



## Mobile measuring equipment for measuring gamma radiation

The Norwegian Radiation Protection Authority uses several systems for mobile surveys. One of the systems consists of detectors that can be fitted on the roof of a car. Mobile systems can be used to survey radioactive pollution in large areas in a short time, for reference measurements and for searching for missing sources. The systems can be fitted onto vehicles or used in helicopters or fixed-wing aircraft.



*A Radiation Authority vehicle from the Preparedness Unit fitted with equipment for mobile surveys (Photo: NRPA).*

### New capacity for Norwegian nuclear preparedness

The Radiation Protection Authority's preparedness unit at Svanhovd, and at the Authority's head office at Østerås, near Oslo, have the equipment and routines to carry out mobile gamma spectrum surveys with detectors fitted to the roof of a vehicle. This sort of equipment can be used to survey contamination over large areas in a short space of time, or to search for radioactive sources.

In the autumn of 2006, the preparedness unit participated in a major exercise in Sweden, which was based around the search for missing radioactive sources in which the equipment proved to be efficient and precise when doing the surveys. It was actively used in the summer of 2007 in northern Norway for, among other things,

surveying radiation levels at Pasvik and out to Grense Jakobselv on the border with Russia. In January 2008, a similar system was deployed at the Radiation Protection Authority's head office at Østerås. The equipment can also be fitted to other mobile units if a vehicle is not appropriate. The Radiation Protection Authority has collaborated with the Norwegian military and has tested the same sort of equipment in Orion patrol and reconnaissance aircraft and a simplified set up has been used in boats.

The Authority, NGU (the Geological Survey of Norway) and the Defence Forces also have other systems for mobile deployment.

### Roof-mounted detectors

This mobile measuring equipment consists of two four litre Sodium Iodide (NaI) detectors fitted on

each side of the vehicle's roof. The advantage of this exterior fitting is that it raises the detectors higher from the ground. This permits radiation to be detected farther from where the vehicle is driving. The NaI detectors measure gamma radiation and are connected to an electronic unit (spectrometer) that processes the data and sends it over to a PC. The vehicles are fitted with mobile broadband. This permits data transfer from the field directly to the Authority. The data are thereafter analysed and presented for the preparedness organisation, using special tools.



*Spectrometer and associated 4 litre NaI detector (foto: Science Applications International Corporation (SAIC)).*

### Results and presentation

The data that are registered in the field are saved continuously. The PC that is connected to the detectors can display selected parameters, and present them graphically on screen, in real time. If the detectors approach a source of radiation, or a point with an elevated radiation level, an alarm is triggered. Hand-held equipment, which the vehicle also carries, can be used to identify and quantify any sources.

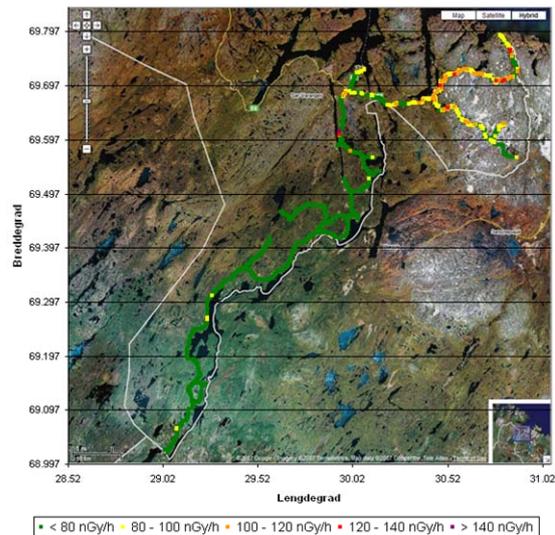
Surveys of radiation levels in the environment provide important reference measurements. Give the current level of threat, it is not possible to exclude new radioactive fall-out in Norway. By surveying the current radiation levels, there will be a better basis to estimate the deposited amount in the case of new fallout.

The equipment will also provide assistance for the customs authorities and other players. Mobile measurements are carried out at regular intervals thanks to a collaboration between the Norwegian Radiation Protection Authority and Norwegian Customs. The equipment permits the Radiation Protection Authority to assist Customs in checking vessels berthed in Norwegian ports. This

will be a supplement to the normal checks that the customs authorities carry in connection with ship inspections.



*Gr-135 - "The Identifier". Handheld instrument for the identification of any finds or sources.*



*Surveying radiation levels in Pasvikdalen and towards Grense Jakobselv.*

### Stronger nuclear preparedness

This equipment for mobile measurement of gamma radiation is easy to fit and can be made operational in a very short time. If needed, the equipment can be transported by air to a suitable site, and fitted to a local vehicle. The measurement data can then be acquired, and the results from large areas transmitted immediately and be used to gain a total overview of any potential pollution situation. The measurement equipment contributes to strengthening Norway's nuclear preparedness.