Reliability Society

NEWSLETTER

Vol. 51, No. 4, November 2005

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President's Message

Dear IEEE Reliability Society Members:

After three years as President, this is my last President's *Newsletter* message, and it has been a great privilege to serve the Society's members. I thank you all for your trust in me in this position.

While times were not always pleasant for the Society during these past years, we have stayed together as a group, and we are in far better shape than we were 3 years ago, and your Administrative Committee (ADCOM) leadership continues to look forward, as opposed to looking back. We are still very much focused on the future.

In this last message, I'd like to discuss two key issues concerning where our Society may be placed within the Institute in the near future. The most recent Technical Activities Board (TAB) meeting, held in early November 2005 in Orlando Florida, gave a hint on this matter.

At that TAB meeting, two fairly substantial proposals were discussed. (They ate up a majority of the TAB's time in Orlando.)

Both proposals will likely impact the RS, regardless of which one (if either) is adopted, because both proposals argue that the current TAB voting rules on motions, combined with the continually changing revenue structure (IEL and ASPP) for the publication/page content that different Societies/Councils produce, is becoming an unstable mixture.

The first proposal was from the Computer Society, the largest society of all within the Institute. They wish to leave TAB, give up their 3 votes on TAB, and report directly to the Board of Directors of IEEE. If that were to occur, it is likely that the other larger societies would attempt to follow suite.

Why would such a proposal come up? Because TAB is currently run on a U.S. Senate voting model as opposed to the U.S. House of Representatives voting model. In the Senate model, each entity (U.S. state), regardless of size, gets the same number of votes; in the House of Representatives model, it is based on number of citizens in a district within a state. So a state with a small population has few representatives, however a state like California has many. The Senate model is the current TAB model for societies and councils. So a society with 500 members gets the same representation as a society with 2,000 members.

There was also a second proposal presented that would modify TAB into the two-chamber model: effectively, there would be both a Senate and a House of Representatives (those were not the names proposed but that was the intent). One would focus on Operations of TAB, and the other would focus on the Strategy of TAB. If this were adopted, it is possible that the Computer Society might opt to accept it and not leave TAB altogether. Whether the Computer Society was onboard with this other idea was unclear to me. In this model, each society would still get one vote as in the Senate model, but multiple small societies might be forced to elect one person to be their representative in the other organization.

In short, these rumblings stem from a continued disagreement between the societies; the

rumblings have gone on for years, and 2006 will be a year where certainly some action(s) will be taken. The outcome? TBD. Unfortunately, we have little say, and we will have to adapt to whatever is decided. But it is clear that the larger societies do pay a far higher price to infrastructure costs than do the smaller ones, and something must change.

And soon.

In closing, I'd now like to introduce you to your new President for 2006, Dr. Bill Tonti.

Bill is a 1978 graduate of Northeastern University, holding an BS in Electrical Engineering. He joined IBM in Essex Junction Vermont where he is presently employed. Bill pursued an MS in Electrical Engineering from the University of Vermont, and MBA from St. Michael's College. He was selected to participate in the IBM Doctoral Resident Study program, where he completed a PhD in Electrical Engineering from the University of Vermont. In conjunction with, and subsequent to his role as a professional student Bill spent the majority of his career working on Advanced Dynamic Random Access Memory semiconductor technology development. Bill has published numerous contributed and invited papers, holds in excess of 130 patents, and he has chaired two IEEE major conferences. Bill has been a member of the Reliability Society ADCOM, serving as the VP of Technical Operations, and acting as an advisory board member for the IEEE Transactions on Device and Materials Reliability.

I have confidence that Bill will do a terrific job! No worries there. And I wish Bill, the new ADCOM and EXCOM class of 2006, all the BEST!

Happy Holidays,

Jeffrey Voas

mailto:JEFFREY.M.VOAS@SAIC.COM

From the Editor

Welcome to the IEEE Reliability Society e-Newsletter. An issue will be published quarterly and published to the Reliability Society website.

We welcome your articles, comments or questions. All RS Newsletter inputs should be sent electronically to l.chase@ieee.org.

February	***Inputs due January***
May	***Inputs due April***
August	***Inputs due July***
November	***Inputs due October***

Publishing of advertisements will be available in future issues. Advertisements will be accepted in common graphic format.

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Society Solicitations

The IEEE Reliability Society solicites nominations for the following annual society awards. Submit nominations now or at any time. If selections have been made for this year, your nominations will be applied to the following year awards.

Reliability Society Engineer of the Year Award for 2005

The IEEE Reliability Society is soliciting nominations for its Reliability Society Engineer of the Year Award for 2005. This award is aimed to recognize key contributions to the Reliability profession within the last few years. Nominees will be considered according to the following criteria:

- **Reliability Contributions**
  - Reliability Technical Contributions
  - Reliability Management ContributionsReliability Publications
  - Contributions to Reliability Education
- **Professional Services to IEEE**
  - Reliability Society Service
  - Other IEEE service positions

An administrative superior of the nominee (e.g. department head, supervisor, or chapter chair) should make and submit the nomination. The nomination package should consist of a one-half page biography of the nominee plus up to four pages of concise descriptions of the accomplishments. For technical contributions, please concisely describe why the contribution is unique. For managerial and educational contributions, please concisely explain the obtained benefits. Please limit identified publications to only those in which the nominee was the sole or principal author. The accomplishments should be organized according to the above-described criteria. The nominations must be submitted by 1 October. Send the nominations to Dennis Hoffman, your Society's Jr. Past President, at d.hoffman@ieee.org

Reliability Society Lifetime Achievement Award for 2005

The IEEE Reliability Society is soliciting nominations for its Reliability Society Lifetime Achievement Award for 2005. The IEEE Lifetime Achievement Award was created to recognize sustained outstanding contributions to the field of Reliability Engineering. Typically the contributions will span the career of the individual, usually in excess of 25 years. The contributions meriting this award must clearly be within the area of Reliability Engineering.

Nominations must be submitted by a peer or supervisor of the nominee. Self nominations or nominations from a member of the IEEE Reliability Society Nominations and Awards Committee will not be accepted. The nomination package should consist of a one-half page biography of the nominee plus up to four pages of concise descriptions of the nominee's lifetime accomplishments / achievements. Nominations may be submitted until the end of September. Send the nominations to Dennis Hoffman, your Society's Jr. Past President, at d.hoffman@ieee.org

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Technical Operations

Technical Report

Asian Reliability Conference 2005

Society Technical Committee Recruiting Notice

The IEEE Reliability Society national organization is recruiting technical committee members and possibly committee chairpersons for the following technical committees: Software Reliability, System Safety Technology, Human Interface Technology, Mechanical Reliability, Standards & Definitions, CAD/CAE, Microelectronic Technologies, Industrial Systems, Sensor Systems, Information Technology & Communications, Consumer Electronics, International Reliability, Aerospace & Defense Systems, Testing and Screening Technology, Automotive Systems, Energy Systems, 6 Sigma Reliability, Medical Systems, Reliability Design, Warranty, Nuclear Reliability, Maintainability Technology, Assurance Technology, and Emerging (New) Technology.

