



**April 2021 Newsletter**  
**The IEEE Reliability Society**  
**Joint Section Chapter: Boston - New Hampshire - Providence**  
**August 2020 – April 2021**  
<http://www.ieee.org/bostonrel>

## Welcome to the Boston Chapter Newsletter:

“Thank you” to our members and friends for their continuing support and participation in the joint chapter. Despite the ongoing pandemic, our joint chapter and partner groups have been able to sponsor 8 on-line meetings with registrations of 25 to greater than 100. While we miss the in-person networking, on-line applications have allowed the IEEE Reliability community to gather virtually with subject matter experts to converse about applications and solutions.

Thanks to your involvement, the Reliability Society has again proclaimed us among the topmost chapters worldwide. Our success can only be achieved with continued support from our members. The core team of volunteers help us keep things going, but there is ample opportunity for new members to participate in the Advisory Committee. Please send us an e-mail to attend one of our Advisory Committee meetings or if you are interested in presenting at a monthly meeting. We are always working to fill the calendar with fresh reliability presentations months in advance. We welcome Joe Li as new webmaster and thank outgoing Jeff Clark for his many years of website support. Contact Chair Mike Bannan [michael.bannan@ieee.org](mailto:michael.bannan@ieee.org) if you are interested in being added to our meeting notifications. You may find URL links to all the meetings on <https://events.vtools.ieee.org>, - search for region 1, section Boston, CH01021.

## Recent Activities:

The IEEE Boston/Providence/New Hampshire Reliability Chapter has been fortunate to sponsor eight on-line presentations between August 2020 and April 2021. The topics were as follows:

- Near Field EMC Scanning Method Based on an E-Field Collapse
- The Customer is Always Right!
- Rebuilding After Covid-19
- Failure Mode & Effects Analysis: The New 7 Step Approach
- Covariate Software Reliability Models and Applications
- JMP Reliability Platforms – a Zoom In then Zoom Out Introduction
- ESD Fixture Design Considerations and Case Studies Webinar
- Space Radiation Effect – Modeling the Environment for Systems Analysis

## Meeting Highlights:

August 11 ,2020

### Near Field EMC Scanning Method Based on an E-Field Collapse

Jeffrey Dunninghoo, Founder, Pragma Design

Jointly sponsored by NE ESDA Chapter, IEEE Boston Reliability, iMAPS New England, and Boston SMTA.

Jeffrey shared a new method to validate EMC/ESD robustness. Since the introduction of the Field Collapse Event (FCE) testing improvements over Charged Board Events (CBE), this methodology has been expanded to other ESD/EOS/EMC domains. While high voltage referenced CBE is a distinct ESD aggressor, FCE methods allow functional and powered testing with similar real-world pulses while the system under test remains at a safe ground potential. Combining this new method together with automated near field scanning equipment to construct E- and H-field information of a system during transient ESD events was described. This inexpensive method provides an alternative way for system designers to validate and analyze the EMC/ESD robustness of electronic systems without TLP pulsers, IEC61000-4-2 guns, or precision inductive current probes.

October 14, 2020

### The Customer is Always Right!

Jay Skolnik PE, CPI, CPM, Skolnik Technical Training, Albuquerque, NM

Jointly sponsored by NE ESDA Chapter, IEEE Boston Reliability, iMAPS New England, and Boston SMTA.

Jay provided several real-world examples where customer perception was very important to the design even in absence of reality. A customer melting metal for jewelry observed much better results when he pressed a (dead) switch to engage the new machine routine. A car only had operational problems when customer bought a certain product from the store, due to the cooling time the visit took. An extensive design effort for a reconnaissance military aircraft without pilot input was a failure. Several other application failures were presented from design, environment, and operational perspectives.

October 22, 2020

### Rebuilding After Covid-19

Alex (Sandy) Pentland, MIT

Jointly sponsored by Greater Boston AMC (Assoc. for Computing Machinery) and IEEE Boston Reliability

The pandemic has destroyed much of the world economy, and laid bare many failures in our health, finance, law, and government systems. Digital technologies can help us rebuild by enabling more resilient, effective, secure, and inclusive systems. Sandy Pentland discussed what world leaders, multilateral organizations (World Bank, OECD, UN, etc.) and industry are discussing, and how IEEE and ACM members can contribute to these digital initiatives and help them to achieve the best possible outcomes.

November 10, 2020

### Failure Mode & Effects Analysis: The New 7 Step Approach

Laura Halleck, Quality Support Group

IEEE Boston/Providence/New Hampshire Reliability Chapter

The US and Europe Automotive OEMs have recently harmonized their regional FMEA of the Automotive Industry Action Group (AIAG) and Verband der Automobilindustrie (VDA), Germany's association for automotive manufacturers and suppliers, resulting in a common foundation for FMEAs across all global automotive sectors represented by AIAG and VDA. Making it easier for suppliers to meet their customers' needs during the FMEA development process, the handbook features major changes such as a new process for FMEA development – the 7-Step Approach.

Important changes include the following:

- Totally revised Severity, Occurrence and Detection Tables.
- The Action Priority (AP) methodology and Tables to replace RPN.
- New Form Sheets (spreadsheet users) and Software Report Views (software users).
- Change point highlights from both the AIAG 4th edition FMEA Manual and the VDA Volume 4 FMEA Manual.

