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THE IMPORTANCE OF VISIONARIES IN AVIATION & AEROSPACE

by Sherry Knight Rossiter

Have you ever wondered where the aviation and aerospace industry would be today without visionaries and dreamers? What if the Wright Brothers had continued to only build bicycles instead of experimenting with gliders? What if Robert Goddard had not studied rocketry all of his life and pioneered the development of liquid-fueled, multi-stage rockets? What if Burt Rutan had not conceived of the White Knight, which was designed as a reusable vehicle to transport ordinary people into space? I believe that visionaries play a critical role in technological advancements of all types, but society has particularly benefited from “the dreamers” in aviation.

My favorite visionary is Leonardo da Vinci (1452-1519), whose drawings and concepts were centuries ahead of their time. While many may remember da Vinci as simply a gifted artist, he was so much more than that. Da Vinci was also an extraordinary engineer and aeronautical designer. His sketches of flying machines are detailed and impressive and his design of the “aerial screw” became the inspiration for future helicopter designs. (<http://www.da-vinci-inventions.com>)

Fast forwarding 400 years, two other visionaries who contributed greatly to the development of aviation technology in the first half of the 20th century were Daniel and Harry Guggenheim. Again, many may only think of a very wealthy family when the name Guggenheim is mentioned, but Daniel and Harry used their wealth to seriously promote aviation technology competitions, thereby serving as catalysts for the furtherance of aviation.

In 1926, the Daniel Guggenheim Fund for the Promotion of Aeronautics was officially established to promote aeronautical research, aviation education, and the use of aircraft for commercial purposes. A year earlier, Guggenheim had provided a substantial grant to New York University for the establishment of a school of aeronautical engineering. In 1928, the Guggenheim Fund provided the encouragement and monetary support to establish “a model airway” between San Francisco and Los Angeles, which was used by Western Air Express for scheduled commercial passenger service beginning in 1928 with a Fokker F-10 Super Trimotor.

Many other interesting aviation projects were funded by Daniel and Harry Guggenheim including research on “blind” flying, aerial navigation, air safety, and STOL (short takeoff & landing) applications, but on February 1, 1930, the fund ceased operations announcing that it had met its objectives. However, that same year Charles Lindbergh became interested in the potential of rocket powered aircraft for military purposes and he convinced the Guggenheims to invest \$100,000 (the equivalent of about \$1.6 million in today’s dollars) in Goddard’s rocket research.

While Daniel never learned to fly, son Harry did and served as a pilot in World War I. Throughout their lives, both men remained keenly interested in the development of the airplane for both military and civilian purposes. The research competitions they sponsored for high lift devices contributed greatly to the development of modern day STOL devices we see on many types of airplanes today. (http://www.historynet.com/magazines/aviation_history)

About the time that the Guggenheims were becoming less visible in aviation circles, a young man named Howard Hughes was stepping onto the world stage. Howard took his first flying lesson at age 14 and showed a strong aptitude for mathematics and all things mechanical. At age 19, he inherited 75 percent of the family fortune and was declared by the courts to be an emancipated

minor. Shortly thereafter, he dropped out of Rice University, got married, and moved to Hollywood to make movies. In 1932, he founded the Hughes Aircraft Company.

Hughes was quite successful as a movie producer and his first two films earned Academy Awards. His most famous aviation film was *Hell's Angels*, which is now considered a classic film due to the extraordinary special effects. As a movie producer, Hughes developed quite a reputation as “a lady’s man.” He divorced his first wife in 1929 and didn’t marry again until 1957, when he became obsessed with actress Jean Peters.

When Hughes wasn’t being photographed with Hollywood starlets and other beautiful women, he was busy setting world records in aviation, supervising the construction of custom aircraft built for him, and managing Hughes Aircraft Company. One of the airplanes he commissioned, the Hughes H-1 Racer, was important not only because it broke several speed records, but because it was a technologically advanced aircraft featuring a number of design innovations such as retractable landing gear and flush set rivets.

