



DeltaV OTS Express: A New Approach to Operator Training

Traditional Operator Training Systems have a reputation for being expensive, overly complex, difficult to maintain, and unused over time. DeltaV OTS Express changes the game in operator training solutions with an affordable, focused training solution that's faster to implement and easier to maintain.



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The Opportunity

Operator Training Systems (OTS) have become imperative for manufacturing companies wanting to stay competitive in the 21st century. A skilled workforce is paramount as technology becomes more complex and companies strive to do more with fewer personnel. Studies show that OTS improves operator effectiveness and plant-wide safety; providing increased company profits through better product quality, plant availability, and throughput. A recent study by the American Petroleum Institute identified more than \$350,000 per year benefit for upgrading the skills of an average operator using operator training systems.

Traditional OTS Solutions

Traditional OTS solutions have a reputation for being expensive, overly complex, difficult to maintain, and generally neglected over time. Furthermore, operator-training curriculum is often a second thought as more emphasis is placed on the technical aspects of process simulation. The major shortcomings of the traditional approach to OTS are:

Control Simulation Platform. Most simulation companies place their emphasis on the modeling system while effective integration with the control platform is a secondary consideration. Without an integrated platform, they must use an emulated control platform or expensive DCS equipment. The drawbacks of this paradigm are:

- **Emulated Control** – When an emulated control platform is used, the on-line control configuration and operator graphics must be converted for use in the OTS. A converted system is expensive, hard to maintain, and compromises simulation integrity.
- **Actual DCS Control** – Using the actual DCS control platform for OTS is expensive and limits OTS functionality and flexibility. For example, with real control hardware you cannot speed-up, pause, or replay the controller actions. In addition, operator actions and learning are limited because of the constraints associated with using the actual DCS.

Complex Process Simulation. Traditionally, simulation companies such as AspenTech, SimSci and Hyprotech provide high fidelity models used in a wide range of applications from process design to operation optimization. They differentiate their products by the rigor of first principle modeling and mathematical solution techniques. These high fidelity models are expensive, hard to maintain, take one to two years to implement, and are overkill for typical operator training or control system checkout.

Training Curriculum. Simulation companies have not traditionally specialized in operator training and often put together training material as an afterthought.



The Emerson Advantage

Emerson is redefining the OTS experience with integrated process control simulation, effective process modeling, and a professional training curriculum.

Control Simulation Platform. Emerson's platform for simulation is called DeltaV Simulate, which uses the DeltaV system's unique architecture to create a virtual copy of the control system, effectively eliminating the need for emulation software or actual DCS hardware. It's not currently possible technologically for other simulation providers to do this with other DCS systems. The main advantages of this platform are:

- **Virtual Simulation** - DeltaV Simulate use the EXACT same control software used for on-line systems. Emulation software is NOT required. The customer has the option to use either real hardware controllers or virtual software controllers running on the PC. This saves money on both hardware and software.
- **Common Configuration** - DeltaV Simulate uses the EXACT same control configuration, operator graphics, and application software as the on-line system. There's no need to maintain multiple configurations for on-line and off-line systems. This saves money on configuration services and long-term support.
- **Scaleable** - DeltaV Simulate is flexible enough to run on a single PC and powerful enough to simulate the entire control system in a multi-node simulation environment. This flexibility allows you to buy only what you need.
- **Advanced features** - DeltaV Simulate Professional makes it easy to:
 - coordinate with rigorous process simulators
 - save, restore, speedup and playback different operating scenarios
 - incorporate converted Fieldbus function blocks and external I/O references into the simulation.



Effective Process Simulation. Unlike traditional OTS, Emerson's DeltaV OTS is a complete training solution without being overly complex. In most cases, operator training only requires a medium fidelity simulation consisting of dynamic models including mass balance, response characterization, and simple energy balances. High fidelity models including complex thermodynamics and physical property calculations are typically not needed for OTS. A medium fidelity approach provides faster projects that are less expensive and easier to maintain. When a high fidelity model is needed for critical process units, the DeltaV OTS team can deliver a mixed fidelity solution. A mixed fidelity solution will provide medium fidelity models for less critical process areas and high fidelity models for more critical process areas.