December 8, 2020

## Covariate Software Reliability Models and Applications

Lance Fiondella, University of Massachusetts Dartmouth  
IEEE Boston/Providence/New Hampshire Reliability Chapter

Traditional software reliability growth models enable quantitative assessment of the software testing process by characterizing defect detection in terms of testing time or effort. Most of these parametric models do not identify specific testing activities underlying defect discovery and only provide general guidance on how to incrementally allocate effort. This talk presented a non-homogeneous Poisson process software reliability growth model incorporating covariates based on the discrete Cox proportional hazards model, which explicitly link test activities to defect discovery. Expectation conditional maximization algorithms were derived to estimate the numerical parameters of a model that best characterized the failure data collected during testing. An optimal test activity allocation problem was formulated to maximize defects discovered, so that they could be corrected prior to release. An overview of the Covariate Software Failure and Reliability Assessment Tool (C-SFRAT) was provided.

Feb 24, 2021

## JMP Reliability Platforms – a Zoom In then Zoom Out Introduction

Peng Liu, JMP Reliability R&D Expert, SAS  
IEEE Boston/Providence/New Hampshire Reliability Chapter

JMP has a comprehensive suite of tools for reliability data analysis and reliability engineering, to address time-to-failure distribution analysis, warranty forecast, accelerated life test data analysis, degradation data analysis, recurrent events data analysis, reliability growth, and system reliability analysis using reliability block diagram and system maintenance simulation. The first of two general demonstrations illustrated the capability of warranty forecast in the Reliability Forecast platform. The second illustrated the Bayesian modeling capability of analyzing accelerated life test data. Additional examples and use cases highlighted some of the distinctive capabilities of JMP reliability platforms.

March 10, 2021

## ESD Fixture Design Considerations and Case Studies Webinar

Ted Dangelmayer, Dangelmayer Associates, LLC  
Jointly sponsored by NE ESDA Chapter, IEEE Boston Reliability and iMAPS New England.

Ted presented an interactive webinar and learn about the complexity, customization, and attention to detail required to successfully develop fixtures for ESD sensitive applications including Class 0 devices. Fixture design considerations were presented including material selection, ESD event detection, isolated conductors, and limitations of ionization. Manufacturing applications will cover operations such as in-circuit test, ESD damage during a board connector press operation, cable discharges at test sets, automated test heads, and burn-in. One of the Class 0 Case documents 22% failures rates with a good S20.20 program in place. The corrective action required modification to a test fixture and the addition of a special operating procedure. A particularly interesting Class 0 case study will be presented on the installation of CCDs at the Gemini Observatory in Hawaii. These CCDs cost \$175,000 each which did not have any input protection and a 10 V CDM sensitivity.

April 14, 2021

## Space Radiation Effect – Modeling the Environment for Systems Analysis

Dr. J. Brent Parham, MIT Lincoln Laboratory

The space environment presents many natural hazards, one of which is a harsh radiation environment. Energetic ions from the sun and far-off galaxies affect sensitive microelectronics, causing a multitude of adverse effects. With modern manufacturing techniques that increase performance by decreasing feature sizes, commercially available digital parts such as FPGAs are only becoming softer to particle radiation, reducing reliability. This talk discusses how analysis of this environmental risk can be done in the system engineering process and introduces in-house modeling efforts at Lincoln Laboratory that will better enable future space program assessments of reliability.

## Advisory Committee (AdCom) Members 2021

Chair: Mike Bannan – BAE Systems - [michael.bannan@ieee.org](mailto:michael.bannan@ieee.org)  
Vice Chair: Ken Rispoli - Retired [ken-rispoli@ieee.org](mailto:ken-rispoli@ieee.org)  
Secretary: Dan Weidman - MIT Lincoln Laboratory [danweidman@ieee.org](mailto:danweidman@ieee.org)  
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Publicity: Vacant

### Members at Large:

Gene Bridgers - Results MA [gbridgers@resultsma.com](mailto:gbridgers@resultsma.com)  
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Jay Yakura - Analog Devices, Inc. [james.yakura@ieee.org](mailto:james.yakura@ieee.org)

## Chapter Seeks Volunteers

The IEEE mission is Advancing Technology of Humanity.

The IEEE Reliability Society mission is Promoting recognition of the reliability profession, developing, and disseminating reliability best practices, and being a resource for collaboration among reliability professions.



As a volunteer organization, our success is directly related to having people like you involved in the planning and execution of our meetings and communication processes.

Please consider joining us.

Email or talk to any of us at the next monthly presentation or attend one of our Advisory Committee meetings to see how the team works together. Your contributions may be as much or as little as you would like. We have a good team of volunteers that help us keep things going, so if you would like to join us, there is ample opportunity to choose how you would like to contribute.

You may find URL links to all the meetings on <https://events.vtools.ieee.org>, - search for region 1, section Boston, CH01021. For updates on upcoming events see the IEEE Spectrum or contact Mike Bannan [michael.bannan@ieee.org](mailto:michael.bannan@ieee.org) to be added to our notification list

## **Consider Reliability Society Membership**

Society Membership includes:

- Society Newsletter (electronic),
- IEEE Transactions on Reliability (online),
- IEEE Reliability Society Conference Digital Library (online), and
- IEEE Reliability Society Resource Center (online).

Readers can contact chapter newsletter editor Mary Jones ([maryajones@ieee.org](mailto:maryajones@ieee.org)) with any comments, suggestions or if interested in contributing to our next issue.

## **The IEEE Reliability Society Joint Section Chapter Boston - New Hampshire - Providence**