The basic work for each technical committee consists of developing plans associated with the reliability aspects of the respective field, both present day tactical issues, and long term strategic direction. This is accomplished through four short quarterly written reports that are edited and compiled by the reliability society technical operations editor, and placed in the Reliability Society newsletter, which can be found on our Web site. Additionally, an annual written assessment of the technology in the committee's area of interest is requested. This Annual state of Reliability Technology Report is published world wide, and receives a high level of readership and interest from communities that extend well beyond the IEEE and the Reliability Society. It has become the societies cornerstone publication.

Other work may include the development of standards, guidelines and educational tutorials through the society infrastructure. Working in one of the technical committees is an excellent opportunity to "network" and keep your knowledge current. If you are interested, please contact me and send a short biography with an indication of your experience in the field of interest.

If you do not have a direct interest in either of the above opportunities, please pass this to a fellow reliability, hardware, software, or systems engineering professional who might have an interest.
Thanks for your consideration.

Shuichi Fukuda
VP Technical Operations
E-mail: ShuFukuda@aol.com

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A list of the Technical Committees and their Chairs:
IEEE RS Technical Committees

Technical Committee Activities Focus Spot

Excerpts from the Annual state of Reliability Technology Report

To be included in future newsletters!

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RAMS® 2006 Our on-line registration is open - Register NOW and SAVE!

IEEE Transactions on Reliability, Special Issue on Reliability Studies on Nanotechnology

Fusion Conference 2006 Fusion 2006 Brochure

Risk Management and System Dependibility & Safety Lambda Mu 15 Symposium

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Better-Faster-Cheaper with Macros

Ever tried to check a stress analysis worksheet for quality? More to the point, do you spend time checking things that your computer could handle a lot faster and more accurately? The news is good - the capability is already in your computer.

Here's an everyday example. Suppose the reference designation column on a long worksheet includes two entries that look something like these:

R16-R18, R45-R50, R87
R35, R49, R65-67, R90

How long does it take to check the entire reference designation column for correct coverage? Will you discover the duplication illustrated here? No matter how you do it, it's a tedious, time-consuming, error-prone exercise you face for every analysis that comes your way. Of course, the reference designation column is only a small part of an analysis. The analysis might also include lookup of multiple derating factors for each type of component, computation of actual derating percentage for each factor, and determination of pass/fail. And if several people participate in an analysis, they might not always use the same factors for the same components in different parts of a system. The key point here is that the more work is done by humans, the more there is to be checked.

Microsoft Excel can perform tasks of this sort, and do it a lot better and faster. With a small effort you can put Excel's macro programming language to work to handle tasks like these and countless others. Recently an engineer at The Omnicon Group Inc., faced with extensive quality checks of worksheets, and in particular the reference designation check illustrated above, wrote and tested a macro program in about four days to handle this task. When completed, the program was used repeatedly to check long, multipage worksheets and issue a report. The report identified the lowest and highest reference designation numbers for each type of component, and for values between these numbers it identified duplicate entries, specified where each duplicate entry occurred, and listed all unused (missing) reference designations. The program also included the capability to handle many integrated circuit pins like other discrete components.

Excel macro programming is done using a self-contained, very general-purpose interpreted language - Visual Basic - that is included with the spreadsheet software. The interpreter fixes many common programming statement errors for you as you type, and it identifies most other programming errors in a clear, user-friendly fashion. You can also cheat extensively by letting Excel write code for you, and developers typically take advantage of this. For example, if you need to know how to format data in your code, you can simply perform the steps manually on a test spreadsheet while recording the keystrokes (Tools/Macro/Record New Macro), then view the automatically generated code (Tools/Macro/Macros /Edit) and copy it to your macro. Finally, you can assign the macro to a keyboard shortcut, such as Control-Q. Program execution time is usually measured in seconds rather than microseconds, but that's perfectly fine for macros of this nature. After you fix any reported errors, or revise the

worksheet for some other reason, you can run the macro again at your PC in a matter of seconds.

Of course, any task that can be fully described by rules can be done by machine.  Viewed another way, the only tasks that people should do - as a goal - are tasks that can't be done by computer.  In performing many different kinds of analyses for many different customers with different requirements, Omnicon reliability engineers have written Excel macros ranging from simple cross checks of related data to automatic lookups of stress parameters in a database.  In nearly every case, improved quality and efficiency made the macro development well worth the effort.  Of course, the tool that's developed for the current analysis makes the next analysis easier, but even if there is no next analysis the development effort can still save project time and provide a higher-quality product.

There are two other significant advantages to macro programming for analysis projects.  First, you can take advantage of Excel's powerful mathematical functions.  Any Excel feature you use by clicking buttons can be called automatically in a macro program.  Second, the more you automate, the less you need to check by hand.  Once you determine that the code produces correct results, you can reasonably assume that all mathematical operations are correct and no further checking is needed. In other words, aside from spot checks, you need to check only human work that the computer can't.

In the case of extremely tedious and error-prone analyses that arise repeatedly, investment in a more extensive macro development might be well worth the effort.  At Omnicon, an engineer faced with the mind-numbing task of performing bent pin analysis on a dozen different connectors developed a Visual Basic program that did virtually everything that could be done by machine, including computation of failure rates for each bent pin permutation and automatic generation of grammatically correct failure descriptions.  In any event, the important thing to remember is you can start producing these useful timesavers with an introductory Visual Basic text and a few days of experimentation. 
Naturally, a little programming experience makes things go faster, but once you start automating a few tedious tasks you'll no doubt begin applying similar automation to other tasks. You'll find that macro programming really does make reliability analyses better-faster-cheaper.


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Nat Ozarin is a senior engineering consultant at The Omnicon Group Inc., a company specializing in reliability and safety analysis for the military, medical, industrial, and transportation industries. His background includes hardware engineering, software engineering, systems engineering,

programming, and reliability engineering. He received a BSEE from Lehigh University, an MSEE from Polytechnic University of New York, and an MBA from Long Island University. He is an IEEE member.

Announcement

IEEE Reliability Society, IEEE Reliability Society, Japan Chapter and Institute of Information Security held the following workshop.

IISec or Institute of Information Security is a university newly set up for the growing needs for the information security engineers and managers. They teach only postgraduate students and a majority of them are sent from industries to catch up with the quickly changing situations and rapidly progressing technologies.

