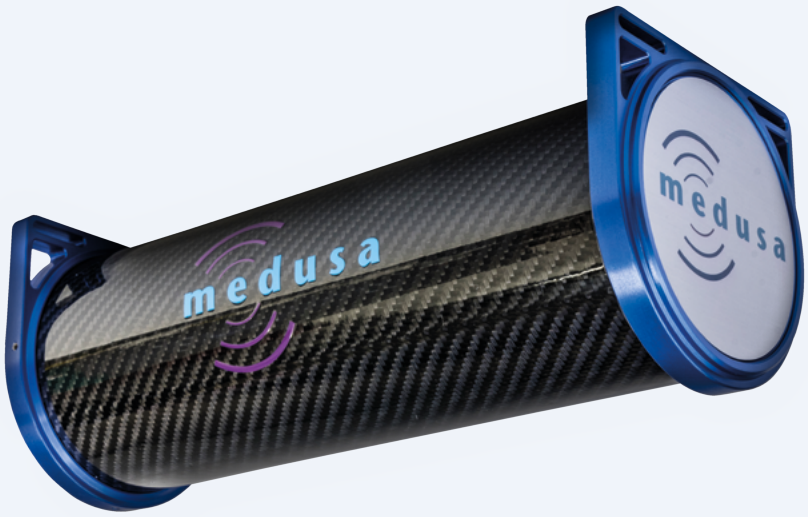
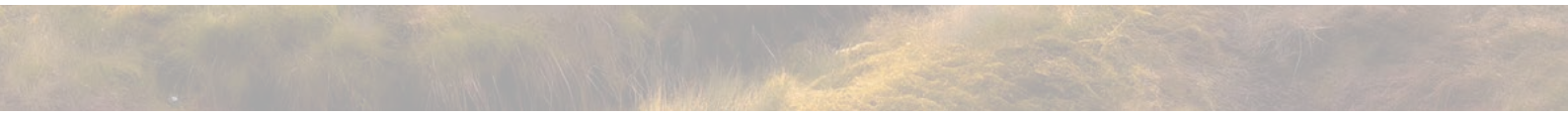
medusa Radiometrics

# Product catalogue




2024 v4

# table of contents



**About Medusa**

Medusa Radiometrics is a Dutch based company that produces gamma-ray sensors in-house. Our sensors are mosly used for geophysical research; gathering soil, sediment, and mineral composition around the world. Users of a Medusa system are able to collect high-resolution data with our lightweight, sturdy and easy to use sensors and software.

**Knowledge**

For a better understanding, please refer to the Medusa Institute. Here you can read more about the theory, best practices, application models, case-studies and relevant publications.

**Product overview**


| Model | Application | Typical mapping speed (up to) | Net weight | Page |
|---|---|---|---|---|
| gSMS-100 | stationary | not applicable | 1.5 kg, or 3.31 lbs | 3 |
| MS-350 | handheld, drone-borne | 15 km/h, or 9 mph | 2.7 kg, or 5.95 lbs | 5 |
| MS-700 | handheld, drone-borne | 20 km/h, or 12 mph | 4.7 kg, or 10.36 lbs | 7 |
| MS-1000 | drone-borne | 30 km/h, or 19 mph | 6.7 kg, or 14.77 lbs | 9 |
| MS-2000 | vehicle-borne | 45 km/h, or 28 mph | 11.0 kg, or 24.25 lbs | 11 |
| MS-4000 | air-borne | 90 km/h, or 56 mph | 27.0 kg, or 92.52 lbs | 13 |



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stationary

# gSMS-100

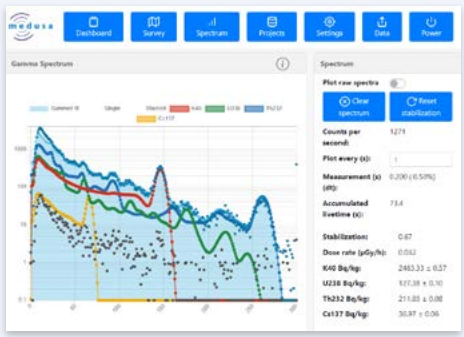
The Medusa Gamma Soil Moisture Sensor (gSMS) is a stationary sensor that continuously records radionuclide concentrations in the area. The sensor can be placed in remote locations and is powered by a solar panel. The gSMS stores data locally and uploads its radionuclide concentrations to an online platform, where they can be inspected and downloaded for further processing. This real-time data can be used for environmental moisture monitoring projects, or for tracking radiation levels in security applications

