

ANSYS FLUENT COUPLING

Bringing nuclear quality and standards
to system simulation.

FLOWNEX[®]
SIMULATION ENVIRONMENT



Flownex[®] SE can couple to a range of Ansys products opening up a new frontier in co-simulation. This provides the capability of simulating complete and integrated engineering systems fast and accurately.

TYPICAL USES

DESIGN

- Reduce large thermal systems by simulating parts in 1D CFD.
- Couple to specialized modules in Fluent.
- Real time direct coupling between Flownex and Fluent.

ANALYSIS

- Analyze effect of 3D geometry in large thermal fluid systems.
- Analyze large thermal fluid systems, impossible for 3D CFD alone.
- Behavioral analysis of advanced Fluent fuel cell modules in thermal fluid system.

OPTIMISATION

- Rapid optimisation of thermal fluid system.
- Quick comparison of different system layouts.
- Tools such as the designer, optimiser and sensitivity analysis.

Flownex[®] is developed within an ISO 9001:2015 quality management system that is ASME NQA-1 compliant.

DETAILS & CAPABILITIES

- Flexible coupling between Ansys and Flownex:
 - Directly couple to Fluent/CFX/Mechanical
 - Using workbench integration
 - Exporting Flownex simulations as FMUs
- Import 3D ROMs into Flownex:
 - Understand system performance in long transients
 - Real time system performance monitoring and prediction (Digital Twins).
 - Optimize control strategies on full systems



WORKBENCH INTEGRATION

WORKS WITH:

- Fluent
- CFX
- Mechanical
- ROM Builder
- Workbench

SUPPORTS:



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Find us on:



EXAMPLES

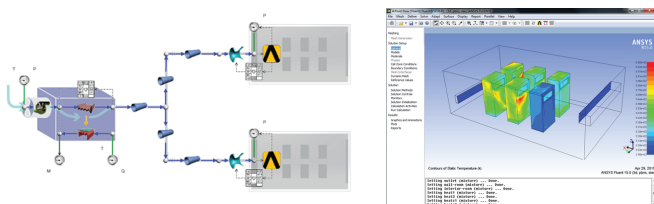
CO-SIMULATION

DATA CENTRE WHITESPACE IN ANSYS AND HVAC SYSTEM IN FLOWNEX

Data centre HVAC systems are highly integrated and complex. Optimisation and increased efficiency will lead to lower temperatures and energy costs.

Flownex can be used to model the thermal management system and cooling distribution. Ansys Fluent is ideal to model the data centre whitespace in 3D.

Boundary conditions from both simulations were linked to obtain dynamic input conditions to the critical space as well as obtain higher detailed results on a system level.



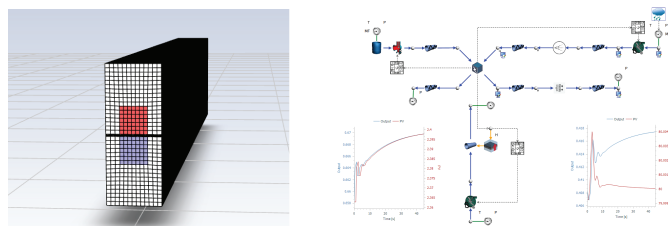
Flownex model of HVAC system and Ansys Fluent model of data centre.

The co-simulation of both models result in better insights holistically, leading to better control philosophies and understanding the impact of temperatures and thermal performance on all levels.

PEM FUEL CELL

FUEL CELL MODULE INTEGRATION WITH FLOWNEX

The co-simulation of both models result in better insights holistically, leading to better control philosophies and understanding the impact of temperatures and thermal performance on all levels. Different fuel cell types can also be included such as the Proton Exchange Membrane, Solid Oxide as well as electrolysis processes.



KEY APPLICATIONS FOR CO-SIMULATION:

- Secondary flow for turbine blade analyses.
- Detailed turbo machinery analyses with influence of distributed flow network.
- Analysis of power generation cycles with detailed component simulation.
- Cycle control optimisation in Flownex where Fluent CFD model of components has been reduced to a ROM.

TESTIMONIAL

**LUFTHANSA
TECHNIK AG**

Stefan Kuntzagk
Performance and
Design Engineer



Flownex SE is able to accurately predict flow and heat transfer in secondary air systems, whilst reducing model setup and execution time substantially