

## Production of vegetation/landcover and dose rate maps by small helicopter and UAV

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The most essential and important information for restoration of the area contaminated by radioactive materials is dose rate and landcover map. The map should cover the SATOYAMA watershed with several hundreds to several kilometers scale, because the life in mountain village depend on water and material cycles in SATOYAMA watersheds and mode of deposition is strongly affected by vegetation type such as deciduous broad-leaved or evergreen coniferous forests. However, large scale maps on present vegetation and dose rate distribution are not available at present, so our team attempts to create vegetation/landcover map and dose rate distribution map by using UAV(Unmanned Aerial Vehicle).

Manned helicopter (Robinson R44), radio controlled gasoline engined helicopter (YAMAHA/RMAX), and radio controlled electric multicopter (Minisurveyer MS-06L) are used as platform of dose rate measuring system. Dose rate is measured by radiation detector module (C12137-01, Hamamatsu Photonics) controlled by small laptop computer.

Hyperspectral camera (NH-7, Eba-Japan Co.,Ltd.) and video camera are installed on manned and unmanned helicopter to map precise vegetation and landcover map. In hyperspectral camera operation, both pushbroom and still images are taken. Motion video is captured to get still images, and mosaicked to ortho-areal photo.

Field campaign are carried out two times during August and November in 2013, and various photographing modes three-dimensional dose rate mapping, and dose rate on various landcover such as forest canopy are attempted.

The campaign reveals the feasibility of low-cost, on-demand photographing and dose rate survey buy using UAV. Next subject is implementation to the actual scene. We plan to continue dose rate survey in Yamakiya district, Kawamata Town in Fukushima Prefecture.

Keywords: nuclear disaster, dose rate measurement, UAV, hyperspectral camera, Yamakiya District, FUKUSHIMA