

# TRANSPORTATION MILESTONES

The following is a list of transportation milestones that have occurred since the birth of our nation. **Red type** indicates milestones for which a poster has been prepared in advance for your use.

If time does not allow you to use all of the events listed, it is recommended the ones with an asterisk (\*) be given highest priority—these are the ones provided on the sample timeline. Consider adding notable events that are of importance to your region—for example, Californians might want to include the Golden Gate Bridge while New Yorkers will probably add the Brooklyn Bridge.

1776	<b>Propellor Submarine - Turtle</b> (David Bushness, USA)	
1779	<b>Iron Bridge</b> (Abraham Darby, England)	
1781	<b>Steam Engine</b> Thomas Newcomen, England and James Watt, Scotland)	
1781	<b>Ornithopter</b> (Karl Friedrich Meerwein, Germany)	
1783	<b>Hot Air Balloon</b> (Joseph Michel and Jacques Étienne Montgolfier, France)	
1787	<b>Steamboat</b> (John Fitch, USA—Connecticut and James Rumsey, USA—West Virginia)	John Fitch is given credit for the first recorded steam-powered ship in the U.S. The first successful trial of his boat was on the Delaware River in 1787. Delegates from the Constitutional Convention witnessed the event. The same year, James Rumsey exhibited a steamboat on the Potomac River. After a battle with Rumsey, Fitch was granted a U.S. patent for his steamboat in 1791—the men had similar designs. Fitch continued to build boats. While they were mechanically successful, Fitch failed to pay sufficient attention to construction and operating costs and was unable to justify the economic benefits of steam navigation. This was left to others.
1800	<b>Electric Battery</b> (Alessandro Volta, Italy)	.
1801-1804	<b>*Steam Locomotive</b> (Richard Trevithick, England)	In 1801, British engineer Richard Trevithick put a steam engine on wheels. He used it on Christmas Eve to take seven friends on a short journey. It became known as the <i>Puffing Devil</i> because he was unable to find a way of keeping up the steam for any length of time. Three years later, he produced the <i>Penydarren</i> , the world's first steam engine to run successfully on rails. During its nine mile journey the <i>Penydarren</i> reached speeds of nearly five miles an hour.
1802	<b>*Practical Steamboat --Charlotte Douglas Steamboat</b> (William Symington and Thomas Dundas, Scotland)	The first practical steamboat towed two 70-ton barges almost 20 miles along the Forth and Clyde Canal to Glasgow.
1807	<b>*Regular Steamboat Service -- North River Steamboat</b> (Robert Fulton and Robert Livingston, USA—New York)	The <i>North River Steamboat</i> (often called the <i>Clermont</i> ) began regular passenger service between New York City and Clermont on the Hudson River—a distance of 150 miles—in 1807. Livingston contracted with Fulton to build the steamboat in 1802. A British steam engine was used.

1811	<b>*National Road Construction Begins</b> (USA—Maryland to Illinois)	In 1911, construction began in Cumberland, MD on one of the first major improved highways in the U.S. The road reached Wheeling, WV on the Ohio River in 1818. Plans were made to continue through Jefferson City, MO but money ran out and construction stopped at Vandalia, IL in 1839. This was the first interstate road to get federal funding. It was also the first road in the nation to use a macadam surface.
1814	<b>Modern Steam Locomotive - Rocket</b> (George Stephenson, Great Britain)	A common misconception is that George Stephenson's <i>Rocket</i> was the first steam locomotive. In fact, Richard Trevithick's steam locomotive ran on tracks ten years earlier. The <i>Rocket's</i> claim to fame is that it was the first modern locomotive—nearly all steam locomotives built since have been based upon the <i>Rocket's</i> basic design.
1818	<b>Cast-Iron Tunnel Shield (Isambard Kingdom Brunel, England)</b>	
1825	<b>*Erie Canal</b> (USA—New York)	In its day, the Erie Canal was the world's longest canal—connecting Lake Erie to New York City's harbor via the Hudson River. It provided the principal route for emigrants from the East and agricultural products from the west. The first section of the canal was opened in 1819 but the entire project was not completed until 1825. The canal was 363 miles long, 40 feet wide, and 4 feet deep. Its 83 locks led to a massive population surge in western New York and opened regions further west .
1827	<b>Commercial U.S. Railway -- Granite Railway</b> (USA—New York)	The Granite Railway—the first commercial railway in the U.S.—relied on horses rather than steam and was primarily used to transport granite from a quarry in Quincy, MA to the Neponset River. The granite was used for building Bunker Hill Monument. The line was constructed of granite, wood and iron bars—it was 3 miles in length.
1825 - 1847	<b>*Ohio Canal System</b> (USA—Ohio)	Between 1825 and 1847, the State of Ohio and private investors constructed about 1,000 miles of canals and feeder canals, 29 dams, 294 lift locks, and 44 aqueducts to provide an economical system of transportation where none had previously existed. Prior to this time, the state had been a relatively undeveloped, under populated region of the United States. As a result of the canal system, Ohio played a significant role in the western expansion of the U.S.
1827	<b>Commercial U.S. Railway -- Switchback Gravity Railroad</b> (USA—Pennsylvania)	Anthracite coal was discovered in Summit Hill, Pennsylvania in 1791. This primitive rail system was established in 1827 to bring the coal to market. The Switchback Gravity Railroad transported the coal from the mines to the Lehigh River in Mauch Chunk — now Jim Thorpe — Pennsylvania. Coal was loaded onto wooden cars with gravity pulling them down a mountain; their speed controlled by hand brakes. Mules hauled the empty cars back up to the mines on the same rails. The mules traveled back to the river in special stable cars attached to the coal cars and were fed en route — the first railroad dining cars!
1829	<b>Commercial U.S. Rail Company - Delaware &amp; Hudson Canal Company</b> (USA-New York and Pennsylvania)	The first rail company in the U.S., the Delaware & Hudson Canal Company (D&H), was originally chartered in 1823 to build and operate canals between New York City and the coal fields of Carbondale, PA. But company engineers began thinking about rail transportation as early as 1825. The objective was to transport the coal by rail to boats at the western end of the canal.
1829	<b>Steam Locomotive Operating in U.S. - Stourbridge Lion</b> (England and USA—New York and Pennsylvania)	The Stourbridge Lion was the first steam locomotive to operate in the U.S. Manufactured in 1828 by Foster, Rastrick and Company, the machine was assembled after shipment in New York where it was first tested under steam in 1829. Its first official run took place the same year in Honesdale, PA. The locomotive performed well, but the track could not support its 7.5 tons—nearly double what had been specified at the time of its purchase by the Delaware & Hudson Canal Company (D&H).

