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Reliability Society

NEWSLETTER

Vol. 52, No. 2, May 2006

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President's Message



Dear Reliability Society Members,

A lot of activity has transpired since my first newsletter back in January. My intent is to update you as a society, to ask you to connect with one or more of these activities, to feel free to contact any of the ADCOM members, and for you to lend a helping hand. Here is the link to the RS homepage where you can easily find the ADCOM members: <http://www.ieee.org/portal/site/relsoc/menutem>. Without further adieu, what follows is a brief update on what we as a society have accomplished, or are in the process of developing since January.

Led by Dr. Christian Hansen, the EXPERT Now learning modules are progressing from the drawing board to production. As you may recall, these modules are intended to be relevant on-line learning tools that are managed by IEEE, but whose material is a result of the IEEE technical community at large. The first module that the society is sponsoring this year is entitled "Planning and Performing Failure Mode and Effects Analysis on Software", and is authored by Nathaniel Ozarin of The Omnicon Group, Inc. The second module is "Design-for-Six Sigma meets Design-for-Reliability" and is co authored by Dr. Robert Stoddard of the Software Engineering Institute and Dr. Samuel Keene, consultant. This will boost the EXPERT Now reliability sponsored topics to four. The two completed modules are: "Reliability Analysis of Computer Based Systems Using Dynamic Fault Trees" by Joanne Bechta Dugan of the University of Virginia, and "Effects of Reliability Mechanisms on VLSI Circuit Functionality" by Wayne Ellis of IBM.

Our student initiatives are also progressing. Dr. Robert Loomis is polishing a draft to award college students with an RS scholarship. Keep an eye on the RS website as scholarship details will be posted within the next two months. Marsha Abramo is working hard to kick off subject matter expert lectures at universities around the country. The first two are scheduled mid-July and mid-September at the Naval Post Graduate School and at the University of Tennessee respectively.

In case you have forgotten, RS sponsors many conferences throughout the year. One of our larger conferences, The International Reliability Physics Symposium (IRPS) has recently taken place in San Jose, Ca, and had an excellent turnout. One of the many significant events of this symposium was the keynote address, "Adaptation of Reliability Methodologies To Market Expectations and Technology Roadmaps" by Timothy Collopy of IBM. If you are interested in this conference, or it's baby brother the IIRW, I suggest that you navigate to their respective web sites, www.irps.org, and www.iirw.org.

The IRPS produces a virtual conference DVD that is available on the web, and the IIRW is scheduled to take place October 16-19, 2006 in South Lake Tahoe Ca., and is presently accepting papers until July 14 for platform presentation. These two conferences are synergistic with our Transactions on Device and Materials Reliability (TDMR).

RS also co-sponsors another large conference, The Reliability and Maintainability Symposium (RAMS), which is highly synergistic with our flagship journal, Transactions on Reliability (TREL). You can find out more about RAMS 2007 (January 22-25, Orlando Florida) through this link: <http://www.rams.org/>.

The RS has been incubating a new conference jointly with the System Man and Cybernetics Society that is named "Systems Integration and Reliability Improvements" (SIRI). The two contacts from the Reliability Society that have been handling all the logistics are Dr. Samuel Keene and Alan Street. This conference will be held in Hanoi, Vietnam, December 13-15, 2006. Details on the conference and the July 15th call for papers deadline can be found at <http://paris.utdallas.edu/siri/>.

As the RS President, I had the opportunity to attend an IEEE Technical Activities Board (TAB)

meeting in January. From an RS perspective, two issues surfaced. Financially speaking, a new society tax model has been proposed and adopted. This model spreads a flat tax amongst all societies, and then adds an ala carte tax based on membership. In short, this model taxes smaller societies such as RS more heavily than previous models, and subsequently reduces large society IEEE corporate taxes. Although I am using the phrase "taxes" it is not a tax in an IRS definition. It is more a corporate operational or maintenance fee. In terms of it's impact, our RS tax will increase by 36%. Subsequent to this change, our division director Dr. Clint Andrews is organizing a small society workshop to study the long term impact of this new model. Dick Doyle will represent the RS at this workshop. The second item that surfaced at the TAB meeting affected the Product Safety Engineering Society. Their Transactions approval was reversed, leaving present and future PSES submissions without a home. At this TAB meeting, RS stated that PSES articles would be incorporated in the Transactions on Reliability. The RS Editor In Chief, Dr. Way Kuo, and the managing editor, Dr. Jason Rupe, have subsequently devoted a lot of time both organizing their focus and coaching the PSES editorial staff. Agreements between PSES and RS have been reached so that a PSES article that is submitted to TREL will meet the IEEE publishing guidelines, and will be evaluated by an integrated editorial board for it's respective technical merits. The message is that PSES papers have a home in TREL, and if their pipeline can grow to reach a level to sustain an IEEE Transactions or magazine, it will be spun off.

The RS Constitution is in the process of being revised. The AdCom has approved the changes as has the IEEE except for the changes to the RS Field of Interest, which has its own approval path that includes all IEEE Societies. The modifications involve revisions to Article III, Field of Interest, Section 1; Article V, Organization, Sections 4, 6 & 11; and Article IX, Amendments, Sections 1 & 2. The changes are primarily to clean up the document to be consistent with present day RS operations.

Thanks for your time in reading what we have done in the last few months. Until we meet again,
Best Regards,

Bill Tonti

<mailto:wtonti@US.IBM.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 lchase@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 News

Chapter Awards

A request for 2005 Chapter Award submittals has been requested from all Reliability Society Chapters. Each chapter has been invited to submit inputs for the Reliability Society Chapter Award for 2005 using the provided [submittal form](#) and [instructions](#). Inputs must be returned to the RS Member Committee not later than January 30, 2006. If you are a RS chapter chair and did not receive this announcement, please contact the newsletter editor.

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Society Solicitations

The IEEE Reliability Society solicites nominations for the following annual society awards. More information will be provided in future newsletters closer to the submittal dates.

Reliability Society Engineer of the Year Award for 2006

Reliability Society Lifetime Achievement Award for 2006

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Technical Operations

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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:

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[International Integrated Reliability Workshop \(IIRW\) 2006 - Call for Papers](#)

[International Physics and Failure Analysis of IC Symposium 2006 \(July 3-7, Singapore\)](#)

[System Integration and Reliability Improvements \(SIRI\) 2006 - Call for Papers](#)



[Note: The dates have changed to December 13-15, Hanoi](#)

[Fusion Conference 2006](#)

[Fusion 2006 Brochure](#)

[Risk Management and System Dependability & Safety Lambda Mu 15 Symposium](#)

[International Symposium on Pacific Rim Dependable Computing 2006\(PRDC\)](#)

[International Symposium on Software Reliability Engineering \(ISSRE\) 2006](#)

[Portable Computing 2007 - Call for Papers](#)

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Design for Reliability: New Paradigms

Dev Raheja
Chairman, IEEE Design for Reliability Technical Committee

Editing provided by Lou Gullo, Raytheon, Integrated Defense Systems

INTRODUCTION

Recently IEEE Design for Reliability Technical Committee was activated to promote the state-of-the-art processes that affect design reliability which is critical to the survival of systems and products in the global marketplace. Lou Gullo from Raytheon, Dr. Sam Keene, independent consultant, and Bob Stoddard from Carnegie Mellon Software Engineering Institute contributed their thoughts and shared their wealth of experience on this subject. The IEEE-RS members are welcome to contribute. Others are encouraged to contact me to share in your knowledge and understanding of DFR processes and methodologies.

This article is based on my experience of 30 years in Reliability as a practitioner, trainer and a consultant for 25 years. Some of the things may appear to be impractical but don't judge until you have tried. All these paradigms have worked with my clients. Some are the world class companies. The impact of reliability extends far beyond reliability itself. It establishes the cost of repair, maintenance and logistics, and the indirect costs of unavailability, downtime, and the cost of safety recalls throughout the life of the product. Design for Reliability (DFR) therefore must include the entire life cycle performance, and the reduction of indirect costs from low reliability. This article presents a view of paradigms that have yielded extraordinary return on investment (ROI).

THE CURRENT STATE-OF-THE-ART

As we are all aware, some companies have built up a strong and long-lasting reputation for reliability. Raytheon has established a culture at the highest level in the corporation for providing customers Mission Assurance through "No Doubt" mindset. Says Bill Swanson, Chairman and CEO of Raytheon: that there must be no doubt that our products will work in the field when they are needed (Raytheon Company: Technology Today, 2005, Issue 4). Hyundai offering a ten-year warranty is just one example. Toyota built its world leadership mostly because of high reliability. The author's former employer (Cooper Industries) gave 15-year warranty to electric power utilities on high voltage transformer components. This was in 1974, when nobody in the world probably gave longer than one year warranty. But there is lot more than what we have seen. Read on.

THE NEW PARADIGMS

Reliability is a process. If the right process is not followed, results cannot be depended upon to be right. The companies will be under the impression that they are following a good process and doing the right things. However, the results could be far from what they imagine. It is hard enough to do the right things, but it is even harder to know what the right things are!

Knowledge of right things comes from learning to use wisdom. Just having all the facts at your fingertips does not work. One must utilize the accumulated information for arriving at the right decision. This needs practice; theoretical knowledge alone will not do. Take the example of driving. One cannot learn to drive well from books alone; one should also know when and how to apply that knowledge.

Paradigm 1: Spend Lot of Time on Requirement Analysis

My experience shows and data supports that the source of about 60% failures is incomplete, ambiguous, and poorly defined requirements. Look particularly for missing functions. They are often vaguely defined. There is often practically nothing in the specification about modularity, reliability, safety, serviceability, logistics, human factors, reduction of No-Faults-Found (NFF), diagnostics capability, and prevention of warranty failures. Very few specifications address even obvious requirements, such as internal interface, external interface, user-hardware interface, user-software interface, and how the product should behave if and when a sneak failure occurs. A good specification will also address what the design should not do. Developing a good specification is an iterative process with inputs from the customer and the entities that are downstream in the process. Those who are trying to build reliability around a faulty specification should only expect a faulty product. Unfortunately, most companies think of reliability when the design is already approved. At this stage there is no budget and no time for major design changes. The only thing a company can do is to hope for a reasonable reliability and commit to do it better the next time.

To identify missing functions, a cross functional team is necessary. At least one member from each discipline should be present, such as Manufacturing, Field Service, Marketing, and a customer if possible. The usual definition of Reliability implies that a product will perform all that is claimed in the system performance specification, for its specified life cycle. If the specification contains only 50% features, how can one even think of reliability? Reliability is not possible without accurate specifications. Therefore, writing accurate performance specifications is the pre-requisite for reliability. Such specifications should aim at zero failures for the modes that result in product recalls, high downtime, and inability to diagnose. My interviews with those attending the reliability courses reveal that the dealers are unable to diagnose about 60% of the problems (no-faults-found). Obviously fault isolation requirements in the specifications are probably not even considered.

To ensure the accuracy and completeness of a specification, only those who have the knowledge of what makes a good specification should approve it. They must ensure that the specification is clear on what the product should never do, however stupid it may sound. For example: ♦The SUV shall not roll over in case of a component failure or low tire pressure♦ or ♦There shall be no sudden acceleration in the cruise control♦.

In addition, the marketing and sales experts should participate in writing the specification to make sure that old warranty problems ♦shall not♦ be in the new product and that there is enough gain in reliability to give the product a competitive edge. It is not just the reliability but also the downtime, product friendliness, and modularity that are interconnected with reliability. For example, General Motors is designing its hydrogen cars to have a single chassis for all models, instead of 80 different chassis, as is the case with current production. This action influences reliability in many ways. Similarly, an analysis of downtime should be conducted by service engineering to ensure that each fault will be diagnosed in a timely manner, repairs will be quick, and life cycle costs will be reduced by extending the maintenance cycles or eliminating the need for maintenance altogether. The specification should be critiqued for quick serviceability and ease of access. Until the specification is thoroughly written and approved, no design work should begin.

