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Guidelines for Creating a DLL Compatible with GoldSim for xLPR

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Goldsim can execute any software/code compiled as a dynamically linked library (DLL) through the use of an object called an External Element. Ideally, linking external modules to GoldSim requires a simple interface where identical input and output arrays are defined within the GoldSim model file and DLL. For module development in the pilot study, the Sandia Team will work with the model/code developer to define the interface requires (e.g. in/out arrays, control parameters, etc.) and compile the DLL to be compatible with GoldSim software.

Basic GoldSim External Module Requirements:

1. External functions (modules) are independent self contained software functions/models that can receive an input array from GoldSim and pass an output array to GoldSim either once (or per realization during Monte Carlo runs) or once per time step if necessary.
2. External functions are bound to the GoldSim executable at runtime and must be present in the same local directory as the Goldsim model file. Must be complied as a DLL (with libraries include in complied code).
3. External modules are run in a separate memory space and should provide their own error handling, message passing, file management and memory management.
4. DLL must be written or compiled with either FORTRAN or C++.
5. To compile a DLL for use with GoldSim, follow attached guidelines extracted from Appendix C of the GoldSim User's Guide (Reference: GoldSim User's Guide, Appendix C, GoldSim Technologies Group, Issaquah, WA, http://www.goldsim.com).

Probabilistic Framework – Basic Module Information Requirements

External modules need to come with a write-up that includes at a minimum:

1. A discussion of the Model Uncertainty, with a quantative assessment of the uncertainty (if possible)
2. A list of inputs both constants and Uncertain Parameters. Include both a description of the parameter, values or distribution, and how it should be sampled (e.g. every time step, once per realization).
3. Model Description. Should include model dependencies (e.g. does the module require inputs from other modules are the module outputs used by other modules, are there feedback loops/implicit couplings between module and other modules).
4. Description of the input/output arrays. Include a copy of source code needed to interface with the GoldSim code.
5. Identification and discussion of any input files. Input files should be provided.

Contact Information

Patrick D. Mattie, PMTS
Total System Performance Assessment
Nuclear Energy & Global Security Technologies
Sandia National Laboratories
(505)284-4796 / pdmatti@sandia.gov

Donald A. Kalinich, PMTS
Reactor Modeling & Analysis Department
Nuclear Energy & Global Security Technologies
Sandia National Laboratories
(505)284-0731 / dakalin@sandia.gov