The president of IISec is Dr. Shigeo Tsujii, who is an authority on cryptography. Dean and Professor Hidehiko Tanaka, who hosted this workshop is immediate past Dean of the Graduate School of Information Science and Technology, University of Tokyo. Dr. Tanaka is more well know as the leader of the 5th Generation Computer Project, Ministry of International Trade and Industry, which was a Japanese project to develop AI machines.

The discussion was videoed and we are planning to put it either on the web or on a DVD.

Shuichi Fukuda
VP, Tech Ops
fukuda@tmit.ac.jp

Workshop title: Information Security Workshop

Date and Time: Friday, Nov.18, 2005 14:00 - 17:00

Place: Institute of Information Security, 2 minute walk from Yokohama Station
http://www.iisec.ac.jp (in Japanese)

Aim:
This workshop will be held to exchange ideas and information on the current situations in US and in Japan with respect to information security trends and technologies.

Registration Fee:
Free. Everybody who is interested and ready to exchange information is welcome.

Program
Chair Shuichi Fukuda TMIT, IEEE Reliability Society, Vice President

14:00 - 15:00 Survey of Information Security Trend Jeffrey M. Voas, President, IEEE Reliability Society/SAIC http://www.cigital.com/labs/leadership/jmv.php
http://www.ieee-jp.org/japancouncil/chapter/R-07/eng/2005ARC.html

15:00 - 16:00 Computer Security
James Bret Michael, Associate Professor of Naval Postgraduate School http://www.cs.nps.navy.mil/people/faculty/bmichael
http://www.ieee-jp.org/japancouncil/chapter/R-07/eng/2005ARC.html

16:00 - 17:00 Japanese Situation and Researches Toward Secure Society
Hidehiko Tanaka, Dean and Professor, Institute of Information Security
http://lab.iisec.ac.jp/?tanaka/

For Inquiries within Japan
Ms. Aya Tamaru, Secretary to the Dean, Institute of Informtion Security
email : tamaru@iisec.ac.jp
045-410-0225 (TEL/FAX)

For Inquiries from overseas,
Shuichi Fukuda
TMIT
Email: fukuda@tmit.ac.jp

To register,
Email your name, affiliation and email and send it at the following address.
email : ieeeworkshop@iisec.ac.jp

IEEE Reliability Society Newsletter Submission
from the Boston Chapter
November 2005

The Boston Chapter began its 2005-2006 season in September with an interactive meeting on *Implementing an Electrical Parts Derating Guideline* by Gene Bridgers of Mercury Computer Systems and Results MA.• The Boston Chapter developed a Commercial Office Environment Electrical Derating Guideline back in October 1988.• Gene discussed his updates to this derating guideline, including contemporary advice on electrical stresses, parts selection, and infrastructure implementation.

In October, Joe Dzekevich of Raytheon Company and Gene Bridgers presented a Fall Lecture Series on *Simplifying Complex Modeling Using Simulation*.• This short course focused on using General Purpose System Simulation (GPSS) software to solve complex reliability problems in terms of business metrics, such as cost, schedule, and resources.

In November, Jan Krouwer of Krouwer Consulting will give a talk on *Combining Fault Trees with FMEA to Reduce Medical Errors*.• Reports that 98,000 deaths per year are due to medical errors has led to the adoption of Failure Modes and Effects Analyses (FMEAs) in the healthcare industry.• Jan has developed software that uses fault trees to ensure the completeness of medical process FMEAs.

For our annual •Past Chairs• Dinner Meeting in December, we have asked Peter Blais of Kemet to speak on *Capacitor Design for Reliability.*• The electronics industry continues to demand more capacitance in smaller, cost effective packages, operating at ever higher frequencies.• Peter will discuss technical advancements and reliability considerations for ceramic MLCC, Tantalum-MnO_2, Tantalum-Polymer, and Aluminum-Polymer capacitor technologies.

The Boston Chapter recently rehosted its website from a fee-based ISP to the free IEEE Entity Web Hosting (EWH) site.• Our new URL is http://www.ieee.org/bostonrel.• It was easy, had many useful features, and the price was right!• We highly recommend that other chapters look into EWH for their website hosting needs.

Jeff Clark
Chair, Boston Chapter

Dallas IEEE Reliability Society

Lon Chase, Chapter Chair

September 2005 Meeting

Title:

Wafer-Level microEncapsulation

Speaker: Dr. Charles L. Goldsmith, MEMtronics

Program Summary: This presentation overviews the mechanical, electrical, process development, and cost issues involved with microencapsulation of RF MEMS switches. The latest RF and humiticity results will be presented, with estimates of the production cost involved in applying these packaging techniques to RF MEMS wafers.

Many of the current efforts focusing on improving RF MEMS reliability are concentrating on packaging techniques. This is necessary because much of the switch's longevity is determined by the local environment of the switch. Conventional packaging methods have come up short in terms of both cost and loss. Most present efforts are focused on reducing loss and cost utilizing wafer-level packaging. The dominant techniques generally involve wafer bonding using metal-metal or glass-frit seals.

Promising wafer-level packaging alternatives to wafer-bonding are currently under development. One alternative technique is microencapsulation. With this technique, individual "cages" are constructed over each switch using the same sacrificial micromachining techniques used to construct the switches. Using this method of wafer-scale sealing of individual switches minimizes losses and processing costs. In addition, this packaging technique is easily scalable to fit a variety of device types and sizes.

Detailed RF measurements up to 110 GHz have been made on the packaging structures used with wafer level microencapsulation, with measured insertion losses well below 0.1 dB through 50 GHz. Efforts are currently underway to evaluate the hermeticity of the sealed package. The ultra-small volumes involved with this packaging method (typically ~1 nL) require alternative methods for measuring hermeticity.

Speaker: Charles L. Goldsmith received BSEE and MSEE degrees from the University of Arizona, and the Ph.D. degree from the University of Texas at Arlington. He has been employed by M/A-COM, Texas Instruments, and most recently was an Engineering Fellow at Raytheon Company, in the design and development of various microwave/millimeter-wave circuits and subsystems.

Dr. Goldsmith recently formed MEMtronics Corporation where he is currently pursuing business opportunities for RF MEMS in the commercial and defense markets, and has spent the last decade dedicated to the development and application of this technology.

He has authored or co-authored over 45 publications on microwave circuits, photonics, and RF MEMS. He is also inventor or co-inventor of nine granted and two pending patents in related fields. He has been the guest editor for three "Special Issues on RF Applications of MEMS Technology" for the *International Journal of RF and Microwave Computer-Aided Engineering* (Wiley). He is a Senior Member of the IEEE, and has served as Chairman & Vice-Chairman of the IEEE LEOS Dallas Chapter, and currently serves as Chair of the IEEE MTT-21 Subcommittee on RF MEMS.

