

2007 Ohio Student Research Forum

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RESEARCH ABSTRACT FORM

TITLE: Human-Powered Helicopter

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In 1980, the American Helicopter Society introduced the Igor I. Sikorsky Human-Powered Helicopter Competition¹ in which \$20,000 was to be awarded to the first contestants to fly 3 meters high for 60 seconds within 10 square meters. Twenty-seven years and 17 attempts later, no team has claimed the prize. The greatest challenge in developing a human-powered helicopter is designing a vehicle that has a high lift-to-power ratio. The HPH must lift approximately 1100 Newtons (250 pounds) and require less than 600 watts of power. This is achieved by first selecting an airfoil with a high lift coefficient and a high lift-to-drag ratio, then constructing large, high aspect-ratio blades with minimal deformations. This leads to a configuration that minimizes induced-drag and thus requires little power. Exploring past attempts and understanding the aerodynamic and structural trade-offs has resulted in a number of preliminary configurations that meet the lift and power constraints. These configurations along with future challenges and other design considerations are discussed.

¹ Visit <http://www.vtol.org/awards/hphregs.html> for complete contest regulations.