

## **Discovery of Flight---Wright Experience Prospectus**

### ***Propeller Tests To Rediscover the Wright Brothers' Aeronautical Achievements***

#### **I. Background**

The Discovery of Flight Foundation was established in 1999 to attract the resources necessary to preserve and promote the legacy of early aeronautical invention. The non-profit 501c(3) foundation seeks to rediscover the Wright Brothers' experimentation, discovery, and methodology, provide for the remanufacture and testing of original Wright Brothers aircraft, and create a living classroom for school children and people of all ages. The foundation has assembled the best experts in the world for this endeavor. The aircraft reconstruction and testing team is headed by Ken Hyde of The Wright Experience, based in Warrenton, Virginia. Hyde, who is a certified aircraft mechanic and retired American Airlines pilot, is a nationally recognized and award-winning aircraft restoration and reconstruction expert.

#### **II. Propeller Reconstruction, Testing, and Evaluation**

One of the first steps to understanding our aeronautical heritage is the authentic remanufacture, testing and evaluation early aircraft propellers. In the case of the Wright Brothers, there is little documentation on their methodology and how they were able to solve the problem of flight. Through a process of "reverse engineering", The Wright Experience will work backwards and rebuild exact reproductions of the Wrights' modern propellers and their forebears to determine how they developed their prop designs and theories of flight.

**1910-1911 Wright Model "B" Propeller---**The first propeller to be reconstructed and tested is the 1911 Model "B" Wright Flyer propeller. On October 18, Old Dominion University professors Dr. James Cross, Dr. Robert L. Ash and Dr. Stan Miley led a team of aeronautical engineers, technicians, and students in a full scale wind tunnel test of two propellers authentically crafted by Hyde's Wright Experience team. Conventional wisdom has long held that the 1910-1911 Wright propellers were 70 percent efficient. Initial data from the ODU/NASA Langley Wind tunnel tests demonstrates a nominal peak efficiency of 80 percent. The performance of the remanufactured Wright propellers was amazing, when you consider that today's wood propellers are only 85 percent efficient. The gain of 5 percent in 90 years clearly demonstrates the Wright Brothers' ability as engineers.

**Early Wright Propellers---**Utilizing the knowledge gained from the 1911 propeller test, The Wright Experience proposes to reconstruct and test the following Wright Brothers' propellers:

- 1903 Kitty Hawk Flyer
- 1904 Flyer
- 1905 Flyer – Three Types of Propellers
- 1908 Ft. Myer Flyer – Two Types of Propellers

**Measuring the Wright’s Success**---According to Wright historian and retired aeronautical engineer Quentin Wald, the Wrights were the first to think of a propeller as a wing moving on a helical path. This enabled them to make use of their measurements of the forces on model wings made in their wind tunnel. Wald, who will aid in the evaluation and documentation of the wind tunnel test results, further asserts that in developing their “blade element” theory of propeller action, the Wrights were the first to combine this idea with the momentum theory of propeller action, which was known to them. By combining these two essential concepts, they were able to design very efficient propellers of predictable performance—something that none of their contemporaries were able to do.

To measure their success, The Wright Experience proposes to reconstruct and test propellers of the following contemporaries who attempted or claim to have “flown” before the Wright Brothers:

- Samuel Langley (1903 Langley Aerodrome flight)
- Hiram Maxim (1892 flight)
- Gustav Whitehead (1901 flight)

### **III. Project Resources**

The reconstruction, testing and documentation of the first propeller (1910/1911 Wright Model “B” Flyer) in the proposed series of propeller projects were made possible by the financial and volunteer resources of numerous organizations, institutions, and individuals. Primary supporters include the Wright family: Marianne and Bob Hudec, Margaret Edwards Brown, Stephen Wright, Leontine J. Davis, The Discovery of Flight Foundation, the Virginia Department of Aviation, Old Dominion University, the NASA Langley Research Center, the Rochester Institute of Technology Department of Mechanical Engineering, the Franklin Institute, the National Air and Space Museum, the Center for Innovative Technology, Dick Jackson of Rochester, New Hampshire, and archivists Wes and Donna Smith.

To complete the data analysis and documentation of the first tests and provide for the reconstruction and testing of the remaining propellers, additional resources are being sought from interested organizations and individuals.