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Tractebel Energy Engineering
OPA: Knowledge-Based Support System

Tractebel Energy Engineering has developed the knowledge-based Operator Advisor (OPA) to warn an operator crew of disturbed operations in such complex process industries as nuclear power plants, chemical plants, steelworks, and others. OPA has the unique capability to not only suggest the actions an operator should take in an event-driven way but also to monitor a selected number of actions that should be performed in the present situation. Operator Advisor is powered by Allegro CL.

"OPA consists of two user interfaces and one technical interface," says Claude Van Dyck, Chief of Knowledge Based Methods. "The first, a real-time process supervision interface, exists for the operator crew in the control room, and the second is a knowledge acquisition interface for the process expert. The technical interface acquires the relevant process data necessary to enable the system to operate in an event-driven way without the need for keyboard dialogue."

The real-time process supervision interface provides the operator crew with critical support information. This information includes context dependent advice on actions to be taken, global assessment of the restoration strategy process, permanent monitoring of equipment status and a display of background information upon request.

Through the knowledge acquisition interface, consisting of a graphical interface, the process expert "introduces knowledge about the procedure or a restoration strategy into the

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system," says Van Dyck, "and the application then monitors the procedure in real time."

OPA is supported by a dedicated tool, developed at Tractebel, called GPS (Goal Processing System). GPS is a specific tool designed to manage procedural knowledge and aimed at process supervision via real time acquisition of the process variables. Tractebel wrote GPS using Allegro CL's Common Lisp Object System (CLOS) and Allegro CLIM.

"The dynamic aspects of Allegro CL are very important to us," says Van Dyke. "The Man-machine Interface makes use of color codings, windowing capabilities, dynamic menus, context-dependent mouse sensitivity, etc. The object oriented approach of Allegro CL leads to a very modular implementation and development of extensible programs. Additionally, object oriented techniques, in particular, class hierarchy, methods, and generic functions are well suited to implement the monitoring function."

"In developing the knowledge acquisition interface, Allegro CLIM proved invaluable," continues Van Dyck. "In just a few lines of programming, we can draw a graph on the screen. By just specifying the nodes and links, we get a drawing immediately."

Tractebel has also developed the following additional applications using Allegro CL for Windows:

- **CORAPS:** aids in planning fuel reshuffling in PWR nuclear power plants. CORAPS generates an optimal sequence of operations and assists the supervisor during the reshuffling process
- **IATOS:** a support system for the execution of complex operations in electrical substations.
- **GIPSY:** aids in designing and planning electrical networks. GIPSY comprises a graphical interface, an object-oriented database and a system analysis module.

For more information about Tractebel Energy Engineering, visit their web site at www.tractebel.be or you may contact Francoise de Viron (francoise.deviron@tractebel.be) or Claude Van Dyck (claude.vandyck@tractebel.be).