Journal of Visualization, Vol. 7, No. 1 (2004) 3

# Visualization of Fluid Flows in Virtual Environments

***Ziegeler, S. B. [1], Gopal, G. P. [1], Blades, E. [2], Moorhead, R. J. [1], Marcum, D. L. [2] and Guan, Y. [1]***

*1) ERC GRI Visualization, Analysis and Imaging Laboratory, Mississippi State University, MS, U.S.A.*
*E-mail : {sean | gopi | rjm | guanyl } @gri.msstate.edu*

*2) ERC SimCenter, Mississippi State University, MS, U.S.A.,*
*E-mail : { blades | marcum } @simcenter.msstate.edu*

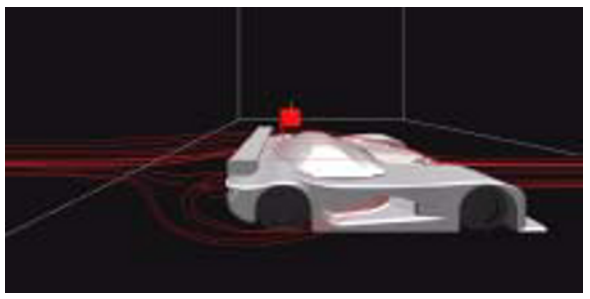

Fig. 1. Virtual Environment (VE) simulator side view of stream lines about a GT race car model

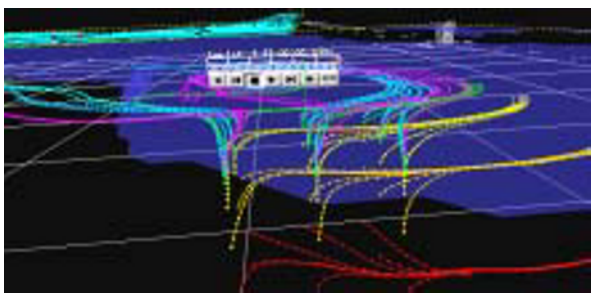

Fig. 2. VE simulator view of path lines computed with six days of oceanographic flow data

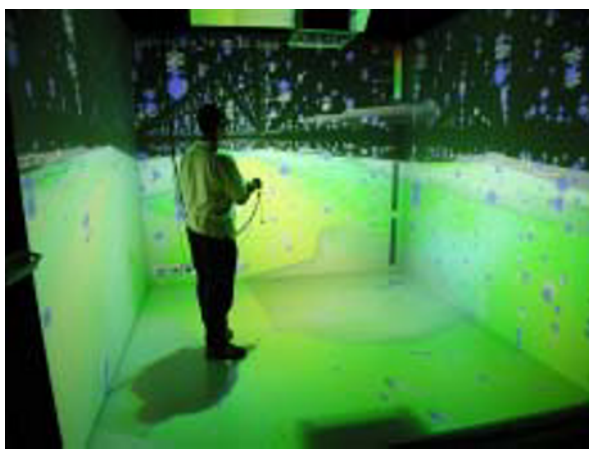

Fig. 3. Full VE view of an atmospheric simulation of a large snow and ice storm

Fig. 4. Full VE view of oceanographic and atmospheric flow data visualized simultaneously

Virtual Environments (VE's) provide advantages over conventional displays for fluid flow analysis. The stream lines for the GT Race Car (Fig. 1) are pre-computed by a flow-solver using a large volumetric model. The oceanographic flow data is model-generated and visualized by our VE software, *Triton II* (Fig. 2). These top two figures illustrate VE simulators for conventional displays. Certain atmospheric models predict the development and movement of water particles for storms (Fig. 3), while newer systems simultaneously run oceanographic and atmospheric models utilizing each other's boundary conditions (Fig. 4). The last two figures exemplify VE visualization hardware to show how the superior view can provide improved analysis.