

Reliability Society

NEWSLETTER

Vol. 52, No. 4, November 2006

[Reliability Society Website](#)

CONTENTS

President's Message

[From the Editor](#)

Society News:

[Officer Elections](#)

[RS Constitution](#)

[RS Scholarships](#)

[Society Solicitations](#)

Feature Articles:

[Accelerated Life Testing Strategy](#)

[Requirements Focus](#)

Chapter Activities:

[From the Chapters](#)

Technical Operations:

[Technical Committees](#)

Announcements:

[See Announcements Section](#)

President's Message



Dear Reliability Society Members,

As the holidays approach, I would be remiss by not wishing all of you a safe and reliable year end, so happy holidays from me to you.

I also wish to personally thank our outgoing 2006 Executive Committee who have themselves been subjected to at least two presidents, myself and Jeff Voas. These folks gave of their personal time and their respective skills to improve upon what we label as reliability. To put some names up front and personal they are: Vice President of Technical Operations, Dr. Shuichi Fukuda; Vice President of Publications, Dr. Christian Hansen; Vice President of Membership, Ms. Marsha Abramo; Vice President of Meetings, Dr. Sam Keene, Secretary, Mr. Alan Street; and Treasurer, Mr. Richard Doyle.

In the same breadth I'd like to congratulate our 2007 elected executive slate: Vice President of Technical Operations, Dr. Sam Keene, and our newly appointed Asian executive Dr. Shuichi Fukuda; Vice President of Publications, Dr. Christian Hansen; Vice President of Membership, Mr. Scott Abrams, Vice President of Meetings, Ms. Marsha Abramo. The secretary and treasurer positions are presidential appointments ratified by the ADCOM, and will be announced in my next newsletter. As you can see, some folks have remained in their present position, some have moved to bring their knowledge into other positions, and we have strengthened technical operations having a US and an Asian chair.

We have completed a few items on our agenda, and we have progressed on many others. I will give you a run down.

The RS student scholarship has been officially launched, and thanks to Bob Loomis we have our first recipient, whose name will be announced at our annual banquet during the RAMS ADCOM meeting. Please encourage students who have reliability in their engineering curriculum to apply via the RS website. These scholarships are rolling, and are still open.

Under the leadership of Bret Michael and Christian Hansen the RS Trust magazine was brought forward for a first review by the IEEE publications committee. We are excited as we embark on this endeavor, and we will be submitting a refined proposal in the Feb IEEE executive meeting series.

IEEE USA is also interested in the entire RS trust initiative, and we were asked to submit to them a one paragraph statement regarding trust. Below is what we submitted. This should give you an idea of how broad this concept is.

IEEE Trust Initiative

Trust is a recognized entity facing every operating unit and is geographically, technologically agnostic. Trust does not necessarily follow a known conformal path; thus it is poorly defined. It's spatial / temporal parameters bound this space, however any bit could trigger a trust breakdown. The union of the physical and non-physical catalysts defining trust is the target to be defined. A consequence of mistrust is an undefined threat space.

In conclusion, trust is a behavioral phenomenon having a large amorphous component.

IEEE-USA acknowledges the susceptibility / criticality / timeliness / vulnerability and thus the urgency of research to bound and frame what trust means today and what will be needed to define trust in future decades. IEEE-USA acknowledges the non-physical aspects of the trust quagmire

(e.g., cyber-security) and they are so poorly understood thus causing roadblocks to progress in the overall trust equation. This is at a minimum a problem of national significance in need of immediate research.

Respectfully submitted,
Dr. J. Voas, Jeffrey.m.voas@saic.com
Dr. W. Tonti, wtonti@ieee.org
IEEE Reliability Society

During our fall ADCOM meeting, we as a society, under the leadership of Marsha Abramo, presented a technical outreach series to the graduate students at the University of Tennessee, Knoxville. The speakers included Marsha, Scott Tamishiro, Jason Rupe, Sam Keene, and myself. This was well received by the students, and ended with an informal luncheon with all involved. It is our intent to continue student outreaches, with our next one taking place on December 18 at the University of Naples, Department of Information and Systems in Naples, Italy with the Robotics and Automation Society (RAS).

We spent quite a bit of time during this past ADCOM refining our budget and complying with what was our spending allocation, sharpening our pencils, and doing the best that we could. At the end of the day unknown to us, IEEE corporate changed the society fee structure (of course we participated in a final vote)... all resulting in funds available to the society to press on with our initial initiatives. With this said, we committed to the second EXPERT NOW module: "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. This module's production will be available 1Q 07. We have already produced a module in 2006 entitled "Planning and Performing Failure Mode and Effects Analysis on Software", and is authored by Nathaniel Ozarin of The Omnicon Group, Inc. To complete the story, our total set of modules including the newest one is four.

Here is a brief summary of the latest IEEE corporate (Technical Activities Board Meeting), where we participate as one of the voting members.

(1) The Trust Initiative Magazine is being socialized as well as possible with the bigger societies, and in the end, we should obtain approval for a magazine. We plan to hold onto the title "Trust", but then we need a lot of work on the revised proposal to make that happen in the February TAB meeting.

