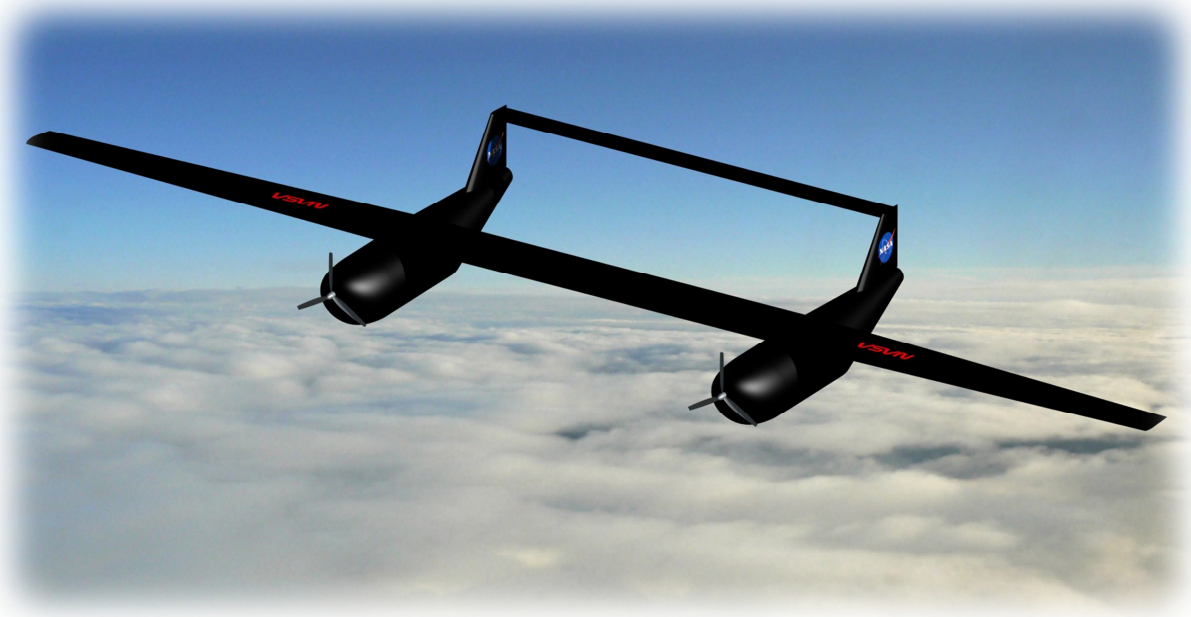


THE GOBBLE HAWK

RESPONSE TO THE NASA AERONAUTICS RESEARCH MISSION DIRECTORATE:
UNIVERSITY ENGINEERING DESIGN CHALLENGE 2013-2014



VIRGINIA POLYTECHNIC INSTITUTE AND STATE UNIVERSITY
AEROSPACE AND OCEAN ENGINEERING DEPARTMENT

FINAL REPORT – May 9, 2014

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II. Executive Summary

A team of nine undergraduate seniors at Virginia Tech is proud to offer the Gobble Hawk, a cost effective system of High Altitude Long Endurance (HALE) aircraft designed to meet all requirements specified in the NASA University Engineering Design Challenge Request for Proposal (RFP). The system will continuously monitor storm development off of the West Coast of Africa for the duration of the traditional six-month hurricane season.

The proposed Un-crewed Aerial System (UAS) consists of two aircraft, each with a 7.8 day endurance, using liquid hydrogen as the fuel source. Each twin-fuselage aircraft is designed to cruise and loiter at 150 knots at an altitude of 60,000 ft., and has a takeoff gross weight (TOGW) of approximately 18,000 pounds. Two propellers with piston engines are used to provide the required power for flight, with the 9 kW power needed for the 2,000 lbs. payload derived from these engines. This system was designed to be the most cost effective system to meet all requirements and provide constant coverage of storm development. The total cost of the system composed of two Gobble Hawk aircraft platforms is \$199.5 million for production and ten years of operation and maintenance, with a unit aircraft cost of \$92.5 million. A three view of the Gobble Hawk aircraft platform is shown in Figure i.

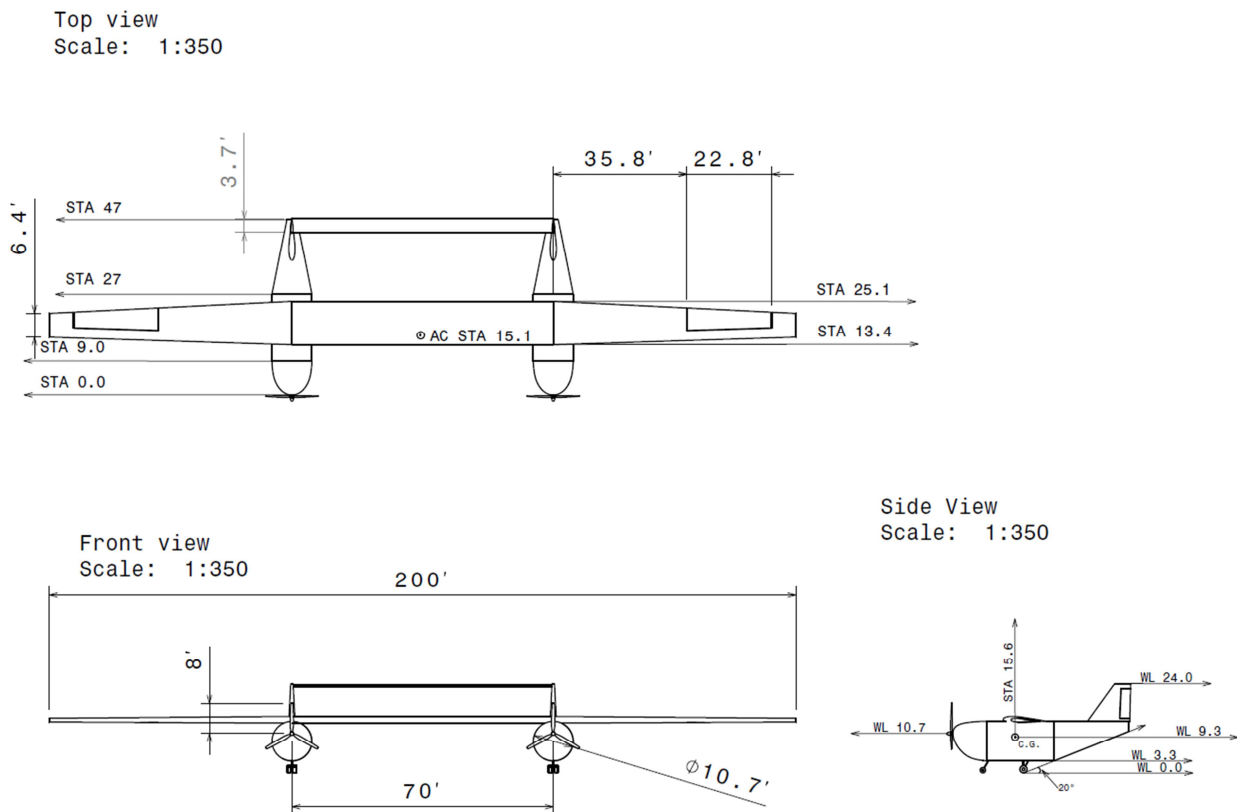


Figure i: The Gobble Hawk aircraft was designed to meet all RFP requirements, while providing successful mission completion at a minimum cost. The process used to develop the Gobble Hawk is presented in the rest of this design.