a newly formed department to help guide young women in their academic careers and toward the workforce. Earhart was paid \$2,000 a year to spend two weeks out of each semester on campus to give lectures, classes, and conferences and to advise university officials on courses and programs. In addition, she was “chief consultant for the University work in aeronautical engineering.” She stayed in the Women’s Residence Halls and was extremely popular with women students. When Earhart decided in 1936 to attempt a flight around the world, the Purdue Research Foundation through private benefactors supplied the money with which she purchased a Lockheed Electra, naming it the *Flying Laboratory*. Purdue gave her a leave of absence from her duties and unrestricted use of its flight and engineering facilities to prepare her airplane for the flight. Earhart and her navigator, Captain Fred Noonan, disappeared over the Pacific Ocean in July 1937 (Todd A. Fruehling, “The Spirit of Amelia Earhart Lives On . . .,” *The Purdue Alumnus*, 63:3 [December 1975], 12-13).

- (356). More women are drawn to aeronautics engineering (357).
- 1947** In February, two men are the first to graduate from Purdue with the degree Master of Science in Aeronautical Engineering (357).
- 1947** First forty-one students graduate with Purdue’s Bachelor of Science degree in Air Transportation (356).
- 1950** First Purdue Ph.D. in Aeronautical Engineering is granted to Commander Richard L. Duncan, U.S.N. (357).
- 1960** Name of school is changed to School of Aeronautical and Engineering Sciences (Web site).
- 1973** Name of school is changed to School of Aeronautics and Astronautics (Web site).

1995 School celebrates its golden anniversary with publication of *One Small Step: The History of Aerospace Engineering at Purdue University* (Web site).

In 1984, Purdue University adopted a special logo depicting the *Challenger* space shuttle and the saying “Purdue, touching tomorrow today.” President Steven Beering noted that the logo “vividly illuminates our university’s mission.” In addition, it was designed to “heighten public awareness of Purdue’s major contribution in educating astronauts and mission specialists for the nation’s space program” (Indianapolis News, February 8, 1984).

Twenty-one Purdue “alumni have made pioneering contributions to the nation and the world as astronauts.” The Purdue Web site provides the names and information about all of them. The Indianapolis *Star Magazine*, March 15, 1981 noted that “Purdue University has contributed more astronauts than any institution except the Naval and Air Force academies.”

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| <p>Wrightway) from Indianapolis to Dayton, Ohio.</p> <ul style="list-style-type: none"> 1948 Indiana aeromagnetic survey reveals possible oil and gas fields. 1949 Indiana State Police purchases its first airplane (see p. 8). 1950 Dr. Abe Silverstein, native of Terre Haute, is chief of space-travel plans for NASA. 1954 Indiana’s Early Bird pilot, Roderick M. Wright, flies in a jet plane (<i>Air Training</i>, September 1954, p.14) (see p. 10). 1955 Allison T-56 turbine propelled engines power | <ul style="list-style-type: none"> Lockheed’s C-130 Hercules—first turboprop aircraft to roll from an American production line. 1956 Indiana aerial applicators spray 1 out of every 185 acres in the state. 1958 First automatic computer to be placed in operation by the Civil Aeronautics Administration begins service at Weir Cook Municipal Airport in Indianapolis (<i>Indianapolis News</i>, September 9, 1958). 1959 Trans World Airlines and Delta Airlines announce non-stop jet service between Indianapolis and New York City and Indianapolis and Miami, Florida, respec- | <ul style="list-style-type: none"> tively, to begin within a year (<i>Indianapolis Star</i>, December 31, 1959). 1960 Indiana University Medical Center works with collaborators to plan emergency use of helicopters for ambulances throughout the state (<i>Indianapolis Star</i>, December 19, 1960). 1962 Purdue graduate Neil Armstrong and Frank Borman, Gary, Indiana, are named to nine-member group to be first men on the moon (<i>Indianapolis News</i>, September 17, 1962). 1967 On January 27, Virgil I. Grissom and 2 other |
|---|---|---|

1919 Robert H. Goddard of the U.S. suggests that a small vehicle can reach the moon by using rockets (Hellemans and Bunch, 435).	1926 Robert H. Goddard launches first liquid-fuel propelled rocket which goes 184 feet into the air, reaching a speed of 60 miles per hour (Hellemans and Bunch, 447).	1927 Charles A. Lindbergh of the U.S. makes first nonstop solo flight across the Atlantic in 33.5 hours (Hellemans and Bunch, 449).	1929 Robert H. Goddard launches first instrumented rocket, carrying a small camera, barometer, and thermometer (Hellemans and Bunch, 455).	1930 British engineer Frank Whittle patents the jet engine (Hellemans and Bunch, 457).	1932 Auguste Piccard of Switzerland becomes first human to enter the stratosphere in a balloon, reaching a height of 53,158 feet (Hellemans and Bunch, 461).	1936 German engineer Heinrich Focke develops first practical helicopter (Hellemans and Bunch, 473).	1937 Germany works on construction and testing of liquid-fueled rockets (Hellemans and Bunch, 475, 477).
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The first plane of the Indiana State Police Aviation Section, a 1949 Navion.



