

# CMSE 2017

## Advanced Program and Registration



## 21<sup>st</sup> Annual

Components for Military & Space Electronics  
Conference & Exhibition

April 11-13<sup>th</sup>, 2017

Four Points by Sheraton (LAX)  
Los Angeles, California



*Organized by: TJ Green Associates LLC*

# Invitation to CMSE 2017

Dear Military and Space Electronics Professionals,

The CMSE Conference, Training and Exhibition promotes new technology and advancements in electronic components for use in military and space electronic systems. The DoD and NASA continue to emphasize the use of commercial electronics, where suitable, to drive down procurement and life cycle cost of military/aerospace systems. Many new components are only available as advanced PEMS and COTS. This conference focuses on how to successfully incorporate these new technologies into the harsh environments of military and space systems, which often require ten or twenty year mission life.

Two such thrust areas are copper wirebonding and the use of “non-hermetic” packaging in lieu of traditional hermetic packages. We have an entire session devoted to copper wire with peer selected talks from key industry experts. In addition to “non-hermetics” there are several presentations on the newly tightened MIL-STD-883 TM 1014 hermeticity test spec limits for class K hybrids and new leak testing technologies designed to meet tighter specs. A panel discussion is planned for this important topic of hermetic vs non-hermetic parts.

The latest developments in polymer tantalum capacitors, BME MLCC are presented along with success stories and challenges of COTS insertion will be a major point of discussion at this year’s conference, as it has in the past.

Day one is a full day of cutting edge educational seminars (dual track) designed to complement the speaker presentations scheduled on the following two days. These professional educational seminars are an important part of the CMSE tradition.

CMSE was founded 20 years ago by Leon Hamiter, a retired NASA engineer. Recipients are requested to pass this Program to components engineers in your address book. After many successful conferences Leon has decided to step back from the chairman position and pass the torch so to speak, however Leon will remain active in helping to steer the conference in the right direction for many years to come. We thank Leon for his vision and service to the community.

Personnel working in this field are encouraged to attend CMSE 2017 to learn about the new technology advancements and stay current with industry trends.

I look forward to meeting each and everyone one of you in April at the Four Points by Sheraton, conveniently located at the LAX airport.

A handwritten signature in black ink that reads "Tom Green". The script is fluid and cursive, with the first letters of "Tom" and "Green" being capitalized and prominent.

Program Chairman

## Program Committee

Tom Green

*TJ Green Associates LLC  
Program Chair*

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*AVX Corp.*

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*Hesse Mechatronics*

Mike Sampson

*NASA*

Jeff Sokol

*The Aerospace Corp.*

Tom Terlizzi

*TJ Green Associates LLC*

## General Information

### VENUE ACCOMMODATIONS



### Four Points by Sheraton LAX

9750 Airport Blvd.  
Los Angeles, CA 90045  
Tel: +1 (310) 645-4600

Room reservations should be made directly with the hotel and mention the event CMSE\*. A block of rooms have been reserved starting at a single rate of \$135/night plus tax (add \$10 for each additional person). Individual guests may reserve a room by calling +1 (800) 529-4683 or [book online](#).

