

The ESD Association newsletter, for everyone with an interest in the understanding and control of electrostatic discharge.



THRESHOLD™

Volume 21, No. 3

May/June 2005

News bits

Symposium 4 months away

The EOS/ESD Symposium continues to take shape as we move into the final stages of preparation and organization. See page 8 for a summary of this year's symposium schedule.

First Program Manager exam

The ESD Association is offering the first Program Manager exam at the 2005 EOS/ESD Symposium. See page 10 for details.

Education schedule

The education schedule now includes this year's EOS/ESD Symposium courses. See page 5 for more information.

Online seminar

The next online seminar, Air Ionization, has been scheduled for June 6. See page 8 for more information.

In this issue

Customize your symposium experience	1
Philippine Forum success	2
From the President	3
2005 Plenary session	3
Symposium fees	4
Education schedule	5
Device/Design Seminar	6
Corporate membership	7
Device/Design Seminar in Germany	7
Online tutorials update	8
Symposium schedule	8
Notice to NARTE certified engineers	8
Exhibit at symposium	9
June meeting schedule	10
First Program Manager exam	10
And the survey says	11
Calendar	12

27th Annual EOS/ESD Symposium

Anaheim, California, USA, September 11-16, 2005

Customize your symposium experience

The EOS/ESD Symposium continues to be the best source for ESD information and solutions. Attendees can customize their Symposium experience to concentrate on their specific areas of interest.



To help plan your participation, symposium is programmed along three technical tracks: **1. ESD Test, Failure Analysis, and Systems;** **2. Factory, Materials, and ESD Control;** and **3. Device, Design, and Technology.** Select your area of interest and use the track designations to help fill your symposium experience with courses best suited to your area. These tracks serve as guidelines only—you may attend any event or session you wish.

Thursday

- Troubleshooting On-Chip ESD Failures
- Device Technology and FA Overview
- Electrostatic Calculations for the ESD Engineer
- TLP Systems Design and VeryFast TLP Applications
- TLP Measurements: Parametric Analyzer for ESD On-Chip Protection

Technical Sessions

- 1A On-Chip RF
- 2B Testing (TLP, On-Chip, Standards)
- 3B System Level ESD

Workshops



- A.2 TLP Application for Design and Characterization: Can we use TLP in a different way?
- B.2 System Level ESD Considerations

Track 2

Factory, Materials, and ESD Control (FMEC)

Targeted to those responsible for the factory floor, standards, material selection, or ESD program management, this track offers sessions and activities specifically focused on the information and resources needed to address and solve ESD problems.

Technical Tracks

Track 1

ESD Test, Failure Analysis, and Systems (TFAS)

If you need to understand failure models, troubleshoot ESD failures, test for or evaluate component ESD susceptibility, or develop systems or protection schemes, you will find the following tutorials, technical sessions and workshops of special interest:

Tutorials

Sunday

- System Level ESD/EMI (Part 1 & 2)

Monday

- EOS/ESD Failure Models and Mechanisms
- Device Testing - Component Level

Continued on page 4

Local chapters

ASEMEP ESD Council Hosts the Second Premier Learning Series of Events on Electrostatic Discharge in the Philippines

Submitted by Fairs & More Inc. (FMI), Imperial Consulting Philippines Inc., European Chamber of Commerce

The ASEMEP Electrostatic Discharge Council (AEC), the first chapter of the Electrostatic Discharge Association (ESDA) in Asia, successfully organized the 2nd Philippine Electrostatic Discharge Forum and Exhibit 2005 with 160 delegates and 7 corporate sponsors this past March 8 to 9 at The Bellevue Manila, Alabang, Muntinlupa City. The event also marked the first Philippine run of the ESDA Regional Tutorial Program (RTP) offering two certification tutorials, ESD Basics for the Program Manager and How to's of In-Plant ESD Auditing and Evaluation Measurements, on March 10 and 11. Also, this year's forum hosted the second NARTE ESDC Engineer and Technician Exam in the Philippines on March 12.

This series of events was sponsored by the Semiconductor and Electronics Industries in the Philippines (SEIPI) and the Association of Semiconductor and Electronics Manufacturing Engineers of the Philippines (ASEMEP). The event is also supported by the ESD Association.

The forum speakers were led by Andrew Olney of Analog Devices, Inc., Ken Sakamoto of Shishido Electrostatic Ltd., Vladimir Kraz of Credence Technologies,

Dr. Larry Levit of Ion Systems Corp., Yuichi Komatsu of Kureha Chemical Industry Co., Ltd., Dr. Leo G. Henry of ESD-TLP Consulting/Testing, Mark Hogsett of Novx Corp., Toshikazu Numaguchi of Sumitomo 3M Japan, Yuta Mizutani of



Hugle Electronics (Japan), Inc., Lui Restauro of TÜV Product Service Asia Pacific Pte. Ltd., and Ronald Gibson of Celestica International who is also the ESD Association treasurer and chairman of the ESD Association Standards and Certification Business Unit.

The event also marked the announcement of the first ANSI/ESD S20.20-1999 certified company in the country, PSI Technologies. PSI Technologies is a leading independent provider of power semiconductor assembly and test services to the

power semiconductor market. It provides comprehensive assembly and test services to a diverse customer base, which includes most of the major power semiconductor manufacturers in the world. The industry is excited about this achievement and looks forward to having a larger number of Philippine firms certified to the ANSI/ESD S20.20-1999 standard.

