Codes And Methods Improvements for VVER comprehensive safety assessment

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WP8 - Task 8.3

D8.4 – Report of the CAMIVVER International Workshop

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Summary

Within the framework of the H2020 CAMIVVER project, Work Package 8 (WP8) is dedicated to the knowledge dissemination activities. In this deliverable a summary of the CAMIVVER Final Workshop organized by KIT is provided.

Approval

Version	First Author	WP leader	Project Coordinator
1	L. MERCATALI (KIT) 27/07/2023	N. FORGIONE (UniPI) 31/08/2023	D. VERRIER (Framatome) 31/08/2023
			

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1 CAMIVVER Final Workshop Overview

The CAMIVVER Final Workshop has been organized by KIT (Germany) and has been held at the Institute for Neutron Physics and Reactor Technologies (INR) on July 3-5, 2023. The main goal of the Workshop was to present the outcomes of the project to a wide international community. The event was offered in a hybrid form, namely with the possibility to either attend in presence or online. A total of sixty-four participants from ten different countries attended the Workshop, these being representatives of twenty organizations belonging to universities, research centers, industries and regulators. A breakdown of the participants by Country is provided in Figure 1.

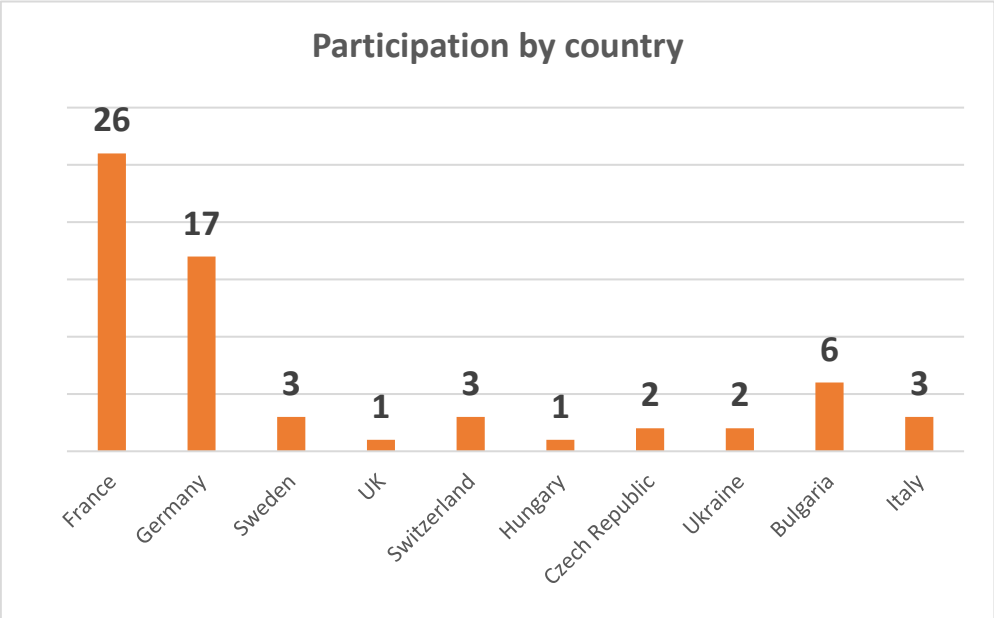

Figure 1. Total number of participants by Country

During the Workshop seventeen lectures were given by different CAMIVVER experts representing all the project partners within the CAMIVVER consortium (KIT, FRAMATOME, CEA, EDF, UNIPI, INRNE and ENERGORISK). The presentations provided a comprehensive overview of the CAMIVVER achievements and summarized the main outcome of each Work Package in the different areas of reactor modeling, namely lattice physics, core physics, CFD and system code analysis.