The ♦shall not♦ specification is not limited to failures. That is too simple. We must be able to see the complexity in this simplicity. This is called interconnectedness. We need to know that reliability is intertwined with many elements of life cycle costs. The costs of downtime, repairs, preventive maintenance, amount of logistics support required, safety, diagnostics, and serviceability are dependent upon the level of reliability.

Paradigm 2: Mission-Stopping Failure is Not an Option for Critical Systems

It is obvious that a mission failure for NASA is a terribly costly event. But it can be very annoying in the commercial world also. For example: The mission for a FedEx driver is to complete the trip safely once he/she starts to deliver urgent packages. That is one reason why redundancy is built into critical functions, in hardware as well as in software.

For the same reason I give less importance to the component failure mode and effects analysis (FMEA). I emphasize functional FMEA for critical functions, which highlights the important components as well. By all means, if you do have the resources to perform component FMEA, please do so. This analysis can reveal risks that you may have missed in the functional FMEA. After all, even the functional analysis is only as good as the people performing it.

If the brake of a truck fails, is it OK? In my view, as long as the brake system gives advanced warning (such as audible degraded performance) and lets the driver complete the mission of delivering goods on time, then it may be acceptable. The warning should be sufficiently in advance so that the driver can fix it before the next trip. Why is it that a component failure is acceptable while mission failure is not? Usually the customer is unwilling to accept the downtime and the cost of the mission not being accomplished. NASA was shut down for almost three years after the accident to the Space Shuttle Challenger. The cost of the seal that failed was minimal, but the cost of losing the entire shuttle along with the loss of life and the cost of shutting down the entire program were enormous. Thus we see that reliability has a heavy impact on availability, downtime and its cost, the cost of managing the logistics after the mission failure, and even the cost of safety recalls

Paradigm 3: Measure Reliability by Life Cycle Costs

It is wrong to measure reliability in terms of failure rates alone. Such a negative index with unknown impact does not get much attention from management, except when there is crisis. It is the cost of failures that is important. It should be measured by reduction in life cycle costs. The costs should be measured over the expected life. They are not just warranty costs. They include the cost of downtime, repairs, logistics, and product liability. When I was in charge of the reliability of the Baltimore Rapid Transit Train system design, we measured it in terms of cost per track mile. Similarly, at Baltimore Gas & Electric, we measured reliability in terms of cost per circuit mile. Smart customers look for only one performance feature ♦ the life cycle cost per unit of use. Those who approve the specification should concentrate on this measure. Reliability must result in cheaper, faster, and better products

Paradigm 4: Design for Twice-the-Life

Why twice-the-life? The simple answer is that it is cheaper than designing for one life. It requires understanding of the life cycle costs. When Weibull Analysis is done, the usual method is to use median ranks, which implies that 50% of the time the life will be less than predicted. In other words, either the supplier or the customer has to pay for 50% failures during the product cycle. This is expensive for both. Besides, there are many indirect costs of monitoring, production testing, and more inventory to replace failed parts. Eaton ♦s requirement of twice-the-life at 500% ROI actually turns the situation into a positive cash flow. This is proven since there is nothing to be monitored if the failures occur beyond the first life. The 50% failure rate is now shifted to the second life when the product is going to be obsolete.

Another reason for twice-the-life is the need for basic engineering which seems to be a forgotten art.

Imagine a bridge designed for 20-ton trucks. It may have no problems in the beginning. But the bridge is degrading over time. After five years it may not be strong enough to take even 15 tons and it is very likely to collapse. If it was designed for 40 tons, it will be very safe. This is the same case as 100% safety design margin. For the same reason, the electronic components in the aerospace industry are de-rated 50%.

At a large corporation in Michigan, engineers design for twice-the-life creatively. They try to do it without increasing the size or weight of the components, the main cost drivers. Occasionally they may increase the size by a very minor amount such as on wires or connectors to expedite the solution. This is acceptable, as long as the ROI is at least 500%. There are many examples of twice-the-life design without changing the size or weight. In a shaft and key assembly, the life was increased several-fold by using a different method of heat treating. The life increased further by using the cheaper round key instead of the rectangular key. The round key has practically no stress concentration points. In the Brazil operation of Eaton, twice-the-life was achieved by molding two parts as a single piece, preventing the stresses at the joint. The cost was lower because no assembly was required, less part numbers in the inventory, no failures, and no downtime for the customers.

Paradigm 5: Design for Prognostics

In complex systems such as telecommunications and fly-by-wire systems, most of the system failures are not from component failures. They are from very complex interactions and sneak circuit. Failures rates are very difficult to predict. The sudden acceleration experienced by Audi 5000 user was a result of a software sneak failure. To predict such failures, we need several tools such as System FMEA, fault trees, and event trees. One tool for this kind of analysis is called **◆ Sneak Circuit Analysis (1)**. It is used for discovering hidden problems, which usually turn up in rare events, such as deployment of air bags, or when there is a major accident in which a fireman may come in contact with high voltage battery terminals. Questions are asked, such as **◆ Will the air bag open when it is supposed to?◆◆ Will it open at the wrong time?◆◆ "Will the system give a false warning?◆◆ Or,◆◆ Will the system behave failsafe in the event of an unknown fault.** The bottom line is that no matter how much analysis we do. It is impossible to analyze millions of combinations. The following data on a major airline, announced at a FAA/NASA workshop (2) shows the extent of unpredicted failures.

- ◆ Problems reported confidentially About 13,000
- ◆ Number actually in airline files About 2% or 260
- ◆ Number known to FAA About 1% or 130

The sneak failures are more likely to be in the embedded software where it is impractical to do a thorough analysis is done. Frequently the specifications are faulty because they are not derived from the system performance specification. Peter Neumann, a computer scientist at SRI International, highlights the nature of damage from software defects in the last 15 years (3)

- ◆ Wrecked a European satellite launch.
- ◆ Delayed the opening of the new Denver airport by one year.
- ◆ Destroyed NASA Mars mission.
- ◆ Induced a U.S. Navy ship to destroy an airliner.
- ◆ Shut down ambulance systems in London leading to several deaths.

To counter such risks, we need an early warning, early enough to prevent a major mishap. This tool is prognostics. It consists of postulating all the possible mishaps and designing intelligence to detect unusual behavior of the system. The intelligence may consist of measuring important features and making a decision on its impact. For example, a sensor input occasionally occurs after 30 milliseconds instead of 20 milliseconds, as the timing requirement states. The question is: is this an indication of a disaster? If so, the sensor should be replaced before the failure manifests itself to a critical state. If readers wish to see how these new paradigms have been applied at a large Corporation, they may read the Appendix B in the new text by the author, Ref [1]. The author welcomes comments at the email address at the end of this article.

CONCLUSION

Once I was at a company meeting. The supplier asked customers to describe the warranty they wish to have. One of them said (and others agreed): No warranty is the best warranty. I understood the paradox ♦ the best warranty is the one where there is no need to file a warranty claim. In other words, the preferred system is a failure-free system.

REFERENCES

- [1] Raheja, Dev ; Allocco Michael, Assurance Technologies Principles and Practices: A Product, Process, and System Safety Perspective, Second Edition, Wiley, New York,2006
- [2] Speech by Dr. Douglas R. Farrow, Fifth International Workshop on Risk Analysis and Performance Measurement in Aviation sponsored by FAA and NASA, Baltimore, August 19-21, 2003.
- [3] Mann, Charles, C., Technology Review, MIT, July/August, 2002.

CONTACT

We welcome your responses. Contact Dev Raheja, email: draheja@aol.com; or send to Design for Competitiveness, Inc., 9811 Mallard Drive, Suite 213, Laurel, MD 20708.

The following defines the RS Fellows Committee, nomination and evaluation process.

From Dr. Thad Regulinski

2.8.2.3 Fellow Committee

The Society Fellow Committee consists of IEEE Fellows who are members of the Reliability Society (07). The Fellow Evaluating Committee is a subset of the Society Fellow Committee, and its function is to prepare technical evaluations and ranking of the nominees.

2.8.2.3.1 The Society Fellow Committee Chair

The Society Fellow Committee Chair is appointed by the Junior Past President with the advise and consent of ADCOM. The Chair must be an IEEE Fellow and cannot be a nominator, reference or endorser, and cannot be a member of the IEEE Fellow Committee or the IEEE Board of Directors. These requirements apply equally to all members of the Society Fellow Committee and members of the Fellow Evaluating Committee. The Chair organizes and chairs the Fellow Evaluating Committee assuring that the backgrounds of members include researchers, educators, technical managers, and practitioners. Should the Chair be a personal friend of the nominee, the Chair recluses him / her self and appoints a Chair of the Evaluating Committee. The Chair instructs the Evaluating Committee about factors constituting technical evaluations consistent with RSF-2 form titled Reliability Society Fellow Evaluation Criteria and Evaluation Weightings, ranking of the nominees and the preparation of the individual evaluation form B-3's which the Chair signs, confirming that no conflict of interest exists among the evaluating committee members.

2.8.2.3.2 The IEEE Fellow Nomination Process

One does not sponsor a candidate for the IEEE Fellow award, any more than one can sponsor a candidate for the Pulitzer or Nobel award. One is nominated for the Fellow award by the Nominator, who prepares the IEEE Nomination B-27 form. Any person, including a non-member, is eligible to serve as nominator, except members of the IEEE Board of Directors, members of the IEEE Fellow Committee, Society Fellow Committee Chairs, Chairs of a Society Fellow Evaluation Committee reviewing the B-27 Nomination form, or IEEE Staff.

2.8.2.3.3 The Responsibilities of the Nominator

- Obtains a copy from IEEE of the GUIDELINES for IEEE SOCIETY / COUNCIL EVALUATIONS OF FELLOW GRADE NOMINATIONS herewith referred to as the GUIDE, by phone 732-981-0060, or on line using the Electronic Fellow Nomination Process accessing it at <www.ieee.org/.fellows>
- Studies the contents of the GUIDE diligently and follows detailed directions on the preparation of IEEE Fellow Nomination Form B-27.

- Prepares the IEEE Fellow Nomination Form B-27 consistent with verifiable information and data on the nominee available from public records among others and from the nominee ONLY if necessary facts or background information is not available elsewhere.
- Selects a minimum of 5 and maximum of 8 active (paid up) IEEE Fellows as References for the candidate outside the candidate's own organization whenever possible, or at least minimize the number from within to avoid the question of partiality that can arise if most References are from the candidate's organization. Selects judiciously the nominee's References based on their personal knowledge of the nominee's technical accomplishments and their ability to address those accomplishments with a high degree of specificity and avoiding painstakingly broad generalities.
- Provides those asked to be References for the candidate with (a) Fellow Nomination form B-27 and (b) IEEE Fellow Grade Reference Form (B-29) and instruct them to submit the B-29 form directly to the IEEE Fellow Committee by the 15 March deadline either on line or by mail addressed: IEEE, Fellow Program Administrator, 445 Hoes Lane, Piscataway, N.J. 08855-1331, USA. It is vital that this be followed up to assure that all Reference forms are in fact sent to IEEE prior to the deadline.
- Selects the Technical Society or Council engaged in the technical field specified in the proposed citation for the nominee (item #4, p1 of B-27 Form).
- Determines the need, if any, for an endorsement of the nomination. A maximum of three endorsements, limited to one page each, are allowed. An endorsement has no IEEE standard form but may be submitted as a regular business letter. The endorsement of the nomination is OPTIONAL and can be offered voluntarily by any IEEE member or non-member, IEEE section or chapter, indeed anyone in or outside the electrical / electronics profession who can provide additional information on the nominee's principal contribution. This suggests that the nominator may also request an endorsement from anyone who can provide from personal experience some information not otherwise generally known.
- Considers the risks which must be carefully weighed against any potential gain of having an endorsement of the nomination. One is that any endorsement, particularly by heavy artillery of a Society President or Chair of Society Awards Committee, may suggest to the IEEE Fellow Committee that the nominee's contribution cannot stand on its own without outside aid. The other risk is that any repetition of what already has been said either on the B-27 Form or by the References may diminish the intrinsic value of the endorsement and thereby jeopardize the candidate's ranking. The IEEE Fellow Committee which evaluates over a thousand nominations submitted every year has little time, tolerance, or patience for flowery encomiums; the Committee is interested only in verifiable facts, most of which come from a computer search performed by the Chair

of Society Evaluators.

