Nuclear measurement techniques

Dear Reader,

It is my great pleasure to introduce the activity and product line of the GAMMA Technical Corporation, a significant measuring equipment manufacturer company, with the widest nuclear instrumentation portfolio amongst the Hungarian manufacturers. GAMMA was founded in 1920 and with several decades of experience Gamma's products are mainly made for military, civil protection and radiation protection applications.

Our company has always been involved in the R&D of innovative technological solutions, where our intention is to pay special attention to the demand of our Customers. With all our expertise, we are open to support our partners in the planning and realization of any kind of projects in our fields of activity.

Our extensive product range consists of radiation detection and measuring instruments, integrated CBRN/HazMat reconnaissance systems, monitoring and early warning networks, meteorological instruments, as well as reconnaissance and first response vehicles, personal respiratory protective equipment, decontamination systems, special purpose vehicles and trailers. The company has developed the Hungarian "KOMONDOR" Light Armoured Vehicle Family, too.

The Nuclear Devices division is eager to provide solutions for customers working in the fields of nuclear power, radiation protection, radiochemistry or industrial irradiation. We produce measuring instruments to equip complete nuclear laboratories with radiation monitoring systems and analytical capabilities. We offer single, custom made scintillation crystals and probes, as well as turn-key solutions for emission, environmental, area and contamination monitoring applications.

We are ready to serve customers' needs with our expertise in the field of nuclear measurement techniques, whether for a complex monitoring system or a unique device to perform a special measurement task.

In the followings, we are glad to give you a short summary of our nuclear measurement techniques portfolio what we think and hope to be of interest to you.

Please take the time and download our presentation and the product catalogues of our company using the links on the back of this catalogue. More details about the products can be found at our webpage (www.gammatech.hu).

Should you need any further information please do not hesitate to contact us, we will always be at your service with pleasure.

Your sincerely,

Dr. Attila Zsitnyányi, PhD

CEO
GAMMA Technical Corporation

History

GAMMA Technical Corporation entered the nuclear industry in 1955.
We have been developing and manufacturing scintillators, radiation detectors and equipment for diverse nuclear applications throughout the past decades.

Present

We develop and manufacture GM type and scintillator type detectors. With different types of detectors and sensors we build complete systems for customers on the field of safety, security, environment and radiation protection. We have our own scintillation crystal growing facility and the capability to design and make special, customized devices ideal for research institutes and nuclear facilities.

Scintillators for nuclear measuring applications in metal canisters

- wide range of scintillator materials
- scintillators in grooved or flanged canister
- rectangular and cylindrical canister
- scintillators with diameter from 0.25" to 5" and thickness up to 12"
- well-type and transversely bored crystals
- compound scintillators for simultaneous α, β, n counting and γ spectrometry
- unique scintillators according to special customer requirements

Demonstration model

- transversally bored
- combined scintillators
- well type
- lead collimated
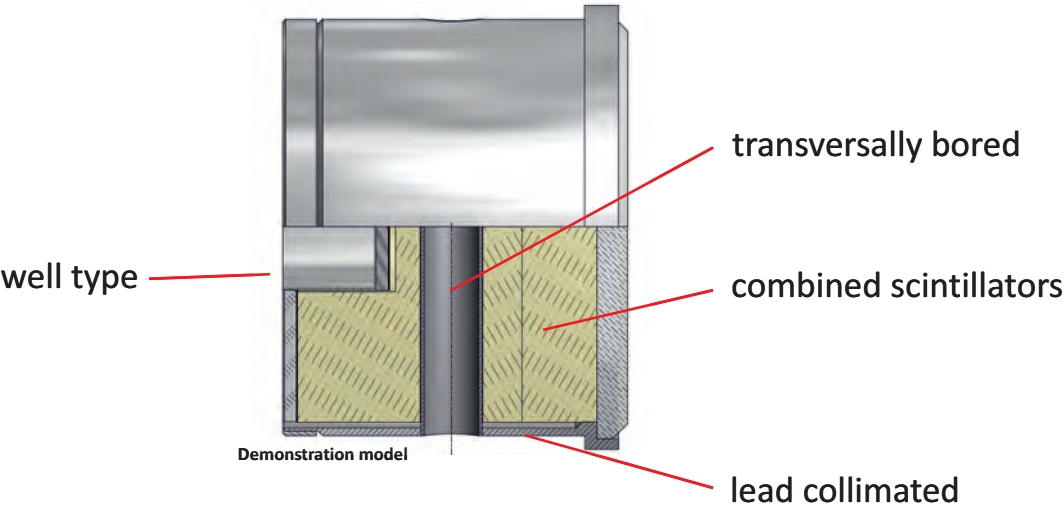
Versions:
S……/H: heat-resistant
S……/R: with built-in reference source
S……/L: built-in LED for stabilization
S……/Q: rectangular base
S……/C: lead collimated
Other sizes, housing and scintillator materials are available on customer request.

Technical details

standard types	measurement application	material	housing	window	standard size (D: diameter) (L: lenght) [mm]
S111...	soft and medium gamma	NaI(Tl)	Al-Mg-Si or steel, grooved or flanged housing	Al 0.2 or 0.5 mm thick	D: 8 - 127 L: 10.5 - 300
S112...	low activity gamma	NaI(Tl)	well-type Al-Mg-Si or steel, grooved or flanged housing	Al 0.2 or 0.5 mm thick	D: 40 - 127 L: 50 - 127
S113...	low-energy, X-Ray, Mössbauer	NaI(Tl)	Al-Mg-Si or steel, grooved or flanged housing	Al or Be 0.05 or 0.2 mm thick	D: 5 - 50 L: 0.1 - 4
S114...	soft gamma	NaI(Tl)	Al-Mg-Si or steel, grooved or flanged housing	Al 0.2 mm thick	D: 14 - 127 L: 2.5 - 6.3
S121...	gamma	CsI(Tl)	Al-Mg-Si or steel, grooved or flanged housing	Al 0.2 or 0.5 mm thick	D: 8 - 127 L: 10.5 - 300
S191...	gamma	CsI(Na)	Al-Mg-Si or steel, grooved or flanged housing	Al 0.2 or 0.5 mm thick	D: 8 - 127 L: 10.5 - 300
S10...1	gamma	BGO	Al-Mg-Si or steel, grooved or flanged housing	Al or Be 0.05 or 0.2 mm thick	D: 8 - 127 L: 10.5 - 300
S10...2	gamma	LaBr$_3$(Ce)	Al-Mg-Si or steel, grooved or flanged housing	Al or Be 0.05 or 0,2 mm thick	D: 8 - 127 L: 10.5 - 300
S522...	Proton, electron, beta, gamma	PVT plastic	Al-Mg-Si grooved or flanged housing or fixed to light guide	Al-metallized film	D: 8.5 - 127 L: 0.1 - 5
S523...	gamma	PVT plastic	Al-Mg-Si grooved or flanged housing or fixed to light guide	Al 0.2 or 0.5 mm thick	D: 8 - 127 L: 10.5 - 2000*
S212...	alpha	ZnS(Ag)	Al-Mg-Si grooved or flanged housing	Al-metallized film	D: 40 - 63
S222...	alpha + beta	PVT Plastic + ZnS(Ag)	Al-Mg-Si grooved or flanged housing	Al-metallized film	D: 40 - 63 L: 0.2 - 5
S32...	slow neutron	Boron polyester + ZnS(Ag)	Al-Mg-Si or steel, grooved or flanged housing	Al 0.2 or 0.5 mm thick	D: 25 - 63 L: 1.2
S332...	fast neutron	Plastic + ZnS(Ag)	Al-Mg-Si or steel, grooved or flanged housing	Al 0.2 or 0.5 mm thick	D: 25 - 63
S1.9...	beta + gamma	gamma scintillator + PVT plastic	Al-Mg-Si grooved or flanged housing	Al-metallized film	D: 25 - 63 L: according to request
S1.9... Zn	alpha + beta + gamma	gamma scintillator + PVT plastic + ZnS(Ag)	Al-Mg-Si grooved or flanged housing	Al-metallized film	D: 25 - 63 L: according to request
S1.9...32	gamma + slow neutron	gamma scintillator + Boron polyester + ZnS(Ag)	Al-Mg-Si or steel, grooved or flanged housing	Al 0.2 or 0.5 mm thick	D: 25 - 63 L: according to request
Sxxxxxx	*according to Your request				

