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

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Met Office

UK Research and Innovation

UK Atomic Energy Authority

SEAVEA project

- Aim is to develop an exascale-ready toolkit that allows applications to apply VVUQ techniques in a mutually repurposable way:
  - Verification and Validation (VV),
  - Uncertainty Quantification (UQ).
- In addition, SEAVEA provides tools for
  - Sensitivity analysis (SA),
  - Surrogate models,
  - Model coupling,
  - Ensemble forecasting.

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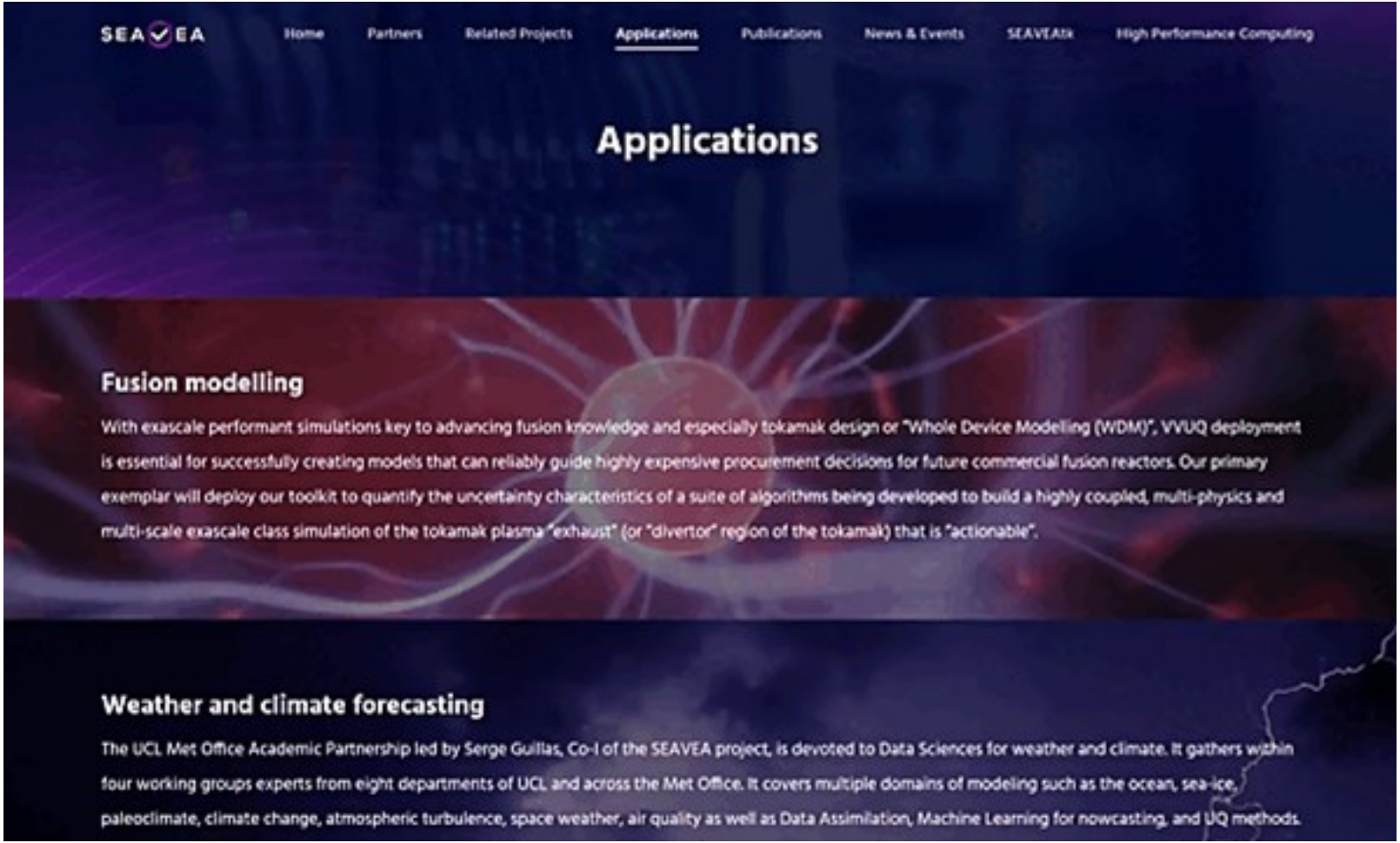
https://www.seavea-project.org

