



February 2019 Newsletter
The IEEE Reliability Society
Joint Section Chapter: Boston - New Hampshire - Providence
November 2018 –January 2019
<http://www.ieee.org/bostonrel>

Happy New Year I hope everyone had a safe and healthy holiday. The winter has set in with record breaking temperature in the Midwest. Here in New England we haven't had the extreme temperatures and so far the snow totals are below average but February is our traditional snow month.

I had the opportunity to attend one of the new car shows that occur around this time of the year. Great looking cars, trucks and SUV's and some interesting electric vehicles were on display from all the mainstream manufacturers and some new entries. The one thing that really caught my eye was the amount of electronics that is becoming standard with connected vehicle, Wi Fi, Bluetooth and even satellite connection. There is the start of autonomous vehicle with accident avoidance and driver assistance systems. Power trains are going more electric with hybrid and all electric systems. These will continue to displace the standard internal combustion engine that is also seeing drastic changes and upgrades to extend product life while reducing emissions and increasing gas mileage. All these changes bring along new challenges to insure safety and reliability. These systems are complex with enormous opportunities for software and hardware failures. Testing can't catch all the bugs and software upgrades require either down loading on the fly or going back to the dealer. Just think what happens to your computer or smart phone if they hit a bug, just down load software upgrades and reboot. I'd hate to think of what would happens when I'm driving on the highway or in traffic and the system encounters a "glitch" and tries to reboot or automatically shifts over to a safe mode without any warning. There is also the introduction of artificial intelligence with all its challenges and unknowns to deal with as this is being considered as a way to improve system reliability.

With all this I couldn't help think of how important reliability engineering has become. Things aren't getting easier just more complex and challenging.

Regards

Kenneth P Rispoli

IEEE Life Member

IEEE Reliability Society AdCom Member '16-'18

Chair, IEEE Reliability Society Boston Chapter joint with Providence, RI and New Hampshire

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Recent Activities:

- November 14, 2018 **“Keyence Inspection Solutions – Superior Analysis through Clearer Observation”** Alik Apelian Keyence Corporation of America
- December 12, 2018 **“Functional Electronic Clones & China’s plan to Dominate the Semiconductor-Manufacturing Industry.”**
Tom Sharpe SMT Corp
- January 20, 2019 **Introduction to Thermal Imaging using Infrared Technology”** Video presentation by FLIR

Upcoming Events:

- March 13, 2019 **“ESD QMS Best Practices Strategy for Class 0”** Ted Dangelmayer Dangelmayer Associates, LLC.
- March 19, 2019 **Photo Etch Technology**, Presentation and plant tour details to follow
- April 11, 2019 **“Design for “Rinsability” of Electronic Components”**
Norman Armendariz PhD Raytheon

Reliability Society Sponsored Conferences

RAMS	Reliability & Maintainability Symposium	USA <i>January (annual)</i>
ISQED	Int'l Symposium on Quality Electronic Design	USA <i>March</i>
IRPS	IEEE Int'l Reliability Physics Symposium	USA <i>March-April</i>
WF-IoT	IEEE World Forum on Internet of Things	Ireland <i>April 2019</i>
ICPHM	IEEE Int'l Conference on Prognostics & Health Management	USA <i>June (annual)</i>
ISSSR	Int'l Symposium on Safety & Software Reliability	China <i>June</i>
SG4SC	IEEE Int'l Forum on Smart Grids for Smart Cities	Europe <i>November</i>
PHM-Chengdu	Prognostics & Systems Health Management Conference	China <i>October</i>
ICRMS	Int'l Conference on Reliability, Maintainability & Safety	China <i>October (annual)</i>

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).

“Keyence Inspection Solutions – Superior Analysis through Clearer Observation” November 14, 2018 Alik Apelian Keyence Corporation of America

ABSTRACT: Keyence is a rapidly growing leader in factory automation products and turnkey inspection equipment. Their microscope and surface measurement systems ensure that their customers can meet increasing quality standards and guarantee the reliability of their products.

