

Unmanned Aerial Vehicles in On-site Inspection: New techniques for gamma spectroscopy survey

Under the Comprehensive-Nuclear-Test-Ban-Treaty a State Party can request an on-site inspection (OSI) to establish whether a nuclear explosion has taken place. Gamma spectroscopy measurements are key to OSI and aerial radiometric survey has been demonstrated to provide efficient coverage of large areas. We have developed the Advanced Radiation Detector for Unmanned Aerial Vehicle (UAV) Operations (ARDUO). This gamma spectrometer can point out the direction to a radiation source while in flight to permit real-time evolution of flight plans. We have collected data with this system flown over a variety of point and extended sources including a controlled release of 40 GBq of ^{140}La in an L-shape pattern covering 3,200 m². Here we will present these results and show how the directional information from the system can be used to improve the spatial precision of an aerial survey map. In an OSI UAVs can provide advantages over manned vehicles by keeping the pilot out of hazardous situations, flying lower and slower for improved sensitivity and by removing the need for the Inspected State party to supply an aircraft. We will discuss how directional techniques could be applied to improve the spatial precision of traditional manned aerial survey in on-site inspection.

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Track Classification: Theme 3. Verification Technologies and Technique Application