



SPC DOZA

ENVIRONMENTAL RADIATION
MONITORING SYSTEM

ERMS

RADIATION
MONITORING
EQUIPMENT

ERMS

AUTOMATED ENVIRONMENTAL RADIATION MONITORING SYSTEM

PURPOSE

The ERMS is designed for continuous monitoring of the radiation and meteorological situation in the sanitary protection zone and observation area of Nuclear Power Plants and other nuclear related facilities in all operating modes, including accident and post-accident conditions.

The ERMS provides the facility personnel with actual and reliable information about the radiation conditions in the monitored areas.

FEATURES

- spectrometric monitoring of gamma radiation;
- gas-aerosol emission monitoring;
- fast deployment version based on the mobile monitoring units PINGWIN;
- communication type: GSM/GPRS, VHF, Tetra, RS-485, Ethernet;
- integration into upper level systems, Situation rooms, Crisis Management Centers.

TYPICAL CAPABILITIES

Continuous remote monitoring:

- Ambient dose equivalent rate for gamma radiation at stationary monitoring points in air and in water reservoirs;
- radionuclide composition of gamma-emitting nuclides in air;
- meteorological parameters.

Periodic monitoring:

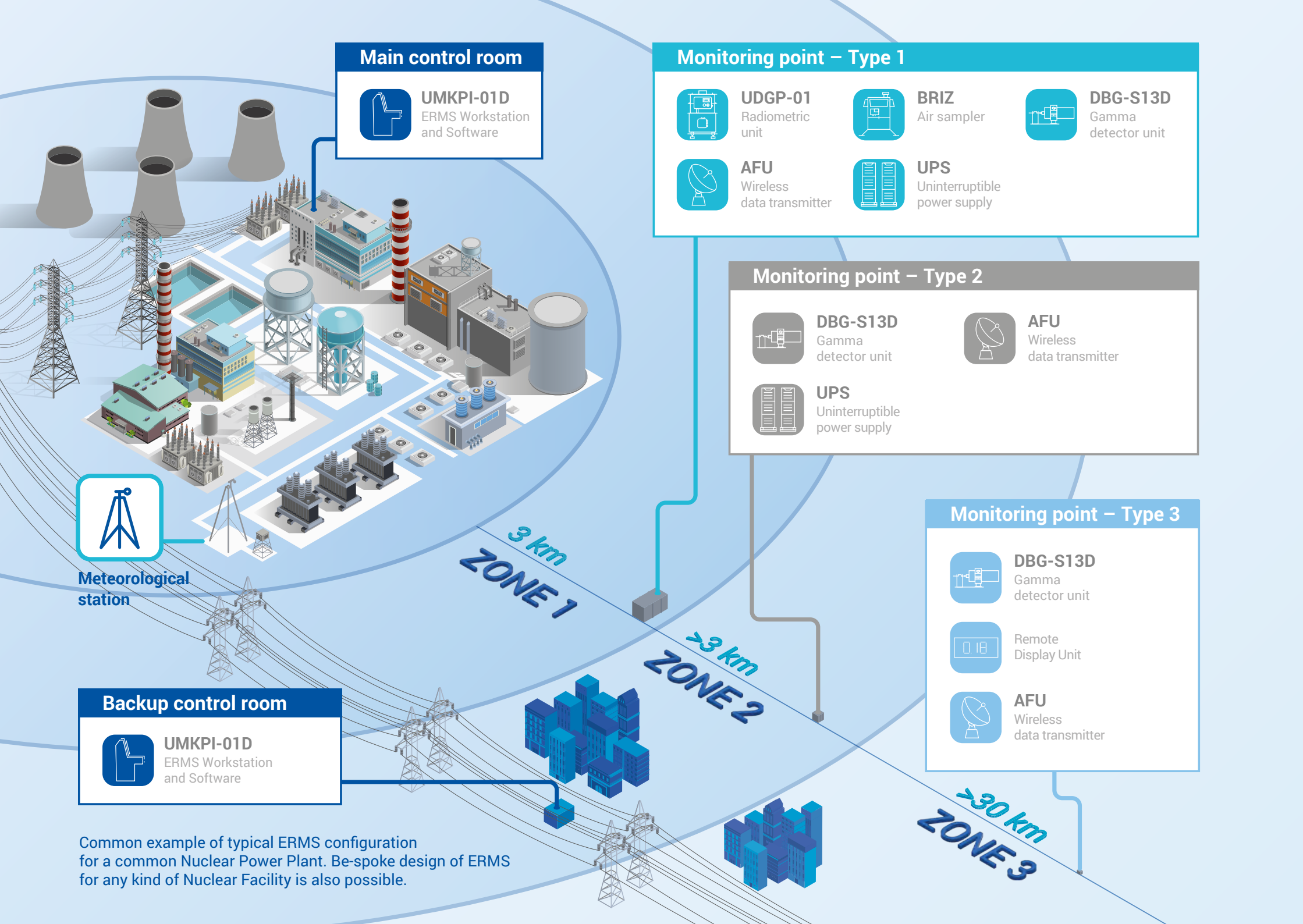
- volumetric activity of aerosols in atmospheric air;
- radionuclide content in samples of agricultural products;
- Personal Dosimetry Monitoring of personnel involved in post-accident works;
- cartograms (mapping) of gamma radiation dose rate fields.

