

ILLUMINATING THE VALUE OF GEOPHYSICAL IMAGING THROUGH VISUALIZATION AND VIRTUAL REALITY

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The results of geophysical imaging techniques often hold high significance to stakeholders in the problems addressed yet the effective perception of those results remains a dynamic challenge for all. To illuminate the value of geophysical imaging techniques, we are developing a framework to visually integrate geophysical data and models in 3D which extends into Virtual Reality (VR) as well as statistically analyzing interpretation advantages in VR. The motivation for this effort comes from a desire to directly engage stakeholders with geophysical data gaining Value of Information (VOI) and de-risking decision making in project planning. This framework is a code base that extends the functionality of the open-source visualization platform ParaView by Kitware. These extensions make it possible to visually integrate geophysical data in a multidimensional rendering space so that the end product is interpretable to non-geoscientists and that all parties can gain insight and VOI from geophysical imaging techniques. To show value in the VR presentation of multi-dimensional visualizations, we aim to develop metrics that will analyze the effectiveness of visual analysis in VR compared to traditional methods. We will evaluate these metrics through statistical gaming type protocol, where we will task subjects with making spatial decisions and finding features of interest in complex geoscientific scenes. We hypothesize that VR will bring the needed perception to most efficiently make spatial decisions and detect features of interest as well as convey information such as uncertainty in a usable manner. We will have preliminary results of the gaming protocol by March 2018 as well as share our visual framework along that journey in the form of a GitHub repository titled ParaViewGeophysics. Our goal in sharing the repository is to deliver a toolset that enables geophysicists to rapidly visualize their data and models as well as effectively communicate their findings to interested stakeholders.