

# GENERAL

Helping you create extraordinary value through engineering excellence.

**FLOWNEX<sup>®</sup>**  
SIMULATION ENVIRONMENT



*Flownex<sup>®</sup> SE determines the pressure drop and heat transfer of interconnected components in a complete system both in steady state or transient simulations.*

## TYPICAL USES

### ANALYSIS

- Plant digital twins
  - Safety analyses
  - Fault root-cause analysis
  - Performance calculations
- Thermo-hydraulic and thermodynamic analyses

### DESIGN

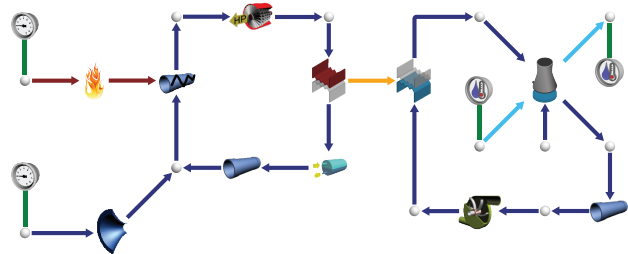
- Design verification
- Component and system sizing
- Determine operating ranges
- Design for energy efficiency
- Test control philosophy

### OPTIMIZATION

- Optimise performance
- Control system tuning
- Predict system transient behaviour
- Parametric studies and sensitivity analysis

## SYSTEM LEVEL THERMAL-FLUID FLOW

### SIMULATION SOFTWARE



*Flownex<sup>®</sup> is developed within an ISO 9001:2015 quality management system that is ASME NQA-1 compliant.*

SIEMENS

energy



**Solar Turbines**  
A Caterpillar Company

SASOL



Steinmüller  
engineering services

UNIVERSITY OF  
NOTRE DAME

SAMSUNG

TERRESTRIAL  
ENERGY



**Lufthansa Technik**

MAN  
MAN Energy Solutions

HATCH

Berkeley  
UNIVERSITY OF CALIFORNIA

website



www.flownex.com  
enquire@flownex.com

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# INDUSTRIES



## POWER GENERATION SYSTEMS

Renewable energy systems, fossil fuel systems, nuclear systems, simulators.



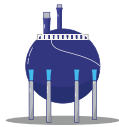
## MILITARY, SHIPPING, SPACEFLIGHT & AEROSPACE

Hydraulic, pneumatic, fuel and environmental control systems.



## GAS TURBINES

Secondary air systems, combustion chamber design, lubrication systems.



## OIL & GAS SYSTEMS

Exploration, production, refining, transportation.



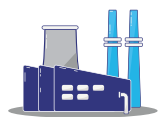
## HVAC-R SYSTEMS

Refrigeration, heating systems, ventilation systems, air-conditioning.



## MINING SYSTEMS

Water reticulation, ventilation, compressed air, slurry pumping.



## INDUSTRIAL PROCESS

Process design, process control, process operation.



## ACADEMIC, RESEARCH & DEVELOPMENT

Fundamental physics, proof of concept, experimental validation.

# ADVANTAGES



Model the flow, heat transfer, mechanical rotation and distributed control systems of complete and integrated systems to simulate holistic response.



The flexibility to simulate simple components and sub-systems to complete and complex thermo flow systems. Model anything from ventilation and reticulation networks, detailed internal turbomachinery rotating flow to complete power cycles such as supercritical CO<sub>2</sub>.



A robust steady state solver and iterative, non-iterative and adaptive timestep transient solving allows users to run hundreds of simulation scenarios quickly and accurately.



A user-friendly environment and informative interface helps users to input typical engineering design parameters to use empirical and semi-empirical correlations or actual component design data to predict performance and system response.



Flownex supports the FMI standard for Functional Mock-up Units (FMUs) and has built-in machine learning capability to generate Reduced Order Models (ROMs) out of the box.



Integrated links to external software such as MS Excel, Matlab, Simulink, MathCad and Labview allow for greater model flexibility. True co-simulation is possible with coupling to Ansys Fluent, Mechanical and CFX as well as Workbench Integration.

## TESTIMONIAL

### RESONANT

Chris Coetzee, MBA Pr. Eng.  
Managing Director



*Flownex® gave new meaning to complex systems fluid flow analyses in our company.*