2.8.2.3.4 ♦ Individual Evaluations addressing ♦ Items A through E ♦ on Form (B-3)

Members of the Fellow Evaluation Committee

- A) Ascertain whether the work of the candidate is recognized and considered outstanding in the candidate's contribution to the Reliability discipline and/or its practices.
- B) Describe how the work of the candidate compares with Fellows of the Reliability Society on a discipline-wide, national and international basis. Equal recognition should also be accorded to Technical Leadership and to "Practitioners", who may contribute significantly to the design, synthesis, operation and evolution into practical use or manufacturing of products or systems.
- C) Indicate why the candidate qualifies for the Fellow Grade.
- D) Advise whether the proposed citation furnished by the nominator is appropriate or provide a revised citation.
- E) Indicate whether the designation by the nominator of Engineer / Scientist, Technical Leader, Educator, or Practitioner is consistent with the nominee's individual contributions as delineated on the B-27 Form.
- F) Indicate a score in the box, which qualifies the candidate for the Fellow grade and ascertain that all members of the Fellow Evaluation Committee involved in the evaluation of the candidate are listed by name.

2.8.2.3.5 ♦ Summary Form (B-93)

The chair of the Fellow Evaluation committee with concurrence of all members of the committee lists all candidates evaluated on the Summary Form (B-3) in descending order, with #1 as the highest rank and with each candidate identified by with numeric score and the qualification categories: ♦ EQ for Extraordinarily Qualified, HQ for Highly qualified, Q for Qualified and MQ for marginally qualified .

IEEE Reliability Society
AdCom Meeting Minutes
March 24, 2006
San Jose Marriott Hotel

In Attendance - Bill Tonti, Way Kuo, Christian Hanson, Marsha Abramo, Jeff Clark, Same Keene, Lou Gullo, Jim McLinn, Bob Stoddard, Scott Tamashiro, Jeff Voas, Bret Michaels, John Healey, Ted Freeman, Dennis Hoffman, Lon Chase, AS, Alfred Stevens, Bob Loomis

Introductions

Recognition ♦ Pin presentation for Jr. and Sr. Past Presidents, Jeff and Dennis.

Change in agenda to allow Way Kuo, Christian Hansen and PSES representatives to meet, discuss and come to some agreement before presentation to AdCom.

Motion to accept minutes from Jan meeting. AS Motion, Sam second, all approve.

Discussion of new IEEE ♦Tax♦ model that shifts some financial burden from larger societies to smaller societies (larger fixed fee, smaller per member/per publication fee). Net result is to hurt smaller societies ♦ some of which the IEEE would like to eliminate. Meeting in May at Piscataway, Bob Loomis suggests Dick Doyle as best person to attend, but Bob will go if Dick can♦t. Dick Kowalski also good choice.

Action ♦ Dick Doyle - appoint attendee to meeting

RS Booth discussion ♦ Dennis Hoffman

Recommendation ♦ maintain displays, repair displays, update graphics. We induce a lot of damage ourselves by improper set-up/break-down. Shipping costs vary greatly depending on destination and mode - \$250 to \$1500. Shipping into a hotel is very expensive. Last minute activities cost a lot of money; would like to have a person to coordinate booth activities. Some training necessary to show how to set-up/break down, etc.

Suggestion ♦ allocate funds to repair, maintain, and ship booths to ~five conferences per year.

Action ♦ Bob Loomis ♦ Approach RAMS leadership to see about incorporating IEEE sign-up into registration process.

Motion ♦ Dennis, second Bob Loomis ♦ allocate ~\$5750 to fund refurbishment, updating, shipping display. All approved.

Action ♦ Marsha Abramo ♦ take lead in handling display issues.

VP Reports

VP TechOps: via e-mail. All projects are on track. New MEMS committee formed, being led by Danielle Tanner of Sandia. Activities with Air Force started, but didn't happen. Shuichi could probably use help with various activities, any help would be appreciated.

VP Meetings: Major conferences:

2005 ISSRE (\$7K surplus)

2006 RAMS ♦ seed money returned (\$30K surplus anticipated)

2006 IRPS

2006 IRW

2006 ISSRE ♦ Raleigh

2006 SIRI ♦ Hanoi

(see attachment)

Brief discussion about budgeting, IEEE wants a 20% surplus budgeted to give some room for unexpected losses.

September meeting ♦ Way Kuo: Chamber of Commerce presentation by Way on the wonders of Knoxville.

Action ♦ All AdCom ♦ Meeting dates: September 29/30 (ExCom/AdCom)

Action ♦ All AdCom ♦ E-mail 15 minute university presentation ideas to Sam Keene

VP Membership: Thanks to subcommittee volunteers ♦ Lou Gullo, Jim McLinn, Bob Stoddard, Jeff Clark, Lon Chase, Scott Tamashiro,

Total membership is down 5.7% to 1,643

IEEE Total is also down ~3%

Various activities outlined (see attachment)

There's been a change in focus to try to find new members at the student level, showing Reliability/Failure Analysis as a career path. Part of the student outreach new initiative some discussion about tactics and logistics.

Action Bill Tonti Send accreditation requirements to Marsha

Action All AdCom Members Send Marsha yet more suggestions for likely universities for outreach program

Membership Committee Initiative Presentation by Lou Gullo (part of Membership presentation attachment).

PSES Discussion Henry Benetiz (PSES Chair), Irv Ingelson (Director Elect).
Christian: Agreement, one time experiment a special section on product safety engineering. One paper that has been accepted, one paper that is close to acceptance. Anticipate that special issue will be December 2006. Financial impact extra page count, which means additional publishing and possibly extra production costs, will be borne by PSES. Any extra profit resulting from downloads of PSES paper(s) will be returned to PSES. Metrics for measuring success include number of downloads, and perhaps direct feedback to editor. Any issues with Jason Rupe? Not anticipated, but will monitor.

Comments by Henry: Thanks to publications group for support, which allows PSES to meet commitments to authors. Bill Tonti's announcement to TAB about this cooperation resulted in an ovation, which is unprecedented.

VP Publications:

TDMR Update Tony Oates, Editor in Chief
Presentation outlining editorial content, markets, finances, including a synopsis of the new IEEE accounting methods and the significantly negative impact.

Motion To accept TDMR new finance proposal. Motion by Christian, second by AS, accepted unanimously.

Transaction on Reliability Way Kuo, Editor in Chief
Presentation by Christian and Way giving synopsis of journal status, digitization

Note: Almost all materials presented under VP Publications TR, Newsletter, Website, Expert Now, TRUST Magazine are included in the publications

presentation.

Action ♦ **Christian - contact Historian and Ralph Evans for old issues needed for digitizing.**

RS newsletter ♦ Lon Chase, Editor
Presentation by Christian on content, business

RS Website ♦ Scott Tamashiro appointed as new webmaster. Some difficulties with approval process, as well as a need to update society officer information.

System Safety Engineering Presentation ♦ IEEE Computer Society Task Force Proposal
Presentation by Bret Michael

Action ♦ **All AdCom** ♦ **Contact Bret if interested in participating in task force**

Jr. Past President

Discussion of opportunity to let Computer Society/NetG turn our tutorials into e-learning products. No negative impact to RS, we just provide them with a copy of our content, and create the material and market it.

Motion ♦ Allow Jeff Voas to engage computer society to market our training products via NetG or similar entity. Constraints: must retain RS identity in products from us ♦ Motion by ExCom, approved unanimously.

Discussion of new source with computer society for RS technical courses (kind of ancillary to Expert Now) ♦ E-books. User profiles: Abusers (on-line 24/7 ♦ one company, many users), Completers (complete entire course, take test), Reference Users (extracts what they want, then out). Teaming with Computer Society to create these books. Cost is \$10K/book. Interest from IRPS/SAR Associates to turn IRPS videos into courses.

Sr. Past President

Update of constitution, special provision for officers and presidents terms. Update of By-Laws. New material not completely ready. Dennis will re-write constitution over the next two weeks, including an update of the field of interest, and will

distribute to AdCom for e-mail vote. By-Laws will be updated at later date to incorporate Operations Manual updates. Changes to constitution must be approved by TAB, who is expecting an update at their next meeting in June.

Action ♦ All AdCom ♦ Please respond in a timely manner to e-mail vote on Constitution

New business/other ideas/concerns/thoughts:

Lou Gullo ♦ spend some time brainstorming about the website. Also trying to find ways to make better use of Yahoo forum. E-mail ♦propaganda?♦

Jim McLinn ♦ publicity. How can we better publicize the society

Bob Stoddard ♦ DFR technical committee. Some ideas on tie into six sigma and software.

John Healy ♦ interaction between reliability and security. DHS stuff.

Ted Freeman ♦ Likes X-pollenization between PSES & RS. Other similar opportunities?

Dennis Hoffman ♦ Like to have new initiatives ♦in the bank♦ so we can move on new projects as funding becomes available. For information, IEEE is advertising society memberships at half-price, since the year is half over.

Lon Chase ♦ keep up this trend of adding things that add value for our members.

Bill Tonti ♦ Reliability Letters publication.

Appointments:

Presentation by Bill on various appointments, both to external organizations and internal tasks/functions.

External committee activities are available from the IEEE-USA website. Some travel funding is available ♦ limits are same as AdCom travel, and a trip report published in RS newsletter is required.

New Initiatives:

SIRI ♦ Some big logistics hurdles to overcome. April 30 deadline for venue and budget, May 15 for technical program. If deadlines are met, conference will happen. If not, probably re-set for December 2007.

Region 8 ♦ trying to bring ESREF proceedings under IEEE publication umbrella. Challenge because existing publication is low grade journal, appeals to some academicians. Ongoing project. May have some success in 2007.

Expert Now Tutorials

Christian Hanson presentation on this new initiative. Three potential tutorials submitted. We can fund one. Suggest that two that aren't funded be put in the bank per Dennis' suggestion. Big picture marketing is murky, so it's hard to make a good choice based on business plans.

Ad Hoc voting:

Six Sigma ♦ 5

FMEA ♦ 7

NBTI ♦ 2

Runoff

FMEA ♦ 8

Six Sigma ♦ 8

Motion ♦ approve FMEA tutorial for development, AS Motion, Sam Keene second, nine in favor, one opposed. Motion Passed

Trust Magazine

Presentation by Bret Michaels discussing March 23 meeting in Monterey.

Status report of activities over the last two months.

Motion to appoint Bret Michael editor in chief of Trust Magazine. Motion by Sam Keene, seconded by Bob Loomis. Passed unanimously.

Discussion by Irv Engleson about IEEE small societies. New IEEE method of calculating infrastructure costs. TAB has been hit with increased infrastructure costs, which is being distributed to the societies. Something of a wealth tax was in place before, which penalized societies with larger reserves. New method is a zero-sum game; winners and losers. Old method penalized larger societies, which were going bankrupt and were threatening to withdraw from TAB. New method allocates 25% fixed costs to societies based on reserves, remaining to income

tax based on publications revenues. There will be a retreat in Piscataway for the small societies to try and band together and change the allocation algorithm to be a little easier on them. Trend in IEEE membership is to not join societies. Access to publications was primary reason to join societies. With open access, institutional access and Xplore, this need is going away. This trend is impacting the smaller societies much more (80K members vs 3K members) because they can't absorb the losses in membership. This workshop is also intended come up with strategies to try and deal with these challenges.

