

## **Semi-Tailless Aircraft Concept with Variable Cant Stabilizers Applied to Small UAVs**

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In recent years the use of small UAVs (<5lbs) has grown rapidly. While fundamentally the same as large aircraft, differences in requirements, payloads, and cost allow for a greater number of viable concepts. Many new concepts have been proposed however, old concepts that were never adopted for large aircraft may be viable for small UAVs. One such concept is a semi-tailless concept proposed by Blohm & Voss in 1944. This concept placed the stabilizer surfaces outboard and aft of the wing tips of a highly swept main wing. This allowed for the removal of the empennage, resulting in a reduction of empty weight and wetted area, improving a number of performance parameters. Applying this concept to small UAVs mitigate some of the potential downsides, while providing additional opportunities. Specifically, varying the cant angle of the stabilizers to provide control and improve performance. Using the basic geometry developed by Blohm & Voss, trade studies were done to determine the effects of the stabilizer cant angle. A simple analytical model was used to perform trade studies and identify the key parameters affecting control. The configuration was then modeled with a vortex lattice solver to predict performance. Wind tunnel and flight testing was performed to validate predictions and provide pilot feedback on the aircraft's performance. It was found that the variable cant stabilizers do allow sufficient control for most of the flight regimes, and small increases in performance are possible. The results show that the concept is viable for application to small UAVs.