The most famous aircraft commissioned by Hughes was the H-4 Hercules, now commonly referred to as “The Spruce Goose,” and permanently on display at the Evergreen Aviation Museum in McMinnville, Oregon. The H-4 is still the world’s largest flying boat, the largest aircraft made from wood, and one of the heaviest aircraft ever built. The only time the H-4 was flown, Hughes was at the controls. On November 2, 1947, the H-4 flew one mile at approximately 70 feet above the water.

Another visionary who contributed greatly to the development of the helicopter and the notion of a “flying platform” was Stan Hiller (1924-2006), who lived his entire life in the San Francisco Bay Area. When Hiller was only 15 years old, he designed a coaxial helicopter and produced a working model. At age 17, he presented his design of the XH-44 “Hiller-Copter” to the U.S. Army and immediately received a draft deferment because they were so impressed with what

they saw. It was shortly after this that Hiller opened a helicopter factory in Berkeley, California, and on July 4, 1944, he gave a public demonstration of the XH-44 in Memorial Stadium at the University of California in Berkeley.

Hiller actively pursued a number of military research and development contracts that produced such novelties as the Hiller Hornet, the X-18 tilt wing, and the “flying platform.” The platform was developed under contract for the U.S. Navy and based on a ducted fan concept propelled by two 45 HP engines. This flying platform, which was actually quite stable, was controlled by bending the body. Pilot Phil Johnston performed the first free flight of the platform in early 1955, but further development of the platform was not pursued because engines powerful enough to insure controllability and reliability were not then available.

Just a few decades ago, a Canadian dreamer and visionary named Paul Moller came to the attention of the aviation community as he began designing the M400 Skycar. The Skycar was half airplane and half automobile. In other words, it could drive on the road when its wings were retracted and it could fly in the air when the wings were extended. The Skycar did not need a runway because it was designed for vertical takeoff and landing (VTOL). The only known hover test was performed in 2003 under very controlled conditions and no other flight testing has occurred.

Moller’s goal in designing the Skycar was to produce a personal transportation vehicle that was both practical and affordable. A few years ago, the Skycar was placed for sale on e-Bay with a reserve price of \$3.5 million. The highest bid received before the auction closed was just over \$3 million, so the Skycar did not sell. While Moller fell short of his goal to create a Skycar that is easily affordable, his many years of research have kept alive “the dream” that one day such a vehicle may be possible.

Perhaps the best known modern day aviation visionary is Burt Rutan – aeronautical engineer, aircraft designer, and aviation and space pioneer. Rutan’s aircraft designs are as unique as they are controversial, but over the years he has proven beyond a doubt that his airplanes are very capable of not only flying, but even setting records. To date, Burt Rutan has designed 367 aircraft of which 45 have actually flown. Many of his designs were for amateur-built aircraft that are still popular today like the VariEze, Long-EZ, and Quickie.

In December 1986, Rutan’s brother Dick and a spunky young woman named Jeanna Yeager flew non-stop around the world in eight days in the Voyager, a twin-hulled composite airplane Burt designed. In doing so, the two pilots set several world records and drew worldwide attention to another unusual Rutan aircraft design. Later, all three were awarded the prestigious Collier Trophy by the National Aeronautics Association for their contributions “to improving performance, efficiency, and safety of air or space vehicles.”

A common trait of all visionaries is that they passionately believe in their theories and design concepts. This was certainly true for the Wright Brothers, Robert Goddard, Howard Hughes, Stan Hiller, and Burt Rutan. Without such dreamers and visionaries -- many of whom are jeered and belittled in their own lifetimes -- aviation and aerospace would not have the technology or the vision to build a Space Shuttle or a Boeing 787 “Dreamliner.”

Goddard said it best in his 1904 book titled *On Taking Things for Granted*: “It has often proved true that the dream of yesterday is the hope of today and the reality of tomorrow.”