

GammaTRACER - “ a new concept in gamma radiation monitoring”

What is GammaTRACER?

GammaTRACER is a new concept in radiation monitoring, designed and manufactured by Genitron Instruments GmbH, Frankfurt, Germany.

Until now two types of system have been used for long term environmental surveillance. Both have advantages and disadvantages:

- *on-line measurement networks* represent a relatively significant investment in setting up a fixed infrastructure (mains power, modem or radio communications, installation costs, etc). However, the user has the benefit of continuous on-line information and, in some cases an automatic alarm for emergency situations;
- *passive integrating TLD dosimeters* are flexible, easy to install and, above all, cheap but can not provide information on variations in the radiation level over time or minimum / maximum values because they integrate the dose rate.

GammaTRACER offers the best features of both systems: time-correlated dose rate information at an affordable cost and with a high degree of flexibility to meet customers' different applications.

The GammaTRACER System

The basic *GammaTRACER* system is very simple:

- one or more *GammaTRACER* probe units
- *DataGATE* embedded Web Server device serving as infra-red transceiver for configuration and downloading of data and to connect *GammaTRACER* into local networks
- *DataEXPERT* database and analyzing software

We also provide suitable mast supports to attach your probe(s). The software is operable under WIN 95/98/2000, WIN NT and XP.

The Principle of Operation

The *GammaTRACER* probe is an autonomous data logging unit. Running off its own internal batteries, it stores the gamma dose rate value at intervals that can be preset by the user. Each measurement is stored with the date and time.

Stored data from the *GammaTRACER* probe can be downloaded at any time into a PC. This is carried out using an infra-red transceiver, connected to the serial port of the PC.

Together with the *DataGATE* interface and *DataEXPERT* software the user can easily:

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- read and configure the probe only by web browser (MS-Internet Explorer, Netscape etc)
- easily integrate into networks for surveillance and access data from any computer
- set up specific parameters in the probe
- download stored information from the GammaTRACER probe
- display, analyze and report these data
- export the data to other software packages.

As well as the dose rate, time and date, each GammaTRACER probe logs the ambient temperature at the measurement location over the selected cycle time. These values, plus a large number of diagnostic parameters and mathematical functions are available for display and analysis via DataEXPERT software.

Typical applications of GammaTRACER

GammaTRACER can be applied to virtually any situation where trends in gamma dose rate levels need to be monitored over time. Examples include:

- documentation of variations in natural background radiation
- surveillance of specific areas within nuclear installations
- site boundary or perimeter monitoring
- environmental monitoring around nuclear installations, eg by local authorities
- monitoring transportation of nuclear material
- temporary work area monitoring, eg during maintenance operations.

A great advantage of GammaTRACER is its flexibility for use in different applications to meet users' particular requirements.

Since 1995 the French power supply company Electricité de France has equipped all French nuclear power stations with 440 GammaTRACER probes as an environmental monitoring system. Since 2000 there is also the radio transmission system SkyLINK installed at the NPP site Dampierre planned to be extended to all 19 NPPs. Users worldwide operate more than 1 300 probes.

Price

The price of a GammaTRACER system is dependent on the number of units purchased. The probes are available in different measurement ranges and additional modules.

Please contact the manufacturer or distributor for a quotation to meet your requirements.

Free Evaluation

We are offering customers a 2 - 4 week trial period to enable you to evaluate the GammaTRACER system without obligation. Please contact us to arrange this.

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Can the dose rate also be extended?

Yes. Instead of supplying the GammaTRACER probe with two identical GM tubes, Genitron will exchange one of them for a tube covering a higher dose rate range. In this way the total range of the probe will extend from 10 nSv/h to 10 Sv/h. We offer different combinations known as the GammaTRACER types – WIDE – and – HIGH –. Again, due to the fact that GM tubes draw more current at higher dose rates, it is only possible to offer a 1 year warranty for the extended range probe.

Is it possible to obtain a better sensitivity?

Yes, with the new GammaTRACER type –XL–. One channel of this model is suited with a Geiger Mueller detector of big volume design. Thus the –XL– probe is approximately eight times more sensitive than one channel of the GammaTRACER type –Basic– is. The second channel of the –XL– is equipped with a high dose detector. Thus, the –XL– type also shows a measuring range from 10 nSv/h to 10 Sv/h.

How do I change the batteries?