Membership Overview & Benefits

Jeff Clark presentation on Chapter initiative to increase membership (part of VP membership presentation).

Student Scholarships not prepared to discuss at this point. Will try to handle via e-mail vote over the summer and have a scholarship program in place before the start of the 2007 school year.

Systems Council

Lon Chase presentation on collaboration.

IRPS 2006

Carole Graas

Number of papers 106

Last years attendance was ~700. On target for this year with 500 prereg. Merged literature review into the tutorials time. Also merged year-in-review charge into tutorials charge. 1/3 of all attendees go to tutorials. \$490 each for tutorials and conference (non-advance). Poster session will be at computer history museum Wednesday evening. Retrospective paper by Rich Blish and Bob Thomas on the Jewels of IRPS.

Cybersecurity Grand Challenge

Jeff Voas presentation outlining the Challenge.

Discussion about sleeping room rates at RAMS. RAMS BoD has agreed to add enough rooms in future contracts for ExCom/AdCom. Future contracts is from 2013 on. Until then, RAMS will try to make as many committee room rates available to ExCom/AdCom members as possible. At next January's RAMS, contract requires \$70K catering costs. RAMS would ask that RS charges apply towards this minimum.

TREL Letters do we want to consider proposing a new publication two, three or four years down the road. Pros are new venue for publishing short articles, ease of

starting (based on Computer Society recent experience), member benefit. Cons are heavy resource requirements, many of which would be taken up with TRUST. Way will give this some though.

Banking new initiatives  Expert now tutorials and half-price e-books.

Adjourned at 5:10 pm

IEEE Reliability Society

Chapter Awards Instructions 2005

Background

The IEEE Reliability Society sponsors an annual Chapter Awards program to encourage activities and member participation within its chapters. All IEEE Reliability Society chapters officially recognized as active on January 1, 2005 are eligible.

Scoring Criteria

Awards are given based on each chapter's score calculated with the attached Chapter Awards Scoring spreadsheet. Scoring criteria cover the period from January 1 through December 31, 2005 and include:

- Number of meetings
- Total attendance at meetings *
- Hours of training, lecture series, and conferences
- Number of papers/presentations *
- Number of participants in professional meetings *
- Number of chapter reports published in the Reliability Society Newsletter

Scoring criteria marked with * are weighted based on chapter size. Jointly sponsored and non-IEEE activities receive half the points as chapter sponsored and IEEE activities. The judgment of the IEEE Reliability Society Awards Committee is final.

Awards

The following awards will be given to chapters in the order of highest to lowest score:

First Place: \$500

Second Place: \$300

Third Place: \$200

Fourth Place: \$100 (given to all Chapters that submit a complete awards package, but do not place in the top three)

Results will be announced by July 31, 2006. Awards will be presented at the IEEE Reliability Society Administrative Committee dinner in Knoxville, Tennessee on Saturday, September 30, 2006. Chapters do not need to be present to receive their awards.

Submission Process

Please complete the attached Chapter Awards Submission Form, attach all requested documentation, and send the awards submission package electronically to jaclark@ieee.org (preferred), or mail hardcopies to the following address:

Jeffrey A. Clark
The MITRE Corporation
202 Burlington Road
Mailstop 1630A
Bedford, MA 01730

Complete awards submission packages must be received no later than **June 30, 2006**.

IEEE Reliability Society Chapter Awards Submission Form 2005

1. Chapter

2. Officers

Position

Name and IEEE Number

Chair

Vice Chair

Secretary

Treasurer

3. Committee Members

Position

Name and IEEE Number

IEEE Reliability Society

Chapter Awards Submission Form 2005

4. Chapter Sponsored Meetings (Not Joint with Other Organizations)

Do not include training courses, lecture series, or conferences, which are counted in Section 6. Credit will be given for only one management meeting per year. Provide the L-31 form for each meeting.

	Date	Topic	Speaker(s)	Attendance
1				
2				
3				
4				
5				
6				
7				
8				
9				
10				

Total Number of Chapter Sponsored Meetings _____

Total Attendance at Chapter Sponsored Meetings _____

5. Jointly Sponsored Meetings (with Other Organizations)

Do not include training courses, lecture series, or conferences, which are counted in Section 7. Provide the L-31 form for each meeting.

	Date	Topic	Speaker(s)	Co-Sponsoring Organization(s)	Attendance
1					
2					
3					
4					
5					
6					
7					
8					
9					
10					

Total Number of Jointly Sponsored Meetings _____

Total Attendance at Jointly Sponsored Meetings _____

IEEE Reliability Society

Chapter Awards Submission Form 2005

6. Chapter Sponsored Training Courses, Lecture Series, and Conferences (Not Joint with Other Organizations)

Provide the announcement, agenda/syllabus/outline, presentations or proceedings (papers), and L-31 form for each training course, lecture series, and conference.

	Date	Topic/Title	Speaker(s)	Hours
1				
2				
3				
4				
5				
6				
7				
8				
9				
10				

Total Hours of Chapter Sponsored Training Courses, Lecture Series, and Conferences

7. Jointly Sponsored Training Courses, Lecture Series, and Conferences (with Other Organizations)

Provide the announcement, agenda/syllabus/outline, presentations or proceedings (papers), and L-31 form for each training course, lecture series, and conference.

	Date	Topic/Title	Speaker(s)	Co-Sponsoring Organization(s)	Attendance
1					
2					
3					
4					
5					
6					
7					
8					
9					
10					

Total Hours of Jointly Sponsored Training Courses, Lecture Series, and Conferences

IEEE Reliability Society

Chapter Awards Submission Form 2005

8. Papers/Presentations in IEEE Publications/Meetings by Chapter Members

	Title	Author(s) and IEEE Number(s)	IEEE Publication/Meeting	Date
1				
2				
3				
4				
5				
6				
7				
8				
9				
10				

Total Number of Papers/Presentations in IEEE Publications/Meetings _____

9. Papers/Presentations in Non-IEEE Publications/Meetings by Chapter Members

All non-IEEE publications/meetings must be available/open to the public. Internal company publications/meetings are not eligible.

	Title	Author(s) and IEEE Number(s)	Non-IEEE Publication/Meeting	Date
1				
2				
3				
4				
5				
6				
7				
8				
9				
10				

Total Number of Papers/Presentations in Non-IEEE Publications/Meetings _____

IEEE Reliability Society

Chapter Awards Submission Form 2005

10. Participation in IEEE Professional Meetings by Chapter Members

Do not include papers/presentations, which are counted in Section 8. Participants must have an active role (e.g., chair, moderator, committee member, etc.) in the meeting. Simply attending the meeting does not qualify. Participation in chapter or jointly sponsored training courses, lecture series, or conferences included in Sections 6 and 7 is not eligible.

	Participant and IEEE Number	IEEE Professional Meeting	Participant's Role	Date
1				
2				
3				
4				
5				
6				
7				
8				
9				
10				

Total Number of Participants in IEEE Professional Meetings _____

11. Participation in Non-IEEE Professional Meetings by Chapter Members

Do not include papers/presentations, which are counted in Section 9. Participants must have an active role (e.g., chair, moderator, committee member, etc.) in the meeting. Simply attending the meeting does not qualify. All non-IEEE meetings must be open to the public. Participation in internal company meetings is not eligible.

	Participant and IEEE Number	Non-IEEE Professional Meeting	Participant's Role	Date
1				
2				
3				
4				
5				
6				
7				
8				
9				
10				

Total Number of Participants in Non-IEEE Professional Meetings _____

IEEE Reliability Society

Chapter Awards Submission Form 2005

12. Number of Chapter Reports Published in Reliability Society Newsletter _____
Newsletter articles/submissions other than chapter reports should be listed in Section 8.

13. Awards Payment Information

Concentration Bank Account Number (if applicable) _____

Mailing Address (provide name of chapter/section and person authorized to endorse check)

If your chapter holds its own bank account, then the check will be payable to IEEE <chapter> Reliability Chapter c/o <authorized person>. If the section holds your chapter bank account, then the check will be payable to IEEE <section> Section c/o <authorized person>. Please ensure all information provided is correct.

14. Signature of Chapter Officer

Signature _____

Name _____

Office _____

Date _____

Boston Chapter Report

April 2006

Greetings from the Boston Chapter! Two meetings remain for the 05-06 season before we break for the summer.



Meeting Lecturer Gene Bridgers reviewing technologies used in accelerated testing.
- images courtesy of AdCom member G. Kedem (RSA Security Inc)

The January meeting entitled: "6 DOF Vibration Variability: Great or Ghastly" (reviewed in the February newsletter) images were provided for the May publication, above.



Meeting Lecturers Ted Dangelmayer & Terry Welsher Discuss ESD at the Joint meeting.
- images courtesy of AdCom member G. Kedem (RSA Security Inc)

In February, RSA Security Inc. hosted our joint meeting with the New England ESD association. Ted Dangelmayer & Dr. Terry Welsher of Dangelmayer Associates presented: "Impact of the ESD Trend Toward Ultra-sensitive Components". Ted & Terry reviewed the ESD trends & challenges in micro-electronics, as semiconductor / component feature sizes continue to shrink. This meeting was well attended with active discussions & questions. We had 49 attendees present for this meeting.



SLS Instructor Joe Dzekevich (Raytheon) "Reviewing DOE, Markov modeling & Weibull analysis"
- images courtesy of AdCom member Aaron D. (Raytheon)

In March, we held our Spring Lecture series "Learn QuART: The latest integrated reliability tool from the experts!" over 3 nights with 12 students in attendance. The 1st night included an overview by Seymour Morris of Quanterion, on QuART tool's cost affordable "ease of use" analysis capabilities. The 2nd night Led by Joe Dzekevich, included an in depth look at DOE (Design of experiments) utilizing QuART's capabilities for comparison, assessment, optimization & modeling analysis. The 3rd night was led by Gene Bridgers, providing Reliability process & best practice overviews, based on a class questionnaire provided in class 2.

Upcoming meetings:

We will hold our April monthly meeting at EMC Corporation in Hopkinton MA. This will be a presentation on Software Reliability by Obaid Quadri (EMC) & Nihar Senapati (Avici Systems). Registration is open & we anticipate a good turn out as this is an area of growing interest in Reliability Engineering.

In May, we'll return to RSA Security Inc. for the final season meeting. Ray Valazquez from Agilent Technologies will present "Demystifying 5DX X-ray Laminography". Ray will cover Automated X-Ray inspection technologies, physics of x-ray Solder inspection, PWB/CCA Design for Reliability lessons learned. Ray will also cover the associated effects and implications of lead free solder.

The Boston Reliability chapter advertises upcoming meetings, registers attendees & uploads past presentations on our IEEE hosted web-site. Area professionals are encouraged to check the website periodically for updates & meeting notices.

The URL is <http://www.ieee.org/bostonrel>.

Regards,
Aaron C. DerMarderosian Jr.
Chair, Boston Chapter

Dallas Chapter

by Lon Chase
Chapter Chair

The Dallas chapter held the following meeting presentations:

Title: ♦Thermal Imaging in Failure Analysis♦

Date: Tuesday, March 21, 2006, 6:30 P.M.

Speaker: Mr. Todd Snively, Raytheon Failure Analysis Lab

Program Summary: Thermal imaging, or Infrared (IR) Imaging, has been widely used in industry as a diagnostic tool to identify thermal gradients on systems as large as electrical substations to areas small enough to reside on a silicon die. Security forces also use thermal imaging for security surveillance on our borders, as do firefighters in the search for hot spots in burning buildings. From manufacturing organizations to public service, from large to small feature, the application of thermal imaging techniques provides a wealth of information about the thermal characteristics and manifestations in a system of interest.

