Use of Gaming and Affordable VR Technology for the Visualization of Complex Flow Fields

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In the engineering world the post processing of CFD simulations is done with tools that are very difficult to use for whoever is not an insider. Moreover, simulations are often heavy and displaying the results may be very time consuming. This is even more true when the simulations are non-steady or in the case of Fluid-Structure Interaction [1], when it is required to work with the results of every time step and the amount of data grows exponentially, making it impossible to carry out real time exploration of the results. Engineers and researchers therefore require a tool to show to non-experts the results of their work in a way that is easily accessible.

VR technology used to be very expensive in the past, and its computational speed very slow [3]. Nowadays, with the introduction of affordable headsets, it provides a cheap and effective communication channel between industries and the scientific world. By selecting a relatively small amount of data to show, we can lighten the load of the simulations and have our interlocutor focus on the results that are most important, also giving them an interactive tool to explore that data. Steps have already been taken in this direction, for example by making an explorable fluid simulation of buildings on a 2D screen [4]. But the work discussed in this paper goes even further and shows how it is possible to couple game engine technology and VR displays to achieve these results. Using the game development platform Unity, it is possible to import the data collected using CFD software and convert them into a 3D VR application.

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