The AEC looks forward to organizing a bigger Philippine ESD Forum in the future together with the support of SEIPI, ASEMEP and of course, ESDA. ▲

Howell Packaging, Division of F.M. Howell & Company

P.O. Box 286, Elmira, NY 14902

Tel: 607-734-6291 Fax: 607-734-8667

Designers & Manufacturers of ESD Protective Packaging,
Paperboard & Thermoformed Plastic, In-House Testing

DESCO Industries Inc.

3651 Walnut Avenue, Chino, CA 91710

Tel: 909-627-8178 Fax: 909-627-7449 www.descoindustries.com

ESD CONTROL PRODUCTS: Charleswater, CMG, Desco, EMIT, Menda,
ESD Systems.com, Protoktive Pak, Semtronics, Statguard Flooring

From the president

A volunteer effort



Ed Weggeland

The ESD Association is an organization that relies on the participation of volunteers. ESD Association standards and educational programs are developed by groups of very dedicated individuals working

in the field who volunteer their time to further our understanding and handling of ESD.

The ESD Association is headed by an executive structure that includes the Executive Committee, which is comprised of

the president, senior vice president, junior vice president, secretary, treasurer, and past president, and the Board of Directors. Association activities are managed by Senior Vice President Kay Adams, Business Operations, and Vice President, Joe Bernier, Technical Operations. Below

Business Operations and Technical Operations are Business Units. The Business Units and their managers are

- Standards, Ron Gibson
- Symposium, Charvaka Duvvury

- Academic Outreach, Joe Bernier
- Certification, Ron Gibson
- Headquarters, Lisa Pimpinella
- Marketing and Communications, Craig Zander
- Human Resources, Tim Jarrett

These units are divided further into committees for more specific activities. Most of these activities rely on volunteer work, from standards development to tutorial management to symposium activities.

Anyone interested in becoming a part of the ESD Association volunteer works can contact Tim Jarrett, of the Human Resources Business Unit, through association headquarters at info@esda.org. ▲

Symposium

2005 Plenary session: Advanced Thermal Modeling of Transistors

The 2005 EOS/ESD Symposium will feature invited plenary speaker Kenneth E. Goodson, Associate Professor of Mechanical Engineering at Stanford University. Goodson's presentation, "Advanced Thermal Modeling of Transistors, will take place Tuesday, September 13, 2005," in Anaheim, California.

The past decade has brought much progress in the thermal simulation techniques available for semiconductor devices, such that the available tools are beginning to approach the accuracy (and complexity) already available for electron

transport calculations. This seminar reviews progress on thermal modeling of transistors, with special attention given to the implications for ESD simulations and protection circuitry. The latest advances include Monte-Carlo / ballistic simulations of electrons and phonons in semiconductor devices, which track the highly nonequilibrium nature of heat generation and transport in modern transistors. Further attention is given to the impact of novel device materials and geometries, including strained silicon, silicon-on-insulator,

and short-channel devices, on thermal phenomena and device performance.

Kenneth E. Goodson received his Ph.D. in 1993 from MIT in Mechanical Engineering. Prior to joining the Stanford faculty in 1994, he worked with the Materials Group at Daimler-Benz AG on power transistor design. At Stanford, Goodson's research group currently includes 20 students and research associates studying thermal phenomena at small length and time scales, in particular those occurring in transistors, semiconductor lasers, and MEMS.

Continued on page 9

Conductive Containers, Inc.

4500 Quebec Ave. North, New Hope, MN 55428

Tel: 1-800-FARADAY Fax: 763-537-1738 www.corstat.com

Manufacturer of CORSTAT conductive corrugated products and ESD safe thermoformed plastic designs for shipping, storage & handling.

3M

Electronic Solutions Division

Tel: 1-800-328-1368 www.3M.com/eisd

Manufacturer of static control permanent flooring, wrist/heel straps, static shielding bags, & testing/monitoring equipment

Symposium

Continued from page 1

Customize your symposium experience

Tutorials

Sunday

- ESD Basics for the Program Manager

Monday

- Air Ionization: Issues and Answers
- How To's of In-Plant ESD Survey and Evaluation Measurements
- Packaging Principles for the Program Manager

Thursday

- ESD Standards Basics for EPA
- Cleanroom Considerations for the Program Manager

- ESD Control for Extremely Sensitive Devices

Technical Sessions

- 2A On-Chip Latch-up
- 3A Factory and Materials
- 4A MR Heads

Workshops

- A.3 ESD Control and Design for Extremely Sensitive Class 0 Devices
- A.4 Automated Equipment, ESD and Grounding Issues



- B.3 ESD Auditing
- B.4 Cleanrooms/ESD/Ionization Guidelines and Considerations

Track 3

Device, Design, and Technology (DDT)

Advancing and changing technologies continually challenge designers and users of sensitive devices to seek new EOS/ESD solutions. At this year's Symposium,

Continued on page 10

Symposium Registration and Fees

Save by registering early!

You can save time and money by registering in advance. Save hundreds of dollars by registering early. Attendees who take advantage of bundled fees and full-time students will save even more.

Advance registration fees are valid only if received no later than **July 29, 2005**. Registrations received after this date will be processed at the on-site fees.

