Use of the MonRaS SW application during Emergency situations
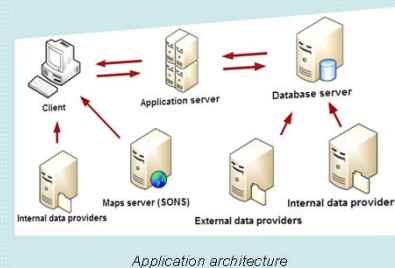
Ondřej Chochola, State Office for Nuclear Safety (Czech Republic),

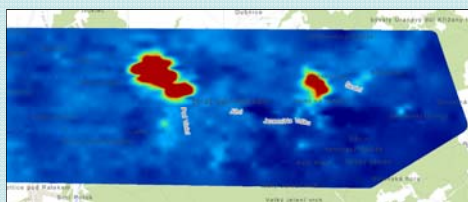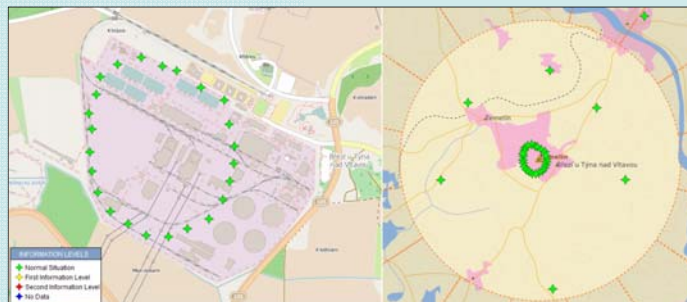Department of Radiation Protection of Nuclear Fuel Cycle

Description of the Application

- **MonRaS** (MONitoring of RAdiation Situation) is a software tool used for collecting, analyzing and publishing data from the Radiation Monitoring Network of the Czech Republic. The application has been developed by the **ENVINET** and **ABmerit** companies during 2008. During 2008 and 2011 has been tested by the realization team of the State Office for Nuclear Safety (SONS) and 1.11.2011 began full operation (when replaced an older application IS RMS).

- The application is based on the three-layer architecture: *Database server - Application (web) server - Web client*. All the data are stored in the central database server and accessible through the internet explorer from each computer connected into the SONS and National Radiation Protection Institute (NRPI) internal network. The Web Presentation System has been created besides the internal part of the MonRaS application and serves for the publishing of selected data to the public.


Application architecture

Radiation monitoring – Radiation Monitoring Network

- Radiation situation data are collected by the National Radiation Monitoring Network (RMN) founded by the State Office for Nuclear Safety, which is also RMN coordinator. Monitoring data are provided by the SONS, NRPI, Nuclear Power Plant operator (ČEZ, a.s.) and currently the Ministry of Finance, Ministry of Defense, Ministry of Interior, Ministry of Agriculture and Ministry of Environment.

- Radiation situation monitoring data are used for the radiation situation assessment, for the monitoring and evaluation of the exposure and, in case of a radiation accident, for the decision about countermeasures related to the exposure reduction or adverting.

- Data collected by RMN are divided into several groups of different measurements and samples, also called as Monitoring Items, such as dose rates, integrated doses, ground and aerial monitoring data, spectrometry results, environmental and foodstuffs sample results, in-situ measurements, internal contamination, meteorological data, NPP discharging data, etc.

Teledosimetric Network around NPP Temelín (TDS 1 and 2)

Ground monitoring inside Emergency Planning Zone

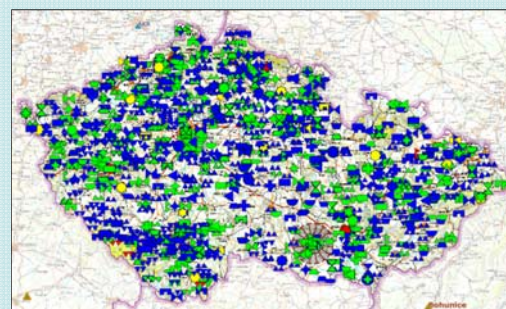
Example of the aerial survey

Normal and emergency mode of the application

- During normal situation all the (automatically) verified data are transmitted into the external Web Presentation System. The Application divides collected data in virtue of *Information Levels* (ILs) which helps to distinct normal and abnormal values. First IL for dose rates have been set up by long-term averages and differs from one place to another. Second IL is same for all places (500 nSv per hour). Information Levels for other samples were set up by national legislation.

- The Application sends an Information and Warning Messages if some IL is exceeded. It allows to the MonRaS operator simply find and recognize unusual situation. Crisis staff cooperates with MonRaS operator who can change the operation mode of the Application, then the Application works in emergency mode.

- The Emergency mode stops the data transmission between internal and external part of the Application and also transmission between other systems. All future data must be verified by the operator and then published with an additional commentary in order to keep correct interpretation of the results. The Emergency mode also separates the emergency data from the annual evaluation of the radiation situation carried out by the *Annual Messages Module*.

Environmental monitoring around NPP Dukovany
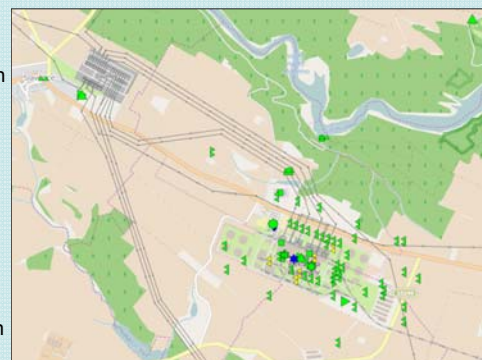
Connection to the other external crisis tools

- The Application is used as a support for other crisis tools such as the modelling software **ESTE** (Emergency Source Term Evaluation code, created by the ABmerit company). The situation prognosis calculated by the external application could be verified on the real monitoring data, mostly on the results of the Early Warning Network and spectrometry measurements. Environmental monitoring data are the base to taking out the urgent protective measures (such as sheltering, evacuation and ITB), later on foodstuffs and feedings monitoring data to acceptance of food restrictions.

- In case of NPP accident in Czech Republic the operator of NPP (even as SONS) is evaluating situation by means of software tools (**RTARC**) and advising (recommending) Urgent Protective Measures (UPM). UPM are accepted according to Emergency Response Plans (ERP) – the operator is following Onsite ERP, the Regional Office is following Offsite ERP. SONS confronts both computing aids by virtue of source terms and makes efforts to eliminate eventual inaccuracies. The results are in accordance of both systems and lead to the same UPM. At present SONS prepares SW application **EXPES** which will automatically advise Protective Measures and their extension based on prognosis (SW ESTE) and real data from MonRaS.

Foodstuffs monitoring across the whole national territory

Spectrum as a one of MonRaS output

- For more information please follow our website: www.sujb.cz
  or visit the Web Presentation System: http://www.sujb.cz/monras/aplikace/monras_en.html →