RAMP Continuity Network

SEAVEA toolkit: https://www.seavea-project.org/seaveatk

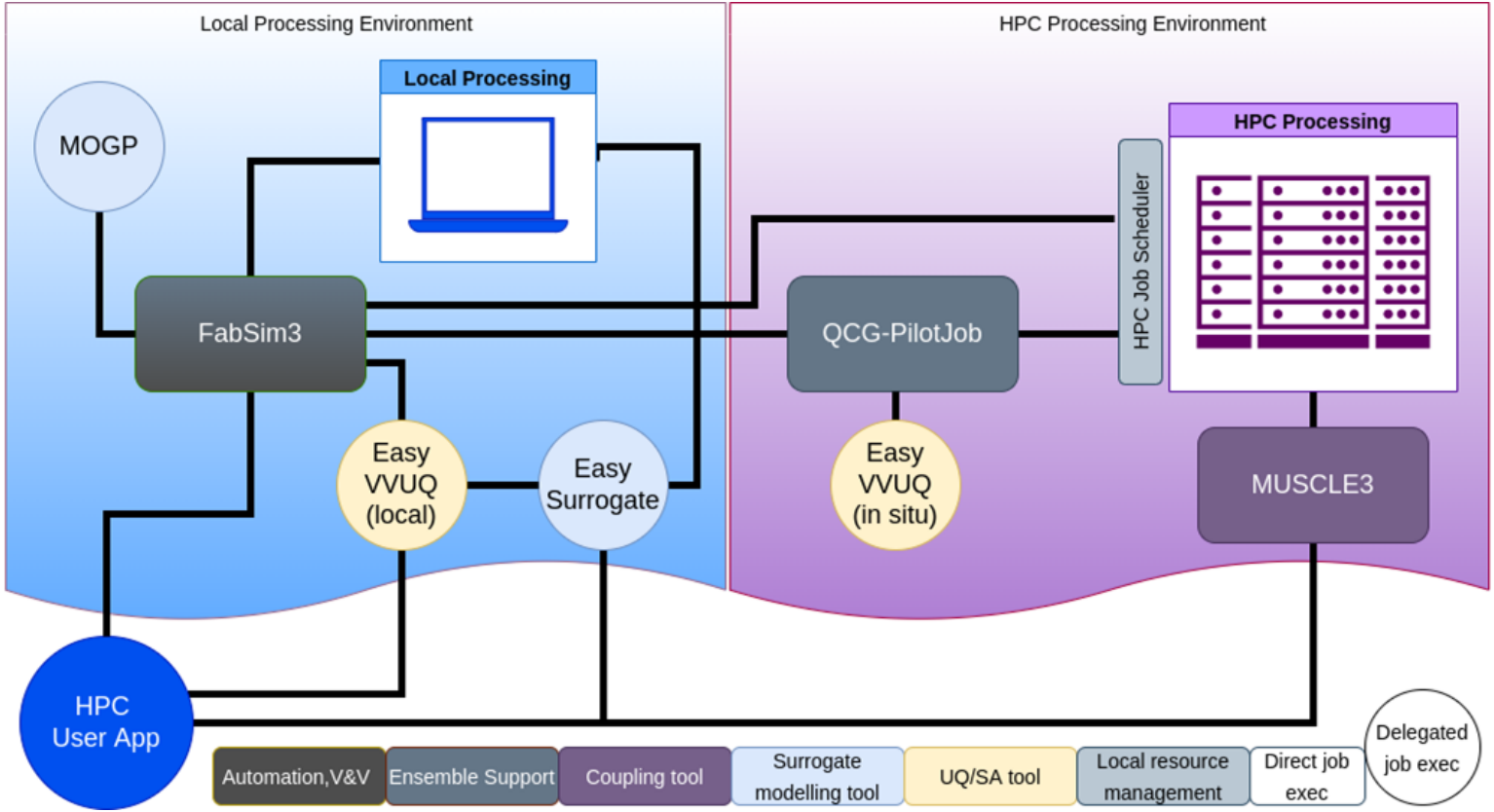
- EasyVVUQ → UQ+SA,
- FabSim3 → VV + automation,
- MUSCLE3 → Code coupling + UQ,
- QCG-PilotJob → Run 1000s of jobs in a single allocation,
- EasySurrogate → Surrogate modelling for multiscale simulations,
- mogp_emulator → Surrogate modelling for fitting Gaussian Process Emulators,
- RADICAL-Cybertools → Abstraction-driven approach to HPC.

The SEAVEA toolkit is open source and freely available to use with any application, using any programming language.



https://www.seavea-project.org/applications

SEAVEA toolkit map



SEAVEA project events

- Online Toolkit Hackathons,
- “Uncertainty in Mathematical Modelling of Pandemics” (w/ RAMP),
- VVUQ On The Exascale Workshop and SEAVEA Hackathon at ICCS 2022,
- CompBioMed - SEAVEA Hackathon 2023,
- Applications Hackathons.

We have submitted our first papers and are growing the consortium and the user base.

Summary

Toolkit uptake:

- ❏ We're happy to support users currently outside of SEAVEA and organize dedicated sessions to bring them up to speed.
- ❏ We're happy for other projects to integrate parts of SEAVEAtk in their own software stacks.

Toolkit expansion:

- ❏ We're keen to include external optimisation or VVUQ-related algorithms within the toolkit.

Development and Event alignment:

- ❏ We're happy for other ExCALIBUR projects to provide advice on our development priorities.
- ❏ We're keen to organize workshops, tutorials or hackathons with other ExCALIBUR projects.

Questions?

https://www.seavea-project.org

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