(2) We are planning on having a TRUST workshop in December to rework and crisp up TRUST.

(3) While we show an anticipated loss of about 40K on our books this year, it appears that IEEE will make a profit of about \$25M. We usually get about 1% of that, so we should be in a good position to produce the second EXPERT NOW module.

(4) A new society allocation algorithm was passed, right on the heels of the one last year. As you recall, last year the algorithm caused more of a charge to smaller societies, while this year's algorithm does just the opposite. The only thing I can say is that we will most likely have another alteration. The present impact to us will be small, but noticeable. However, if IEEE has another great year in the markets, the impact will be tolerable. The big winners again are small societies e.g. Product Safety Engineering. The present algorithm has societies with many publications paying more (last year's had the charges divided equally among societies).

(5) We discussed with the higher brass of IEEE that the old model from the past 100+ years of focusing on products, components, and "engineered-physical-items" would not be a model that fits a "services" world 20+ years out. They seemed receptive to hearing more and we hope to spin that into our trust initiative. Also there was discussion that non-physical systems had to be included in their future plans to a higher extent, and that physical systems will have lesser roles. Time will decide that prediction.

(6) The Engineering Management Society (EMS) proposed changing its respective status from its present form, i.e. a society, to a council. In simple terms, a council has no members (They come from other societies), and they do not have all the privileges of a society. Typically, councils form and then become a society if their field of interest and membership core reaches a level of technical uniqueness and self-sustainability. In this case, EMS determined based upon last year's tax algorithm that they could not satisfy the self-sustainability element. We, the Reliability Society, agreed to sponsor this council as we have a significant quantity of RS members who are also EMS members. Sponsoring is not just a technical commitment. Councils are fiscally sponsored by societies.

I enjoy providing conference, chapter and workshop updates, as these become the places where our members meet face to face. This month I have two updates, and I will close on this note. The Reliability and Maintainability Conference (RAMS) is right around the corner (Jan 22-25 in Orlando FL), and is also the location of our next ADCOM (1/20/06). If you are in town, please stop in at the ADCOM meeting and sit in and participate!

The Integrated Reliability Workshop (IRW) recently concluded, and an excellent meeting took place. [This link](#) is the wrap up sent by the IRW communication chairman Hirsch. Goffman. I

conclude on his statement!

Respectfully Submitted, and again Happy Holidays

Bill Tonti

Reliability Society President

<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 l.chase@ieee.org.

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

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[Top](#)

Society News

New Society Officer Election Results

The results of the vote for 2007 officers are in. This was a very close race.

Our elected RS Officers for 2007 are:

President -- Bill Tonti

VP Meetings -- Marsha Abramo

VP Tech Ops -- Sam Keene

VP Membership -- Scott Abrams

VP Pubs -- Christian Hansen

Congratulations to our 2007 officers. We are looking to you for continued leadership.

Thanks to all who agreed to run for election. It was nice having a true election this year for many of the offices.

Congratulations,

Dennis

Senior Past President

[Top](#)

TAB Approved Update to Reliability Society Constitution

The Reliability Society AdCom revised the RS Constitution to clarify our Field of Interest statement and to make minor changes to reflect actual operating practices. The IEEE TAB Administration approved the minor changes to the Reliability Society Constitution in May 2006, less the update to our Field of Interest. The Field of Interest statement requires review by all Society Presidents and was approved by the Presidents at the TAB meeting on June 24, 2006. Please review the Constitution and if you have comments provide them to Dennis Hoffman, RS Past President, at d.hoffman@ieee.org.

The Reliability Society governing documents are posted on the Reliability Society web site for your use and reference at any time. The RS Constitution, ByLaws (will be updated next), and Operational Manual (updated annually) are posted on the web site.

[RS Constitution](#)

[Top](#)

Reliability Society Scholarships

The IEEE Reliability Society is pleased to announce scholarships to graduate students and upper division undergraduate students. Up to five \$2000 scholarships will be awarded each year to students who have demonstrated achievement in their studies and who have taken at least one course with reliability content.

"We are extremely pleased with this outreach effort, and hope that these scholarships encourage students to take an interest in Reliability Engineering and to understand that reliability is an overarching factor in whatever they may be studying and what they will do in their career. If you are a student, and have taken a course with reliability content which sparked an interest in reliability, I encourage you to apply for this scholarship" said Bill Tonti, the President of the IEEE Reliability Society.

Detailed requirements and applications for the scholarship are available [here](#) and on the Reliability Society website (<http://www.ieee.org/portal/site/relsoc/>) and through school financial aid offices.

[Top](#)

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.