This presentation will provide an insight into case studies in the Failure Analysis Lab where thermal imaging has been used to troubleshoot a failure as well as evaluate a design. Several examples will be given.

Speaker: Todd Snively is a Senior Failure Analysis Engineer for Raytheon Electronic Systems in McKinney, Texas. He has been with Raytheon for six years. He holds Masters Degrees in Materials Science and Engineering and in Industrial Chemistry from the University of North Texas. In recent years, Todd has contributed to several publications/ presentations related to failure analysis of components and materials. Todd's main job function is to support internal projects within Raytheon by performing failure analysis for production, field returns as well as analyses for research and development.

Title: "Characterizing Terrestrial Radiation Induced Soft Errors in an Advanced Multi-core Digital Signal Processor"

Date: Tuesday, April 18, 2006, 6:30 P.M.

Speaker: Vivain Zhu, Texas Instruments

Program Summary: As technology scaling reduces dimensions and voltages to provide higher density and lower power functionality, the system sensitivity to radiation-induced soft errors increases. Soft errors, also known as single event upset, on ground level, is caused by alpha particles from packaging material and nuclear reaction product of terrestrial neutron and semiconductor material. Soft error can manifest in unpredictable system behavior, thus represent considerable risk for high reliability applications. This presentation presents an approach to characterize soft error rates (SER) for an advanced 0.13um, multi-core, voice-over-packet digital signal processor (DSP) system in both the accelerated alpha-particle and neutron environment.

Speaker: Xiaowei (Vivi) Zhu received the B.S. (1994) and M.S. (1997) in Applied Physics from South China University of Technology, Guangzhou, China, and the M.S. (2000), Ph.D (2002) in

Electrical Engineering from Vanderbilt University. Her doctoral dissertation title is "Single event effects in commercial microprocessors using dynamic circuitry." She joined Texas Instruments, Inc. in 2002 as a Reliability Engineer in the Silicon Technology Development group. Her research interests are focused on characterizing and modeling radiation induced soft error rates in advanced CMOS technologies. Dr. Zhu has published several papers in the field of radiation induced single event upset, served as technical session chair for IEEE Nuclear Science Radiation Effect Conference, and is a frequent reviewer for IEEE TNS, European Conference on Radiation and Its Effects on Components and Systems, and Microelectronics Reliability.

Title: "Negative Bias Temperature Instability in ULSI CMOS Technology"

Date: Tuesday, April 16, 2006, 6:30 P.M.

Speaker: Mr. Anand T. Krishnan, Texas Instruments

Program Summary: Negative bias temperature instability (NBTI) has become one of the most significant reliability concerns in recent years. NBTI manifests as a threshold voltage increase and consequently, a drive current reduction. This mechanism is difficult to work-around through transistor design modification (unlike hot carrier-induced degradation, which can be reduced by using lightly doped drains), because it affects PMOS transistors in CMOS circuits that are biased in inversion, even when the circuit is not switching. This instability mechanism has existed for forty years, but has come to the forefront recently due to a confluence of process and design modifications needed for advanced technology nodes. Consequently, this has led to significant research activity in this area, resulting in improved understanding of the underlying physics of NBTI degradation.

In this presentation, the NBTI kinetics will be briefly described, and the mechanism of process impact will be related to the kinetics. The device impact of NBTI degradation will then be quantified, followed by a demonstration of the circuit & product impact.

Speaker: Anand T. Krishnan received his Bachelor of Technology degree in Metallurgical Engineering from Institute of Technology, BHU, Varanasi, India in 1994, and M.S. and Ph.D degrees in Materials from The Pennsylvania State University in 1997 and 2000, respectively. In 2000, he joined the silicon technology development group at Texas Instruments, where he is currently working as a Reliability Engineer. His interests and activities are in the areas of negative bias temperature instability and plasma charging damage. He has served in the technical program committee for the International Reliability Physics Symposium (IRPS), Integrated Reliability Workshop (IRW) and for the Plasma Process-Induced Damage Symposium (P2ID). He has authored or co-authored 32 papers and 5 patents.



Report by Singapore REL/CPMT/ED Chapter (25 April 2006)

1. Short Courses

- 21 April 2006, Failure Mechanisms and Reliability in Integrated Circuits, Dr MK Radhakrishnan, *CTO of NanoRel – Technical Consultants*
This short course attracted 29 participants, 22 from the industry and 7 from academia.

2. Workshop on Silicon-based Technologies

Jointly organized by Pall Filtration Private Limited & Microelectronics Center, School of EEE, Nanyang Technological University (NTU) and the Chapter, a workshop on “Technology of Silicon-based Nanodevices” was successfully held on 24 Feb 2006 in NTU. Pall Filtration Private Limited had financially funded the workshop. Four overseas speakers and six local speakers presented talks on topics ranging from new filtration technologies on defectivity reduction to advanced sub-30nm transistor technologies. The details of the talks are as follows:

- Effectiveness of New Filtration Technologies on Defectivity Reduction in Advanced Microlithographic Processes, Dr Barry Gotlinsky, *Pall Corp Scientific and Laboratory Services, USA*
- Sub-30 nm Transistors: Material and Device Structure Innovations for Enhanced Performance, Dr Y.C. Yeo, *National University of Singapore*
- Towards Nano Purification with Selective Ion Removal Technology in Wet Chemistry, Dr Fumitomo Kunimoto, *Nihon Pall, Japan*
- Challenges, Issues and Solutions to low-k Implementation in Future Technology Nodes, Dr Sanjeev Jain, *Applied Materials, USA*
- Reliability Issues and Challenges in Cu/low-k Interconnects, Mr Y.K. Lim, *Chartered Semiconductor Manufacturing*
- Cu-based Nano Interconnects, Dr C.M. Tan, *Nanyang Technological University*

IEEE Singapore Reliability/CPMT/ED Chapter

c/o IEEE Singapore Section Secretariat

70 Bukit Tinggi Road

Singapore 289758 Tel:(65)6461 1234 Fax:(65) 6467 1108

E-mail: sec.singapore@ieee.org Web Site: <http://www.ewh.ieee.org/r10/singapore/>



- Three-dimensional Interconnects, Mr N. Ranganathan, *Institute of Microelectronics*
- Silicon Based 3-D Multi-layer CMOS Integrated Circuits, Dr Mansun Chan, *Hong Kong University of Science & Technology, Hong Kong*
- Negative-bias Temperature Instability of p-MOSFETs: The Role of Nitrogen, *Dr D.S. Ang, Nanyang Technological University*
- Si Technology for Nano and Bioelectronics, Dr Patrick Lo, *Institute of Microelectronics*
- Silicon Front-End Junction Formation - Physics and Advanced Technology, Dr Benjamin Colombeau, *Chartered Semiconductor Manufacturing*

The workshop attracted more than 180 participants from the industry, research institutions and universities. The Chapter plans to organize similar workshop annually.



IEEE Singapore Reliability/CPMT/ED Chapter

c/o IEEE Singapore Section Secretariat
70 Bukit Tinggi Road

Singapore 289758 Tel:(65)6461 1234 Fax:(65) 6467 1108

E-mail: sec.singapore@ieee.org Web Site: <http://www.ewh.ieee.org/r10/singapore/>



Left to right: Dr Patrick Lo, Dr Mansun Chan, Dr K Prasad, Dr KL Pey, Dr DS Ang, Dr Sanjeev Jain, Mr N. Ranganathan, Dr Benjamin Colombeau, Mr Y.K. Lim, Dr CM Tan, Dr Barry Gotlinsky, Dr Fumitomo Kunimoto

3. Conferences

IPFA2006

Preparations are well underway for the 13th IPFA which will be held from 3 to 7 July in the Meritus Mandarin Hotel, in the heart of Singapore's central business district. The technical sessions will be:

- FEOL (gate dielectrics, NBTI, hot carriers, etc.)
- BEOL (Cu and Al interconnects, low-k and ultra-low-k, stress migration and electromigration, etc.)
- Packaging (flip chip, system-on-chip, SIP, etc.)
- Novel device architectures, design, processes, and characterization (SGOI, FinFET, nanowires, CNT, etc.)
- Advanced instrumentation or methodology for Failure Analysis
- Advances in reliability evaluation and approaches (methodology for novel new devices, design-in/build-in reliability, wafer level reliability, etc.)

At the time of writing, the abstract review process has just been completed and authors have been informed of the results. Of the approximately 100 hundred abstracts

IEEE Singapore Reliability/CPMT/ED Chapter

c/o IEEE Singapore Section Secretariat

70 Bukit Tinggi Road

Singapore 289758 Tel:(65)6461 1234 Fax:(65) 6467 1108

E-mail: sec.singapore@ieee.org Web Site: <http://www.ewh.ieee.org/r10/singapore/>



submitted, 44 papers have been accepted for oral presentation and 25 for the poster session. This year, for the first time, paper submission and registration will be via a web-based on-line procedure. The Keynote Speaker will be Prof Hiroshi Iwai from the Tokyo Institute of Technology.

The following invited talks are scheduled for IPFA 2006:

Speaker	Topic
Prof. Cary Yang (Santa Clara University, USA)	Carbon Nanotube Interconnects in Electronic and Biological Systems
Prof. Muhammad Alam (Purdue University, USA)	Gate dielectric reliability, NBTI
Dr. Burnell West (Credence, USA)	Advanced Test Methodology/Roadmap and Strategies for Semiconductor
Dr. Nestor J. Zaluzec (Argonne National Labs, USA)	The scanning confocal electron microscope: A new tool for defect studies in semiconductor devices
Dr. John Lau (Agilent, USA)	Lead free related reliability issues

In a paper exchange arrangement, the best papers from ESREF 2005 and ISTFA 2005 will be presented at IPFA 2006, while the best papers in reliability and failure analysis from IPFA 2006 will be presented at the corresponding ESREF & ISTFA conferences.

In conjunction with the three day technical symposium, two days of tutorials will be held on the 3 and 4 July 2006:

- Transmission Electron Microscopy in Failure Analysis of ICs: S. Subramaniam (Freescale)
- Atomic Force Microscopy Principles and Role in Failure Analysis: Terence Kane (IBM)
- Reliability of Lead-Free Solder Joints for Semiconductor Packaging: John Lau (Agilent)
- Copper Interconnect and Low-k Reliability: Eckhard Langer (AMD)
- Test & Failure Analysis: Burnell West (Credence)
- Ultra High Resolution in Scanning Electron Microscopy: Nestor Zaluzec (Argonne National Labs)

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Singapore 289758 Tel:(65)6461 1234 Fax:(65) 6467 1108

E-mail: sec.singapore@ieee.org Web Site: <http://www.ewh.ieee.org/r10/singapore/>



The exhibition will be held in parallel with the symposium between 5 and 7 July and is expected to draw just under 30 companies.

EPTC2006

The 8th Electronics Packaging Technology Conference (EPTC 2006) will be held from 6th to 8th Dec 2006 at the Pan Pacific Hotel, Singapore. The 1st call for papers has been announced recently.

EPTC 2006 is an International event organized by the IEEE Reliability/CPMT/ED Singapore Chapter, sponsored by IEEE CPMT Society with technical sponsorship from IMAPS.

EPTC 2006 will feature technical sessions, short courses and exhibition. It aims to provide a good coverage of technological developments in all areas of electronic packaging from design to manufacturing and operation. It is a major forum for the exchange of knowledge and provides opportunities to network and meet leading experts in the field.

Since its inauguration in 1997, EPTC has developed into a highly reputed electronics packaging conference in Asia and is well attended by experts in all aspects related to packaging technology from all over the world.

The conference program includes full-day short courses which will be conducted by leading experts in the field. Details will be updated in the conference website and available in subsequent mailings.