To register, use the registration form in the program you will receive in the mail in June, download the form from the ESD Association website, www.esda.org, or contact ESDA headquarters by phone at 315-339-6937, fax at 315-339-6793, or email at info@esda.org.

Symposium

ESD Association Members	\$495	\$695
Non-Members	\$595	\$695

Tutorials-Member Prices

Sunday (Full Day)	\$475	\$575
Monday (Full Day)	\$475	\$575
Thursday (Full Day)	\$475	\$575
Thursday (Half Day)	\$275	\$375

Tutorials-Non-Member Prices

Sunday (Full Day)	\$575	\$675
Monday (Full Day)	\$575	\$675
Thursday (Full Day)	\$575	\$675
Thursday (Half Day)	\$375	\$475

Student Fees

50% discount for full-time students. Proof of enrollment required. Student fees apply only to Symposium or Tutorial registration and do not apply to Bundled Fees.

Bundled Fees (Symposium + 3 full days of tutorials)

ESD Association Members	\$1,725	\$2,110
Non-Members	\$1,815	\$2,110

\$20.20 Seminar (Attendance limited to first 30 registrants)

ESD Association Members	\$1,495	\$1,595
Non-Members	\$1,595	\$1,595

Advance Fees
On or Before
July 29, 2005

On-Site Fees
After
July 29, 2005

VPI

3123 S. 9th St., P.O. Box 451, Sheboygan, WI 53082-0451
Tel: 800-874-4240 Fax: 920-458-1368
Email: floor@vpiflooring.com
www.vpiflooring.com
Manufacturer of static control flooring

TREK, INC.

11601 Maple Ridge Road, Medina, NY 14103
Tel: 585-798-3140 Fax: 585-798-3106
Web: www.trekinc.com
Designer and manufacturer of instrumentation and sensors for measuring surface voltage, ionizer performance, and surface resistivity

Education

Education schedule includes symposium

Below is a list of courses currently scheduled, including tutorials being offered at the 2005 EOS/ ESD Symposium, in Anaheim,

California. The full schedule, including instructor listings, is available online. This schedule is subject to change and will be

updated throughout the year. Check the website, www.esda.org, or contact the ESD Association for the latest schedule.

Course	Location	Date	Designation*	Status
ESD Program Development and Assessment	Bloomington, MN	May 10-11	Program Manager	Confirmed
ESD Device/Design Seminar	Rome, NY	May 23-24	Device/Design	Confirmed
Ionization	Online	June 6	General Interest	Confirmed
Device Technology and FA Overview	Austin, TX	June 7	Program Manager	Confirmed
ESD Standards	Reno, NV	June 9	Program Manager	Confirmed
ESD Packaging Principles	Reno, NV	June 9	Program Manager	Confirmed
ESD Device/Design Seminar	Munich, Germany	June 27-28	Device/Design	Confirmed
Electrostatic Calculations	Mexico	Aug.	Program Manager	Tentative
ESD Packaging Principles	Austin, TX	Oct.12	Program Manager	Confirmed
ESD Program Development and Assessment	Anaheim, CA	Sept. 11-12	Program Manager	Confirmed
ESD Basics for the Program Manager	Anaheim, CA	Sept. 11	Program Manager	Confirmed
ESD On-Chip Protection for Advanced Technologies	Anaheim, CA	Sept. 11	Device/Design	Confirmed
System Level ESD/EMI Part 1	Anaheim, CA	Sept. 11	Device/Design	Confirmed
System Level ESD/EMI Part 2	Anaheim, CA	Sept. 11	Device/Design	Confirmed
Air Ionization: Issues and Answers	Anaheim, CA	Sept. 12	Program Manager	Confirmed
ESD On-Chip Protection in RF Technologies	Anaheim, CA	Sept. 12	Device/Design	Confirmed
SPICE-Based ESD Protection Design Utilizing				
Diodes and Active MOSFET Rail Clamp Circuits	Anaheim, CA	Sept. 12	Device/Design	Confirmed
EOS/ESD Failure Models and Mechanisms	Anaheim, CA	Sept. 12	Device/Design	Confirmed
How To's of In-Plant ESD Auditing and				
Evaluation Measurements	Anaheim, CA	Sept. 12	Program Manager	Confirmed
ESD Packaging Principles	Anaheim, CA	Sept. 12	Program Manager	Confirmed
Circuit Modeling and Simulation for On-Chip Protection	Anaheim, CA	Sept. 12	Device/Design	Confirmed
Latch-up Physics and Design	Anaheim, CA	Sept. 12	Device/Design	Confirmed
Device Testing—IC Component Level	Anaheim, CA	Sept. 12	Device/Design	Confirmed
Impact of CMOS Technology Scaling on ESD HCPH	Anaheim, CA	Sept. 12		Confirmed
CDM Design and Characterization	Anaheim, CA	Sept. 12		Confirmed
ESD Standards Basics for EPA	Anaheim, CA	Sept. 15	Program Manager	Confirmed
Troubleshooting On-Chip ESD Failures	Anaheim, CA	Sept. 15	Device/Design	Confirmed
Device Technology and FA Overview	Anaheim, CA	Sept. 15	Program Manager	Confirmed
Electrostatic Calculations	Anaheim, CA	Sept. 15	Program Manager	Confirmed
TLP Systems Design Very Fast TLP Applications	Anaheim, CA	Sept. 15	Device/Design	Confirmed
TLP Measurements: Parametric Analyzer for ESD				
On-Chip Protection	Anaheim, CA	Sept. 15	Device/Design	Confirmed
Cleanroom Considerations for the Program Manager	Anaheim, CA	Sept. 15	Program Manager	Confirmed
ESD Control for Extremely Sensitive Devices	Anaheim, CA	Sept. 15		Confirmed

