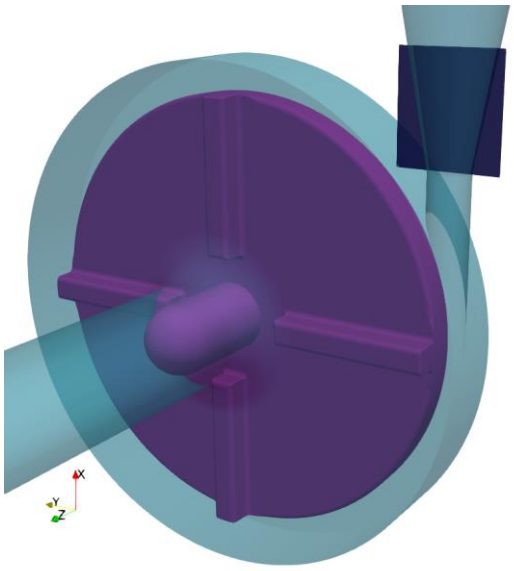
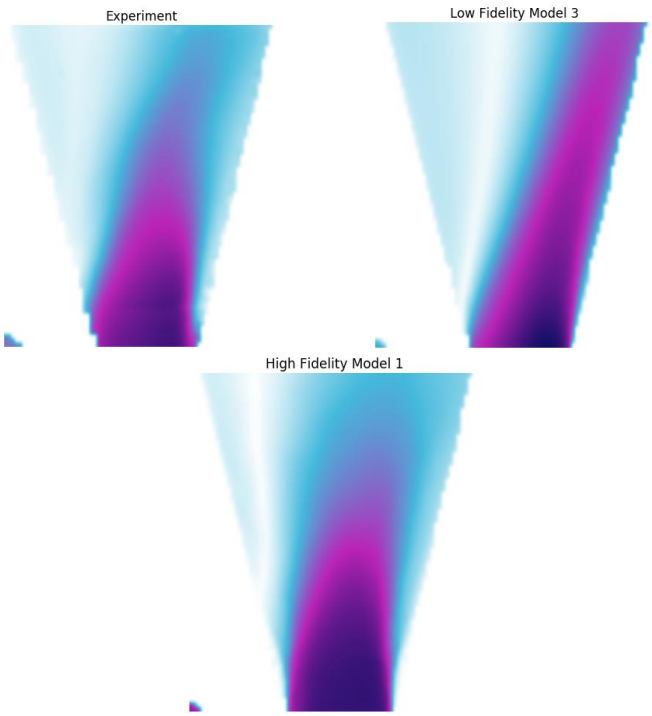
Accelerating innovation with HPCBOX

For turbulent flows the choice of how to represent the turbulence in a CFD model is critical to the validity of the results. There exist a large number of low fidelity models of turbulence which model its effects entirely (Reynolds' Averaged Navier Stokes models, or "RANS") which are often referred to as engineering workhorse models as they are relatively easy to use and are computationally efficient. With the advent of cloud computing however, higher fidelity turbulence models which model only around 10% of the effects of turbulence and capture the remainder directly (Large Eddy Simulation, or "LES"), can now be brought to bear on CFD studies.

Simon Hubbard founded Upstream Applied Science Ltd. in the UK in 2019 to offer applied science and math consultancy services and specialized Computational Fluid Dynamics (CFD) capability. Simon's specific interests are in the application and development of open source toolsets in the Computer Aided Engineering space and the use of cloud computing capability to allow the use of more advanced computational techniques in product design and development.



3D representation of the FDA blood pump geometry, showing plane over which velocity is analyzed



2D velocity magnitude in the analysis plane

At-a-glance:

Customer: Upstream Applied Science

Website: https://www.upstream-applied-science.com/

Customer Size:1 -10

Country: United Kingdom

Industry: Applied Science

Products and Services: HPCBOX on Microsoft Azure

Drizti Inc., Upstream Applied Science & Microsoft Azure

Customer challenges

Upstream wanted to assess the performance of a number of low fidelity and one high fidelity turbulence model on the Federal Drugs Admission's (FDA) CFD benchmark model of a blood pump, in the context of being able to use HPCBOX in as time effective manner as possible to determine which modelling approach is beneficial ahead of a CFD phase of product design and development.

Drizti HPCBOX Solution

Drizti's HPCBOX solution on Microsoft Azure, delivers a desktop-centric, workflow enabled cloud HPC Platform with a rich user experience making supercomputing as easy to use as a personal computer. HPCBOX lets users harness Microsoft Azure's Big Compute Infrastructure through its rich user experience and desktop-centric workflow system. With HPCBOX, applications can be run in parallel with their native GUI significantly reducing the time involved in developing products and allowing end users to focus on their innovation.

Customer Benefits

Using HPCBOX on Microsoft Azure, a number of model configurations were assessed in a short period of time, in addition to the desired variation in turbulence modelling approach. HPCBOX allowed Upstream Applied Science to run a range of CFD models of the blood pump and retrieve data for analysis quickly and effectively.

"HPCBOX helped in addressing the challenge by providing quick and straight forward access to Microsoft's Azure HPC capability, offering a toolset that enabled quick setup and execution of computational workflows."

"HPCBOX is a great tool for facilitating fast and effective access to Microsoft Azure HPC environment. The support provided by Drizti during the trial was very responsive and pro-active in releasing performance enhancing developments to the toolset."

"The turbulence model simulations completed in less than five days, showing the turnaround time that can be achieved for performing modelling methodology assessment ahead of a computational phase of product design and development."

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Learn More

https://www.drizti.com

https://www.upstream-applied-science.com/