1830	<b>*Passenger Rail Service in U.S. -- Baltimore &amp; Ohio Railroad</b> (Philip E Thomas and George Brown, USA–Maryland)	In 1927, Thomas and Brown invited 25 citizens—primarily Baltimore merchants and bankers—to invest in the building of a railroad from the port of Baltimore to the Ohio River. The goal was an alternative, faster route for Midwestern goods to reach the East Coast than the successful, but slow Erie Canal. The first 13-mile section from Baltimore west to Ellicott’s Mill (now known as Ellicott City) opened in 1930 using horse-drawn cars. The B&O Railroad is considered the first public railroad in the U.S. constructed for the general conveyance of passengers and goods between two distant points. After the successful run of the Tom Thumb locomotive in 1930, the railway switched to steam power. Further extensions were added to the railway until it terminated at the Ohio River in what is now Wheeling, WV in 1853.
1830	<b>U.S. Built Steam Locomotive -- Tom Thumb</b> (Peter Cooper, USA–Maryland)	Peter Cooper built the <i>Tom Thumb</i> —the first American-built steam locomotive—hoping to convince owners of the newly formed Baltimore and Ohio Railroad to use steam instead of horses to pull rail cars. He offered to race the <i>Tom Thumb</i> against a horse in 1830. The locomotive rolled along a track, pulling a wagonload of people. Alongside the engine ran a horse. The engine lost a part and slowed down so the horse won, but B&O officials were convinced of the engine’s power and promise.
1830	<b>U.S. Built Steam Locomotive Put into Service-- Best Friend of Charleston</b> (West Point Foundry, USA–New York)	The first all U.S.-built locomotive placed into actual service on a railroad was built in New York then taken apart for shipment by boat to South Carolina. The merchants of Charleston, eager for a faster and more reliable method of transportation in the state of South Carolina, unofficially named the locomotive the <i>Best Friend of Charleston</i> . It was used in regular passenger service along a six-mile route on the Charleston-Hamburg Railroad. Unfortunately, in 1831 it got a new title—first locomotive boiler explosion.
1832-1842	<b>*Electric Carriages</b> (Robert Anderson and Robert Davidson, Scotland; Sibbrand Acker Stratingh and Christopher Becker, Holland; and Thomas Davenport, USA)	Between 1832 and 1839 (the exact year is uncertain), Robert Anderson of Scotland invented the first crude electric carriage. A small-scale electric car was designed by Professor Stratingh and built by his assistant Christopher Becker in 1835. Practical and more successful electric road vehicles were invented by both American Thomas Davenport and Scotsmen Robert Davidson around 1842. Both inventors were the first to use non-rechargeable electric cells.
1833	<b>*Regular Rail Passenger Service in U.S. -- Charleston-Hamburg Railroad</b> (USA–South Carolina)	The Charleston-Hamburg Railroad was formed in 1828—making it the second commercial railroad company formed in the United States for the transportation of passengers and freight. Upon its completion in 1833, it was the first railroad in the U.S. to be powered by steam. It is also given the honor of first to carry mail under contract and the first to regularly provide passenger service. At the time it was the longest railroad in the world--spanning 136 miles. Local businesspeople invested in the line because they wanted to divert the flow of cotton from the port of Savannah, GA., to the older and larger South Carolina port.
1834	<b>*Rail Tunnel in U.S. -- Staple Bend Tunnel</b> (Allegheny Portage Railroad, USA–Pennsylvania)	Staple Bend Tunnel was the first railroad tunnel constructed in the U.S. The railway carried canal boats over the steep grades of the Allegheny Mountains. The 901-foot tunnel replaced packhorse trails and wagon roads.
1836	<b>*Transatlantic Steamship Crossing --SS Great Western</b> (Isambard Kingdom Brunel, Britain)	The steamship <i>SS Great Western</i> made its maiden journey across the Atlantic from Bristol, England to New York in 15 days. The iron-strapped wooden side-wheel paddle steamer (with auxiliary sails) was designed by railway engineer Isambard Kingdom Brunel. Able to carry 148 passengers, the ship’s boilers fueled by coal took up almost half of its interior.
1839	<b>*Cast-Iron Bridge in U.S.-- Dunlap Creek’s Bridge</b> (Richard Delafield, USA–Pennsylvania)	Dunlap Creek’s Bridge is the first cast-iron bridge in the U.S. and the first anywhere to use standardized, interchangeable, manufactured parts. Nearby foundries made it possible to build the bridge’s cast-iron arch and open spandrels supporting the bridge floor. The abutment and wingwalls were sandstone. Stagecoaches and Conestoga freight wagons rolled over the bridge until 1853, when the B&O railroad opened to Wheeling.

1848	<b>Reinforced Concrete</b> (Jean-Louis Lambot, France)	
1852	<b>*Steam-Powered Airship</b> (Jules Henri Giffard, France)	Giffard was the first person to make an engine-powered, steerable flight—he flew 17 miles from Paris to Trappes at an average speed of about 3 miles per hour. His hydrogen-filled airship was 144 feet long and had a steam engine that drove a 3-blade propeller. It was steered using a sail-like rudder. Giffard’s invention helped open the way to transport that can travel above geographical obstacles such as waterways and mountains—significantly reducing travel time.
1853	<b>Multipurpose Bridge -- Brooklyn Bridge</b> (USA—New York)	Connecting Brooklyn to Manhattan, this bridge provided railroad tracks, trolley tracks, a roadway and a walkway. The 1,595.5 span broke all world records for span length when it was built. This was also the first bridge to have galvanized steel used in cable construction. Galvanized steel is electroplated with zinc to protect it against rust. The process reduces bridge maintenance costs.
1853	<b>*Glider -- Coachman Carrier</b> (George Cayley, England)	George Cayley persuaded his coachman to fly his glider—appropriately named the <i>Coachman Carrier</i> --across the British country side. The unpowered glider was launched by estate workers and flew a little less than one-tenth of a mile. The flight was the earliest recorded manned, heavier-than-air flight.
1855	<b>*Sault Sainte Marie Canal OR Soo Locks</b> (USA—Michigan and Canada)	The Sault Ste. Marie Canal (also referred to as the Soo Canal or Soo Locks) opened in 1855. The canal allowed ships to bypass the rapids of the St. Marys River. It uses locks built to lower boats and other vessels from Lake Superior to the Great Lakes.
1855	<b>*Panama Railway</b> (Panama)	In 1855, a railway was built across the isthmus of Panama in Central America cutting the number of miles that had to be traveled by water between New York and California in half. Travelers took a ship to Panama then transferred to the railway. On the other side of the isthmus, they waited for another ship that could take them to California. Unfortunately, people and freight were often stranded for weeks—even months—in overcrowded towns where life-threatening diseases were common.
1856	<b>*Rail Bridge Across the Mississippi River-- Rock Island Bridge</b> (USA—Illinois and Iowa)	The first rail bridge to span the Mississippi connected Rock Island, Illinois with Davenport, Iowa—offering a seamless rail ride into Iowa and eventually across the continent. The bridge had one span near the middle of the river that could be opened to allow ships to pass—the longest draw span built at the time. Boats frequently ran into the bridge. One such accident in 1861 caused both the bridge and the boat to burn. When ice and wind damaged the bridge again in 1868, the government proposed moving it. The bridge has been moved and replaced several times since.
1856	<b>Bessemer Process</b> (Henry Bessemer, England)	
1859	<b>Internal Combustion Engines and Tractor</b> (Etienne Lenoir, Belgium)	
1863	<b>*Subway - London Subway</b> (England)	Authorized in 1854, the London Subway began operation in 1863. It is the world’s longest and oldest underground passenger-carrying system in the world. Early lines used steam engines. Advances in electricity and the use of tunnelling shields eventually made it possible for the system to use electric trains in deep-level tunnels.
1864	<b>Pullman Palace Rail Cars</b> (George Pullman, USA—Illinois)	Sleeping cars were being used in the U.S. since the 1830s but they were not very comfortable. George Pullman—cabinet-maker turned building contractor turned industrialist—created luxury rail cars that improved the rail travel experience. The luxuries included sleeping cars, dining cars, gourmet meals, electric lighting, plus heating and air conditioning systems. Trips over long distances could be made without stops for sleeping and eating.