**NDI Intelligent scintillation detectors for measuring and analysing ionizing radiation**

- simultaneous alpha, beta, gamma and neutron radiation measurement
- measurement evaluation of multiple types of radiation via phoswich scintillator
- customized embedded software on request
- no consumables
- high sensitivity
- high stability
- long endurance
- built-in high-voltage power supply
- LED spectrum stabilization
- no regular maintenance required

Wide range of configurations

Scintillator sizes [mm]
a. 6 (0.25'') ... 127 (5'')
b. 0.1 (0.04'') ... 300 (12'')
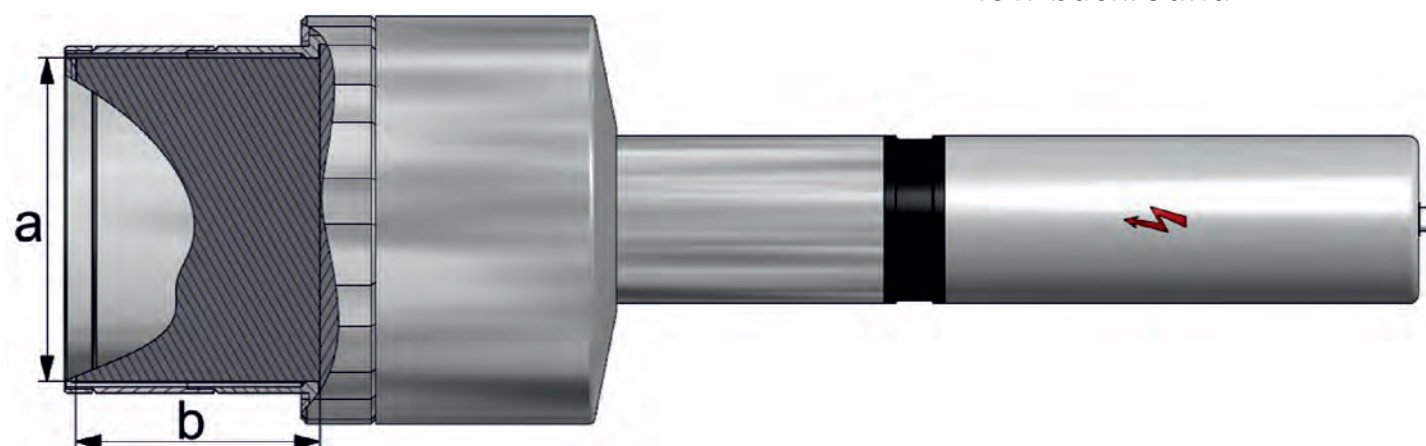
Special electronics
- spectrum stabilization
- coincidence
- low backround

Scintillator materials
NaI(Tl), CsI(Tl), CsI(Na), BGO, ZnS(Ag), etc.

Communication interfaces
RS-232, RS-485,
USB, Bluetooth, etc.

	NDI accessories:
1	vertical detector support stand with sample and shielding plate holder
2	shielding plate kit for demonstration
3	advanced desktop detector holder, handheld NDI carrier for any type of NDI detectors
4	standard desktop detector holder, handheld carrier for standard (NDI-65) detectors
5	touch screen computer with mounting kit
6	rugged case for NDI
7	MultiAct spectrometric software
8	airtight lead shielding with filter holder for air monitoring
9	NZ-138 lead shielded measuring place on wheels, opening lid
10	NZ-305 lead tower composed of lead segments, with NDI mount and sample holder
11	radioisotope sources (^{137}Cs, ^{60}Co, ^{90}Sr, ^{210}Po, ...) under exemption level (EU), shielded holder
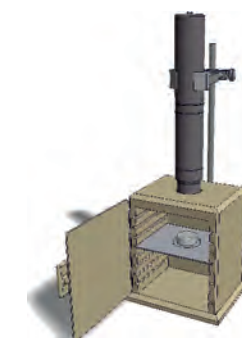
stand with sample and
shielding plate holder
(1)

handheld carrier
(3)
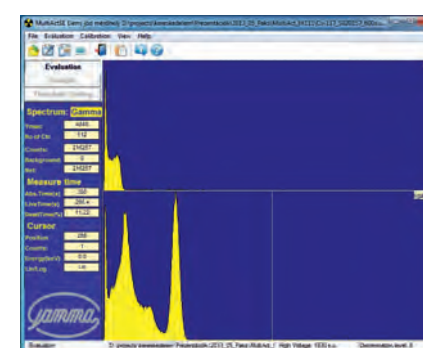
shielded holder
(11)

MultiAct software
(7)

lead shielding for air monitoring
(8)

NZ-138
(9)

NZ-305
(10)

The RadSpect Spectrometric Evaluation Software package is designed for spectrometric measurements with GAMMA's scintillation detectors and analysis of all kind of spectrometry data. It is a Windows desktop application with an intuitive user interface.

