

# CHEM : Advanced Decision Support System for Chemical/Petrochemical processes

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The aim of the CHEM<sup>1</sup> project is to develop and implement advanced Decision Support Systems (DSS) for process monitoring, data and event analysis, and operation support in industrial processes. These systems are synergistic integration of innovative software tools, which improve the safety, product quality and operation reliability as well as reduce the economic losses due to faulty states, mainly in refining, chemical and petrochemical processes.

The development of advanced methods and software tools based on statistical, system theoretic, and artificial intelligence methods for signal processing, process monitoring, fault detection and isolation, diagnosis, and decision was carried out. Twenty three software toolboxes were developed during the project (from April 2001 to March 2004).

A methodology has been elaborated to define how the different toolboxes can be used individually and together so that, in the future, new supervision applications can be easily built on different processes. A whole activity diagram has been elaborated and a methodological guide was established. Moreover, for allowing easy communication between the toolboxes, an information model has been developed which allows information to be shared in XML.

An integration platform has been developed to allow the toolboxes to be integrated in a modular fashion. XML, Message Oriented Middleware, Corba, Java are being employed jointly with G2, a commercially proven platform for developing complex industrial applications. G2 is combining its real-time and communication features with the above mentioned standard technologies to provide a unique integration platform for the large number of heterogeneous toolboxes in the project. It demonstrates the advantages of these standards in industrial environments. The DSS was developed such as to be able to interface with commercial plant databases and process control software. The final version of the integration platform is available and has been used for integrating many of the toolboxes together.

An important aspect of the project concerned the industrial tests. The DSS environment has been tested at pilot plants and industrial sites. It was applied to partner facilities to ensure rapid technology transfer. The industrial end-users provided different kinds of processes including a FCC (Fluid Catalytic Cracking) pilot plant, a paper making process, a gasifier pilot plant, a steam generator, a blast furnace and distillation process

and a CIM (computer integrated manufacturing) process. Several sets of toolboxes have been used on different processes.

The talk will present the results of this 3 year project. It will summarise the principles used in the different toolboxes, present the integration methodology, the results obtained on the different processes of the project either with individual toolboxes or with sets of toolboxes.

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