DeltaV OTS (Operator Training Solution)

Gain real experience without risk with simulation-based training.

- Risk free learning and experience of your plant processes and DeltaV system functionality

- Identical operator interface and control configuration to the actual plant

- Realistic dynamic process simulation and operating scenarios

- Professional instruction and support

- Convenient, on-site, 24/7 learning

- Easy maintenance and updates

- Customized curriculum and courseware designed to maximize retention

- Affordable tiered solutions

Introduction

DeltaV OTS is a comprehensive simulation-based operator training solution that provides highly effective, affordable operator training. Operators are exposed to what they will experience in their actual control room enabling them to accelerate their learning and gain experience through realistic, hands-on training in a safe controlled environment.

DeltaV OTS utilizes the DeltaV Simulate Suite integrated with process simulation software as the training simulator system. This is combined with a detailed customized curriculum, courseware, testing, and professional instruction for a comprehensive operating training solution.

Emerson Process Management's Educational Services DeltaV OTS team works with customers to document training objectives, design an appropriate training system, develop dynamic process simulation, construct event scenarios, and create the training curriculum and courseware that will be used to accomplish customers' specific training objectives.

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Benefits

Achieve faster, smoother start-ups. Operators can be trained and build experience before actual commissioning, enabling incident free startups and quicker time to full production. All features and functionality of the DeltaV system can be experienced without the need for DeltaV hardware.

Operate processes more efficiently. Operators can explore and exercise control functionality to practice their skills and see the effect on process efficiency. Experienced operators generally consume less energy or raw materials and are more likely to run processes at optimal levels.

Improve product quality. Operators can practice complex operating procedures under varying process conditions and witness the resulting effects on quality. They are better prepared to identify issues early before quality is affected. Batches can be executed with compressed simulated timelines to aid in understanding quality issues.

Avoid unnecessary shutdowns. Operators can experience a number of "what-if" upset scenarios to improve recognition and response to developing situations. They can practice possible failure scenarios and the appropriate action to avoid unnecessary shutdowns.

Capture and transfer knowledge and best practices among different operators or crews. Actual key process events that occur on one shift can be recreated to share experiences with different operators and crews. The experiences and actions of senior operators can be captured so that new operators can learn them.

OSHA compliance for operator training (Article 29 CFR Part 1910.119). Periodic training and certification of all operators is mandated on hazardous processes. On-site simulation training provides an ideal environment for proficiency validation and operator certification. Fully automated training that is available 24/7 and trains, tests, and records performance can greatly facilitate compliance.

Improve change management. For operations that face ongoing process and production changes, being able to expose and train operators prior to implementation improves operator acceptance, confidence, and expertise with the new operating conditions.

Improve safety. One of the highest causes of safety incidents is operator error. Confident, experienced operators are at the heart of safe, high-performing operations. Confidence and experience is gained through realistic repetitive exercises that allow the operator to explore the system and process and learn appropriate actions and responses without consequence. A breadth of operating scenarios can be introduced and practiced such as startup, shutdown, changeover, upset conditions, emergency conditions, and normal operations, keeping operators sharp and ready for most possibilities.

DeltaV OTS benefits build upon and reinforce the value of PlantWeb®.

30% Automation Project Savings by Reducing...
RISK | COST | STARTUP

2% Operational Improvement by Impacting...
OUTPUT: QUALITY | THROUGHPUT | AVAILABILITY
COST: OPERATIONS and MAINTENANCE | SAFETY, HEALTH and ENVIRONMENT | UTILITIES | WASTE and REWORK

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DeltaV OTS Base Components

Solution Description

DeltaV OTS is an engineered simulation-based operator training solution designed to up-skill the operator workforce. It provides a hands-on, process-specific learning environment that exposes operators to what they will experience in their actual control room enabling them to learn in a lifelike, non-intrusive environment. Operators will learn and gain experience with both DeltaV system operating concepts and realistic plant process simulations.

The base solution components consist of:

- Identical configuration and graphics to the actual plant DeltaV system
- DeltaV Simulate suite for the training system platform
- Design and integration of realistic dynamic process simulation and operational scenarios using process simulation software
- Customized operator training curriculum and courseware with professional instruction

DeltaV Simulate Suite

The DeltaV Simulate suite provides all DeltaV system features and dynamic simulation of the control system in a standalone PC environment. The PC acts as a DeltaV ProfessionalPLUS Station.