The RadSpect program allows different types of NDI scintillation detectors to be handled using the software modules best suited for the measurement task. With custom interfaces, algorithms and reports the program can save the user a lot of administration and time. Thanks to the different user rights, even low-skilled operators can use it with high reliability and ease.
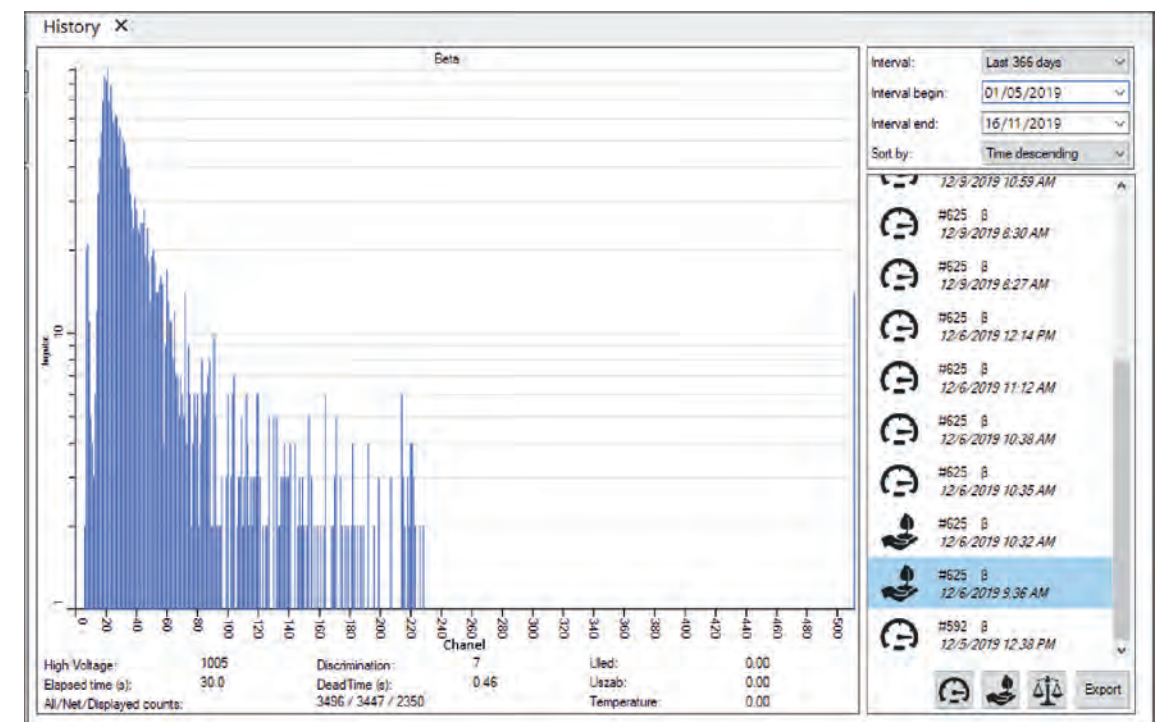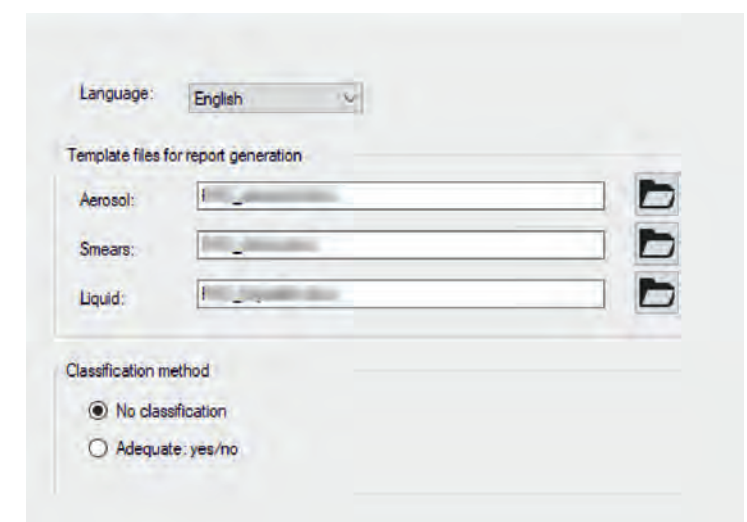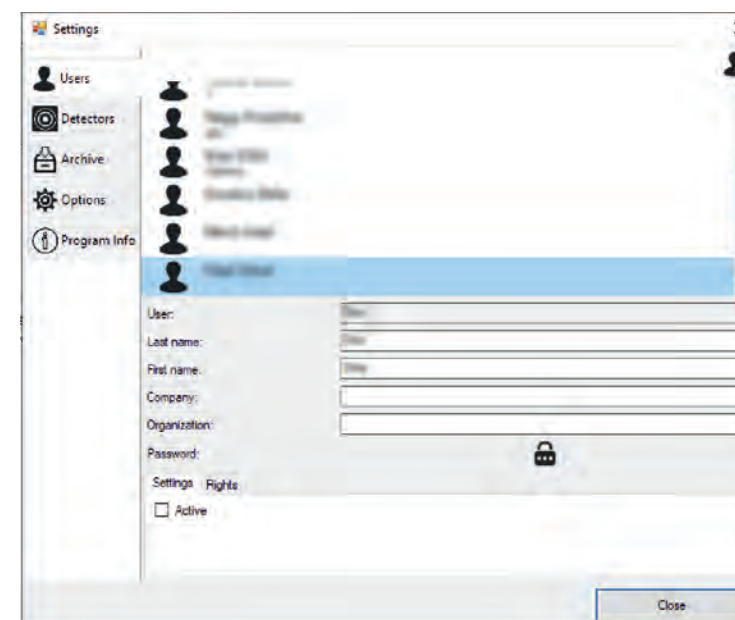

Measurement and calibration functions (licence dependent):
- basic alpha-, beta-, gamma- and neutron spectrum measurement with ROIs
- industrial applications (aerosol-, fluid-, smear measurement)
- medical applications (iodine measurement)
- alpha-, beta calibration
- gamma energy, FWHM and detection efficiency calibration
- calibration check, including counts by impulse width
- multiple detector handling, parallel measurement processes
- spectrum measurement
- data import from other sources like ANSI N42.N42 standard xml files
- spectra combinations (add, substract, ratio)

Scintillation detector for measuring and analyzing ionizing radiation

- high-tech gamma and neutron radiation measuring scintillation detector in environment resistant housing
- separate or simultaneous alpha-, beta-, gamma- and neutron radiation measurement
- measurement evaluation of multiple types of radiation via phoswich scintillator
- built in web application (no software installation needed)
- radionuclide identification feature
- no consumables
- high sensitivity
- high stability
- long endurance
- built-in high-voltage power supply
- energy stabilization (optional LED and natural background)
- no frequent maintenance required

Fields of application

- physical, chemical research
- medical isotope diagnostics
- postal facilities
- alpha-, beta-, gamma- and neutron radiation measurement at nuclear facilities
- radiation portal monitor and aerosol application

Built-in software

- analysis software for the identification of close to a hundred radionuclides
- medical application (thyroid examination, renography)
- web user interface with hardware setup and control utility
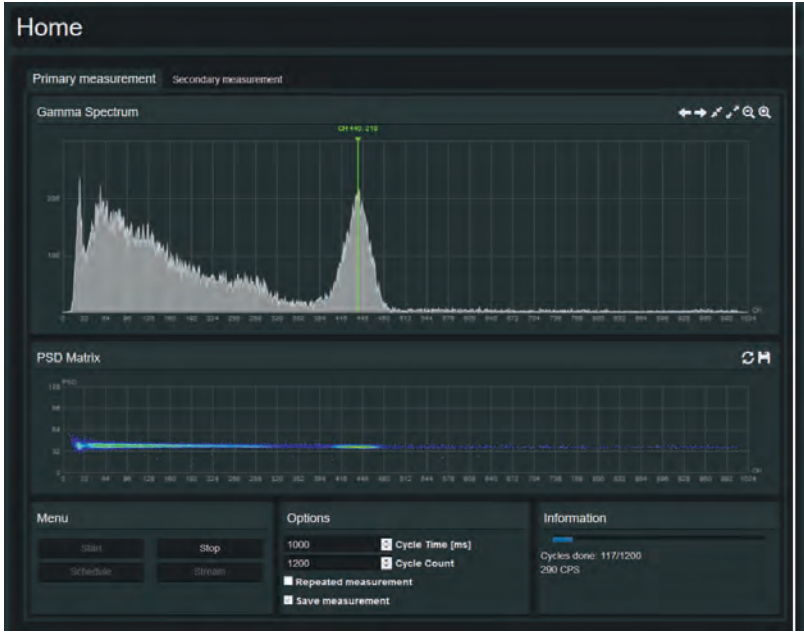
NDI - RADNDI comparison

	NDI	RADNDI
Energy range	20 keV ... 3 MeV	20 keV ... 3 MeV
Gamma spectrum	512 amplitude channels	512 ... 4096 amplitude channels
Energy stabilisation	LED	optical, natural background
Processor	MCU (8052 core)	MCU, FPGA (ARM Core)
Communication	RS-485	webserver, modbus (RTU) over RS-485, SDK or USB
Power supply	8 ... 35 VDC	9 ... 32 VDC 5W or POE
Operational temperature range	-25 °C ... +55 °C	-30 °C ... +55 °C
Housing	IP2X	IP20 or IP68 for indoor, outdoor and underwater usage, EMC conformity IEC 61017
Software	dedicated offline software	webserver based user interface with hardware setup and control utility

Complete instrumentation for nuclear measurement, research and education

- qualitative and quantitative analysis
- isotope identification and determination of activity with estimated deviation
- full-fledged nuclear spectrometry system
- user editable library with more than 100 isotopes already included
- simultaneous spectrum recording and evaluation
- adjustable measurement time / number of measurement cycles
- quick evaluation with calibration files and background spectra
- automatic calculation of net alpha, beta, gamma activity and relative uncertainty
- peak marking and net peak area highlighting
- peak search and identification of overlapping peaks
- calculation of overlapping, single peak areas and deviation

Configurations

	measurement applications	configuration	installation	weight
1	4π gamma	2x NDI 127 detectors, spectrometric sw., with or without lead shielding	fixed	100-300 kg
2	gamma	1x NDI 65 detector, spectrometric sw., NZ-305 lead tower	fixed	200 kg
3	sum beta counter	2x NDI 65 beta detectors, spectrometric sw., NZ-305 lead tower	fixed	200 kg
4	gamma	1x NDI 65 detector, spectrometric sw., NZ-138 hollow-type measuring place	portable, on wheels	200 kg
5	beta, gamma	1x NDI 65 beta + gamma detector with lead shielding, spectrometric sw.	portable	25 kg
6	gamma, (opt. neutron)	1x NDI gamma + opt. neutron detector, auxiliary lead collimator as accessory (optional isotope identification)	handheld	3,5 kg