1866	<b>Permanent Bridge Across the Ohio River -- John A. Roebling Bridge (USA-- Kentucky)</b>	By the mid-1800s, Cincinnati, Ohio had become the nation's leading inland port and ferry traffic to and from cities in Kentucky reached a level that made the need for a bridge apparent. The largest suspension bridge in the world at the time it was built, the <i>John A. Roebling Bridge</i> was the first permanent bridge over the Ohio River. It was originally called the Covington and Cincinnati Suspension Bridge. It is also known as the Ohio Bridge.
1867	<b>Dynamite (Alfred Nobel, Sweden)</b>	
1867	<b>*Steam-Powered Motorcycle (Sylvester Howard Roper, USA--Massachusetts)</b>	Sylvester Howard Roper invented a two-cylinder, steam-engine motorcycle (powered by coal) in 1867. This can be considered the first motorcycle, if you allow your description of a motorcycle to include a steam engine. The first gas-powered cycle is credited to German inventors Gottlieb Daimler and Wilhelm Maybach in 1885.
1867	<b>Combustion-Powered Submarine -- Ictineu II (Narcis Monturiol, France)</b>	The <i>Ictineu II</i> was the first successful combustion powered submarine. About 46 feet in length, Narcis Monturiol built it of wood with a copper layer. The engine used a chemical mix of manganese peroxide, zinc and potassium chlorate that reacted to create a temperature sufficient to produce steam. A byproduct, oxygen, was collected in tanks used for breathing and lighting. An intended use of the machine was to ease the harvest of coral. The <i>Ictineu II</i> was originally launched in 1864 as a human-powered submarine, propelled by 16 men.
1869	<b>Suez Canal</b>	
1869	<b>*Transcontinental Railroad (USA)</b>	In 1845, Asa Whitney presented to Congress a plan for the federal government to subsidize the building of a railroad from the Mississippi River to the Pacific coast. Congress enacted the Pacific Railroad Act in 1862—authorizing the Central Pacific and Union Pacific Companies to build a transcontinental rail line along the 42nd parallel. Public lands and loans were offered as incentives for every mile of track put down. In 1863 the Union Pacific began construction from Omaha, Nebraska, while the Central Pacific broke ground at Sacramento, California. The two lines met at Promontory Summit, Utah in 1869. By 1894, five transcontinental railroads were completed. NOTE: Transcontinental railroads of the time do not run from coast to coast, but from the Missouri River to the West Coast.
1869	<b>*Bicycle (James Starley, England)</b>	Starley introduced the pedal-driven human-powered vehicle with two wheels attached to a frame—one wheel behind the other. Bicycles provide the principal means of transport in many parts of the world. With increasing energy prices, they offer an alternative to automobiles for individual transport.
1874	<b>Major Rail Bridge Across the Mississippi - Eads Bridge (USA--Missouri)</b>	The Eads Bridge was the first major rail bridge over the Mississippi. It was constructed by the city of St. Louis in an attempt to maintain its dominance as a regional commercial hub. The structure consisted of 3 steel arches—the largest that had ever been constructed. It was also the first to be built of cast steel. Unlike the Rock Island Bridge (1859), the Eads Bridge remains today and continues to carry traffic across the river.
1879	<b>Air Brake (George Westinghouse, USA--New York)</b>	After watching a collision between two trains, George Westinghouse invented an improved braking system that could be operated by the locomotive engineer, without the delay of going through a brakeman. The device enabled trains to be stopped with fail-safe accuracy by the locomotive engineer for the first time. Previously, train accidents were frequent since brakes had to be applied manually on each car by different brakemen following a signal from the engineer.
1880	<b>Tunnel Boring Machine (Thomas English, England)</b>	

1880	<b>*Refrigerator Train Cars</b> (Gustavus Franklin Swift, USA –Illinois)	Swift developed the first practical ice-cooled railroad car which allowed his company to ship dressed meats to all parts of the country and even abroad—ushering in the era of “cheap beef.” His invention made it possible to transport perishable goods over long distances. Large-scale use of refrigerator cars began in 1887.
1882	<b>*Electric Trolley</b> (Ernst Werner von Siemens, Germany)	Siemens is considered the “father” of the trolleybus, which is also known as the electric bus or trackless trolley. The bus powered by two overhead electric wires—from which it draws electricity using two trolley poles—it is still used in cities around the world. Its value at the time was limited to local transport with the requisite infrastructure of electrical wiring. But it also showed the promise for electrical locomotives.
1884	<b>Controllable Lighter-Than-Air Craft -- La France</b> (Charles Renard and Arthur Krebs, France)	The first fully controllable lighter-than-air flight was made in a French Army electric-powered airship, <i>La France</i> , by Charles Renard and Arthur Krebs. The airship went 5 miles in 23 minutes.
1885	<b>*Practical Gas-Powered Autos - Motorwagon</b> (Karl Benz, Germany) AND <b>Horseless Carriage</b> (Gottlieb Daimler and Wilhelm Maybach, Germany)	Benz debuts what is considered the world's first practical automobile—a gas engine designed by Daimler powers it, Benz's three-wheel vehicle was built from the ground up. Gottlieb Daimler and Wilhelm Maybach followed the next year with their four-wheeled “horseless carriage”. As the name implies, the latter was actually a carriage for a horse modified to be operated with an engine.
1887	<b>Pneumatic Tire</b> (John Boyd Dunlop, Scotland)	Scottish engineer, Robert William Thomson patented the first pneumatic (inflatable) tire in 1845. The tire consisted of a canvas inner tube surrounded by a leather outer tire. Dunlop is credited with re-inventing the tire for his ten-year old son's tricycle in 1887. Dunlop's tire had a leather innertube and rubber treads. The invention of rubber inner tubes soon followed. His invention quickly caught on for bicycles and was later adapted for use on cars—significantly improving riding comfort.
1889	<b>*Reinforced Concrete Bridge in U.S. -- Alvord Lake Bridge</b> (Ernest L Ransome, USA—California)	Built in 1889, the Alvord Lake Bridge is believed to be the oldest reinforced concrete bridge in the U.S. Ernest Ransome, an innovator in reinforced concrete design and construction, designed it. Steel reinforcing bars were used to improve the performance of the concrete. The bridge survived the San Francisco earthquake and several subsequent tremors with no damage. The bridge now arches over a pedestrian entrance to San Francisco's Golden State Park.
1891	<b>*Rail Tunnel Under Water to Canada --St. Claire River Tunnel</b> (USA—Michigan)	The St. Claire River Tunnel was the first rail tunnel in the world built under water. It connects eastern Canada with the U.S.—encouraging and supporting trade between the neighboring countries. Before the tunnel, rail traffic from the Plains states had to detour south of the Great Lakes or rely on ferry transfer of cargo.
1893	<b>*Concrete Pavement</b> (George W. Bartholomew, USA –Ohio)	Bartholomew is credited with the invention of concrete pavement. In 1886, He moved to Bellefontaine, Ohio, after having learned about cement production. Bartholomew convinced the city council to pave a test strip on <i>Main Street</i> which proved successful. The council later approved the pavement of <i>Court Street</i> which is the first concrete paved street in the nation.
1893	<b>Diesel Engine</b> (Rudolf Diesel, Germany)	
1894	<b>Motor- Driven Helicopter</b> (Jan Bahyl, Hungary)	The modern motor-driven helicopter was invented by Jan Bahyl in 1894. Over the next decade, he constructed several improved helicopters. In 1905 his petrol-engine helicopter flew to a height of 13 feet for approximately one mile.
1895	<b>Truck and Bus</b> (Karl Benz and Netphener, Germany)	Karl Benz built the first truck in 1895. The motor vehicle used an internal combustion engine. Later the same year, some of his trucks were modified to become the first buses used by <i>Netphener</i> , the world's first bus company.