In addition to the presentations of the CAMIVVER partners, three invited talks were also given by VVER experts from UJV, Studsvik Scandpower and Atomenergoservice LLC. The first invited talk was given by Dr. M. Bencik (UJV) and covered the main VVERs safety and licensing related studies undergoing at UJV. The second invited speaker was Dr. A. Kornitsky (Atomenergoservice LLC) who provided an updated overview of the deterministic aspects of VVER safety operation in Loss of External Electric Load in the Ukrainian NPPs due to the influence of the current military operations. The third invited talk was given by Dr. E. Georgieva who presented an overview of the capabilities of the Studsvik's tools for VVERs core physics simulations.

Three Ph.D. works related to CAMIVVER and VVER modelling in general have been presented at the Workshop as contributions to the education and training activities of the project. The Ph.D. works are carried out at UNIPI (Italy), KIT (Germany) and INRNE (Bulgaria).

The Workshop's agenda and the list of participants are given in Figures 2 through 5 and the complete presentations are available for download in the Zenodo open source platform at the following link: https://zenodo.org/record/8183023.

CAMIVVER Final Workshop

July 3-5, 2023

Location:
Karlsruhe Institute of Technology (KIT) - Campus Nord
Institute for Neutron Physics & Reactor Technology (INR)
Hermann-von-Helmholtz-Platz 1, 76344 Eggenstein-Leopoldshafen (Germany)

Agenda

Monday - July 3rd 2023

13:30 - 13:40: *Welcome from the Chairs*
(L. Mercatali - KIT, B. Vezzoni - FRAMATOME, N. Forgione - UniPI)

13:40 - 14:00: *Welcome from the INR Director* (R. Stieglitz - KIT)

14:00 - 15:00: VVERs *Safety Assessment and Licensing in the Czech Republic*
(M. Bencik, UJV- Invited)

Coffe break

15:15 -15:30: *Overview EU WP 2023-2025* (M. Dzubinsky - EC)

15:30 - 16:00: *Overview of the CAMIVVER Project*
(D. Verrier - FRAMATOME)

16:00 - 16:30: *Innovative methodologies for multi-parametric data library cross section generation* (P. Mosca - CEA)

16:30 – 17:00: *PhD student presentation* (V. Georgiev - INRNE)

17:00 - 17:30: *Discussion* (All)

19:30 - Workshop's Dinner

Tuesday - July 4th 2023

09:00 - 10:00: *Deterministic aspects of VVER safety operation in Loss of External Electric Load due to the influence of military operations*
(A. Kornitskyi - LLC Atomenergoservice, Invited)

10:00 - 10:30: *VVER multi-parametric neutron libraries generation based on advanced lattice codes* (A. Brighenti - FRAMATOME, A. Willien - EDF)

Figure 2. Workshop's agenda (1/2)

Coffe break

10:45 - 11:15 *Advanced features of APOLLO3 lattice code in the framework of CAMIVVER project* (E.Y. Garcia Cervantes – CEA, M. Tiberga - EdF)

11:15 – 11:45: *VVER Core simulations by improved neutronics-thermal hydraulics coupled modelling* (L. Mercatali - KIT)

11:45 – 12:15: *High-fidelity pin-by-pin multi-physics modelling* (G. Huaccho - KIT)

Lunch

13:45 - 14:15: *A multi-physics prototype for reference 3D neutronics-thermal-hydraulics coupled calculation* (B. Calgaro - FRAMATOME)

14:15 - 14:45: *CFD analysis of VVER* (O. Bernard - FRAMATOME)

14:45 - 15:15: *CFD models of VVER primary vessel* (A. Mas - FRAMATOME)

Coffe break

15:15 - 15:45: *CFD Benchmark on Kozloduy-6 mixing experiment (M. Böttcher - KIT)*

15:45 - 16:15: *Uncertainty propagation in CFD simulations through deterministic sampling method (V.* Khayiguian - FRAMATOME*)*

16:15 - 16:45: *PhD student presentation* (O. Halim - UniPI)

16:45 - 17:15: *Discussion* (All)