[Fellows Nomination Information](#)

Reliability Society Engineer of the Year Award for 2006

Reliability Society Lifetime Achievement Award for 2006

[Top](#)

Chapter Activities

[Boston](#)

[Dallas](#)

[Denver](#)

[Singapore](#)

[Twin Cities](#)

[Top](#)

Technical Operations

Technical Committee Reports

Coming in future issues

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

[Top](#)

A list of the Technical Committees and their Chairs:
[IEEE RS Technical Committees](#)

[Top](#)

Announcements

[RAMS 2007](#)

[RAMS PHM Session Info](#)

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

[IEEE Sensors Applications Symposium 2007 - Call for Papers](#)

[CALL FOR AWARDS NOMINATIONS - IEEE Nanotechnology Council](#)

[1st Annual IEEE Systems Conference 2007 - Call for Papers](#)

[International Symposium on Consumer Electronics \(ISCE\) 2007](#)

[International Computer Software and Applications Conference \(COMSAC\) 2007 - Call for Proposals](#)

[Summer Safety and Reliability Seminar \(SSRS\) 2007](#)

[Top](#)

Accelerated Life Testing Strategies for Components and Systems

Jim McLinn

Oct 3, 2006

There are several different life testing strategies to consider when performing component or even system level testing. Here, system refers to anything as simple as a circuit board with 100 or more components all the way to a rack of electronics. Each life test approach may really be tied to a different type of customer market. Each approach also has a different strategy for handling financial risk that any customer failures may create. A brief description of each of three approaches is worthwhile to understand why it might be employed. Any component or system would require additional testing such as Highly Accelerated Life Test, HALT, combined with Failure Analysis to assure that the causes of any component or system failure are fully understood. At present, I will ignore software-controlled systems and soft failures in this life test discussion. Each of these represents an article of its own. Soft failures can often lead to "No Fault Found" situations at analysis and are as real to customers as hard failures.

Now a few words about the differences between components and systems would be in order. Components often have a small number of failure modes, usually in the neighborhood of 10 to 20. Many are evident only when certain stresses are present. For example, a life test based upon temperature and humidity may result in a variety of corrosion-related failure modes being evident. The same group of components subjected to temperature and operating voltage combined with a variable signal frequency, but without humidity present, may show a variety of other failure modes and no corrosion-related ones. All components are at nearly the same operating conditions. Thus, a component may show 4 to 6 dominate failure modes as a response to applied stress. These 4 to 6 are a subset of the total potential failure modes (the 10 to 20) which may exist. Sometimes this complex situation is approximated by a single number such as activation energy. Said another way, the activation energy may be associated with the observed failure modes based upon the range of stresses present in the original tests. Caution, if you change the range of the same set of stresses, the failure modes obtained may change. Be careful when setting up accelerated tests. Understanding the physics of failure for components may help. Even if a component life test is carefully set up and a typical failure rate or FIT number obtained, this test may not reflect the field failure situation when the component is employed on a circuit board. Why is that? This is answered in the system level discussion.

Systems are different from components: they are much more complex. Imagine a circuit board with 500 components. These might be divided into groups such as film resistors, ceramic capacitors, inductors, linear operational amplifiers, voltage regulation components, dynamic memories and digital logic. What happens during an accelerated life test of such a circuit board? Each component type may have the potential for 10 to 20 failure modes, but only the dominate failure modes of some of the components may be observed during the test. Why is this? System testing is different from component testing in many ways. I will list a few of these differences here. When temperature, say 70C, is applied to a circuit board, all of the components start at the same temperature. Because the components are in a circuit, some consume more power than others and so self-heat to different operating temperatures. A resistor used as a pull-up may dissipate a small amount of power, self-heating only a few degrees above the applied test temperature. The same value resistor used in a feedback circuit, may dissipate 3 or 4 times the power of the pull-up resistor and self-heat 20 or 30 degrees. A voltage regulator circuit may dissipate enough power to self-heat 60 degrees above and be near the absolute maximum rating. A digital integrated circuit might be operating at a speed and fan-out such that self-heating is only 10 to 15 degrees. On the circuit board, the components are at a variety of different operating temperatures and voltage conditions. Usually the most highly stressed components dominate the circuit board failure modes. We may observe 4 to 6 dominate failure modes again, but they

typically represent only a small number of component types present. There is a great temptation to simplify the circuit board results in a manner similar to that of the component and sometimes even describe the average activation energy for the circuit board. This would not be correct. The circuit board is dominated by a few failure modes from a few components, but has a variety of components with very different on-board operating conditions, even when the external test conditions are known and fixed. Change the circuit board design slightly and the on-board operating conditions may change significantly, hence the accelerated life test results would change. Change the external airflow on the unchanged circuit board and the observed failure modes of the life test may change. Be very careful with setting up the life test of a system. Even if the life test has been carefully constructed and run, it may not fully reflect the field results. Why is that? The accelerated life test is a fixed condition for stresses and is somewhat benign. The field has a variety of similar conditions and is not necessarily benign. Customer A may have a high uncontrolled temperature, combined with the presence of salt air and corrosive chemicals as a use condition. Customer B may have an air conditioned steady temperature, but swap circuit boards and change system configurations periodically. Customer C may have a power outage or high voltage spike combined with the presence of EMI. None may have results similar to the in-house accelerated life test.

Why do testing at all then? The primary reason is to find system failure causes, if they exist, and implement preventive action to reduce customer problems and costs associated with field failures. The “cost” to replace a failed complex circuit board can be about \$3000 for the service plus the cost of a new circuit board. Even a simple \$10 (to build) control board for a home furnace cost typically about \$100 for the circuit board and \$100 or more for the service. There is lots of potential saved money by doing life tests. Consider the three different approaches that follow; these are not the only ways, but show some of the problems.

