

Graphics Processing Unit (GPU) Large Eddy Simulation Contaminant Dispersion Modeling System for Open Terrain Environments

*Paul E. Bieringer,
Aaron J. Piña, and George Bieberbach*

*Aeris LLC
1314 Main Street, #101
Louisville, CO 80027
(720) 370-9012*

In this presentation, we will describe a Department of Defense funded effort use a Large Eddy Simulation (LES) model with an in-line coupled atmospheric transport and dispersion (AT&D) model to produce microscale (e.g. ~ 5 m resolution) airborne contaminant dispersion simulations. This new model has been implemented on a Graphics Processing Unit (GPU) computing platform which enables the dispersion simulations to be completed on the order of 150 times faster than comparable simulations on a Central Processing Unit (CPU) based computer. A key element of this GPU-based system is that it is computationally efficient which enables the development of solution ensembles that can then be used to develop distributions in material transport and scenario outcomes and corresponding statistical properties of these dispersion solutions. In this presentation we will provide a background on this new technology, examples of the types of simulations that can be produced with this system, results from a recent evaluation of the accuracy of the dispersion solutions, and a live demonstration of the modeling technology.