* Course is a requirement of this certification program

Kenflex Corporation

460 NE Hemlock, Suite A, Redmond, OR 97756
Tel: 541-923-4765 Fax: 541-923-4190 sales@kenflex.com
Manufactures FLEXCELL®, FLEXSTAND®, FLEXTOTE®
circuit board transport and protection units, also on Web.
For additional information: www.kenflex.com

ACL Staticide

1960 E. Devon Avenue, Elk Grove Village, IL 60007
Tel: 847-981-9212 Fax: 847-981-9278
www.aclstaticide.com
Cleanroom products, topical antistats, floor finishes and coatings,
static detection meters, monitors, computer cleaning products

Device/Design Seminar at ESDA Headquarters and Training Center

If you are interested in the ESD Certified Professional-Device/Design certification, here is a way get a head start with your classes. The Device/Design Seminar, a two day course, fills the requirements for the following required courses for certification:

- ESD On-Chip Protection in Advanced Technologies
- SPICE-Based ESD Protection Design Utilizing Diodes and Active MOSFET Rail Clamp Circuits
- EOS/ESD Failure Models and Mechanisms
- CDM Design and Characterization

Developed by the Association's International Council on Education (ICE), the technical seminar for on-chip ESD protection designers is part of the Association's effort to expand technical education beyond the annual EOS/ESD Symposium. Created specifically to meet the needs of persons responsible for ESD protection in circuit design, this two-day seminar program includes in-depth technical education in a number of specific areas including the following:

ESD in the Industrial Semiconductor IC Context—What is ESD? Why is it important? What methods are used to control it? Who is responsible for ESD? What is the role of the design engineer?

ESD Models and ESD Testing—Description of the three models and model issues from the designer's point of view, for example, tester-device interaction.

ESD Device Operation—Fundamentals of MOS device operation, its behavior under high current mode, latch-up effects and SCR devices, transistor snapback behavior, emission analysis, process effects, diode physics and operation, the role of the PMOS, BiCMOS and the similarity of the techniques for CMOS, bipolar devices, DENMOS and LDMOS devices and protection techniques.



ESD Association Training Center, Rome, NY

ESD Circuit Operation—Operation of and issues with NMOS circuits, active clamping versus snapback, self-protection versus parallel protection; static (Zener based) triggering, dynamic gate-coupling, substrate pumping, and multi-finger turn-on. Instruction includes discussion of implementation, simulation, and experimental results.

Technology Impact on ESD Design Choices—Review of ESD protection design options as a function of technology and process fluctuations.

Special Circuit Requirements, Including RF, and Their Impact on ESD—Mixed voltage protection, RF and analog protection, BiCMOS, high voltage protection, and new latch-up effects.

CDM ESD Protection—Concerns and considerations; fast enough diodes, transistors, and SCRs; the on-chip CDM event; the golden rules; an application example.

Design Examples and Case Studies—Layout methods, ESD rules, new design methods, case studies of protection design problems, class exercises.

Instructors for the seminar are Charvaka Duvvury, Ph. D., Texas Instruments, and James W. Miller, Freescale.

ESD Association Headquarters and Training Center, in Rome, New York, will again host the Device/Design Seminar. The city of Rome, located in central New York, is about an hour from Syracuse and three hours from Rochester. Headquarters are located at the Beeches Inn and Conference Center, with ESDA Headquarters offices situated among the tall beech trees, not far from the historic Beeches Inn overlooking a quiet pond.

Detailed information on the seminar will be mailed to all ESDA members and also may be downloaded from the ESDA Web site, www.esda.org. For more information on the ESD Design Seminar, contact ESDA headquarters. ▲

Wolfgang Warmbier

Untere Giesswiesen 21, D-78247 Hilzingen, Germany
Tel: 49-7731-86880 Fax: 49-7731-868832
www.warmbier.com
ISO 9002 certified for advice, supply and manufacturing of static control materials and systems

Monroe Electronics

100 Housel Avenue, Lyndonville, NY 14098
Tel: 585-765-2254 Fax: 585-765-9330
Email: electrostatics@monroe-electronics.com
www.monroe-electronics.com
Full line manufacturer of static measurement equipment

Symposium

Corporate Membership program can save money

If you'd like to send several people to this year's EOS/ESD Symposium, but are concerned about the costs, take a close look at the ESDA Corporate Membership program. This package not only includes symposium and tutorial registrations, but also coupons for additional educational programs that can be used for the symposium or other ESDA sponsored programs throughout the year. You can also receive multiple individual memberships,

a Standards Enterprise-Wide Site License, and a paper ANSI/ESD S20.20 review of your ESD control program. You can save as much as 45% over purchasing the items separately. Sign up now to reduce your costs of sending multiple individuals to the 2005 Symposium and save on a variety of ESD Association programs and services during the coming year.