A) Short test time with large sample size

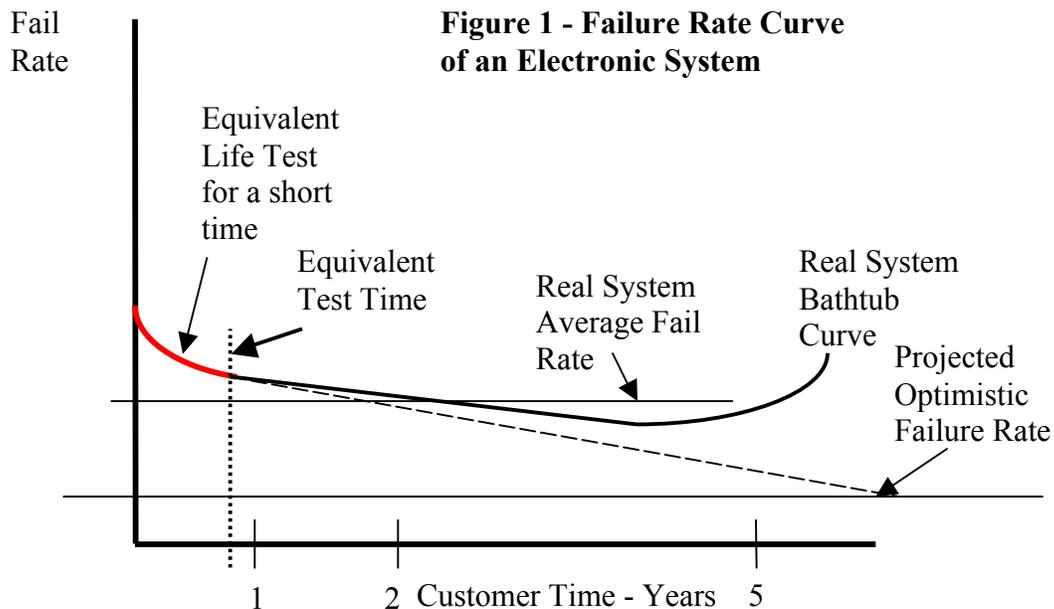
The first approach is to build a life test based upon testing a **large number of components or systems for a relatively short period of test time**. This approach is used in some markets and by some companies. Usually, the cost of components or systems is low and the ability to perform life testing is not too complicated or costly. Testing, in this case, may be limited to about 3 months in an accelerated fashion. It could run longer as required and often only covers the first year or two of customer life. Three months is usually too short to see end of life of wear-out failure modes. This life test is really designed to assure low failures during warranty and not much longer. The test conditions may be nominal operating or a worst case customer scenario. Most applications are usually electronic dominated systems, but this also works for mechanical ones. A few examples include hard drives, computer memory arrays, servers, many common laboratory medical instruments, flash drives (also called jump drives or memory sticks) and any low cost or throw-away item such as watches, cell phones and ipods. The advantages of this approach to testing include:

- a. You get some (incomplete) life data and failure rates estimates quickly.
- b. The results are usually positive, that is, large MTBF numbers or low FIT numbers are often observed.
- c. If results are not positive, you find out quickly about undesirable failure modes.
- d. Long term system behavior is not too important. That is, the product is not expected to stay in the customer’s hands for more than a few years since technology is changing quickly. A new model replaces the old one before the end of life.
- e. There is an estimate of warranty risk.

There are some disadvantages to this “large numbers for a short time approach” and these include:

- There is limited information about system failure modes over time. Lot-to-lot variability may not be present in the samples.
- There are only a few failures observed in the group, typically 0 to 3 at most on a good sample. The FIT estimate is rough and the early failure modes non-existent.
- You don't know much about any wear-out failure modes.
- You don't usually learn much about maintenance issues if these exist.
- There may be little or no information about the real customer failure modes because the life test may not simulate the way the customer uses the product.
- A negative corporate image may develop because of limited information. Said another way, you can get a false positive impression about the product by this short test. People tend not to question positive lab test results. You really don't have a strong assurance of few field problems.

Figure one shows some of the advantages and disadvantages as they relate to a bathtub curve. This example selected an electronic bathtub and so the on-set of wear-out is placed at 5 customer years or longer. It could be shorter or longer depending upon the technology and application. The figure points out that the short 3 months of test with a low acceleration is equivalent to about one customer year of time on each sample. The combined data of all the samples allows us to project to a large and overly optimistic MTBF. The projection could have been based upon a sample of 20 with 1 failure or a sample of 77 with 3 failures. Both represent dangers from testing to low failures. If possible, the test sample should run until 1/3 or more of the samples fail. As always, the more failures found in test, the better are the test results. Also remember that a larger sample size run for a short time will not represent the population accurately, especially when the system is wear-out dominated.



