

SVC063-31

Room: 201B

Time: May 25 10:45-11:00

Development and performance test of an unmanned aerial vehicle Sky-1 Stonefish with GPS automatic navigation system

Kazuto Saiki^{1*}

¹Graduate School of Science, Osaka Univ.

An unmanned aerial vehicle (UAV) named "Sky-1 Stonefish" with GPS-guided automatic navigation system was developed as a tool that the researchers and the staff of the municipality who investigate volcanic field were able to operate easily and at low cost. Sky-1 Stone Fish was developed from a radio-control (RC) UAV "Sky-1". RC Sky-1 had shown good performance at volcanic fields, but the actual control range is limited to ~400 m by human ability. To overcome this defect, GPS-guided autopilot system Ardupilot was added to Sky-1. Ardupilot is a low-cost autopilot system based on the Arduino open-source hardware platform. It uses infrared sensors for stabilization and GPS and Pitot tube for navigation. The strong points of Sky-1 Stonefish are as follows: "An electric ducted fan is employed to secure the safety", "Portable on one's back because of the new design of the airframe division", "The payload that reaches 300 g is reserved", and "Achievement of the high flight performance against the strong wind around 10 m/s", etc. RC Sky-1 was tested at Kusatsushirane volcano and Aso volcano and Autopilot Sky-1 Stone Fish was tested at Izu-Oshima. To show the performance of SKY-1 Stone Fish, some impressive movies taken at field tests will be presented.

The specification of Sky-1 Stone Fish is listed as follows;

Name: Osaka University Sky-1 Stonefish, Maximum length: 90 cm, Maximum width: 90 cm, Airframe Material: Expanded polypropylene (EPP), Weight: 500 g (with a battery), Payload: 300 g maximum, Battery: 11.1V Lithium-polymer battery, Propulsion: Ducted fan with brushless motor, Thrust: 500 gf, Control: 3 ch (motor, aileron, elevator) by GPS waypoint navigation, Flying range: 3~4 km (with a standard battery)

Keywords: UAV, robot, GPS, volcano, airplane, arduino