All function blocks that access process inputs and outputs include a simulation parameter that enable simulation of input values and status. Simulation parameter inputs can be manually entered, supplied by another function block, or come from an interfaced process simulation application. Control modules are downloaded and assigned to the PC and automatically execute at assigned rates.

The exact database and graphics of the plant DeltaV system are used ensuring operators are interacting with the same control modules, batch phase logic, advanced control, and graphical interface as the actual plant system. The control configuration database and graphics library is exported from the plant DeltaV ProfessionalPlus station and imported into DeltaV Simulate. Updating and maintaining the training system is made easy.

A variety of DeltaV Simulate options are available based on the training system size and functionality required. More detail on DeltaV Simulate can be found in the *DeltaV Simulate for Training and Development* product data sheet.

Dynamic process simulation

The Educational Services DeltaV OTS team works with customers to define the best representation of plant processes for effective learning. The team will design, develop, and integrate process simulation models to reflect actual plant process dynamics and to provide realistic feedback for control modules executing in DeltaV Simulate. For operator training, MiMiC™ from Mynah Technologies is a recommended process simulation software package.

MiMiC is an object based, real-time dynamic process simulation software package that provides both simple and complex I/O process modeling in a Windows user interface. It uses a client-server architecture enabling multiple users to interact with the simulated process at the same time.

MiMiC integrates with DeltaV Simulate via OPC and provides a scaleable, easy to use, medium fidelity process simulation that is expedient and cost effective for operator training. Its capability to emulate a breath of digital busses matches well with the DeltaV system's "built for bus" architecture.

More detail on MiMiC process simulation software can be found in the *MiMiC Simulation* product data sheet.

Customized curriculum and courseware

The Educational Services DeltaV OTS team works with customers to define training objectives and design a detailed customized curriculum with lesson plans, courseware, and testing. The curriculum includes basic DeltaV operational procedures and explanations of all control module faceplates and detail displays. For batch processes, the curriculum will also include an introduction to DeltaV batch functionality and proper usage of the Batch Operator Interface, equipment modules, phase logic, and recipe manipulation.

A typical standard curriculum will cover:
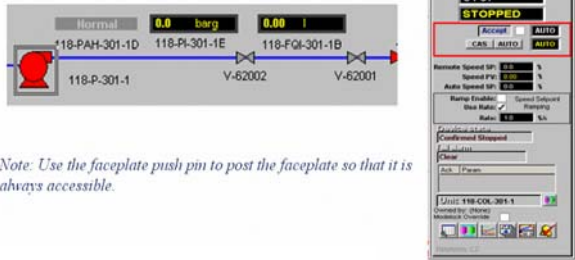
- Level I Operator Training - DeltaV control system features, functionality, and operating basics
- Level II Operator Training - Process specific operator training such as startup/shutdown procedures, react and recover to specific failure scenarios, learn unit phase descriptions, define batch recipes
- Training certification – Proficiency assessments and documented scenario testing

Courseware includes instructor manuals, student manuals, and tests in flexible formats. All courseware content is based on the actual plant DeltaV system configuration database and graphics.

Sample Workshop Exercise

Professional instruction

Depending on customer requirements, DeltaV OTS can be fully automated, self-guided, or instructor led. Educational Services professional instructors can lead training sessions or train customers to be trainers.

In addition, Emerson Process Management Educational Services offers leading educational expertise, resources, and solutions for the process industries. Over 260 courses are available to complement DeltaV OTS.

Scaleable, flexible solutions

DeltaV OTS is scaleable and flexible to meet customers' specific training needs. The delivery approach to simulation-based operator training is based on affordable tiered solutions allowing customers to maximize training dollars without buying an operator training solution that is too large and complex or too small and ineffective.

The DeltaV OTS scope can range from a single process to an entire plant. The architecture can be a single self-contained training workstation to a network of multiple nodes and operator training workstations.

In addition, a pre-scoped DeltaV OTS Express option is available for quick and cost effective training on selected critical or priority units, areas, or processes at an affordable standard price.

DeltaV OTS Example Architectures

Single DeltaV Simulate Standalone workstation with MiMiC process simulation software.

Multiple DeltaV Simulate "Standalone" workstations networked to a simulation server. The number of operator training stations can vary from 1 to 32.

DeltaV OTS is scalable to meet your training needs.

DeltaV OTS Express option

DeltaV OTS Express is a pre-scoped targeted option for quick and affordable simulation-based training on customers' selected critical or priority process units, areas, or processes. DeltaV Simulate Standalone and MiMiC simulation software are integrated on a single operator training workstation. Emerson defines with the customer the best representation of targeted processes 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. Included are a detailed customized curriculum, courseware, testing, and professional instruction, providing a complete operator training solution for targeted priority processes.