Indiana State Police Aviation Section.

Aviation and law enforcement

The Indiana State Police Aviation Section was formed in 1947 when “The traffic at the Indianapolis Motor Speedway . . . was becoming troublesome and it was thought that if someone could observe traffic from the air, alternate routes could be used to increase traffic efficiency.” After renting a Navion aircraft to help with 1947 race traffic, the Indiana State Police purchased its own Navion in 1949.

Over the years the Indiana State Police Aviation Section fleet has grown. Its responsibilities now include services to government, citizens, and law enforcement: “flying the Governor along with other state officials, conducting medivac flights and premature baby transportation, traffic enforcement, marijuana eradication, criminal surveillance and assisting State Emergency

Management during state wide disasters.”

Today, the Aviation Section includes eight helicopters, two twin-engine aircraft, and four single-engine aircraft.

Source: Sergeant Richard Kirk, “Indiana State Police Aviation Section” (Indianapolis: Indiana State Police Aviation Section, 1998).

astronauts are killed in *Apollo 1* capsule (Carruth, 645) (see p. 14).

1969 TWA jet flight to California carrying Hoosiers among its passengers is hijacked after Indianapolis stop. After landing in Havana, Cuba, the plane and passengers return safely to Miami, Florida (Indianapolis *Star*, August 1, 1969).

1970 More than 50 Indiana crop dusters help Hoosier farmers fight European corn borer (Indianapolis *News*, July 11, 1978).

1985 Indianapolis helicopter pilots set 15 world

records in a commercial helicopter with an Allison engine (Indianapolis *Star*, April 16, 1985).

1986 U.S. Department of Commerce grants Foreign Trade Zone status to Michiana Regional Airport at South Bend (<http://sbnair.com/timeline.htm>).

1992 In November, South Shore rail service begins at Michiana Regional Airport making it the only U.S. airport with air, intercity rail, and interstate bus service in one location (St. Joseph County Airport Authority Press Release, March 19, 1998).

1994 On October 31, American Eagle Flight 4184

crashes into a soybean field south of Roselawn, Indiana, killing 64 passengers and 4 crew members (Indianapolis *News*, November 1, 1994).

1995 Air traffic control for Indiana consists of a network of 12 air traffic control towers and 9 radar-equipped facilities (*Indiana State Aviation System Plan*, 1995, p. 15).

1997 September 28 marks the official start of Indianapolis native David A. Wolf’s 119 days aboard Russian space station *Mir* (<http://www.jsc.nasa.gov/Bios/htmlbios/wolf.html>).

1937 Frank Whittle of Great Britain builds first working jet engine (Hellemans and Bunch, 475).	1938 Germany succeeds in producing a rocket that travels 11 miles (Hellemans and Bunch, 477).	1939 Pan American institutes first regular commercial flights across the Atlantic Ocean (Hellemans and Bunch, 479).	1939 German engineer Pabst von Ohain’s jet engine is first such engine actually to fly an airplane (Hellemans and Bunch, 481).	1939 Igor Sikorsky constructs first helicopter designed for mass production (Hellemans and Bunch, 481).	1944 Germany begins to use jet-propelled bombs controlled by an autopilot mechanism against the United Kingdom (Hellemans and Bunch, 487).	1947 First airplane flies at supersonic speed in the U.S. (Hellemans and Bunch, 501).	1957 October 4 Soviet Union launches first artificial satellite, <i>Sputnik I</i> ; later <i>Sputnik II</i> is launched carrying a dog (Hellemans and Bunch, 526).	1958 January 31 <i>Explorer I</i> , first U.S. satellite, weighing 30.8 pounds, is launched (Carruth, 581).
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Birthplace of Wilbur Wright

Wilbur Wright was born on an Indiana farm near Millville, Henry County on April 16, 1867. In the spring of 1869, the family moved to Dayton, Ohio, where Orville was born on August 19, 1871.

In 1892, the Wright brothers opened a bicycle shop in Dayton. They began to manufacture their own bicycle brand there in 1896.

By 1897, the brothers were seriously pursuing research on flight by writing to the Smithsonian, the U.S. Weather Bureau, and Octave Chanute, an engineer living in Chicago. In the period 1899-1903, the Wrights built flying models, performed experiments, flew gliders, and constructed a wind tunnel. They continued seasonal experiments at Kitty Hawk, North Carolina.

