

Airborne Radiation Monitoring System of KAERI and Environmental Radiation Survey in Fukushima

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Airborne radiation monitoring (ARM) holds significant worth for the monitoring of radiation levels in the environment and the prompt management of radiation incidents and emergencies. Its efficacy extends to emergencies, enabling rapid analysis of extensively contaminated regions with minimal human involvement. Radiation distribution maps created from aerial survey data also effectively visualize atmospheric radiation levels and ground contamination.

Korea Atomic Energy Research Institute (KAERI) developed MARK-M(Monitoring of Ambient Radiation of KAERI-Multipurpose) system for radiation monitoring. It consists of two LaBr₃(Ce) detectors, LiDAR, GPS, laser altimeter and other auxiliary devices. This multi-purpose equipment can be mounted on vehicles, drones, and helicopters to conduct monitoring, and can be transformed into a bag, allowing survey on foot. In-situ measurement also possible on the ground using a tripod. In addition, LiDAR can be used to visualize the exploration site, and exploration information can be acquired in real time using GPS and altimeter. KAERI also developed various algorithms to convert airborne doses to ground doses and derive distributions, and investigated the area around the Fukushima nuclear power plant using an integrated system.

We mounted our equipment on an unmanned helicopter and conducted an aerial survey at a site 4km away from FDNPP, and obtained air dose distribution map. Air dose was converted to ground dose using dose conversion algorithm, and comparing the predicted value with the ground dose obtained by walk survey. It was confirmed that the prediction was good within 20%.

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