B) Moderate sample size with longer test time

The second test method is to run a moderate number of systems for a longer time - an approach used by some companies in a few target markets. Testing may be limited to 3 to 6 months with some acceleration. Think of electric motors, compressors, many automobiles, DVDs, digital TVs, most appliances and any moderate-to-high-cost-to-replace item. Here, the useful life

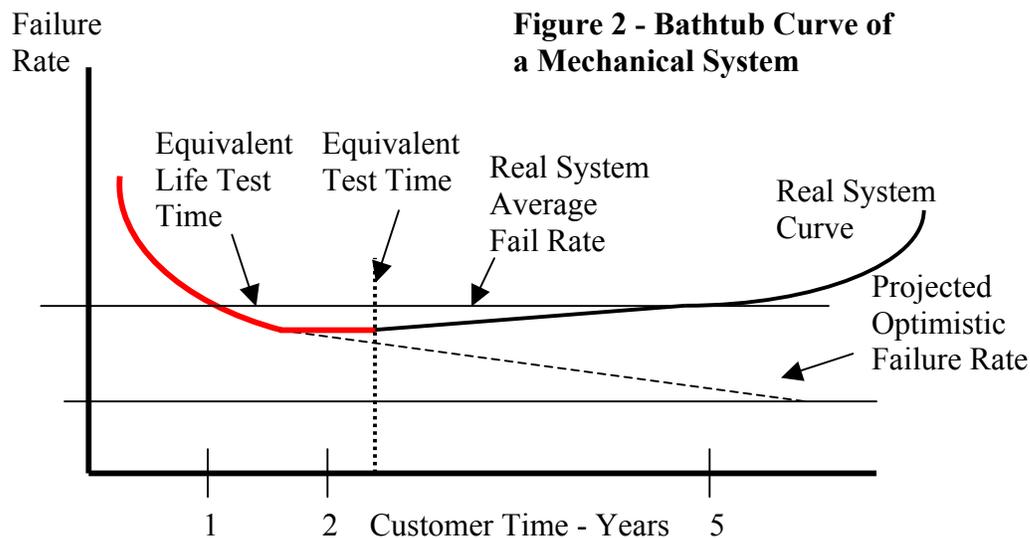
is considered to be 5 to 10 customer years. There are a few advantages to this type of testing that include:

- a. Better life test results but at a higher test cost.
- b. The results are usually positive with large MTBF numbers resultant.
- c. If results are not positive, you usually find out within the first 3 months.
- d. There is usually a reasonable estimate of warranty risk.

Some other results also exist and these include:

- a. There may be more information about preventable system failure modes.
- b. There may be a moderate number of failures in test, maybe 5 to 10.
- c. You might learn something about a few wear-out failure modes.
- d. You might learn about longer term system maintenance issues.
- e. Still, there may be little information about the real customer failure modes. The in-house life test doesn't reflect all customer situations. Surprises may exist.
- f. Reasonable estimates of long term repair risks (post warranty) may exist.
- g. Little lot-to-lot variation information need be present.

Figure 2 shows this situation graphically. Here, I have selected a mechanical-dominated system bathtub curve to show the time issues. A longer, but limited test life was performed. It is still easy to be overly optimistic unless at least 1/3 of the systems are run to failure. The same cautions apply here as in the short-time test approach A.



C) The long accelerated life test with few samples

The third test method is to test a small number for a very long time. This approach is used by some companies who need to know long-term behavior for low volume or extremely high cost-of-failure items. Testing may occur over 6 to 12 months or longer. Think Pacemakers or airplanes, though some commercial appliance manufacturers and monitoring systems (gas and water) use this approach. The advantages include:

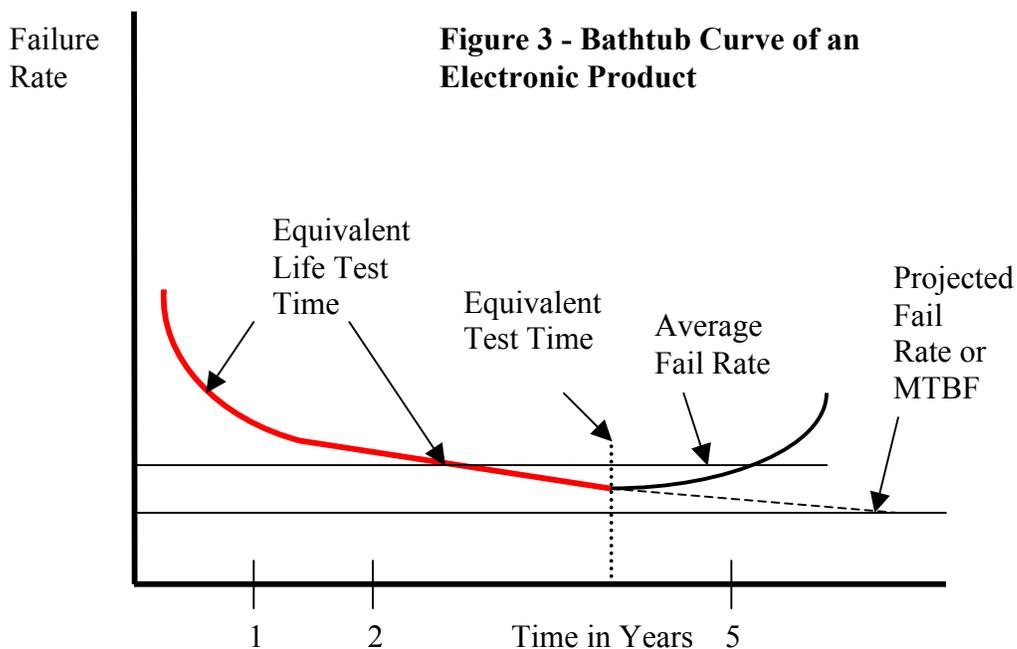
- a. Better life estimates are generated because system is run to end-of life.
- b. The results may show positive or negative impacts on MTBF.