They finally achieved sustained, controlled, powered human flight in their wood-framed and fabric biplane on December 17, 1903. Their principal contributions included a light motor, strong frame, and the ability to control wing edges (wing-warping) during flight. The brothers had applied for a patent concerning wing-warping on March 23, 1903, and it was issued May 22, 1906.

Moving their experiment back to Dayton, they made the first flights of their 1904 plane, the Wright Flyer II. In June 1905, they ran flight tests of the 1905 Flyer III—the world's first practical airplane.

In 1905, in an effort to market their plane, the Wrights offered

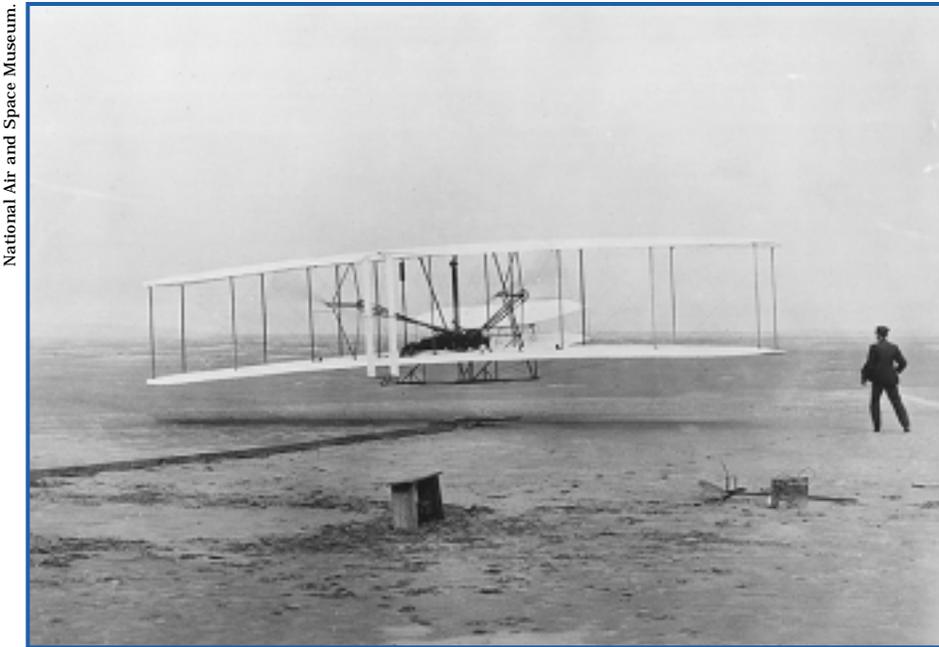


Indiana Historical Bureau, (33.1966.1)
Henry County

to demonstrate the plane for the U.S. War Department, which declined. However, the U.S. Signal Corps signed a contract for delivery of a Wright plane in 1908. In 1911, a Wright Model B-1 hydroplane was delivered to the U.S. Navy.

Wilbur died on May 30, 1912 in Dayton. Orville died on January 30, 1948. The 1903 Flyer now hangs in the National Air and Space Museum, Smithsonian Institution, Washington, D.C.

Source: Historical Marker file 33.1966.1, Indiana Historical Bureau.



National Air and Space Museum.

The 1903 Flyer on December 17, 1903 “piloted by Orville Wright, has just taken off from the monorail” (angled line at left) on “man’s first flight in a power-driven, heavier-than-air machine” at Kitty Hawk, North Carolina. Wilbur Wright (on the ground at right) “had held the wing to balance the machine until it left the rail.” This is the only picture of this flight (Kelly, opposite 116).

<p>1959 Soviet Union, trying to reach the moon, launches <i>Lunik I</i>, which misses but goes into orbit around the sun; <i>Lunik II</i> crashes onto the moon’s surface, becoming first manmade object to reach the surface of the moon; <i>Lunik III</i> passes the moon, but its camera gives first view of the far side of the moon (Hellemans and Bunch, 532).</p>	<p>1961 April 12 Soviet cosmonaut Yuri Gagarin is first human being to orbit Earth (Hellemans and Bunch, 534).</p>	<p>1961 May 5 Alan B. Shepard, Jr. is first U.S. astronaut in space, making a suborbital flight in <i>Mercury 3</i> capsule (<i>Freedom 7</i>) (Hellemans and Bunch, 534, 536).</p>	<p>1961 July 21 Astronaut Virgil I. Grissom is second American in space making a suborbital flight in <i>Liberty Bell 7</i> capsule (Hellemans and Bunch, 536).</p>	<p>1961 Soviet cosmonaut G. Titov orbits Earth 17 times in 25.6 hours (Hellemans and Bunch, 536).</p>	<p>1962 Soviet Union launches first attempted Mars probe, but contact with the probe is lost (Hellemans and Bunch, 538).</p>	<p>1962 U.S. space probe <i>Mariner 2</i> is first object made by humans to voyage to another planet, reaching the vicinity of Venus (Hellemans and Bunch, 538).</p>
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Indiana's Early Bird Pilot



Indiana Historical Bureau.
(14.1997.1)
Daviness County

Members of the Early Birds of Aviation, Incorporated were men who flew solo between 1903 and 1916. These pilots hold a special place in the history of aviation in the United States. The Smithsonian Institution's National Air and Space Museum Archives in Washington, D.C. serves as the official repository for documents concerning the Early Birds.

