

Meteorology

Early Warning System
Airport Weather System
Modelling and Forecasting
Automatic Weather Stations
Road Weather Information Systems
Microclimate Cave Monitoring
Climatological Database
Meteorological Radar
System Integration

MicroStep - MIS

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MicroStep-MIS operates worldwide and it is specialised in development and manufacturing of monitoring and information systems, data acquisition and processing, research and numerical modeling.

The company's key field activities cover:

- Meteorology and Climatology
- Aviation Systems
- Road Weather Information Systems
- Marine Systems
- Hydrology - Flood Warning systems
- Microclimate Cave Monitoring Systems
- Seismology
- Radiation Monitoring Systems
- Air Quality, Emission Monitoring
- Crisis Information Systems
- System Integration as well as Turnkey Projects

Our global operations include the following customer groups: airports, port authorities, meteorological and seismological institutes, hydrological institutes, environmental authorities, industry, and municipalities.

Activities of MicroStep-MIS cover the complete process of software and hardware systems development and integration. Our products and comprehensive services fully comply with the technical as well as quality standards (ISO 9001:2008, ICAO, WMO, EUROCAE), and are supplied under very competitive financial and trade conditions.

Our highly qualified staff of developers and experienced researchers, dynamic product development process, and close cooperation with our customers guarantee the development and delivery of the most progressive and outstanding solutions.

*More than 20 years of experience
in the field of monitoring and
information systems*



NEWS

Digital Barometers MSB780X and MSB181



MicroStep-MIS flagship MSB780X is designed for use in meteorological and aviation applications that require reliable and highly accurate measurement, fast dynamic response and advanced long-term stability.

- Excellent total accuracy better than 0.15 hPa
- Fully temperature compensated (-50 °C to +80 °C)
- Long-term stability ± 0.05 hPa / year

Budgetary version MSB181 is suitable for use in various environmental monitoring applications that require accurate measurement.

Meteorological Mast MM10-100



MM10-100 is usable in winds up to 100 m/s, providing a stable platform for measuring equipment. It is easily installed by two persons and allows quick access for maintenance.

- Usable in winds up to 100 m/s
- Highly resistant to corrosion, made of stainless steel

Data Logger SAWS111



SAWS111 is a compact version of data logger designed for standard, temporary and mobile meteorological stations, as well as for those applications where a small footprint but full functionality is required.

Rain Gauge Compensator RGC



RGC is a device that compensates systematic error of tipping bucket rain gauge at high rate rain intensity.

- Decreasing error range down to 3 % and less
- Waterproof and energy-efficient
- Compatible with various types of tipping bucket rain gauges

IMS4 CalibLab & Humiwell



IMS4 CalibLab is a universal & easy to use calibration laboratory which can satisfy the needs of any metrological, meteorological, aviation or industry institute. It avails the possibility to calibrate relative humidity, barometric pressure, temperature and wind sensors, rain gauges, pyranometers and data loggers.

Humiwell is a Relative Humidity Calibrator. It enables the accurate calibration of all humidity sensors. Whether it is used as a benchtop device or taken to the field, Humiwell is always ready to promptly deliver the highest accuracy calibration.

Pressurewell



Pressurewell is integrated pressure calibrator. It is all you need to accurately calibrate pressure sensors in one box. There is no need for external gas sources, compressors or vacuum pump. everything required is already built-in, small and silent.

Sandstorm Modeling



Sandstorm model is a new module of IMS4 Model Suite. It is based on the state-of-the-art 3D numerical weather prediction, a model for sand uplift, dispersion and deposition.

Tide Modeling



Tidal model is a complex hydrodynamic model associated with a numerical grid covering a specific spatial domain. It predicts motion of the water, such as, water surface elevation, position information, and current velocity.

Automatic Weather Stations

- Synoptic Observation
- Climatological Observation
- Environmental Monitoring
- Radiation Monitoring
- Industrial Applications
- Internet-ready
- Aviation and Traffic Weather Observation



The MicroStep-MIS AMS 111 II system is designed for standard or mobile meteorological stations, as well as for the applications in areas where the commercial power or communication networks are limited or non-exist.



The AMS 111 II interfaces with a various sensors and telecommunication devices. Embedded with the state-of-the-art software, AMS 111 II is the reliable and cost-effective solution for meteorological and environmental monitoring.