A tabletop exhibition featuring suppliers of materials, equipment, components, software and service providers of the microelectronics and electronic assembly industries will be held during the conference.

The Conference topics include:

- Interconnection Technologies;
- Emerging Packaging Technologies;
- Manufacturing Technologies; Materials & Processes;
- MEMS Packaging;
- Electrical Modeling & Signal Integrity;
- Thermal Characterization & Cooling Solutions;
- Mechanical Modeling & Structural Integrity;
- Optoelectronics;
- Quality & Reliability.

IEEE Singapore Reliability/CPMT/ED Chapter

c/o IEEE Singapore Section Secretariat
70 Bukit Tinggi Road

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4. Others

Book Prize Awards

- The Chapter donated a book prize of S\$2,500 to the School of Materials Science & Engineering, Nanyang Technological University. This book prize entitled "IEEE Singapore Reliability/CPMT/ED Chapter Book Prize" is awarded to the student who has distinguished himself/herself in the Microelectronics related subjects, offered in the third and final year of the Engineering (Materials Science & Engineering) course of next 5 years, commencing in 2006.
- The Chapter also donated a Subject Prize of S\$1,500 to the Temasek Polytechnic Engineering School. This award is entitled the "Subject Prize" for the student who graduates with a Diploma with Merit in the Diploma in Microelectronics course of next 5 academic years, commencing in 2006.

IPFA 20th Anniversary

- The IPFA Board met on 21 April 2006 to discuss over the hosting of the 20th IPFA Anniversary celebration since its first inception in 1987 in Singapore. A task force committee has been setup to plan for this celebration in conjunction with the 13th IPFA Conference to be held from 3 to 7 July 2006 at the Meritus Mandarin Hotel, Singapore.

By Wilson TAN
Chair, Singapore REL/CPMT/ED Chapter

IEEE Singapore Reliability/CPMT/ED Chapter

c/o IEEE Singapore Section Secretariat
70 Bukit Tinggi Road

Singapore 289758 Tel:(65)6461 1234 Fax:(65) 6467 1108

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Twin Cities Chapter Report

The Twin Cities RS chapter is alive and well. So far this year we have had

January - Estimating DRAM reliability with 14 people.

February - Handling zero failure tests with 17 people.

April - Ensuring reliability through audits with 23 people

May - upcoming is Reliability testing for ROHS compliance

June - will be setting up a reliability program

Jim McLinn

Chapter Chair



- 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
- JOIN NOW!**

Annual Technical Report

Reported by Shuichi Fukuda

Present Technical Committees are as follows (links to committee reports are provided).

<u>Name of Committee</u>	<u>Chair</u>
- Automotive Systems	Guangbin Yang
- Standards and Definition	Tom Brogan
- Software Reliability	Sam Keene
- Warranty	Judith Koslov
- System Safety	Takeshisa Kohda
- Industrial Systems	Kenji Yajima
- Information Technology and Communications	John Healy
- Aerospace and Defense Systems	Lon Chase
	(Vice chair: Scott Tamashiro)
- Mechanical Reliability	Dick Doyle
- Assurance	Bret Michael

Two new committees will be formed.

- MEMS and Microsystems	Danielle Tanner
- Reliability Design	Dev Raheja

Reports from each committee are provided in the links.

Automotive Systems Technology

Guangbin Yang

Chair of the Automotive Systems Technology Reliability

In the automotive marketplace, the past year was characterized by the fierce competition for market shares due to the global headache of high fuel price. To survive and grow in such a competitive business environment, manufacturers of automotive systems have to produce better-fuel-economy vehicles at higher reliability, with more features, and at lower costs. The unprecedented challenges are forcing the manufacturers to develop and utilize more effective and efficient technologies.

Many new technologies, which are aimed at improving fuel efficiency, are subject to premature failures. It is reported that most field failures can find root in inadequate design. Eliminating design mistakes and increasing design robustness are the most important and effective approaches to minimizing field failures. ♦ A powerful tool for improving robustness is the Design for Six Sigma (DFSS). ♦ DFSS is a structured design process, which systematically institutes the existing design tools such as the robust design, design of experiment, probabilistic design, and CAE modeling. ♦ The process consists of four steps: define system metrics critical to customer satisfaction, characterize the system by decomposing the system metrics into engineering measurable metrics, optimize product / process design, and verify the effectiveness of the results. ♦ Because DFSS establishes reliability and robustness into products in the upfront of the design phase, the technique is capable of reducing design costs, accelerating design time, minimizing field failures and warranty costs. ♦ Due to these coveted benefits, DFSS has been assessed, implemented and advanced by the automotive industry.

The emerging hybrid vehicles impose difficult challenges to the reliability engineering. Many subsystems and components of the vehicles are warranted for 15 years and 150000 miles, in contrast to 3 years and 36000 miles of pure gas vehicles. The lengthy period certainly raises warranty costs to manufacturers. To make the products profitable, the manufacturers must improve the reliability by extending the design life and using more effective reliability techniques. Testing of the high reliability components and subsystems is also a challenge in terms of time and cost, especially in today's business climate. Accelerated life tests and degradation tests must be used. There are some new test methods that emerged lately. For example, the accelerated life tests at higher usage rates allows a product, whose life is measured by usage, e.g., mileage, to be tested at elevated stress levels as well as at higher usage rates. The lifetime at the use condition is obtained by extrapolating the test data. ♦ Another example of the new test methods is the accelerated degradation test using tightened thresholds. The approach tests products at

higher stress levels, and at the same time, tightens the critical values of the performance characteristics such that the products can fail sooner. On the other hand, the extended warranty coverage challenges the current warranty analysis tools, which may be inefficient and even invalidated when applied to these products. There is a strong need to develop new techniques for the warranty analysis.

Automotive systems are usually expensive; statistical test at large sample size is unaffordable. Motivated by the difficulty, experts have developed various methodologies, including, for example, bogey testing based on physical characteristics. The approach reduces the sample size by integrating the physical information into the test data analysis.

◆◆◆◆◆◆◆◆◆◆ The Committee on Automotive Systems has successfully completed a number of tasks in the past year. The tasks include chairing sessions for ISSAT and SAE conferences, presenting technical papers at RAMS and other symposia, publishing papers in technical journals such as the IEEE Transactions on Reliability, reviewing technical papers for journals and international conferences and technical standards for societies, and many others.



**RELIABILITY SOCIETY
STANDARDS & DEFINITIONS
COMMITTEE
YEAR 2005 REPORT**

Yvonne Lord

Tom Brogan

January 22, 2006



Topic Areas

- P1633: Recommended Practice for Software Reliability
- P1624: Guide for Organizational Reliability Capability Definition
- P1413: IEEE Standard Framework for Reliability Prediction of Electronic Products
- New financial reporting requirements for Standards Developing groups



P1633 Recommended Practice for Software Reliability

- Original PAR for a “Recommended Practice” Approved by IEEE Standards Board on Feb 13, 2003
- Between February 2003 and June 2004 significant discussion between WG members on changing document to a “Standard”
- In December 2004 draft document as a “Standard” circulated for comments with responses due by February 1, 2005. Committee of Dr. Allen Nikora, Dave Franklin (RS), Dennis Lawrence & Norm Schneidewind were to resolve comments
- As of 1/5/06 technical work is complete and Allen Nikora is completing formatting arrangements with IEEE SA after which document will go to Ballot (PAR has not been revised to Standard)



P1624: Guide for Organizational Reliability Capability Definition

- Original PAR was approved in December, 2002 as a guide for development by SCC 37
- In July 2005, after the dissolution of the SCC, the development process is continuing under the auspices of the reliability society
- The last meeting of the workgroup was held on October 2005 that reviewed the working draft
- An updated version of the standard based on that review is ready to be sent to the rest of the workgroup for discussion by the end of January 2006.
- Based on the level of feedback obtained from the workgroup, a decision will be made on whether to seek an extension for the PAR



P1413: IEEE Standard Framework for Reliability Prediction of Electronic Products

- An one year extension was obtained form the standards board to keep 1413 active beyond its scheduled cancellation in 2004
- PAR for the revision was approved on August 2005
- The main focus of the revision is to ensure that the knowledge developed regarding the use and application of 1413 in the field and during the development of the guidebook 1413.1 is appropriately reflected in the revised standard
- It is expected that PAR revision will be proposed later this year because there are expected to be changes in the title and scope during the development



FINANCIAL REPORTING REQUIREMENTS FOR STANDARDS DEVELOPING GROUPS

- Recent legislation requiring stricter controls in fiscal accounting has made it necessary for the IEEE Audit Committee to implement a new accounting and reporting policy.
- The policy is being implemented IEEE-wide and includes all Technical Activity and Regional Activity volunteer groups (sections and conferences), as well as all standards developing sponsors and working groups operating under the IEEE-SA standards oversight.
- Effective immediately, the IEEE-SA will be requiring an L50-S form submitted annually from all IEEE-SA standards developing sponsors and working groups. The fiscal year 2006 L50-S will be due March 2007.

IEEE Reliability Society Technical Committee Annual Reports

Software Reliability Committee

(1) What is the objective of your committee?

To promote and teach best practices of software reliability, and be a focal point for answering software reliability questions put to the IEEE reliability society. This committee also participates in the management of the International Software Reliability Engineering Symposium (ISSRE).

(2) Who are the members with their affiliation?

Dr. Samuel Keene Keene and Associates
Professor Norman Scheidewind, US Congressional Fellow
Dr Alan Nikora, JPL
Dr Bill Everett, Los Alamos Laboratories

(3) What did you do on your committee?

Dr Samuel Keene, Software Reliability Committee Chair

(4) What is going on in your committee activity area?



IEEE 1633A, AIAA R-013A, Software Reliability Standard is being rewritten:
The technical work is complete. The standard is awaiting completion of edit according to IEEE format rules. The next step is to go to ballot. All committee members

IEEE 982.1 "Standard Dictionary of Measures of the Software Aspects of Dependability":
Approved by the IEEE Standards Board Schneidewind and Nikora

Presented Software reliability lecture at the ARC meetings in Tokyo

Professor Norman Schneidewind served as a Congressional Fellow for 2005

Dr Sam Keene continues to refine and present his process-based software reliability model.

All of the committee members participated in re-writing the ISSRE Charter and selecting a new steering committee.

Chaired IEEE CS TCSE Committee on Software Reliability Engineering (SRE) - Everett

Bill Everett served as ISSRE2005 Pubs Chair, mentored General Chair, also served on Program and Industry Practices Committees (reviewed a dozen papers for the ISSRE conference).

Bill Everett served on ISSRE2005 panel "Everything you wanted to know about SRE but were afraid to ask".

Bill Everett Chaired 3 sessions at ISSRE2005.

Professor Min Xie, who works in software reliability community, was recognized as an IEEE Fellow in the 2005 election.

Six Sigma

(1) What is the objective of your committee?

To promote and teach best practices of Six Sigma engineering, and be a focal point for answering Six Sigma questions put to the IEEE reliability society. (2) Who are the members with their affiliation?

(2) Who are the members with their affiliation?

Dr. Samuel Keene Keene and Associates
Robert Stoddard Carnegie Mellon University

(3) What did you do on your committee?

Dr Samuel Keene, Six Sigma Committee Chair

(4) What is going on in your committee activity area?