Indiana's only Early Bird pilot, Roderick M. Wright, was born on March 24, 1887 on a farm in Daviness County, near Washington. He grew up fully expecting to be a farmer and became an agricultural student at Purdue University, West Lafayette, Indiana.

Wright, however, read about the efforts of Orville and Wilbur Wright as pioneers in flight. In June 1911, Wright attended his first air exhibition in Evansville, Indiana. He was so excited by the event that he decided to become a student at the flight school oper-

ated by Orville and Wilbur Wright in Dayton, Ohio.

He later enrolled in the flight school and earned his license on July 26, 1913—Number 254 issued by the Federation Aeronautique Internationale. This international group preceded United States federal aviation agencies, which started in 1926 and evolved into the Federal Aviation Administration in 1958. Wright was the first licensed pilot in Indiana.

Wright utilized his flying skills and experience as mechanic, test pilot, flight instructor, and passenger/transport pilot. He returned to the family farm in 1933, bought an airplane, and built a private airstrip and hanger. He taught family members to fly and took occasional contract work. During World War II, he tested parachutes over his property.

From 1953 to 1957, Wright represented Daviness County in the Indiana General Assembly. In 1954, he flew for the first time in a jet plane. On October 13, 1960, Wright died. He is buried near his family farm.

Source: Historical marker file 14.1997.1, Indiana Historical Bureau. There is no known kinship between Roderick M. Wright and Orville and Wilbur Wright.

Air Training, September 1954, p. 14.



Roderick M. Wright in 1954, wearing the black and white checkered cap of the Early Bird pilots.

1962 February 20 John H. Glenn, Jr. is first American to orbit Earth in <i>Mercury 6</i> capsule <i>Friendship 7</i> (Hellemans and Bunch, 538).	1963 May 15 L. Gordon Cooper of the U.S. completes 22 orbits of Earth in 34-hour flight in <i>Mercury capsule Faith 7</i> (Hellemans and Bunch, 542).	1963 June 16 Valentina Tereshkova-Nikolayeva of the Soviet Union is first woman in space, making 48 orbits of Earth in 78 hours (Hellemans and Bunch, 542).	1965 March 23 Virgil I. Grissom and John W. Young are America's first two-man crew, orbiting Earth 3 times in a <i>Gemini spacecraft</i> (Hellemans and Bunch, 548).	1965 July 15 <i>Mariner IV</i> reaches the neighborhood of Mars, passing within 7,500 miles of the planet (Hellemans and Bunch, 548).	1965 August 21 L. Gordon Cooper and Charles Conrad, Jr. of the U.S. begin 190-hour, 120-orbit mission to demonstrate the feasibility of a lunar mission (Hellemans and Bunch, 550).	1965 December 4 Frank Borman and James A. Lovell, Jr. of the U.S. are launched for a 13-day mission in <i>Gemini 7</i> spacecraft; they perform first space rendezvous with Walter M. Schirra and Thomas P. Stafford, who are launched on December 15 in <i>Gemini 6</i> (Hellemans and Bunch, 550).
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P-47 Thunderbolt Factory

On December 8, 1941, the United States declared war on Japan as the result of the Japanese bombing of Pearl Harbor, Hawaii. There was an immediate need for war-related materials.

World War II had a major effect on the economy of Evansville, Indiana. By the end of the war, fifty of its companies were involved in war-related production with three-quarters of its industries having defense contracts.

On April 7, 1942, the Republic Aviation Corporation of Farmingdale, New York broke ground for a factory to manufacture P-47 Thunderbolts in Evansville, Vanderburgh County.

The factory produced its first plane, named the "Hoosier Spirit," on September 20, 1942. By

September 27, 1945, 6,242 Thunderbolts had been manufactured at the Evansville plant. The factory provided employment for over 5,000 people; a high percentage of the employees were women.

The P-47 Thunderbolt was the star of World War II fighter planes. There were 15,683 Thunderbolts produced between May 1941 and December 1945 in three U.S. factories—more than any other fighter bomber. It was reliable, durable, and fast. P-47s served U.S. efforts in all geographical locations of the war and logged 1,350,000 combat hours.

A P-47 weighed almost seven tons, had a wing span of nearly forty-one feet, and was more than thirty-six feet long.



