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Full Scale Wind Tunnel

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Thank you very much Mr. Holloway for your fine introduction. Friends, guests and honored veterans of the National Aeronautics and Space Administration and the National Advisory Committee on Aeronautics. Today we join at this site to recognize the closing of one of the great research facilities of NASA--The Full Scale Wind Tunnel. It is altogether fitting that we have this ceremony today to mark this ~~day~~ event.

The Full Scale Wind Tunnel holds a special place in the hearts and minds of many of us here today and it also holds a position of special importance to the American people. It is a National Historic Landmark--a site of national significance and singular consequence in the history of aeronautics. It also tells for us the important role of aeronautics within the history of NASA and how in the early years of this century the American people, committed a small fraction of their money and resources to aeronautical research. It tells us how we decided as a nation to build the best airplanes in the world and to present to the next generation of Americans a world class aircraft industry that would employ thousands of Americans and provide for the best defense possible.

The Full Scale Wind Tunnel also tells us of the important role of NASA as the National AERONAUTICS and Space Administration. All too often we forget the proud history of achievement in the field of aeronautics that is the heritage of NASA.

My first association and knowledge of the Full Scale Wind Tunnel came in 1982, when I was asked by the National Park Service to complete a National Historic Landmark Theme Study of NASA that had been requested by the Congress. At that time, my mission was clear--the Committee on Interior and Insular Affairs wanted to know about those sites and facilities that NASA used to place a man on the moon in 1969. In completing this assignment I began to visit the various NASA field centers important in the manned lunar mission. Luckily, the first center I visited was NASA Langley where I had the good fortune to meet Dr. Jim Hansen, who was working on a history of NASA Langley. Jim kept telling me I had to visit the wind tunnels--the Variable Density Wind Tunnel, the Full Scale Tunnel, the Eight Foot High Speed Tunnel and others. After a while I decided to humor Dr. Hansen and visit his wind tunnels. Of course, almost without realizing it, I began to understand the history and culture of the National Advisory Committee on Aeronautics, the predecessor agency of NASA. This institutional history and culture--is what German historians have called a "Weltanschauung" a world view. What Dr. Hansen and others told me was that only

through the study of the Wind Tunnels of NASA could I make contact with and comprehend the aeronautical history and heritage of NASA. It is through the wind tunnels that we learn and understand the development of the airplane by the Wright brothers and and the subsequent history that led to the creation of the National Advisory Committee on Aeronuatics.

This story is well known by many of you here today. Simply stated, Wilbur and Orville Wright were scientists. Unlike Otto Lilienthal and others engaged in the study of flight in the late 19th century the Wrights attacked the problem of developing the airplane in a scientific manner. To do this they built a wind tunnel. By using this wind tunnel and testing out their theories at Kitty Hawk, North Carolina, the Wrights were able to identify and solve the problems that needed to by overcome to enable man to fly.

After their 1903 success at Kitty Hawk the Wright Brothers returned to Dayton Ohio where they continued their work. In 1904 and 1905 working at the Huffman Prairie- also a National Historic Landmark the Wright's developed the Wright Flyer III-the world's first practical airplane .

From 1905 until 1908 the Wright Brothers stopped flying and work on the airplane. Instead they developed strategies for selling their invention and concentrated on patents for the airplane. By 1908 they startled both the European and American aviation communities with their invention. At Le Mans, France, in August 1908 Wilbur Wright demonstrated his absolute mastery of the air with precise control of his flyer. He stayed aloft for 1 1/2 hours and even took passengers up for a ride.

The success of the Wright Brothers airplane was followed by a technological backward slide by the American aircraft industry. British, French, and German designers soon surpassed the Wright Brothers and other American aircraft builders. By World War I the United States had slipped into a position of technological inferiority compared to the European designers.

This was realized by such prominent Americans as Alexander Grahm Bell, Alexander Walcott and others. These were educated men-- interested in the advancement of science and the place of America in the world of science. Both Walcott and Bell saw the importance of the airplane, not only as a weapon of war but also as a means of transportation that would revolutionize the world. They were determine that America would take a back seat to no nation in the field of aeronautics.

After intense lobbying on the part of these men Congress passed the enabling legislation creating NACA as part of the Naval Appropriations Act in 1915. This bill was signed by President Woodrow Wilson into law a bill establishing the National Advisory Committee for Aeronautics (NACA) March 3, 1915.