## Sensor key features

- 1.5 kg, our smallest sensor
- Ultra rugged 100 ml CsI scintillator crystal
- Optimized for ease of use
- Integrated data storage and processing
- Life-long feature updates

## Typical applications

- Stationary measurements
- NORM characterization
- Soil moisture determination



***'A uniform interface for all our sensors'***

## Medusa Detector Operating System (mDOS)

Whether doing an airborne survey, locating a lost source with a UAV, or using our detector for a hand-held survey for mapping the environment, you can count on using the same familiar interface.

mDOS is developed for in-the-field usage. Optimized for real-time monitoring, ease of use and automating your survey workflow.

## About Medusa Radiometrics

- Scientific collaboration with eminent research institutes and peer-reviewed publications of the analysis procedures
- We have over 20 years of experience in developing gamma–ray spectrometers and their applications
- We help you to develop your business by delivering state of the art gamma-ray spectrometer solutions, tailored to your needs
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# gSMS-100 Technical specifications

Recommended application: stationary

**Designed for stationary, long term outdoor measurements**

### Gamma-ray spectrometer

| | |
|---|---|
| Scintillation crystal | 2x2” (100 ml) CsI |
| Recording frequency | Up to 5 hz |
| Radionuclide analysis | $^{40}$K, $^{238}$U, $^{232}$Th and $^{137}$Cs |

### Electrical

| | |
|---|---|
| Input voltage | 5 - 35 V |
| Power consumption | 3 W (average), 6 W (max) |
| Power source | Solar powered (optional) |

### GPS

| | |
|---|---|
| Type | uBlox ZED-F9P |
| Accuracy | 1.5 m CEP |
| RTK accuracy | <1 cm |
| Signals | GLONASS, BeiDou,Galileo |

### Mechanical

| | |
|---|---|
| Dimension | 80 (Ø) x 250(L) mm |
| Weight | 1.5 kg |
| Operating Temperature | -20 to +65 °C |
| IP rating | IP67 |

### Connectivity

| | |
|---|---|
| Wi-Fi | 2.4 and 5 Ghz |
| Ethernet | 100 Mbps |
| Port | RS-232 |

### Data

| | |
|---|---|
| Format | JSON, NMEA, CSV |
| Streaming | RS-232, ethernet and Wi-Fi |
| Sensors | Spectrometer, GPS, PTH |
| Pressure | 300 ... 1100 hPa |
| Temperature | -40 ... 85°C |
| Humidity | 0 ... 100% |
| Internal storage | 16 GB, 700+ days of data |

### Included software

| | |
|---|---|
| Onboard-processing (by mDOS) | Real-time analysis<br>Survey planner<br>Real-time radionuclide inspection<br>Sample measurements<br>Mobile data upload (optionally) |
| Post-processing (by GammAn) | Full spectrum analysis (FSA)<br>Window analysis (WA) |

### Support

| | |
|---|---|
| Online support | Extensive library of support guides |
| Custom support | Optional |

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handheld
drone-borne

# MS-350

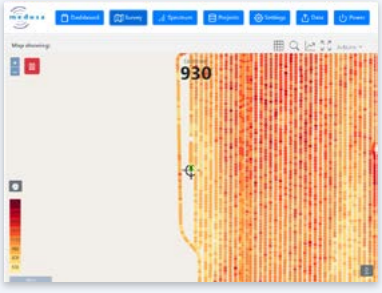

The Medusa MS-350 is primarily designed for drone-borne surveys. However, it is also being used successfully as a handheld (walking) survey system. With its weight of 2.7 kg it is well suited for carrying around and for the smaller off-the-shelf drones.