Mobile equipment:

- measurement of volumetric activity of Iodine-131 in the ground layer of the atmosphere.

Bespoke design is also possible.





Main control room



UMKPI-01D
ERMS Workstation
and Software

Monitoring point – Type 1



UDGP-01
Radiometric
unit



BRIZ
Air sampler



DBG-S13D
Gamma
detector unit



AFU
Wireless
data transmitter



UPS
Uninterruptible
power supply

Monitoring point – Type 2



DBG-S13D
Gamma
detector unit



AFU
Wireless
data transmitter



UPS
Uninterruptible
power supply

Monitoring point – Type 3



DBG-S13D
Gamma
detector unit



Remote
Display Unit



AFU
Wireless
data transmitter

**Meteorological
station**

Backup control room



UMKPI-01D
ERMS Workstation
and Software

Common example of typical ERMS configuration
for a common Nuclear Power Plant. Be-spoke design of ERMS
for any kind of Nuclear Facility is also possible.

3 km
ZONE 1

>3 km
ZONE 2

>30 km
ZONE 3

ERMS WORKSTATION AND SOFTWARE



- Located in Main Control Room (Backup control room).
- Can be organized as UMKPI-01D rigid industrial console, normal table-top PC or wall-mount panel.
- Data collection from the stationary Monitoring points Type 1, Type 2, Type 3, Mobile Laboratory and Portable Units.
- Data processing, display and storage.
- Configurable HMI screens with the ERMS layout (area perimeter plan), location and current condition of the connected detectors and monitors;
- Alarms and triggers set up;
- Reports preparation.
- Self-check of the system health, channel failure, communication failure with indication to operator;
- Mapping of the surrounding area with radioactive contamination forecast.
- Integration with upper level systems (e.g. DCS of NPP) and Meteorological Station.
- Training capabilities for the facility personnel (training simulator).



ERMS MONITORING POINTS

MONITORING POINT, TYPE 1

4000x2000x2000 mm size CONTAINER for the equipment installation. The container size can be changed according to the user's specification. Air conditioning system (cooling or heating) is an option depending on climatic region.

- DBG-S13D gamma area monitor.
- UDGP-01 volumetric activity monitor.
- BRIZ high-volume air sampler.
- Lightning rod. Located on the roof of the container.
- Mast (radio tower). Serves for installation of detectors and antenna feeders.
- Antenna feeder system. Types of radio signals: TETRA, VHF, GSM. Wired data transfer: RS-485, Ethernet.
- UPS uninterruptible power supply. Provides no less than 72 hours of internal power supply in case of an external power break.



MONITORING POINT, TYPE 2

- 1000x1000x1000 mm size CONTAINER for the equipment installation. The container size can be changed according to the user's specification.
- DBG-S13D gamma area monitor.
- Antenna feeder system.
- UPS uninterruptible power supply.



MONITORING POINT, TYPE 3

- 600x400x400 mm size CONTAINER for the equipment installation. The container size can be changed according to the user's specification.
- DBG-S13D gamma area monitor.
- Antenna feeder system.
- Remote display unit. Local indication of current radiation parameters.