Two package types are available to suit different needs:

- User package—designed for companies who have a use for ESD control and design education
- Vendor package—designed for companies interested in exhibiting at the EOS/ESD Symposium.

Download program details at www.esda.org/symposia.html or call the association at 315-339-6937.▲

Education

Device/Design Seminar in Munich, Germany to include testing program

The ESD Association will hold a Device/Design Seminar in Munich, Germany, June 27-28, at the Fraunhofer Institute for Reliability and Microintegration IZM, followed on June 29 by an ESD Testing and Characterization Program presented by the Fraunhofer Institute for Reliability and Microintegration IZM. This program will include the following sessions:

ESD Qualification Testing

Discuss how to apply HBM, MM, and CDM standard test methods, how high pin count works, and the limitations of CDM.

ESD Characterization

Discover how to gain accurate insight into the electrical behavior of protection elements and of elements to be protected.

ESD Failure Reproduction and Alternative Models

This session looks at ESD failures and how to reproduce them, including aspects of system level HBM, cable discharge event, and charged board model.

Lab Experience

Gain an understanding of characterization equipment and methods. Send devices that you would like to discuss at the June 29 session by May 27 to IZM, with a brief description. IZM will pre-test and discuss them at the session but reserves the right to select cases of general interest. Printed data will be provided only to the individuals who sent devices.

Instructors

Horst Gieser, is head of the Analysis & Test of Integrated Systems (ATIS) department at the Fraunhofer-Institute for Reliability and Microintegration, Munich branch. He received his diploma in electrical engineering and his Ph.D. from the Technical University of Munich. He has authored and co-authored more than 50 publications, including two books, mainly in the field of electrostatic discharge. Three of them received awards at international conferences. Currently, he is chairing the ESD Forum e.V., a German non-profit association that supports the exchange of experi-

ence in this complex subject by means of a bi-annual symposium called ESD-Forum.

Heinrich (Henry) Wolf received his diploma in electrical engineering from the Technical University of Munich (TUM), Germany in 1994. He joined the Chair of Integrated Circuits at TUM as a member of the scientific staff working on ESD related issues. In 1999 he joined the Fraunhofer-Institute for Reliability and Microintegration (IZM). He was involved in the investigation of ESD phenomena in the CDM time domain for CMOS and Smart Power Technologies. Furthermore, he has published information on the development of ESD test methods and tester characterization. Currently he is also working in the field of RF-characterization and parameter extraction.

For more information about this program or to register, download a flyer in PDF format from the ESD Association website, www.esda.org/upcomingcourses.html.▲

Static Solutions Inc.

331 Boston Post Rd.-East, Marlboro, MA 01752 USA

Tel: 508-480-0700 Fax: 508-485-3353 www.staticsolutions.com

Worldwide manufacturer of patented ESD Cleanroom products, including Ohm-Stat™ combination/resistivity meters, Ohm-Shield™ coatings/floor finishes/paints, Ohm-Cide™ EPA cleaners, Stat-o-Flex™ Class Zero wriststrap, and Ultimat™ Class Zero out-gassing rubber.

Saint-Gobain Advanced Ceramics

1225 Aeroplaaza Drive, Colorado Springs, CO 80916

Tel: 719-637-8714 Fax: 719-380-5591 Stanley.C.Smith@saint-gobain.com

Manufacturer of Cerastat™ ESD ceramics products to customers' prints: tools, fixtures, wear parts for data storage and other electronic industries

Education

Online tutorials update

Now you can get valuable information and training on ESD control topics without leaving your office. The ESD Association continues to develop online training programs that offer fundamental training on various topics.

According to Craig Zander, ESD Association Marketing and Communications Director, "The association has received a strong demand for additional training on ESD related topics. We have had strong attendance at our classes and tutorials offered at the Symposium and at various locations. Web based training is a great tool to provide this training to those who cannot travel to Symposium or to our training sites."

The training was initiated in November of 2004 with a one-hour session, "Developing an ESD Control Program Based on ANSI/ESD S20.20." Ron Gibson, Celestica International, Inc. facilitated the seminar and John Kinnear, IBM, functioned as co-presenter, answering questions during the presentation in a text-chat format. Feedback from the attendees following this presentation was very positive.

This program was followed in March of this year with "Grounding for the Electrostatic Protected Area." This program addressed the basics of ESD grounding and the changes in the new revision of the standard *ANSI/ESD S6.1-1999 Grounding—Recommended Practice*. Unfortunately, due to technical difficulties the seminar was delivered by Ron Gibson, originally designated to handle questions. Dave Swenson, Affinity Static Control Consulting, L.L.C., answered questions received during the presentation following the seminar's completion. The entire presentation, with text, in PDF format was provided to all attendees. The technical difficulties experienced during this presentation were addressed and have since been resolved.

A third presentation, "Air Ionization", will be presented on June 6 by Arnie Steinman, Ion Systems. Watch the association website, www.esda.org, for more information regarding this presentation.

Future presentations are in development for the online training program. The ESD Association welcomes suggestions for future online topics.

Certification

Notice to NARTE certified engineers

The ESD Association is offering NARTE certified ESD engineers the opportunity to take the ESD Certified Professional-Program Manager exam without taking all of the required courses. Simply show your current NARTE card, pay the exam fee, and take the exam. Please note that the Pro-

gram Manager exam does cover additional areas and maybe more difficult than the NARTE exam.

