

ADVANCED AUTOMATION SOLUTIONS

Advanced Process Control (APC)

APC can be an effective tool for reducing process variability in continuous manufacturing processes. Reduced variance means fewer plant upsets, reduced operator workload and operation closer to constraints — thereby improving yields and throughput while minimizing energy consumption.

MAVERICK's Advanced Automation Solutions group offers a variety of APC services designed specifically to solve operating challenges in the following process industries:

- Oil Refining
- Gas Processing
- Petrochemicals
- Basic Chemicals
- Polymers
- Plastics

The portfolio of services includes:

- **APC Consulting**
 - Evaluation of competing technologies
 - Identification of productivity improvement opportunities
- **Definition and Justification Studies**
 - Preliminary APC design
 - Cost-and-benefits estimation to define project return
- **APC Project Execution**
 - Overall project execution
 - Fast-track implementation by expert application engineers
 - Fixed price or T&E terms
 - Post-project audits for benefits quantification
- **Software**
 - Vendor-independent implementation of model predictive, multivariable control
 - Inferred properties (soft sensors) to replace costly analyzers
 - Intelligent algorithms for superior feedback, feedforward and decoupling control



Examples of Typical APC Applications Implemented by MAVERICK:

Oil Refining

- **Crude Fractionation** — Product quality estimating and control; heater firing controls / pass balancing; pumparound duty supervisors; exchanger train heat recovery maximization; charge maximization
- **FCCU** — Severity control; charge maximization; main fractionator distillate quality estimating and control
- **Hydrocracking** — Reactor conversion control and bed balancing; main fractionator distillate quality estimating and control
- **Reforming** — WAIT control; reformate octane estimating and control; charge maximization; reformate RVP estimating and control
- **Delayed Coking** — Drum outage estimating and minimization; fractionator drum switch controls; fractionator distillate quality estimating and control

Petrochemicals

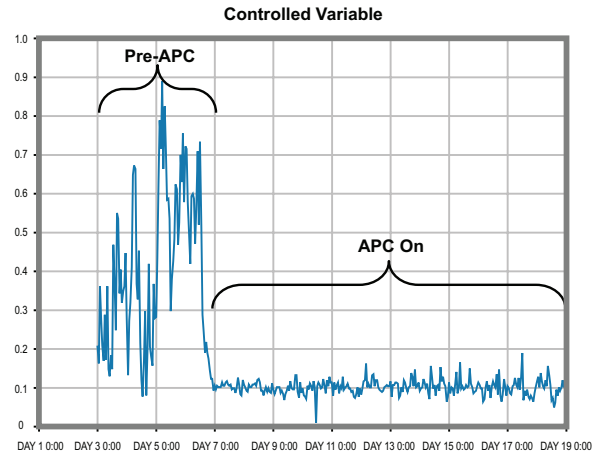
- **Olefins Plant (hot section)** — Cracking severity control; charge maximization; furnace startup / shutdown controls
- **Olefins Plant (cold section)** — Fractionator product quality controls; refrigeration compressor anti-surge calculations and control; stage load balancing; power minimization
- **Aromatics** — Xylenes plant reactor controls; molecular sieve absorption controls; fractionator product quality controls; benzene / toluene extractive distillation controls

Chemicals

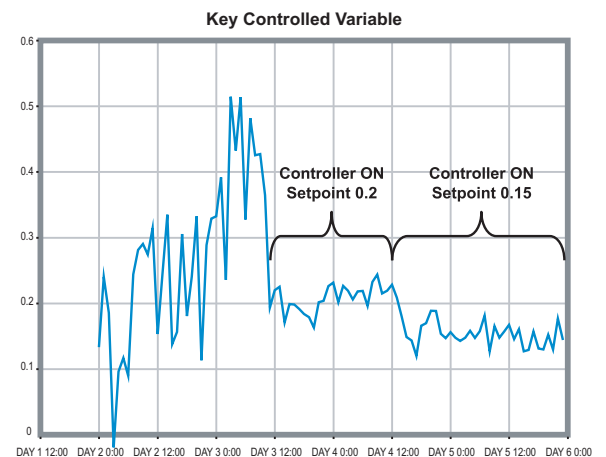
- Ethylene oxide reactor controls for optimizing conversion and selectivity
- Styrene fractionation plant product quality controls

Plastics

- **Polycarbonate Monomers and Resins** — BPA reactor, crystallizer, desorber and flaker inventory controls and charge maximization; dimethyl carbonate (DMC) / diphenyl carbonate (DPC) quality controls and charge maximization
- **SAN and ABS** — Reactor conversion controls; code switch transition controls; product melt index estimating and control



APC stability improvement



The stability that results from APC allows for operation closer to key limits, which improves productivity.

MAVERICK Technologies is a next-generation engineering, systems integration and operational consulting firm. We deliver innovative solutions for a wide range of manufacturing and process clients, leveraging our extensive network of skilled employees deployed from regional and international locations.

Our talented staff is dedicated to helping our clients break away from the business inefficiencies they face. We deliver profitability improvement — individually in plant automation, performance management and business systems, and holistically by integrating knowledge across the enterprise.

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