

## **Design and Aerodynamic Characteristics of Solar UAV**

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We have studied the solar unmanned aerial vehicle (UAV) under the collaborative project that manufactures the Solar UAV and conducts on flight test with King Abdul-Aziz University (KAU) in Kingdom of Saudi Arabia and Tokai University in JAPAN. Recently, necessity of airplane that can perform observation for long endurance is increasing. However, a conventional airplane with manned flight and using fuel cannot carry out flight mission for long endurance such as weeks or months. Solar UAV can supply energy by using solar cell and perform long endurance autonomous flight. A conventional airplane could not perform yet. We aimed at design and manufacture of airplane that is possible peaceful long endurance flight mission with KAU in Kingdom of Saudi Arabia.

This project has started since March 2012 and we aimed at making the airplane which is possible to fly autonomously for 5 days by using the solar energy is the final goal. Prior to this, the prototype solar airplane model for day time flight by radio control was manufactured and succeeded to fly in Saudi Arabia on June 6, 2013.

In this airplane, we have to consider the influence of flow on the surface of main wing. An irregularity is made from a joining part of solar panel and the main wing, and this irregularity may increase drag in comparison with a smooth surface. Particularly, in the case that this drag is remarkable or the irregularity has an effect to reduce lift, so it is necessary to know the influences for drag reduction when we produce the main wing.<sup>1-3)</sup>

In this research, we explain the design method of solar UAV and compare with the wind tunnel test data and analysis data by using the ANSYS FLUENT in order to know what kind of change the irregularity that occurred by solar panel brings in aerodynamic properties of the main wing surface. Then the result will use for the design of final airplane model.



Fig.1 Solar Airplane for Day Flight

## REFERENCES

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