# AT1117M Radiation Monitor (with PU5)


Portable combined multi-purpose instrument equipped with different external detection units for various applications.

Depending on used detection units the radiation monitor is suitable for measurement of:

- X-ray, gamma and neutron radiation ambient dose equivalent and ambient dose equivalent rate
- Air kerma and air kerma rate of X-ray and gamma radiation
- Directional dose equivalent and directional dose equivalent rate of X-ray and gamma radiation
- Flux density and fluence of $^{239}$Pu alpha and beta particles from contaminated surfaces
- Flux density and fluence of neutrons with known energy distribution
- Surface activity and disintegrations of $^{239}$Pu and $^{90}$Sr + $^{90}$Y
- On-line search for sources of ionizing radiation and radioactive materials.

PU5 Processing unit can be used for control and indication. PU5 is a hand-held PC (HPC) with integrated detection module, providing in situ measurement of gamma radiation dose and dose rate. Operation algorithm provides measurement continuity and real time statistical processing of measurement results.

Data from detection unit into PU5 can transferred in two ways:
1) Bluetooth interface by BT-DU4 adapter
2) Direct cable connection to PU5

## Application

- Radiation protective measures in case of nuclear disasters
- Radiation monitoring during decontamination operations
- Radioecology
- Sanitary and epidemiological inspection
- Nuclear industry
- Emergency rescue service
- Civil protection
- Research activities
- Customs control
- Search X-ray apparatus


PU5 has the following functions:

- Processing and display of measurement data
- GPS referencing of measurement results
- Automatic recording and storing over 10,000 measurements with GPS referencing
- Sound and visual alarm when threshold level are exceeded
- Indication of battery charge level in PU5 and BT-DU4 adapter
- Automatic data transfer to a remote server by “Cloud9” software [via FTP server over 4G connection or if Wi-Fi network is available]
- Loading data to PC for further analysis and processing in professional *"GARM"* software (*Option*)

## Features

- Multiple functions
- High sensitivity and wide measurement range
- Quick accommodation to changes in radiation level
- Search for X-ray, gamma, alpha, beta and neutron radiation sources
- LED stabilization system integrated into scintillation detection units
- Compensation of intrinsic Geiger-Muller counter tubes background
- Sound and LED alarm
- Wide choice of accessories: Telescopic bars, tripods, alarm units, sealed containers, etc.

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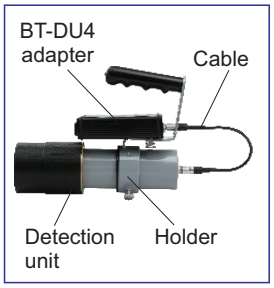
## COMMON ARRANGEMENT AND EQUIPMENT VARIANTS

### Version 1

Variant 1
Detection unit and BT-DU4 adapter are attached to a holder with handle. Operator carries PU5 in his hand or on his belt. Wireless communication between PU5 and adapter.

Variant 2
Detection unit is in holder or operator's hand. Operator carries PU5 in hand or on belt. Cable communication between the detection unit and PU5.

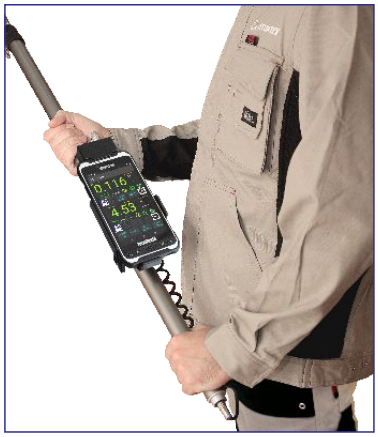



### Version 2

Detection unit and BT-DU4 adapter are carried in a backpack.
Operator carries PU5 in hand or on belt.
Wireless radio communication between BT-DU4 and PU5.

### Version 3

Detection unit and PU5 are attached to a bar.
Cable communication between detection unit and PU5.



### Version 4

Variant 1
Detection unit and BT-DU5 adapter are attached to a tripod. PU5 is on a tripod, in operator's hand or on operator's belt. Wireless communication between BT-DU4 and PU5.

Variant 2
Detection unit and PU5 are mounted to a tripod. Cable communication between detection unit and PU5.

Variant 1

Variant 2

| DETECTION UNIT (user-selected) | BDKG-01 | BDKG-03 | BDKG-04 | BDKG-05 | BDKG-11 | BDKG-17 | BDKG-24 | BDKG-30 | BDKG-32 | BDPS-02 | BDKR-01 | BDPA-01 | BDPA-02 | BDPA-03 | BDPB-01 | BDPB-02 | BDPB-03 | BDKN-01 | BDKN-03 |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| *Version* 1 | ▪ | ▪ | ▪ | ▪ | ▪ | ▪ | ▪ | ▪ | ▪ | – | ▪ | ▪ | ▪ | ▪ | ▪ | ▪ | ▪ | ▪ | ▪ |
| *Version* 2 | ▪ | ▪ | ▪ | ▪ | ▪ | ▪ | ▪ | ▪ | ▪ | – | ▪ | – | – | – | – | – | – | ▪ | – |
| *Version* 3 | ▪ | ▪ | ▪ | ▪ | – | ▪ | ▪ | ▪ | ▪ | ▪ | ▪ | ▪ | ▪ | ▪ | ▪ | ▪ | ▪ | – | – |
| *Version* 3 | ▪ | ▪ | ▪ | ▪ | ▪ | ▪ | ▪ | ▪ | ▪ | – | ▪ | ▪ | ▪ | ▪ | ▪ | ▪ | ▪ | ▪ | – |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Software

