# *“IFHUMANS WERE MEANT TO FLY, THEY WOULD HAVE BEEN BORN WITH WINGS!”*

**Over the years there were many different ideas about the world. Ancient Greeks believed that the Earth floated in the ocean. Early Chinese believed the sky was a round dome surrounding a flat square shaped Earth. In Egypt, it was believed that the Earth was flat with the sky being supported at four places by mountains. These early people had only a very narrow and limited view of the world they inhabited.**

**As time passed more and more countries sent ships out to trade with people from other countries. Greece happened to be a center of trade routes where people from different countries met and exchanged ideas along with goods. One idea that grew from those many encounters was a ball shaped Earth. This idea was probably set forth by Pythagoras or one of his students more than 2,500 years ago.**

**By the time Columbus sailed in 1492, many educated people believed in a ball shaped Earth. They disagreed on the size. Some felt Columbus and his crew would run out of food before they reached land. However many more believed the Earth to be flat. They felt that Columbus would sail out to the edge and then fall over. People made many of their decisions based upon the evidence given to them by their senses and after all don’t we live in a horizontal world?**

**When the pioneers traveled across this great land from east to west, they traveled by foot, horse, wagon, or train. They crossed a horizontal land and measured their journey in hours, days, weeks, and years. Their judgments of the world they lived in were guided by their senses. The only vertical explorers were animals with wings and they soared magnificently across the sky.**

**So it came as no surprise that when some adventurous and imaginative individuals decided they would try to copy the flight of birds by building a wide assortment of unique devices and proceeded to test them out by perhaps jumping off a bridge only to meet their end, that many observers commented knowingly: “*Why if humans were meant to fly they would have been born with wings!”***

*"The earth is the cradle of humankind, but one cannot live in the cradle forever."*
*Konstantin Tsiolkovsky, Kaluga, 1911*

**It's getting out of the cradle that is tough. The process has been developing and evolving over hundreds of years by a large and diverse group of individual thinkers, dreamers, experimenters, and adventurers. So at this point we will peer back into the depths of the past and work forward to some of the individuals of today who are leading us to the future and possibly finally a way "out of the cradle".**

**We begin with three individuals who helped us better understand the forces that govern our little planet and the universe in which it is found.**

*"We shall not obtain the best insight into things until we actually see them growing from the beginning."*
*Aristotle, 330 B.C.*

**Aristotle was a philosopher and a teacher in Athens, Greece. Some of the ideas he passed along to his students in the Lyceum were certainly wrong but still he laid the foundation for Albert Einstein's 1915 discovery of General Relativity. At the time he taught his pupils that "Earth things" such as clay and rocks fall down because they are trying to find their natural place at the center of Earth. He also explained that it is obvious from observations that a large heavy object must fall to the ground faster than a small object. Aristotle never did any experiments. His conclusions were based upon his observations. Surprisingly his ideas were passed on for two thousand years before someone came along and proved them to be false.**

**Italian born Galileo Galilei, 1564 – 1642, was a mathematician, inventor, teacher, and experimental scientist. As with most students in his time he studied the writings and teachings of Aristotle. While teaching at the University of Pisa he began investigating Aristotle's idea that heavy objects fall faster than lighter ones. In the late 1500's he dropped two cannonballs at exactly the same time from the top of the Leaning Tower of Pisa. One cannonball had ten times the mass of the other cannonball. According to Aristotle the heavier cannonball should have hit the ground first. As it turned out both cannonballs hit the ground at exactly the same time thereby proving Aristotle's idea to be wrong! In testing Aristotle's ideas about falling bodies, Galileo concluded that all objects accelerate at the same rate as they fall to the ground. Later in life he went on to perfect the refracting telescope.**

**Isaac Newton (1643-1727): Born in England, Isaac Newton was a physicist, mathematician and astronomer. In 1665 Isaac returned to his mother's farmhouse in Woolsthorpe to escape the bubonic plague that raged through the city of London. It was while there he observed an apple falling from a tree and began to wonder about the force that brought the apple to the ground. The gravitational force that brought the apple down must extend much further perhaps even as high as the Moon. He eventually proved that the same force that keeps the Moon in orbit also keeps the planets in their orbits around the sun. He called this Universal Gravitation. Every object in the Universe attracts every other object with a force directed along the line of centers for the two objects that is proportional to the product of their masses and inversely proportional to the square of the separation between the two objects. He later invented calculus and the reflecting telescope.**

***"Eventually we must leave Earth—at least a certain number of our progeny must as our sun approaches the end of its solar life cycle. But just as terrestrial explorers have always led the way for settlers, this will also happen extraterrestrially. Earth is our cradle, not our final destiny."***
***Astronaut Edgar Mitchell, the Way of the Explorer, 1996***

**Milestones of flight are measured by individual acts of courage. Each step has expanded our boundaries and led us to the future. Here are a few examples.**

**The first manned balloon flight occurred on November 21, 1783. The seventy foot paper lined linen bag soared 3000 feet above Paris and traveled 5 miles! The flight lasted 25 minutes. This first travel to the vertical was the result of the ingenuity and courage of the Mongolfier brothers.**

**Balloon travel at first was a novelty but later was used in war time for military observations. In the 1930's balloon flight across the Atlantic in the form of dirigibles was popular. Unfortunately, that form of travel ended with the sudden explosion of the German zeppelin the *Hindenburg* over Lakehurst, New Jersey in 1937.**

**But it wasn't until 1903 when the Wright flyer lifted off the ground that the dream of flight finally became a reality. No longer at the mercy of the wind, this plane commanded speed and controlled flight.**

**The airplane proved its usefulness during battle in the brutal fighting that occurred in World War I. Later, after the war, the young adventurous pilots, seeking a way to earn money, took their flying skills across the country putting on flying shows and bringing the airplane to millions of people. Along the way they inspired many future pilots such as Amelia**