IH-111 beta + gamma measuring system (5)

SFK handheld radiation reconnaissance instrument (6)

Wide range of configurations

Measuring systems including intelligent nuclear detector(s), lead shielding, display and analytical software are available in wide range.
Requests for tailor-made measurement assemblies according to special requirements are very welcome.

measuring system for Marinelli vessels (4)

4π gamma measuring system (1)

gamma spectrometry system (2)

Advantages of scintillation type instruments compared to semiconductor systems

- lower cost
- higher sensitivity
- no additional power supply or process unit is needed, only a PC or laptop with appropriate software
- easier to transport or relocate the complete equipment (smaller weight and size)
- easier to use, also with little experience or low level of education
- quicker start-up (ready to use in 10s)
- no consumables, no moving parts, no cooling system needed
- suitable for higher activity samples

Main components of radiation protection systems:

- portal monitors
- area monitoring equipment
- emission control systems
- environment monitoring stations
- reconnaissance systems

GammaServer central data collector software

All measuring instruments are connected to one network with a central data acquisition and visualization unit. Alarms can be sent by e-mail and/or SMS text message. Actual values can be checked via a smartphone application or remote computer. Dosimetry, telemetry, GIS modules can be integrated. Reporting and action plans are supported by the software.

Network example

GammaServer
data collection
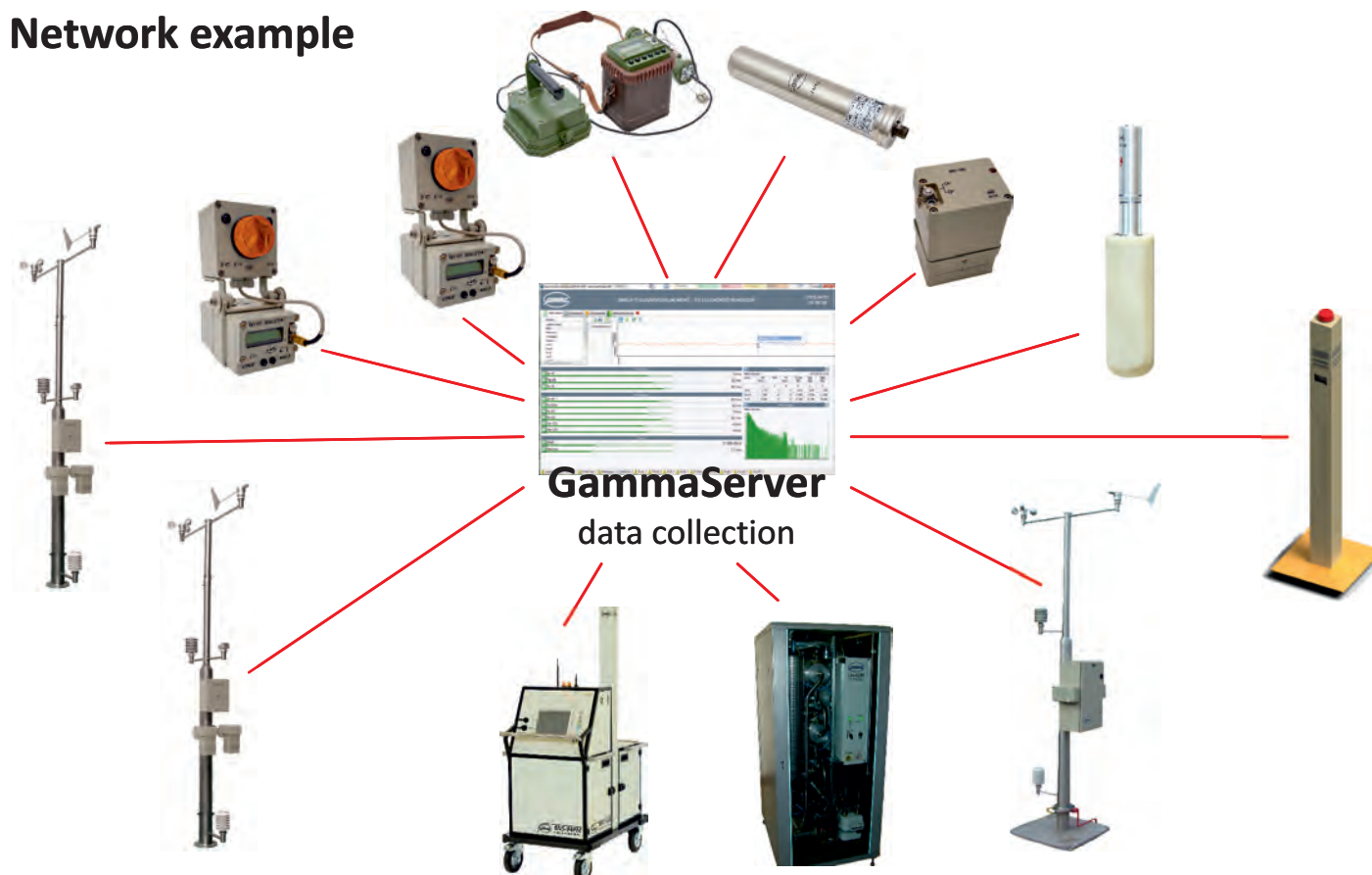
Installation examples

