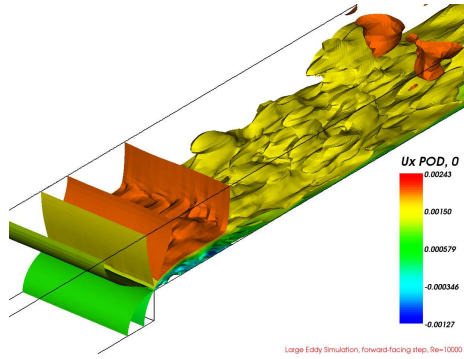
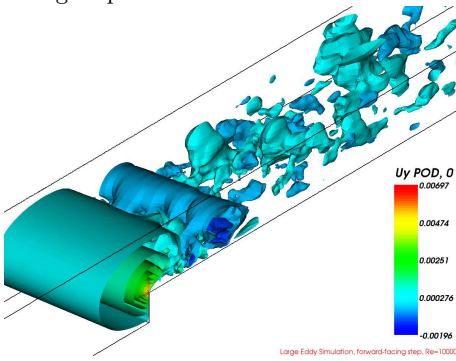


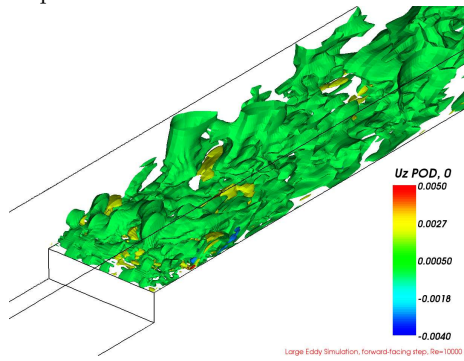
**Figure 7.** The first POD mode of pressure field for turbulent flow over a forward-facing step.



**Figure 8.** The first POD mode of  $u_x$  field for turbulent flow over a forward-facing step.



**Figure 9.** The first POD mode of  $u_y$  field for turbulent flow over a forward-facing step.



**Figure 10.** The first POD mode of  $u_z$  field for turbulent flow over a forward-facing step.

pling, data interpolation and simulation management. This approach imposes limitations on the mode of coupling and creates problems in model setup.

In this example, OpenFOAM is used to build a self-contained FSI solver, simulating the interaction between an incompressible Newtonian fluid and a St. Venant-Kirchhoff solid. Fluid flow is modelled by the Navier-Stokes equations in an Arbitrary Lagrangian-Eulerian (ALE) formulation, while the large deformation of the solid is described by the geometrically nonlinear momentum equation in an updated Lagrangian formulation.

Spatial discretisation of both models is performed using second-order accurate unstructured FVM, where the fluid model is discretised on the moving mesh [21], while the solid model is discretised on the fixed mesh, updating its configuration in accordance with the displacement from the previous time step. Automatic mesh motion solver [22, 23] is used to accommodate fluid-solid interface deformation. Temporal discretisation for the fluid and solid models is performed