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October 2005 Meeting

Title: **How to fail HAST: a combination of bad handling and package design**
Speaker: Becky Holdford, Failure Analyst, SC Packaging Development, Texas Instruments, Inc.
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Program Summary:
This talk will illustrate what can go wrong with HAST testing when there is a package design problem in combination with contamination from handling. Leakage failures are all too common at HAST, and are usually the result of the mold compound absorbing water and creating a leakage path between pins or bond pads. A high-temperature bake for 24 hrs. will usually cure this. But what if the problem is not on the inside, at the chip surface, but on the outside of the package?

Speaker: Becky Holdford has worked in failure analysis .at Texas Instruments, Inc. for 27 years and has worked in numerous groups, from wafer fabs to assembly operations. She currently works in the SC Packaging Development Group performing FA on new package types and new silicon node, also developing new FA techniques and training team members on same.

She is active in many technical societies, such as Microscopy Society of America (MSA), Electronic Devices Failure Analysis Society (EDFAS), the Surface Mount Technology Association (SMTA), and is webmaster for the Texas Society for Microscopy. She was chair of the committee that edited and published the Microelectronics Failure Analysis Desk Reference, 5th edition and contributed a chapter on the uses of dual beam FIB in FA of ICs to the Introduction to Focused Ion Beams: Instrumentation, Theory, Techniques and Practice, published Jan. 2005.

France Section Reliability Chapter Hosts Conference on Reliability for Reliability Engineering Students

The IEEE Reliability Chapter, France Section hosted an evening conference for reliability engineering students. The well attended meeting was held on October 5th, 2005 at the Hotel Etas-Unis Opera in Paris. The opening presentations featured an overview of the Reliability Society by Marsha Abramo, VP Membership and a review of the France Section Student Activities by Frederique Vallee, Paris Chapter Chair. Two technical reviews were also presented with ample time for in-depth discussions. The first was presented by Samuel Keene entitled "Perspective on Reliability Prediction With an Emphasis on Software Reliability Prediction". The second technical review was presented by Francois Reiuneau, Renault, entitled "The Role of the Reliability Engineer in the Automotive Industry". Refreshments were served during which time the students had an opportunity for networking and to interact with the speakers.

Dr. Samuel Keene speaks to reliability engineering students during the technical conference in Paris

Reliability engineering students listening to a technical review by Dr. Samuel Keene on Reliability Prediction

Frederique Valee responds to a students inquiry regarding France Section student activities

Japan Chapter
Chair Prof. Kazuyuki Suzuki

As I wrote in the September issue of this Newsletter, the Japan chapter held its annual symposium on Human Factors in Reliability on October 22nd at the University of Electro-Communications, Tokyo. The topics of this year were ``Error proofing in health care`` by Prof. Takeshi Nakajo and ``A catch in redundancy design with human assistance`` by Prof. Kenji Tanaka. Prof. Nakajo first described the status quo in medical area in the US and pointed out that error proofing is very effective in health care. He proposed a systematic approach for human error proofing in health care. Prof. Tanaka pointed out that the introduction of redundancy simply with humans as a final backup would not work as we expect it to be and emphasized more collaboration between human and machine is needed for securing higher safety. Both professors delivered remarkable lectures based on their recent researches and experiences. The meeting was well attended and there were about 80 participants.

On the coming November 19, 2005, our chapter organizes IEEE Asian Reliability Conference 2005 at the University of Electro-Communications, Tokyo, Japan. The purpose of the conference is to present the advanced technology and concepts on Reliability including Security, Risk, Trust, Reliance and Quality Assurance. That is, wider meetings of ``Reliability``. We expect not only the academic researchers but also practitioners such as manufacturing, medical and governmental fields to attend the conference. The program is as following: please refer to the following URL in details,
http://www.ieee-jp.org/japancouncil/chapter/R-07/eng/conf.html

Program:
Morning 9:00-12:30
Session A: Principles of Reliability
Jeffrey Voas: In today's world, where does "reliability" fit?
John Viega: Software Security: why it's important, and what to do about it
Akihiko Masuda: A New Approach on Service Reliability - Its Concepts and Analytical Tools
Session B: Reliability for Human and Complex Systems
Bret Michael: Environment Behavior Models for Automation of Testing and Assessment of System Safety
Toshiyuki Inagaki: Risk-based design of human interactions with smart machines
Kazuyuki Suzuki: Optimal Decision Procedure for Safety Monitoring Systems
Session C: Reliability Modeling
Richard Doyle: MEMS Reliability - Mechanical Stress Analysis
Sam Keene: Reliability prediction technology and perspective
Koichi Suyama: Probabilistic safety assessment of control logic
Afternoon 13:30-17:00
Tutorial A Jeffrey Voas: Software fault injection and its relationship to software testing
Tutorial B Sam Keene: Six Sigma contributions to

reliability

Tutorial C□□□□□□□□□□□□□□ Richard Doyle: Thermal Analysis of Electronic Systems and Parts

Tutorial D□□□□□□□□□□□□□□ Bret Micheal: Software-Based Safety Kernels for Hybrid Systems

John Viega: Common Misconceptions about Cryptography

Information Exchange Meeting 18:00-19:30

Kazuyuki Suzuki, Chair
Japan Chapter
suzuki@se.uec.ac.jp

Report by Singapore REL/CPMT/ED Chapter

1. Technical talk and short courses

- 21 July 2005, Dr. Ernest Y. Wu, IBM System and Technology Group, Essex Junction, VT, USA, "From TDDB Reliability to Circuit Reliability"
- 5 September 2005, Prof. Gehan Amaratunga, Engineering Department, Cambridge University, UK, "Nanotube and Nanowire Transistors"
- 12 Oct 2005, Dr. John Lau, Agilent Technologies, USA, "Reliability of RoHS (e.g. Pb-Free) products with Emphasis on Solder Joints"
- 12 September 2005, Prof Souvik Mahapatra, IIT Bombay, "Negative bias temperature instability in CMOS devices"

2. 12th INTERNATIONAL SYMPOSIUM ON THE PHYSICAL AND FAILURE ANALYSIS OF INTEGRATED CIRCUITS (IPFA'2005)

The 12th International symposium on Physical and Failure Analysis of Integrated Circuits (IPFA) was held 27 June to 1 July 2005 at Shangri-La's Rasa Sentosa Resort, in Singapore. The location was an unusual one, several km from the city centre, next to the beach on the island of Sentosa, more relaxing than the usual city centre hotels. IPFA has been away from Singapore for two years since IPFA 2003 had to be cancelled due to the SARS outbreak in that year and in 2004, IPFA went overseas for the first time in its history, to Hsinchu in Taiwan.