The responsibility of NACA, as the new agency was called, was to "supervise and direct the study of the problems of flight, with a view to their practical solution...." The act also provided for the construction of research facilities and a laboratory site near

Memorial Aero. Lab.

Hampton, Virginia. Thus the Langley Research Center came into being in 1917 as a RESEARCH center.

In June 1921 NACA's Executive Committee decided to leapfrog European wind tunnel technology and build a tunnel in which pressures could be varied. This concept was strongly advocated by Max Munk, a NACA technical assistant, who was familiar with European wind tunnel design from his days at Gottingen. The product of this effort was the Variable Density Wind Tunnel-a National Historic Landmark, now ~~located~~ interpreted at the Reid Conference Center. ↖ also

Although the Variable Density Tunnel gave NACA engineers confidence in scaling up test results from models, several research areas could be explored only with full-scale models or with actual aircraft. The VDT was limited when the aerodynamic characteristics of a complete airplane were desired because it was practically impossible to build a model of the required size that is a true reproduction of a complete airplane. Some of the questions that needed to be answered involved solving drag penalties due to external struts, surface gaps, air leaks, and engine cooling ~~insulation~~ exposed for. These questions could only be answered by using full scale aircraft. Models simply would not work.

Under the leadership of Smith J. De France, the design of the Full Scale Wind Tunnel began at Langley in 1929. With funds appropriated before the start of the Depression, NACA was able to buy materials and labor at bargain prices. In addition a large pool of talented but now unemployed aeronautical engineers was available to work on the project. The work progressed quickly and by 1931 the tunnel was complete.

The significance of the Full Scale Tunnel was immediately apparent to NACA engineers. Drag tests in the tunnel indicated surprisingly large performance penalties from external struts and other exposed aircraft parts. This information had been suspected by NACA engineers for some time but with the completion of the Full Scale Tunnel the engineers now had the data needed to correct the problem. Soon a large procession of military aircraft was dispatched to Langley for drag cleanup tests. Before and during World War II practically every high performance aircraft used by the United States was checked out at the Full Scale Tunnel. At times, the tunnel operated 24 hours a day 7 days a week during the war performing drag cleanup tests for the military. For most of the war the Full Scale Tunnel was the only tunnel in the country and in the world capable of performing these tests. The importance of the tunnel was so evident that the United States built an even larger Full Scale Tunnel at the Ames Research Center in 1944. And so, the Full Scale Tunnel proved to be a remarkably adaptive research tool serving the needs of aeronautical research from the 1930s until the present day. within a few years

The NACA era wind tunnels of NASA help us to remember that--NACA was a research organization and was the home to some of the most creative minds doing aeronautical research. In addition, these wind tunnels represented a commitment by the American people to lay the foundation for greatness in aeronautical research. The Full Scale

Wind Tunnel and other facilities at Langley began a tradition of excellence in NACA which was soon known as an agency with the top aeronautical research facilities in the world. These facilities attracted the best minds and shaped the institutional character and mindset of NACA. They represented challenges overcome and opportunities taken. The aeronautical engineers at NACA were American pioneers working on the edge of aeronautical knowledge. They represented the best and most inventive minds of their generation. Max Munk, and others of his generation, gave to NACA Langley and later NASA a vision to anticipate the future trends in aeronautical engineering and the practical genius and ingenuity to produce one clever device after another. Without fanfare the NACA engineers who designed and the scientists who work in these facilities became the heros of the aviation age and created a world in which time and space have changed forever.

We in the National Park Service are honored to have the Full Scale Wind Tunnel listed as a National Historic Landmark. We are honored to know that we have been given a role and responsibility to preserve the memory of the men and achievements of Max Munk and Smith J. De France and the other heros who contribute to this important history. We recognize that even though the Full Scale Wind Tunnel is no longer operational- the tunnel is listed as a National Historic Landmark and hopefully will be preserved and maintained as a site of memory where tradition is both handed down and taken up as the baton of knowledge is passed from one generation of aeronautical engineers to the next. By visiting the Variable Density Wind Tunnel and the Full Scale Wind Tunnel each generation once again learns the lessons and events of the uncommon history of NASA Langley and of the aeronautical heritage of NASA.