Dr Keene puts on the annual RAMS tutorial on Six Sigma
Dr Keene has been an invited speaker at workshops and presentations in the Denver CO area
Dr Keene put on lectures and tutorials at Asia Reliability Conference in Tokyo, November 2005
Dr Keene is helping to organize the joint conference with the SMC society on Systems Integration and Reliability Improvement in Hanoi VN for December 6-8, 2006

Industrial Systems committee Report

Kenji Yajima

The objectives of Industrial Systems committee are

- (1) First to make reliability issues on site of industrial systems clear
- (2) Second, survey of concept and methodology for solving these reliability issues especially useful for real system operation.
- (3) Finally, to output result of survey and discussion to newsletter and other documents

- Last year, we paid much attention to reliable culture, and focused on organizational issues and risk management issues in industrial systems from viewpoint of systems engineering
- Members of our committee attended some symposiums and conferences of reliability and system safety.
- Through these activities, we feel that safety of industrial system on site is not achieved only by technology, but also by human engineering sociology and so forth. So, we set focus on safety science and safety culture.
- Safety science seem to consist of a variety of heterogeneous fields such as, safety education study, risk management, system safety management, human behavior science, system safety engineering, and safety information system study and interdisciplinary sturdy among those fields.
- Also, Safety science should be studied in connection with safety support fields such as psychology, decision-making theory, and human engineering.
- We began to survey organization theory and management theory in sociology and management science, and organizational behavior theory and organizational psychology in industrial field.
- From our survey , we believe that those sturdy and interdisciplinary sturdy among them are not enough for safety of industrial systems.
- In constructing safety science, we find several Approach◆ such as (1) Systems approach to safety issues, (2) Approach from the viewpoint of human behavior and so forth.

But, we think that right now it is difficult to create concept and theory of safety culture in general,

So, we should try to study the concept through the activity of failure analysis of real accident such as railway accident at Kansai area in Japan..

For our survey, we want to establish connection with other association such as Japanese chemical industry association. The result of our survey is shown in Newsletter

For this year, we will continue survey of safety culture,.And also we survey trend of safety of industrial systems in Internet era and a knowledge architecture of safety in interdisciplinary fields and solves real safety issues at systems, products and service in industrial systems.The result of our activity will output to committee report and newsletter

Aerospace and Defense Committee

Lon Chase (l.chase@ieee.org)

January 22, 2006

What is the objective of your committee?

- Mission Statement

The Aerospace and Defense Technical Operations committee's mission is to monitor, assess, manage and report ongoing aerospace and defense industry reliability activities and future direction. As such, this committee will track and report various thrusts and technologies, conferences and symposiums, major publications, activity and issues important to reliability in this industry.

Who are the members?

- Current Identified Members
 - Dennis Hoffman
 - Dave Franklin
 - Scott Tamashiro
 - Lou Gullo
 - Tom Brogan?
 - Others TBD
- 2006 efforts will include participant identification

What is going on in your committee activity area?

- Desired Inputs
 - Technologies and thrusts
 - Issues
 - Publications/Conferences
 - Opportunities for international collaboration
 - Other useful information to communicate
- Future activities
 - Firm members and participants in the committee
 - Identify areas of involvement
 - Identify opportunities for communication
 - Gather information for the ATR

MEMS and Microsystem Technical Operations Committee

Chair: Danelle M. Tanner

The purpose of the MEMS and Microsystem Committee is to provide a reliability focus to this new multi-disciplinary field where some products have overtaken the market (accelerometers) and other products have been mired in reliability-related issues (RF MEMS). ❖❖

General objectives:

- Form an international team of individuals addressing reliability issues of MEMS and promote open discussion of failure mechanisms
 - Promote IRPS and TDMR as an avenue to publish results
 - Have teleconferences (or email discussions) twice a year
 - Write Newsletter articles twice a year reflecting discussions from the meetings
- Monitor the state-of-the-art technical developments in the field
- Address the multi-disciplinary aspects of MEMS & Microsystems by fostering close relationships to other professional societies (ASME, MRS, SPIE)

The Design for Reliability (DfR) Committee

Chair Dev Raheja

The committee will meet once per month.

On February 2, 2006, the DfR Committee held its first monthly teleconference meeting. At this meeting, the committee reviewed the goals and milestones for the IEEE-RS Design for Reliability (DfR) Committee which were documented by Dev prior to the meeting. The initial edits of the goals and milestones that were discussed by Dev, Sam and Lou at this meeting were documented by Lou, and the draft of these goals and milestones are provided herein.

The goals and milestones for the IEEE-RS Design for Reliability (DfR) Committee are:



GOALS



To train design engineers and system engineers with the processes and tools to find more design weaknesses and improve Design for Reliability in a manner such that:

- (a) Mission stopping failures are minimized or reduced over the anticipated life
- (b) Minimize or reduce unscheduled downtime
- (c) Zero net cost, and the ROI must be more than the DfR investment.



To accomplish these goals:



1. Perform predictions, analysis, assessments, and testing to identify, understand and manage as many failure modes and failure causes as possible, and mitigate risk of these failure modes and causes in the system and product specification. This will result in many changes to the system specification. The changes to the specification should be correlated to the expected return in terms of risk reduction or risk avoidance.
2. Integrate Reliability with other design specialty disciplines such as maintainability, logistics, safety, and human factors such that the failures in these are identified and mitigated.
3. Perform FMEAs, fault trees, and other analytical tools at several levels. Mitigate all major risks by changing the design and the specifications.
4. Perform Accelerated Life Testing, Highly Accelerated Life Testing (HALT), Alpha and Beta Testing
5. Develop Reliability Design Guidelines that are useful to designers (such as electrical device derating guides, and mechanical tolerance analysis procedures)
6. Anticipate inherent and latent defects introduced in production such as loose connections, poor weld joints, the correct application of grease/lubrication, improper assembly, forgetting to install a component, etc, that are valuable lessons learned to avoid repeating the same mistakes. Mitigate the risk of such operational occurrences in manufacturing, service or customer use through design changes or specification changes that are as proactive as possible.



Bottom Line: Design Reliability can be achieved, or Reliability principles and processes can impact improvements in the design through design changes or specification changes.



NEAR TERM MILESTONES



Develop a training module for wide IEEE membership (Dev Raheja, Lou Gullo, Sam Keene, Bob Stoddard)

Write an article as an announcement of this committee's work through the Reliability Society in the

IEEE-RS newsletter publication.

Present the DfR Body of Knowledge at industry conferences.

Provide DMAIC DFSS tools to the committee to show how they affect reliability.



- 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
- JOIN NOW!**

Tech Ops Committees

Status of Tech Ops technical committees:

Technologies:

- | <u>Name</u> | <u>Chair</u> |
|-------------------------------|---|
| 1) Reliability Design | vacant |
| 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 |
| 17) Automotive | Guangbin Yang gyang1@ford.com |
| 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 |

2007 Reliability and Maintainability Symposium



The 53rd Annual Reliability & Maintainability (RAMS) will be held in Orlando, Florida USA in January 2007. ♦ ♦ RAMS is the foremost Symposium in the US and possibly the world covering the topics of reliability, maintainability, safety and risk. ♦



The theme of the 2007 RAMS is "Reliability and Maintainability in the New Frontier." ♦ More information about topics that are relevant to the theme of the 2007 Symposium may be found on our website. ♦



For more information please visit our website - <http://rams.org>



Jim Hess

RAMS Webmaster





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- JOIN NOW!**



Meeting: 2006 IEEE International Integrated Reliability Workshop (IIRW)

Sponsors: Both IEEE Electron Device, and IEEE Reliability Societies

When: Oct. 16-19, 2006

Where: Stanford Sierra Camp, S. Lake Tahoe, California

Purpose: The workshop provides an open forum for paper presentations, tutorials, posters, topical discussion groups, and focused special interest groups on reliability technology for all present and future semiconductor applications.

2-page Abstract Deadline: July 14, 2006.

Submit your abstract to the Technical Program Chair:

Technical Program Chair: Yuan Chen, yuan.chen@jpl.nasa.gov

Jet Propulsion Laboratory 4800 Oak Grove Drive MS 303-230 Pasadena CA 91109

Additional Details at URL: <http://www.iirw.org>

This year's **IIRW 2006 Keynote Topic** is "**Reliability Challenges: Preventing Them from**

Becoming Limiters to Technology Scaling" presented by Jose Antonio Maiz, Intel Fellow, Technology and Manufacturing Group Director, Logic Technology Quality & Reliability, Intel Corporation

The Conference is published in the IEEE referenced IIRW Final Report.

Conference General Chairman: John Conley Jr., Sharp Laboratories of America, jconley@sharplabs.com



Send questions or comments to [Webmaster](#), IEEE Reliability Society.
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**13th INTERNATIONAL SYMPOSIUM
ON THE PHYSICAL AND FAILURE
ANALYSIS OF INTEGRATED CIRCUITS**



IPFA 2006
3 - 7 July 2006
Meritus Mandarin Singapore

CALL FOR PAPERS
SUBMISSION DEADLINE EXTENDED

The 13th International Symposium on the Physical and Failure Analysis of Integrated Circuits (IPFA 2006) is organised by the IEEE Reliability/CPMT/ED Singapore Chapter in co-operation with the Centre for Integrated Circuit Failure Analysis and Reliability (CICFAR) of the National University of Singapore (NUS). The Symposium is technically co-sponsored by the IEEE Electron Device Society and IEEE Reliability Society.

IPFA 2006 will be devoted to the fundamental understanding of the physical mechanisms of semiconductor device failures and issues related to semiconductor device reliability and yield, especially those related to advanced process technologies. The Technical Programme Committee is inviting papers related, but not limited to, the following areas:

- FEOL (gate dielectrics, NBTI, hot carriers etc.)
- BEOL (Cu and Al interconnects, low-k and ultra-low-k, stress migration and electromigration etc.)
- Packaging (flip chip, system-on-chip, SIP etc.)
- Novel device architectures, design, processes, and characterization (SGOI, FinFET, nanowires, CNT etc.)
- Advanced instrumentation or methodology for Failure Analysis
- Advances in reliability evaluation and approaches (methodology for novel new devices, design-in/build-in reliability, wafer level reliability etc.)

Exchange Papers

In a paper exchange arrangement with ESREF and ISTFA, the Best Papers from ESREF 2005 and ISTFA 2005 will be presented at IPFA 2006, while the best papers in reliability and failure analysis from IPFA 2006 will be presented at the corresponding conferences.

Tutorials

In conjunction with the technical symposium, two days of tutorials will be conducted.

Exhibition

A 3-day exhibition of analysis equipment and services will be held concurrently with the Symposium.

SUBMISSION GUIDELINES

Prospective authors are requested to submit **one cover page and a two-page summary** (includes text and figures) of their previously unpublished and original research work.

The cover page should contain the following information:

1. Title of the work.
2. Name, affiliation, and address of each author.
3. Telephone number, fax number and e-mail address of the corresponding author
4. An abstract not exceeding 50 words.
5. The category/categories (FEOL, BEOL, Packaging, Advanced instrumentation, etc.) that you would like your submission to be considered under.

The summary section of the submission **should not** contain any reference to the authors or their affiliation, and should present the content of the submission according to the following sub-headings:

1. Brief introduction to the background and motivation/objectives of the work.
2. Experimental results, analysis and discussion.
3. Summary of the findings, highlighting their impact, novelty and importance.
4. Supporting figures, tables, and references.

All submissions must be in English. Please e-mail your submission in **Adobe PDF format** to the IPFA Secretariat (ipfa@pacific.net.sg) by **3 February 2006**. Please limit your submission file size to 2 MB. **Hardcopy submissions will not be accepted.** For further details please contact the technical program chair.

Authors of papers that have been accepted for presentation will be notified by 14 March 2006. Upon notification of acceptance, authors will be asked to submit a final manuscript (to be submitted by 2 May 2006) such that it can be published in the Symposium Proceedings and presented at the symposium.

IMPORTANT DATES:	3 February 2006	Submission of Summary and Abstract
	14 March 2006	Notification of Paper Acceptance
	2 May 2006	Submission of Final Manuscript

LATE BREAKING NEWS MANUSCRIPTS

The conference also accepts important findings as late papers. Full-papers, no longer than 4 pages, should be submitted by **14 April 2006** for consideration. The acceptance of such papers is limited to break-through findings and is subject to space availability and scheduling considerations. Accepted late papers will be included in the conference proceedings and in the technical presentations at the conference.