The batteries are guaranteed for 3 years and will typically last 5 years at normal background levels, so you will not need to change them for (at least) this period. The battery capacity is continuously monitored by the probe electronics and you can view the current age and anticipated future lifetime of the batteries via the DataEXPERT software. If batteries get to within 180 days of depletion all data will automatically be saved and you will receive a warning of this when you download data.

Customers with only a few probes will need to return them to the supplier to have new batteries fitted. However, in the case of large scale users, training may be provided to allow this to be done on site. Note that the probe is hermetically sealed, so in normal circumstances it should not be opened.

So how do I know the GammaTRACER is operating correctly?

GammaTRACER has a built-in Quality Assurance system which continuously checks and compares the two GM detectors, to ensure that they are consistent, and verifies other operating parameters. Any irregularity is logged in the probe's memory and flagged by a marker in the displayed data, once this is downloaded. The nature of the irregularity can then be investigated by the user. Examples of situations which will be “flagged” in this manner include:

- memory error
- high voltage error
- low batteries
- environmental stress (shock, humidity, electromagnetic interference)
- detector error
- inconsistency of measurement between the two GM tubes
- short transient “spikes” of radiation
- over-range.

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Can I recalibrate the GammaTRACER probe?

Yes. For annual recalibration you just need a small ¹³⁷Cs source of 5mBq to verify the calibration factor. The probe calibration should not drift but if necessary you can enter new calibration values via the DataEXPERT software. By the way we guarantee a stability on the calibration factors for at least three years. For the periodic control of GammaTRACER probes we offer a special testing device.

What do I need to run DataEXPERT?

The new powerful visualization software *DataEXPERT* with integration of database functionality runs on AT-compatible PCs and has following system requirements:

- Operating System Windows98, Windows NT, Windows 2000, Windows XP
- Internet Explorer (4 or bigger, it is necessary for library)
- MDCA (Microsoft Data Access Components)
- Network interface card (if you also employ *DataGATE*)
- Hub or cross link (cross link cable is included for connecting *DataGATE* directly to the PC's network card)
- installed TCP/IP-protocol stack (if you also use *DataGATE*)

Over what distance can I download data?

The infra-red transceiver operates up to approximately 10 - 12 meters. For other methods of downloading data, see next page.

And at what angle with respect to the GammaTRACER probe?

Infra-red transmission operates roughly over the line of sight, so you need to position the IR transceiver at a point within +/- 10 ° of the axis of the GammaTRACER probe. For field use a handy accessory is a simple camera tripod, onto which you can attach the DataGATE with IR transceiver.

What if I only want to download the most recent data?

You can do this. The date and time of the last data transfer is always logged and DataEXPERT allows you to choose to download only the new values recorded since that time. Alternatively, you can download the values over a fixed time period or a fixed number of values. Of course, you can always download the full archive at any time.

How can I analyze the data?

With the *DataEXPERT* database and software package you can administrate the data, analyze, graphically present them and document selected measuring series. In detail you can:

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- display and import data from dvd-file (also elder data available in dvd files)
- select data from different instruments or measurement series out of the database and display them in one or more windows
- powerful zooming, visualizing, performing mathematical and report functions. For example you can add to, or subtract from data sets by a fixed constant, smooth the measurement curve or interpolate between points. You can also convert between different quantities.

How do I print the data?

You can choose to print the contents of the PC screen. Alternatively, the data can be printed in tabular format or as a graph.

And what about exporting to other applications?

DataEXPERT allows you to export the data easily to Excel or SQL databases. The chart can be exported into a file or on the clipboard in different formats: as Bitmap (bmp), Metafile (wmf), Enhanced Metafile (emf), TEE (tee) or as JPEG (jpg).

Is it possible to incorporate GammaTRACER into a monitoring network?

Yes. For users wishing to combine a number of probe units into a complete monitoring network, GammaTRACER can be supplied with an integral RS485/RS232 module. The additional module requires an external 12V DC power supply. This enables the user to download data into a PC either via hardwired connection (maximum length 1,000 meters) or using a modem link to a telecommunications system.

The DataGATE –ONLINE- embedded Web Server serves as an interface unit between GammaTRACER RS-232 and the TCP/IP interface. Locally supplied routers and modems (also GSM) can be supplied and installed by a local IT specialist. With this configuration the user is independent of any changing requirements for PC hardware/operating systems. With the DataGATE device he can easily integrate into complete networks and access data from any computer.

