



OX5 AVIATION PIONEERS

TEXAS WING NEWSLETTER

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Sept, 2017 No. 74

Message from the Editor

Once again we hope everyone will pay their National Dues prior to April 2018. If you pay at the beginning of the year, you will automatically receive your National membership card. This is important because it means you will receive your Texas Wing Newsletter in the mail all year long. Remember that the Texas Wing does not charge for membership in this exclusive group. We hope to send you 4 newsletters a year. We welcome your suggestions at any time and hope you will be inspired to ask your aviation friends to join the organization. The only qualification is to be interested in aviation...

Thanks to the following Texas Wing members for their generous 2017 contributions:

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I read in the news that Space X recently launched two rockets, one from California and the other from Florida, and they together placed 10 more commercial satellites in the low orbit for Iridium Communications Inc. The remarkable thing is that the First Stage rockets returned to and landed on floating platforms in the Pacific Ocean, another marvel of GPS navigation technology. The rocket engines are to be cleaned up and used again. This is a great leap forward for the commercial space business. Mr. Elon Musk, the owner of Space X, is thus building another launch pad at Brownsville, Texas, Southern tip of Texas, in order to continue these multiple launches in the future.



Robert Hutchings Goddard

Meantime another interesting development by Mr. Jeff Bezos of Amazon fame is Blue Origin, another rocket development project, which builds rocket engines in the northwest and tests them in a valley north of Van Horn, Texas. Mr Bezos made a very large purchase of land in Culbertson Co. for this work and has also been launching a single engine design into the lower atmosphere about 30 miles straight up and returning the rocket to the launch pad for reuse. The object is to develop a safe passenger flight into the lower atmosphere with an immediate return of the passenger capsule via parachute, while the rocket assembly returns for reuse. There is along list of potential riders, and so far there have been over a half dozen successful launches and recoveries of the capsules. The engine restarts at low altitude have successfully slowed the rockets descent for a landing near where they took off. The site is now marked on the El Paso sectional chart with the new Rocket symbol. On nice weather days Albuquerque Center provides airspace control with a type of radar 'flight following' for them. You may realize that the Blue Origin site is not far from Alamogordo and Roswell, New Mexico, places associated with previous previous rocket launches in America.

I thus looked into New Mexico history to find some details about the life of the first American Aerospace Engineer, Dr. Robert Hutchings Goddard, the first American Aerospace Engineer, who designed and launched the first liquid-fueled rocket in 1926 after years of research and experimentation. Goddard was born and educated in New England, becoming a faculty member of Clark University in Worcester, Mass. He became nationally known for his scientific research into high altitude flight. Rocket power fascinated the public imagination and was usually written about in science fiction. However Goddard's success was delayed for years because of the difficulty in finding monetary support, a common problem for academics. He was also a poor salesman. In addition he was frequently set back due to having poor health, having contracted tuberculosis at the completion of his higher education at age 31, but recovering sufficiently to continue his work. A stroke of luck occurred in 1928 when the recently world famous Charles Lindbergh and his close friend Harry Guggenheim discovered his efforts. From there on Goddard was then generously funded by the Guggenheim Foundation. He moved his equipment and wife and technical assistants to Roswell, New Mexico which was a wide open space and had a much better climate.



Not being a gifted mechanic, he was always dependent on a team of men who could assist him in the building of more increasingly complex rocket components, thus the continued cost of his research. He had abandoned solid fuel in the early 1920's but had originally conceived of using hydrogen and liquid oxygen (LOX) ahead of it's time. During the time that availability of LOX improved, he stuck with oxygen and common gasoline as liquid propellant. A plant in Amarillo eventually became his source.

