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Paper Abstract

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Govt. Agency/Lab The Subject Technology Was Developed By/For: NASA
Paper Title: The ZIPSIM Series of High Performance, High Fidelity Spacecraft Simulators
Category: Simulation

Description:

ZIPSIM is a software foundation for the development of high performance spacecraft simulators. It has been used to develop FASTSIM for Galileo and is being used to develop HSS for Cassini and an as yet unnamed product for Voyager. ZIPSIM is used to develop inexpensive fast-to-field spacecraft simulators for use in spacecraft design studies, flight software development, sequence validation, and anomaly investigation. It uses a number of novel technologies to provide this capability. The remainder of this abstract discusses those technologies and their application to commercial and industrial needs.

o ZIPSIM is designed to be tailored to suit new projects, and as such is directly useful to companies that develop spacecraft.

o ZIPSIM has several high performance bit-level CPU models, including in particular the 1750A. The 1750A model executes well over a million instructions per second on typical modern workstations, and is useful to any company that sells 1750A-related services (e.g. Hardware, compilers, development environments) or uses 1750A processors in its products.

o ZIPSIM has a novel interfacing technology (called "splices") that makes it easy to interface with third-party products. For example, a 1750A/Ada compiler vendor could interface a simple ZIPSIM with 1750A processor models with its own proprietary debugger and development tools, thus providing a high performance simulator upon which code can be developed before real hardware even exists. This would save the vendor the costs of independent development of such a product and probably provide superior performance as well.

o We have applied Formal Methods to the development of ZIPSIM and derived simulators. Our reason for applying formal methods is rather unique - cost reduction and schedule compression. Again, we have some interesting (and successful!) experiences and techniques to report.