For such a wire-bound network configuration we now offer all the sophisticated software modules which are used with a radio based SkyLINK system.

I would like to transmit the data via radio link. Is this possible with your probes?

Yes, the GammaTRACER probes can be equipped with a radio module, the transmitter. Depending on the measurement task we offer two radio solutions, *ShortLINK* and *SkyLINK*, both operating as a proprietary network. *ShortLINK* is a bi-directional radio link designed to cover a range up to 5 km line of sight. *SkyLINK* is a unidirectional wide-area data collection network with highly sophisticated receiver technology, covering ranges between typically 30–100 km. Both are designed for connecting low-power sensors. A complete system consists of an antenna, the receiver and organizer unit. Both of these wireless approaches

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have really unique features. One system can cover tasks in routine surveillance as well as for emergency preparedness. You can use it for perimeter monitoring as well as for wide range data collection. *ShortLINK* can also be applied for instrument parametrization.

How can I find out if a ShortLINK or a SkyLINK approach is suited for my purposes?

To judge on this question we need to know more on your measurement project. We have prepared a separate brochure with 'Frequently asked questions' and a questionnaire to get to know the basic ideas on your intended set-up. There are many advantages with a *ShortLINK* or *SkyLINK* system in comparison to other radio solutions. Have a first look on our website to get a glimpse on the system outlines (www.genitron.de) and contact us with your project details. We will find the best suited solution for your measurement project.

What kind of after-sales support do you offer?

Besides the technical advantages our products are regularly known as user-friendly, easy to handle and practically maintenance-free. Should you nevertheless have any initial problem to get started contact your distributor or send us a short e-mail, fax or just give us a call indicating your problem clearly. We may also return your call and will try to get you out of this situation as fast as possible.

If you wish to learn a bit more on the system and to make best use of the functions and the software we offer a training course on request.

What further developments are planned?

Beyond measuring the ambient dose rate it may be important to perform additional measurement functions. In order to identify the cause of an increase of the ambient dose rate as the result of air-borne or deposited activity or to selectively record inert gases as indicators of volatile radioactive nuclides such as iodine. For these particular tasks the following two special versions have been designed. In case of further interest please ask for a separate leaflet on these specially configured versions.

Separator

The GammaTRACER special model **Separator** features a lead separator between the two special counter channels. Therewith this model allows measuring by the lower channel the dose rate of deposits in the ground, while the upper detector "sees" the air-borne activity. Thus, by comparing the two independent courses of the ambient dose rate values the user is able to determine the source of fluctuations in the ambient dose rate.

Xenon – Energy Differentiator

The GammaTRACER special model **Xenon** is equipped with special, differently filtered detectors. A comparison of the two counter channels can thus indicate whether an increase in the dose rate is the result of the presence of Xe-133 or not. By determining this way the radioactive nuclide Xe-133 important early warning information after reactor accidents is available.

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UTP

Genitron is currently developing a Universal Telemetry Platform (**UTP**). On this basis it will be possible to extend the applications of the radio network with other kinds of sensors for example for meteorological data.

Finally, tell me more about Genitron Instruments!

‘Innovation and personal engagement’. Since more than 20 years this motto has been valid for Genitron Instruments GmbH, based in Frankfurt, Germany. The company was founded in 1980 by Volker Genrich. Based on long term experience with the French Saphymo company Genitron Instruments has joined forces with Saphymo, Massy, since October 2002. This enables the companies of the Saphymo group to make better use of the existing technological potential.

Over the years, Genitron has become a specialist supplier of radiometric instrumentation for environmental monitoring. A number of innovative dose rate monitors and monitoring systems have been developed. The company has been on the cutting edge of technology and is known for its high quality of its products. Its philosophy is to add value to these by offering its customers besides a long warranty period practically maintenance-free operation of the instruments and systems. Genitron also manufactures the *AlphaGUARD* Radon Monitor, which has achieved outstanding success since its launch and is now firmly established as the world leading device in its field.

For more information contact us directly in Frankfurt am Main, Germany, or your local distributor of which we will supply the address on request. On our website www.genitron.de you will find additional information and video presentations. We are looking forward to get in touch with you!

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GAMMATRACER . . .

state-of-the-art in environmental monitoring

in combination with

SKYLINK

a new dimension in wireless data collection