

## RGUI Upgrade, Part 1

Hope Forsmann

Apr, 2013

*RGUI conversion and upgrades to support newer RELAP5-3D code version.*

RELAP5-3D Graphical User Interface (RGUI) is a user interface developed by the INL RELAP5 Team to provide enhanced analysis capability, increase accessibility to new users, provide automatic isometric display, represent plan models in 3D, and render more physical phenomena such as Hydrodynamics and Heat Conduction. RGUI functionality is divided into two major interfaces, the RELAP5-3D station and the plant model. This article discusses the first major part.

The RELAP5-3D station, station for short, launched from a desktop icon, and provided an interface for running RELAP5-3D, peripheral tools such as PYGMALION, displaying RELAP5-3D screen output, and other simple functions. The plant model, model for short, produced a 2D image of the flow region of a plant model that had three important properties:

- (1) It was produced automatically without any additional user input
- (2) It was isometric meaning it preserved all lengths exactly
- (3) It showed the control volumes as small rectangles and junctions as connecting lines.

Menus and mouse clicks provided the user means to make the image 3D, display data with color on pipe surfaces, display data numerically, translate/rotate/zoom the figure, and much more.

An effort is underway to upgrade RGUI to work compatibly with the FORTRAN 95 versions of RELAP5-3D. The station will be modified first, and the plant model later. The principle change is to convert the RELAP5-3D station to a platform independent technology (Java) with comparable functionality to the original version. Some enhancements are being incorporated to improve the user experience and provide additional functionality.

The station will provide drop-down menus of familiar function like FILE and TOOLS. Selecting a menu item from TOOLS will launch display interfaces for configuring command-line parameters and executing programs such as RELAP5-3D, Pygmalion<sup>[1]</sup> (PYGI), SNAP<sup>[2]</sup>, and any graphing package the user chooses, such as AptPlot<sup>[3]</sup>, XMGR5, etc. The execution parameters can be saved to a file for future use within the station.

During the conversion of the station, some changes to the PYGI interface (necessary for use with JAVA) were made. PYGI has two new input arguments `-i` and `-o` are now used for indicating the RELAP5 input deck name and the resulting output deck file name. This replaces the previous command line usage of redirected input and output for identifying these files.

The station also provides the ability to launch a graphing tool or SNAP from within the 3D station environment. The graphing package or version of SNAP can be set and changed by the user at any time.

Additional functionality is planned for the RGUI interface to provide the ability to run the suite of tests that are recommended during installation. This will allow the user to “batch” a series of problems using the RGUI interface.

Much of the functionality reported in Part 1 of this article is scheduled for bundling with the next code product, which is scheduled for release in the summer of 2013.

#### REFERENCES

- [1] [2012 RELAP5-3D 4<sup>th</sup> Quarterly Newsletter](#)
- [2] [Symbolic Nuclear Analysis Package](#)
- [3] [AptPlot](#)