*\*Reservations should be made no later than Tuesday March 28th, 2017.*

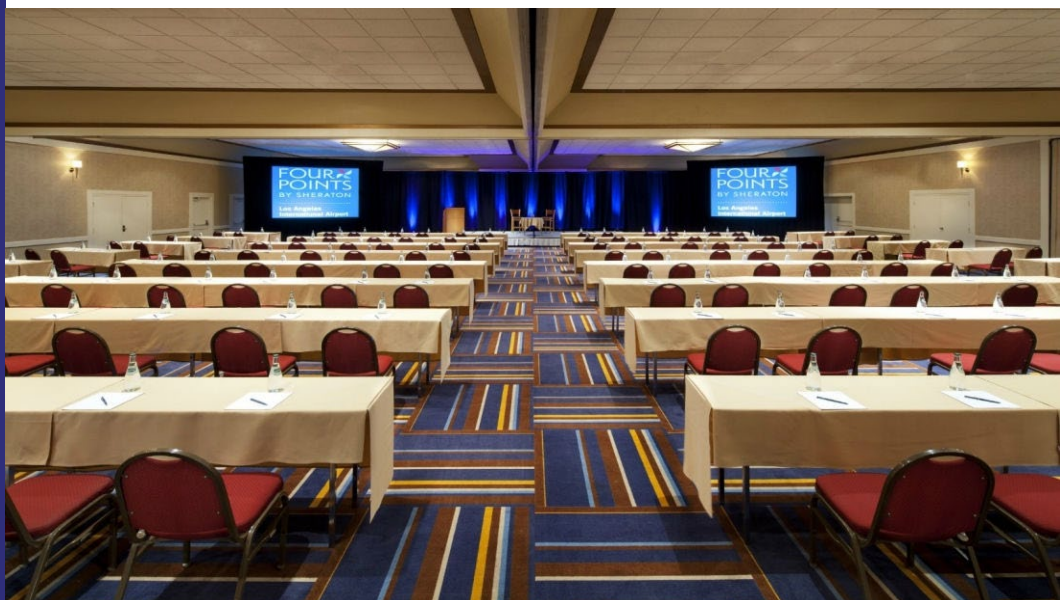
### PARKING

The Sheraton Four Points Hotel discounted self-parking is \$12/day or \$14/overnight.

### HOTEL SHUTTLE

The Hotel provides 24-hour complimentary shuttle service between the airport and hotel. Go to the transportation island outside baggage claim for pickup at the Hotel Shuttle sign.

For questions email  
[amber@tjgreenllc.com](mailto:amber@tjgreenllc.com).





# Schedule of Events

## TUESDAY, APRIL 11

### Training Seminars

0700 - 0800

#### **BREAKFAST AND REGISTRATION**

0800 - 1200

Morning Session A

#### **HERMETICITY TESTING, RGA AND THE NEW TM 1014 SPEC LIMITS**

Hermeticity of electronic packages including hybrids, RF microwave modules, semiconductor devices and MEMS continues to be of critical importance to the military and aerospace community as evidenced by the recent tightening of the spec limits in MIL-STD-883 test method 1014. This seminar examines each of the major hermeticity test methods described in TM 1014. The basic science and applicability of HMS (helium mass spectroscopy), radioisotope Kr-85 and optical leak test (OLT) methods are examined in detailed. Each method is compared/contrasted in light of the new specification limits.

The gas content inside a sealed electronic package is measured using RGA (Residual Gas Analysis). The basic scientific principles of the RGA test are described and reviewed along with the basis for the 5,000 ppm moisture spec level. RGA data and how it relates to hermeticity and as a process monitor is also discussed along with plenty of time for questions.

Students will come away with a better understanding of the latest hermeticity test methods and new spec limits along with an understanding of RGA testing and how the two are related.

[Click here for full course outline.](#)

#### **THOMAS J GREEN**

*TJ Green Associates LLC*

#### **ROBERT LOWRY**

*Electronic Materials Consultant*

Morning Session B

#### **MULTI LAYER CERAMIC CAPACITOR TECHNOLOGY...MATERIALS, PROCESSES AND RELIABILITY**

Ceramic capacitors are widely used in high reliability military and aerospace applications and recent qualifications of Capacitor BME technology within the Space community has delivered larger capacitance values in smaller sizes. This seminar introduces the technologies and materials used to manufacture ceramic capacitors and how these are adjusted and developed to meet a wide spectrum of applications needed from low voltage 4V parts to high voltage KV rated parts. The product design and materials selected are examined to better understand their influence on both the reliability metrics and the parametric performance of the capacitors in the final product application. CSAM and Burn IN processes are discussed in detail along with their influence on defect elimination and product reliability.

Detailed product data is discussed and over-voltage and over-temperature conditions are used to evaluate BME technology product capabilities. This data is used to calculate and extrapolate reliability performance. The QPL status of the MLCC BME products and planned future developments is also reviewed with plenty of time for questions.

[Click here for full course outline.](#)

#### **JOHN MARSHALL**

*AVX Corp*

*continued...*

## Schedule of Events *Continued*

### TUESDAY, APRIL 11

#### Training Seminars

1300 - 1700

Afternoon Session A

##### **NON-HERMETIC PACKAGING FOR HI-REL MILITARY AND AEROSPACE**

Packages made from polymeric materials as opposed to traditional hermetic materials (i.e. metals, ceramics and glasses) require a different approach from a production, testing and qualification standpoint. The problem is now one of moisture diffusion through the barrier and package interfaces. Fick's law of diffusion and the interaction of moisture and other gases with the plastic package, with or without a cavity, is of primary importance. The Class Y qualification program is an attempt to standardize the screen testing and qualification of PEMS. This seminar reviews some of the basic science and reliability issues related to plastic packaging.

A review of the techniques and methods to evaluate a "non-hermetic" approach is discussed with a special emphasis on cleaning of the device prior to encapsulation and alternate test methods to evaluate reliability.