During our November meeting, two specialists from Keyence discussed High-Resolution Microscope systems and how they are an asset in Reliability, Failure Analysis, and R&D. These systems are designed to allow the researcher or engineer to make better decisions through superior imaging and metrology with reduced subjectivity and how these products are used for a variety of applications including counterfeit electronic detection. Multi-directional lighting and full focus stacking make it easy to identify these in a fraction of the time, and with greater confidence. It is estimated that 70-80% of all potential counterfeits can be caught with a thorough inspection. Counterfeit inspection techniques are still new for many in the industry.

Discussed was the many surface roughness parameters, and why Ra isn't always the best choice in analysis surface texture. Many companies are moving away from stylus and profilometers and toward laser scanning microscopes to get down to the true depth of a groove with 0.5nm resolution, and 87-degree slope angle detection.

Keyence demonstrated 3 of their Microscope systems and discuss the value each one provides: A Digital Microscope, a Laser Scanning Confocal, and a 3D Measuring Macroscopic. Keyence encourages attendees to bring samples to see the equipment in action after the meeting.



AUTHOR BIO: Alik started with Keyence in 2012 as product specialist for Digital Microscope and High Speed Camera. Since then, she has moved into management of a team of 5 who span that area.

Alik is a member of the IEEE Reliability Society and has spent some time on the Boston Chapter Advisory Board. She graduated from UMass Amherst in 2007 with an International Business degree.

“Functional Electronic Clones & China’s plan to Dominate the Semiconductor-Manufacturing Industry.” December 12, 2018 Tom Sharpe, SMT Inc.

ABSTRACT: The first half of the presentation focused on the relatively recent appearance of cloned electronic components within global supply chains. The entire electronics industry is now facing a much more insidious counterfeit threat than at any time in the past. The existence of cloned electronic components bearing the markings of major component manufacturers in today's global supply chains has been clearly established within SMT's labs over the past 6 years.

The most worrisome aspect of these “made from scratch” fakes is their ability to easily pass current inspection

processes *AND* electrical testing to the manufacturers data sheet. The presentation will focus on several actual examples of this most concerning advanced counterfeiter capability and some of the cutting-edge processes utilized by SMT as an obsolescence component supplier and testing lab to mitigate this new and growing threat from making it to our OEM, EMS & CM customers.

The 2nd half of the presentation will focus on the current state and future OEM/End-User implications of Chinas' "Home-grown Chips" initiative targeting the semiconductor manufacturing industry over the next 2-5 years.

Both of these presentation focal points will be discussed in the context of their predictable future effects on the entire "Hi-Reliability" Electronics Industry.



AUTHOR BIO: Tom Sharpe is Executive Vice President of SMT Corporation which maintains the largest inventory of obsolete & DMS-type electronic components within the U.S. - as well as the largest in-house authentication and electrical testing service capability within the Independent Distribution sector.

Tom is a founding member of the SAE G-19 AS6081 committee which is continuing to develop new inspection and process standards in the fight against counterfeit electronic components in global supply chains.

SMT's labs are credited with the initial identification and industry-sharing of several counterfeit processes over the past several years as well as developing the required mitigation inspections to reliably detect these new counterfeiting methods.

In 2011 Tom was requested to provide subject-matter-expert (SME) testimony before the formal Senate Armed Services Committee (SASC) hearings on counterfeit electronic components within DOD supply chains.

In 2012 SMT labs were credited with being the first to identify the newest threat from China - "made from scratch" functional cloned electronic component devices within global supply chains.

Tom's presentations serve to educate all sectors of the electronics industry about the growing dangers of counterfeits in today's market and best practices to reliably detect and mitigate these constantly evolving dangers.

"Introduction to Thermal Imaging using Infrared Technology"

January 20, 2019 FLIR Systems

This video presentation was targeted to people that have not used or are new to Thermal Imaging and discussed the physics of how thermal imaging works and some of the common misconceptions. Various camera/sensor types were discussed, how they are different from each other, optics/lenses and the applications that leverage their strengths and finished with how the images can be analyzed and exported to other applications for further analysis or report generation.



AUTHOR BIO: Jeff Steele has worked in the field of Measurement and Testing for over 30 years. He has a BS in Electrical and Computer Engineering from Clarkson University. He currently is employed by FLIR Systems, a leader in Thermal Imaging technology.

2019 Advisory Committee (AdCom) Members

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Readers can contact chapter newsletter editor Ken Rispoli (ken-rispoli@ieee.org) with any comment/suggestion or if interested in contributing to our next issue. Thanks.

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