

For many years we have used movie animations to illuminate the complex dynamics of turbulent fluid flows in astrophysics. Movies have a unique power to elucidate vector flow fields, and side-by-side comparison of movies of different quantities, such as the vorticity and the divergence of velocity, makes it possible to sort out the complexities of the dynamics. The main problem with this approach is the time that is required to create the movies. For highly resolved flows, on grids of billions of cells, a single movie of a few thousand frames rendered for a PowerWall display can take a whole night to produce, even on a substantial PC rendering cluster. At the LCSE we have been developing an improved rendering cluster and faster rendering software in order to overcome this problem. Our goal is to have the movies generated immediately at multiple frames per second, so that the entire data exploration process can become interactive. A key to our new system design is to attack the implied data bandwidth problem by installing a dozen disks read in parallel on each PC workstation node and then having multiple PCs cooperatively generate each image panel. Each PC has its own copy of up to 2 TB of data, so that with our 14 nodes, the aggregate data bandwidth from disk exceeds 4 GB/sec. The performance characteristics of this system will be presented and its usefulness illustrated with examples of complex, turbulent astrophysical flows.