

topics

Gamma Camera Radiation Measurement Device

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OVERVIEW: Hitachi Consumer Electronics Co., Ltd. has developed a radiation measurement device that can measure amounts of radiation over a wide range and show them in a color-coded display. Ever since sales began in March 2012, Hitachi has listened to and reflected the opinions of specialists and other parties involved in the decontamination of municipalities and other locations while also taking actual radiation measurements itself. As a result, Hitachi started taking orders for an improved model in August of the same year. This device features highly sensitive and precise measurements as well as excellent usability, and can be easily operated by just setting up a camera and laptop PC, and then launching measurement software.

TOWARDS STREAMLINING DECONTAMINATION ACTIVITIES

THE decontamination of radioactive material has been carried out in various locations ever since the Great East Japan Earthquake occurred in March 2011. If a general-purpose dosimeter (survey meter) is used during decontamination activities, although doses can be measured, locations that should be decontaminated are not displayed. There is an urgent need for the ability to visualize hot spots that have received high doses, in order to improve the efficiency of decontamination.

It is against this background that Hitachi Consumer Electronics Co., Ltd. developed and began selling the gamma camera radiation measurement device, which can measure amounts of radiation all at once over a wide area, while showing results in an easy-to-view color-coded display (see Fig. 1).

OVERVIEW AND FEATURES

This device is used together with a laptop personal computer (PC) to superimpose the results of gamma ray (radiation) dose measurement over images shot with the camera in a color-coded display on the PC screen (see Fig. 2). In addition, the types of radiation measured (cesium-134, cesium-137, or iodine-131) can also be identified. The gamma camera can also be used for a wide range of applications other than decontamination activities, such as the measurement of radiation in hospitals, research centers, and other facilities that handle radiation.

High Sensitivity and Precision

This device includes a semiconductor radiation

detection sensor module developed by Hitachi Consumer Electronics that features high energy resolution and sensitivity. Highly sensitive radiation detection is implemented by placing elements on each



Fig. 1—External Appearance of Gamma Camera Radiation Measurement Device and Example of Usage.

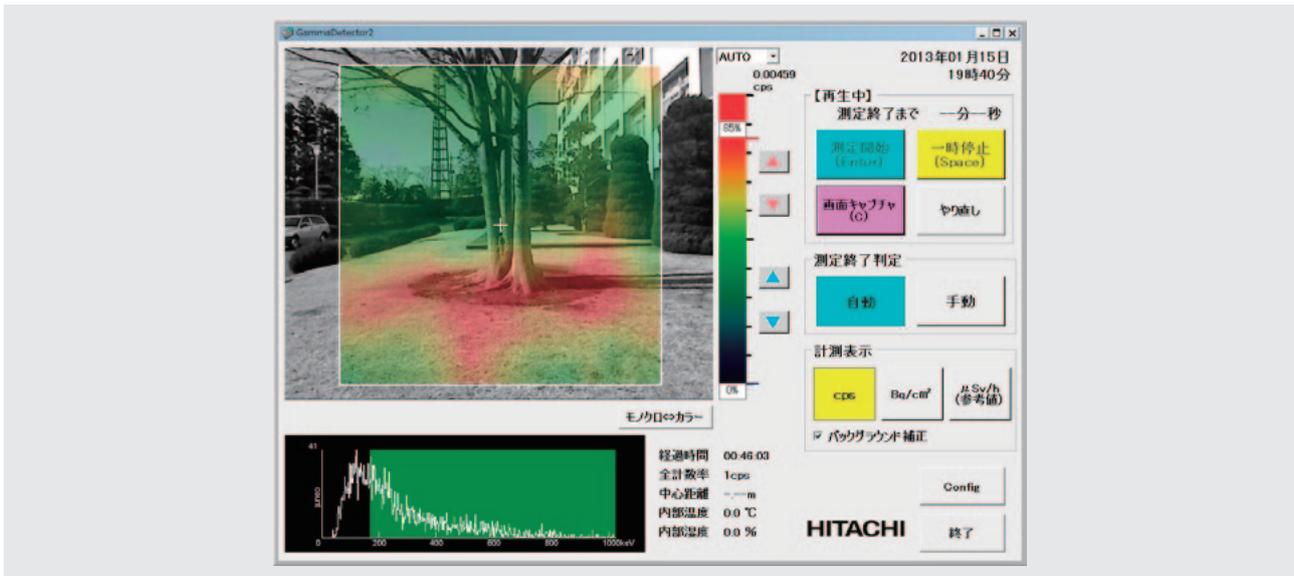


Fig. 2—Example of Measurement Result Screen Display.

of the 256 pixels of the radiation detection area.

Thanks to this design, it is possible to measure amounts of radiation in a wide area from a location that is separated from the measurement target (viewing angle at a point 10 m away is 8 m × 8 m). This allows high-dose locations to be identified without approaching the measurement target, which makes it possible to streamline measurement work while securing the safety of workers.

Furthermore, this device uses multiscanning to measure the distance to the measurement target using each of the 256 measuring pixels, and displays the surface dosage rate after applying a correction process based on Hitachi's unique technology. This method results in highly precise radiation measurements at each pixel.

REFLECTING DEMANDS OF PARTIES INVOLVED IN DECONTAMINATION AND SPECIALIZATION

Hitachi Consumer Electronics has been conducting radiation measurements in and around Fukushima Prefecture, Japan ever since it began selling radiation measurement devices. At the same time, it has been listening to the demands, product improvement ideas, and other suggestions of the decontamination personnel and radiation measurement specialists working for municipalities and other organizations regarding the radiation measurement device, and has reflected the opinions gathered at numerous hearings in further development.

Specifically, the graphical user interface (GUI) was

improved in a number of ways, including the automatic display of the end time of measurement based on the measurement environment, and the display of remaining battery power. These improvements have increased usability, and the device is easily operated even without specialized knowledge. Also, by attaching a global positioning system (GPS) receiver using the universal serial bus (USB) connection [National Marine Electronics Association (NMEA) product, should be obtained separately], it is possible to append GPS information to the measurement data, which helps with data management both before and after decontamination activities.

Hitachi will continue development efforts that contribute to the improvement of efficiency in decontamination activities and the containment of decontaminated debris and other waste materials.

ABOUT THE AUTHORS



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