1895	<b>Internal Combustion/Electric Submarines</b> (John Phillip Holland, USA)	In 1895, the Irish-born inventor John Philip Holland designed a submarine that, for the first time, made use of internal combustion engine power on the surface and electric battery power for submerged operations. His vessels were purchased by navies around the world including the U.S., Britain, Russia and Japan.
1897	<b>Subway in U.S. - Boston Subway</b> (USA—Massachusetts)	Often called "America's First Subway", the original sections of Boston's subway opened in 1897 and 1898. The system was built to get streetcars off downtown streets. In 1901 an elevated section opened providing transit to outlying areas. All of this came three years before the first underground line of the New York City Subway but long after the first elevated railway in New York. The Boston Subway was the fifth in the world.
1900	<b>Streamliner -- Windsplitter</b> (Frederick Upham Adams, USA)	Inventor-author Frederick Upham Adams convinced the Baltimore & Ohio to build the Adams <i>Windsplitter</i> , an early streamlined train that reaches 85 miles per hour on test runs. By the turn of the twentieth century, Adams had been granted several patents for streamliner designs.
1900	<b>*Dirigible -- LZ1 Zeppelin</b> (Ferdinand von Zeppelin, Germany)	Count Ferdinand von Zeppelin, a former German cavalryman saw hot air balloons used during the American Civil War (1861-1865) and the Franco-Prussian War (1870-71). He spent much of the remainder of his life experimenting with balloons--particularly problems with steering maintaining their shape. Zeppelin's solution was a rigid but very light frame. Zeppelin's first flight in a "dirigible balloon" was in 1900. It lasted just 18 minutes before he was forced to land when a balancing weight broke. Upon repair, the dirigible beat the speed record of the <i>La France</i> which had made the first fully controllable lighter-than-air flight in 1884. Experiencing financial difficulty, Zeppelin was forced to disassemble the LZ-1, sell it for scrap, and close the company. With private donations, a lottery and government support supplementing his personal funds, Zeppelin's company was reopened and produced more than 100 additional dirigibles before the end of WWI. Many were used by the German military.
1901	<b>*Commercially Successful Automobile - Oldsmobile</b> (Ransom Olds, USA—Michigan)	The three-horsepower, curved-dash Oldsmobile was the first commercially successful American-made automobile: 425 of them were sold in 1901 and 5,000 in 1904. Noting its prosperity, 241 new automobile-manufacturing firms went into business in the U.S. between 1904 and 1908.
1901	<b>Routine Controlled Flights -- Number 6 Airship</b> (Alberto Santos-Dumont, France)	The first non-rigid aircraft to make routine controlled flights were non-rigid airships (later called "blimps".) Alberto Santos-Dumont's "Number 6" flew over Paris. His craft combined a balloon with an internal combustion engine. His 1901 flight lasted less than 30 minutes.
1903-1909	<b>Transcontinental Auto Trips</b> (Horatio Nelson Jackson and Alice Ramsey, USA)	
1905	<b>*Sustainable Flight by an Airplane -- Flyer</b> (Orville and Wilbur Wright, USA—North Carolina)	The Wright Brothers—two bicycle builders—are commonly credited with the invention of the aircraft. In fact, their 1903 flight which lasted 12 seconds was instead the first sustainable and well documented attempt of a heavier-than-air craft. Europeans had flown in self-powered aircraft as early 1880. By 1905, the Wrights did develop the world's first practical airplane.
1907	<b>Bakelite</b> (Leo Hendrik Baekeland (USA))	
1907	<b>*Helicopter Flight</b> (Paul Comu, France)	In 1907, French bicycle maker Paul Cornu became the first person to rise vertically in powered flight. His twin-rotored helicopter rose stayed in the air just a few seconds. Because of severe control and stability difficulties, it is considered the first (but impractical) helicopter flight.

1908	<b>*Affordable Automobile -- Model T</b> (Henry Ford, USA—Michigan)	Henry Ford’s use of mass production strategies to manufacture the Model T automobile makes the auto affordable to the masses and initiates a new era in personal transportation. The company produced 1,700 cars during its first full year of business. As of 1927 when production of the “Tin Lizzie” ended, 15 million vehicles had been sold. About half of the vehicles in the world were Model Ts at the time.
1909	<b>Commercial Passenger Service by Dirigible -- LZ-6</b> (The DELAG OR Deutsche Luftschiffahrts-AG, Germany)	The DELAG (Deutsche Luftschiffahrts-AG) is considered the first commercial airline. The company used Ferdinand von Zeppelin’s sixth dirigible attempt—the LZ-6 to provide the first commercial dirigible service. The aircraft could fly at 45 to 50 mph over thousands of miles without having to land. In the 5 years prior to the outbreak of World War I, Delag made 1,588 flights, safely carrying 34,228 passengers, covering a total of some 170,000 miles. For decades, dirigibles were the largest aircraft in use--far more capable than fixed wing aircraft in terms of cargo carrying capacity.
1910	<b>*Seaplane -- Le Canard</b> (Henri Fabre, France)	On March 28, 1910, the first successful seaplane take-off from water was made at Martinique, France. The seaplane or Hydravion was flown by its inventor, Henri Fabre and flew a 1650-foot distance over water. The plane was nicknamed "Le Canard" which means the duck.
1911	<b>Electrical Ignition</b> (Charles Kettering and Clyde Coleman, USA—Michigan)	The first electrical ignition system or electric starter motor for cars was invented by GM engineers Clyde Coleman and Charles Kettering. First installed in a Cadillac in 1911, the invention eliminated the need for hand cranking vehicles.
1911	<b>Hydroplane</b> (Glenn Curtiss, USA)	For years, Glenn Curtiss tried to convince the Navy of aviation’s potential. Test pilot Eugene Ely successfully landed and took off in a Curtiss plane from a Navy battleship in January 1911. But the Navy thought planes should be able to take off and land on water so they would not interfere during combat. One month later, Curtiss completed a hydroplane—a biplane fitted with floats--which he flew out close to the USS <i>Pennsylvania</i> . After landing, Curtiss was hoisted onto the ship. To return to land, he was lowered to the water where he took off. Curtiss is credited with the first successful seaplane flight in the U.S.
1911	<b>Flight Across U.S. -- Vin Fiz</b> (Cal Rodgers, USA)	Cal Rogers was the first person to fly across the U.S. He flew his Wright biplane from Sheepshead, NY to Pasadena, CA—starting September 17 and landing November 5, The plane was named after a new grape soft drink, Vin Fiz, which was being marketed by plane sponsor, Ogden B Armour of meat-packing fame. Cal Rodgers, one of the Wright brothers’ students, had learned to fly in June 1911 after only 90 minutes of flight lessons. Also of interest is the fact that he was deaf -the result of a childhood bout with scarlet fever.
1913	<b>*Lincoln Highway</b> Carl Fisher, USA)	In 1913, railroads dominated interstate transportation, and roadways were primarily of local interest. Many states had constitutional prohibitions against funding “internal improvements” such as road projects. The result was many poorly maintained rural roads. Carl Fisher—an early automobile enthusiast and racer who manufactured the headlights used on most early cars--called for a coast-to-coast rock highway. With his associates, Fisher established the Lincoln Highway Association to get private contributions for an improved highway that would be available for use free of tolls. The route chosen—from New York City to San Francisco—is now the same general corridor as Interstate 80.
1914	<b>Dixie Highway</b> Carl Fisher, USA)	In 1914, Fisher started promoting a second highway to connect the Midwest to the South. The Dixie Highway is best thought of as a network of interconnected paved roads versus a single highway that extended from Montreal, Canada to Miami, Florida. It was funded by individuals, businesses, local, and state governments. Fisher believed his two projects would demonstrate the value of highways to the nation’s agriculture and business.