Indiana Historical Bureau.
(82.1995.1)

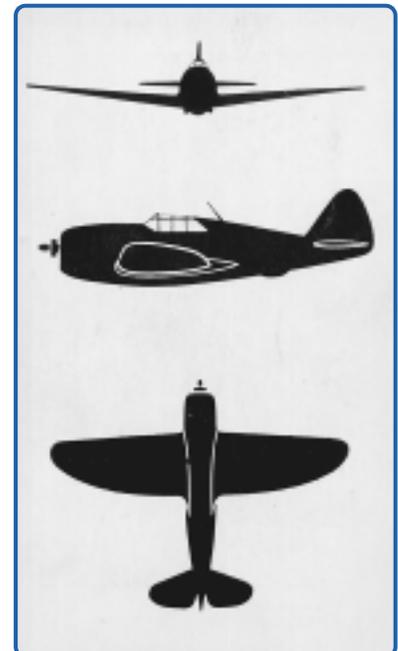
Vanderburgh
County

The Thunderbolt plant in Evansville was a large-scale operation. The primary structure was 972,909 square feet, and the grounds covered seventy-one acres. In 1946, International Harvester purchased the facility; it is presently owned by Whirlpool Corporation.

Source: Historical marker file 82.1995.1, Indiana Historical Bureau.

This image of the P-47 Thunderbolt is on a ground identifier card—one of a set—used by ground spotters during the war to assure that enemy planes were not passing overhead. The reverse side gives the silhouette views that a spotter might see.

Alan January.



1966	1966	1966	1967	1967	1968	1968	1969	1970
August Soviet space probe <i>Luna XI</i> goes into orbit around the moon (Hellemans and Bunch, 554).	U.S. spacecraft <i>Lunar Orbiter I</i> sends back dramatic photographs of the moon's surface (Hellemans and Bunch, 554).	Soviet space probe <i>Luna XIII</i> lands on the moon and returns photographs and soil data (Hellemans and Bunch, 554).	January 27 Launch pad fire during Apollo tests at Cape Kennedy, Florida, kills astronauts Virgil I. Grissom, Edward H. White II, and Roger B. Chaffee (Carruth, 645).	April 19 U.S. space probe <i>Surveyor III</i> soft-lands on the moon (Hellemans and Bunch, 558).	December 21-27 Frank Borman, James A. Lovell, Jr., and William A. Anders orbit the moon 10 times in first manned <i>Saturn V</i> flight (Carruth, 661).	December 31 First supersonic airliner, the Soviet Tupolev TU-144, is demonstrated (Hellemans and Bunch, 561).	July 20 American astronaut Neil Armstrong is first human to stand on the moon; Buzz Aldrin is right behind him (Hellemans and Bunch, 564).	First of the "jumbo jets," the Boeing 747, goes into service across the Atlantic Ocean (Hellemans and Bunch, 565).

Freeman Field



Indiana Historical Bureau.
(36.1977.1 and .2)
Jackson County

On December 8, 1941, the United States declared war on Japan in response to the Japanese bombing of Pearl Harbor, Hawaii. Manpower and materials were needed quickly.

On May 6, 1942, the War Department announced its intention to build a pilot training school and air field southwest of Seymour in Jackson County. On December 1, 1942, the Seymour air field was activated.

The U.S. Army Corps of Engineers oversaw the construction of the structures, runways,

and roads. There were 413 buildings and four 5,500-foot runways located on 2,560 acres. It was a state-of-the-art facility.

In March 1943, the field was officially named the Freeman Army Air Field. Richard S. Freeman was born on June 22, 1907 in Winamac, Pulaski County. He graduated from West Point and was assigned to the Army Air Corps. He earned the Distinguished Flying Cross. He died on February 6, 1941 when his plane crashed in Nevada.

Also in March 1943, the first cadets arrived at this advanced twin-engine training school. Many of the graduates went on to fly bombers, such as B-17s and B-24s. The last graduation was February 1, 1945. A total of 4,245 pilots graduated from the Freeman Field aerial training base. Twenty-four instructors and cadets were killed during training.

In January 1946, the facility was declared to be surplus. It was deactivated in November 1948. The War Assets Administration determined the post-war use of the land and structures: 2,241 acres for a municipal airport for Seymour; more than 240 acres for agricultural training in the Seymour Community Schools; and the Seymour Industrial Association received more than sixty acres to develop an industrial park.

Source: Historical marker file 36.1977.1, Indiana Historical Bureau.

Registration at Freeman Field in 1944. Black aviators, including a group of Tuskegee Airmen, trained at Freeman Field. In April 1945, black officers tried to integrate an officers' club resulting in a major incident. See James C. Warren, *The Freeman Field Mutiny* (Vacaville, Calif.: The Conyers Publishing Co, 1996) and Ray Boomhower, " 'Nobody Wanted Us': Black Aviators at Freeman Field," *Traces of Indiana and Midwestern History* (Summer 1993), pp. 38-45.



