



Contribution ID: 182

Type: ORAL

## An Investigation into the Uses and Applications of Unmanned Aerial Vehicles at the National Nuclear Regulator

The National Nuclear Regulator (NNR) of South Africa has initiated a project to benchmark and improve its regulatory framework. The NNR performs a multitude of confirmatory surveys to verify the assessments as provided by authorisation holders and applicants. Further to that, there has been increasing requests from the NORM industry to decommission and release land from regulatory control. Such large areas require verification to be conducted as part of the process to reach regulatory decisions and sometimes are not reachable by employing normal walk-in detectors. Therefore, NNR conducted an investigation into the uses and applications of Unmanned Aerial Vehicles (UAVs), also known as drones, for regulatory improvements purposes.

To evaluate and assess the benefits of UAV's, the project included experimental work where a drone was deployed to monitor radiation and activity concentration at a calibration pads facility. A Radiation Solutions Inc. RS-230 BGO Super Spec handheld Gamma-Ray Spectrometer instrument was mounted under a DJI Matrice 300 RTK drone to take measurements at the specific heights and at different speeds.

The results of the experimental work proven that the use of drones will contribute to safety and sustainability since less time and resources were spent compared to when using the ground-borne methodology of walking a site with a detector. The most important safety benefit realised during was the potential of dose savings due to less exposure of the staff while conducting radiological surveys.

The results of this project were used to determine the way forward regarding the applications of drones by the regulator in South Africa, and there are positive developments to support sustainable management of regulatory functions and radiation protection. Further investigations on the contributions and benefits of drones to safety and sustainability will be conducted for other applications such as land release confirmatory survey for large scale areas, accessibility to areas that are difficult to reach and the use and benefits of photography (mapping) it produced during survey.

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**Track Classification:** Track 5 - Practical experiences in integrating safety and sustainable development