

## Implementation of airborne geophysics using unmanned aerial vehicles (drone)

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These days various kinds of unmanned aerial vehicles (UAV) such as helicopter, airplane, kite, balloon etc. are available. In Japan, UAV has been used for aerial photography, agricultural activities and various observation works. Regarding geophysical survey, we have developed and operated grounded source airborne electromagnetic survey, using industrial unmanned helicopter. But service was terminated now due to discontinuation of the production and operation of industrial unmanned helicopter.

In drone operation, planes and industrial unmanned helicopters, those capable of conducting programming flight, have been used for a long time. An autonomous navigation type unmanned industrial helicopter has been used for monitoring and evaluation of the effect of radiation caused by the accident at Fukushima Daiichi Nuclear Power Plant after the Great East Japan Earthquake. This monitoring is being continued until now. The unmanned industrial helicopter (hereinafter referred to as "unmanned helicopter") can perform survey with a maximum payload of 10 kg, a flight time of 90 minutes, a flight speed of up to 72 km per hour, and a maximum flying distance of 3 to 5 km. At present, operation is limited to the visible extent; however, operation beyond the visual range is also possible. In addition to radiation monitoring, this unmanned helicopter can be used to perform geophysical exploration such as airborne magnetic survey and aerial thermal infrared photography.

Recently, high performance and compact multicopter has become available at low price. Performance improvement and low price of multicopter have boosted its use significantly in activities such as photography, aerial surveying, laser surveying, and so on. However, use of multicopter has been started even in the field of geophysical exploration.

In this presentation, we report airborne electromagnetic and radiation monitoring technology using multicopter along with geophysical survey technology using unmanned helicopter.

Keywords: drone, airborne geophysics, airborne electromagnetic survey, airborne radiation monitoring