Indiana State Archives.

1971 During the U.S. <i>Apollo 14</i> lunar mission, crew members Alan B. Shepard, Jr. and Edgar D. Mitchell collect 98 pounds of moon rocks (Hellemans and Bunch, 566).	1971 David R. Scott and James B. Irwin of the U.S. drive the <i>Lunar Rover</i> on the moon's surface (Hellemans and Bunch, 568).	1971 November 13 The U.S. <i>Mariner 9</i> spacecraft is the first human-built object to orbit another planet by orbiting Mars (Hellemans and Bunch, 568).	1972 Soviet spacecraft <i>Venera 8</i> soft-lands on Venus (Hellemans and Bunch, 570).	1972 U.S. space probe <i>Pioneer 10</i> is launched, first human-created object to leave the solar system (Hellemans and Bunch, 570).	1973 First U.S. <i>Skylab</i> mission is launched May 25 and lasts 28 days; the second <i>Skylab</i> is launched July 29 and lasts 59 days; the third <i>Skylab</i> is launched November 16 and lasts 84 days (Hellemans and Bunch, 572).	1974 Soviet space probe lands on Mars (Hellemans and Bunch, 574).	1976 July 20 U.S. <i>Viking 1 Lander</i> lands on Mars, first spacecraft to soft-land on a planet other than Earth (Hellemans and Bunch, 578; http://nssdc.gsfc.nasa.gov/planetary/viking.html).
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Lawrence D. Bell

Bell was born in 1894 in the Indiana farming community of Mentone, Kosciusko County. The Bell family moved to Santa Monica, California in 1907 when Lawrence was thirteen. Lawrence saw his first airplane at the 1910 Air Show at Los Angeles, with his older brother, Grover. At home, he and his brother built their own flying airplane model.

After graduating from Santa Monica High School in 1912, Lawrence became a mechanic for exhibition pilots Lincoln Beachey and Grover Bell with their Curtiss airplane.

In 1913, Bell became a factory manager at Glenn L. Martin's factory in Santa Ana, California and later in Cleveland, Ohio. A year later he was superintendent. In 1928, Bell went to work for Consolidated Aircraft in Buffalo, New York, reaching the rank of vice-president.

In 1935, Bell founded his own company, Bell Aircraft Corporation, also in Buffalo. Many advanced aircraft were produced there. These included the first jet plane of the U.S., the P-59; the Bell X-1 jet aircraft, and the Bell 47G helicopter. The X-1 was the first plane to break the sound barrier earning Bell, Charles Yeager, and designer John Stack the Collier Trophy. In addition, the first commercial helicopter license of the Civil Aeronautics Administration was granted to Bell Aircraft Corporation. Lawrence Bell died in

October 1956.

Two related companies still exist. Bell Helicopter Textron is the world's largest helicopter manufacturer. Bell Aerospace Textron produces component parts for space vehicles. Two presidential helicopters preserved in the National Air and Space Museum, Washington, D.C., and in the Air Force Museum, Dayton, Ohio, are Bell products.

The Lawrence D. Bell Aircraft Museum in Mentone was dedicated in 1982. It houses and displays, with associated aircraft, the collection given by Bell to his hometown.

Source: Historical marker file 43.1995.1, Indiana Historical Bureau. Contact: Lawrence D. Bell Aircraft Museum, Inc., Box 411, Mentone, Indiana 46539 (Web site: <http://www.livingweb.com/bell>).



Indiana Historical Bureau.
(43.1995.1)
Kosciusko County

Indiana State Police Aviation Section.



This Bell 47 helicopter was the first helicopter purchased by the Indiana State Police. It is pictured at Stout Field, Indianapolis in 1953.

1976 French-English <i>Concorde</i> is the first supersonic airliner to operate a regularly scheduled passenger service (Hellemans and Bunch, 579).	1977 U.S. space probes <i>Voyager 1</i> and <i>2</i> are launched on a journey to Jupiter and the outer planets (Hellemans and Bunch, 580).	1979 <i>Gossamer Albatross</i> is first human-powered aircraft to cross the English Channel (Hellemans and Bunch, 583).	1980 May 12 First nonstop transcontinental balloon flight is completed by American Maxie Anderson and his son Kris. Aboard the <i>Kitty Hawk</i> , they travel 3,100 miles from California to Quebec in four days (Carruth, 747).	1980 November 12 U.S. <i>Voyager 1</i> flies by Saturn (Hellemans and Bunch, 586).	1981 April 12 First flight of the U.S. space shuttle <i>Columbia</i> begins; its landing April 14 at Edwards Air Force Base, California is the first wheels-down landing by any spacecraft (Carruth, 753).	1986 December 14 Dick Rutan and Jeana Yeager of the U.S. pilot the airplane <i>Voyager</i> around the world in 9 days without refueling (Hellemans and Bunch, 599).
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Virgil I. Grissom



Indiana Historical Bureau.
(47.1966.1)
Lawrence County

Virgil I. Grissom was born April 3, 1926 in Mitchell, Lawrence County, Indiana. He graduated from Purdue University, West Lafayette, Indiana in 1950.

