Wing Tips

A CAP Aerospace Education Moment

Did you know?

As a young man, Hiram Maxim built a better mousetrap. It automatically re-set itself and cleared a local grist mill of mice. For the United States Electric Lighting Company in New York, he developed a carbon filament for electric light bulbs. In the late 1870's, he developed and was responsible for installing the first electric lighting system in a New York City office building.

He went to Europe in 1881 to attend an electrical exhibition in Paris and to organize the London office of the U.S. Electric Lighting Company. It was while in Europe that a fellow American suggested to him that he invent "something that will enable the Europeans to cut each other's throats with greater facility." While living in England, he developed a machine gun which was so superior to any previous machine gun that it was adopted by most countries. He became a rich man and took up an interest in flying machines.

Maxim felt that the most important problems to solve were an efficient motor and a lifting surface (a wing or wings) that would cause the machine to rise from the ground. He had ideas for controlling the machine, but serious work on that problem would come later.

His flying machine was huge and it was heavy. He used two 17' 10" pusher propellers, each with its own steam engine that used naphtha as fuel to generate the steam. He calculated that the engines developed 300 horsepower. Maxim stated that his main "aeroplane" (wing) was 50 ft. wide (span) and 47 ft. long (chord). It was not rectangular, but octagonal in shape. He also used the octagonal shape for his front and rear "horizontal rudders" meant to control the machine in the up-down direction. To turn left and right, he intended to try decreasing the steam to one propeller while increasing the steam to the other. To maintain lateral stability, he would use smaller rectangular wings attached to the sides of his main wing at a dihedral angle. There would be more rectangular wings beneath the main wing. With everything attached, fuel, water, and crew on board, it would weigh about 7,000 lbs. The spread of the wings was 107 ft. and the length, from front rudder to rear rudder, about 200 ft. Since, at this point, he was only testing to see if he had enough power to rise from the ground, the auxiliary wings were left off his "test rig."

Maxim's method of testing was to run the flying machine on an 8 ft. wide railroad track ½ mile long. The first half had a second rail, of wood, 13 ft. to either side of the main track. Four wheels, attached to out-riggers, ran under the wooden rail. The purpose of which was to prevent the flying machine from going too high. Maxim started it up with himself and three others on board. It lifted off with such force that it ripped up the wooden rail and "flew" uncontrollably at an altitude of two or three feet for about 200 yards. They shut down the engines and it crash-landed. It was badly damaged but, luckily, the people were not hurt. Maxim gave up. The year was 1894.