

NuEM DRONES G

Gamma Detection and Spectroscopy UAV System



The DRONES G system is a state-of-the-art technology for light airborne radiation monitoring using UAV (unmanned aerial vehicle) devices as carriers. The system offers an excellent performance for environmental radiation inspection and emergency monitoring. Measured data is transmitted in real time to the ground station equipped with DRONIC software providing an immediate overview of the radiation situation in the territory the UAV is operating in. The main advantages of the DRONES G radiation monitoring system are its flexibility of use and wide range of capabilities.

Benefits

- Designed for independent operation - suited for any drone (with adapted payload and autonomy)
- Real-time data processing and transmission to the ground station
- Single interface for BRUS* drone control and data acquisition and visualisation
- Less costly than helicopter monitoring, quicker and easier than pedestrian monitoring
- Easily programmable path to survey the area in a systematic way

Key figures

6 → Number of different detectors available

50 nGy/h – 10 Gy/h
→ Operation range

2.6 kg → Weight of minimum detection configuration

Errors excepted. Technical changes reserved.

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Product description

The DRONES G system consists of a base module and of special detection modules that can be attached, in various combinations according to application needs.

The DRONES G base module includes a main processing unit with a memory card for data storage, a RF data link module, a GM (Geiger-Müller) detector, an external GPS module, auxiliary sensors for temperature, atmospheric pressure and humidity measurement and a Li-Pol battery that also powers external modules. The base module is equipped with a USB interface for service or local connectivity. All data from detection modules is

processed on board in real time and synchronised with GPS time and position. The basic communication and data transmission between the DRONES G and the ground station is achieved through a long range radiofrequency data link working on communication frequencies that allow licence-free operation: 433 MHz or 868 MHz.

Windows®-based DRONIC software enables data acquisition from connected modules, system setup, real-time data and spectra visualisation as well as operation status information. In addition, it displays the battery capacity, ambient temperature,

pressure, humidity and other parameters. The software controls the data recording on the SD card and the On/Off function for the air sampler.

Product applications

- Surveying of medium size areas to search for potential contamination, orphan radioactive sources or for operations in areas with hazardous dose rate levels
- Surveying areas that aren't easily accessible by foot or other means of transportation
- Ambient air sampling on filters for subsequent analyses of radioactive material and radionuclide identification

Product specifications

Base Module	
GPS u-blox* module	A-GPS, GLONASS/GALILEO
Battery	Li-Pol, 11.1 VDC / 5100 mAh
RF data link	433 MHz / 868 MHz Option: LTE cellular network
High dose GM module	Energy compensated GM tube Sensitivity (¹³⁷ Cs, 1 µGy/h): 1.4 cps Dose rate range: 50 nGy/h – 20 mGy/h Option: The second GM tube can be added to extend dose rate range. Dose rate range of second GM tube: 1 µGy/h – 10 Gy/h
Number of connectors	4 (each connector can be used for a detection module or the air sampler)
Time of operation	Approx. 4 hours, whatever the detector configuration chosen
Weight	1.6 kg
Communication	USB
Gamma Spectroscopy Module	
Detectors	Nal(Tl) detector 2" × 2" or 3" × 3"
Resolution	256, 512, 1024 channels
Energy range	50 keV – 3 MeV
Detector resolution	<7.5% on ¹³⁷ Cs at 662 keV
Dose rate range	50 nGy/h – 100 µGy/h for 2" × 2" 50 nGy/h – 50 µGy/h for 3" × 3"
Max. throughput	50 kcps (with dead time correction)
Weight	1.4 kg for 2" × 2", 2.7 kg for 3" × 3"
High Resolution Module	
Detectors	LaBr ₃ (Ce) or CeBr ₃ detector 1.5" × 1.5"
Resolution	256, 512, 1024 channels
Energy range	50 keV – 3 MeV
Detector resolution	3.0% LaBr ₃ (Ce) / 3.0% CeBr ₃ at 662 keV
Dose rate range	50 nGy/h – 100 µGy/h
Max. throughput	50 kcps (with dead time correction)
Weight	1.0 kg



High Sensitivity Module	
Detector	Plastic (polystyrene) scintillation detector, volume 1 litre
Sensitivity	50 cps / 10 nGy/h
Dose rate range	10 nGy/h – 25 µGy/h
Energy range	50 keV – 3 MeV
Max. throughput	100 kcps
Weight	2.1 kg
Neutron Detection Module	
Detector	Plastic light guide coated with ⁶ LiF/ZnS:Ag detection layer
Thermal neutron detection efficiency	24% (for a detector without moderator)
Sensitivity	100 cps/nv (for a detector without moderator)
Neutron detection efficiency	0.3 cps/ng of ²⁵² Cf (According to PNNL-18903 when meeting requirements for gamma insensitivity. Detector with moderator.)
Weight	2.3 kg
Mini Air Sampler	
Air sampling	Max. 5.2 L/min
Filters	Synthetic fibre, plastic, paper
Weight	0.7 kg

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