Grissom served in the U.S. Army Air Corps as an aviation cadet in 1944. He reenlisted after college and earned his pilot wings in early 1951. He served in Korea; he was an instructor pilot after the war. In 1957, he became a fighter test pilot. He was selected in 1959 by the National Aeronautics and Space Administration as one of the seven astronauts in the first phase of the U.S. Space Program.

In a speech on May 25, 1961, U.S. President John F. Kennedy

pledged to support a program to land a man on the moon by 1970. This program was to be accomplished in a process that included the Mercury, Gemini, and Apollo mission programs.

Grissom flew the second project Mercury sub-orbital mission on July 21, 1961. He flew as the command pilot in the *Gemini III* flight, March 23, 1965, with John Young. They orbited the earth three times and were the first astronauts to maneuver a spacecraft in orbit.

Grissom, Roger B. Chaffee, and Edward H. White, were chosen to pilot the first Apollo mission, with Grissom as the command pilot. They began training for a planned sixteen-day mission scheduled to launch February 14, 1967. On January 27, 1967 a flash fire in the *Apollo 1* capsule killed all three men.

Grissom was buried at Arlington National Cemetery. Bunker Hill Air Force Base, Miami County, Indiana was renamed after him in 1967. There is a memorial with exhibits at Spring Mill State Park, near Mitchell, including Grissom's helmet from the Mercury mission and the *Gemini III* capsule and space suit.

Source: Historical marker file 47.1966.1, Indiana Historical Bureau. **Contact:** Indiana Department of Natural Resources for *Virgil I. Grissom: Teacher Packet* (Indianapolis: Department of Natural Resources, [1987]).

Astronaut Virgil I. Grissom is suited up and ready to climb into the *Liberty Bell 7* spacecraft on August 9, 1961 for NASA's Mercury-Redstone 4 mission. Backup pilot John Glenn is in the right corner behind Grissom (<http://www.ksc.nasa.gov/mirrors/images/images/pao/MR4/10073558.htm>).



National Aeronautics and Space Administration.

<p>1986 January 28 U.S. space shuttle <i>Challenger</i> explodes 74 seconds after liftoff at Cape Canaveral, Florida, killing all seven astronauts aboard, including Christa McAuliffe, a New Hampshire schoolteacher and the first private citizen chosen for a space shuttle flight (Carruth, 787).</p>	<p>1987 Soviet cosmonaut Yuri V. Romanenko returns to Earth from <i>Mir</i> station after 326 days in space, a new record (Hellemans and Bunch, 602).</p>	<p>1989 May 4 U.S. unmanned spacecraft <i>Magellan</i> is launched by space shuttle <i>Atlantis</i> to begin a voyage to Venus. It reaches Venus orbit on August 10, 1990 (Carruth, 819).</p>	<p>1990 April 25 Hubble Space Telescope is launched by the U.S. space shuttle <i>Discovery</i> (Carruth, 827).</p>	<p>1992 July 9 U.S. <i>Columbia</i> ends the longest space shuttle flight, after circling Earth 221 times and traveling 5,760,000 miles in 2 weeks of orbit (Carruth, 851).</p>	<p>1997 July 6 U.S. Mars Pathfinder's <i>Sojourner Rover</i> rolls onto the surface of Mars and sends pictures and sensor data to Earth until September 27 when all communication is lost (http://nssdc.gsfc.nasa.gov/planetary/mesur.html).</p>	<p>1998 January 16 NASA names 77-year old former astronaut John H. Glenn, Jr. to the crew of space shuttle <i>Discovery</i>, due to launch in October 1998 (NASA Press release, January 16, 1998).</p>
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Selected Resources

Bibliography

• Carruth, Gordon. *The Encyclopedia of American Facts and Dates*. New York: Harper Collins Publishers, 1993.

Comprehensive, easy-to-read timeline of American history.

• Hellemans, Alexander, and Bryan Bunch. *The Timetables of Science*. New York: Simon and Schuster, 1988.

Contains chronology of most significant achievements in science history.

• Historical marker files, Indiana Historical Bureau.

The Historical Bureau maintains an individual file for each Indiana state format historical marker. Files vary, but may contain copies of resources, application materials, and research papers.

• Knoll, H. B. *The Story of Purdue Engineering*. West Lafayette: Purdue University Studies, 1963.

Very informative, easy-to-read and understand chapter on Purdue and aviation.