**Earhart. This was the day of the *Barnstormers*, the days of the "Roaring Twenties".**

**On May 20, 1927 a twenty-five year old Charles Lindburg took off from Roosevelt Field in the *Spirit of St. Louis* and flew non-stop across the Atlantic to Paris in 33 ½ hours. He received a ticker tape reception upon returning home. Today his airplane still flies high in the Smithsonian Institution's National Air and Space Museum.**

**Amelia Earhart was a passenger on a 21 hour flight from Newfoundland to Wales on June 17, 1928. Less than four years later she flew her own plane from Newfoundland to Paris. Unfortunately, she landed in Ireland. Nonetheless she was the first woman to accomplish that flight. On January 11, 1935 she was the first to fly solo across the Pacific from Honolulu to Oakland, California. In June of 1937 she attempted to fly around the world but was declared lost at sea a short time later. She once said, "Failure must be but a challenge to others."**

**Howard Hughes was a pilot and self-taught aircraft engineer. He designed and built several aircraft himself while heading Hughes Aircraft Company. In 1935, he set an airspeed record of 352 miles per hour. He set a transcontinental airspeed record by flying non-stop from Los Angeles to New York City in 7 hours 28 minutes and 25 seconds in 1937. In 1938 he traveled around the world in 91 hours. He built a 190 ton aircraft out of birch wood and named it *Hercules* but it became better known as the *Spruce Goose*. Although it flew only once and traveled only one mile, Hughes proved that a plane that size could in fact fly. This was the beginning of the mega-transport planes that were used in later years to transport troops and machinery to other countries. Today the Airbus landed in the the United States. It carries 550 passengers and**

**has a wingspan the length of a football field. Thanks Mr. Hughes!**

**Chuck Yeager was a US Air Force pilot during World War II. After the war he worked as a test pilot. On October 14, 1947 while flying a rocket powered Bell X-1, he was the first to travel faster than sound (Mach 1. 6) at an altitude of 45,000 feet. He did this with two broken ribs.**

**Robert Goddard, 1882-1945, is known as the "Father of Modern Rocketry". Early in his life he predicted man's journey to Mars. He spent many years perfecting a liquid propellant rocket. He used liquid Hydrogen and liquid Oxygen as fuel. His first successful rocket was launched on March 16, 1926 in Auburn, Massachusetts. He was the first to place the motor at the bottom of the rocket. He developed a gyroscope system for flight control and a payload compartment for scientific instruments. He also had a parachute recovery system to return the rocket safely to the ground. His last rocket was launched in 1941 with many special features such as a combustion cooling chamber, thermally insulated propellant tanks, turbo pumps, and automatic stabilization.**

**Konstantin Tsiolkovsky, 1857 – 1935 was a Russian teacher who enthusiastically promoted spaceflight. He wrote over 500 scientific papers and influenced many young Russian engineers and designers. Among them was Sergey Korolev who became the chief designer of the Soviet space program and who in 1957 launched Sputnik. He also launched the first cosmonaut Yuri Gagarin.**

**In 1961 President John Kennedy promised America that one day we would put a man on the moon. He said we would meet the challenge of space.**

**The list of accomplishments from that point in time is a long and thrilling series of adventures. Each bringing us further and further into space at increasing speeds. Our world was shrinking at an incredible speed. The following is simply a small sample of achievements.**

**On February 20, 1962 Astronaut John Glenn, Jr. became the first American to orbit Earth three times. The flight lasted four hours and fifty-five minutes. The capsule landed in the Atlantic Ocean where it was retrieved.**

**Ed White II became the first American to do a spacewalk during his Gemini IV flight on June 3, 1965. His EVA (Extra Vehicular Activity) lasted only 22 minutes. The first EVA was done by Aleksei A. Leonov from Russia 3 months earlier. His spacewalk lasted 10 minutes.**

**On July 20, 1969 all eyes were watching television as Neil Armstrong and Buzz Aldrin landed on the surface of the moon. Returning home safely, the event marked a moment in time when a dream was fulfilled and a promise kept.**

**The days of April 11-17, 1970 are not to be forgotten. Apollo 13 on its way to the moon experienced a problem. The call went out, "Houston we've had a problem." The days that followed were filled with anxious moments for all here on planet Earth. Mission Control was racing to find a way to bring Jim Lovell, John Swigert Jr., and Fred Haise Jr. back home safely. Although the mission failed, the ingenuity and persistence of the people at Mission Control proved to be a resounding success. This was team work at its best.**

**April 14, 1981 marked another important step into the future. John Young and Bob Crippen piloted the maiden voyage of the world's first reusable space vehicle. The Shuttle was born!**

**On October 31, 2000 the first crew arrived at the new International Space Station. This home in space also housed a laboratory. The ISS was built with the cooperation of many nations. Its first inhabitants included American Astronaut Bill Shepherd KD5GSL, Russian Cosmonaut Sergei Kirkalev and Cosmonaut Yuri Gidzenko. They spent 141 days in space on Space Station Alpha. On December 21, 2000 students at Burbank School in Burbank, Illinois made the first Amateur Radio contact with Bill Shepherd inspiring many students, teachers, and parents alike to look to the heavens and dream. Since that time, over 279 schools have participated in an Amateur Radio contact with the ISS. Perhaps your school will be next.**

**But what about the future? Have you heard about SuitSat 2? How would you like to communicate with an orbiting satellite in the form of an astronaut? SuitSat 2 will be launched from the ISS sometime in 2007. She'll be sending out a signal as she orbits planet Earth. Listen for her call.**

***"Few goals are truly impossible if only we have the courage to seek them."***
***Edward Kennedy***