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### *The Wild Blue Yonder then and now*



The Declaration of Independence, the Treaty of Alliance with France, the Treaty of Paris and the United States Constitution are all major documents signed by Benjamin Franklin. He was dispatched to France as commissioner for the United States in December, 1776 and remained there until 1785. The signing of the Treaty of Paris was performed on September 3, 1783, by representatives of King George III of Great Britain, and, along with the separate peace treaties between Great Britain and the nations that supported the American cause (France, Spain and the Dutch Republic), it ended the American Revolutionary War. Collectively, this is known as the Peace of Paris and its provisions were exceedingly generous to the United States in terms of enlarged borders. (It is where and why the modern United States we see today all started).

Mr. Franklin was an inventor and although he never patented his inventions he was always searching to increase the efficiency and improvement of human society and life. Navigation, electricity, the lightning rod, The Wave Theory of Light, Meteorology, the concept of cooling through evaporation, temperature's effect on electrical conductivity, and Oceanography were many of the experiments he conducted. Experiments that lead to inventions changing the way we live.

As an avid scientist, Benjamin Franklin was interested in new ideas and followed the progress of research by Jacques Charles on how Hydrogen would be a suitable lifting agent for balloons relative to his study of Robert Boyle's 1662 published work. Jacques Charles had found that Oxygen, Nitrogen, Hydrogen, Carbon Dioxide and Air will expand and contract at the same rate, a relationship between pressure and volume when temperature is constant. It's what makes balloons work. As a balloon rises, gases within the balloon expand, increasing volume, the higher it goes as the atmospheric pressure outside decreases.

Hydrogen was selected for his first manned balloon flight based on its lighter than air density. The envelope was

designed using silk and treated with dissolved rubber mixed in a solution of turpentine. The flight was promoted and daily reports circulated for the first un-manned flight scheduled for August 27, 1783, in Paris. That flight encouraged Benjamin Franklin so much that he provided financial support to build a manned Hydrogen balloon scheduled for a December 1, 1783 flight. Franklin was seated in a special enclosure for honored guests to see this historic flight piloted by Jacques Charles and



Nicolas-Louis Roberts. The historic event was viewed by an estimated 400,000 people. The flight plan included a barometer to act as an altimeter and a thermometer to make atmospheric measurements at various heights, making this also the first meteorological flight. During their 9000 ft. high altitude flight, it also provided the explorers the first time a human experienced

hypoxia, a condition caused by a deficiency of oxygen the higher you go.

The gas balloon is a sealed spherical shape and has one-fourth the internal volume of a hot-air balloon. The gas commonly used is Helium or Hydrogen. A gas balloon can be maneuvered to climb by discharging ballast of sand or water and can descend by opening a gas valve in the top of the envelope. Whereas, hot air balloons rise and fall from controlling the temperature of the air inside.

The first manned hot-air balloon was designed by the Montgolfier Brothers and was launched on November 21, 1783, just ten days before the Jacques Charles gas balloon flight. The balloon rose to 50 feet and traveled five miles before the balloonists feared that the burning embers of the smoky fire that provided lift would engulf their paper balloon (good thinking).

Hot air balloons climb because the gas or warm air is less dense and therefore lighter than the air outside of the

balloon's envelope. Unlike gas balloons, the envelope does not have to be sealed at the bottom since the air near the bottom of the envelope is at the same pressure as the air surrounding the balloon. Hot air balloons use liquid propane and vaporize it to burn. The warming of the interior of the envelope gives the controlled lift and maneuverability of the balloon. Modern hot air ballooning development and acceptance as a sport and competition is recognized throughout the world today and is one of the oldest forms of air transportation. Fast forward 200+ years and here we are in the modern age of flight and space exploration.

To today's general public flight is not exciting news, in fact, most of us do not give it a second thought and consider it simply just another form of getting around. In our busy rock star, glitzy world we give little or no consideration to the wondrous technology that brought this about, much less the continued need for further development of minds and technology to maintain the way we must live and travel in modern society. Our expectations are also that, the United States has and will continue to lead in technology, particularly in aviation and space, Not true, and there is a very real threat on the horizon of not only keeping our leadership, but also for merely maintaining what we have built so far.

No, we did not get here by some sudden transference of super intelligence, it was accomplished by the shared inspiration and cooperation of minds like Benjamin Franklin, and many, many others since him. Today, our economy and well being is and will continue to be totally dependent on the continuation of technology and the development of future wonders and needs, all relative to maintaining our modern human existence.

Here are some scary statistics! The U.S. Department of Commerce estimates that fulfillment needs for jobs in science, technology, engineering, and math (STEM) will grow 17 percent by 2018—nearly double the growth for non-STEM fields. By 2018, the U.S. will have more than 1.2 million unfilled STEM jobs because there will not be enough qualified workers to fill them. Science, technology, engineering, and math is where the best and many of the highest paying jobs are today, and it is where job growth will continue to be in the future. Although there are programs exemplifying this need to students, getting the general public and particularly parents informed of this crisis is critical, and lacking, but there are initiatives, so, pass the word.

Recently, Mr. Peter Groebner a STEP (Secondary Technical Education program) instructor at Anoka-Hennepin District 11 High School toured the Blaine Airport with his Aviation Technology Class. The objective was to provide a hands-on experience for young students to learn and design

what a children's aviation museum should be like. During the students tour a table was set with a variety of flight charts, sound equipment, an Edison spool record (considered to be the first phonograph ever designed) along with other electronic components. The centerpiece of the display was a game called "Hex-Bug". Its main feature was a small robotic toy that would travel through a maze. Only three robots were provided. It didn't take long before one student removed a robot and sat on the floor to examine the its movements more closely. Next, there were three other students sharing that robot which eventually prompted them to develop their own HexBug game. Eventually, there were eleven students, and all the robots were being used. This group learning and cooperation is critical in any modern technological field.

Providing a hands-on emphasis for group learning and cooperation, along with motivating guest speakers and field trips, is an important part of STEP and it's goal to assure fulfillment for technology job needs of the future. Specific courses offer students an opportunity to explore careers in aviation such as; pilots, air traffic controllers, aviation mechanics, airport service/management positions, aircraft dispatchers and meteorologists, all specific and critically eminent job fulfillment areas.

Starting with an aviation history, unit students eventually are worked into a Private Pilot curriculum covering; ATC, Meteorology and Physiology, all taught to the FAA private pilot standards. Importantly, hands-on simulations using air traffic control simulators, PC weather programs as well as the use of some of the Blaine Airport facilities supply students basic information and knowledge on many aviation topics exposing them to aviation weather, flight training and general corporate and commercial aviation operations. It is helping them too consider and; hopefully, pursue careers among these many outstanding opportunities.

Mr. Groebner is one of many teachers involved in Project Lead The Way (PLTW) which is the nation's leading provider of K-12 STEM programs. This world-class curriculum and high-quality teacher professional development model, combined with an engaged network of educators and the support of corporate and community partners, such as the Blaine Airport, is encouraging students to develop the interest and skills necessary to succeed in the existing global economy. It is part and parcel of our nation's obligation to inspire our youth to explore and tap their potential in the ever growing technological world we enjoy.

If you want to know more about Aviation today and the fulfillment needs of tomorrow, contact your local airport public relations department, Anoka County Airport in Blaine or call the Blaine Airport Promotion Group.