# «GARM»

# Geolocation Application for Radiation Monitoring

**For operation**

**with AT1117M Radiation monitor**

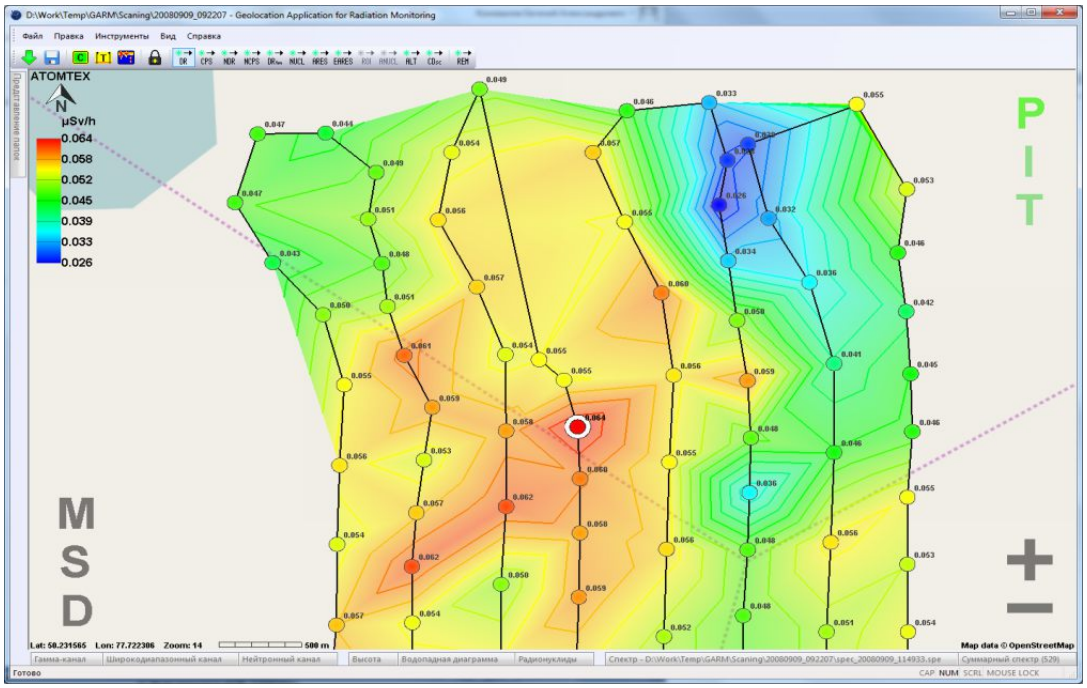
* Functions available with AT1117M are displayed only

***Purpose:***

Process results of instrument radiation survey, e.g. gamma radiation dose rate and count rate values, neutron radiation count rates (if internal neutron channel is available) and geographical coordinates of radiation survey maps.

## Mapping of radiation survey track with indication of measured value

Colour of each marker and displayed overhead value matches the selected parameter data and corresponds the scale shown in the upper right hand corner (Scale is selected automatically according to the range from minimum calculated values (blue) to maximum calculated values (red)).

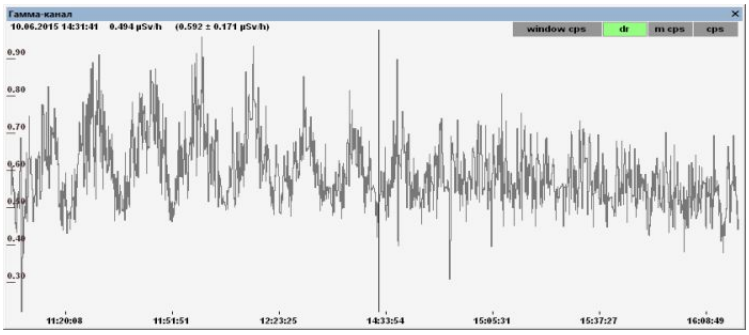



***Functions:***

- Zoom
- Select required area
- Measure distance between points
- Show/hide points, text and track
- Isoline contouring and gradient fill of scan area
- Simulate movement along the survey track
- Add GPS markers
- Working with off-line maps.

## Measurement channel data

**Gamma channel:**
Dose rate – "dr",
average impulse count rate – "cps",
instantaneous impulse count rate – "m cps"

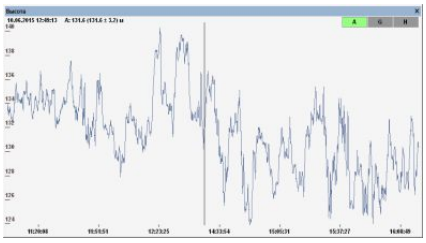



## Save data

- Save map as image (*.bmp)
- Convert and save scan results into .kml files for their further display in Google Earth application
- Save data into text file. The resulting file can be opened in Microsoft Excel or text editor

## Functionality

- Edit measurement results
- Display sea level elevation



- Apply filters to select certain areas in data windows.
- Set time intervals to facilitate quick navigation in big data volumes.
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- Evaluation of radiological situation:
  - Convert dose rate measured at 50-300 m height above ground to dose rate value at 1 m height. Internet connection is required for calculation (level above ground)
  - Calculate contamination for Cs-137 on the basis of dose rate value at 1 meter height above ground.


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