Conference Chair

Alastair Trigg
Institute of Microelectronics, Singapore
Email: alastair@ime.a-star.edu.sg
Tel: +65 6770 5455

Technical Program Chair

Tung Chih-Hang
Institute of Microelectronics, Singapore
Email: chihhang@ime.a-star.edu.sg
Tel: +65 6770 5370

Website: <http://www.ieee.org/ipfa>



Call for Papers
The First IEEE International Conference on
System Integration and Reliability Improvements



SIRI 2006

Hanoi, Vietnam
13-15 December 2006

**Sponsored by: IEEE Reliability Society
IEEE Systems, Man and Cybernetics Society**

General Chairs

Samuel Keene
skeene@attglobal.net

Hoang Pham
hopham@rci.rutgers.edu

Duc H. Nguyen
ducnh@vnu.edu.vn

Program Chairs

Jian Chen
jchen@mail.tsinghua.edu.cn

Eric Wong
ewong@utdallas.edu

Binh N. Nguyen
nnbinh@vnn.edu.vn

Local Arrangements Chair

Hien T. Nguyen
thehien@vnn.edu.vn

Finance Chair

Alan Street
astreet@qualcomm.com

Int'l Participation Com.

Seiichi Takeuchi (Chair)

Shuichi Fukuda (Co-Chair)
fukuda@tmit.ac.jp

Publicity Chairs

Min Xie
mxie@nus.edu.sg

Hien T. Nguyen
thehien@vnn.edu.vn

Web Masters

W. Art Chaovalitwongse
wchaoval@rci.rutgers.edu

Hai Hu

Asian Liaison

Tsu-Tian Lee
tlee@cn.nctu.edu.tw

Conference website
<http://paris.utdallas.edu/siri/>

BACKGROUND:

SIRI focuses on the theory and practice of Systems Integration with special emphasis on the orderly and reliable introduction of emerging technologies into world class products. The conference scope includes techniques and practices to (1) gather and validate product requirements, (2) perform technology assessment, opportunity and risk analysis, and (3) apply the best development practices to assure successful product realization. This will be big enough in attendance to represent major SIRI topics, but small enough to provide an in-depth representation of theory or practice in these areas. We hope to have Industry and academic participation, product and device suppliers, as well as a healthy mixture of theory and practice.

CALL FOR CONTRIBUTIONS:

- ✓ Lessons Learned on developing new products, including success stories and pitfalls found in developing, releasing and supporting fielded products
- ✓ Requirements collection strategies and validation
- ✓ New chip technologies
- ✓ Embedded systems
- ✓ Impact of regulations on product design
- ✓ Six Sigma contributions to World Class product development
- ✓ Building security into products
- ✓ Software system verification
- ✓ Integrating COTS components into new products
- ✓ System integration for human computer interaction
- ✓ Maintaining COTS components through development and field support
- ✓ Support strategies for fielded systems
- ✓ Role of simulation and prototypes
- ✓ Accelerated testing to demonstrate life capability
- ✓ Physics of Failure (POF) contribution to robust product design
- ✓ Experimental design considerations
- ✓ Building "Green Systems"
- ✓ Mitigating EMC and other environmental effects on new designed equipment
- ✓ Supply chain management
- ✓ Design tools and automation

IMPORTANT DATES:

Submission of proposal for tutorial sessions: June 15, 2006

Submission of invited sessions: June 15, 2006

Regular papers, written in English, should be submitted electronically: July 15, 2006

Notification of Acceptance/Rejection: August 1, 2006

Final camera-ready papers: September 15, 2006

For further information, visit the conference website at <http://paris.utdallas.edu/siri/>

Accepted papers will be published in the Conference Proceedings. Outstanding papers will be considered for publication in special issues of the IEEE Transactions on Reliability and Transactions on Systems, Man and Cybernetics.

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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Conference Contact Information

Stefano Coraluppi
coraluppi@nurc.nato.int
+39 0187 527 304

Peter Willett
willett@engr.uconn.edu
+1 860 486 2195

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.

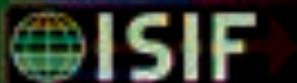
Student Paper Program. Fusion 2006 is featuring a student paper program to encourage the involvement of young engineers and scientists in information fusion research. Conference fees will be waived for the leading author of the best paper. Further details are available at the Conference website.

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
Final papers	15 May 2006
Early registration	1 June 2006



RISK MANAGEMENT AND SYSTEM DEPENDABILITY & SAFETY



LILLE

09 octobre 2006 : Tutoriels
10 - 12 octobre 2006: Congrès

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 criticality;
- Consistent 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 $\lambda\mu$** 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 Im15@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/Im15>, 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 $\lambda\mu 15$ 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 Maîtrise des Risques et la Sûreté de Fonctionnement 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 guarantor 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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Sophie Latrive

Phone: + 33 (0)1 41 49 04 15

Fax: + 33 (0)1 41 49 04 14

E-mail: lm15@imdr-sdf.asso.fr

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**The 12th IEEE International Symposium on Pacific Rim Dependable Computing (PRDC'06)
at University of California, Riverside, USA
December 18-20, 2006
<http://www.cs.iupui.edu/~ydai/PRDC06/>**

PRDC 2006 is the twelfth in this series of symposia started in 1989 that are devoted to dependable and fault tolerant computing. PRDC is now recognized as the main regular event of the Pacific area that is covering the many dimensions of dependability and fault tolerance, encompassing fundamental theoretical approaches, practical experimental projects, and commercial components and systems. As applications of computing systems have permeated in every aspects of daily life, the dependability of computing system has become increasingly critical. This symposium provides a forum for countries around the Pacific Rim and other areas of the world to exchange ideas for improving the dependability of computing systems. The symposium will be organized by the University of California, Riverside, a city on the west coast of USA. The roots of the University of California date back to 1907 when the California State Legislature established the Citrus Experiment Station to conduct research on the agricultural problems of Southern California. Riverside is fortunate to have a wealth of sites and buildings that provide a link to the city's past and a strong sense of place. Examples include the Mission Inn, the Chinatown site, the National Packing House, Citrus Experiment Station and engineering feats like the Gage Canal. Riverside is also close to some famous sites including Disneyland, Beaches, and some big cities.

- ◆◆◆◆ Topics of interest include (but not limited to):
- ◆◆◆◆ - Software and hardware reliability, testing, verification and validation
- ◆◆◆◆ - Dependability measurement, modeling and evaluation
- ◆◆◆◆ - Safety-critical systems and software
- ◆◆◆◆ - Architecture and system design for dependability
- ◆◆◆◆ - Fault tolerant algorithms and protocols
- ◆◆◆◆ - Tools for design and evaluation of dependable systems
- ◆◆◆◆ - Reliability in Internet and Web systems and applications
- ◆◆◆◆ - Dependability issues in computer networks and communications
- ◆◆◆◆ - Dependability issues in distributed and parallel systems
- ◆◆◆◆ - Dependability issues in real-time systems, database and transaction processing systems

PAPER SUBMISSIONS

Manuscripts should be submitted in the following categories:

Regular Papers and Practical Experience Reports. Regular Papers should describe original research (not submitted or published elsewhere) and be not more than 20 double-spaced pages including figures and tables using 11-point type. Practical Experience Reports (of 5-12 pages) should describe an experience or a case study, such as the design and deployment of a system or actual failure and recovery field data. The title page should include a 150-word abstract, five keywords, authors names and address and include a line specifying whether the submission is a Regular Paper or a Practical Experience Report. The full mailing address, phone, fax and email address of the corresponding author should be specified. All submissions must be made electronically. Additional submission opportunities are also possible at a later deadline under the form of Fast Abstracts.

Please visit our web site for full submission instructions and updated information on the symposium.
<http://www.cs.iupui.edu/~ydai/PRDC06/>

IMPORTANT DATES

Submission:  May 15, 2006

Notification :  July 31, 2006

Final version:  September 15, 2006

PUBLICATION

Accepted papers will appear in a proceeding published by IEEE Press. Selected papers that are presented will be published in a special issue of Some International Journals

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The 17th IEEE International Symposium on Software Reliability Engineering (ISSRE 2006)

November 6-10, 2006

Raleigh (Research Triangle), North Carolina, USA

<http://www.issre.org>

The International Symposium on Software Reliability Engineering (ISSRE) focuses on the practice and theory of software systems reliability engineering and analytics. The scope ranges from techniques and practices to verify, validate and test software, to those needed to estimate and predict its reliability, availability and dependability, to those that make it more tolerant to faults and (unexpected) changes in operating conditions, to the impact different development methods and processes have on the field reliability of a software-based product.

While, as always, the conference will provide an in-depth representation of both software reliability engineering (SRE) theory and experimentation, this year strong focus will be on the SRE practices and challenges faced by the software industry and by government systems, and on how SRE relates to security related software failures.

Topics, as they relate to reliability, availability and dependability of software and software-based systems, include but are not limited to the following

- Reliability, availability and dependability modeling and practices
- Software development methods, processes and standards (including reliable, secure and trustworthy software architectures)
- Software safety, security, trust and information assurance analysis
- Verification, validation and testing (including formal methods)
- Empirical studies; Metrics and measurements, estimation, and prediction
- Tools and automation (including SRE analytics and visualization)
- Fault-tolerant, robust and dependable software-based systems (including SRE of cyber infrastructure components such as storage, networking, switching, high-performance systems and applications, virtualization frameworks and solutions, and mobile and wireless devices and infrastructural components) - Networked software-based systems (including end-to-end workflows & services. ad hoc networks, sensors)
- Reliability of critical systems with software components (e.g., Internet and cyber infrastructure, bio-medical, flight and other transportation, information security)
- Open source systems
- Role of reliability in government and government-sponsored software-based systems - SRE implementation and experiences, workforce development and training

IMPORTANT DEADLINES:

Research Track Papers: April 7, 2006 (full length papers - up to 20 pages)

Workshop, Tutorial & Panel: May 15 2006 (one page proposals)

- Please send letter of intent ASAP so we can coordinate hotel rooms

Industry Practices Abstracts (papers, experience reports): June 30 2006
(full length papers, upto 20 pages)

Fast Abstracts & Student Papers: August 1 2006 (see web page for details)
<http://www.issre.org>

ISSRE will be collocated with the workshop on Advances in Model-Based
Software Testing (A-MOST06), 6-7 Nov 2006

ORGANIZATION

General Chair: Mladen A.Vouk, NC State University, USA

Program Committee Co-Chairs: Carol Smidts, U. of Maryland, USA and Amit Paradkar,
IBM Research, USA

Complete list of the Organizing Committee and Program Committee is available
on-line at <http://www.issre.org>

Sponsored by: IEEE Computer and Reliability Societies.



IEEE PORTABLE 2007 Call for Papers



IEEE PORTABLE 2007 will bring together communications, electrical, industrial, manufacturing, materials, mechanical, optical, and reliability engineers and business leaders involved in various types of Portable Information Devices (PIDs), to address and discuss state-of-the-art challenges, attributes and pitfalls in PID-related areas of engineering and applied science, with an emphasis on the interaction of the hardware and software, as well as their functional and physical (mechanical) performance, reliability and durability.



CALL FOR PAPERS

IEEE PORTABLE 2007 seeks technical papers (initially in the form of extended abstracts, then in the form of full-length papers), tutorial presentations, panel discussions, and trade-show-like demonstrations on different aspects of PID engineering



Schedule for Abstract and Paper Submissions:

Deadline for Submission of Extended Abstract: 15 July 2006

Notification of Abstract Receipt and Tentative Acceptance: 15 August 2006

Full-Length Paper Due: 15 October 2006

Notification of Full Paper Acceptance: 30 November 2006

Final Papers Due: 6 January 2007



Visit: www.ieee-portable.org/2007 for the full Call for Papers and submittal information

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