Simulation & learning

Portfolio overview and roadmap

Chloe Smith – Director of Product Management, Simulation & Learning

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The evolution of AVEVA
Decades of expertise

AVEVA has over 50 years of experience in developing leading process simulation software

80% of refining capacity in the world has been designed with AVEVA™ PRO/II Simulation

AVEVA is the only company to have developed a next generation simulation platform

More than 1,300 OTS delivered for all process intensive industries
AVEVA simulation & learning provides benefits across the life cycle of the plant

**FEED and detailed design**
- Fast evaluation of design alternatives
- Bring innovation to the forefront
- Sustainability at the core of each decision
- Seamless integration with AVEVA™ Unified Engineering

**Start-up and operations**
- Validate controls and logics before commissioning
- Measure and improve sustainability
- Fewer unplanned shutdowns
- Road to autonomous operations
FEED and detailed design
Bringing an integrated approach to process simulation

- AVEVA™ Process Simulation is a multi-purpose integrated process simulation tool designed to support digital transformation.

- Replace dozens of specialized programs for one solution integrating all facets of process design across the entire plant life cycle.

- Design sustainable processes, products, and plants with groundbreaking ease-of-use features and built-in sustainability features.

- Build simulations that leverage your full digital transformation with real-time data from operations.
Bringing an integrated approach to process simulation

- Predictive Maintenance (PAO)
- Steady State Simulation
- Dynamic Simulation
- Real-time engineering data
- CapEx and OpEx calculations
- Emission Calculations
- Process, flare, utilities and renewables
- Optimization
- Hybrid AI modeling
- Online Monitoring
- AVEVA Simulation

Shell
AVEVA Process Simulation performance for a Shell Propane Precool-Mixed refrigerant (C3-MR) LNG plant line-up

ISU / AVEVA
Hybrid simulation with AI

AVEVA
Predictive asset optimization & simulation with AVEVA™ PI System™

AVEVA
Improving engineering efficiency with AVEVA Process Simulation and AVEVA Unified Engineering

ThyssenKrupp
Maximize your operational excellence with AVEVA Process Simulation and scripting automation: A digital twin story by ThyssenKrupp Uhde GmbH and AVEVA

Schuller / AVEVA
AVEVA Unified Engineering - The caravan story

Alteragreen
Feasibility case study on the mitigation of Carbon Dioxide Emissions from an Ammonia synthesis plant via green Methanol and Dimethyl Ether synthesis in Coffeyville, KS
Focus on sustainability

Greenhouse gases
Predict the amount of GHG emissions to improve process design or operations

1. **Total CO2e**
   - The total CO2 equivalent emissions produced directly or indirectly

2. **GWP**
   - The specific mass of CO2 emitted by a process per mass of product

3. **Efactor**
   - The specific waste produced per unit mass of product

4. **CI**
   - The mass of carbon in product over the mass of carbon in feedstock
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Model amines and other solvents to remove CO2 from effluent streams.
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Energy transition
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3. **Energy transition**
   Use solar and wind to electrolyze water to create hydrogen

4. **Power to X**
   Synthesize chemicals and fuels (e.g. ammonia) from electrolysis products.

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Green ammonia example
Focus on sustainability

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Circular economy
Chemical companies must reinvent portfolio of products with sustainability in mind
AI + simulation = hybrid models

First principles models

Can be:
• Difficult to describe the process
• Slow or unreliable
• Time consuming to create

Limitations:
• Difficult to extrapolate
• Requires a lot of data
• Does not represent physical constraints
Start-up and operations
Online modeling and troubleshooting

- Real-time and historical plant data
- Forecast
- AVEVA Simulation
- Soft sensing
- Asset and plant monitoring
- Look ahead
- Optimization
- RTS (Real-Time System)
What is AVEVA™ Operator Training Simulator?

Dynamic case studies: Validate the process design and determine if process specifications, production goals, and safety requirements can be met. Design and validate process control strategies to reduce risk during abnormal events.

