SEAVEA: Software Environment for Actionable and VVUQ-enabled Exascale Applications

Presenter: Derek Groen
Investigators: Peter Coveney, Serge Guillas

Bristol, 11-12 October 2023

Met Office

UKRI UK Research and Innovation

UK Atomic Energy Authority

Project Overview

We aim to develop a generic exascale toolkit to enable application users to make their models more robust and the results actionable through e.g.:

- uncertainty quantification (aleatoric and epistemic)
- sensitivity analysis
- ensemble forecasting
- ensemble validation
- on-the-fly verification
- training and large-scale application of surrogate models.

August 2021 - October 2024

https://www.seavea-project.org

RAMP Continuity Network

Current Project Status

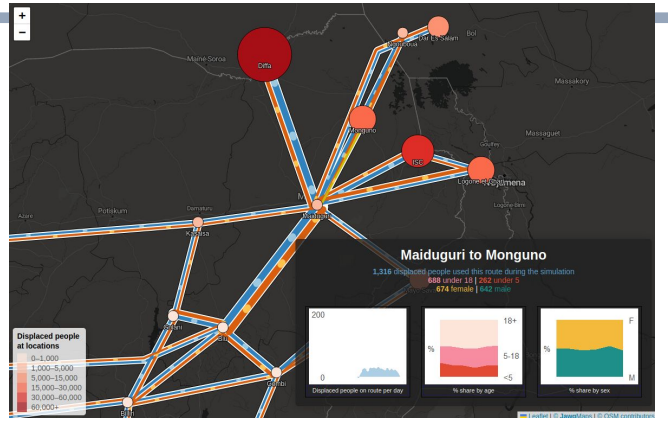
We have made our third SEAVEAtk release: https://www.seavea-project.org/seaveatk/

Several major research outputs:

- FabSim3 paper in CPC
- Sensitivity analysis with correlated parameters (preprint)
- Robust simulation dev for emergency response.
- Release of TIES 2.0 (CBMX)
- Flee forecasting collaboration with Save the Children

Events:

- More more hackathons!
- Tutorial sessions at home and abroad
- HPC Workshop at LRZ in Munich.
- https://mms.computationalscience.nl



https://williamlow.github.io/ABM/ABM_nigeria_update.html

ELSEVIER
Computer Physics Communications
Volume 283, February 2023, 108596

Feature article

FabSim3: An automation toolkit for verified simulations using high performance computing ☆

Derek Groen [a d], Hamid Arabnejad [a], Diana Suleimenova [a], Wouter Edeling [b], Erwan Raffin [c], Yani Xue [a], Kevin Bronik [d], Nicolas Monnier [c], Peter V. Coveney [d e f]

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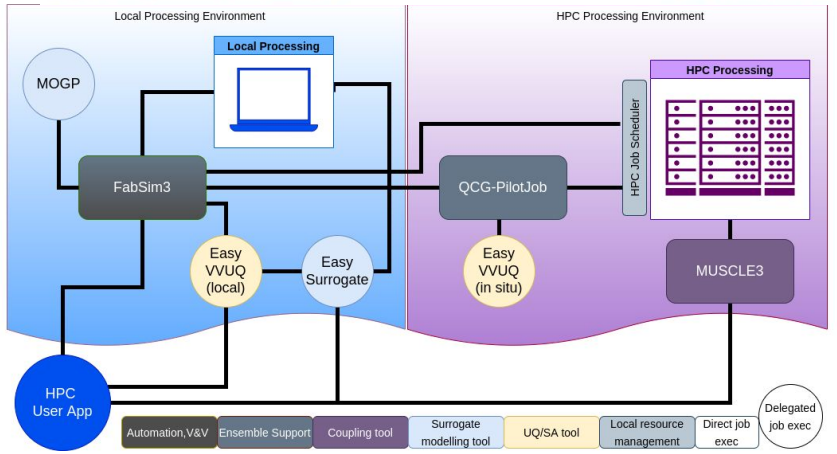

ELSEVIER
Journal of Computational Science
Volume 72, September 2023, 102107

Facilitating simulation development for global challenge response and anticipation in a timely way

Derek Groen, Diana Suleimenova, Alireza Jahani, Yani Xue

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arXiv > stat > arXiv:2306.00555
Statistics > Methodology
[Submitted on 31 May 2023]

Sensitivity Analysis of High-Dimensional Models with Correlated Inputs

Juraj Kardos, Wouter Edeling, Diana Suleimenova, Derek Groen, Olaf Schenk

Strengths & Challenges

- Strengths
  - Solid user uptake of SEAVEAtk across the board.
  - Good team of maintainers, with long-term interest.
  - Clear upticks in research and code outputs.
    - A lot of working papers going on as well.
    - Next SEAVEAtk release planned for December.
- Challenges
  - Technical: UQ and ensemble simulation beyond 100,000 cores / jobs.
    - Two horses: QCG-PilotJob & RADICAL Cybertools
  - People barrier: Looking for PhD student opportunities & recruitment challenges.
  - Funding barrier: Looking for VVUQ / simulation research opportunities.
    - SEAVEA ends October next year, no follow-up funding yet.

Thank you