VisAD and Vis5D for Meteorological Applications

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VisAD is a Java class library for building scientific data analysis and visualization applications. It is aimed at the future computing environment when applications are invoked by clicking on web links, and when data from diverse sources are brought into those applications by dragging and dropping web links. VisAD defines a very general data model that can be adapted to virtually any numerical data and that integrates metadata for units, coordinate systems, regular and irregular sampling geometries and topologies, missing data indicators, and error estimates. By integrating these metadata into the visualization and computational semantics of data, the system can combine data from different sources. The data model has been adapted to the netCDF, HDF-EOS, FITS, Vis5D, McIDAS, GIF, JPEG and HDF-5 file formats, with a variety of other special-purpose adapters being developed by various users.

VisAD is written in Java 2 and uses RMI (Remote Method Invocation) for distributed objects. A VisAD application consists of a network of data, display, computational and user interface components that may be distributed arbitrarily around the network. The components include built-in support for real-time collaboration, so that components on multiple users' desktops maintain consistency. In other words, any interactions by one user are seen by all users. VisAD uses Java3D and Java2D for graphics. Its visualization components can be displayed in web browsers, ordinary applications, or immersive virtual reality. It is freely available, including source code, from http://www.ssec.wisc.edu/~billh/visad.html. It has a rapidly growing developer community sharing code and application infrastructure with each other.

Vis5D is a system for interactive 3-D visualization of gridded data sets such as those produced by environmental simulations. Since its first public demonstration at ECMWF in December 1988, it has become the leading system for 3-D visualization of environmental simulations. It recent years it has developed an API (Application Programming Interface) that allows it to be used as a 3-D sub-system by other systems. Now it has been adapted as a component of the ECMWF Metview system, and by NOAA FSL as the proposed D3D component of the AWIPS system. Both of these efforts have contributed significantly to the functionality of Vis5D, particularly for visual comparison of multiple gridded data sets. Version 5.2 of Vis5D, released in late 1999, supports visual comparison of irregularly located observations with gridded model output. Vis5D is freely available, including source code, from http://www.ssec.wisc.edu/~billh/vis5d.html. It has a mature user and developer community sharing code and application infrastructure with each other.