Consisting of the building blocks interconnected by RS 485 system bus, AMS 111 II serves as a modular and flexible platform for construction of various measuring and logging systems, which include AMS 111 II modules, intelligent sensors, displays and PC-s. System flexibility allows wide application range from simple compact system to multipurpose stations. 24 bit A/D conversion and software features such as data validation and quality control ensure the accuracy of the measured data.

System supports data output to RS 232/485 lines, modems and cellular phones (SMS, GPRS), radio-modems and satellites. PPP protocol support makes AMS 111 II Internet-ready. User friendly software applications allow easy and comfortable system configuration, setup and maintenance also remotely via modem/PPP connection.

Manned Weather Stations



The Integrated Meteorological System (IMS4) is open meteorological system, suitable for building of national meteorological networks, airport weather systems, and meteorological stations for commercial use.

IMS4 Observer Workstation is the version of Integrated Meteorological System application software designed to interface the automatic weather station AMS 111 II model or 3rd party. It performs continuous measurement and/or data collection from connected automatic weather station, data processing (quality control, recalculations) and archiving; and provides user with the real time screen with current data as well as modules for data export into Microsoft Excel/OpenOffice. OrgCalc and for displaying data time series in the form of charts.

The IMS4 Observer Workstation supports WMO codes (SYNOP, METAR, etc.) as well as data protocols and formats for data exchange over GTS, AFTN network or other media (asynchronous lines, dial-up lines, FTP, PPP, e-mail). An integrated part of the IMS4 Observer Workstation system is a built-in web server providing access to the data over the intranet/Internet.



Data Collection System (UDCS)

- Scalability
- Fault Tolerance
- High Availability
- Supports wide choice of protocols

Meteorological, radioactivity and environmental data can be useful only after they reach the end-users. Information and communication technologies have never been more important in the world of meteorology and environmental monitoring.

IMS4 UDCS is a data collection and switching system built on the field proven IMS4 platform for meteorological, radiation and environmental data acquisition and remote system maintenance.

Scalability, Fault Tolerance and High Availability

The IMS4 UDCS runs on standard PC, or fault tolerant server with redundant components or even a high availability cluster of two servers running in a hot failover mode, providing more and more safety for your data.

WMO Message Collection and Switching Capabilities

The IMS4 UDCS supports wide choice of protocols defined by the WMO Manual on the GTS:

- SOH/ETX protocol for serial lines as defined by the WMO
- IPP protocol for serial lines as defined by the Slovak Hydrometeorological Institute
- FTP file transfer (different formats)
- TCP/IP sockets as defined by the Attachment II/15 of the WMO Manual on the GTS
- AFTN gateway

The full-duplex mode of operation allows not only collection of the data from stations, but also distribution and switching of messages between/to the stations. The system fully supports standard WMO codes SYNOP, METAR/SPECI, CLIMAT, GRIB, BUFR, and is open for the support of proprietary/national codes.

Non-WMO Data Processing

In addition to WMO standards the UDCS supports numerous proprietary protocols and formats for communication with automatic weather and environmental stations and data loggers, as well as for data distribution and exchange:

- Text log-files (user configurable formats),
- National and/or international formats (EURDEP),
- NWP model output,
- Dispersion model output,
- Radar, Satellite images,
- JPEG images, MPEG videos.

Supported Interfaces:

- LAN/WAN, Ethernet
- TCP/IP, FTP, PPP
- Asynchronous leased lines
- and dial-up lines with dial-in, dial-out options (both periodical and manual)



Climatological Database System (CLDB)

- High Availability
- Manual or Automatic Data Sources
- Highly Configurable Quality Control
- Metadata Management
- Variety of Extension Modules Available
- Advanced Graphical Presentation Tools
- Export to Standard Formats
- Mathematical/Statistical Packages

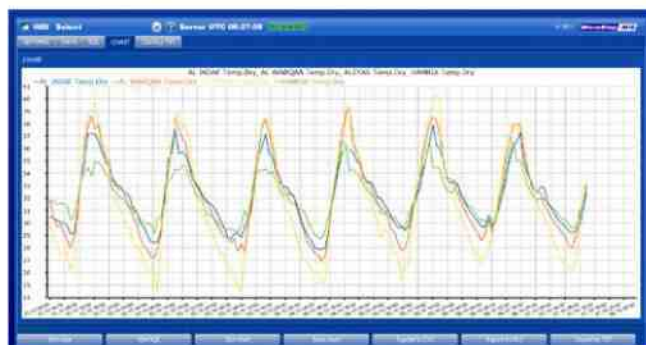
Climatological database belongs to the usual means of meteorological institutes of today. The main reason of its utilization is storage of all collected meteorological data in one unified structure to avoid data inconsistencies and discrepancies and to enable standard comfortable data access for all users and other software systems. No additional data storage and no different and confusing data formats are needed.

