

The Simulytica Approach

ENGINEERING OPERATIONAL SYSTEMS,
BUILT AROUND INDUSTRIAL FACILITIES

DELIVERED OPERATIONAL SYSTEMS

Simulytica works directly with operators and engineering organisations to design, build and deploy operational systems engineered specifically for each facility.

Rather than delivering software tools to configure and integrate, we deliver continuously executing engineering systems ready for engineering and operations.

PHYSICS, ENGINEERING, OPERATIONS, INTELLIGENCE,
ONE CONTINUOUS UNDERSTANDING.



Engineered Around the Facility

Industrial software evolved
around applications.

**Simulytica starts with
the facility itself.**

Industrial facilities have become increasingly complex, yet the software used to engineer and operate them has evolved as independent applications solving individual problems.

Simulytica takes a different approach. The facility becomes the foundation from which engineering, operations and operational understanding are developed.



ENGINEERING UNDERSTANDING •

• SIMULATION •

• MONITORING •

• COMPRESSION SYSTEMS •

• COMPLEX RECYCLES •

• PROCESS •

• CONTROL •

**The facility
comes first.**

Engineering Defines the System.

Operational data continuously aligns the engineering representation with the real facility.

Many industrial platforms attempt to infer facility behaviour primarily from operational measurements.

Simulytica begins with engineering.

Thermodynamics, equipment behaviour, process relationships and control logic define the engineering representation of the facility.

Operational data continuously aligns that engineering representation with the plant throughout operation.

ENGINEERING FOUNDATION

Physics • Thermodynamics • Equipment
Process • Control • Relationships

OPERATIONAL DATA

Live measurements continuously
inform and validate

OPERATIONAL INSIGHT

Trusted understanding for
better decisions and performance

$$p = \frac{nRT}{V-nb} - \frac{an^2}{V^2} \quad (\text{PR EOS})$$

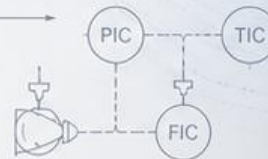
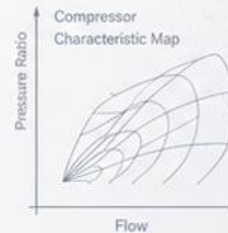
$$h = h_b^{\text{ig}}(T) + \int_{T_{\text{ref}}}^T C_p dT + h^{\text{res}}$$

$$\dot{m}_{\text{in}} = \dot{m}_{\text{out}}$$

$$\sum \dot{m} = 0$$

$$\frac{dx_i}{dt} = f(x_i, u, p, T)$$

$$dQ = UA\Delta T$$



Physics provides the foundation.
Data keeps it current.

Physics Based Intelligence

Physics remains the foundation of the platform.

Thermodynamic equations of state, equipment models and engineering relationships provide the source of truth.

Artificial intelligence is positioned as an accelerator,

for convergence, optimisation, authoring assistance and workflow automation, rather than replacing engineering with opaque statistical models.

PHYSICS FOUNDATION

The Source of Truth

$$p = \frac{nRT}{V - nb} - \frac{an^2}{V^2} \quad (\text{PR EOS})$$

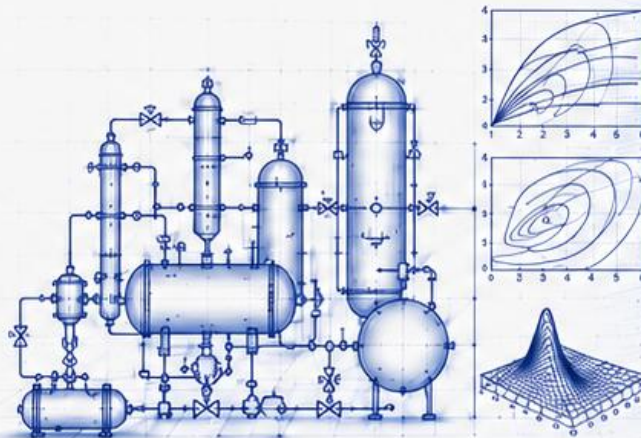
$$h = h_g^{ig}(T) + \int_{T_{ref}}^T C_p dT + h^{res}$$

$$u = u_g^{ig}(T) + \int_{T_{ref}}^T (C_v^{ig} + C_v^{res}) dT$$

$$\sum \dot{m}_{in} = \sum \dot{m}_{out}$$

$$\sum \dot{m} z_i^{in} = \sum \dot{m} z_i^{out}$$

$$\frac{d(\rho\phi)}{dt} + \nabla \cdot (\rho \vec{v} \phi) = \nabla \cdot (\Gamma \nabla \phi) + S_\phi$$



THERMODYNAMICS • EQUIPMENT MODELS
ENGINEERING RELATIONSHIPS • CONTROL LOGIC

AI ACCELERATION

Intelligent Enablement

CONVERGENCE

AI guidance improves initial guess, stabilises solvers and reduces iterations.

OPTIMISATION

AI algorithms explore more combinations, finding optimal solutions faster.

AUTHORING ASSISTANCE

AI accelerates flowsheet authoring, validations and engineering tasks.

WORKFLOW AUTOMATION

AI automates repetitive tasks, checks and documentation.

PHYSICS FIRST

Thermodynamics, equations of state and equipment models define the behaviour of the system.

ENGINEERING TRUTH

Engineering relationships and constraints ensure accuracy, consistency and reliability.

CONTINUOUS SOLVING

Robust numerical methods solve the full system in real time, respecting physics and constraints.

AI ACCELERATION

AI accelerates convergence, optimisation and authoring while engineering remains in control.