### Sensor key features

- 2.7 kg, easy to integrate under a drone
- Ultra rugged 350 ml CsI scintillator crystal
- Optimized for ease of use
- Integrated data storage and processing
- Life-long feature updates

### Typical applications

- Drone-borne measurements
- Handheld soil scanning
- NORM characterization
- Contamination mapping





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# MS-350 Technical specifications

Recommended application: handheld / drone-borne

**With its weight below 3 kg, it is well-suited for smaller drones**

### Gamma-ray spectrometer

| | |
|---|---|
| Scintillation crystal | 3x3” (350 ml) CsI |
| Typical mapping speed | Up to 15 km/h |
| Recording frequency | Up to 5 hz |
| Radionuclide analysis | $^{40}$K, $^{238}$U, $^{232}$Th and $^{137}$Cs |

### Electrical

| | |
|---|---|
| Input voltage | 5 - 35 V |
| Power consumption | 3 W (average), 6 W (max) |
| Battery | Up to 8 hours |

### GPS

| | |
|---|---|
| Type | uBlox ZED-F9P |
| Accuracy | 1.5 m CEP |
| RTK | Optional (accuracy <1 cm) |
| Signals | GLONASS, BeiDou, Galileo |

### Mechanical

| | |
|---|---|
| Dimension | 100 (Ø) x 215 (L) mm |
| Weight | 2.7 kg |
| Operating Temperature | -20 to +65 °C |
| IP rating | IP65 |

### Connectivity

| | |
|---|---|
| Wi-Fi | 2.4 and 5 Ghz |
| Ethernet | 100 Mbps |
| Port | RS-232 |

### Data

| | |
|---|---|
| Format | JSON, NMEA, CSV |
| Streaming | RS-232, ethernet and Wi-Fi |
| Sensors | Spectrometer, GPS, PTH |
| Internal storage | 16 GB, 500 hours of data |

### Included software

| | |
|---|---|
| Onboard-processing (by mDOS) | Real-time analysis<br>Survey planner<br>Real-time radionuclide inspection<br>Sample measurements |
| Post-processing (by GammAn) | Full spectrum analysis (FSA)<br>Window analysis (WA) |

### Support

| | |
|---|---|
| Online support | Extensive library of support guides |
| Custom support | Optional |

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handheld
drone-borne

# MS-700

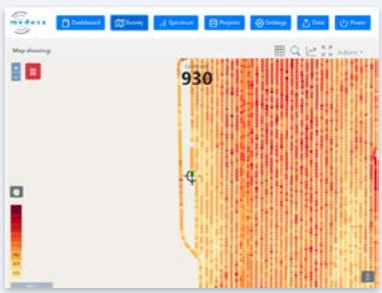

Drone borne: The Medusa Radiometrics MS-700 is optimized for use on drones. Its payload under 5 kg makes it well-suited for off-the-shelf drones. It performs exceptionally well when flying low and slow, and can be used for prospecting, soil mapping, and pollution mapping.

### Sensor key features

- 4.7 kg, easy to integrate under a drone
- Ultra rugged 700 ml CsI scintillator crystal
- Optimized for ease of use
- Integrated data storage and processing
- Life-long feature updates

### Typical applications

- Drone-borne measurements
- Handheld soil scanning
- NORM characterization
- Contamination mapping

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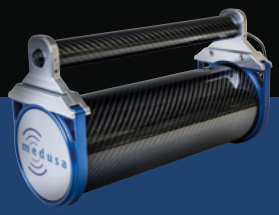
# MS-700 Technical specifications

Recommended application: handheld / drone-borne

**The MS-700 performs exceptionally well when flying low and slow**



### Gamma-ray spectrometer

| | |
|---|---|
| Scintillation crystal | 3x6” (700 ml) CsI |
| Typical mapping speed | Up to 20 km/h |
| Recording frequency | Up to 5 hz |
| Radionuclide analysis | $^{40}$K, $^{238}$U, $^{232}$Th and $^{137}$Cs |

### Electrical

| | |
|---|---|
| Input voltage | 5 - 35 V |
| Power consumption | 3 W (average), 6 W (max) |
| Battery | Up to 8 hours |

### GPS

| | |
|---|---|
| Type | uBlox ZED-F9P |
| Accuracy | 1.5 m CEP |
| RTK | Optional (accuracy <1 cm) |
| Signals | GLONASS, BeiDou, Galileo |