Within the Climatological database (CLDB), the above mentioned unified structure is based on SQL Database Server and the standard data access is based on SQL language. The guarantee of data storage quality is the industry-proven Oracle® Database Server, the world leader in database technologies. Great open source solution offered is PostgreSQL.

CLDB is based on WMO¹ recommended practices for climatological data processing (WMO¹ Guide No. 100). It follows the WMO¹ suggestion of a RDBMS (Relation Database Management System) application with wide use in climatology (World Climate Program efforts concerning new Climate Data Management Systems - CDMSS).

Great advantage of CLDB is its modular architecture, which gives end user the possibility of detailed customization. End user can specify additional non-standard input and output modules. Modules can be easily implemented and added to any existing or future installation. One of the most interesting extensions offered is upgrade to environmental database (integration of AWS, radar, satellite, profiler, historical observations, marine data, radiation and air pollution monitoring and more).

¹⁾ World Meteorological Organization



IMS4 AWOS

Automated Weather Observation System

More than **300 aviation systems**
installed in **28 countries**



- Integrates all airport weather data
- Scalable up to ICAO category CAT III
- Conforms to the ICAO and WMO regulations and recommendations
- Access to AWOS data from Net

The IMS4 Automated Weather Observation System is an airport weather observation system for regional, national and international airports.

The IMS4 AWOS measures, processes, stores, presents and communicates all meteorological data at the airport, including, measurements produced by variety of meteorological sensors, manual observations, and WMO codes received from GTS and AFTN. It provides weather data and reports to observers, air traffic control, pilots and other users. It generates real-time screens, graphs, WMO codes, alarms and voice reports. Moreover, it interfaces upper air systems, low level windshear alert system and radars.

The IMS4 AWOS conforms to all ICAO and WMO recommendations regarding the measurements and reporting. It calculates various derived meteorological data such as QNH, QFE and Runway Visual Range. It generates alarms, METAR, SPECI, SYNOP reports, as well as national codes if required.

Scalable and flexible

The configuration and structure of a respective Airport Weather System depends on the size, and category of the individual airport up to ICAO category CAT III. The modular architecture allows the expansion from single Aviation Weather Display with basic set of sensors up to

comprehensive systems for multirunway airport connected to GTS and AFTN networks including a dual hot fail-over Central System, several Observer's Workstations, displays and terminals, briefings and ATIS/VOLMET services. The well-developed upgrade programs allow our systems to follow technology progress and adapt to airport expansion and changes in regulations during its lifetime.

Aviation Web Server

Within the same airport, or on another continent, IMS4 AWOS provides users with the powerful and efficient web interface. All the user needs in order to view the AWOS data is a standard web browser and Internet connection.



IMS4 ATIS / VOLMET

- Arrival, Departure or Combined ATIS and VOLMET broadcast and datalink services
- From regional up to major international airports
- Easy expansion from single up to the multi-channel ATIS /VOLMET system
- Open architecture and easy adaptation



The IMS4 ATIS/VOLMET system benefits from more than fifteen years of MicroStep-MIS experience in the field of meteorological service for civil aviation. It provides Arrival, Departure or Combined ATIS and VOLMET broadcast and datalink services for airports from regional up to major international airports as well.

The IMS4 ATIS/VOLMET system can be installed as a standalone system or as an integrated part of the MicroStep-MIS IMS4 Automated Weather Observation System (AWOS) with permanent access to AWOS data.

The open architecture allows easy expansion from the basic single channel system (combined departure and arrival ATIS service) up to the multi-channel ATIS/VOLMET system (separate broadcasting channels for airport with multiple runways, multichannel service for group of airports etc.).



Software configuration allows easy adaptation to specific airport conditions, national rules, and voice report composition rules.

Variety of system options include but are not limited to:

- multiple channels and/or multiple languages
- dual hot-failover configuration and/or redundant transmitter equipment as a guaranty of the highest possible system reliability
- remote operator and control positions for convenient authorized access to the system
- telephone interface for the preview of current broadcasted reports

The IMS4 ATIS/VOLMET user interface is intuitive and easily operated. The fully automated mode allows cost effective operation without human intervention. The semi automated or manual mode can be also configured for specific channels, if required, with visual and audible warnings announcing new data availability and new report compilation.



