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Multiplatform Model Integration Framework of JRODOS – Decision Support System for Off-Site Nuclear Emergency Management

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Abstract: Decision Support Systems for off-site emergency management in the case of a nuclear accident should integrate, among others, real-time monitoring systems around a Nuclear Power Plant, regional GIS information, source term databases and geospatial data for population and environmental characteristics. They should comprise state of the art models to simulate the fate of accidentally released radionuclides in air, water, vegetation, and soil to estimate exposure of the population via all relevant exposure pathways. The real-time online decision support system RODOS is being developed under the auspices of the European Commission's RTD Framework programs since 1992 to achieve the above-formulated objectives. RODOS was re-engineered in the last decade as multiplatform software system JRODOS in a Java environment. The software architecture of JRODOS organizes the data flow between different sources and recipients, e.g. databases, numerical models, user interface via unified data objects. These objects (data items) are organized in an expandable hierarchal tree of Java-classes using benefits of object-oriented programming principles. Numerical model integration is carried out by distributed wrapper objects (DWO), which provides logical, visual and technical integration of computational models and the system core, even if models used different programming languages such as FORTRAN, C, and JAVA. The DWO technology supports various levels of interactivity, required by different computational models including pull- and push driven chains, user interaction support, sub-models calls. The DWO and data item approaches are applicable for integration into DSS the sets of the different computational models, which read and produce scalars and arrays.

Keywords: Decision Support System; Radiological emergency; Environmental Software; Model integration