### Mechanical

| | |
|---|---|
| Dimension | 100 (Ø) x 295 (L) mm |
| Weight | 4.7 kg |
| Operating Temperature | -20 to +65 °C |
| IP rating | IP65 |

### Connectivity

| | |
|---|---|
| Wi-Fi | 2.4 and 5 Ghz |
| Ethernet | 100 Mbps |
| Port | RS-232 |

### Data

| | |
|---|---|
| Format | JSON, NMEA, CSV |
| Streaming | RS-232, ethernet and Wi-Fi |
| Sensors | Spectrometer, GPS, PTH |
| Internal storage | 16 GB, 500 hours of data |

### Included software

| | |
|---|---|
| Onboard-processing (by mDOS) | Real-time analysis<br>Survey planner<br>Real-time radionuclide inspection<br>Sample measurements |
| Post-processing (by GammAn) | Full spectrum analysis (FSA)<br>Window analysis (WA) |

### Support

| | |
|---|---|
| Online support | Extensive library of support guides |
| Custom support | Optional |

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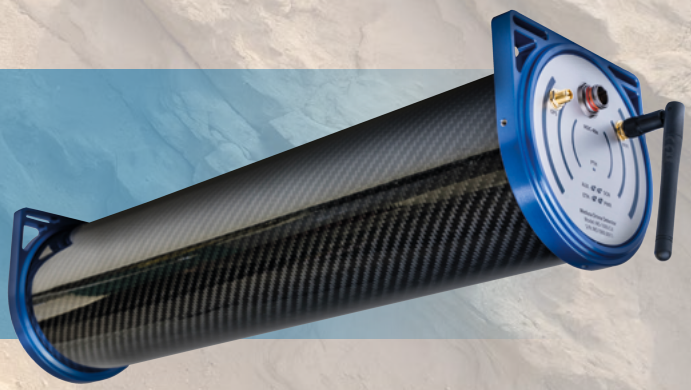
drone-borne

# MS-1000



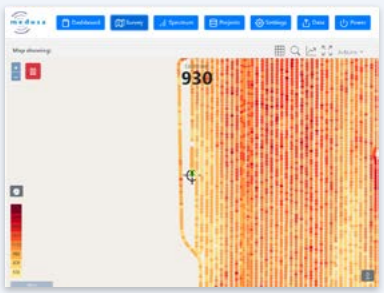
The Medusa Radiometrics MS-1000 gamma-ray spectrometer is specifically designed with the drone deployment use case in mind. It is an all-in-one sensor system featuring a spectrometer, GNSS, pressure, temperature, and humidity sensors. The onboard mDOS enables real-time analysis and onboard storage. This sensor is a robust stand-alone solution suitable, but not limited to drone use.

## Sensor key features

- 6.7 kg, easy to integrate under a drone
- Ultra rugged 1000 ml CsI scintillator crystal
- Optimized for ease of use
- Integrated data storage and processing
- Life-long feature updates

## Typical applications

- Drone-borne measurements
- Backpack soil scanning
- NORM characterization
- Contamination mapping




***'A uniform interface for all our sensors'***

## Medusa Detector Operating System (mDOS)

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mDOS is developed for in-the-field usage. Optimized for real-time monitoring, ease of use and automating your survey workflow.

## About Medusa Radiometrics

- Scientific collaboration with eminent research institutes and peer-reviewed publications of the analysis procedures
- We have over 20 years of experience in developing gamma–ray spectrometers and their applications
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# MS-1000 Technical specifications

Recommended application: drone-borne

**All-in-one sensor system featuring a spectrometer, GNSS, pressure, temperature, and humidity sensors**

### Gamma-ray spectrometer

| | |
|---|---|
| Scintillation crystal | 3x9” (1000 ml) CsI |
| Typical mapping speed | Up to 30 km/h |
| Recording frequency | Up to 5 hz |
| Radionuclide analysis | $^{40}$K, $^{238}$U, $^{232}$Th and $^{137}$Cs |

### Electrical

| | |
|---|---|
| Input voltage | 5 - 35 V |
| Power consumption | 3 W (average), 6 W (max) |
| Battery | Up to 8 hours |

### GPS

| | |
|---|---|
| Type | uBlox ZED-F9P |
| Accuracy | 1.5 m CEP |
| RTK | Optional (accuracy <1 cm) |
| Signals | GLONASS, BeiDou, Galileo |