The ESD Association will not be hosting the NARTE exam in 2005. Exam locations are listed on the NARTE website at www.narte.org.

Symposium

2005 EOS/ESD Symposium Schedule Summary

September 11-16, 2005
Marriott Anaheim
Anaheim, California

Sunday, September 11, 2005

Registration
Standards Meetings
ANSI/ESD S20.20 Seminar, Part 1
ESD Tutorials

Monday, September 12, 2005

Registration
ANSI/ESD S20.20 Seminar, Part 2
ESD Tutorials
Welcome Reception
Exhibits (PM only)

Tuesday, September 13, 2005

Registration
Awards Breakfast
Exhibits
Technical Sessions
Association Luncheon and Annual Meeting
Professional and Technical Women's Reception

Wednesday, September 14, 2005

Registration
Technical Sessions
Exhibits
Workshops

Thursday, September 15, 2005

Registration
Technical Sessions
Tutorials

Friday, September 16, 2005

ESD Certified Professional-Program Manager certification exam

RMV Technology Group, LLC

ESD Materials Testing (including equipment, thermoforming, paper, polymers, foam)
Tel: 925-673-0225 www.esdrmv.com Fax: 925-672-3316

NARTE Certified ESD Engineer, AMERICAN Council of Independent Labs, ESD Product Development & Product Safety, Comprehensive ESD/Cleanroom AUDITS, Event Monitoring, On-Site Seminars

Tek Stil Concepts, Inc.

P.O. Box 67, Haddonfield, NJ 08033
Tel: 800/603-0848 856/428-4464 Fax: 856/429-6532
www.tekstilconcepts.com Email: info@tekstilconcepts.com
s ESD dissipative and conductive vinyl sheet and tile,
ESD carpet tile, ESD high traction safety floor tile

Symposium

Exhibit at the 2005 EOS/ESD Symposium



Good exhibit space for the 27th annual EOS/ESD Symposium is still available! Exhibitor information is available online at www.esda.org/exhibits.html. To reserve your space or for information on exhibiting, contact Lisa Pimpinella phone, 315-339-6937; or fax, 315-339-6793.

Current Exhibitors

Product, Service Providers, and Organizations

3M
ACL, Inc.
Advanced Test Equipment
Asiatic Fiber Corporation
Associated/ACC
Barth Electronics, Inc.
Bolidt Synthetic Products & Systems

Botron Co., Inc.
CCI-Conductive Containers, Inc.
Century Container
Compass Concepts, Inc.
Credence Technologies, Inc.
Desco Industries, Ltd.
Dou Yee Enterprises, Ltd.
ESD Consulting Group, Inc.
ESD-TLP Consulting & Testing
Electro-Tech Systems, Inc.
Electronic Polymers, Inc.
FLEXCO
Global Technology Leader, Inc.
Hyperion Catalysis
Hytest Safety Footwear
ION Systems Inc.
ITW/Richmond Technology
Kreha Corporation of America
MEFAS Inc.
Monroe Electronics, Inc.
Noveon Static Control
Novx Corporation
Oryx Instruments
PRF Industrial LLC
Prostat Corporation

RTP Company
Static Control Components (SCC)
SIMCO an ITW Co.
Static Solutions, Inc.
STATICO
Stephen Halperin & Assoc.
Tech Wear, Inc.
Thermo Electron Corp.
Trek, Inc.
Uniglobe Kisco, Inc.
Vidaro Corporation

Publications

A2C2
Advanced Packaging
Circuits Assembly
Connector Specifier
Evaluation Engineering
Medical Electronics Manufacturing
Military & Aerospace Electronics
Printed Circuit Design & Manufacture
Solid State Technology
Surface Mount Technology

Sponsor

ESD Association

Symposium

continued from page 3

2005 plenary session: Advanced Thermal Modeling of Transistors

Other projects include two-phase microchannel and micro-jet impingement cooling technology for semiconductor chips and the applications of MEMS technology for biomedical diagnostics, thermal machining, and infrared imaging. Goodson has authored or co-authored

more than 150 journal and conference papers and six book chapters. He has received the ONR Young Investigator Award, the NSF CAREER Award, the Journal of Heat Transfer Outstanding Reviewer Award (1999), a JSPS Visiting Professorship at the Tokyo Institute of Technology (1996),

as well as Best Paper Awards at SEMI-THERM (2001), the Multilevel Interconnect Symposium (1998), and SRC TECHCON (1998). Goodson is a co-founder and former CTO of Cooligy, which develops electro-osmotic microcooling technology for computers. ▲

ProLine

10 Avco Rd., Haverhill, MA 01835
Tel: 800-739-9067 Fax: 978-374-4885
www.1proline.com Email: Bench@1proline.com
Manufactures ESD modular and ergonomic workstations

Barth Electronics, Inc.