- c. With long-term tests, the wear-out modes become well known.
- d. If results are negative, it may still take a long time to find out.
- e. There is better understanding of financial risk for any long term repairs.

There are some additional distinct considerations to long-term testing and these include:

- a. There may be a relatively high number of failures to be repaired during test.
- b. The cost to run a long term test may be high and test beds with other needed resources can be limited or costly.
- c. The maintenance issues may remain an unknown if the test is not set up correctly.
- d. There still may be no useful information about the real customer failure modes until systems are operated by customers under real field conditions.
- e. No lot-to-lot variation need be present. In fact, a small sample size doesn't even reflect one lot well.

Adding longer test conditions leads to a better picture of the whole life curve and may avoid some risks of post warranty failures. Here, the company reputation is on the line, just as during warranty. Look at consumer product recalls; they are usually post warranty period problems. Recently Toyota and Honda had recalls of cars that averaged 4 years old. Sony recalled laptop batteries that were 2 to 4 years old. The problem in these situations was that the undesired failure mode (here safety related) did not show up until after some operating time in the field under harsh field conditions. Extending laboratory test time may or *may not* lead to the desired knowledge of the life curve and reveal these safety related failure modes. It is up to the qualification engineer to write a thorough life test program. An improvement team should “put the pieces together” and then implement improvements resulting from life test failures. Figure 3 documents one possible outcome for long duration tests.



The number one reliability driver of today's system problems
Dr. Samuel Keene, FIEEE
s.keene@ieee.org

Consistently, the largest Pareto significant software and system problem lies with “requirements” deficiencies. First, it must be recognized that the customer who wants the product has an immature or imperfect notion of what is truly desired. The customer knows the main points of the desired product but has not realized the “totality of requirements”. Then, the customer issues these imperfect requirements for the developer to interpret. Limitations of the natural language clarity represent another hazard to the perfect understanding of requirements.

In the 1990's, two contractors independently coded safety-critical code for the Canadian Darlington nuclear reactor. This code forced the reactor to go into a safe mode when the reactor coolant fell below a specified level. The coolant level was in a constant state of variation. There was interpretation ambiguity facing the contractors as to whether this contingent action was to take place when the mean, mode, or the median coolant level was used to trigger the action. It was later discovered that both contractors made the same misinterpretation. This ambiguity was subsequently corrected by mathematically stating the control invoking condition. This made the triggering condition explicit without relying on individual's interpretation of a natural language statement.

Requirements are always a big challenge. Branden Murphy reported that the preponderance of system reliability problems stem from “System Management” deficiencies [1]. These are deficiencies resulting from incomplete requirements or interface definition. He published this finding a decade ago based upon over 2,000 Digital systems operating in Europe. He has related to me in the past year that this observation still holds on other systems that he is now tracking in Europe.

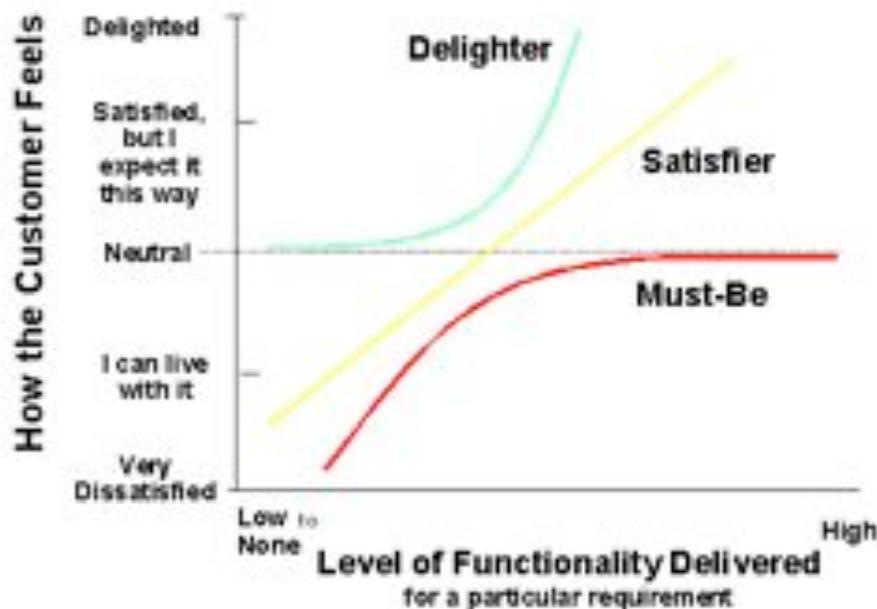
Managing Requirements

The Kano diagram depicts three levels of requirements:

- Delighters- which the customer did not expect but loves
- Satisfiers – which meet his specified needs
- Musts - often unspoken and not even realized until they are not met

The “delighters” are features that the customer did not specify, or even think of, but likes a lot. These can differentiate a product. A compass on rear view mirrors was an unexpected “delighter”. Once people depended upon them, expected them to be present, they became a requirement. The compass became a specified “satisfier”. Some believe that the “must have” requirements are those basic things needed to make the product work. This author feels that the “must have” are assumed capabilities. They do not even have to be stated and are only noticed in their absence. Example would be a home sold in my area that did not have heat on the second floor. The buyer discovered this in the wintertime. He had assumed heat ducting would have been provided to all rooms. This lack was a surprise “dissatisfier”.