Wednesday - July 5th 2023

09:00 - 10:00: *Overview of Studsvik Scandpower codes for VVER reactors* (E. Georgieva - Studsvik Scandpower, Invited)

10:00 - 10:30: *VVER primary circuit TH modelling* (A. Hashimov - Energorisk)

Coffe break

10:45 – 11:15: *SB LOCA + SG line break transients* (P. Vryashkova - INRNE)

11:15 – 11:45: *MSLB transient analysis* (A. Stefanova – INRNE, G. Huaccho – KIT)

11:45 – 12:15: PhD student presentation (N. Beydogan – KIT)

12:15 – 12:45: *Discussion* (All)

Lunch & End of the Workshop

Figure 3. Workshop's agenda (2/2)

Name	Organization
Adam Morgenstern	DSR - Germany
Adrien Willien	EDF - France
Akiv Abdullayev	WESTINGHOUSE - Sweden
Alberto Previti	ENEA - Italy
Alberto Brighenti	FRA - France
Alex Kornitskiy	Ukraine
Alexander Vasiliev	PSI - Switzerland
Alexander Mas	FRA - France
Andrea Pucciarelli	UNIPI - Italy
Antoneta Stefanova	INRNE - Bulgaria
Bálint Batki	CER - Hungary
Baptiste Pothet	FRA - France
Barbara Vezzoni	FRA - France
Barbara Calgaro	FRA - France
Benjamin Levi	FRA - France
Bruno Miglierini	FRA - Germany
Daniele Sciannandrone	CEA - France
Denis Verrier	FRA - France
Elias-Yammir Garcia-Cervantes ·s	CEA - France
Emiliano Masiello	CEA - France
Emiliya Georgieva	STUDSVIK SCANDPOWER - Germany
Fabio Inzirillo	FRA - France
Fadhel Malouch	CEA - France
Frederic Damian	CEA - France
Galina Sieber	FRA - Germany
Gianfranco Uaccho	KIT - Germany
Gino Natali	WESTINGHOUSE - Sweden
Igor Zmijarevic	CEA - France
Jan Frybort	CTU - Czech Republik
Jean Lavarenne	JACOBS - United Kingdom
Jean-François Vidal	CEA - France
Juan Blanco	FRA - France
Kanglong Zhang	KIT - Germany
Louis Berry	PSI - Switzerland
Lucas Furlano	WESTINGHOUSE - Sweden
Luigi Mercatali	KIT - Germany
Marco Tiberga	EDF - France
Marek Bencik	UJV - Czech Republik
Marylene Lecomte	FRA - France
Mathieu Ursin	EPFL - Switzerland
Matias Zilly	FRA - Germany
Michael Böttcher	KIT - Germany
Mira Pashtrapanska	FRA - Germany
Mykola Dzubinsky	European Commission
Neli Zaharieva	INRNE - Bulgaria

Figure 4. List of participants (1/2)

Name	Organization
Nicola Forgione	UNIPI - Italy
Nikola Kolev	INRNR - Bulgaria
Nuri Beydogan	KIT - Germany
Olivier Bernard	FRA - France
Ossama Halim	UNIPI - Italy
Pavlin Petkov Grudev	INRNE - Bulgaria
Petra Mala	FRA - Germany
Petya Vryashkova	INRNE - Bulgaria
Pietro Mosca	CEA - France
Romain Henry	GRS - Germany
Simone Santandrea	CEA - France
Stefan Balzus	FRA - France
Uta Naether	DSR - Germany
Uwe Imke	KIT - Germany
Valentin Georgiev	INRNE - Bulgaria
Veronika Jauregui	FRA - Germany
Victor Sanchez	KIT - Germany
Viken Khayiguian	FRA - France
Xavier Hubert	FRA - France
Yann Perin	GRS - Germany
Veit Marx	FRA - Germany

Figure 5. List of participants (2/2)