Road Weather Information Systems

- Improves timeliness of maintenance actions
- Increases winter maintenance efficiency
- Minimizes the traveling public's exposure to hazardous weather related roadway conditions

IMS4 Road Weather Information System is a unique system consisting of several meteorological stations strategically located alongside the highway that offer detailed information about weather and road conditions.

Specialized equipment and computer programs monitor weather and pavement parameters to make forecasts. This gives the road maintenance authorities opportunities to utilize alternate de-icing chemicals, make optimal use of materials and staff, and practice anti-icing techniques.

RWIS stations are located in strategic locations to provide accurate real-time road weather information and critical observations for forecasts.

- **Pavement sensors** in travel lanes to measure road surface temperature, water film height, freezing temperature, road condition
- **Non intrusive sensors** to measure surface temperature and road surface conditions
- **Meteorological sensors** adjacent to the roadway to measure: air temperature, dew point temperature, relative humidity, wind speed and direction, visibility, present weather, precipitation occurrence, precipitation accumulation, air pressure, snow depth
- **Cameras** that take images of the roadway for snow and ice control as well as for traveler information.



IMS4 Caliblab Calibration Laboratory



To achieve the most accurate and professional measurement, it is necessary to employ a regular calibration and adjustment of the meteorological sensors. MicroStep-MIS offers a comprehensive solution for calibration laboratory hydrometeorological services which include:

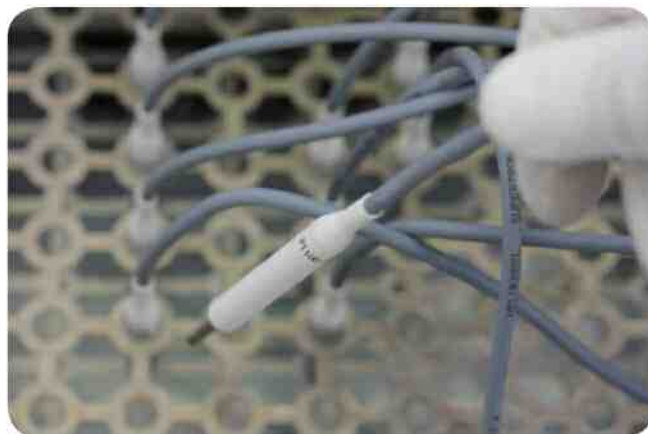
- Laboratory equipment and standards for the required quantities
- Validated calibration method
- Automation of calibration
- Staff training
- Preparation for accreditation and assistance during the accreditation process



MicroStep-MIS has prepared equipment and measurement standards for laboratories prepared to comply with the special customers requirements for:

- Temperature
- Relative Humidity
- Atmospheric Pressure
- Wind Speed and Direction
- Precipitation
- Solar radiation
- Electrical Quantities (Voltage and Resistance)

with optional expansion for other quantities



Humiwell



Humiwell is a Relative Humidity Calibrator developed by MicroStep-MIS. It is everything you need to accurately calibrate your humidity sensors. Whether you use it as a benchtop device or take it to the field, Humiwell is always ready to deliver the highest accuracy just in few moments.

Calibration laboratory in one device

Humiwell contains internal humidity and temperature probe, which can be used as a reference in a mobile calibration laboratory.

Highest standards calibration laboratory

Humiwell works well with chilled mirror reference hygrometers, providing fundamental measurement and low uncertainty down to 1 % RH. The temperature stabilized chamber with mixing fan provides wide range of temperature and humidity conditions for your precise calibration.

Pressurewell Integrated Pressure Calibrator

Highly integrated pressure calibrator Pressurewell is all you need to accurately calibrate pressure sensors in one box. No need for external gas sources, compressors or vacuum pump. Everything required is already built-in, small and silent.

Regulator algorithm

Sophisticated regulator algorithm provides fast response, no overshoot, high stability of the pressure setpoint.

Reference sensor

Pressurewell features highly accurate, stable and reliable pressure sensor, which are used as a feedback sensor and a reference.