1913	<b>4-Engine Airplane --The Grand</b> also referred to as the <b>Bolshoi Baltiski Aircraft</b> (Ihor Sikorsky, Russia)	The maiden flight of <i>The Grand</i> , the world's first four-engine airplane, occurred in St. Petersburg, Russia in 1913. Sikorsky both built and flew the plane. Before this flight, experts believed that such a craft was too big and much too heavy to rise from the ground. Even if it did become airborne, they reasoned, the aircraft would be impossible to control, especially if one or more engines failed. It was the inspiration for all subsequent large, multi-engined airplanes.
1914	<b>Panama Canal</b> (USA and Panama)	The Panama Canal connects the Atlantic to the Pacific Oceans via the isthmus of Panama in Central America. Ships no longer have to travel around Cape Horn at the tip of South America. The Canal reduced by more than half the distance sailing ships had to travel to get from New York to San Francisco.
1914	<b>Air Service in U.S. - Benoist Airline</b> (Thomas Benoist, USA--Florida)	On January 1, 1914, a wealthy manufacturer named Thomas Benoist launched air service between Tampa, Florida, and nearby St. Petersburg. The towns were separated by Tampa Bay. The only connections were once-a-day boat or train. The airline drew business all winter, but prospects faded with spring and the end of the tourist season. The airline shut down and flights were never resumed.
1916	<b>Controlled Helicopter Flight</b> (Raúl Pateras de Pescara, Argentina)	The first fully-controllable helicopter was demonstrated by Raúl Pateras de Pescara in Buenos Aires, Argentina.
1919	<b>*Transatlantic Flights BY Curtiss NC-4 Flying Boat</b> (Glenn Curtiss and A.C. Read) AND <b>Vickers Vimy</b> (John Alcock and Arthur Whitten Brown)	In May 1919, an NC-4 flying boat built by American Glenn Curtiss and piloted by Lieutenant Commander A.C. Read makes the first flight across the Atlantic from Newfoundland to Ireland. The trip in the U.S. Navy aircraft took over 19 days and made multiple stops along the way. One month later, in June 1919, British Captain John W. Alcock and Lieutenant Arthur Whitten Brown make a similar trip but this time it is nonstop. The 1980-mile flight took about 16 hours and ended in a crash landing. The aircraft was a modified Vickers Vimy—a twin-engine bomber.
1920	<b>Underwater Tunnel for Autos -- Holland Tunnel</b> (USA--New York)	The Holland Tunnel is the first underwater vehicular crossing of the Hudson River and the first tunnel specifically designed for automobiles and trucks. Previously, the trip could only be made by ferry. A major challenge was ventilation—it was feared that dangerous auto exhaust fumes would make travel through the tunnel impossible. Engineers designed an automatic ventilation system that produces purer air under the Hudson than was to be found above. When it opens, the tunnel is the longest underwater tunnel in the world. Its north tube is 8,558 feet long while its south tube has a length of 8,371.
1924	<b>Around-the-World Flight - Douglas World Cruiser--USA)</b>	In 1924 four Douglas World Cruisers and eight American crewmen set out from Seattle, Washington, to attempt the first around-the-world airplane flight. One hundred seventy-five days later three of the aircraft and crews became the first to circumnavigate earth—one plane crashed in dense fog over Alaska but the two crew members were able to hike out of the wilderness. The biplane could be operated either with wheels or floats. The trip's success was largely a result of extensive planning; 30 spare engines were dispatched all over the world prior to the flight; with co-operation of the Royal Air Force and the US Navy, 28 nations supplied thousands of gallons of fuel and oil along the flight path.
1925	<b>*Modern Airport -- Cleveland Hopkins Airport</b> (USA--Ohio)	Founded in 1925, this was the first municipally owned airport in the U.S. It has been the site of many airport firsts: the first airfield lighting system and the first air traffic control tower, both in 1930; and the first U.S. airport to be directly connected to a local or regional rail transit system, in 1968. It is considered the first modern airport.
1925	<b>*Diesel-Electric Locomotive</b> (Central Railroad of New Jersey, USA--New York)	The Central Railroad of New Jersey uses the first diesel-electric locomotive in regular switching service for its operations to New York City. In 1950—railroads decided to convert their entire locomotive fleets from steam to diesel power. Diesel locomotives required less maintenance and could handle far heavier loads than the other kinds of locomotives. In the west, the need to transport water to desert locations for thirsty steamers was also eliminated.

1925	<b>Aluminum</b> (Hans Christian Ørsted, Denmark)	
1926	<b>Liquid-Fueled Rocket</b> (Robert Goddard, USA--Massachusetts)	
1927	<b>*Rail Tunnel Through the Rockies -- Moffat Tunnel</b> (USA--Colorado)	This 6.2 mile rail tunnel united the eastern and western slopes of the Rocky Mountains. It was the longest in the Western Hemisphere at the time—shaving 173 miles off the trip from Denver to Salt Lake City. The tunnel served a second function as a water aqueduct carrying water to the city of Denver.
1927	<b>Transcontinental Bus Service -- Greyhound Lines</b> (Carl Wickman, USA)	
1926	<b>*Passenger Plane - Ford Trimotor</b> (Henry Ford, USA—Michigan)	In 1927, Ford Motor Company produced the <i>Ford Trimotor</i> , one of the first all-metal airplanes. Referred to as the "Tin Goose", it was the first plane created to carry passengers rather than mail, with a seating capacity of 12. As the name indicates, the airplane had three engines, which allowed it to fly higher and faster than other airplanes of the same time period—reaching speeds of up to 130 miles per hour. During the 1920s, the plane was the workhorse of American carriers. A total of 199 aircraft were produced by the time production ended in 1933. Planes such as the Vega which had a cruising speed of 150 mph in 1927 and the vastly superior Douglas DC-2 helped Ford to lose interest in aircraft production until World War II.
1927-1928	<b>Solo Transatlantic Flights -- Spirit of St. Louis</b> (Charles Lindbergh, USA) AND (Amelia Earhart, USA)	
1928	<b>*Transatlantic Passenger Service -- Graf Zeppelin</b> (Germany)	In 1928, the dirigible <i>Graf Zeppelin</i> named in honor of the German aviation pioneer Ferdinand von Zeppelin inaugurated the first commercial air passenger service across the Atlantic. In 1929, it circled the globe in 21 days, 5 hours and 31 minutes. Its average speed was 70 mph. By 1930, regular transatlantic service was available carrying about 60 passengers in the same luxurious style as the ocean liners. Travel time was about days. The dirigibles were at the height of their popularity when the 1937 Hindenburg disaster occurred killing 35 of the 97 passengers helped lead to the aircraft's demise.
1930	<b>Auto Tunnel Between Nations --Detroit-Windsor Tunnel</b> (USA and Canada)	The Detroit-Windsor Tunnel opens as the first vehicular subway ever built between two nations. Connecting Detroit, MI with Windsor, Canada, the underwater tunnel is approximately one mile long.
1930	<b>Aerodynamic Aircraft - Monomail</b> (Boeing, USA)	The Monomail made traditional biplane construction a design of the past. Its aerodynamic design also demonstrated the virtues of all-metal planes with the installation of retractable landing gear. The first Monomail was a mail plane but later models provided six-passenger transport.
1931-1933	<b>Faster Around-The-World Flights -- Winnie Mae</b> (Wiley Post and Harold Garry, USA)	Wiley Post, the one-eyed son of a poor farmer, and Harold Garry, a well-known Australian pilot achieve a new record for traveling around the globe in 1931. Taking off from Long Island, the pair make their trip in 8 days and 16 hours—beating the world record previously held by the <i>Graf Zeppelin</i> . Two years later, Post made the same flight solo, bettering his and Garry's record by nearly a full day. Both flights were in a plywood airplane called the <i>Winnie Mae</i> .
1930	<b>Seaplane -- S-40</b> (Igor Sikorsky, USA)	The <i>S-40</i> was the first of a series of seaplanes built by Russian immigrant Sikorsky for Pan Am Airways and the largest commercial aircraft of its time. The <i>S-40</i> and its successors were referred to as <i>Clippers</i> after the great ocean sailing ships—the name was the brain child of Pan American's owner Juan Trippe. Planes that were water-based could be larger in size and have multiple engines—this made it pos-