BNS-94H+
portal monitor

BNS-94/AU
alarm unit

BNS-94FM
reconnaissance

KML-ADR
mobile laboratory

corridor

GammaServer
data collection

BNS-98
area monitoring

BNS-94PM
portal monitor

working area

BNS-97
area monitoring

dressing room

sample analyser

BNS-94PHK
hand-feet monitor

BNS-94PS
portal monitor

OnREM
emission control

TVS-3
environment monitoring
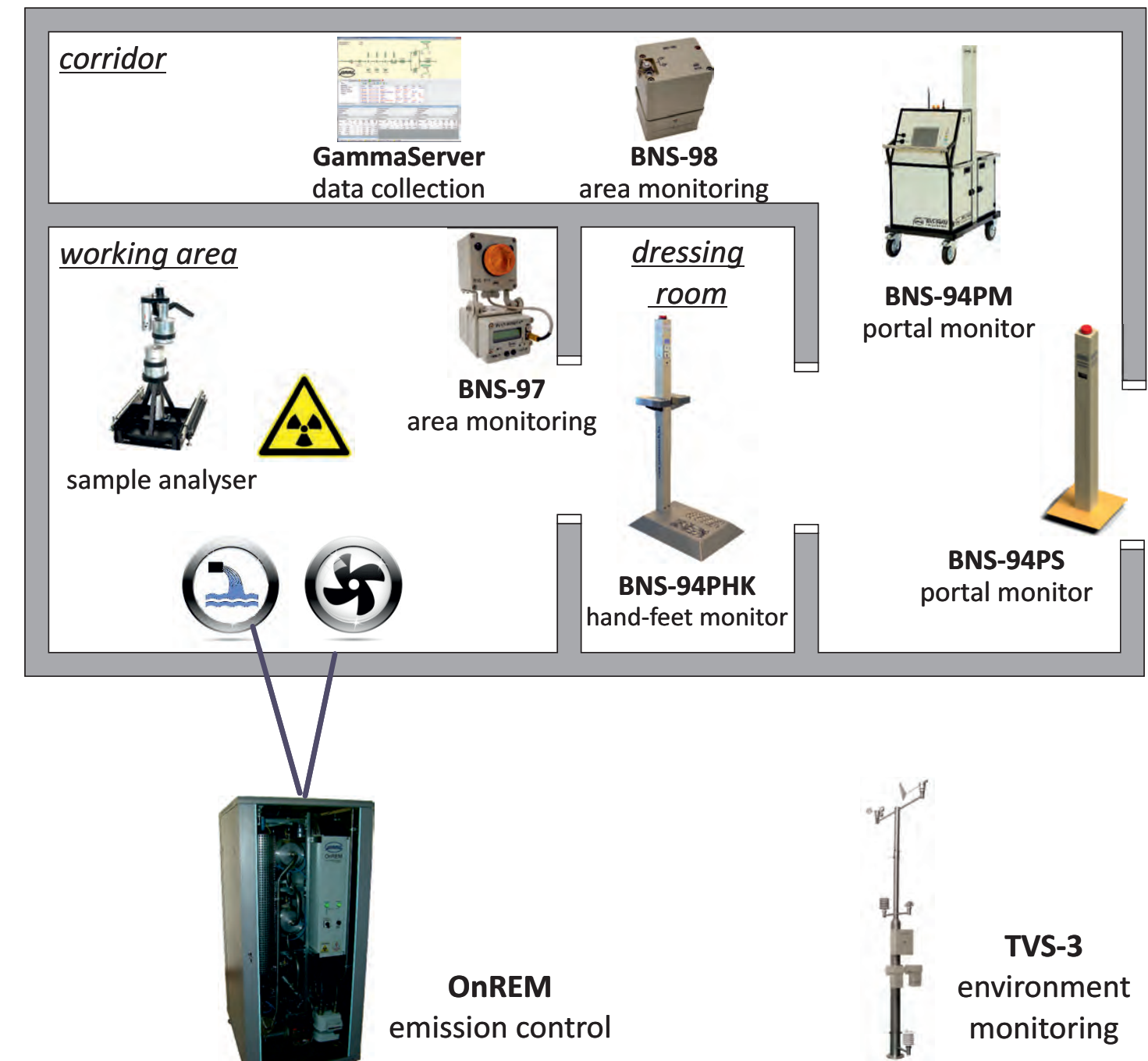
Our line of Radiation Portal Monitors consists of the numerous available types of the BNS-94 portal monitor family, optimized for checking persons, vehicles, cargoes, packages, etc. The BNS-94 product family includes mobile and fixed versions as well. Typical places of application include border stations, customs checkpoints, security systems, nuclear facilities, metal processors, harbours.

The BNS-94 systems are capable of the followings:

- highly sensitive, continuous measurement of gamma radiation
- compensation of background radiation
- energy selective measurement to distinguish between natural, medical and industrial radiation sources
- optional indication of neutron radiation
- optional isotope identification

Wide range of accessories:

Gate control, camera system, license plate identification, remote surveillance, text messages, email alert, data and event logging, occupancy sensors.

Wired or wireless connection between system components (optical, ethernet, RS-485, 3G/4G, ...).
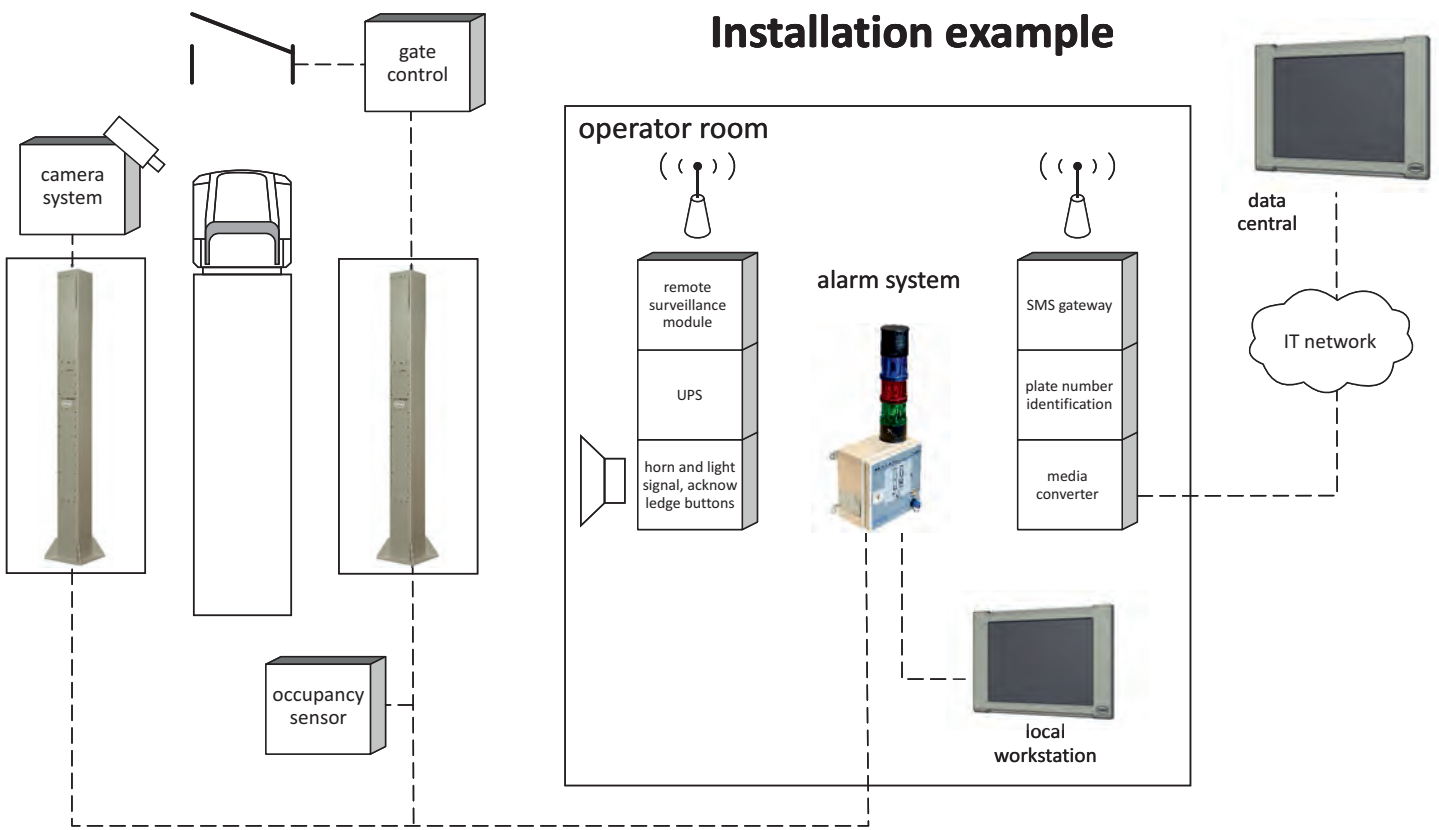
standard types	measurement applications	scope of inspection	installation	features
BNS-94	gamma, neutron	trucks, trains, cars	fixed	1 horizontally installed detector in one pillar
BNS-94H	gamma	trucks, trains	fixed	1 vertically inst. detector in one pillar
BNS-94H+	gamma	trucks, trains, cars, motorcycles	fixed, mobile	1 vertically inst. detector in one pillar
BNS-94ZG	gamma	trucks, trains, cars, motorcycles	fixed	1 or 2 detectors in one pillar
BNS-94PS	gamma	persons, baggage	fixed	lightweight
BNS-94P/L	gamma, neutron	persons, baggage	fixed	above or beside doors or conveyors
BNS-94PM	beta, gamma	persons, baggage	mobile	wheeled, parallel checking of floor and wall contamination
BNS-94PHK	beta, gamma	persons	fixed	built-in hand and foot contamination control
BNS-94FM	gamma, neutron	trucks, trains, cars persons	mobile	prepared for being mounted on vehicles, mobile, with stand
BNS-94M	gamma	trucks, trains, cars	fixed	mobile detectors with tripod, built-in alarm unit and battery pack
BNS-94MH	gamma	trucks, trains, cars	mobile	detectors can be operated either on fixed stands and / or tripods
BNS-94B	gamma, neutron	persons, baggage	portable	handheld, baggage size, ad hoc hidden checkpoint
BNS-94V	gamma	trucks, trains, cars	fixed	1 large volume plastic detector in one pillar

