

Technology Transfer Track Posters

PROVEN METHODS AND SOFTWARE TOOLS

VTT Technical Research Centre of Finland (established 1942) is the leading multidisciplinary research, development and innovation company in Northern Europe. This poster presents three Expression of Interest presents three technologies developed at VTT, all potential for Big Science projects

- Automation verification by formal methods – VTT Model checking
- Apros® for analysis and dynamic simulation
- Serpent – a Continuous Energy Monte Carlo neutron and photon transport code

For more about VTT, see <http://vttresearch.com>

VTT Model checking

Design review is one of the essential phases in the engineering of safety-critical systems, where experts analyse what can potentially go wrong with the system, such as events that could cause the system to give conflicting actuation commands. Model checking is an efficient formal method of verification of hardware and software designs. The method verifies the system model against formal properties, based on functional requirements.

The difference compared to common verification methods (such as testing or simulation) is that model checking takes all relevant executions of the system model into account. No test case planning is needed; instead, the method automatically identifies ‘counter-example’ scenarios in which the system will breach its requirements. Through this exhaustive analysis, hidden design errors can be uncovered in systems that have already undergone verification through conventional means.

Model checking can be applied in any industry where automation functionality is expressed in logic programming language (function block, ladder, or sequence diagrams) or hardware description language (e.g. VHDL).

For more about VTT Model checking, see <http://vttresearch.com/modelchecking>

Apros® for analysis and dynamic simulation

With Apros® software you can build a digital, dynamic model of a facility including its process & piping, instrumentation & control, and electrical systems.

The Apros model is created by simply selecting components from model libraries, adding them on the diagram canvas, connecting them and entering parameter values through data sheets. The input data consists of physical dimensions, correlations e.g. pump curves, control parameters etc. After the data has been entered, the model can be run similarly to operating the real plant.

For more about Apros, see <http://apros.fi>

Apros® is a registered trademark of VTT and Fortum.

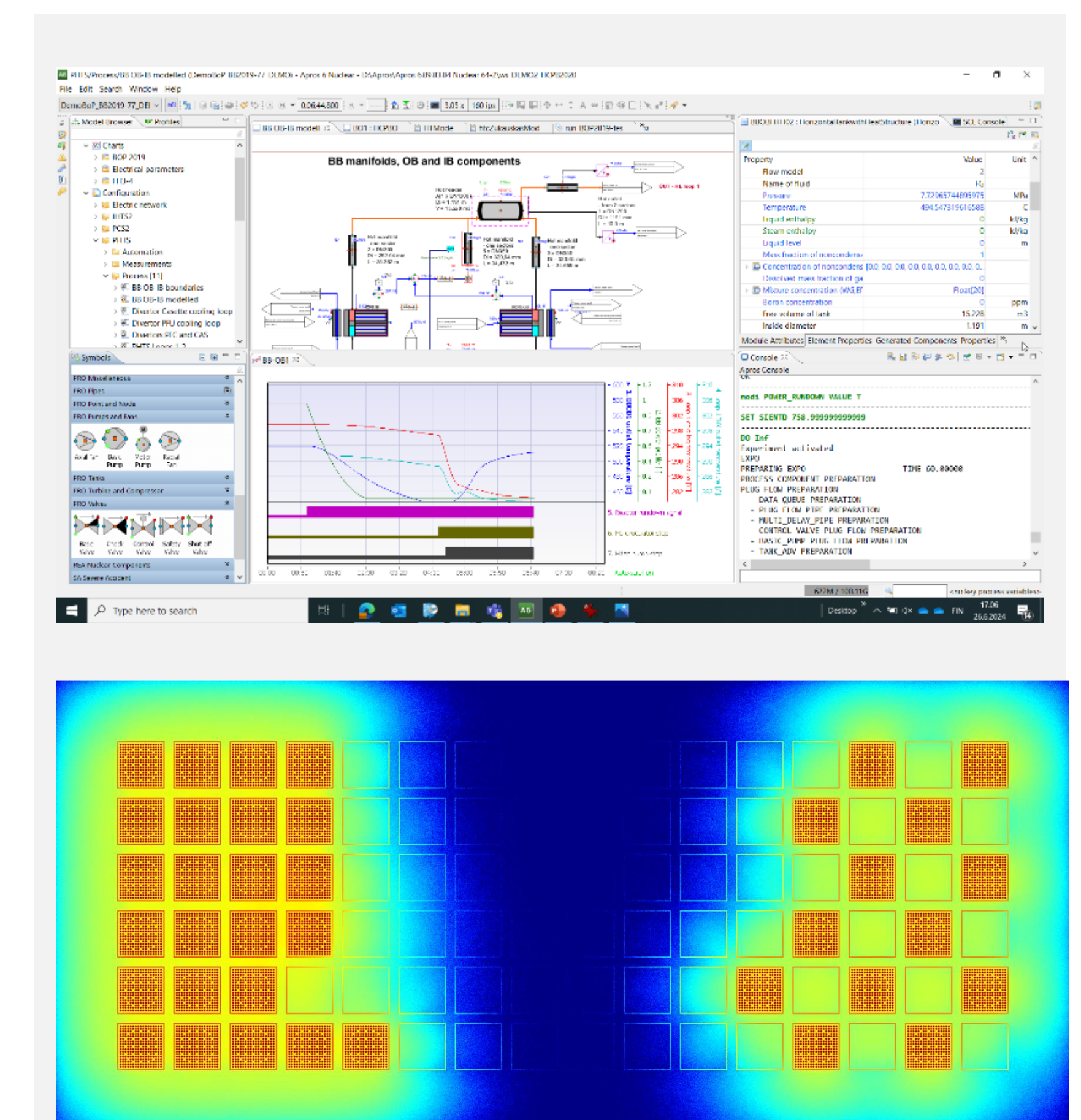
Serpent – a Continuous Energy Monte Carlo neutron and photon transport code

Serpent is a multi-purpose three-dimensional continuous-energy neutron and photon transport code, developed at VTT. The physics model in Serpent covers neutron, photon and coupled neutron-photon simulations.

Serpent’s CAD-based geometry type is a practical option for the modelling of complicated and irregular structures. Such geometries are commonly encountered in fusion and radiation transport applications. The same neutron and photon physics routines developed for fission applications are similarly valid, regardless of the source from which the particles were emitted.

For more about Serpent, see

<http://serpent.vtt.fi>



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