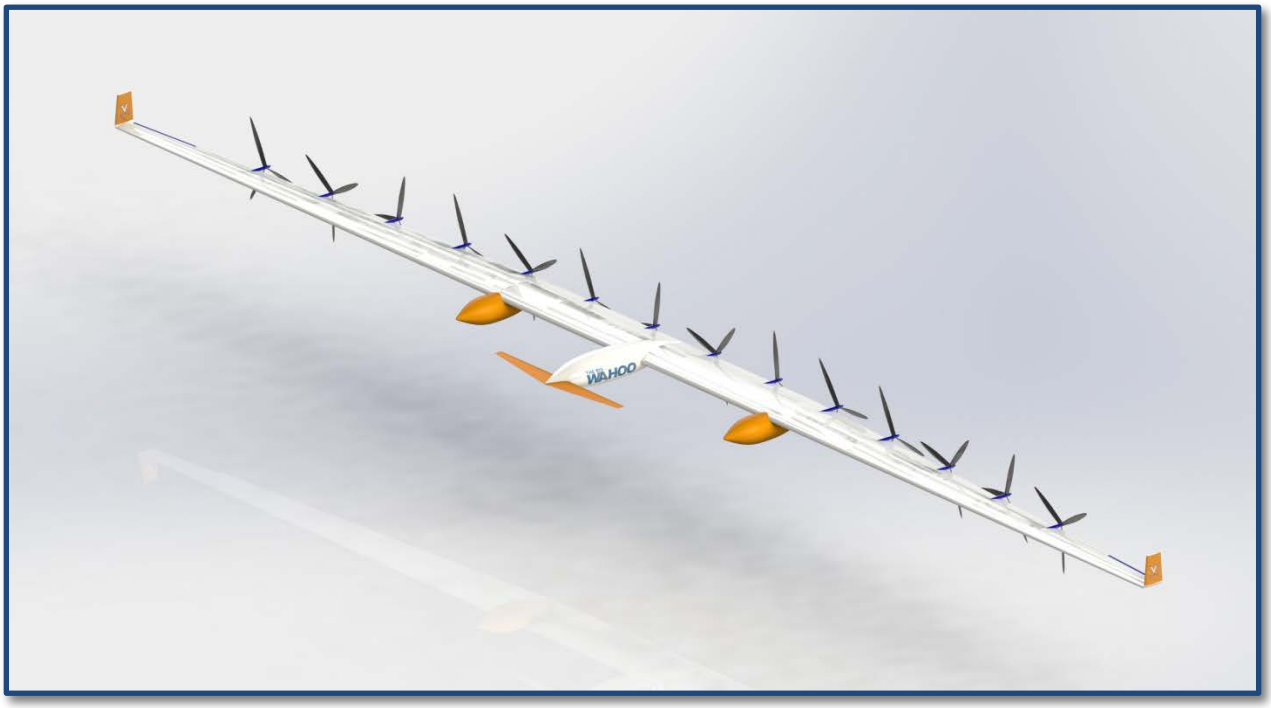
THE BIG WAHOO

worldwide autonomous hurricane oceanic observer



"Ensuring Constant Surveillance"

The University of Virginia Aerospace Design Team

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Abstract

Every year, millions of Americans are put in danger by tropical storms. The annually threatening Atlantic hurricane season is the current impetus behind the development of high altitude long endurance unmanned aerial systems. Hurricane forecasting and tracking is of paramount importance and NASA's Hurricane Severe Storm Sentinel (HS3) mission is helping to guarantee earlier and more accurate hurricane predictions. The Global Hawk is the current aviation platform for NASA's high level storm reconnaissance, delivering 32 hours of endurance. With the Atlantic hurricane season lasting from June until October, a new aviation platform with improved endurance, payload capabilities, and speed is needed. The Big WAHOO is intended to fulfill all the requirements for hurricane surveillance with a state of the art technological design and cutting edge performance. The design's loiter speed and altitude will allow for uninterrupted coverage of tropical systems. The payload capabilities will also allow for a myriad of atmospheric measurement devices.

The Big WAHOO's unique hybrid distributed propulsion system allows for a 7.5 day endurance and boasts a thrust specific fuel consumption of 0.3 lb/lb*hr. With a state of the art composite wing structure and an airframe weight of less than 12,000 pounds, the Big WAHOO can cover over 44,000 nautical miles in one flight, while carrying 2,500 pounds of payload. This payload consists of constant measuring devices such as radiometers and interferometers, as well as 352 disposable dropsondes that accurately measure atmospheric variables within a hurricane. These characteristics, among others, have all been declared a Technology Readiness Level 6 for a 2020 timeframe.

The Big WAHOO has been designed to be the industry leader in high altitude long endurance unmanned aerial systems atmospheric research. The vehicle is designed to be able to adapt to the rapidly changing technological environment that exists within the aeronautics industry. As new technology emerges, the Big WAHOO will continue to provide extended endurance flights and improved payload requirements as not only a replacement to the current NASA Global Hawk, but also a vastly improved high altitude long endurance unmanned aerial system platform for the future.