Electrical design studies: Integrate simulations with Schneider Electric’s ETAP platform for rigorous simulation of electrical components in the process.

VCSU: Integrate dynamic models with DCS/SIS/PLC controls and logic to bring controls ‘online’ and test automation systems in the virtual plant to reduce the risk of startup delays.

Operator training: Train engineers and operators using an emulated DCS system in the virtual plant environment to ensure the workforce is ready to operate safely and efficiently from Day 0.

Immersive training: Deploy VR models of every asset and overlay equipment tags, real-time data, and simulated data for training, maintenance, and remote troubleshooting of the process.

AI advisory models: Build and train AI advisory models that reduce startup time and automatically optimize plant operations with minimal operator inputs.
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Schneider-Electric

*A link between load behavior and overall electrical network stability*

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Schneider-Electric

*Integrated simulation: bridging power and process for contextualized insight and optimization*

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TRI-Sen

*Elevating Compressor Control Systems & Operator Training with AVEVA dynamic simulation solutions*

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Shell

*Multipurpose dynamic simulation use at Shell Polymers Monaca*

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AVEVA / Shell

*AI-driven autonomous plant operation for Shell Scotford*

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Technip Energies

*Integrating SPYRO® Into AVEVA’s Optimization, Steady-State & Dynamic Simulators*
“To master anything in life all you have to do is spend 10,000 hours on it.”

Malcolm Timothy Gladwell, author of *Outliers: The Story of Success*

AVEVA™ Unified Learning helps reduce these 10,000 hours into just a few days!
AVEVA™ Unified Learning

Reshaping industrial learning: The road to operational excellence
TotalEnergies uses AVEVA’s cloud-based training to safely simulate dangerous environments

Training programs reduced in length from several months to a few hours

The cloud-based training provides access from anywhere and at any time

Train operators how to cope with dangerous incidents that are otherwise difficult to practice

Solution: AVEVA™ Operator Training Simulator

“It was key to combine AVEVA’s proven leadership in OTS training with the secure operational agility of a cloud-based platform. This has never been more important than today when global lockdowns force many teams to operate remotely.”

Meriam Chebre, Competences Program Manager, TotalEnergies
AVEVA™ Unified Learning mobile app... is coming

Industrial learning at your fingertips
AVEVA™ Unified Learning

Empower sustainable behavior

- New renewable library for OTS
  - PEM electrolyzer
  - AEL electrolyzer

- Sustainability indicators can be used to score the learner performance together with other process / operation KPIs

- Integration with ETAP for process and electrical simulation
Dynamic simulation is used to train an AI agent to identify the optimal operation to complete a transient.

The AI tries different operations using parallel sessions of the model on the cloud to identify the one that can be completed in less time, with less alarms and with lower emissions.

The AI agent is finally deployed in the plant for autonomous operation.

This translates into higher production, safer operations and lower environmental impact.

Examples: Crude feed changeover, plant load change, start-up
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Questions?
Please wait for the microphone.
State your name and company.

Please remember to...
Navigate to this session in the mobile app to complete the survey.

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ABOUT AVEVA

AVEVA is a world leader in industrial software, providing engineering and operational solutions across multiple industries, including oil and gas, chemical, pharmaceutical, power and utilities, marine, renewables, and food and beverage. Our agnostic and open architecture helps organizations design, build, operate, maintain and optimize the complete lifecycle of complex industrial assets, from production plants and offshore platforms to manufactured consumer goods.

Over 20,000 enterprises in over 100 countries rely on AVEVA to help them deliver life’s essentials: safe and reliable energy, food, medicines, infrastructure and more. By connecting people with trusted information and AI-enriched insights, AVEVA enables teams to engineer efficiently and optimize operations, driving growth and sustainability.

Named as one of the world’s most innovative companies, AVEVA supports customers with open solutions and the expertise of more than 6,400 employees, 5,000 partners and 5,700 certified developers. The company is headquartered in Cambridge, UK.

Learn more at www.aveva.com