

Feb 14, 2019

# Electronics Reliability: What the Best Companies are Doing

## The U.S. National Academy of Science Study

### ABSTRACT:

The urgency to deploy new technologies and capabilities often leads to systems being fielded without having first demonstrated adequate reliability. Deficient systems cost money and are much more likely to require extra maintenance, lead to recalls, and cause general customer dissatisfaction. Reliability Growth: Enhancing Defense System Reliability, is a report from the National Academy of Science (NAS), written by the leading reliability and risk analysis experts in the U.S., including Prof Pecht. This report offers recommendations to improve defense system risks throughout the sequence of stages that comprise DoD acquisition processes—beginning with the articulation of requirements for new systems and ending with feedback mechanisms that document the experience of deployed systems. This presentation will overview some of the key reliability problems that have plagued organizations, and the solutions for improvement recommended by the NAS committee. However, Professor Pecht will expand upon this and provide insights into the reliability concerns with the whole electronics supply chain, including parts selection, qualification processes and reliability predictions. The use of reliability science and machine learning (data analytics) will be presented to show how the best companies are addressing product reliability prediction. The presentation will include supply chain issues, change issues, qualification testing and implementation.



### Michael Pecht

*Professor Department of  
Mechanical Engineering,  
University of Maryland,  
MD*

### BIOGRAPHY:

Prof Michael Pecht has a BS in Physics, an MS in Electrical Engineering and an MS and PhD in Engineering Mechanics from the University of Wisconsin at Madison. He is a Professional Engineer, an SAE Fellow, an IEEE Fellow, and an ASME Fellow. He is the editor-in-chief of IEEE Access, and served as chief editor of the IEEE Transactions on Reliability for nine years, and chief editor for Microelectronics Reliability for sixteen years. He has also served on three National Academy of Science studies, and two US Congressional investigations in automotive safety. He is the founder and Director of CALCE (Center for Advanced Life Cycle Engineering) at the University of Maryland, which is funded by over 150 of the world's leading electronics companies at more than US\$6M/year. The CALCE Center received the NSF Innovation Award in 2009 and the National Defense Industries Association Award. He is currently a Chair Professor in Mechanical Engineering and a Professor in Applied Mathematics at the University of Maryland. He has written more than twenty books on product reliability, development, use and supply chain management. He has also written a series of books of the electronics industry in China, Korea, Japan and India. He has written over 700 technical articles and has 8 patents. He consults for 22 international companies. In 2015 he was awarded the IEEE Components, Packaging, and Manufacturing Award for visionary leadership in the development of physics-of-failure-based and prognostics-based approaches to electronics reliability. In 2010, he received the IEEE Exceptional Technical Achievement Award for his innovations in the area of prognostics and systems health management. In 2008, he was awarded the highest reliability honor, the IEEE Reliability Society's Lifetime Achievement Award.