English Title (Arial 18-Point)

On the Experimental and Application Study of

High-Curvature Wing for Load-Task UAV [[1]](#footnote-1)\*

First Author 1, Second Author 1, and Third Author 2 (Arial 11-point)

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ABSTRACT: Each paper should have abstract (not exceeding 200 words). The abstract should appear at the beginning of the manuscript. They should not only indicate the subject and scope of coverage but also, in the case of research papers, give major results and conclusions. Times New Roman 11-Point

ABSTRACT

Abstract Context: Times New Roman 10-Point)

Present work studies the aerodynamic properties of high curvature wing for UAV using wind tunnel test and CFD simulation. The high curvature S1210 wing is adopted for experiment and simulation. The lift condition with different AoA, the ground effect and wind speed effect are key topics to be examined and discussed in detail. The real flight test also be carried out in this work to verify the experiment and simulation results. Experimental results indicate that the high curvature wing not only has high AoA flight performance but also possesses ground effect when flies near ground. The ground effect is dependent on wing span and happens at distance lower than 1/4 span from the ground. Moreover, the flow over the wing surface does not separate till 18o AoA. It illustrates that the high curvature S1210 wing is a good choice for task UAV. Especially the UAV needs to takeoff in short distance and fly at bad weather or strong head wind.

Keywords: Several keywords (no more than 5 words) for the paper should be given below the abstract. Times New Roman 10-Point.

Keywords: High curvature, Task UAV, S1210, Ground effect

Text Format: The title of each section should be numbered by I, II, III and placed in the middle of a line (all capitals in Times New Roman 11-Point.) Titles of sub-sections are placed to the left with or without a preceding number. Times New Roman 10-Point.

I. INTRODUCTION

In past decade, there were more and more contraries committed to develop and research on unmanned aerial system (UAS) and unmanned aerial vehicle (UAV). Most obvious features of UAV are low-cost, high-flexibility, high-automation and high-resolution for detection. Based on previous causes, UAV gradually replaced manned aircraft to execute common mission including disaster relief, airborne support. As for special missions are landscape photography and military reconnaissance. Special UAV likes USA RQ-4 Global Hawk. Its endurance and flight range are over 24 hours and larger than 25,000 km. It can perform long-term military reconnaissance mission in the battle. In order to simulate flight trajectory of cruise missile and improve training efficiency, the Flamingo II UAV in Taiwan was developed to be a military drone aircraft. Until today, more and more different types UAV were used for different military or civilian purposes.

**II. SETUP AND METHODOLOGY**

S1210 is a typical high-performance wing because of its high curvature. Based on the theorem of aerodynamic [3], wing with high curvature has ground effect when near ground and flow on wing surface is not easy to separate at high angle of attack. Especially at relative low-speed flight,

All equations and mathematical formulas should be typewritten. Equations should be numbered serially on the right hand side by Arabic numerals in parentheses. Leave proper space above and below all of the mathematical expressions.

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(3)

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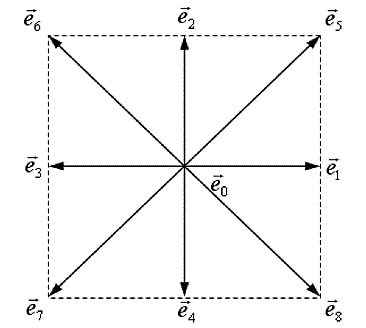


Figure 1 D2Q9 model (Arial 10-Point)



Figure 2 Low-speed suction type wind tunnel in Hsin-Chu campus of CUST

Table X Time-Averages of Estimation Errors (Arial 10-Point)

|  |  |  |
| --- | --- | --- |
| State Filter | Position (km) | Velocity (km/s) |
| EKF 1 | 7.98 | 0.11 |
| EKFIF 1 | 0.02 | 0.03 |
| RF | 0.02 | 0.03 |
| RLSEIF | 0.02 | 0.03 |

**III. RESULTS AND DISCUSSION**

This section will well discuss the experimental results. Firstly, the fundamental concept of the ground effect will be examined from some important references to identify the key control factor. Then the wind tunnel experiment and CFD simulation are executed to investigate the ground effect, high AoA performance and wind speed effect in the second step. In the final stage, the real flight test will be implemented to further confirm the ground effect. An airborne digital GPS is used to know the altitude variation during takeoff process.

**IV. CONCLUSIONS**

Present work studies the aerodynamic properties of high curvature wing for UAV using wind tunnel test and CFD simulation in detail. The high curvature S1210 wing was adopted for experiment and simulation. The lift condition with different AoA, the ground effect and wind speed effect are key topics to be examined and discussed in detail. The real flight test also be carried out in this work.

**ACKNOWLEDGMENTS**

Acknowledgments should be kept in minimum words and be given as a paragraph at the end of the text.

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REFERENCES

References should be numbered in the order in which they are cited at the end of the manuscript in the following format:

a. The format of author name should be last name followed by the first initials.

b. Journal name must be in italics and cannot be abbreviated.

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1. [↑](#footnote-ref-1)
2. \*\* To whom correspondence should be addressed, E-mail: ylyeh1229@gmail.com [↑](#footnote-ref-2)