		sible for them to carry fuel for longer flights as well as more cargo.
1933	<b>*Modern Passenger Plane -- Boeing Model 247</b> (Boeing, USA) AND <b>DC-2/3 Aircraft</b> (Douglas Aircraft Company, USA)	The Boeing Model 247 was an all-metal, twin-engine airplane and is considered the first modern passenger plane. Carrying 3 crew members, 10 passengers and up to 400 pounds of mail, the aircraft had a cruising speed of 189 mph and range of 747 miles. So many 247s were ordered that the Boeing Company had to turn down a request from TWA for more. TWA turned to a smaller builder, the Douglas Company and asked for a similar plane on trial. The DC-2/3 that was produced is considered the most significant commercial plane ever built—it showed that flying could be safe, comfortable, reliable, affordable, and profitable for the operator.
1934	<b>*Coast-to-Coast Passenger Service by Landplane --Sky Chief/DC-2 Aircraft</b> (TWA, USA)	In 1934, TWA put DC-2s on overnight flights from New York to Los Angeles, CA Called <i>The Sky Chief</i> , the flight left New York at 4 p.m. and, after stops in Chicago, IL, Kansas City, MO, and Albuquerque, NM, arrived in Los Angeles at 7 a.m. For the first time, the air traveler could fly from coast to coast without losing the business day.. The DC-2 is credited with changing flight from curiosity to standard transport. The twin-engine plane had a top speed of 192 mph and a range of 1,495 miles. It could accommodate 3 crew and 14 sleeper passengers or 21 to 28 day passengers.
1934	<b>Internal-Combustion Streamliner -- M-10000 or Little Zip train</b> (Union Pacific, USA)	Completed in February 1934, <i>Little Zip</i> was the first internal combustion, lightweight streamline train in the U.S. The streamliner consisted of a set of three rail cars that were permanently coupled together—a driving, power and baggage car at the front, and two passenger cars. The train was much lighter than the common engine and passenger cars of the day because it was constructed of stainless steel. Running on a fuel similar to kerosene, the car bodies were built by Pullman-Standard while the engines, mechanical and electrical components were from General Motors. This train was later renamed <i>The City of Salina</i> .
1934	<b>*Fully Controllable Helicopter -- Focke-Wulf Fw 61</b> (Heinrich Focke and Gerd Achgelis, Germany)	Professor Heinrich Focke and engineer Gerd Achgelis first flew the prototype <i>Focke-Wulf Fw 61</i> in 1934. It was the first fully controllable helicopter. The airframe was based on that of a well-trying training aircraft. A single engine drove twin rotors, to the left and right of the fuselage. When it was demonstrated in Berlin, Germany in 1936 it achieved an altitude of nearly 8000 feet, a speed of 76 mph, a flight duration of 80 minutes and a distance of over 50 miles. It is considered the first practical helicopter.
1936	<b>*Passenger Service Across the Pacific by Seaplane</b> (Pan American, USA) AND <b>M-130 Seaplane</b> (Glen Martin Company, USA)	In October 1936, Pan American inaugurated its first passenger flights across the Pacific by carrying nine travelers. Each passenger paid more than \$1,400 for the round-trip from San Francisco to Manila, an astronomical sum at that time. The four-engine M-130 seaplane produced by the Glen Martin Company was designed specifically for these flights. The plane nicknamed the China Clipper could carry 41 passengers. It traveled at 130 mph and had a range of 3,200 miles.
1937	<b>Largest Suspension Bridge at Time - Golden Gate Bridge</b> (USA—California )	Connecting San Francisco with Oakland, the Golden Gate Bridge is the largest suspension bridge in the world at the time it was completed.
1938-1939	<b>High-Altitude Plane -- Boeing 307 Stratoliner</b> (Boeing, USA) AND <b>Constellation</b> (Howard Hughes and Lockheed Air, USA)	Making its first flight in 1938, the Boeing Model 307 Stratoliner was the world's first high-altitude commercial transport and the first four-engine airliner in scheduled domestic service. Its pressurized cabin allowed the airplane to fly above bad weather at an altitude of 26,200 feet—higher than any other transport of its time. Setting new standards for speed and comfort, the plane could carry 5 crew members and 33 passengers up to 2,390 miles. The Stratoliner was the first airplane to have a flight engineer as a member of the crew. The engineer was responsible for maintaining power settings, pressurization and other subsystems, leaving the pilot free to concentrate on other aspects of flying the aircraft. In 1939, Howard Hughes—majority owner of TWA—asked Lockheed to build the Constellation. This high-altitude plane had its virgin flight in 1943—flying as fast as fighter aircraft of the day.. The plane could cross the nation nonstop—cutting about 8 hours off the trip.

1939	<b>*Passenger Service Across the Atlantic by Seaplane -- B-314 Seaplane</b> (Pan American and Boeing, USA)	Pan American began the world's first transatlantic passenger service using Boeing's B-314 seaplane between New York and Southampton. Passengers paid \$375 for a one-way trip across the ocean. Passengers enjoyed the comforts of dressing rooms, a dining salon that could be turned into a lounge and a bridal suite. The Clipper's 74 seats converted into 40 bunks for overnight travelers. Four-star hotels catered gourmet meals served from its galley. The B-314 was the largest commercial plane in scheduled use until the coming of the jumbo jets 30 years later. At a top speed of 199 mph, the four-engine plane had a range of 5,200 miles and a crew of 10. Scheduled flight time was about 29 hours.
1940	<b>Bantam Reconnaissance Car OR Jeep</b> (Bantam Car Company, USA--Pennsylvania)	In 1940, the Bantam Car Company of Butler, PA developed the <i>Bantam Reconnaissance Car</i> in response to a US Army request for a prototype of an all-purpose military vehicle. The new vehicle was nicknamed "the Jeep" and General Dwight D. Eisenhower said that the U.S. could not have won World War II without it.
1939	<b>*Jet Aircraft</b> (Frank Whittle, England and Hans von Ohain, Germany)	A jet engine is an engine that accelerates and discharges a fast moving jet of fluid to generate thrust. Frank Wittle submitted papers for a patent on a jet aircraft engine in 1930 but it took another decade (1941) until the engine is fitted into a plane and actually flies. Apparently unaware of Whittle's efforts, German Hans von Ohain started work on a similar design in 1935. Ohain's engine was fitted into an He 178 airframe and flies in 1939 garnering the title as the world's first jetplane. The first American jet plane flight was by Robert Stanley, chief pilot for Bell Aircraft Corp.
1943	<b>Computer -- ENIAC</b> (J. Presper Eckert and John Machly, USA--Pennsylvania)	
1945	<b>Transatlantic Passenger Service by Landplane</b> (American Export)	American Export became the world's first airline to offer regularly scheduled landplane (as opposed to seaplane) commercial flights across the North Atlantic. Using the DC-4 aircraft, it began passenger services from New York to England (with stops in Newfoundland and Ireland) in October 1945. Each one-way flight lasted about 14 hours. Pan American debuted its own flights a few days later. Eventually, Pan Am began using the new Lockheed Constellation and Super Constellation aircraft.
1946	<b>Ballistic Missile - V-2</b> (Germany)	
1947	<b>Faster than Sound Flight-- Bell X-1 Aircraft</b> (Chuck Yeager, USA)	Test pilot Chuck Yeager is credited as the first person to fly faster than the speed of sound. Yeager exceeded Mach 1 in the rocket powered Bell X-1, an experimental aircraft. Anecdotal evidence exists that some fighter pilots may have done so earlier while divebombing ground targets during the war. Yeager's flight is considered the first controlled, level flight to cross the sound barrier.
1947	<b>Largest Flying Boat and Wingspan -- H-4 Hercules OR Spruce Goose Aircraft</b> (Hughes Aircraft, USA)	The <i>H-4 Hercules</i> ( <i>Spruce Goose</i> ) was designed and built by Howard Hughes' Hughes Aircraft company. The nickname arose as a way of mocking the project due to company's alleged misuse of government funding for the project. The Hercules is the largest flying boat and has the largest wingspan of any aircraft ever built. Due to wartime restrictions on metals, the H-4 was built almost entirely of laminated birch, not spruce as its nickname suggests. The aircraft was a marvel in its time. It married a soon-to-be outdated technology – flying boats – to a massive airframe that required some truly ingenious engineering innovations. Only one was ever built.
1949	<b>Nonstop Around-the-World Flight - Boeing B-50A Superfortress</b> (James Gallagher, USA--Texas)	Capt. James Gallagher and U.S. Air Force crew of 13 flew a Boeing B-50A Superfortress around the world nonstop from Ft. Worth, returning to same point: 23,452 miles in 94 hours and 1 minute. Four aerial refuelings were made en route.
1951	<b>Nuclear Energy - EBR-1 Reactor</b> (USA--Idaho)	