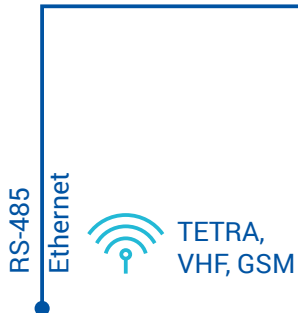
DATA TRANSFER



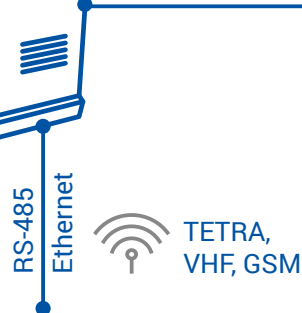
MAIN CONTROL ROOM



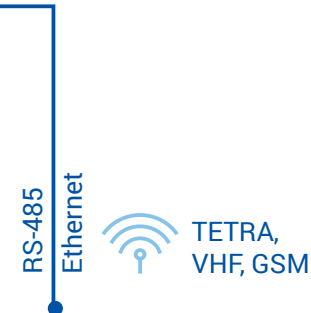
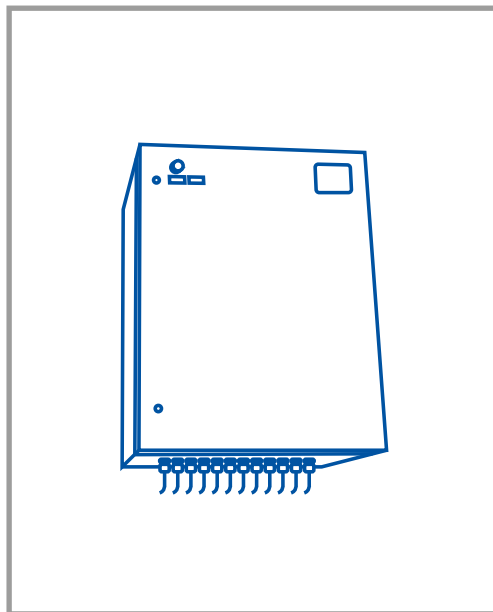
TETRA, VHF, GSM



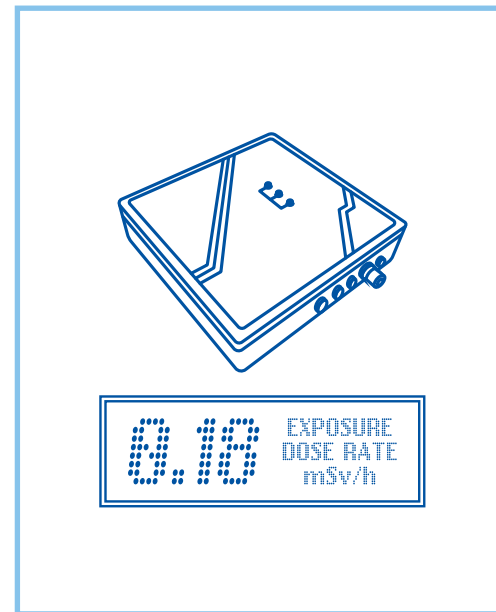
MONITORING POINT, TYPE 1



MONITORING POINT, TYPE 2



MONITORING POINT, TYPE 3



BRIZ

HIGH-VOLUME AIR SAMPLER



PURPOSE

- Continuous pumping of atmospheric air with a constant flow rate through the filter element (with further analysis of the filter in laboratory).
- Option to measure Gamma radiation dose rate using DBG-S11D detector and to measure Beta radiation flux density using BDZB-18D detector.

FEATURES

- Offline mode of operation as well as online mode based on interface RS-485, Ethernet or GSM/GPRS.
- Available in two versions:
 - basic version – a self-contained free standing unit;
 - version 01 – the parts are mounted in external housing like vehicle body, boat, shelter, etc.

PHYSICAL CHARACTERISTICS

- Measurement range of flow rate: $48 \div 2800 \text{ m}^3/\text{h}$.

Operating conditions

- temperature range: $-40 \text{ }^\circ\text{C} \div +40 \text{ }^\circ\text{C}$;
- relative humidity limit value at $35 \text{ }^\circ\text{C}$ temperature: 95%;
- atmospheric pressure range: $84.0 \div 106.7 \text{ kPa}$.

