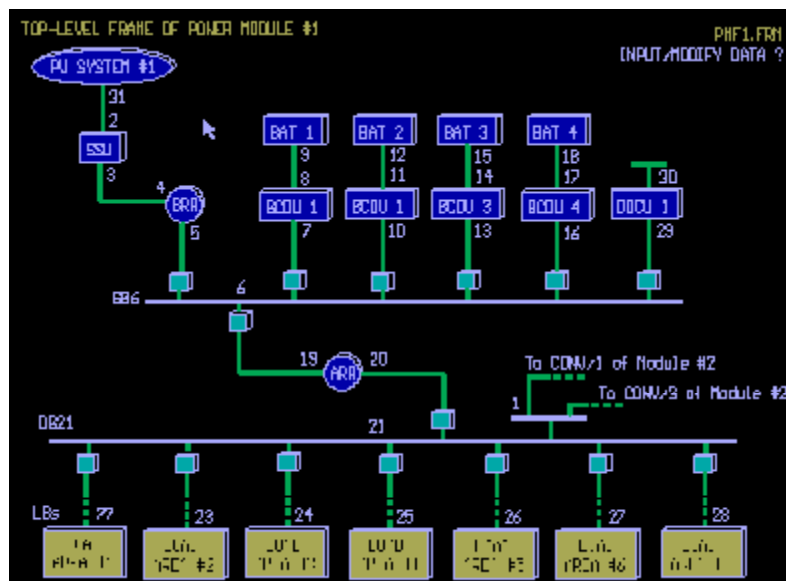# Aerospace Power Systems Design and Analysis (APSDA) Tool

The conceptual design of space and/or planetary electrical power systems has required considerable effort. Traditionally, in the early stages of the design cycle (conceptual design), the researchers have had to thoroughly study and analyze tradeoffs between system components, hardware architectures, and operating parameters (such as frequencies) to optimize system mass, efficiency, reliability, and cost. This process could take anywhere from several months to several years (as for the former Space Station Freedom), depending on the scale of the system.

Although there are many sophisticated commercial software design tools for personal computers (PC's), none of them can support or provide total system design. To meet this need, researchers at the NASA Lewis Research Center cooperated with Professor George Kusic from the University of Pittsburgh to develop a new tool to help project managers and design engineers choose the best system parameters as quickly as possible in the early design stages (in days instead of months). It is called the Aerospace Power Systems Design and Analysis (APSDA) Tool.

By using this tool, users can obtain desirable system design and operating parameters such as system weight, electrical distribution efficiency, bus power, and electrical load schedule. With APSDA, a large-scale specific power system (see the figure) was designed in a matter of days. It is an excellent tool to help designers make tradeoffs between system components, hardware architectures, and operation parameters in the early stages of the design cycle.

Screen sample of a top-level configuration of a typical space and/or planetary electrical power system from the APSDA graphics utility tool.

The APSDA tool is user friendly, with menu-driven, online help and a custom graphical

user interface. It operates on any PC running the MS-DOS (Microsoft Corp.) operating system, version 5.0 or later. A color monitor (EGA or VGA) and two-button mouse are required.

The APSDA tool was presented at the 30th Intersociety Energy Conversion Engineering Conference (IECEC) and is being beta tested at several NASA centers. Beta test packages are available for evaluation by contacting the author.

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