



Advanced Process Controls

Custom software provides automatic, continuous condition monitoring and reporting

As ICM has adjusted our process design to improve performance and take advantage of cost reduction strategies, we have also focused on efficiencies gained through improved process controls. We've partnered with American Advanced Technologies Group, a licensed distributor of Matrikon software, to develop a control program specifically for ethanol facilities.

Known as Ethanol APC, this system has been proven at Prairie Horizon Agri-Energy in Phillipsburg, KS. By more tightly controlling operating parameters, a four-month test showed that this and other typical 40 MGY plants can realize an estimated \$1 million to \$2 million annual savings.

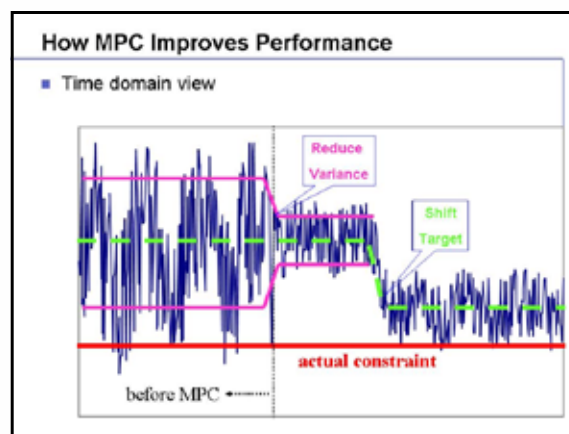
User-friendly software tightens plant operating parameters

With our technology backing about half of the industry's existing capacity, ICM takes our responsibility to support the ethanol industry very seriously. While we've been successful adapting off-the-shelf solutions to meet many of our plant's operational needs after startup, the increases in productivity achieved when we've implemented custom solutions have been phenomenal. We've built upon those successes to offer a menu of nearly three dozen products and services developed to meet the unique needs of the ethanol industry. This includes our Ethanol APC package—four software solutions geared toward maximizing plant efficiency by eliminating swings in operational parameters in critical areas: slurry solids, water balance, beer column/evaporators, molecular sieves, dryer moisture, fermentation, stillage/centrifuges, thermal oxidizers, and real-time optimizer.

Improved plant performance through reduced variability

Deviation from steady-state operation, known as variability, can affect plant economics significantly. From a change in air makeup in the boiler combustion control areas to product loss through overpurification to an event that causes downtime by tripping units offline, variability from steady-state can cause serious financial implications.

Ethanol APC's Multivariable Predictive Control (MPC) uses a mathematical model that calculates variable interactions to predict the effect of a disturbance, enabling the automated MPC to apply changes at the optimum time and in the right amount to mitigate undesirable results. This allows continual operation much closer to constraint limits (temperature, pressure, quality, etc.) than is possible through the manual step correction processes a human operator must follow.



Increased production, decreased energy use

After integrating Advanced Process Controls, plants are able to adhere to much stricter operating parameters. Financial benefits for typical plants come in the form of a 1 – 3% increase in ethanol production coupled with a 3 – 5% decrease in thermal energy use.





Support on demand

Once the software is installed, our team of experts is available 24/7 to provide guidance and support. We provide our service and support contract for the first year, renewable on an annual basis, meaning expert assistance is never more than a phone call away.

Phone Support is available 24 hours a day, 7 days a week.

Remote Support Services include:

- Real-time continual system performance monitoring
- Quarterly report generation (PID and APC loop condition)
- Alarm support, including appropriate response instruction for users
- Periodic system re-tuning

On-site Services include a minimum of two visits to your plant annually. We can:

- Assist with installation of new software releases
- Provide user training
- Check system health
- Make any necessary adjustments
- Troubleshoot

Calculate your potential savings!



Use our interactive APC+ tool to calculate predicted financial benefits for your plant based on your inputs.

icminc.com/apc/calculator

877.456.8588



the energy of innovation™

Our software solution consists of four main components:

Control Performance Optimizer (CPO)

CPO is a complete solution for design, development, and implementation of advanced process control applications. It can be used in conjunction with your plant's existing control system to provide a powerful control and simulation development solution for tackling challenging regulatory control problems, implementing multivariable model predictive control and optimization strategies, and developing real-time plant simulators and soft sensors.

CPO has two main components. The CPO Development System includes a user-friendly interface and real-time development facility, and the CPO Runtime System utilizes CPO engine software executing on an industrial PC running on the Windows XP operating system.

Control Performance Monitor (CPM)

CPM supports Multivariable Model Predictive Control (MPC) applications and has the ability to monitor, maintain, and easily identify faulty models, increasing production while saving energy. This system enables your plant to automatically and continuously monitor all control assets, detect problems, and prioritize maintenance, supporting process operation much closer to optimum operational targets and/or limits than is currently possible.

Far beyond what a tuning program is capable of, this condition-based performance monitoring system has both performance analysis tools and archiving tools. All components in both PID and MPC loops, from sensor to final control element, are analyzed. A comparison is done periodically, and when loop performance degrades beyond the allowed limit an alarm will trip to alert maintenance staff. Since the alarm sounds only when performance actually degrades, no manual maintenance is required until the system alarms. This is much more cost effective than time-based maintenance or running to a failure point.

Exclusive Tai Ji automated model identification system

Tai Ji is used to re-identify models as they become degraded over time. The software allows all variables to be moved simultaneously, greatly reducing testing and model identification time while cutting associated expenses by 60 – 70%. Tai Ji also mitigates risk of process upset since PID controls and MPC loops are left in automatic during identification, reducing lost production. Testing with Tai Ji takes days, rather than the weeks manual step testing can take. ICM's professional engineers monitor your plant conditions from our secure remote location, allowing them to perform necessary model re-identification, testing, and tuning on a timely basis without costly travel expenses.

Operational Insight™

Operational Insight™ is a web-based data and information delivery tool, allowing authorized parties to view process control and test data. This real-time decision support platform enables users to make business decisions quickly and effectively with instant access to historical, real-time, and relational data. This system features universal connectivity using OPC drivers to connect to virtually any data source or application. You can filter, correlate, and manipulate data from your DCS, laboratory, and maintenance systems all at once, turning what was previously considered too much data into a competitive advantage. This software allows you to analyze and share results of one or multiple plants over the web using robust reporting, trending, and visualization tools without the IT costs and support issues of thick-client applications.

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