• *A Salute to Indiana's Aviation History*. [Indianapolis]: Aeronautics Commission of Indiana, [circa 1956].

Brochure; place to start for further research.

Additional Resources

• Ball, Edmund F. *Rambling Recollections of Flying and Flyers*. Muncie: Edmund F. Ball, 1993.

Gives personal insight into many of Indiana's early pilots.

• Cassutt, Michael. *Who's Who in Space: The First 25 Years*. Boston: G. K. Hall & Co., 1987.

Good general information.

• *Encyclopedia of Aviation*. New York: Charles Scribner's Sons, 1977.

General, but informative and comprehensive in its topics.

• Glines, Carroll V. *Roscoe Turner: Aviation's Master Showman*. Washington, D.C.: Smithsonian Institution Press, 1995.

Provides insight into a fascinat-

ing Hoosier.

• Hallion, Richard P., ed. *The Wright Brothers: Heirs of Prometheus*. (Washington, D.C.: Smithsonian Institution Press, 1978.

Very good timeline and bibliography.

• Indiana Challenger Centers for Space Science Education

Contact for more information: Brownsburg Community School Corporation, Harris Elementary School, 725 South Green Street, Brownsburg, IN 46112, telephone 317-858-4106; and Purdue University-Calumet, 2200 169th Street, Hammond, IN 46323-2094, telephone 219-989-2323 (opening projected January 1999).

• Thumma, William. *Early Aviation in Indiana*. Elwood, Ind.: William Thumma, 1989.

Useful resource for further research.

• Tipton, Richard S. *They Filled the Skies: Arthur Young . . . Maker of the Bell, Larry Bell . . . Aviation Trailblazer*. Fort Worth, Texas: Bell Helicopter Textron, Inc., 1989.

Very useful for research on Bell.

Suggested student resources

• Aust, Siegfried. *Flight! Free As a Bird*. Minneapolis: Lerner Publications Company, 1991.

Traces the history of human flight from Greek mythology to the space shuttle. Related activities are included in easy-to-read language.

• Berliner, Don. *Before the Wright Brothers*. Minneapolis: Lerner Publications Company, 1990.

Historic photographs and documents are included; for intermediate readers. Ideas and experiments that led to the first powered flight in 1903 are described.

• Bredeson, Carmen. *Gus Grissom: A Space Biography*. Springfield, N.J.: Enslow Publishers, Inc., 1998.

An easy-to-read biography focusing on the training and career of this Indiana native.

• Briggs, Carole S. *At the Controls: Women in Aviation*. Minneapolis: Lerner Publications Company, 1991.

Includes profiles of four female aviators; the Ninety-Nines, an association of female pilots; and the record-setting flights of Amelia Earhart and other female aviation pioneers. For intermediate readers.

• Challoner, Jack. *Flight*. New York: Thomson Learning, 1995.

Illustrated projects, demonstrating the properties of flight. Appropriate for any age reader. Make it Work series.

• Jefferis, David. *Flight: Fliers and Flying Machines*. New York: Franklin Watts, 1991.

Traces the evolution of the airplane from the first flying machine to supersonic jets; wonderful illustrations. Timelines series.

• Nahum, Andrew. *Flying Machine*. New York: Alfred A. Knopf, 1990.

Wonderful photographs trace the history and development of aircraft from hot-air balloons to jetliners. An excellent resource for any age. Eyewitness Books.

• Weiss, Harvey. *Strange and Wonderful Aircraft*. Boston: Houghton Mifflin Company, 1995.

This easy-to-read work details earliest attempts at flight; includes illustrations and projects to demonstrate flight principles.

Special thanks to the following individuals:

• Mary Anthrop, Archivist, Tippecanoe County Historical Association.

• Deb Taylor, Indianapolis Motor Speedway Museum.

• Sergeant Richard Kirk, Field Enforcement Division, Aviation Section, Indiana State Police.

• R. Troy Allen, "Project Takeoff," Aviation Division, Indiana Department of Transportation. Contact Allen at 317-232-1494 for information on school aviation programs.



Indiana Historical Bureau

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National Aeronautics and Space Administration.

NASA mission specialist, David A. Wolf, in preflight activities for Mission STS-86 on the space shuttle *Atlantis*. *Atlantis* docked with the Russian space station *Mir* on September 28, 1997. Wolf spent 119 days aboard *Mir* and returned to Earth on January 31, 1998. Wolf is a native of Indianapolis, Indiana. He received a Bachelor of Science degree in electrical engineering from Purdue University

and a doctorate of medicine from Indiana University. Information about Wolf, the mission, letters from Wolf from space, etc. are available on the NASA Web site (<http://www.ksc.nasa.gov/shuttle/mission/sts-86/mission-sts-86.html>) and by searching for David A. Wolf.