Professional Training Curriculum. Emerson is a global leader in automation educational services and applies this expertise to develop customized training curriculum for DeltaV OTS solutions. The DeltaV OTS curriculum includes instruction on basic DeltaV operation, as well as detailed explanations of the control components specifically developed for your process. For batch projects, the curriculum will also include an introduction of DeltaV batch functionality (following S88 guidelines) and proper usage of the batch operator interface, equipment modules, phase logic, and recipe manipulation. All courseware content is process specific and based on your plant configuration database and graphics. Training also includes hands-on workshops using the OTS simulation with actual control configuration and graphics.



A New Approach with DeltaV OTS Express

Emerson is changing the market for operator training with DeltaV OTS Express, a unique, affordable, entry-level training solution that's faster to implement and easier to maintain than traditional OTS. By packaging DeltaV's unique control simulation platform, with an effective approach to process simulation, and professional training curriculum, DeltaV OTS Express provides unprecedented value. Included in DeltaV OTS Express are:

- DeltaV Simulate Standalone.
- Medium fidelity process simulation using MiMiC.
- Customized simulation using plant control configurations (including batch) and operator graphics (engineering services included).
- Customized training curriculum with student and instructor manuals (train-the-trainer services included).
- DeltaV workstation with dual monitor.
- Project Management

All for less than 50% of a traditional Operator Training System.

Details of DeltaV OTS Express are provided below and described further in the DeltaV OTS Product Data Sheet.

For more information on DeltaV OTS Express, please contact your local Emerson sales office or visit our website at: <http://www.emersonprocess.com/education/ots.asp>

DeltaV OTS Express Details

DeltaV OTS Express is a pre-scoped solution for quick and affordable simulation-based training on specific process units, areas, or processes. DeltaV Simulate Standalone and MiMiC simulation software are integrated on a single operator training workstation. Emerson works with the customer to define a specific process that can be sized into one DeltaV MD controller's worth of control modules and simulated to provide simulation-based operator training at an affordable standard price. DeltaV OTS Express provides a complete operator training solution including a detailed customized curriculum, courseware, testing, and professional instruction.

DeltaV operator training workstation

- Dell workstation class computer
- 2 GHz processor (min), 1 MB memory (min)
- Dual 19" ViewSonic® LCD monitors
- Keyboard and mouse

DeltaV Simulate Standalone

- All DeltaV system features are made available on a single standalone PC workstation
- Acts as a DeltaV ProfessionalPLUS station
- Uses the identical database configuration and graphics as the actual plant DeltaV system
- 9 DeltaV Operate graphics made "live"

MiMiC process simulation software

Input and output parameters of DeltaV control modules are simulated for realistic process feedback and integrated with DeltaV Simulate using OPC. A MiMiC Operator Training Module works with the simulation and supports non-intrusive scenarios.



Process simulation development

Emerson Simulation Consultants work with the customer to define the targeted processes that can be simulated and sized into a single DeltaV MD controller's amount of control modules. Dynamic process simulation includes up to 5 operating or upset scenarios to train and test operators.

Customized curriculum and courseware

The curriculum and courseware includes actual process configuration and workshops that are specific to the targeted processes. Operators will learn to:

- Understand basic terminology
- Manipulate various control module operating parameters to operate the process
- Respond to process alarms
- Monitor process performance/optimize control system responses to process dynamics
- View real-time and historical trend data
- Manipulate Unit Module parameters
- Run procedures or batches
- For batch processes; access the Batch Operator Interface, review batch history data

Learning Modules

- DeltaV system overview
- Accessing DeltaV Operate
- Window, menus, displays, and directories
- Discrete, analog, regulatory and cascade control module operation
- Motor control module operation
- Alarm displays and alarm handling
- Real-time and historical trending
- Process History View
- Equipment module operation
- Phase and operation controls
- For batch applications: Batch Operator Interface, Batch Historian, and Campaign Manager

Skills verification

- Proficiency testing on DeltaV system operation
- Hands-on testing with 5 failure scenarios
- Hands-on workshops for each learning module

Factory Acceptance Testing

- 1 day (8 hours) at the factory for F.A.T. or remote online access testing
- Professional instruction
- 2 days (16 hours) at the factory or on-line for train-the-trainer instruction.

Ordering information

Contact your local Emerson Process Management sales office or call Emerson Educational Services at +1 641.754.3771 or 800.338.8158. Part number: **D750512X012**