Kano Diagram



There are two venues to collect initial requirements. First the customer/users can be directly asked. They identify their product needs. These typically center on their early thoughts on performance, quality and cost. These needs are given independently, whereas there are trade offs to be made, to reach an optimum balance. Typically these stated needs are the Kano “Satisfiers”. The more they are satisfied, the better the customer feels about them, ie., the faster the response time of a device, the greater the satisfaction of the customer.

The more proactive developer will also actively seek “Context Data” about the customer needs. These are the indirect comments provided by the potential customers. These comments might be mined from help desk comments made on the present product. It might be product complaints that have been received. This is the data that can be mined to find “unstated requirements”. These requirements have the potential to “delight” the customer, and successfully differentiate your product and raise the perceived quality of your delivered product. Quality is the customer’s perception of your product benchmarked against the customer expectation.

I asked a successful realtor in San Diego, what she did to be so successful. Her response, “I listen to what the customers don’t say”. She was collecting “context data” to particularly find the customer delighters’. My question to the readers here, “is what techniques have you found successful in developing good requirements?”.

1. B. Murphy, and T. Gent, “Measuring System and Software Reliability Using an Automated Data Collection Process”, Quality and Reliability Engineering International, CCC 0748-8017/95/050341-13pp., 1995.

IIRW Deals With a Wide Spectrum of Semiconductor Reliability Challenges

The 2006 International Integrated Reliability Workshop (IIRW), sponsored by the IEEE Reliability Society and the IEEE Electron Devices Society, was held at the Stanford Sierra Camp on the shore of Fallen Leaf Lake near South Lake Tahoe, CA from October 16th to 19th, 2006. This workshop provides a unique forum for open and frank discussions of all areas of reliability research and technology for both present and future semiconductor applications and was chaired by John Conley, Jr. of Sharp Labs of America. The Technical Program of the 2006 workshop was organized by Yuan Chen of Jet Propulsion Laboratory, and focused on the main topic areas of: designing-in-reliability (products, circuits, and processes), customer product reliability requirements, root cause defects, physical mechanisms, and simulations, identification and characterization of new reliability effects, deep sub-micron transistor and circuit reliability, wafer level test and test structures.

Jose Antonio Maiz Intel Fellow, Technology Manufacturing Group Director, Logic Technology Quality & Reliability gave the Keynote Presentation entitled, "*Reliability Challenges: Preventing Them from Becoming Limiters to Technology Scaling*". In this address, an analysis of the key technology and reliability



2006 IEEE IIRW Attendees

trends with a potential to slow down technology scaling were discussed along with key concerns for some of the proposed options. The research opportunities and directions that will contribute to removing or minimizing reliability as a scaling limiter were analyzed. Key Messages were aggressive technology scaling continues according to Moore's law, many new materials, transistor & design architectures will be introduced to support continuation of scaling, major changes in circuit design and chip architecture will also be needed to address process, power, and reliability issues, and early engagement & close coordination between Process, Design, Layout & Reliability functions will be critical to success. "Creativity and Innovation will be key to success".

The technical program included paper sessions on (NBTI) Negative Bias Temperature Instability, Interconnects, Mixed Signal Devices, Transistor Reliability, Memory Reliability, Products Reliability, Wafer Level Reliability, and High-K Dielectrics.

In addition, eight separate Tutorials were presented by world-class experts on a variety of topics such as Image sensors, Reliability issues, Dielectrics, NBTI, Phase Change memory, Qualification strategy, Copper Electromigration, & High-K in Back End.

The workshop evenings featured four moderated Discussion Groups and two open Poster sessions, all with refreshments provided to stimulate open discussion. A wide range of attendees from commercial semiconductor manufacturers to universities and government organizations were represented. The workshop schedule included a Wednesday afternoon break to allow participants to take advantage of the Stanford Camp's unique mountain setting's recreational opportunities.

Selected papers will be published in a special proceedings issue of IEEE Transactions on Device and Material Reliability.

Next year's workshop will be at the same location from October 15th-18th, 2007. More details can be found at www.iirw.org.