Installation example

gate control

camera system

operator room

remote surveillance module

UPS

horn and light signal, acknowledge buttons

alarm system

SMS gateway

plate number identification

media converter

data central

IT network

local workstation

occupancy sensor

94   94H 94H+ 94ZG2 94PS 94P/L   94PM   94PHK   94FM   94M   94MH   94B

94V

Registering any changes compared to the normal background radiation, or tracking radioactive material related working processes

- gamma dose rate measuring instrument with GM tube
- area monitoring in system or stand-alone mode
- using already existing power and communication network infrastructure
- built-in and/or remote and/or centralized alarm units
- central data logger with event logging and status visualisation
- reporting and action plan support capability
- high sensitivity
- wide measuring range

Places of application:

- nuclear reactors
- isotope laboratories
- environmental applications
- waste yards
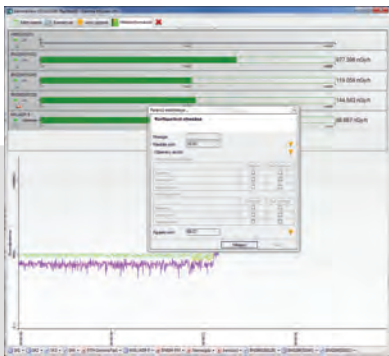
The system alerts if the radiation level exceeds any of the pre-set thresholds. Several detectors, alarm and supplementary units can be connected to the network.

Configurations

type	measurement applications	measurement value	installation
BNS-97	gamma dose rate	Gy/h	fixed, built-in display, UPS, alarm unit
BNS-97S	gamma dose rate	Sv/h	fixed, built-in display, UPS, alarm unit
BNS-98	gamma dose rate	Gy/h	fixed
BNS-98S	gamma dose rate	Sv/h	fixed
IH-99D	gamma dose rate	Gy/h	fixed, separate sensor and electronics
IH-99DM	gamma dose rate	Gy/h	fixed, for high dose rates separate sensor and electronics
BNS-298	surface beta contamination in high gamma background	Bq/cm^2	manipulator
NDI	gamma	cps + spectrum	fixed, isotope selective measurement
NDI + BNS-98S	gamma + neutron	Sv/h + cps	fixed or mobile
RADNDI	gamma, gamma dose rate	cps + spectrum	fixed, isotope selective measurement
RADGM	gamma dose rate	Sv/h	fixed

RADNDI

NDI

BNS-98
BNS-98S

RADGM

BNS-97
BNS-97S

IH-99DM

NDI + BNS-98S

BNS-298

Measuring alpha, beta and gamma radiation emitting materials in gaseous or liquid substances

- user-defined alarm and emergency levels
- measurement of alpha, beta and gamma radiation
- continuous, uninterrupted measurements
- three types of filters (can be expanded if needed)
- isotope identification
- measurement of noble gases
- online data about current, daily, weekly, annual emission

The basic system is highly customizable to meet the requirements of various industrial, security and environment monitoring applications. It measures the activity of the emitted radioactive materials. It is capable of continuously displaying measurement information and also capable of triggering alarms and sending emergency stop signals to the connected systems if the activity is above the pre-set threshold level, or if the measured activity-increase is significant. The system generates error messages if the filters are torn, damaged or the filter contains a pre-set amount of activity. The system doesn't contain moving parts (no automatic filter-exchanger) to maximize reliability. Thanks to the software algorithm the system has an optimized filter lifetime. With the use of sandwich detectors it is possible to evaluate the quality and quantity of the radiation, determining the type of radiation (alpha/beta/gamma), and it is also capable of gamma spectroscopy. The system measures the air-flow and temperature parameters, monitors the input power and reports any unauthorised entry into the system.

Configurations

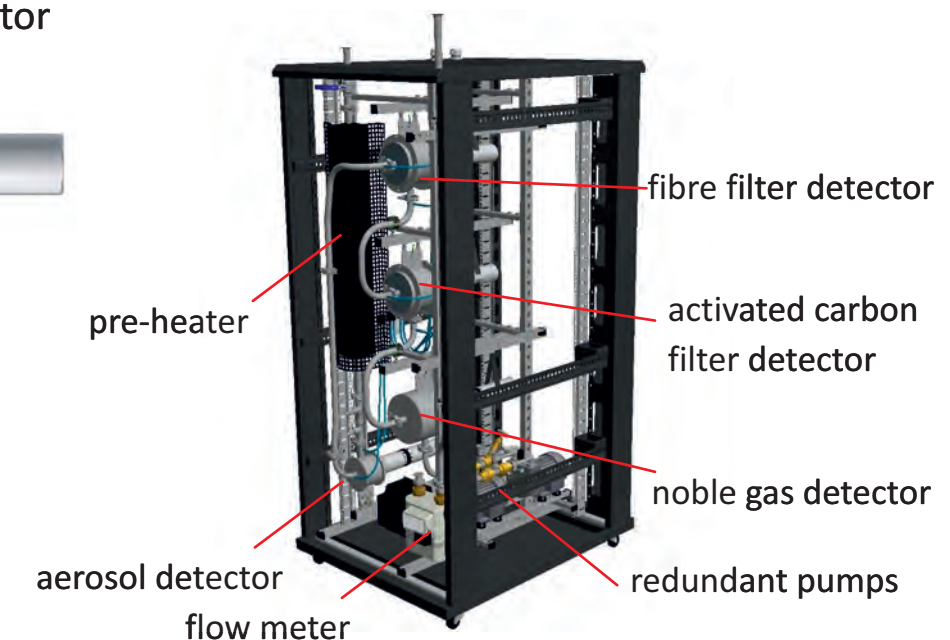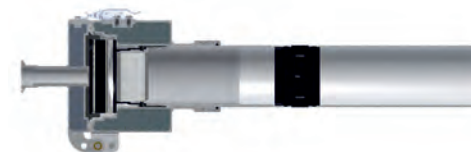activated carbon and fibre filter detector
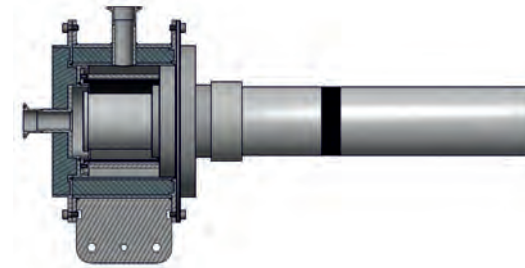
aerosol filter detector

- display
- RS-485 / ethernet converter
- switch
- redundant servers
- redundant UPS

Places of application:
- nuclear facilities
- radiological laboratories
- technologies of isotope production
- radioactive particle emitting plants

