

## NEPP and CALCE Working Together

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The National Aeronautics and Space Administration (NASA) Electronic Parts and Packaging (NEPP) Program and the Computer Aided Life Cycle Engineering (CALCE) Electronic Products and Systems Center partnership will provide research and development strategies and methodologies for selecting and evaluating electronic parts and packaging technologies on future NASA projects and missions.

Selected NASA engineers will be trained at CALCE on the use and application of CALCE tools and on strategies for improving the quality of parts selection and qualification processes and procedures.

The CALCE Center, based at the University of Maryland, was established in 1986 under a National Science Foundation (NSF) program and operates through industry sponsored research. The center and its original six industry sponsors formed the CALCE Consortium with a mission to create a knowledge and resource base for the development of competitive electronic components, products, and systems.

Today the CALCE Consortium consists of over forty companies and agencies from all over the world, and represents the full breadth of the electronics industry including automotive, avionics, consumer, semiconductor, telecommunications as well as government agencies.

The CALCE research program has also expanded and is committed to developing a comprehensive methodology for achieving quality and sustainability of electronic systems. This research effort is organized by three primary thrusts:

- Failure Identification and Reliability Modeling
- Environment and Operational Assessment of Products
- Risk-Informed Technology Insertion Methodologies

Current research efforts are focused on the use of lead-free solder, parts management, the effect of impact on portable electronics and simulation techniques to virtually qualify electronics.

With over 15 years of research, CALCE has compiled resources on such issues as the use of plastic parts in high reliability applications, durability of ball grid arrays (BGAs) and chip scale packages (CSPs) and guidelines for developing high temperature electronics.

In conducting research, CALCE has always emphasized the examination of the fundamental physical principles that cause failure, for which the group coined the phrase "physics of failure". In striving to provide the best possible service to CALCE sponsors, the Center underwent the process of becoming ISO certified and received the Certificate of Registration for ISO 9001 in December of 1999.

The collaboration between NASA and CALCE will afford NASA engineers the opportunity to interact with CALCE and gain access to CALCE web resources.

The CALCE web site, [www.calce.umd.edu](http://www.calce.umd.edu), contains some of the world's most advanced reliability assessment and virtual qualification software: calcePWA and CADMP II. It provides the guidelines for a silicon-to-system accelerated product qualification, and a wide collection of resources such as journal articles,

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technical reports, web-based textbooks that cover areas of critical importance in electronic product and system development. Also guidelines for solder joint fatigue analysis, cost analysis and supply chain management are available through the web site.

The CALCE research and software is available to NASA GSFC engineers and contractors through the NEPP web site at <http://nepp.nasa.gov>. CALCE is in

the process of forming additional partnerships with the other NASA centers. An online account request form is available at [http://www.calce.umd.edu/account\\_request.html](http://www.calce.umd.edu/account_request.html).

For more information on the program, contact Dr. Michael Osterman, [osterman@calce.umd.edu](mailto:osterman@calce.umd.edu), or Ashok Sharma, [asharma@pop300.gsfc.nasa.gov](mailto:asharma@pop300.gsfc.nasa.gov)