

UAV-BASED MOBILE GAMMA SPECTROMETRY

Ralf Kaiser¹, Iain Darby², Milan Matos², Mladen Bogovac², Richard Murphy², Philippe Ortega²

¹IAEA, Physics Section, Wagramer Str.5, 1400 Vienna, Austria

²IAEA, Nuclear Science and Instrumentation Laboratory, 2444 Seibersdorf, Austria

After the Fukushima-Daichi accident the IAEA started a project to develop an Unmanned-Aerial-Vehicle-based system for rapid environmental mapping. The goal of the project was two-fold: To provide the IAEA with a system for quick response in case of a nuclear emergency and to produce a prototype system for Fukushima Prefecture to support environmental remediation.

UAV-based systems fill the gap between large-scale helicopter-based aerial surveys and car-based or walking surveys. They are less expensive and have better resolution than helicopter-based surveys, are faster than walking surveys and cover areas that otherwise are inaccessible. In an emergency situation a UAV-based system can measure unknown radiation levels without exposure for the human operators. Radiation data are available via online telemetry

The system is based on an Aibotix X6 hexacopter as platform, with a high-resolution Leica Global Navigation Satellite System (GS14) using information from GPS, GLONASS, Galileo and Beidou satellites and an integrated laser altimeter. The hexacopter carries different cameras and detectors, depending on the task at hand: high resolution cameras, small cameras e.g. Hero GoPro 4, 4-channel Geiger-Müller counter, Safecast single channel Geiger-Müller counter, LaBr spectrometer, 4-channel CZT spectrometer.

The IAEA UAV system will be presented including results from missions to Japan and Argentina.