1589 Foothill Drive, Boulder City, NV 89005
Tel: 702-293-1576 www.barthelectronics.com
Supplying the ESD Community with the most Accurate and Reliable
CDM-TLP and HBM-TLP Test Equipment

Standards

June Meeting Schedule

ESD Association Standards and Association Committee Meetings June 9-14, 2005

John Ascuaga's Nugget Resort Hotel
Reno, Nevada



Sunday, June 9 Tutorial Program

ESD Standards Basics for
EPA 8:00-Noon
ESD Packaging Principles 1:00-5:00

Friday, June 10

TAS 7:00-5:00
WG-3, Ionization 8:00-Noon
WG-6, Grounding 8:00-10:00
WG-5, Device Testing 8:00-5:00
WG-10, Handlers 1:00-5:00

Saturday, June 11

TAS 7:00-5:00
WG-53, Workstations 8:00-Noon
WG-5, Device Testing 8:00-5:00
WG-11, Packaging 1:00-2:00
WG-2, Garments 2:00-5:00

WG Chair meeting 5:30-6:30
ESDA Mixer - all invited 6:30-7:30

Sunday, June 12

TAS 7:00-5:00
ICE Academia 9:00-10:00
WG-7, Flooring 8:00-Noon
WG-14, ESD Simulators 8:00-Noon
WG-15 Gloves 8:00-Noon
STDCOM 1:00-4:00

Monday, June 13

Human Resources 8:00-Noon
Marketing & Comm. 10:00-Noon
Steering Committee 1:00-4:00

Tuesday, June 14

Board of Directors 8:00-5:00

Symposium

continued from page 4

Customize your symposium experience



explore the latest research and information on device technologies.

Tutorials

Sunday

- ESD On-Chip Protection in Advanced Technologies

Monday

- On-Chip ESD Protection in RF Technologies
- SPICE-Based ESD Protection Design Utilizing Diodes and Active MOSFET Rail Clamp Circuits
- EOS/ESD Failure Models and Mechanisms

continued on page 11

Cerification

First Program Manager exam

The ESD Association is offering the first ESD Certified Professional-Program Manager certification exam in conjunction with the 2005 EOS/ESD Symposium on Friday, September 16. To take this exam an official certification registration form and

\$50.00 filing fee must be completed and submitted to ESDA headquarters. In addition, you must have taken all of the required courses and have your eligibility verified by ESDA. An exam fee will also be applicable.

The ESD Association is extending an offer to certified NARTE engineers regarding required courses. See page 8 for more information. ▲

Molded Fiber Glass Tray Co.

6175 US Highway 6, Linesville, PA 16424
Tel: 800-458-6050 Fax: 814-683-4504 email: info@mfgtray.com
Manufacturer of static dissipative and conductive trays and containers for static protection of sensitive parts.

TOPLINE-ELME

7331A Garden Grove Blvd., Garden Grove, CA 92841
Tel: 800-776-9888 Email: info@ESD.TV www.ESD.TV
Full line ESD products including shoes, garments, chairs, brushes, mats, gloves. Maximum comfort

Tech Wear, Inc.

2205 Faraday Ave., Suite B, Carlsbad, CA 92008
Tel: 760-438-7788 Fax: 760-438-6868
Email: kay@techwear.com www.techwear.com
Industry leader in static control garments, including groundable cleanroom garment systems.

Abeba "Comfort Shoes for Technologies"

P.O. Box 1066, Medford, OR 97501-0077 www.abeba.com
Tel: 425-501-9811 Fax: 541-864-1092 Email: comfortfootwear@msn.com
Comfortable European quality ESD, Cleanroom, safety shoes and boots for men and women

Association news

And the survey says...

Each month *Threshold*™ provides a column to address the many questions and comments expressed by Association members in their responses to an email survey conducted by the ESD Association's Human Resources Business Unit.

The primary goal of the ESDA is to serve our members. This survey provides an excellent source of direction in our quest to serve the membership.

This survey was distributed by email in August 2003. The ESD Association sincerely thanks those members who took the time to send in their comments.

Member comment: *During the years as a member, the ESDA assisted me in contacting technical experts, researching products, and vendors which successfully helped me in the completion of all ESD assignments. This is the type of service I need from the organization. Your time is always appreciated.*

ESDA Response: Thank you for your supportive comments. The ESD Association continually strives to advance the theory and practice of ESD avoidance in all informational and educational aspects. Our leadership is energetic and always looking for ways to improve communication and training tools for the industry. This year's line-up of online training and local and regional tutorial events have been received enthusiastically by both members and non-members.

More and more members are stepping up, asking "how can I help, how can I vol-

unteer?" Volunteer activities in our association are fun, rewarding, and educational. This new influx of interest is also helping to improve the services that the ESD association offers its members.

Member comment: *Provide information that I can direct to our Design Engineering department on component sensitivities and techniques for design hardening.*

ESDA Response: First, make a copy of the new ESD Association publication, *Electrostatic Discharge (ESD) Technology Roadmap* available to your design engineers. You can find this on the association's website, www.esda.org. The publication is enlightening and should trigger your company's interest for future design hardening goals. The *Roadmap* states, ". . . to achieve the performance and density numbers required by industry, the devices have become more sensitive to ESD events since the late 1990s. The current trend. . . is circuit performance at the expense of ESD protection levels."