Overall dimensions, weight

- Basic version: $1850 \times 1380 \times 1380 \text{ mm}$, 150 kg.
- Version 01:
 - filtration unit: $688 \times 945 \times 945 \text{ mm}$;
 - control cabinet: $155 \times 400 \times 335 \text{ mm}$.

ELECTRICAL CHARACTERISTICS

- Power supply: 220/380 V, 50 Hz.



MOBILE RADIOLOGICAL LABORATORY



The fully autonomous laboratory to solve a complex of radiation monitoring tasks. It is produced on the basis of a van type vehicle to monitor the land. At special request it can be also supplied on the basis of a boat to monitor the coastal areas. The mobile laboratories (MRL) can be used by radiation safety departments of nuclear facilities, Rapid Response team, Disease Control and Prevention service, calibration laboratories etc.

PURPOSE

- detection and localization of radioactive sources and contamination;
- mapping the boundaries of contaminated territories;
- determination of characteristics of radioactive contamination;
- sampling and rapid analysis of soil, water and air samples;
- calibration of instrumentation at the stationary monitoring points.



POSSIBLE CONFIGURATION

(according to the end user requirements)

- van type vehicle or boat
- autonomous power supply system consisting of:
 - voltage converter 12/220 V;
 - external weatherproof gland (to connect with uninterruptible power supplies);
 - petrol/diesel power generator (for field applications);
 - laboratory power system.
- autonomous life-support system:
 - intake and exhaust ventilation system;
 - additional heater;
 - air conditioner.

- operator's workplace:
 - laboratory desk;
 - cabinet with shelves;
 - racks;
 - armchair;
 - locker.
- instrumentation:
 - The gamma-survey system "Gamma-sensor";
 - portable scintillation gamma- (beta-) spectrometer;
 - personal dosimeters;
 - survey radiometer;
 - dosimeter / survey meter;
 - radon monitor;
 - air sampler, water sampler, soil sampler;
 - portable calibration unit.

ADDITIONAL EQUIPMENT

- radio station;
- personal protection kit;
- means of degassing and decontamination;
- set of tools.





GAMMA-SENSOR

GAMMA-SURVEY SYSTEM



The system is designed for gamma-survey of the certain area and is usually a part of the mobile radiological laboratory.

PURPOSE

Measurement of ambient dose equivalent rate (ADER) of gamma radiation during radiation surveillance and operational monitoring of radioactive contamination.

FEATURES

- detection and localization of radioactive sources and contamination;
- database recording of dose rate, spectral composition of radioactive contamination, date and time with a reference to geographical coordinates using a satellite positioning system;
- automatic audible and visual alarm if dose rate thresholds are exceeded;
- determination of ADER obtained as a result of processing the accumulated spectra with the use of the software "Sensor", identification of nuclide composition of radiation source and determination of the contribution of each nuclide to the ADER measurement result.
- integration of the software "Sensor" with the ERMS Workstation installed in the main control room.

TYPICAL SCOPE OF SUPPLY

- detector units BDEG-4 and BDBG-200UD;
- mounting kit for detector units.
- reference source;
- satellite positioning system;
- laptop or table-top PC with a holder (for use inside a vehicle);
- the software "Sensor".



PERIMETER RADIATION MONITORING SYSTEM PINGWIN

BOUNDARY MONITOR



Fast deployment version of the ERMS based on the mobile monitoring units PINGWIN.

PURPOSE

The fast deployment Environmental (Perimeter) Monitoring System PINGWIN is designed to quickly build a local self-contained automated network of mobile monitoring units for monitoring radiation situation in places where radiation emergencies occur.

FEATURES

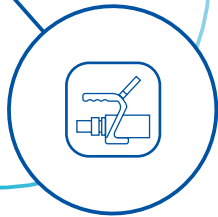
- online radiation monitoring of a certain area;
- gamma radiation detectors;

- global positioning modules;
- wireless communication to receiver;
- internal batteries.

PHYSICAL CHARACTERISTICS

- Measurement range of ADER of gamma radiation: $0.1 \div 10^7 \mu\text{Sv/h}$.
- Energy range: $0.065 \div 3.0 \text{ MeV}$.
- Operating temperature range: $-40 \text{ }^\circ\text{C} \div +50 \text{ }^\circ\text{C}$.
- Battery lifetime: up to 300 hours.
- Data transmission distance to receiver unit: up to 5 km.
- Dimensions (without tripod stand): $600 \times 700 \times 400 \text{ mm}$.
- Weight: up to 50 kg.