Attendees will gain a better understanding of the reliability issues and material selection, testing and qualification of "non-hermetics" intended for mil and aerospace applications.

[Click here for full course outline.](#)

##### **THOMAS J GREEN**

*TJ Green Associates LLC*

##### **ROBERT LOWRY**

*Electronic Materials Consultant*

Afternoon Session B

##### **MICROELECTRONIC PACKAGE & BOARD FAILURE MECHANISMS AND RELATED ANALYSIS TECHNIQUES**

This seminar is aimed at the beginner to advanced engineer working in the area of failure analysis, microelectronic packaging, board assembly characterization and anyone directing, developing, designing, or managing others that are working in these areas. The focus is on the analysis equipment and techniques required to understand root cause of failure and characterize microelectronic packaging and assembly processes.

Methods such as CSAM, 2D and 3D X-ray, XRF, 3D Visual Inspection, DSC/TMA used to evaluate plastic packages, underfills, encapsulations, molding compounds and board level interconnects are reviewed in detail. The instructor brings years of experience and real world examples of successful component and board level analysis to the classroom.

[Click here for full course outline.](#)

##### **STEVE GREATHOUSE**

*Plexus Corporation*

*End Day 1*

## Schedule of Events *Continued*

WEDNESDAY, APRIL 12	THURSDAY, APRIL 13
Conference and Exhibition EXHIBIT HOURS: 1100 - 1900	Conference and Exhibition EXHIBIT HOURS: 1000 - 1400
0800 - 0815 WELCOME/INTRO	0800 - 0830 CHALLENGES FOR FUTURE SPACE SYSTEMS ACQUISITIONS <b>KEYNOTE</b> <b>DAVE DAVIS</b> <i>USAF SMC</i>
0815 - 0845 ECHOES OF THE PAST, GLIMPSES OF THE FUTURE.. ONGOING TRENDS IN ASSURANCE OF EEE PARTS FOR SPACEFLIGHT <b>KEYNOTE</b> <b>MICHAEL J. SAMPSON</b> <i>NASA Goddard Space Flight Center</i>	SESSION 3 COPPER WIRE BONDING FOR HIGH RELIABILITY APPLICATIONS
SESSION 1 HERMETIC VS NON-HERMETIC PACKAGING.....IS OUR FATE SEALED?	0830 - 0855 3.1 INTRODUCTION OF HIGH RELIABILITY COPPER BONDING WIRE FOR HIGH REL INDUSTRIAL, A&D AND AUTOMOTIVE APPLICATIONS <b>WILLIAM (BUD) CROCKETT, JR.</b> <i>Tanaka Denshi Group Saga</i>
0845 - 0910 1.1 HERMETIC AND NON-HERMETIC QML ICS – CURRENT STATUS AND CHALLENGES <b>SHRI AGARAWL</b> <i>NASA/JP</i>	0855 - 0920 3.2 A REVIEW ON COPPER WIREBOND TECHNOLOGY IN PEMS <b>DR. MUKUL SARAN, QRE</b> <i>Texas Instruments</i>
0910 - 0935 1.2 COTS & COTS + TANTALUM CAPACITOR FAILURES CONFIRM SYSTEMIC MOISTURE SENSITIVITY ISSUES <b>AARON DERMARDEROSIAN</b> <i>Raytheon Space and Airborne Systems</i>	0920 - 0945 3.3 ASSESSMENT OF COPPER BOND WIRE FOR USE IN LONG TERM MILITARY APPLICATIONS <b>AARON LECOMTE</b> <i>Raytheon Integrated Defense Systems</i>
0935 - 1000 1.3 THE NEW TIGHTER HERMETICITY TEST LEAK REQUIREMENTS – EUROPEAN OVERVIEW <b>GONZALO FERNÁNDEZ ROMERO</b> <i>Alter Technology</i>	0945 - 1010 3.4 DECAPSULATION OF COPPER WIRE BONDED DEVICES <b>SUBRAMANI MANOHARAN, F. PATRICK MCCLUSKEY</b> <i>CALCE University of Maryland</i>
1000 - 1015 COFFEE BREAK	1010 - 1030 COFFEE BREAK
1015 - 1040 1.4 HERMETIC WELD SCHEDULE OPTIMIZATION BASED TIGHTER TM 1014 LEAK RATE SPECIFICATIONS <b>RICH RICHARDSON</b> <i>Microcircuit Labs LLC</i>	1030 - 1055 3.5 CU BOND WIRE RELIABILITY & DECAPSULATION PROCESS <b>S. ALI LILANI</b> <i>Integra Technologies LLC</i> <b>GARY DOWNING</b> <i>Analytical Solutions</i>
<i>continued...</i>	<i>continued...</i>