combined filter detector

- fibre filter detector
- activated carbon filter detector
- noble gas detector
- redundant pumps
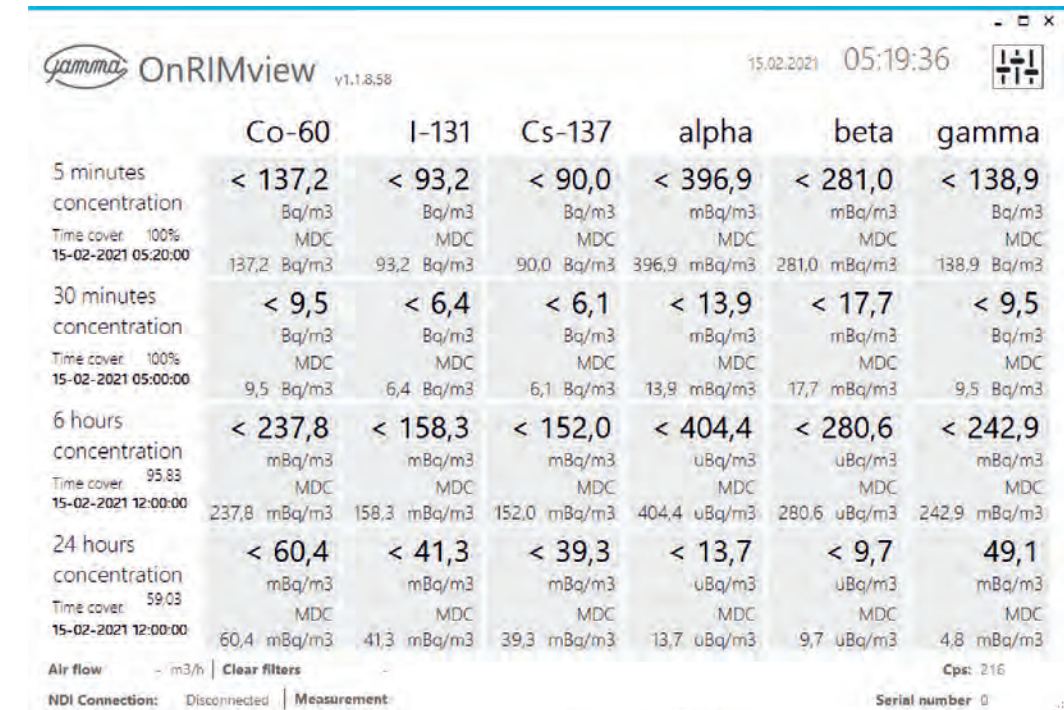- pre-heater
- aerosol detector
- flow meter

OnRIM Online Radioactive Aerosol and Iodine Monitoring Station

The OnRIM Online Radioactive Aerosol and Iodine Monitoring Station is a highly sensitive device intended for measuring, and creating reports and analysis about the environmental effects of radioactive releases in the surroundings of nuclear facilities, such as nuclear power plants, radiopharmaceutical and industrial isotope production companies, C-level isotope laboratories, as well as in case of nuclear accidents.

In basic construction the measurement system measures the I-131 activity concentration. Further measurement capacities can be added for additional isotopes (e.g. Cs-137). It determines the Cs-137 equivalent gamma, Am-241 equivalent alpha and the Sr-90 equivalent beta emitting isotopes in 30 minutes, 6 hours, daily and average concentrations.

- monitoring airborne radioactivity in the proximity of nuclear facilities, isotope laboratories
- simultaneous alpha, beta, gamma measurement with spectrum stabilization
- isotope selective activity concentration
- automatic changing of filter cartridges
- connectivity with data acquisition units, monitoring networks
- autonomous operation with low maintenance requirements
- outdoor operation - IP66 protection, wide operational temperature range
- the operation is not affected by the temperature, or dust content of the inlet air

Options:
- pre-heating
- dehumidifier
- cyclon for dust extraction
- sampling unit for emission monitoring
- local audible and visual alarm
- display

The device can accept connection requests through multiple communication interfaces (Ethernet, 3G/4G, LTE450). It is possible to query the measurement data and alarm signals from a remote data centre. The unit stores measured data and error messages - calculated over 30-minute backup periods - until data is transmitted.

One of GAMMA Technical Corporation's main activities is manufacturing stationary and mobile monitoring stations and implementing local, as well as nationwide monitoring networks and early-warning systems, including the central data acquisitioning system components.

We customized our systems for disaster management, CBRN defence, environmental protection, radiation protection, air and water quality monitoring, radioactive particle monitoring, emission monitoring, meteorological and agricultural applications.

As our company had the pleasure to implement one of Hungary's largest monitoring networks, a telemetric and public alarm system that is operated by the National Directorate General for Disaster Management, just as several other smaller-scale monitoring systems, we gained vast experience in planning, implementing and maintaining monitoring systems, including the cooperation with the competent authorities during these project phases.

With all our expertise, we are open to support our current and prospective partners in the planning and realization of any kind of monitoring projects from local to countrywide scale.

Data center, management and control
- communication
- data acquisitioning, processing
- data displaying, visualization
- dispersion modeling
- control of information broadcasting

Management area

data flow

The structure of a monitoring system

The following components may constitute an environment and safety-monitoring system:
- data center(s),
- monitoring stations,
- alarm units, warning and information broadcasting subsystems.

These components are available in different versions depending on the size of the protected area and the purpose of the system.

Affected area

Information broadcast, warning
- sirens
- local displays
- Web, SMS, email, etc... publication

The purpose of a monitoring system

- provides information about the environmental conditions of an area
- sends an automatic warning in case of predetermined changes of the environmental parameters
- provides a tool to interact immediately with people affected by the environmental change

Surveyed area

Monitoring stations, instruments
- fixed or mobile stations, vehicles
- detectors

Measuring the effect of contamination released into the environment and calculating the spread of airborne particles

Measured parameters:
- gamma dose rate
- radionuclide identification
- alpha, beta airborne particle concentration
- concentration of industrial gases
- meteorological parameters

Features:
- alarm with early warning functions
- mobile version for first response vehicles
- network capable
- continuous operation
- graphic data display
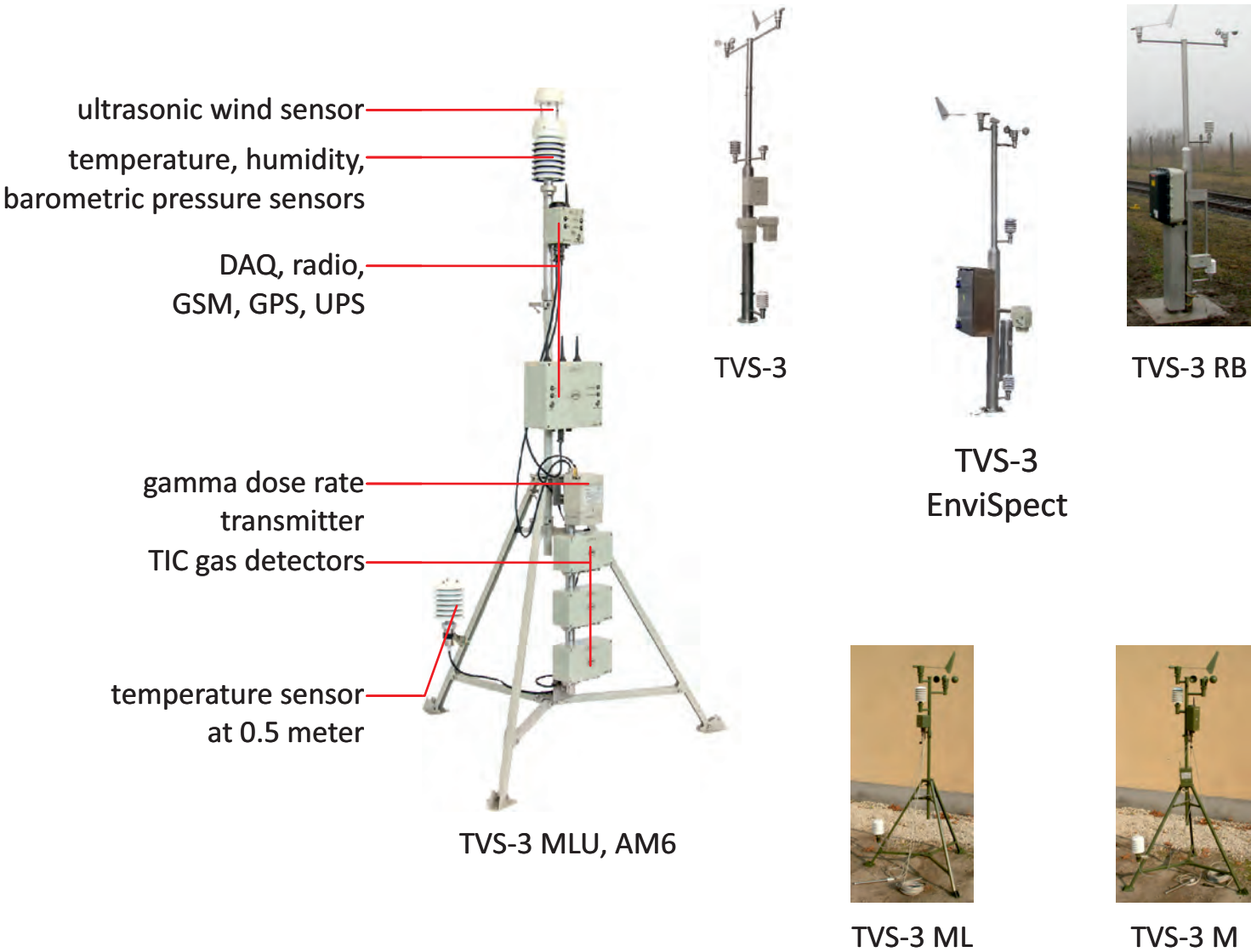- easily deployable
- high sensitivity

The TVS-3 monitoring station measures the different parameters of the environment and sends the measurement data to the central data acquisition unit. TVS-3 is an automatic device that is capable of continuously and independently monitoring an area, helping the prompt evaluation of a current situation and the determination of the spread of environmental pollutants.