Second, send your design engineers to one of the ESD Association's Device/Design Seminars. The ESD Association members who provide this training are experienced practitioners and provide real-world tips on current problems your design teams are dealing with. This seminar is an excellent opportunity for students to interact with instructors who are experienced in the field of ESD techniques for design hardening. Visit www.esda.org/upcomingcourses.html for more information. ▲

Symposium

Continued from page 10

Customize your symposium experience

- Circuit Modeling and Simulation for On-Chip Protection
- Latch-up Physics and Design
- Impact of CMOS Technology Scaling on ESD HCPH
- CDM Design and Characterization

Thursday

- Troubleshooting On-Chip ESD Failures
- Device Technology and FA Overview

Technical Sessions

- 1B On-Chip Physics/Modeling
- 3B System Level ESD
- 4B On-Chip CMOS II

Workshops

- A.1 Silicon Technology Scaling and ESD Reliability
- A.2 TLP Application for Design and Characterization: Can we use TLP in a different way?
- B.1 On-Chip ESD Protection ▲

Electrostatic Society of America

www.electrostatics.org

The Electrostatic Society of America (ESA) is devoted to the advancement of electrostatics, encompassing a wide breadth of areas including MEMS, biological and industrial applications

Your Ad Can Appear Here

Contact ESD Association for details
7900 Turin Rd., Building 3, Rome, NY 13440-2069
Tel: 315-339-6937 Fax: 315-339-6793 info@esda.org

H.C. Starck, Inc.

45 Industrial Place, Newton, MA 02461

Tel: 617-630-5800 Fax: 617-559-3906 www.hcstarck-chemicals.com
Maker of BAYTRON® conductive polymer dispersions based on PEDOT for transparent, conductive, and antistatic coatings

Your Ad Can Appear Here

Contact ESD Association for details
7900 Turin Rd., Building 3, Rome, NY 13440-2069
Tel: 315-339-6937 Fax: 315-339-6793 info@esda.org

Calendar

May 2005

May 10-11

ESDA Program Manager Course

ESD Program Development and Assessment

Hampton Inn, Bloomington, Minnesota
www.esda.org/upcomingcourses.html

May 22-26

17th International Symposium on Power Semiconductor Devices & ICs

Fess Parker's Double Tree Resort, Santa Barbara, California, USA
www.ecse.rpi.edu/conf/ISPSD2005

May 23-24

ESDA Device/Design Seminar

ESDA Headquarters, Rome, New York
www.esda.org/upcomingcourses.html

June 2005

June 6

ESDA Online Program: Air Ionization

Web seminar
www.esda.org

June 7

ESDA Tutorial: Device Technology and FA Overview

3M Innovation Center, 6801 River Place Boulevard, Austin, Texas
www.esda.org/upcomingcourses.html

June 9

ESDA Tutorial: ESD Standards

John Ascuaga's Nugget Resort Hotel
Reno (Sparks), Nevada
www.esda.org/upcomingcourses.html

June 9

ESDA Tutorial: ESD Packaging Principles

John Ascuaga's Nugget Resort Hotel
Reno (Sparks), Nevada
www.esda.org/upcomingcourses.html

June 27-28

Device/Design Seminar & ESD Testing and Characterization Program

Fraunhofer Institute for Reliability and Microintegration IZM, Hansastr. 27d
Munich, Germany
www.esda.org/upcomingcourses.html

Threshold

Threshold™ is published six times a year by the ESD Association, a not-for-profit corporation. It strives for the advancement of theory and practice of electrical overstress avoidance and of allied arts and sciences and the maintenance of a high professional standing among its members and others.

© Copyright 2005, ESD Association, Rome, NY

Threshold™ Publication Schedule

Issue	Deadlines
September/October	Aug. 1
November/December	Oct. 1
January/February	Nov. 19
March/April	Feb. 1
May/June	April 1
July/August	June 1

Threshold Institutional Listings

Space in the Threshold Institutional Listings, which appear at the bottom of newsletter pages, can be purchased for \$600.00 for six consecutive issues. Larger contributions are welcome. No agency fee is granted for soliciting such contributions. Inquiries, or contributions made payable to the ESD Association, should be sent to

ESD Association, 7900 Turin Rd., Building 3, Rome, NY 13440-2069 Tel: (315) 339-6937, Fax: (315) 339-6793, email: info@esda.org

Newsletter Staff

Board of Directors Sponsor

Craig Zander
Restronics Company, Inc.
7125 Washington Ave., So., Edina, MN 55439
Tel: 952-941-9135
Email: czander@restronics.com

Editor

Katie Connor
ESD Association
7900 Turin Road, Bldg. 3, Rome, NY 13440
Tel: 315-339-6937 Fax: 315-339-6793
Email: kconnor@esda.org

Associate Editors

Development

Ed Weggeland, Static Control Components, Inc.

Protection Design

Leo G. Henry, ESD/EMI/TLP Consulting
Steve Voldman, IBM Microelectronics

Technology

Charvaka Duvvury, Texas Instruments

Editorial Advisory Board

Board of Directors Sponsor

Craig Zander, Restronics Company, Inc.

President

Ed Weggeland, Static Control Components, Inc.

Sr. Vice President

Kay Adams, Tech Wear, Inc.

Vice President

Joe Bernier

Human Resources

Timothy Jarrett, Guidant Corporation

Additional Editorial Assistance

Marti Farris, Intel Corporation

ESD Association Headquarters Staff

Katie Connor
Carrie Fragapane
Tammy Muldoon
Lisa Pimpinella



7900 Turin Road, Building 3
Rome, NY 13440-2069
Tel: (315) 339-6937 Fax: (315) 339-6793
Email: info@esda.org
Web: www.esda.org