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The Value of "Test-As-You-Fly": Modernizing FPGA Experimentation And Data Analysis for Space Critical Missions

Melanie Berg, Founder/CEO of Space R3 LLC

Abstract:

New methods for characterizing FPGA performance in radiation environments are presented. Application of the new methods are illustrated via walking through FPGA manufacturer Single Event Data and how they are used to calculate system-level error rates for various space environments. This presentation shows that old test and evaluation methods are insufficient while new methods provide better characterization and assistance for determining suitable design/mitigation strategies for space missions.

Short Bio:

Mrs. Melanie Berg has over 30-years of experience as a designer, verification engineer, instructor, and reviewer for ASIC and FPGA applications. Her more visible accomplishments are her contributions to the FPGA designs for the NASA sponsored New Horizons Pluto and Beyond Mission; and her research/development in mitigation strategies. Melanie is a member of the Radiation Effects and Analysis group at NASA/GSFC; and is the founder/CEO of Space R3 LLC. She has published and presented several papers regarding: ionization and microelectronic error-response characterization, reliable synchronous design methodology, robust verification techniques, mitigation strategies for critical circuitry, reliability/survivability prediction calculations, and hardness assurance for space flight systems

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