The Schneider Electric industrial software business and AVEVA have merged to trade as AVEVA Group plc, a UK listed company. The Schneider Electric and Life Is On trademarks are owned by Schneider Electric and are being licensed to AVEVA by Schneider Electric.
We address both lifecycles in the markets we address through the key elements of our platform.
<table>
<thead>
<tr>
<th>Agenda</th>
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<tr>
<td><strong>What is an Operator Training Simulator (OTS)?</strong></td>
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<td><strong>Training Program Plan</strong></td>
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<td><strong>SimSci Online OTS Generic Training</strong></td>
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<td><strong>SimSci Online Customized OTS Training</strong></td>
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<td><strong>Questions</strong></td>
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What is an Operator Training Simulator?
What is an Operator Training Simulator?

“It’s like a flight simulator – but for a plant, not for a plane”

<table>
<thead>
<tr>
<th>Reality</th>
<th>PLANT</th>
<th>CONTROLS</th>
<th>HMI</th>
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<tr>
<td><strong>PLANT</strong></td>
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</tbody>
</table>

### Reality

- **PLANT**
- **CONTROLS**
- **HMI**

### Simulation

- **Dynamic Simulation**
- **DCS/ESD**
- **PLC**
- **Software Emulation**
- **Same / Similar HMI Hardware**

![Image of plant and control room with computer and HMI devices]
OTS Solution – DYNSIM

- DYNSIM – AVEVA Dynamic Simulation Software

- DYNSIM is a comprehensive, rigorous, field-proven dynamic process simulation software tool.

- DYNSIM includes the following systems for accurate dynamic process modelling:
  - Conservation of mass, heat and momentum as the basis for the simulation
  - Process equipment libraries
    - Rigorous Separation Towers, Reactors, Compressors, Heat Transfer, Piping, etc
  - Mining equipment libraries – supports particle size distribution
  - Control & Logic objects libraries
  - Wide range of chemical components and properties
  - Wide range of thermodynamic methods
What is an Operator Training Simulator?
Field Operator & Emulated Panel Displays

➢ Local Panels

➢ Control Room Panels

➢ Field Devices
3D Solution - EYESIM
Global Project Experience

- 1000 Successful OTS/Studies Delivered
- Projects delivered to more than:
  - 100 Different Clients in over
  - 10 Different Industries in over
  - 40 Different Countries

Example Clients

- Refining
  - ExxonMobil
- Chemicals
  - Arkema
- Power
  - Southern Company
- Mining
  - Rio Tinto
- LNG
  - JGC
- Oil and Gas
  - Total
AVEVA Experience and Capability

SimSci by Schneider-Electric
A pioneer in process simulation and OTS

Simulation and Training Projects

1000 OTS Projects

Other Industries (MMM, F&B, P&P, etc.) 44
Power 287
LNG and Gas Processing 61
Petrochem, Chemical & Fertilizer 172
Upstream Oil & Gas, Pipeline 52
Refining 350

Schneider Electric 503
Honeywell 124
Rockwell 30
ABB 48
Emerson 79
GE 32
Siemens 7
Other 78
Yokogawa 85

2012 Product of the Year Award

DYNYSIM

1000 OTS Projects

Change 2018 USER Conference

40 Year Anniversary 1978-2018
Training Program Plan
Global Training Services team based in:

North America - US (Maryland, Pennsylvania)

LA - Sao Paulo Brazil

EURAS – Madrid, Cairo

APAC – Beijing, Seoul

Our Training Services team will help you defining your Training Program
The Competency Pyramid

From new trainee to expert

Pyramid Copyright: John M Campbell and Company
Training needs ("what") define the plan and the means ("how")

**Plan for Training**
- Analyze: Assess Training Needs
- Design: Customize Training Program
- Development: Of Training Materials
- Implementation: Of Training Program
- Evaluation: Refine and Revise Program

**Develop Training Program**
- Define Learning Objectives for Training Program
- Write Instructional Objectives
- Create Training Outlines and Training Plan
- Write Trainee Manual or Handout
- Lesson Plans & Evaluation Forms
- CBT Authoring or Conversion
- Instructor Training
- LMS Integration and Hosting
- Evaluate Trainees
- Evaluate Program Effectiveness
- Refine and Improve Program

**Develop Roll-out Strategy**
- Classroom training
- LMS & Computer-based learning
- Operator Training Simulator
- Virtual Reality 3D training
- Corporate-wide roll-out
- Cloud-based roll-out
Our Training Approach for an Efficient Use of OTS

