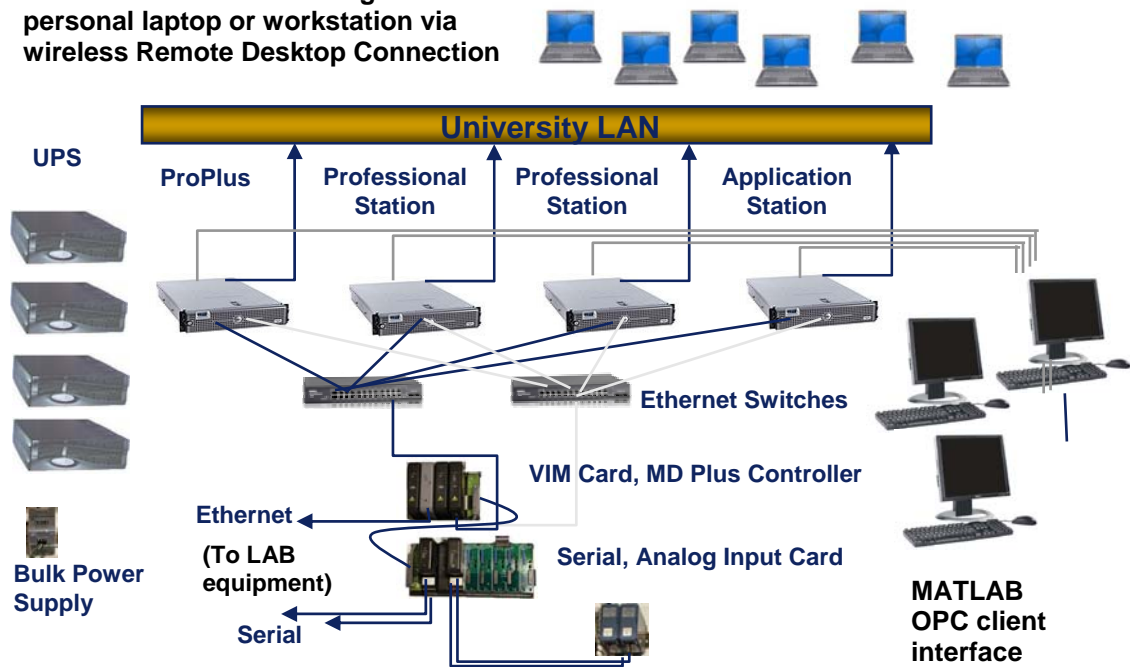


ThB02: Bridging the Gap between Academia and Industry

Students access DCS using their personal laptop or workstation via wireless Remote Desktop Connection



University Installation of DCS for University Courses and Research

The use of a DCS with integrated online advanced controls, diagnostics, data analytics, and first principle models is described for evaluating and demonstrating in an industrial environment the benefits of innovative algorithms developed at universities. The examples will illustrate how students and researchers can concentrate on the implementation of new control capabilities in familiar tools such as Matlab while taking advantage of industrial PID, MPC, PCA, PLS, loop monitoring, process modeling, and automated tuning tools without the need for special interfaces programs, or training. The virtual plant capability in the DCS is capable of running faster than real time and playing back plant data at extremely high speeds. The DCS, lab and pilot plant equipment, and experimental setups are accessible wirelessly at the university and by companies via internet. The system offers rapid exploration, discovery, prototyping, deployment, demonstration, education, and recognition of university advancements in control.

Structure of the Tutorial Session

The tutorial session consist of 5 talks:

- **ThB02.1 (40 min): Bridging the Gap between Universities and Industry** by Terry Blevins and Greg McMillan - This main tutorial session provides a non commercial overview and description of how to use virtual and actual industrial distributed control systems for sharing university ideas and industry experiences. The methodology, terminology, standards, and best practices of industry and an interactive guide are described. A complete virtual suite of embedded modeling, process control, and data analytic tools with application examples and standard OPC interfaces to MATLAB and other programs are demonstrated for sharing innovation opportunities and teaching process control in universities and industry.
- **ThB02.2 (20 min): Washington University's Process Control Labs** by Yinjie Tang and Robert Heider - Professor Tang will describe the use of a DCS virtual plant to model and explore bioreactor and pH control opportunities. Professor Heider will discuss the use of a DCS in a hardware lab complete with smart Fieldbus instrumentation and control valves to understand and improve the dynamics and control of vessels and heat exchangers.

- **ThB02.3 (20 min): Rose-Hulman Institute of Technology Unit Operations Laboratory** by Atanas Serbezov, Ron Artigue, and Ron Knecht - Professor Serbezov will describe a unit operations lab at Rose-Hulman Institute of Technology with over a dozen pilot-scale process units (skids) that is very similar to the environment in a typical chemical, petrochemical or pharmaceutical plant. Students learn how to maintain their process under control, take the process safely from one operating condition to another, collect and analyze data using a historian, respond to process alarms and remotely troubleshoot their experiments using limited process information.
- **ThB02.4 (20 min): Purdue University's Engineering Research Center (ERC)** by Rex Reklaitis and Venkat Venkatasubramanian - Professors Reklaitis and Venkatasubramanian will describe how the ERC on Structured Organic Particulate Systems is focused on research that will improve the design and manufacture of products composed of aggregates of particulate materials, important examples of which are solid dosage drugs forms such as tablets and capsules. The research seeks to develop fundamental understanding through experimental and modeling methods. One of the key application themes is to investigate the conversion of classical batch processes to continuous ones and to adapt real time process management concepts to this challenging family of processes. The ERC is partnering with Emerson and building on DCS technology to develop model-based supervisory and real time optimization capabilities that will drive continuous process improvement.
- **ThB02.4 (20 min): Use of DCS in Teaching and Research at the University of Texas** by Tom Edgar - Professor Edgar will describe the use of DCS in the control of a distillation column in the unit operations laboratory at the University of Texas. Computer control is a standard experiment for seniors and is also used for special team projects by undergraduates. DCS virtual plants are also used in bioreactor modeling and monitoring research involving graduate students