The move to Roswell in the summer of 1930 was a big turning point in Goddard's life. His health naturally improved and Mescalero Ranch, a suitable piece of land, close to town was acquired and became his headquarters. His loyal team of technical assistants accompanied him to New Mexico by automobile and his equipment arrived on the railroad. A workshop was built on the ranch and a test site was found northwest of Roswell in Eden Valley, a few miles beyond the ranch. Construction of the first Roswell rocket was soon underway. It had a small four inch combustion chamber and was 11ft. tall. Four external vanes were added for stability in flight and the nose cone contained a parachute. On 30 December they were ready. Three inline tanks held gasoline, pressurized nitrogen to force the propellant, and liquid oxygen. With a complex set of ropes to open control valves in sequence, they launched the rocket which climbed upward 2000 ft. in 7 seconds, then arched over and landed in the desert with only slight

damage to the rocket assembly. The launch was considered a success and the highest liquid-fuel flight to date. However this early success was followed by three explosive failures in 1931. Mechanical and design improvements then included a larger combustion chamber and electrical control of the valves, no more ropes to pull. In 1932 Goddard added a gyroscope that controlled small vanes in the combustion chamber nozzle. This turned out to be unsuccessful, too complex, and the launch was a failure. Then things got worse; funds ran out, Guggenheim senior died and the Depression continued. By July 1932 the experiments were shut down and the work crew went home to Massachusetts. Goddard and his wife returned to Clark University. He finally got back together with Lindbergh and Harry Guggenheim and a one year funding of flight tests in New Mexico, administered by Clark University, was agreed upon. The Aerospace Technicians were rounded up for a second trip to Roswell. This time the episode would last 8 years.

The Second Roswell Period

The second trip to New Mexico began in 1935. The rockets were called the A series, and the Goddard experiment launched an increasingly successful number about as fast as they could build them. One climbed to 7500 ft, a record altitude. Another flight was over a mile in height, reaching a speed of over 700 mph before crashing in the desert two miles away. Goddard was aiming for more altitude as his supporters demanded, and to get the National Aeronautic Assoc. (NAA) to provide an official record. No one wanted to go to New Mexico. A group of volunteer NMMI professors gathered to witness the launches with a NAA barograph installed. Several barographs had been destroyed before the first rocket worked as advertised, climbing to 6565 ft. MSL which was 3294 ft. AGL above Eden Valley on 9 August. This was the only official flight of all the attempts made. A later high altitude attempt in March 1937 reached an estimated 8000 to 9000 ft. A lost barograph insinuated a failure, which Goddard always tried to avoid.

Charles Lindbergh and Harry Guggenheim became close friends after Lindbergh's transatlantic flight. Guggenheim had been a naval aviator in WW1 and retained his reserve commission. Lindbergh was about the same age, and in 1927 became the world's most famous celebrity. The two of them heard about Robert Goddard and Guggenheim suggested that Lindbergh visit him to find out what he was doing in rocket research. Lindbergh was well versed in aviation matters and did this in November 1929, helping to arrange Guggenheim Foundation funding for him through Clark University. This financial support allowed the move to Roswell, N.M. in 1930 and continued throughout the remainder of Goddard's life.

Since the experimental rocket failures exceeded successful flights during this period, the foundation's interest in aviation was invaluable support toward the eventual development of liquid fuel rockets. Other countries were also interested and developing programs of their own at this time, particularly Russia and Germany. Goddard believed he alone was the legitimate inventor and began to be very secretive, doubling down on his patent applications, which during his lifetime totaled one hundred and fourteen. The patent

writing process was one of the things that slowed down his operational successes, taking much of his valuable time. His wife Esther was his most valuable assistant, becoming an excellent photographer of all the significant events, and providing capable administrative help for all his endeavors. She also became more involved in Roswell social activities in the late 1930's, with Robert joining in, he eventually became a member of the Rotary Club.

With WW II approaching, the government became more interested in the research. James H. Doolittle was still working for Shell Oil when Guggenheim suggested he visit Goddard in 1938, and he was able to advise Goddard on fuel problems he was having, also arranging for the Shell labs to add propane and butane to the rocket fuel. Doolittle had a very high technical education, having a graduate degree from MIT that he completed during the interwar years. He was able to write an accurate technical report on Goddard's accomplishments, and he also was interested in what he saw. Doolittle was also appointed chairman of the National Advisory Committee for Aeronautics (NACA) in the post war period. It was too late for Goddard to do what he had started out to do: develop a working rocket ship for reaching extreme attitudes.



Harry Guggenheim & Lindbergh



Harry Frank Guggenheim & James Harold Doolittle

Goddard had developed cancer and was hospitalized at the University of Maryland where he passed away on 10 August 1945, at the age of 62. Guggenheim and Lindbergh continued to support his wife Esther in the pursuit of multiple patent suits until the end of the 1960's.

