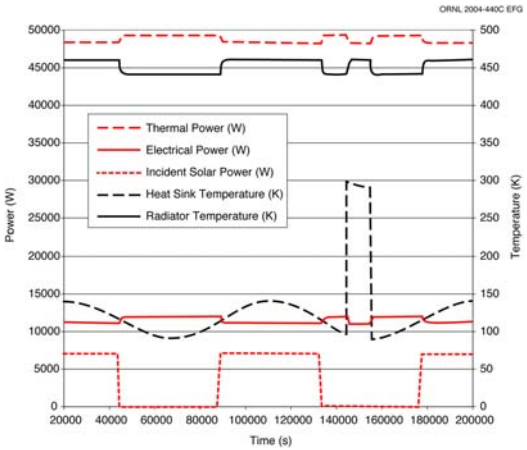
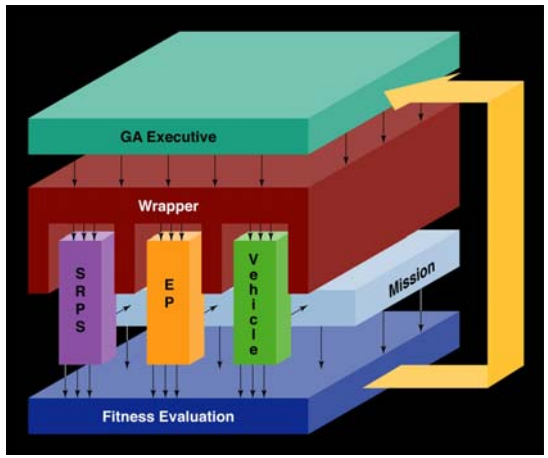
Objective of ARSS Systems Analyses is to Examine Design Options and Optimize Designs



Dynamic Modeling—Mars Reactor Power System Response to Changes in Environment

- **Heat sink temperature**
- **Incident solar flux**
- **Dust storm**
- **Radiator temperature**



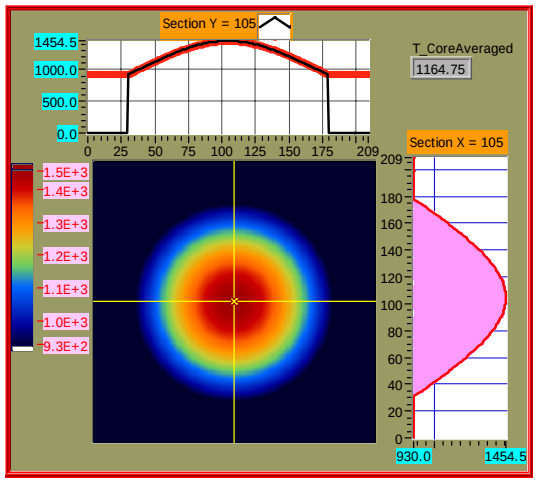
Innovative Use of Genetic Algorithm (GA) Approach as Design Optimization Tool

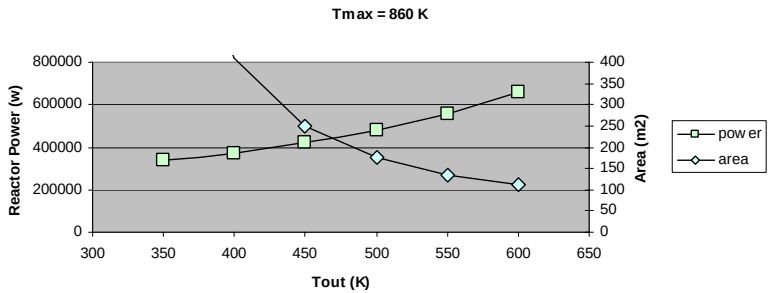
- **Quick assessment of best combinations of subsystems to meet design requirements**
- **Use of GA approach and standard design tools potentially shortens design cycle**
- **Introduces atypical options that meet design objectives**

Temperature Distribution Across Core and Power Generation as Function of

- **Assumed core thermal power**
- **Assumed heat sink temperature**
- **Assumed heat sink location (core/reflector boundary)**

=> Coupled neutronics/thermal hydraulics analysis using LabView





Design Trade Studies Show Integrated Effects on Overall System Design When Optimizing on One Design Parameter

- **Reactor power**
- **Radiator area**
- **Assumed given reactor outlet temperature**