BETTER OUTCOMES

Trusted, explainable results you can rely on for engineering and operations decisions.

One Engineering Representation.

The same engineering representation models the complete facility.

One engineering representation models the complete facility rather than separate engineering disciplines.

Process, control, compression systems and complex recycles are solved together as one continuously executing engineering system.

The result is a consistent engineering foundation for simulation, monitoring and operational performance.

One engineering representation.
One continuously executing system.

SIMULATION

Steady state, dynamic and transient studies for design, analysis and optimisation.

PROCESS

Process equipment, thermodynamics, phase behaviour and complex recycles modelled together.

MONITORING

Live operation is reflected in real time for accurate situational awareness and decision support.

COMPRESSION SYSTEMS

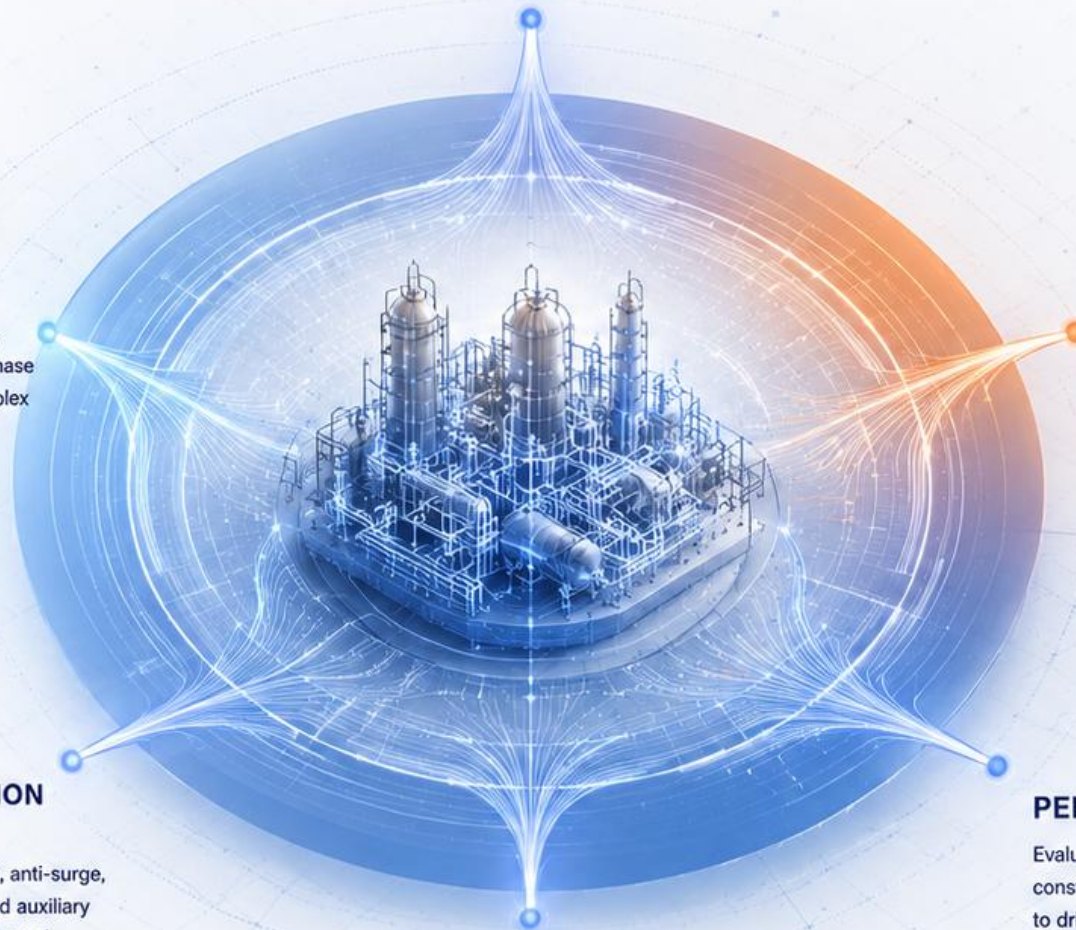
Compressor trains, anti-surge, cooling, drivers and auxiliary systems fully integrated.

PERFORMANCE

Evaluate efficiency, constraints and KPIs to drive operational performance.

CONTROL

Control logic, dynamics and operational constraints solved within the same engineering representation.



Delivered Operational Systems.

We deliver operational systems, not software toolkits.

Most industrial software provides tools that customers must configure, integrate and maintain themselves.

Simulytica works differently.

We collaborate with your engineering team to capture design data, operating requirements and plant behaviour before designing, building and deploying a ready to run operational system engineered specifically for your facility.

The result is a continuously executing engineering system that supports both engineering and operations while significantly reducing implementation effort and long term maintenance.

ENGINEERING

Capture design data, process knowledge and operating requirements.

CONFIGURATION

Model the facility with one engineering representation across process, control and compression systems.

DEPLOYMENT

Deliver a ready to run operational system, tested, validated and tailored to your facility.

OPERATIONS

Continuously executing system supporting engineering and operations every day.



We build the system.
You run the plant.





Engineering Systems. Ready to Run.

From engineering design to operational reality.

Simulytica designs, builds and deploys ready-to-run engineering systems tailored to each customer's facility and operational objectives.

From individual compression casings, trains and process systems to complete facilities, our systems combine engineering design, simulation, monitoring and operational intelligence into one coordinated engineering environment.

We build the system, integrate the engineering knowledge and provide ongoing support throughout its operational life, allowing your engineers to focus on engineering and operations rather than software development and model maintenance.

simulytica.com

