This release of GridPACK™ contains several new features and a new example application, as well as multiple bug fixes and performance enhancements. It also contains a new Fortran 2003 interface that allows users access to almost all the GridPACK™ functionality. The new power grid application is a state estimation code that can be used to find optimal values of the voltage magnitude and phase angle based on measurements of the power grid system. To implement this calculation, several new features were added to the GridPACK™ framework. These include a more general mapping capability for constructing the matrices used in solving power grid problems and a data distribution module that automatically distributes data to the processes containing the buses and branches that need the data.

The existing mapper functionality supports systems where variables and equations are associated with the buses. This is the case for systems such as powerflow and dynamic simulation. With state estimation, equations are associated with measurements that occur on the branches and a new model for mapping elements from the network to matrices and vectors is required. This has been implemented in Version 2.0 and is available through new generalized mapping modules.

Many power grid applications have large amounts of data that map to individual buses and branches but are not included in the original network configuration file. Mapping this data to a distributed network can be a major challenge. The hash distribution module can be used to redistribute data that has been read in on either a single processor or a collection of processors to the processor that owns the bus or branch objects that requires the data. The user interface for this module contains only a few simple commands but it can eliminate a large amount of complicated data exchanges.

Finally, a major new functionality is the initial release of a Fortran 2003 interface for the GridPACK™ toolkit. This interface supports most of the existing GridPACK functionality and contains an example powerflow application to illustrate how to use it. Additional documentation will be forthcoming. Most of the existing GridPACK constructs map directly to the new Fortran interface with only minor changes, mostly in naming conventions. The object-oriented nature of bus and branch types has been preserved using the Fortran 2003 support for polymorphic user types. Fortran does not support templated objects so application-specific bus, branch and factory classes need to start from template files. The templates provide stubs for framework methods that can be modified for specific applications. In addition, users can add their own procedures to these types for functionality that operates outside the framework.