### Mechanical

| | |
|---|---|
| Dimension | 100 (Ø) x 375 (L) mm |
| Weight | 6.7 kg |
| Operating Temperature | -20 to +65 °C |
| IP rating | IP65 |

### Connectivity

| | |
|---|---|
| Wi-Fi | 2.4 and 5 Ghz |
| Ethernet | 100 Mbps |
| Port | RS-232 |

### Data

| | |
|---|---|
| Format | JSON, NMEA, CSV |
| Streaming | RS-232, ethernet and Wi-Fi |
| Sensors | Spectrometer, GPS, PTH |
| Internal storage | 16 GB, 500 hours of data |

### Included software

| | |
|---|---|
| Onboard-processing (by mDOS) | Real-time analysis<br>Survey planner<br>Real-time radionuclide inspection<br>Sample measurements |
| Post-processing (by GammAn) | Full spectrum analysis (FSA)<br>Window analysis (WA) |

### Support

| | |
|---|---|
| Online support | Extensive library of support guides |
| Custom support | Optional |

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vehicle-borne

# MS-2000

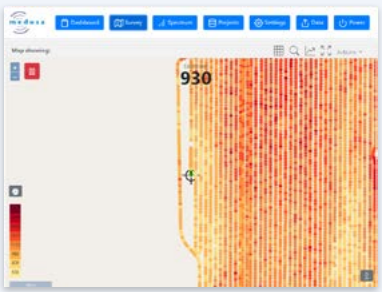

The Medusa Radiometrics MS-2000 scanner is a low-power, autonomous, and robust gamma-ray sensor developed with vehicle-borne mapping applications in mind. The housing is ultra-rugged, made of Kevlar-reinforced carbon fiber, and features a vibration-dampening mounting system. This system can be mounted on a variety of vehicles such as quad bikes, tractors, cars, and even larger drones.

### Sensor key features

- 11.1 kg
- Ultra rugged 2000 ml CsI scintillator crystal
- Optimized for ease of use
- Integrated data storage and processing
- Life-long feature updates

### Typical applications

- Ground-borne measure-ments
- Soil and sediment scanning
- NORM characterization
- Contamination mapping





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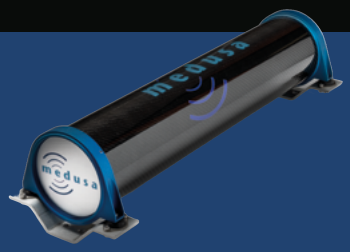
# MS-2000 Technical specifications

Recommended application: vehicle-borne

**This system can be mounted on a variety of vehicles such as quad bikes, tractors, cars and even larger drones**



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### Gamma-ray spectrometer

| | |
|---|---|
| Scintillation crystal | 90x310mm (2000 ml) CsI |
| Typical mapping speed | Up to 45 km/h |
| Recording frequency | Up to 5 hz |
| Radionuclide analysis | $^{40}$K, $^{238}$U, $^{232}$Th and $^{137}$Cs |

### Electrical

| | |
|---|---|
| Input voltage | 12 - 35 V |
| Power consumption | 3 W (average), 6 W (max) |
| Battery | Car battery |

### GPS

| | |
|---|---|
| Type | uBlox ZED-F9P |
| Accuracy | 1.5 m CEP |
| RTK | Optional (accuracy <1 cm) |
| Signals | GLONASS, BeiDou, Galileo |

### Mechanical

| | |
|---|---|
| Dimension | 120 (Ø) x 605 (L) mm |
| Weight | 11 kg |
| Operating Temperature | -20 to +65 °C |
| IP rating | IP65 |

### Connectivity

| | |
|---|---|
| Wi-Fi | 2.4 and 5 Ghz |
| Ethernet | 100 Mbps |
| Port | RS-232 |

### Data

| | |
|---|---|
| Format | JSON, NMEA, CSV |
| Streaming | RS-232, ethernet and Wi-Fi |
| Sensors | Spectrometer, GPS, PTH |
| Internal storage | 16 GB, 500 hours of data |