IPFA has been the main Asian conference on reliability and failure analysis of devices and integrated circuits, for over 15 years and is sponsored by the Reliability/CPMT/ED Singapore Chapter and the IEEE Electron Devices & Reliability Societies.

The five day event began with two days of tutorials followed by the three day technical symposium in parallel with an exhibition of FA and characterization equipment.

The six half-day tutorials, two on Monday and four in parallel sessions on Tuesday were:

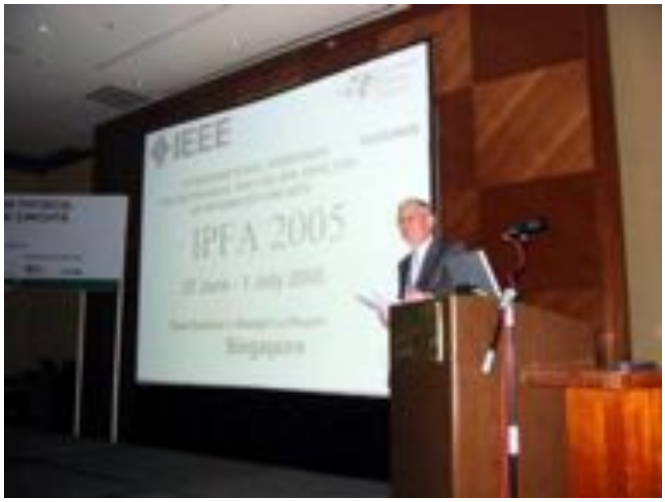
- Cu/Low-k Failure Analysis & Interconnect Degradation Studies by Dr. Ehrenfried Zschech (AMD)
- Reliability Testing in the Semiconductor Industry by Dr. Luc Tielemans (QTest)
- Electrostatic Discharge (ESD) Reliability Issues in Advanced Silicon Technologies - Basics and Trends by Dr. Mahadeva Iyer Natarajan (IMEC)
- Electrical Diagnosis: Making Best Use of Test to Support Physical Failure Analysis by Dr. Camelia Hora (Philips)
- Laser Induced Techniques for Microelectronic Failure Analysis by Prof. Jacob Phang (NUS) & Dr. Michael Bruce (AMD)
- MOS Gate Dielectric Reliability by Dr. James Stathis (IBM)

All were exceptionally well supported with an average attendance of over 40 and none having less than 30 registrants.

The Technical symposium began with the keynote address "Yield Challenges in Nanotechnology" by Kay Chai "KC" Ang, Senior Vice president for Fab Operations at Chartered Semiconductor. This was followed by Best/Outstanding paper exchanges from ESREF and ISTFA. From ESREF Pei Lin Song of IBM T.J. Watson Research Center presented "Testing of Ultra Low Voltage CMOS Microprocessors Using the Superconducting Single-Photon Detector (SSPD)" while from ISTFA J. Evertsen of University at Albany, presented "Three Dimensional Imaging of Microelectronic Devices Using a CrossBeam FIB."

The rest of the week saw four invited papers and 44 contributed papers presented orally and another 18 papers presented during the poster session and reception. The Technical symposium attracted nearly 200 participants, just over half of them from Singapore and the rest from overseas. In parallel with the symposium 30 exhibitors were able to show case their products and services. Although not an official

part of IPFA, an FIB user group meeting and reception was held on the Thursday evening which proved very popular with participants. The social highlight of the week was undoubtedly the banquet barbecue held in the Pavillion room with its excellent view over the South China Sea and the flotilla of ships passing through the port of Singapore.



Opening address by Dr. Alastair Trigg, the General Chair of IPFA2005.

Keynote address by Mr. Kay Chai "KC" Ang, Senior Vice president for Fab Operations at Chartered Semiconductor.

3. Short Courses

• “Negative Bias Temperature Instability in p-MOSFET Devices” by Prof Souvik Mahapatra, IIT Bombay, India, 7 Nov 2005, Hotel Rendezvous Singapore.

By KL PEY

Chair, Singapore REL/CPMT/ED Chapter

Asian Reliability Conference (ARC)
-What it is and what we intend it to be-

Shuichi Fukuda
VP, Tech Ops
Chair, Executive Committee of ARC 2005
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As Japan Chapter Chair Prof. Kazuyuki Suzuki, University of Electro-Communication, reports, Asian Reliability Conference 2005 (ARC 05) will be [was] held on Saturday, November 19, 2005 at the University of Electro-Communications, which is located very close to Shinjuku, Tokyo.

The original idea of holding a reliability conference was proposed by Alan Street at the ExCom meeting in January, 2005. He worked in Singapore and he emphasized the importance of extending our reliability activities across the national boundaries.

I responded to his proposal that Japan is ready to hold the meeting this year. And with the tremendous efforts and supports from Japan Chapter, all the arrangements and preparations for holding the first Asian Reliability Conference 2005 have been made.

Why the meeting is called ⍰Asian⍰ Reliability Conference is because RS ExCom and AdCom members would like to extend this activity throughout the Asian region. In the very near future, we would like to hold the meeting year after year from country to country within Asia. The coming meeting in Tokyo, Japan is intended to be the first one in this series of Asian meetings.

The chair of the organizing committee, ARC 05 is President Takashi Masuda, University of Electro-Communications (UEC) who is the former President of Information Processing Society of Japan and who is a senior member of IEEE. The co-chairs are Vice President of UEC, Prof. Tadahiko Kimura, who is the authority on microelectronics and is also our member of IEEE. Other members of the organizing committee are President or former President of the cooperating societies.

In Asian countries, engineers are committed to many societies, domestic and international. As reliability engineering encompasses a very broad range of engineering disciplines, Japanese reliability engineers are scattered across many different societies.
Therefore, we made efforts to increase the number of Japanese cooperating societies as many as possible. We believe we can eventually increase the number of IEEE RS membership by permeating our membership advantages through ARC activities. And if we are successful this way, we could possibly extend our activities to Singapore, China, Korea, etc in the similar way because their engineering society backgrounds are very similar to ours.⍰

As to ARC 05, IEICE ESS (the Institute of Electric, Communication and Information Engineers, Engineering Science Society) where Reliability Group (chaired by Shuichi Fukuda) belongs to, Reliability Engineering Society of Japan (President Prof. Hideo Nakamura, Nihon University), the Japanese Society for Quality Control (President Prof. Yoshinori Iizuka, University of Tokyo), Human Interface Society (President, Prof. Shogo Nishida, Osaka University, IEEE Fellow) will be our

cooperating societies at the time of writing. And there will be more cooperating societies at the time of the meeting.