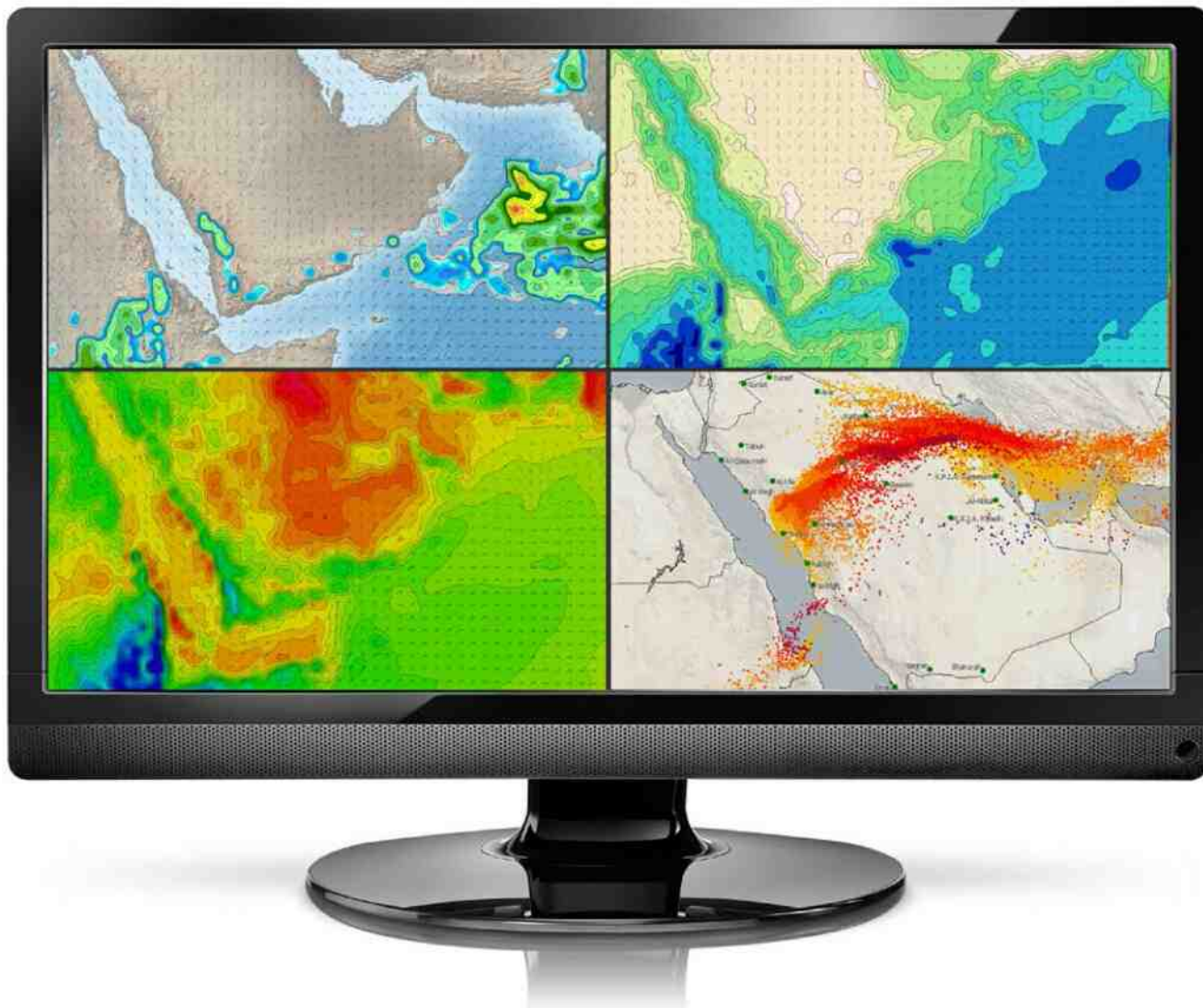
Calibrated sensors

A number of pressure sensors can be connected directly to Pressurewell using high quality pressure connectors. The connectors have the auto-shutoff feature. Pressurewell optionally features readout card with six inputs for sensors.

The outputs are analog voltage, SDI-12 and 5 V UART compatible. RS-232, RS-485 and other buses may be also specified. The readout card connects to the rear panel of IPC. It solves the question how to read the calibrated sensor values during calibration. It also saves space and reduces the number of lab PC ports.