click session titles to view full abstract

## Schedule of Events *Continued*

WEDNESDAY, APRIL 12		THURSDAY, APRIL 13	
Conference and Exhibition		Conference and Exhibition	
1040 - 1105 <b>1.5 MEETING THE NEW TIGHTER HERMETICITY REQUIREMENTS WITH OPTICAL LEAK TESTING (OLT)</b> <b>TOM TRAFFORD</b> <i>NORCOM</i>		1050 - 1115 <b>3.6 FLEXIBLE COPPER WELDED INTERCONNECTS FOR CROSSTALK REDUCTION IN WBG POWER MODULES</b> <b>DR. DOUG HOPKINS, ADAM MORGAN AND MIKE MCKEOWN</b> <i>NC State Hesse-Mechatronics</i>	
1105 - 1130 <b>1.6 GROSS LEAK STANDARDS DEVELOPMENT</b> <b>KATHY LAIRD</b> <i>NASA/MSFC</i>		1115 - 1140 <b>3.7 HIGH PERFORMANCE PACKAGING FOR SPACE</b> <b>ARNE K. KNUDSEN</b> <i>Kyocera America Inc.</i>	
1130 - 1200 <b>1.7 HERMETIC/NON-HERMETIC PANEL DISCUSSION</b> <b>LARRY HARZSTARK, MODERATOR</b> <i>Aerospace Corp</i>		1140 - 1205 <b>3.8 HIGH RELIABILITY RAD HARD E-MODE GALLIUM NITRIDE HEMT GAN POWER TECHNOLOGIES &amp; PACKAGING FOR SPACE</b> <b>JIM LARRAURI</b> <i>Freebird Semiconductor</i>	
1200 - 1400 <b>LUNCH - IN EXHIBITS AREA</b>		1205 - 1330 <b>LUNCH - IN EXHIBITS AREA</b>	
<b>SESSION 2</b> <b>PASSIVE COMPONENTS AND PACKAGING METHODS FOR HI REL/SPACE APPLICATIONS</b>		<b>SESSION 4</b> <b>COTS: SUCCESS STORIES AND CHALLENGES</b>	
1400 - 1425 <b>2.1 DEGRADATION AND ESR FAILURES IN MNO2 CHIP TANTALUM CAPACITORS</b> <b>ALEXANDER TEVEROVSKY</b> <i>ASRC Federal Space and Defense</i>		1330 - 1355 <b>4.1 UNDERSTANDING PCB DESIGN &amp; MATERIAL WARPAGE CHALLENGES WHICH OCCUR DURING B2B BOARD-TO-BOARD/MODULE-CARRIER ATTACHMENT</b> <b>ERIC MOEN</b> <i>Akrometrix</i>	
1425 - 1450 <b>2.2 TANTALUM POLYMER CAPACITORS: COTS PLUS SOLUTIONS FOR SPACE APPLICATIONS</b> <b>CHRIS REYNOLDS</b> <i>AVX</i>		1355 - 1420 <b>4.2 3D DIGITAL STITCHING IN THE ELECTRONICS WORLD AND ITS USE WITH DENDRITIC GROWTH STUDIES</b> <b>STEVE GREATHOUSE</b> <i>Plexus Corporation</i>	
1450 - 1515 <b>2.3 POLYMER TANTALUM CAPACITORS UNDER VACUUM</b> <b>MICHAEL COZZOLINO</b> <i>Raytheon Systems</i>		1420 - 1445 <b>4.3 HALT TESTING FOR USE OF COTS PARTS ON NASA MISSIONS</b> <b>ANUPAM CHOUBEY</b> <i>NASA JPL</i>	
<i>continued...</i>		<i>continued...</i>	