In addition to these official cooperating societies, there will be many societies cooperating with us substantially. Due to the shortage of preparation time, these societies cannot officially endorse cooperating society status. But they certainly will be if the next one will be held in Japan, too.

Our original idea was to hold the meeting with three parallel sessions featuring systems, software and device. But due to the shortage of preparation time, we have to give up the device session. Therefore, if we can hold the next meeting in Japan, we would like to hold these three parallel sessions with much more Japanese cooperating societies.

This is our attempt to expand RS activities throughout Asia and we hope that although this might be a very small step, it will lead to a big leap for our RS.

Useful Information
Transactions on Reliability
Reliability Training
Discussion Forum
Job Postings & Resumes
What is Reliability?
Bylaws & Constitution
Chapters, Committees & Officers
Annual Technology Report
Reliability Society Newsletter
RS Blog
RS LinkedIn
Site Map
E-mail IEEE RS Web Master
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Tech Ops Committees

Status of Tech Ops technical committees:

Technologies:

Name	Chair
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2) Software Reliability	Sam Keene s.keene@ieee.org
3) MicroElectronics	**vacant**
4) Human Interface	Ken Lasala: k.lasala@ieee.org
5) International Reliability	Joe Fragola fragola@prodigy.net
6) Warranty	Judith Koslov Judith.Koslov@Sun.com
7) Testing and Screening	Anthony Chan h.a.chan@ieee.org
8) Standards and Definitions	Y. Lord yvonne.lord@ngc.com / T. Brogan Thomas_L_Brogan@raytheon.com
9) CAD / CAE	**vacant**
10) Mechanical Reliability	Dick Doyle ddoyle@cts.com
11) System Safety	Takeshia Khoda kohda@vib.kuaero.kyoto-u.ac.jp
12) Assurance	James Bret Michael bmichael@nps.navy.mil
13) Six Sigma Reliability	Sam Keene s.keene@ieee.org
14) Maintainability	Stefan Mozar s.mozar@ieee.org
15) Emerging (new) Technology	**vacant**

Systems:

16) Aerospace and Defense	Lon Chase l.chase@ieee.org
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18) Information Technology & Communications	**vacant**
19) Energy Systems	Mark Lively MbeLively@aol.com
20) Medical	Patrick Corcoran patcorkshome@yahoo.com
21) Consumer Electronics	Fred Schenkelberg fms@hp.com
22) Sensors	Ken Lasala (acting) k.lasala@ieee.org
23) Industrial Systems	Hiroshi Yajima yajima@sdl.hitachi.co.jp

IEEE Transactions on Reliability,Special Issue on Reliability Studies on Nanotechnology

Guest Editors: J.-C. Lu, W. R. Tonti and S.-L. Jeng

AIM

Over the past two decades, the ability to measure and manipulate matter at the scale of atoms and molecules has led to the discovery of novel materials and phenomena. These advances underlie the multidisciplinary areas of research and development known today as ?nanotechnology.? Now, nano-technology has been recognized as a revolution that will impact virtually every sector of our economy and our daily lives. In the nano era, device sizes will be in the range of several nanometers, leading to a potential for high degree of failures, due to (i) special physics and chemistry properties of materials in nano scale, (ii) transient faults resulting from reduced noise tolerance at reduced voltage and current levels in device or system design, (iii) faults due to ageing in the processes of using molecular and other techniques for creating nano-devices, and (iv) manufacturing defects.

Scope

Contributions should discuss the application of reliability methods in nanotechnology research. Interdisciplinary papers are particularly welcome. Possible topics of applications, within this scope, include but are not limited to:

? Reliability of nanostructured materials

? Reliability design in nanoscale products and systems

? Reliability testing and failure-mode analysis for nano-devices and ?systems

? Reliability, analysis and fabrication of Self-Assembled-Systems

? Aging, degradation, failure-rate, reliability models for nano-devices and ?systems

? Lifetime assessment techniques of nanoscale products

? Manufacturing quality issues related to reliability of nano-products

? Reliability standards for nanoscale products and systems

? Trade-offs between design, reliability and performance of nanoscale products

? Reliability prediction and assurance considering variations in device manufacturing performed by different supply-chain organizations.

Submission Guidelines

Papers must be submitted to the **guest editor** J.-C. Lu at JCLU@isye.gatech.edu

Although there is no restriction on length, we would prefer shorter papers (20 pages or less) to longer ones, for the sake of greater diversity and more thorough reviewing. Authors are therefore encouraged to be as concise as possible.

Electronic submissions are encouraged, and may be sent as one email. The message should contain the whole paper in PDF or Word. Authors who cannot meet these requirements should submit five hard copies by post instead.

All submitted papers will be refereed according to the usual *IEEE Trans. on Reliability* refereeing process.

To aid planning and organization, we would appreciate an email or a letter of intent to submit a paper (including author information, a tentative title and abstract, and an estimated number of pages) as early as possible.

Important Dates

Official announcement of call-for-papers in the *IEEE Trans. on Reliability*	June, 2005
Letter of intent	September 1, 2005
Submission of papers:	May 1, 2006
Invitation for paper revision	August 15, 2006
Possible second revision	November 30, 2006
Notification of acceptance:	January 5, 2006
Delivery of final LaTeX or Word file:	January 30, 2007
Publication of special issue:	June, 2007

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The 9th International Conference on Information Fusion will be held in Florence, Italy, on 10-13 July 2006.
The objective of the conference is to provide a forum to discuss advances and applications for fusion technologies. The conference will feature keynote speeches, special sessions on topics of current interest, a tutorials program to assist new researchers in the field, and a student paper award.

Prospective authors are invited to submit 4-8 page papers by 15 January 2006. The Call for Papers (PDF format) is available for download on the conference website www.fusion2006.org. Submission instructions and paper templates will be soon provided on the web site. Proposals for special sessions, panel discussions and tutorials are encouraged.

Please note the following important deadlines:

Special session proposal 1 December 2005
Tutorial proposal 15 January 2006
Regular paper submission 15 January 2006
Acceptance of papers 1 April 2006
Final papers 15 May 2006
Early registration 1 June 2006

For further and updated information, please visit the conference website www.fusion2006.org.

The 9th International Conference on Information Fusion
Florence, 10 – 13 July 2006

CALL FOR PAPERS

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www.fusion2006.org

Overview. The 9th International Conference on Information Fusion will be held in Florence, Italy, at the *Convitto della Calza* Convention Centre. Authors are invited to submit papers describing advances and applications in information fusion, with submission of non-traditional topics encouraged.

