Forschungszentrum Karlsruhe
in der Helmholtz-Gemeinschaft

RODOS

Decision support for nuclear emergency management

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Objectives

The objectives of the RODOS project have, since its inception, been to develop a real-time on-line decision support system that could provide consistent and comprehensive support for off-site emergency management at local, regional and national levels at all times following a nuclear or radiological accident and that would be capable of finding broad application across Europe unperturbed by national boundaries. The use of the system for training and exercises was a further important consideration in its developments. The overriding consideration was promote, through the development and use of the system, a more coherent, consistent and harmonised response to any future accident that may affect Europe.

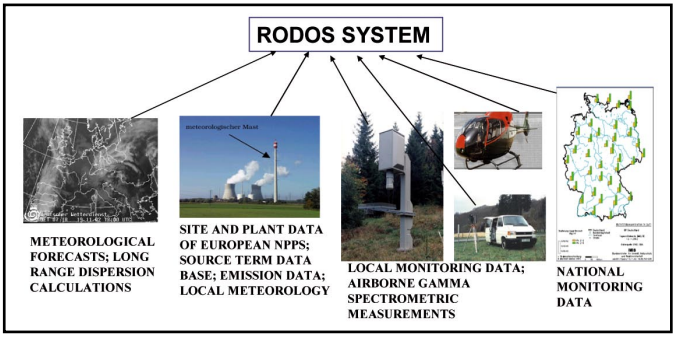
The RODOS project

The RODOS project was launched in 1989 to respond to these needs. It increased in size through the European Commission's 3rd, 4th and 5th Framework Programmes. Significant additional funds have been provided by many national R&D programmes, research institutions and industrial collaborators, in particular, by the German Federal Ministry for the Environment, Nature Conservation and Nuclear Safety (BMU). Up to 40 institutes from some 20 countries in the EU, CEE, and FSU were actively involved in the project.

System features

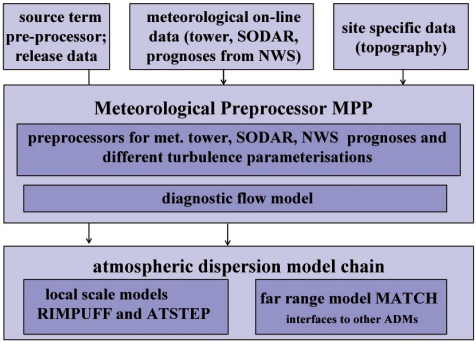
As a result of these collaborative actions, the comprehensive **R**eal-time **O**n-line **D**e-cisi**O**n **S**upport system RODOS has been developed which can be applied generally within and across Europe. It can be used in national or regional nuclear emergency centres, providing coherent support at all stages of an accident (i.e., before, during and after a release), including the long term management and restoration of contaminated areas. Special attention has been given to radiological emergencies caused by dirty bombs, terrorist attacks, traffic accidents, etc.

The dispersion and deposition of material released to the atmosphere (up to 47 days) is predicted using a nested chain of flow and dispersion models, which cover two distinct areas, the near range within an area of 160 km X 160 km and the far range up to thousands of kilometres. Appropriate interfaces exist with local and national radiological monitoring data, meteorological measurements and forecasts. Estimates of the current plume position are updates every 10 min, prognostic calculations are performed every 30 min. A



hydrological model chain covers the dispersion of radioactive material into and through most aquatic environments (rivers, reservoirs, lakes, estuaries, coastal waters, seas, etc).

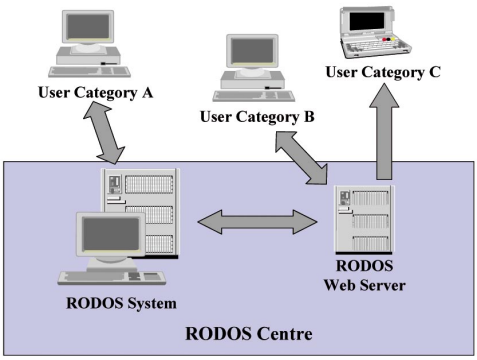
Exposures from all pathways of potential importance are assessed both during and after the passage of the radioactive plume. The transfer of radioactive material to 21 feedstuffs and 33 foodstuffs (plus water bodies, fish, mushrooms, berries and games) and subsequently to man is modelled



time dependent taking account of seasonal variation. Data assimilation tools update diagnoses and prognoses as monitoring data (e. g. gamma dose rates, ground deposition or food contamination) arrive. Customisation tools exist for adapting the underlying data bases to local, regional and national conditions in Europe.

The system is able to support decisions about the introduction of a wide range of potentially useful countermeasures (e. g., sheltering and evacuation of people, distribution of iodine tablets, food restrictions, agricultural countermeasures, relocation, decontamination, restoration, etc.). Costs of implementation, manpower resources needed and quantities of waste material produced can be estimated as well as the effectiveness in terms of reducing contamination levels in the environment and radiation doses to members of the population. MAV/UT based software enables the user to compare and evaluate the benefits and drawbacks of different countermeasure strategies (e. g. risks, costs, feasibility, public acceptance, perceptions, social, psychological and political implications and preferences or values of decision makers).

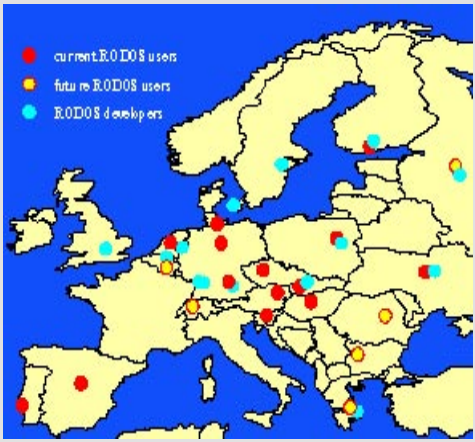
RODOS is a modular structured UNIX based system and has a client-server architecture that allows it to be distributed across a network of computers. Three categories of users can access the system: (1) via an X-Windows user interface (full functionality), (2) on PCs with standard browser via a simplified Web based user interface, (3) as passive users with access to results generated by Category A or B users. Furthermore, software tools exist for directly exchanging raw and processed data between decision support systems of neighbouring coun-tries. A LINUX version of RODOS will be available by mid 2005.



European coverage

The current version of the system (RODOS version PV 6.0) has been, or is being, installed in national emergency centres in several European countries (Germany, Finland, Spain, Portugal, Austria, the Netherlands, Poland, Hungary, Slovakia, Ukraine, Slovenia, and the Czech Republic).

Installation is foreseen or under consideration in Belgium, Switzerland, Greece, Romania, Bulgaria, and Russia within the next few years. Installations of RODOS in the Ukraine and in the EU's New Member States have been achieved with support from the European Commission' s ECHO, TACIS and PHARE Programmes.



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The further development of RODOS builds part of the work programme of the EURANOS project (http://www.euranos.fzk.de)

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