An innovative environment

R&D in process control technology and ICT domains…

The Competence Centre for Advanced Control Technologies (CC ACT) represents an innovative environment stimulating industrial R&D in the process control technology and ICT domains. It integrates 17 partners – the most prominent Slovenian engineering companies and academic institutions in these domains, along with some end-user production companies.

The R&D activities of the centre are structured into six thematic projects and one demonstration project with the following topics: Development environment and components for implementation of advanced control; Technology of web, remote and distributed control; Model-based production control; Optimisation and control for efficient energy consumption and clean environment; Automatic condition monitoring of process equipment; Efficient fusion power plant control system; Development of the technical prototypes and realisation of demonstration projects.

The planned results are more than 25 new products, technologies, services and demonstration projects, seeking either opportunities to be placed on the international market, or networking for further development in regional or Europe-wide R&D projects.

Some of the technological solutions include the following:

Software tool for rapid prototyping and implementation of advanced control methods in process industry. With built-in modules for in situ identification, simulation and self-tuning of control algorithms, the tool speeds up the implementation and tuning of advanced control algorithms and improves the process performance.

Batch process control tool suitable for chemical, pharmaceutical, food and other process industries. The tool has several unique features such as batch server execution on standard PLC equipment, tabular representation of recipes, automatic code generation, extended state-machine phase behaviour model, and special object model of equipment reducing repetition of information and improving reusability.

Production control tool designed to improve the overall plant performance in various kinds of production processes. The tool exploits the possibilities for improved production control relying on model-based control concept. It extends the functionality of classical MES systems with embedded intelligence; it enables the analysis of the production dynamics using complex analytical functions such as data mining, data reduction, determination of relevant manipulated variables and identification of production performance indicators.

Diagnostic centre for automatic condition monitoring of process equipment applicable to a broad range of generic industrial assets such as mechanical drives, electrical machines, pumps, fans, heavy duty vehicles, etc. The centre implements the prognostic and health management (PHM) systems to reduce the costs of machine maintenance. It relies on most recent ICT technologies of wireless sensors networks (WSN) and MEMS sensors developments and data storage in a MIMOSA database. Versatile signal processing algorithms calculate the state of health, as well as the remaining useful life of particular items of equipment.

Optimisation of HVAC systems in buildings. The project exploits the possibilities for reducing the operating costs of heating, ventilation and air-conditioning systems in buildings by optimising different heat sources and cold production system using room occupancy information.

Smart grid interface supporting electricity demand response services for trading and reducing electricity costs of smaller industrial companies and larger residential customers.

Terminal unit for remote process control and supervision with the built-in functionalities for remote supervision of geographically distant processes, such as energy, water and ecological processes. Its newly developed HW and SW solutions enable the integration of the unit into public and private web portals and social networks.

Modbus TCP IP Driver web service, available for any popular operating system and equipped with additional features speeding up time to market for customers.

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