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
- 6 to 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
Educational Services works with the customer to define the targeted processes that can be simulated and sized into a single DeltaV MD controller's number of control modules. Dynamic process simulation includes 4 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 4 to 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 for train-the-trainer instruction.

Ordering information
- Contact your local Emerson Process Management sales office or call Educational Services at **641-754-3771** or **800-338-8158**
- Part Number: **D750512X012**
- Call for standard pricing

DeltaV OTS

DeltaV OTS is a turnkey, engineered, hands-on, process specific learning environment designed to up-skill the operator workforce.

Emerson Process Management's Educational Services DeltaV OTS team will design and engineer a comprehensive, customized, simulation-based operator training solution. The team will guide customer personnel through the process of documenting training objectives, designing an appropriate training system, defining the best representation of the plant, and developing the customized curriculum, courseware, and instruction to achieve training objectives. The scope and scale of the operator training solution is completely customized.

DeltaV OTS implementation methodology:

- *Framing and Design* – Define scope of the overall DeltaV OTS solution. Basis for creating detail design documents that will further define the individual solution components. A Front End Engineering and Design (FEED) study is recommended in order to properly develop the functional design specification.

- *Implementation* – Simulation code is written per detailed design documents. Training curriculum is developed, including workshops and testing. Simulation standards are defined to ensure modeling consistency.

- *System Test* – Simulation is tested against detail design documents.

- *Acceptance Test Planning* – Customer defines the procedures to be followed during acceptance testing.

- *Factory Acceptance Test* – Thorough testing at Emerson Process Management facilities all of the DeltaV OTS simulation, curriculum, and tests.

PROJECT EXECUTION PROCESS
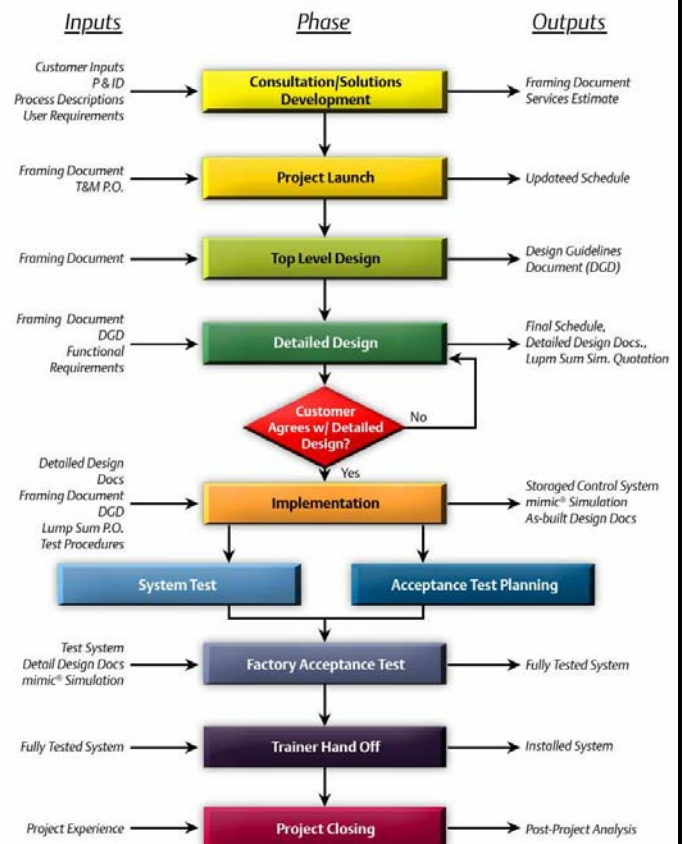
Ordering information

DeltaV OTS is a custom-engineered solution. For a proposal, contact your local Emerson Process Management sales office or call Educational Services at: **641-754-3771 or 800-338-8158**

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Prerequisites

- All workstation hardware used in the DeltaV Simulate multi-node environment must be purchased from Emerson Process Management.

- As of DeltaV v6.3, a Microsoft SQL Server 2000 license will be required to utilize the following applications within the DeltaV Simulate environment: DeltaV Batch Historian, Device Audit Trail, and Version Control and Audit Trail.

DeltaV Simulate may not be used in or be connected to any system controlling a live process. It must be used only for software configuration development, process and control design, system operation checkout and training in a strictly off-line environment.