click session titles to view full abstract

## Schedule of Events *Continued*

WEDNESDAY, APRIL 12	THURSDAY, APRIL 13
Conference and Exhibition	Conference and Exhibition
1515 - 1540 <b>2.4 ADVANCED POLYMER CAPACITORS</b> <b>CHUCK POTHIER</b> <i>Vishay</i>	1445 - 1510 <b>4.4 DEPLOYED FORENSIC CLOUD-BASED TRACK AND TRACE PLATFORM FOR MICROCIRCUITS</b> <b>BOB MACDOWELL</b> <i>Applied DNA Sciences</i>
1540 - 1600 <b>COFFEE BREAK</b>	1510 - 1530 <b>BREAK</b>
1600 - 1625 <b>2.5 HERMETIC TANTALUM CAPS FOR HIGH POWER PULSE APPLICATIONS</b> <b>CHARLIE DEWEY</b> <i>Evans Capacitor Company</i>	<b>SESSION 5</b> <b>OBSOLETE COMPONENTS AND COUNTERFEIT PARTS</b>
1625 - 1650 <b>2.6 BASE METAL CERAMIC CAPACITORS FOR HIGH RELIABILITY APPLICATIONS</b> <b>JOHN MARSHALL</b> <i>AVX</i>	1530 - 1555 <b>5.1 A COUNTERFEIT COMPONENT CASE HISTORY</b> <b>BOB LOWRY</b> <i>Electronic Materials Consultant</i>
1650 - 1715 <b>2.7 A LOW PROFILE HIGH POWER INDUCTOR FOR HIGH RELIABILITY APPLICATIONS</b> <b>DAVID OLSON</b> <i>Vishay</i>	1555 - 1620 <b>5.2 INTEGRATED CIRCUIT REDESIGN OBSOLESCENCE: ASSEMBLY OPTIONS AND SOLUTIONS</b> <b>TIM FLAHERTY</b> <i>Golden Altos</i>
1730 - 1930 <b>WELCOME RECEPTION BUFFET</b>	1620 - 1645 <b>5.3 IMPLICATIONS OF COTS PACKAGING MODIFICATIONS IN LEGACY SYSTEMS</b> <b>AARON DERMARDEROSIAN</b> <i>Raytheon Space and Airborne Systems</i>
<i>End Day 2</i>	1645 - 1710 <b>5.4 RISKS WITH OBSOLETE MILITARY MARKED COMPONENTS FROM THE OPEN MARKET</b> <b>LEON HAMITER</b> <i>Components Technology Institute Inc</i>
	<i>End Conference</i>



# Attendee Registration

[Click to Register Online](#)

Attendee Information			
Full Name	Title/Position		
Company			
Address			
City	State	Zip	
Email	Phone	Ext.	Fax

Select Registration		
	Early Registration*	After/On Site
Full Registration Package**	\$1,900	\$2,100
Full Registration (Speakers only)	\$1,700	\$1,900
Educational Tutorials Only (4/11)	\$795	\$895
Conference Only (4/12-4/13)	\$1,200	\$1,400
Exhibits Pass (includes lunch)	\$0	\$50

\*Early Registration ends 3/17.

\*\*Full registration package includes attendance at any of the four scheduled tutorial sessions on April 11th . Please select the session(s) you plan to attend below. Each student receives a comprehensive student workbook, continental breakfast, coffee breaks and lunch.

Every full conference attendee receives a CD and/or online access to all the presentations made at the conference. plus a program guide, continental breakfast, lunch, coffee breaks on both days in the exhibits area and a pass to the welcome reception along with 2 complimentary drink tickets.

Group discounts available for 3 or more attendees from the same company.

Select Training Session (if applicable)			
Morning Session A	Morning Session B	Afternoon Session A	Afternoon Session B

Payment Information					
	Check	Visa	Mastercard	Amex	Paypal
Credit Card No.				Exp Date:	
Signature				Billing Zip Code:	
Make checks payable to TJ Green Associates, LLC.					

Email form to [info@tjgreenllc.com](mailto:info@tjgreenllc.com) or fax to +1 (610) 625-2158. For questions call +1 (610) 625-2158 or email [amber@tjgreenllc.com](mailto:amber@tjgreenllc.com)

# Exhibitor Information and Advertising Opportunities



This Conference provides a major opportunity for direct marketing, advertising and technical interchange with decision makers:

Component Engineers - Design Engineers  
Engineering Managers - Project Managers  
Quality Assurance Personnel - Procurement Executives

**Exhibitor dates: April 12<sup>th</sup> & 13<sup>th</sup>**

[Click here for Exhibitor Registration form.](#)

Contact Tom Terlizzi at [terlizzi@tjgreenllc.com](mailto:terlizzi@tjgreenllc.com) or +1(516) 807-9488 to learn more about exhibitor information and advertising opportunities.

A special thanks to our Sponsors :



Contact Tom Terlizzi at [terlizzi@tjgreenllc.com](mailto:terlizzi@tjgreenllc.com) or +1(516) 807-9488 to learn more about sponsorship opportunities.



*Organized by: TJ Green Associates LLC*