Train the Instructors and Produce Trainee Material

Perform various levels of DYNSIM standard classroom training

Design and Produce Trainee Materials

<table>
<thead>
<tr>
<th>Item</th>
<th>Overview Deliverables</th>
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<tbody>
<tr>
<td>1</td>
<td>Training Needs Analysis and Design Plan</td>
</tr>
<tr>
<td>2</td>
<td>Development of Custom Training Standard Simulator Scenario eLearning Workbooks</td>
</tr>
<tr>
<td>3</td>
<td>Development of associated Custom Simulator Scenarios</td>
</tr>
<tr>
<td>4</td>
<td>Development of Trainee Performance Monitoring Exercises (TPM)</td>
</tr>
<tr>
<td>5</td>
<td>Development of Integrated Start-up and Procedure built for Self-Study</td>
</tr>
<tr>
<td>6</td>
<td>Integration of the Learning Management System (LMS) with the Simulator</td>
</tr>
<tr>
<td>7</td>
<td>Integration of Self-Study workbook in Learning Manager</td>
</tr>
<tr>
<td>8</td>
<td>Development of Operator Initial Qualification and Requalification Documentation</td>
</tr>
<tr>
<td>9</td>
<td>Trainee Evaluation Examinations</td>
</tr>
</tbody>
</table>
Standard DYNSIM Training Courses
The more you understand how Dynamic Simulation works the better your OTS training experience will be

**Basic DYNSIM Training**

- Learn How to operate DYNSIM through its GUI

**DYNSIM OTS Based Instructor Training**

- Develop Training Material for a specific OTS Application
- Create Scenarios that will activate typical malfunctions
- Create Procedures for Startup, Shutdown, ESD, Normal Operating Scenarios
- Create Trainee Performance Monitoring Exercises (TPM)

**DYNSIM OTS Administrator Training**

- Learn how to maintain your OTS installation
DYNSIM Engineering Training – Understand the underlying technology and being able to maintain

- Understanding Unit Operations, How are configured and function
  - Separation Towers, Drums, Reactors, Compressors, Expanders, Pumps, Heat Exchangers, Furnaces, Valves, Pipes, Motors
  - PID controller & control configurations (Simple, Cascade, Complex)

- Basic Understanding of Physical Properties & Thermodynamics
  - VLE, VLLE, VLEW, solids
  - Cubic Equations of State
  - Liquid Activity Methods

- You will learn how to configure a simple DYNSIM model from scratch and start-it-up (for example: Distillation Tower)
SimSci Phased Approach to Training

- Process Fundamentals
  - For all Industrial Personnel

- Base Scope
  - Program with OTS
  - Includes Scenarios and Procedures

- Full Scope
  - Program with OTS

- COTS – LMS
  - Cloud Simulation Training Courses accessed via LMS remotely or locally

- eLearning Fundamentals
- Simulator Self-Study
- Instructor-led Operations Courses
- Corporate OTS with LMS
What is a Learning Management System (LMS)?

Stand-alone computer based training or integration with a corporate-wide learning system

- Software application to plan, implement, and assess a specific learning process.
- “Online” course Repository for eLearning, questions, activities, and training resources.
- Create and deliver content
- Monitor activities and participation
- Assess performance
- Manage activities and users
- Structure training
- Schedule and execute training
- Tracking of training
SimSci Online OTS Training

Generic Training
### Refining and Chemical Generic OTS

1. **Unit-based Generic Simulation**
   - Crude Distillation Unit / Vacuum Distillation Unit (CDU/VDU)
   - Hydrocracking Unit (HCU)
   - Hydrogen Plant (HGU HTAS)
   - Hydrogen Plant (KTI)
   - Naptha Hydrotreater (NHT CCR)
   - Sulphur Recovery Unit (SRU)
   - Diesel Hydro Desulphurization (DHDS)
   - Fluidized Hydrolytic Cracking Unit (FCCU)
   - Air Separation Unit (ASU)
   - Acid Gas Removal (AGR / Amine)
   - Mercury Removal
   - Gasification (GE Gasifier)
   - Condensate and Water Systems

### Power Generic OTS

1. Combined Cycle Power Plant (300 MW)
2. Generic Drum Unit (700 MW)
3. Simple Cycle
4. Water Intake / Circulating Water
5. Condensate, Feedwater (Rankine)

---

All Generics can be combined with EYESIM 3D Augmented Reality.
SimSci Online: For Training

Customer Requests

I do not want to be burdened with hardware-software install/maintenance

I want easy “one-click” access to a simulation training system

I want to use a set of pre-defined application content

I want an integrated simulation with learning management system
SimSci Online for Generic Training

e-learning

2.1_Purge

Purge Control Panel

- XL-0636: Ready for Purge (Green)
- XL-0616: Purge Completed (Green)
- XL-0630A: Ready for Tightness of Cell A (Green)
- XL-0604B: Ready for Tightness of Cell B (Green)

- HS-0031: Purging Start (Green)
- HS-0060A: Tightness for Cell A (Green)
- HS-0060B: Tightness for Cell B (Green)

- XL-0657: Purging On (Green)
- XL-0650: Tightness of Cell A (Green)
- XL-0609B: Tightness of Cell B (Green)
SimSci Online for Generic Training

Instructor View
Enabling Global Generic Training

Student Management

No limit to number of Student

All Refinery Generic Courses

HG

CDU

CCR

XYZ

x3

x20

x50

x50

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SimSci Online: Customized OTS Solutions

Customize Anything
Operator Training Simulator Installed on Site
Corporate Operator Training Simulators in the Cloud

- OTS models hosted on a Cloud Server
- Custom OTS: Access of instructors, trainees, training managers and maintenance engineers from anywhere in the world
Questions?