### Included software

| | |
|---|---|
| Onboard-processing (by mDOS) | Real-time analysis<br>Survey planner<br>Real-time radionuclide inspection<br>Sample measurements |
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### Support

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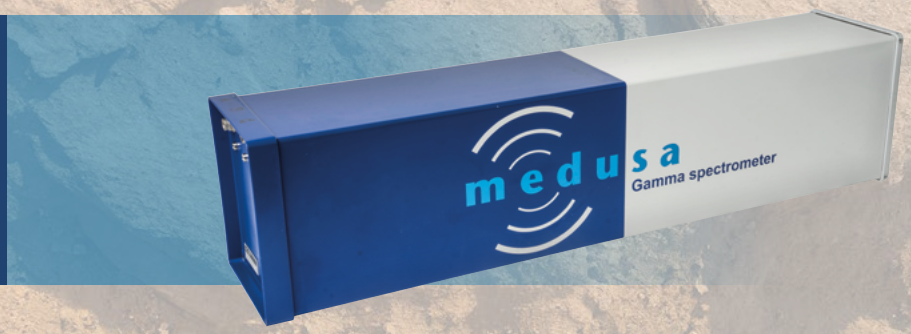
# MS-4000



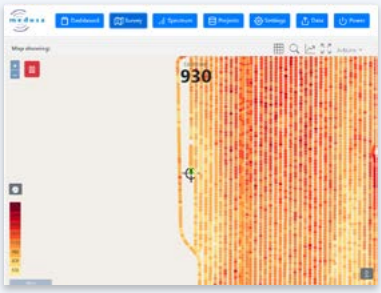

The Medusa Radiometrics MS-4000 'Airborne' gamma-radiation detection system (AGRS) is our 'classic' lightweight radiation sensor, first introduced in 2006 for a large regional uranium survey in Madagascar. Since then, this system has been utilized worldwide for mineral exploration and remediation surveys. Key customers include geophysical survey companies, geotechnical consultants, and research institutes, which use this sensor in small airplanes or helicopters.

## Sensor key features

- 27 kg, easy to integrate in airplanes and helicopters
- Ultra rugged 4000 ml CsI scintillator crystal
- Optimized for ease of use
- Integrated data storage and processing
- Life-long feature updates

## Typical applications

- Air-borne measurements
- Integrated in vehicles
- NORM characterization
- Mineral mapping

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# MS-4000 Technical specifications

Recommended application: air-borne

**Our high-speed, high resolution sensor suited for exploration and mapping**

### Gamma-ray spectrometer

| | |
|---|---|
| Scintillation crystal | 4x4x16” (4000 ml) CsI |
| Typical mapping speed | Up to 90 km/h |
| Recording frequency | Up to 5 hz |
| Radionuclide analysis | $^{40}$K, $^{238}$U, $^{232}$Th and $^{137}$Cs |

### Electrical

| | |
|---|---|
| Input voltage | 12 - 35 V |
| Power consumption | 3 W (average), 6 W (max) |
| Battery | Car battery |

### GPS

| | |
|---|---|
| Type | uBlox ZED-F9P |
| Accuracy | 1.5 m CEP |
| RTK | Optional (accuracy <1 cm) |
| Signals | GLONASS, BeiDou, Galileo |

### Mechanical

| | |
|---|---|
| Dimension | 17(h) x 20(w) 86(l) cm |
| Weight | 27 kg |
| Operating Temperature | -20 to +65 °C |
| IP rating | IP65 |

### Connectivity

| | |
|---|---|
| Wi-Fi | 2.4 and 5 Ghz |
| Ethernet | 100 Mbps |
| Port | RS-232 |

### Data

| | |
|---|---|
| Format | JSON, NMEA, CSV |
| Streaming | RS-232, ethernet and Wi-Fi |
| Sensors | Spectrometer, GPS, PTH |
| Internal storage | 16 GB, 500 hours of data |

### Included software

| | |
|---|---|
| Onboard-processing (by mDOS) | Real-time analysis<br>Survey planner<br>Real-time radionuclide inspection<br>Sample measurements |
| Post-processing (by GammAn) | Full spectrum analysis (FSA)<br>Window analysis (WA) |

### Support

| | |
|---|---|
| Online support | Extensive library of support guides |
| Custom support | Optional |

Visit us online at
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