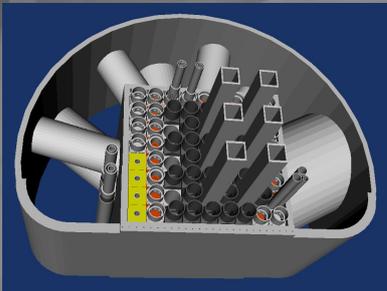# OSCAR-5
Release and
User Group Workshop

15-19 April 2019
Pretoria, South Africa
Hosted by
RRT, Necsa

About OSCAR-5

OSCAR-5 is a reactor calculational platform providing multi-code, multi-physics support for research, power and high temperature reactor analyses. The platform is a fit-for-purpose tool in support of reactor operation. The OSCAR-5 system incorporates a powerful pre- and post-processing system which maintains a consistent reactor model and manages the data passing between target codes. Codes already linked to this platform include the OSCAR nodal package, Serpent and MCNP. The platform also includes a database of reactor models for V&V purposes.

Workshop details:

✓ First official release of OSCAR-5 to national and international clients

✓ Establishment of an OSCAR-5 user group and development forum

✓ Demonstration of the OSCAR-5 approach to reactor modelling

✓ Hands-on training on various reactor models

✓ Enjoy the rich beauty of South Africa with some planned social activities

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OSCAR-5
REACTOR ANALYSIS PLATFORM

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The OSCAR-5 reactor analysis platform

The OSCAR code suite, developed at Necsa, South Africa, is a nodal diffusion based calculational system, which has been used over many years for research reactor analyses. Version 4 of the system is primarily used to support the operation of the SAFARI-1 research reactor at Necsa, South Africa, but is also applied at various other international research reactors, such as HOR (TU-Delft, The Netherlands), HFR (NRG, The Netherlands) and MNR (McMaster University, Canada) as a reactor core-follow and core reload design tool.

OSCAR-5 Release and User Group Workshop

In this planned workshop the next generation OSCAR system (termed OSCAR-5) is released with the aim to respond to the challenging demands of the modern reactor analysis environment.

The OSCAR-5 system aims to allow for multi-code, multi-physics support for reactor analysis, with the primary aim to allow the use of fit-for-purpose tools in support of reactor operations. This implies finding a balance between the nature of a specific calculational application and the level of detail and fidelity utilized in achieving the result. The OSCAR-5 system is built around the concept of a code-independent, consistent reactor core model. This model is deployable to an extendable set of integrated target codes and manages the passing of data between these target codes. Currently fully coupled to the system is our in-house OSCAR nodal package, Serpent and MCNP.

To better serve the nodal package, OSCAR-5 also introduces a number of improvements to the front end of the calculational path. This includes additional lattice code options and a theoretically consistent step by step approach to move from a detailed heterogeneous model to an energy condensed homogeneous model. The system gives feedback at each step, to help the user improve the nodal model and to quantify the final error estimate associated with the model.

The workshop will cover the key concepts in model development and model deployment to target codes. Furthermore, the tutorials will cover multi-code application to analysis scenarios such as detailed flux analysis, core-follow analysis, reload and core design calculations, as well as equilibrium and core optimization analysis.

A database of research reactor models will also be provided and discussed, to illustrate the way in which the system can be used to model various plant configurations and how the multi-code approach allows for powerful and synergistic reactor modelling support.

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