Conference Site. Lying in the heart of Tuscany, surrounded by gentle green hills, Florence is a unique treasure chest of works of art. Florence is the home of Dante, Giotto and Botticelli. Leonardo da Vinci, Michelangelo, and Raphael all came to Florence to learn about art and to teach it. Renaissance buildings, churches and museums like the *Uffizi* gallery provide an extraordinary voyage through the history of art. The coastline is approximately an hour's distance, as are the notable Italian centers of Pisa and Siena. Florence is served by a modern international airport.
The conference venue is the *Convitto della Calza*, a former monastery built in the 14th century. It is strategically located in the heart of the historical center, surrounded by remarkable works of the Renaissance, and close to the *Boboli* Gardens and *Palazzo Pitti*.

Topics of interest include (but are not limited to) the following:

1. Foundational tools
Probability theory; non-Bayesian approaches to uncertainty representation; random sets; fuzzy logic; risk-sensitive approaches; fusion modeling; agents; genetic optimization.

2. Technological advances
Sensor modeling (radar, active and passive sonar, acoustic, seismic, magnetic, optical, visual, infrared); fusion-related hardware, software and communications technology.

3. Algorithmic developments
Classification; data mining; nonlinear filtering and smoothing; contact-based tracking algorithms; combined detection/tracking; resource management; distributed fusion; active and passive data fusion; data registration; image fusion; database fusion.

4. Application areas
Command, Control, Communications, Computers, Intelligence, Surveillance and Reconnaissance (C4ISR); network centric warfare; decision support; situation assessment; computer vision; economics and finance; condition monitoring; medical diagnostics and biological systems; robotics; intelligent transportation systems; security.

Paper Submissions. Prospective authors are invited to submit 4-8 page papers through the conference website (www.fusion2006.org), where paper templates and submission instructions are available, by 15 January 2006.

Special Session Proposals. Proposers are invited to submit by email (coraluppi@nurc.nato.int, willett@engr.uconn.edu) the theme of the special session, as well as the list of committed papers, by 1 December 2005.

Tutorial Proposals. The first day of the conference will be devoted to tutorials on information fusion. Organizers for proposed tutorials are invited to submit by email (marano@unisa.it) a title and description for their tutorial, by 15 January 2006.

Student Paper Program. Fusion 2006 is featuring a student paper program to encourage the involvement of young engineers and scientists in information fusion research. Conference fees will be waived for the leading author of the best paper. Further details are available at the Conference website.

Invited Speakers. Fusion 2006 will include the following invited talks:

- Dr. Nils Sandell (BAE Systems Advanced Information Technologies), *Fusion Technology and Applications: A Retrospective and Some Thoughts about the Future.*
- Dr. Marcel Hernandez (QinetiQ), *Performance Measures for Sensor Management: Computationally Efficient Formulations and Associated Applications.*
- Dr. Roy Streit (Metron), *The PMHT and Related Applications of Mixture Densities.*

Important deadlines

Special session proposal	1 December 2005
Tutorial proposal	15 January 2006
Regular paper submission	15 January 2006
Acceptance of papers	1 April 2006
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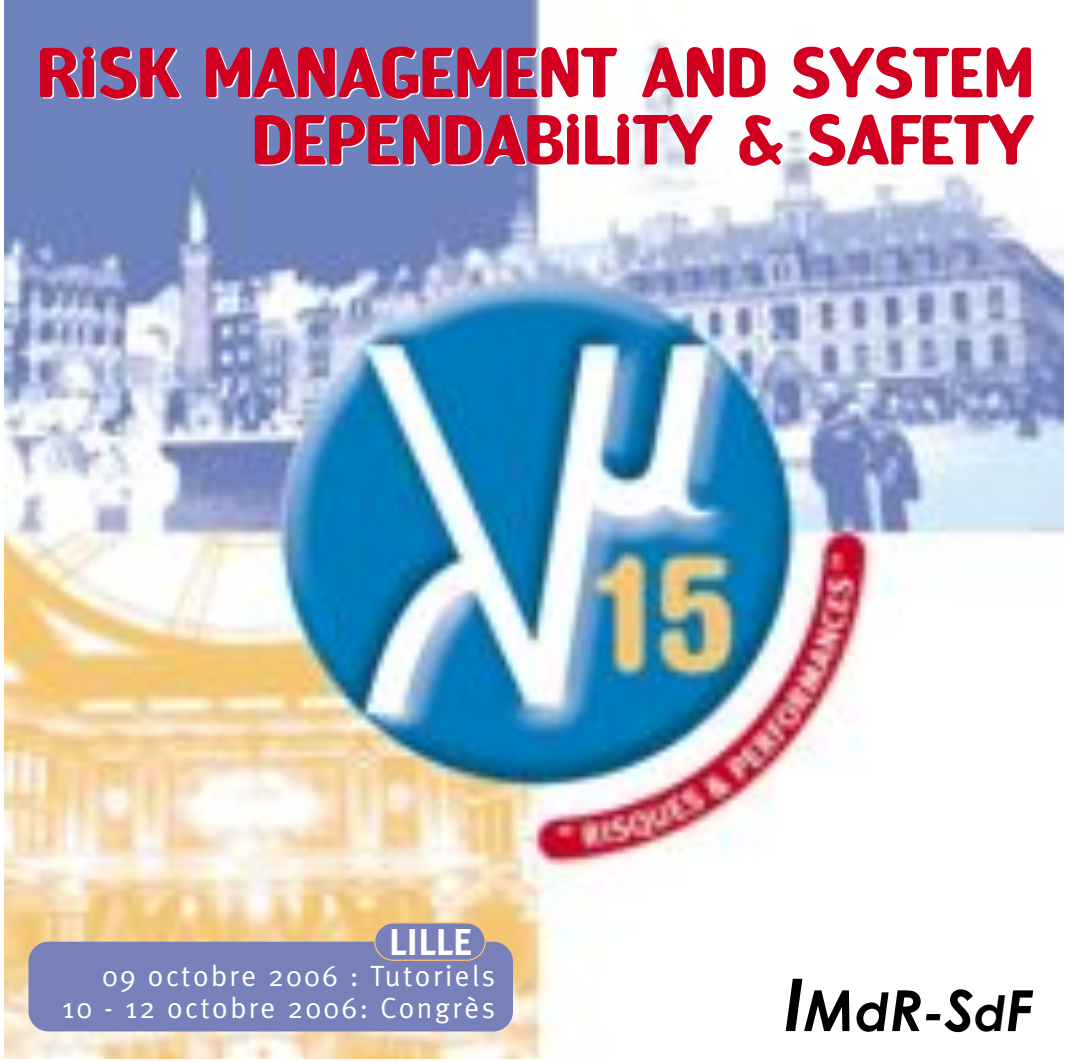
Early registration	1 June 2006

RISK MANAGEMENT AND SYSTEM DEPENDABILITY & SAFETY



IMdR-SdF

CALL FOR PAPERS

THEME OF THE SYMPOSIUM

RISKS & PERFORMANCES

Efficient risk management involves not only taking actions to exercise preventive and protective capacities, but also engaging an offensive process in order to improve efficiency, quality and availability. Safety and performance are therefore objectives which reinforce each other to sustain industries and services.