1952	<b>Jet Plane - Comet</b> (de Havilland, England)	The first commercial passenger flight of a jet airliner flew from London, England to Johannesburg, South Africa. The airliner was about twice as fast as contemporary craft.
1953	<b>Practical Solar Cell</b> (Gerald Pearson, Daryl Chapin and Calvin Fuller, Bell Labs, USA)	
1954	<b>Nuclear Submarine - USS Nautilus</b> (Hyman Rickover and Philip Abelson, USA)	Soon after World War II, Hyman G. Rickover - an electrical engineer and U.S. Navy Admiral—became a proponent of nuclear-powered naval vessels. His efforts led to the development of the world’s first nuclear powered submarine, the USS Nautilus, which was launched in 1954 of the U.S. Navy. With a speed of 18 knots above water, it could travel 23 knots submerged. Operation of the vessel depended on a nuclear reactor which generated heat that turns water into steam to drive the turbine. A nuclear-powered aircraft carrier, <i>USS Enterprise</i> , followed in 1960 while a cruiser, <i>USS Long Beach</i> , was launched in 1961. Rickover is referred to as the “Father of the Nuclear Navy.” A contributor to the development of the Nautilus, Philip Abelson has been called the “Father of the Nuclear Submarine.”
1955	<b>Container Ship -- Ideal-X</b> (Malcom McLean, USA—North Caroline)	Malcom McLean, a trucking entrepreneur, bought a steamship company in 1955 with the idea of using its ships to transport cargo-laden truck trailers. McLean’s experiment resulted in the world’s first container ship, the <i>Ideal-X</i> . It made its inaugural voyage from New Jersey to Texas in 1956 with 58 containers on its deck. McLean’s enterprise became Sea-Land Services—an international shipping company. Prior to this time, most cargo was loaded and unloaded by hand by longshoremen. Hand loading a ship cost \$5.86 a ton. Using containers, it cost only 16 cents a ton to load a ship. Goods in standardized steel containers can now be easily moved from train to truck to ship.
1957	<b>*Jet Passenger Service-- Boeing 707</b> (Boeing, USA) AND <b>DC-8</b> (Douglas Corporation, USA)	The 707 first flew in 1957. It has a range of 3,000 feet and an altitude ceiling of 41,000 feet. It can accommodate up to 181 passengers. A year later, Douglas introduced its competitor, the DC-8 which had a range of 4,773 miles and an altitude ceiling of 35,000 feet. Its speed was 570 mph. It could accommodate 3 crew, 8 attendants and 117 to 259 passengers. In the same year, Pan American started providing daily jet service from New York to London. National Airlines began domestic service between New York and Miami.
1957	<b>Satellite - Sputnik 1</b> (Soviet Union)	
1958	<b>U.S. Satellite - Explorer I</b> (William Pickering and James Van Allen, USA)	The Explorer-I, officially known as Satellite 1958 Alpha, was the first earth satellite. sent aloft by the U.S. it was designed by the Jet Propulsion Laboratory of the California Institute for Technology under the direction of Dr. William H. Pickering. The satellite’s instrumentation was designed and built by Dr. James Van Allen of the University of Iowa. It’s launch was in February 1958.
1958	<b>Solar- Satellite -- Vanguard I</b> (Hans Ziegler and the U.S. Navy, USA)	
1958	<b>Longest Suspension Bridge at Time -- Mackinac Bridge</b> (USA—Michigan)	The Mackinac Bridge spanning the Straits of Mackinac connects Michigan’s upper and lower peninsulas. At the time, it was the world’s longest suspension bridge between anchorages—it is now third in the world.
1959	<b>Saint Lawrence Seaway</b> (USA and Canada)	The Saint Lawrence Seaway in its broadest sense is the system of canals that permits ocean-going vessels to travel from the Atlantic Ocean to the Great Lakes as far as Lake Superior.

1959	<b>*Modern Electric Auto -- Henney Kilowatt</b> (Eureka-Williams Company), USA—New York)	The Henney Kilowatt was a 1959 to 1961 Renault Dauphine converted to electric power. It is considered the first modern production of an electric car. Boasting a top speed of 35 mph and a range of 40 miles per charge, the vehicle was priced at \$3,600 in 1961. Approximately 120 were manufactured with the great majority purchased by electrical utility companies for use by meter readers. The vehicle was built by the Eureka-Williams company (of Eureka vacuum cleaner fame) . Electric vehicles have met with little success in the marketplace due to a lack of a national network for recharging automobile batteries and the relatively limited range which these electric vehicles can achieve without recharging
1961	<b>*Manned Space Flight - Vostok 1</b> (Yuri Gagarin, Russia)	Russian cosmonaut Yuri Gagarin becomes the first human to travel into space on board the Vostok I in April 1961. Gagarin orbited the earth once, in 108 minutes, and returned unharmed. He ejected from the Vostok capsule about 23,000 feet above the ground and parachuted to the ground. A landing was too rough for cosmonauts to risk.
1962	<b>U.S. Manned Space Flight -- Friendship 7</b> (John Glenn, USA)	Astronaut John Glenn was the first U.S. pilot to travel to space. His trip around the earth was aboard <i>Friendship</i> in February 1962.. The Mercury Atlas mission lasts 4 hours, 55 minutes, and 23 seconds. Three orbits were completed.
1964	<b>Electric Truck</b> (Batronic Truck Company, USA)	In the early 1960s, an auto body company joined with a truck company and an electric battery company to form the Balltronic Truck Company. It delivered its first electric truck to the Potomac Edison Company in 1964. This truck was capable of speeds of 25 mph, a range of 62 miles and a payload of 2,500 pounds. Batronic worked with General Electric from 1973 to 1983 to produce 175 utility vans for use in the utility industry and to demonstrate the capabilities of battery-powered vehicles. Batronic also developed and produced about 20 passenger buses in the mid 1970s.
1964	<b>Longest Suspension Bridge at the Time -- Verrazano-Narrows Bridge</b> (USA—New York)	Connecting the borough of Staten Island and Brooklyn, the Verrazano-Narrows Bridge is the longest suspension bridge in the U.S. As of 2006, it has the 7 <sup>th</sup> longest span in the world.
1964	<b>Combination of Structures -- Chesapeake Bay Bridge-Tunnel</b> (USA—Virginia)	Crossing the mouth of the Chesapeake Bay, this Bridge-Tunnel connects Virginia's Eastern Shore and the Norfolk/Virginia Beach area. Although individual components are not the longest or largest ever built, it is unique in the number of different types of structures. Money for the project was strictly through revenue bonds to private investors. No local, state or federal tax money was used in the construction of the project.
1964	<b>*Bullet Train</b> (Japan)	The Japanese <i>Shinkansen</i> , or <i>Bullet Train</i> , runs at speeds of more than 100 mph over special tracks with minimal curves connecting Tokyo and Osaka. Its top speed was originally 130 mph. In 1997, a newer version of the <i>Bullet Train</i> became the fastest scheduled train in the world, regularly reaching speeds of up to 186 mph.
1969	<b>Longest Bridge --The Lake Pontchartrain Causeway</b> (USA—Louisiana)	<i>The Lake Pontchartrain Causeway</i> is completed with parallel bridges across Lake Pontchartrain in southern Louisiana—the longest bridge in the world by total length.
1969	<b>*Landing on the Moon -- Apollo 11</b> (Neil Armstrong, Buzz Aldrin and Michael Collins, USA)	<i>Apollo 11</i> was the fifth human space flight of the Apollo program, the third human voyage to the moon, and the first manned mission to land on the Moon. It launched in 1969 carrying Neil Armstrong, Michael Collins and Edwin 'Buzz' Aldrin. Armstrong and Aldrin became the first humans to set foot on the Moon, while Collins orbited.
1969	<b>*Jumbo Jet -- Boeing 747</b> (Boeing Company, USA)	First flown in 1969, the 747 is the first commercial jumbo jet. Its construction required the world's largest building. The passenger version has two decks that can accommodate up to 490 passengers and 33 attendants. Its cruising speed is 640 mph and it has a range of 6,000 miles. Its altitude ceiling is 45,000 feet. Today's model can fly non-stop from New York to Hong Kong—a third of the way around the world.