IMS4 Model Suite

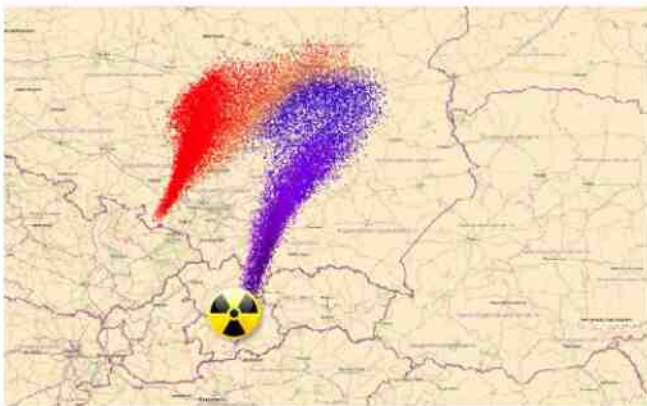


The IMS4 Model Suite provides a composition of modern models and technologies for meteorology, hydrology, radiation and air quality. Models run both operatively and in research mode. IMS4 Model Suite is an integrated, easy-to-use powerful system for modeling, processing, visualization and model validation.

IMS4 Model Suite is a complex system for supporting forecasters as well as crisis managers. It is designed to run regularly for daily forecasting purposes, as well as emergency crisis regime. The decision system consists of several models and tools:

- **Numerical Weather prediction:** 3D regional weather prediction model which produces and visualizes high resolution forecast data (non-hydrostatic option)
- **Nowcasting** integrating radar, satellite and field data
- **Dispersion model** for modelling and visualization of pollutant and radioactivity dispersion in the atmosphere
- **Road Condition Model** for monitoring and forecasting events (snow, freezing rain) which can endanger road traffic
- **Fog Prediction** 1D nowcasting and short term prediction model
- **HI-RES Gaussian Model** performs pollutant and radiation modelling on very high resolution (~m)
- **Wave model** for operational ocean wave predictions
- **Hydrological rainfall/runoff models:** HBV, HEC-HMS
- **1-D hydrodynamic model:** HEC-RAS
- **Dust/sand dispersion model** for dust load and sandstorm modelling
- **Doses calculation after nuclear accident**
- **Model validation tools** for easy monitoring of simulation quality
- **High performance computing** – installation and support of servers centers for demanding meteorological simulations
- **Basic and Advanced Training, Support, System monitoring**

Radiation Monitoring System



Open and scalable, ideal for single monitoring station or building of regional/national radiation monitoring networks, the MicroStep-MIS RadMon is a radiation data collection, processing and presentation software system.

RadMon measurement module offers:

- Interface to the radiation probe or data logger
- Measurement of radiation in configurable time intervals
- Diagnostics of sensor errors
- Quality control and verification of measured data

IMS4 Radiation Monitoring Module extends the functionality of IMS4 Meteorological Station software package by dose rate of gamma radiation monitoring and reporting. RadMon presents the data to many subscribers satisfying the different needs. RadMon communication module utilizes the fixed or dial-up serial lines, LAN, WAN, integrated web server and supports wide choice of formats and protocols. It provides quickly the first information about an increase of ambient gamma radiation dose rate.

IMS4 Radiation Monitoring Module interface allows you to see actual values and minor changes in the ambient

radioactivity level as well as emergency values of gamma radiation dose rate with possibility to review the history of dose rates data with selectable time scale.

Warning and notification subsystem

The task of the integrated warning and notification subsystem is the real time monitoring of increased radiation levels and radiation network performance. Subsystem can be connected to the crisis center.

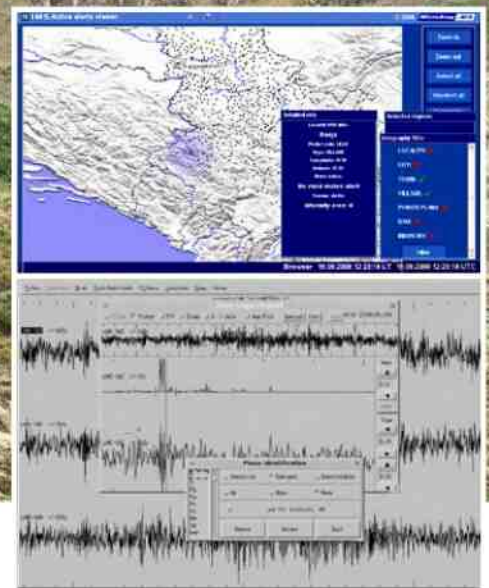
Radiation probe, model RPSG-05, developed and manufactured by MicroStep-MIS, measures dose rate of gamma radiation.



Radiation Probe RPSG-05 consists of two Geiger-Müller tubes with an energy compensator in a dust and humidity proof housing. It covers measurement of dose rates from 10 nSv/h up to 10 Sv/h. This wide measuring range enables indications of minor changes in the ambient natural radioactivity level as well as measuring of extremely high rate.