Many examples in industrial sectors show that the appropriation of a risk management approach procures greater reactivity and higher performances in an entity. This improvement is obtained through a constant effort at controlling the organization and its processes which are key components for performance.
[un espace de trop]
In selecting the theme of "Risks and Performances" for our Symposium, I hope to convince European and international socio-economic actors - industrials, investors, decision-makers, authorities, universities, research laboratories, and other stakeholders - who want to improve their performances, to promote the idea that risk analysis and management issues are an integral part of an organisation's strategic orientation, as equal as marketing, financial and production issues. All the following sectors are concerned: transport, energy and environment, automotive, petrochemicals, chemicals, agro-industry, aerospace, defence, telecommunications, mining industries, information systems, textile, finances...

The programme will put the accent on communications focusing on convergences and synergies between risk prevention and protection strategies and performance-improvement strategies

- The topics might therefore include:
- Relevance of allocating risk-reducing resources related to criticity;
- Consistant management of uncertainties as a function of the issues at stake;
- Management of component ageing and examples of availability, maintenance and safety policies integrating the obsolescence factor;
- Explanation of renewal policies related to obsolescence;
- Dependability methods and tools applied more particularly to complex systems and systems including hardware and software;
- Integration of social, organisational and human factors in technical decisions and management;
- Transverse and global risk analysis and decision aids;
- Vigilance culture;
- Crisis anticipation and management;
- Feedback from experience on technical and organisational aspects;
- Performance and risk management indicators;
- Cost-profit approaches in risk management;
- Economic intelligence approaches;
- ...

The topics above may be dealt with several standpoints:
Industrial applications, strategies, innovations, methodological approaches, tools, theses and in-depth studies, debate ... Risk and performance management is a major challenge for industries, services and research.

Laurent Magne
Scientific committee Chairman

SYMPOSIUM COMPONENTS

- **The sessions**, at the center of the symposium, are organised in **oral sessions and poster sessions**.
- **The industrial exhibition** offers to exhibitors a showcase for their achievements.
- **The tutorials**, scheduled at the beginning of the symposium, are an opportunity for transmitting knowledge.
- **The round table** is an opportunity for a broader debate.
- **The plenary sessions deal with** topical subjects.
- **The workshops** represent places for sustained dialogue on precise subjects.
- **The university-industry forum** enhances possibilities for initial or continuing education & training.
- **The technical visits**, at the end of the symposium, afford access to various companies' premises.
- **A dinner** enables participants to meet and mix in a more casual atmosphere.
- **The golden λμ** will be awarded to the best industrial and academic communications.

SCHEDULE

Deadline for abstracts : 23 DECEMBER 2005

Notification to selected authors : 20 MARS 2006

Deadline for complete texts : 12 MAY 2006

DOMAINS

- Accidents
- Decision aids
- Cost/profit
- Life time and prolongation
- Human factors
- Reliability of structures
- Reliability of Information Systems
- Optimisation
- Impacts of organisations
- Legacy
- Maintenance
- Project risks and financial risks
- Simulation
- Standardisation
- Feedback from experience
- Logistics support
- Advanced statistics
- System dependability and safety
- Safety
- Environmental and health risks

GUIDELINES FOR CONTRIBUTORS

The official language at the symposium is French. However, as the Organisation Committee wishes to confer a European dimension, communications focusing on European or trans-national issues are strongly encouraged. It will also be feasible to organise English communications. All the communications, either oral or poster, must include an abstract in English. Selected papers will be published in a scientific journal. Authors wishing to submit a communication are requested to send to the symposium secretariat by **23 DECEMBER 2005** an abstract in French in the form of a computer file (WORD, PDF) between 600 and 1200 words long. The abstract – which must contain no formulae and no illustration – is to be mailed (on floppy disk) or e-mailed to **lm15@imdr-sdf.asso.fr**. The submitted paper must **follow exactly the structure** described below (selection criterion). In particular, the section titles must appear exactly as shown.

GENERAL INFORMATION

- **Title :** as short and clear as possible.
- **Name of author(s) :** main author underlined.
- **Author(s)' contact details :** company, address, telephone, fax, e-mail.
- **Key words :** a list is given in the abstract template. Choose those that correspond most closely to the paper you are submitting; you are free however to add other key words considered informative and meaningful.
- **Domains :** a list is available on the symposium site. If your paper does not fit in any of those listed, indicate a domain you consider appropriate.
- **Type of presentation preferred :** Oral, Poster or Either.

SUBMISSIONS OF COMMUNICATIONS: abstract in five sections

- **Objectives :** goals of the work presented in the paper
- **Context :** presentation of the subject, scope and stakes at issue
- **Method :** handling of the decision problem; innovative aspects
- **Results :** feedback, findings, successes or failures, lessons learned, etc.
- **References :** provide recent references (maximum 3).

Special attention will be paid to submissions explicitly addressing the decision-making angle and tackling the subject from an innovative perspective. Special sessions will be reserved for the theoretical and mathematical aspects.
You will find on the symposium website **http://imdr-sdf.asso.fr/lm15**, under the heading "Guidance for Contributors", a template for presenting an abstract, together with a completed example, as well as a host of other information about the λμ15 Symposium.

SUBMISSIONS OF TUTORIALS

Anyone wishing to propose a tutorial should submit the subject, goal and a tentative programme to the Symposium secretariat.

SYMPOSIUM ORGANIZING COMMITTEE

The INSTITUT pour la MAÎTRISE des RISQUES et la SÛRETÉ DE FONCTIONNEMENT (IMdR-SdF)

Since 1989, Institut de Sûreté de Fonctionnement, later called Institut pour la **M**aîtrise des **R**isques et la **S**ûreté de **F**onctionnement has contributed to making system dependability and safety part of a sector contributing to the competitiveness of social and economic actors. This has been done, among other ways, by providing methods and tools available to anyone, and circulating information on the subject, as well as by means of a substantial library housed in its Orientation and Documentation Centre and on its web site: **www.imdr-sdf.asso.fr**.
IMdR-SdF is the guarantee for the scientific content of the symposium which gathers every two years, attracting over 500 participants of industrial, scientific, academic and service companies.

The Symposium Organizing Committee, chaired by Mr Jean-Louis RICAUD, Vice-Chairman of RENAULT Group, includes:
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- a representative of SEE, Jacques GIRARD,
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