Fields of application:
- reconnaissance of nuclear contamination
- environment monitoring
- securing event and disaster sites

Configurations

type	measured parameters	data collection	installation	features
TVS-3	temperature, humidity, wind, gamma dose rate	yes	fixed, 3 m or 10 m stand	
TVS-3 EnviSpect	temperature, humidity, wind, precipitation, gamma dose rate, radionuclide identification	yes	fixed	
TVS-3 RB	temperature, humidity, wind, TIC gases	yes	fixed	ATEX certified
TVS-3 M	temperature, humidity, wind, gamma dose rate, TIC gases	yes	mobile	
TVS-3 ML	temperature, humidity, wind, gamma dose rate, TIC gases	no	mobile	
TVS-3 MLU, AM6	temperature, humidity, wind, gamma dose rate, TIC gases	yes	mobile	no moving parts

ultrasonic wind sensor

temperature, humidity, barometric pressure sensors

DAQ, radio, GSM, GPS, UPS

gamma dose rate transmitter

TIC gas detectors

temperature sensor at 0.5 meter

TVS-3

TVS-3 RB

TVS-3 EnviSpect

TVS-3 MLU, AM6

TVS-3 ML

TVS-3 M

Evaluation of nuclear, chemical, biological incidents, conducting in-situ measurements

Equipment list example:
- handheld radiation level and contamination measuring instrument
- low-background beta-gamma measuring instrument for food and other solid or liquid samples
- deployable/vehicle-mountable environment monitoring station (meteo sensors, radiation and gas detectors)
- personal protective equipment
- 4-channel gas detectors
- Ex-Ox measuring instrument
- chemical detection kit
- portable GC/MS
- HPGe detector
- portable radiation portal monitor
- personal dosimeters
- handheld Raman spectrometer
- handheld FTIR spectrometer
- bio agent detection kit
- sampling kit
- first responder decontamination kit
- marking kit
- area lighting set
- power generator
- thermal camera
- communication equipment

The capabilities of Mobile Laboratory Vehicle can be defined specifically according to customer requirements. Mobile laboratories are fully prepared to start any on-site examination of the samples gathered by the crew of the lab vehicle.

State-of-the-art instrumentation supports the crew in analysing and evaluating the samples such as portable GC/MS and IH-111L radiological contamination measuring instrument that enables the identification of radioactive contamination in food, soil or other liquid or solid samples. Built-in meteorological station, radiation reconnaissance system, wide range of handheld detectors, personal or collective protective equipment, mobile portal monitors can also be part of the vehicle.

gas chromatograph and mass spectrometer

on-board PC

handheld instruments

radiation reconnaissance system

on-board PC

on-board camera system

Fast detection of radioactive sources and contamination with reconnaissance systems integrated into various vehicles

- GM-tube and scintillation detectors
- GPS based geo coordinates
- map-display
- NBC reports

RABV

FABV

CBRN-E
Intervention Vehicle

Fields of application:
- reconnaissance of widely contaminated areas
- performing monitoring from a safe distance
- localization of discrete radiation sources

The goal of an on-board reconnaissance systems is to detect any dangerous threat as soon as possible and to monitor the current level of threat to find the borders of a hot zone or safe passage through a contaminated area.

The survey data is stored and displayed with GPS coordinates. User can follow the measurements on LCD screen and can make different NBC reports.

Reconnaissance systems can be integrated into civilian or military road vehicles, UAVs, UGVs, air or water crafts.

Systems

types	carrier	capabilities	specialities
BNS-94FM	vehicles, watercrafts	gamma, neutron rad. detection and identification	integrated camera
LABV	helicopters, UAVs	gamma rad. measurement and identification	high sensitivity, GM tube + NDI detector, integrated altitude meter
RABV (BNS-98L)	UAVs	gamma rad. measurement	GM tube detector, integrated altitude meter
FABV	armoured vehicles	gas detection, meteo and gamma rad. measurement	NATO standard reports, military grade
RDO KOMONDOR CBRN	armoured vehicles	chem. and gamma rad. detection and identification, bio detection, meteo measurement	CBRN reconnaissance system with customized armoured vehicle
KML	laboratory vehicles	chem. and gamma rad. detection, identification and analyzation, meteo measurement	customized mobile laboratory
KML-ADR	civilian off-road vehicles	chem and gamma rad. detection and identification, meteo measurement	full capability on a compact, off-road vehicle
RDO KOMONDOR RSV	Radiation-Shielded Emergency Vehicle	gamma measurement on the sides and in the internal compartments, remaining allowable exposition time	radiation shielded body, over-pressurised filtration-ventilation system
CBRN-E Intervention Vehicle	civilian light commercial vehicles	CBRN monitoring in a large area meteo measurement data collection, evaluation	reconnaissance with UGV standoff chemical detection onboard ColPro system

BNS-94FM

BNS-98L

KML-ADR

LABV

RDO KOMONDOR CBRN

KML

RDO KOMONDOR RSV

Features of our handheld devices:

- wide measuring range
- high sensitivity
- easy to use
- adjustable alarm levels
- audible alarm signal
- wide operating temperature range
- rugged / military construction

BNS-94B

BNS-92S

BNS-295

IH-295

SFK

Places of application:
- inspection, customs checkpoints
- mobile security systems
- protection of threatened facilities

The SFK is a Handheld Radiation Reconnaissance Instrument based on a highly sensitive, large scintillation detector. It serves for the localisation of lost or hidden radiation sources and secondary screening and can also function as an RPM.

The BNS-92S Handheld Radiation Level and Contamination Meter has two operational modes. It operates as a gamma radiation dose and dose rate meter while placed in the carrier case and functions as a contamination meter when it is taken out of it.

The BNS-94B Radiation Warning Equipment serves as a highly sensitive device for detecting nuclear materials and radioisotopes. The detector of the BNS-94B is a scintillation probe sensitive to gamma and neutron radiation.

type	measured values	units	features
IH-295	surface beta contamination in high gamma background	Bq/cm^2	integrated storage card and GPS
BNS-92S	gamma dose, dose rate, alpha, beta surface contamination	Sv, Sv/h, Bq/cm^2	two functions in one device
BNS-94B	gamma radiation	cps	wireless communication with PDA or smartphone
SFK	gamma, neutron radiation	cps, Sv/h, spectrum	optional radionuclide identification
BNS-295	surface beta contamination in high gamma background	Bq/cm^2	integrated storage card and GPS

Personal protection

As part of our respiratory protective equipments the Reactor P3 filter is an essential accessory in case of nuclear accidents and disasters. Combined with a full face mask provides protection against radioactive iodine and methyl iodide as well as against radioactive dusts and aerosols.

Reactor P3 D combined filter

Class-2 filters

Personnel/casualty decontamination equipment

Our decontamination tents, containers and modules are suitable for the decontamination of people and equipment that have been exposed to CBRN contamination.

RBA - water supply modules

SZMF - personnel decontamination equipment

70kVi

35kVi

Have Your customized Nuclear Measuring Tool, in a short time for a reasonable price!

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