Seismological Monitoring System

- Intuitive graphical user interface
- Compatibility with standard data exchange protocols - SeedLink and AutoDRM
- Modular architecture



Seismological monitoring system is a package of products for seismic data acquisition, processing and archival. The system includes components for most of the tasks encountered in standard seismological practice.

Digital recorder Wave32 uses state-of-the-art technology to provide high-resolution data for seismic applications. Versatile device Wave32 fits to wide range of needs, starting from single low-power off-line recording device to high precision network recorder providing real-time data to data center.

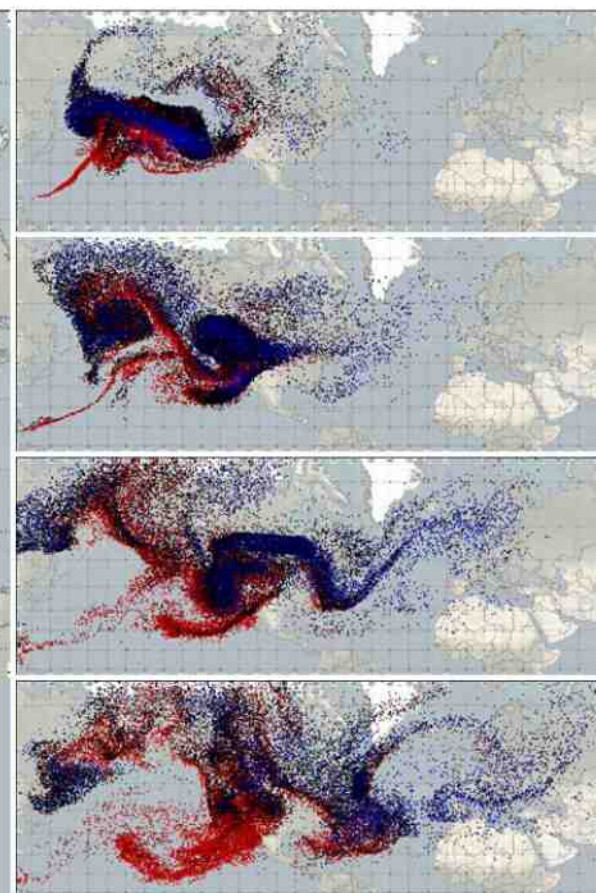
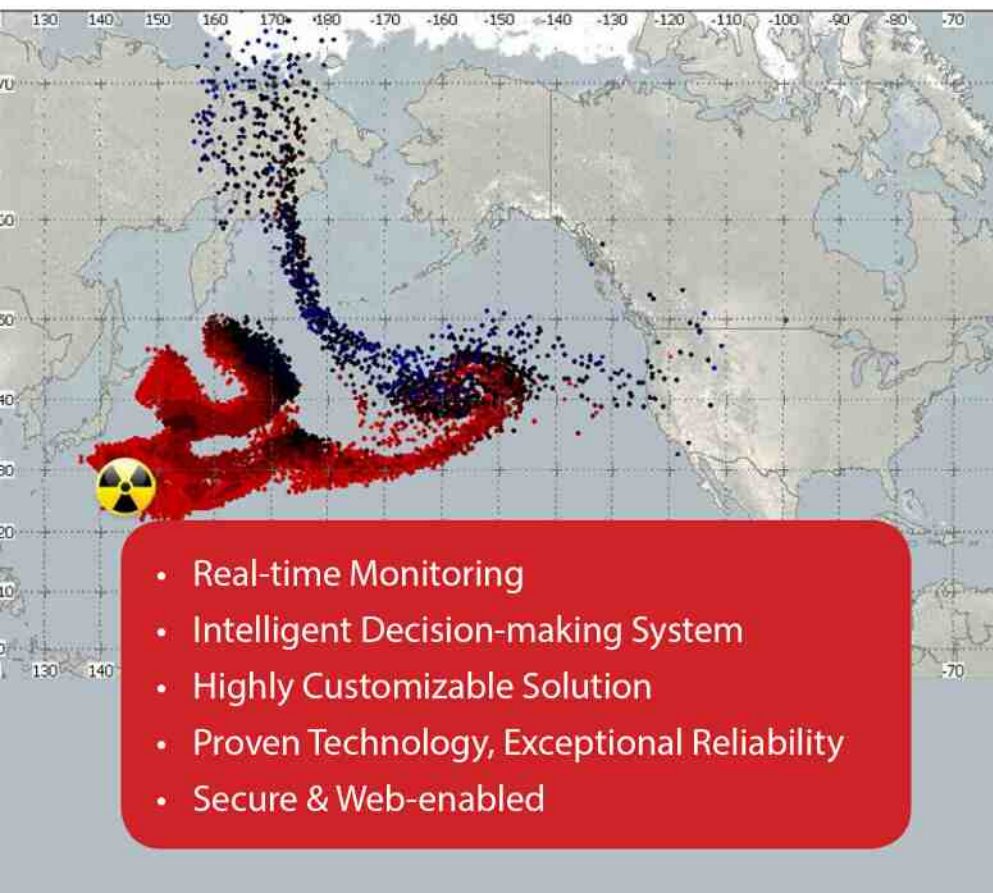
WaveCenter is a web based data acquisition, analysis and archival software with the relational database SeismoDB integrating various seismic data into one system. WaveCenter system provides modules for the:

- waveform data acquisition and exchange
- parametric data acquisition and exchange
- automatic data processing
- manual data processing
- macroseismic survey
- seismic network management

Warning Center uses products of WaveCenter modules and provides the necessary layer to build seismic early warning system.



Early Warning System



- Real-time Monitoring
- Intelligent Decision-making System
- Highly Customizable Solution
- Proven Technology, Exceptional Reliability
- Secure & Web-enabled

MicroStep-MIS Crisis Information System is a complex crisis management and decision support system for the meteorological, radiological, environmental, hydrological as well as seismological emergence.

The Crisis System interfaces the real-time data including:

- Meteorological data
- Seismological data
- Hydrological data
- Radiation data
- Marine data
- Air quality monitoring

The data are processed by Data Management Subsystem.

MicroStep-MIS Crisis Information System incorporates mathematical dispersion models for situation analysis:

- Numerical Weather Prediction Model
- Nowcasting
- Various Dispersion Models (Lagrangian, Gaussian, ...)
- Ocean Wave Models

The Crisis system can be used for simulation of emergency scenarios - during accidents mitigation planning, at the moment of the accident or during the long-term actions implemented months or years after an accident.

The main users of the system are usually the authorities responsible for the crisis management at local, regional, or national levels. The optional subsystems include but are not restricted to call center with digital recording systems, GIS and warning and notification systems.

System components comply with the international standards in the respective areas, however can be customized to meet the geographical, climatic, and environmental, as well as organizational specifics of the customer.

Siren Warning System

Designed to be an integrated part of the crisis centers, the siren warning system is an effective, reliable and cost effective system conforming to the strictest requirements for crisis centers, industrial applications and power engineering, including nuclear energy facilities.

Environmental Monitoring System

- Processes and Strategies Important for Monitoring the Quality of Environment
- Numerical Modeling of Pollution, Deposition, Radioactive Decay
- Complete Solution for Air Quality Monitoring System
- Weather Events System, Ambient Dust Monitoring
- Warning System

MicroStep-MIS Environmental Monitoring System for monitoring the components of the environment is a complex solution for monitoring, data collection and processing. It is also a system for decision support in environmental protection.

- Data gathering, quality control and data storage
- Exporting and reporting of collected data
- Statistical analysis and comparison
- Visualization using GIS tools
- Data integration from various sources

MicroStep-MIS Environmental Monitoring System enables incorporation of the dispersion models for modeling of either the short time or continuous release and dispersion of pollutant, short or long range atmospheric transport, diffusion under changing weather conditions, wet and dry deposition and radioactive decay, as well as seismological data analysis module integration.

Complex Data Management System

MicroStep-MIS offers a complex system integrating all data:

- Ambient air quality monitoring
- Ambient dust monitoring
- Continuous emissions monitoring
- Meteorology
- Radiation monitoring
- Additional environment data

Air Quality Monitoring

The network of MicroStep-MIS AMS 111 II integrated meteorological and air quality monitoring stations with the Environmental Monitoring System as a data presentation system is a complete solution for regional/national air quality monitoring system.

Continuous Emissions Monitoring

The Environmental Monitoring System offers complete software packages for industrial continuous emissions monitoring. The software meets the regulations of the Slovak Republic for continuous emissions reporting and monitoring.

Air Quality and Continuous Emission Monitoring comply with the international standards and can be customized to meet the geographical, climatic, environmental, as well as organizational specifics.





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