MKS-17D

DOSIMETER – RADIOMETER – SURVEY METER

Multipurpose modular designed dosimeter-radiometer. Alpha and beta external probes allow the dosimeter to serve as a contamination monitor. Perfect for use within a mobile laboratory.

PURPOSE AND TASKS:

- planned and on-call inspections of radiation environment;
- measuring of alpha and beta surface activity;
- scanning for the sources of ionizing radiation and radioactive materials;
- radiation monitoring of scrap metals, industrial and domestic wastes;
- radiation and ecological survey at the areas of construction;
- vehicles and cargo inspections.

APPLICATION:

- nuclear power plants and other nuclear energy facilities;
- radiochemical productions and other facilities using the sources of ionizing radiation;
- nuclear medicine and PET clinics;
- metals and mining industry;
- construction sites;
- geological prospecting and exploration;
- customs check-points;
- Disease Control and Prevention Service.



UDI-2

MOBILE IODINE MONITOR



The monitor is designed for continuous automated measurement of volumetric activity of gamma-emitting radionuclides of Iodine (I-131). Can be used as a stand-alone system or as a part of mobile laboratory to monitor I-131 activity in the ground layer of the atmosphere with the data integration to upper level systems.

FEATURES

- Power supply options: 220 V, onboard power system of the vehicle, uninterruptible power supply of the mobile laboratory, internal rechargeable battery.
- External display unit to represent the measured value, air flow rate, geographical coordinates (positioning), date and time, communication channels status. In addition, the display unit provides a visual and audible alarm on excess of the thresholds.
- A number of communication options, wired and wireless: RS-485, Ethernet, GSM, VHF, etc.
- IP 55 enclosure (IP 65 for the display unit).



ENVIRONMENTAL MONITORING

Outside of radiation monitoring itself the ERMS can be also deployed to monitor other environmental and meteorological parameters such as: ambient temperature, wind speed, humidity, noise pollution level, air, soil and water conditions. Big cities, mass gathering places, hard traffic transportation ways, large industrial objects, nature reserves – these and similar facilities are the objects of environmental monitoring.

Similar to radiation monitoring, the environmental monitoring points can be organized as stationary or mobile means – on the ground, in waterways or in the air. Similar to radiation monitoring, the system is able to collect, process and transmit data to upper level recipients like Control Rooms, Situation Rooms or First Responders.

Radiation, Environmental and Meteorological parameters can be combined all together to build a comprehensive monitoring system of a certain area.





ERMS INSTALL BASE

2022-2023

ERMS for Akkuyu Nuclear Power Plant, Turkiye

ERMS for Rooppur Nuclear Power Plant, Bangladesh

2020-2021

ERMS for Dubna Nuclear Research Institute, 16 stationary monitoring points

2019-2020

ROSATOM, development and supply of the Fast deployment version of the ERMS

2018-2022

33 stationary monitoring points for Krasnoyarsk region

2018-2020

ERMS for the EMERCOM of Russia, 60 stationary monitoring points in 19 regions

2014

FGUP RosRAO, ERMS for nuclear storage facility in Primorsky region, 27 stationary monitoring points

2012

Advanced Research Institute of Inorganic Materials, Moscow, 52 stationary monitoring points

2011

Mobile laboratory for the Kaluga region, integration with the regional Situation room

2009-2015

128 stationary monitoring points and 3 mobile laboratories for Moscow, Kursk, Volgograd and Voronej regions, integration with ROSATOM Situation room

2009-2012

ROSATOM, ERMS for the Tver region, 10 stationary monitoring points

1997-2001

ROSATOM, 175 stationary monitoring points for 7 Nuclear Power Plants in Russia (Balakovo, Beloyarsk, Bilibino, Kalinin, Kursk, Novovoronej, Rostov)



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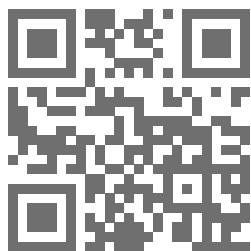


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