1969	<b>*Supersonic Aircraft - Concorde</b> (Britain and France)	The Concorde—the first supersonic aircraft—never lived up to expectations. With soaring fuel prices and ticket prices of \$9,000 per flight, airlines found it difficult to operate profitably. There were also regulatory difficulties regarding supersonic flight over land. Its first regularly scheduled commercial flight was in 1976. A transatlantic flight could be made in 3.5 hours versus 8 hours in subsonic flight. With the five-hour time difference, passengers arrived in New York from London before they left—traveling faster than the sun. The final commercial flight of a Concorde in 2003.
1970s	<b>Affordable Solar Cell</b> (Elliot Berman and Exxon Corp, USA)	
1973	<b>Overnight Package Service -- Federal Express Corp.</b> Frederick W. Smith (USA–Tennessee)	Now known as FedEx, <i>Federal Express</i> was founded in 1971 by Frederick Smith in Little Rock, AR. When Little Rock airport officials refused to provide facilities for the fledging airline, it was moved to Memphis, TN and began operation in 1973 using 14 planes connecting 25 cities. The company was the first cargo airline to use jet aircraft for its services. It has become the world leader in overnight shipping.
1977-1979	<b>*Human-Powered Aircraft - Gossamer Albatross</b> (Paul MacCready and Bryan Allen, USA and England)	The <i>Gossamer Albatross</i> was the first human-powered aircraft to successfully cross the English Channel. California engineer Paul B. MacCready built the craft while Bryan Allen piloted and powered it. The feat won the second Kremer prize given to pioneers of human-powered flight. The first prize was awarded to MacCready when the same aircraft flew in a figure eight around two markers one-half mile apart in 1977. The monetary award were established in 1959 by industrialist Henry Kremer.
1980	<b>*Solar Aircraft - Solar Challenger</b> (Paul MacCready and AeroVironment, Inc., USA)	Paul MacCready builds the first solar-powered aircraft – the <i>Solar Challenger</i> and Steve Ptacek takes it for its first flight November 1980. The next month, <i>the craft makes its first long-distance flight powered by Janice Brown. She flies 6 miles in 22 minutes near Marana, Arizona.</i> The craft was powered by a 2.75-horsepower engine. In 1981, the <i>craft</i> flies from France to England across the English Channel. MacCready saw solar power as a way to "help business and government recognize and meet their environmental and energy objectives."
1981	<b>*Space Shuttle - Columbia</b> (John Young and Robert Crippen, USA)	The reusable Columbia Space Shuttle launched in 1981 with two crew members-- John W. Young, and Robert L. Crippen—from Kennedy Space Center in Florida. Later shuttles carried large payloads to various orbits, provided crew rotation for the International Space Station, and performed service missions. The shuttle was destroyed with all seven astronauts killed upon reentry from a mission in 2003.
1982-1987	<b>*Solar Car - BP Quiet Achiever AND World Solar Challenge</b> (Hans Tholstrup, Australia)	Danish born adventurer Hans Tholstrup drives the first solar-powered car – the BP Quiet Achiever – almost 2,800 miles between Sydney and Perth, Australia in 20 days – 10 days faster than the first gasoline-powered car to do so. In 1986 Tholstrup came up with the idea of a race and invited the Chairman of General Motors to build a solar car to be entered in the World Solar Challenge which was held in 1987. The race was held every three years until 1999 when it was switched to a two year event. Most of the solar racers are fielded by universities or corporations, though some are fielded by high schools. At present, solar cars are not considered practical because insufficient power falls on the roof of a practically sized and shaped vehicle to provide adequate performance.
1986	<b>*Nonstop Flight Around the World Without Refueling - Voyager Aircraft</b> (Dick Rutan and Jeana Yeager, USA)	In December 1986, Dick Rutan and Jeana Yeager (no relation to test pilot Chuck Yeager) flew nonstop around the globe in their plane, the <i>Voyager</i> . Taking nine days, three minutes, and 44 seconds they traveled 24,986 miles and established a nonstop global record.

1988	<b>Largest Commercial Plane - AN-225 Aircraft</b> (Antonov, Ukraine)	The AN-225 was designed for the Soviet space program to airlift rocket boosters and the Russian space shuttle. It's mission was almost identical to that of the U.S. Shuttle Aircraft. The plane first flew in December of 1988 and is still in service. Since 2001, the plane has been used in diverse commercial, military and humanitarian efforts. Even with the introduction of the Airbus 380 in 2005, the An-255 retains the record as the world's largest commercial aircraft--lthough its passenger capacity is only about 80. Only one operational aircraft currently exists.
1988	<b>Longest Rail Tunnel - Seikan Tunnel</b> (Japan)	Connecting the islands of Honshu and Hokkaido, this is presently (as of 2006) the longest railway tunnel in the world. It has a length of 33.4 miles--of which 14.5 miles is under the sea. It will eventually be surpassed by the Gotthard Base Tunnel with a a planned length of 35 miles. The latter is still under construction in Switzerland.
1989	<b>*Tiltrotor Aircraft - V-22 Osprey</b> (Bell Boeing, USA)	Designed for the U.S. Military and built by Bell Boeing, the V-22 Tiltrotor Osprey takes off and lands like a helicopter. Once airborne, its can convert to a turboprop airplane capable of high-speed, high-altitude flight.
1990	<b>Fastest Train - TVG High Speed Train</b> (France)	In 1981, the TGV becomes the first operational high-speed rail line in Europe. It runs between Paris and Lyon--the two largest cities in France. TGV is the abbreviation for Train à Grande Vitesse which translated means high speed train. Running regularly at 168-185 mph, the train cuts the journey time between the two cities from 4 hours 30 minutes to 2 hours. A modified TGV set a world speed record in 1990 when it hit 320 mph in trial runs.
1994	<b>Second Longest Rail Tunnel -- The Channel Tunnel</b> (England and France)	Connecting England to continental Europe, this is the second-longest rail tunnel in the world. Length: 31 miles of which 24 miles is under the sea.
1990s	<b>*Hybrid Autos -- Honda Insight and Toyota Prius</b> Japan and USA)	In the 1990s automakers began selling "hybrid" automobiles which retain the driving range of internal combustion engines with the environmentally desirable characteristics of electric motors. Sales of hybrid vehicles has been increasing in recent years--in part due to government incentives (tax credits) encouraging their purchase.
2001	<b>*Segway Human Transporter</b> (Dean Kamen, (USA)	The Segway Human Transporter is the first self-balancing, electric personal transportation machine. A computer helps keep the device upright. With a top speed of about 12 mph, the device has no brakes. Its speed and direction (including stopping) are controlled by the rider shifting weight and a manual turning mechanism on one of the handlebars. It can travel smoothly across pavement, gravel, grass, and small obstacles. One battery charge lasts 15 miles.
2005	<b>*Superjumbo Jet Plane - Airbus 380</b> (Airbus S.A.S., Europe)	Designed in part to deal with growing airport congestion and air traffic control systems struggling to cope with the number of aircraft in operation, the <i>Airbus A380</i> is a double-deck, four-engine plane manufactured by Airbus S.A.S. - a consortium of European aviation companies. The plane nicknamed "Superjumbo" first flew in April 2005 from Toulouse, France. It s expected to be in commercial service by the end of 2006 or early 2007. The A380 can seat up to 853 people making it the largest passenger airliner in the world . It will supersede the Boeing 747 which has held this distinction for 35 years. (The Antonov AN-225 continues to be the largest aircraft but it's passenger capacity is limited to 80.) Airbus has proposed configuring some cargo compartments as shops, lounges, or even casinos
2005	<b>Nonstop Solo Flight Around the World Without Refueling - Virgin Atlantic Globalflyer</b> (Steve Fossett, Dick Rutan and Richard Branson, USA)	The first nonstop solo flight around the world without refueling was made by financier and adventurer Steve Fossett in 2005. Fossett's flight in the single-seat <i>Globalflyer</i> began and ended in Salina, Kansas. He flew the 22,878 miles in 76 hours and 45 minutes. The aircraft was designed by Burt Rutan. built by Rutan's company, Scaled Composites, and financed by Richard Branson's Airline, Virgin Atlantic.