Hirsch T. Goffman, Medtronic Inc.
2006 IIRW Communications Chair



IIRW at Stanford Sierra Camp, Fallen Leaf Lake near Lake Tahoe, CA

Constitution - IEEE Reliability Society

Original Constitution Approved 06/12/51
Amended 07/07/53
11/09/54
09/09/58
11/14/62
03/03/64
Revised 09/30/70
10/06/78
05/01/86
10/01/94
06/24/06

Table of Contents

- [I - Name and Objectives](#)
- [II - Membership](#)
- [III - Field of Interest](#)
- [IV - Financial Support](#)
- [V - Organization](#)
- [VI - Nomination and Election of the Administrative Committee](#)
- [VII - Meetings](#)
- [VIII - Publications](#)
- [IX - Amendments](#)

Article I - Name and Objectives

Section 1. This organization shall be known as the IEEE Reliability Society.

Section 2. The objectives of the Society shall be scientific, literary, and educational in character. The Society shall strive for the advancement of the theory and practice of electrical engineering and of the allied arts and sciences, and the maintenance of a high professional standing among its members, all in consonance with the Constitution and Bylaws of the IEEE and with special attention to such aims within the field of interest of the Society as are hereinafter defined.

Section 3. The Society shall aid in promoting close cooperation and exchange of technical information among its members and to this end shall hold meetings for the presentation of papers and their discussion and, through its Committees, shall study and provide for the needs of its members.

[Table of Contents](#)

Article II - Membership

Section 1. Membership in the Society shall be available to members of the IEEE in any grade, including Student, having a professional interest in any phase of the field of interest of the Society.

Section 2. Nonmembers of the IEEE may become Affiliates of the Society and may participate

in Society activities, as provided by the Society Bylaws and subject to the applicable IEEE Bylaws.

[Table of Contents](#)

Article III - Field of Interest

Section 1. The Society is concerned with the strategies and the best practices for attaining, assessing, assuring, and sustaining system reliability throughout its life cycle.

Reliability is a design attribute of a system (encompassing service and process). Even though reliability is intangible physically, it is a true system performance measure.

Note: System reliability in this context implies the reliability of any product tier starting at the materials level, then the device / component level, then the assembly / unit / module level, to a system or system of systems. The term system is meant to be a broad term so that anyone within Reliability Engineering working on or with a product or process or service can be included within this Society.

Additionally, by having Reliability as an attribute, with the Society's broad perspective of the term, leads to the use of descriptive terms, such as: dependable, trustworthy, available, maintainable, reliable, fault-tolerant, graceful degradation, failure immunity, secure, safe, intuitive, resilient, reliant, etc. Reliability is integral to Design, Availability, Maintainability, Testability, Diagnostics, Prognostics and Health Management, Integrity, Security, Quality, Supportability, Human Engineering, and System Safety.

The Society membership encompasses engineers who are designing, analyzing, producing, and assessing some portion or level of a system, be it hardware, software, devices, processes, or materials.

Section 2. The field of interest of the Society may be enlarged, reduced, or shifted moderately as the needs of the occasion indicate, with the provision that such revisions shall be processed as an amendment to this constitution. The new field of interest must also be approved by the IEEE Technical Activity Board (TAB).

[Table of Contents](#)

Article IV - Financial Support

Section 1. The Society shall collect an annual assessment or fee from its members, as prescribed in the Society Bylaws.

Section 2. The Society may make registration charges at its Society meetings, symposia, conferences, and conventions. The registration fee for nonmembers of the IEEE shall be higher than for IEEE members.

Section 3. The Society may raise revenues by other means, such as advertising, shows, request for contributions, sale of publications, and charges for sending our notices to non-Society members, provided such means are consistent with applicable IEEE Constitution and IEEE Bylaws, and do not encroach on revenue fields of prior established Societies or sections. Revenue means not explicitly covered by the IEEE Constitution or IEEE Bylaws must be

approved by the IEEE General Manager before being adopted by the Society.

[Table of Contents](#)

Article V - Organization

Section 1. The Society shall be managed by an Administrative Committee (AdCom) of 18 elected members-at-large plus members ex-officio with vote as specified in the Bylaws. (There may also be members ex-officio without vote.)

Section 2. Technical Committees may be established as needed to develop specific areas of the Field of Interest.

Section 3. Sub-societies may be formed as provided in the IEEE Bylaws, and the supervision of sub-society affairs, other than by the AdCom, shall be as prescribed in the Society Bylaws.

Section 4. The terms of the 18 members-at-large of the AdCom shall normally be for three years, with 6 members to be elected each year. Only two consecutive terms are permitted, but eligibility is restored after a lapse of one year. The AdCom shall have the right to approve special provisions affecting the length of member term and shall document those provisions within the Society Bylaws.

Section 5. The AdCom shall annually elect one of its members as President, and four others as Vice-Presidents, whose terms shall be for one year. A Secretary and a Treasurer shall also be appointed annually for one-year terms. These two officers need not be elected members of the AdCom, and they may be reappointed.

Section 6. The President, under direction of the AdCom, shall have general supervision of the affairs of the Society. The President shall preside at meetings of the AdCom, at general meetings of the Society, and at the Annual Meeting of the Society, and have such other powers and perform such other duties as may be provided in the Society Bylaws, or as may be delegated by vote of the Society AdCom. In the President's absence or incapacity, his/her duties shall be performed by one of the Vice-Presidents, selecting one of their number to act as President.

Section 7. The AdCom may utilize the services of IEEE Headquarters as bursar for all or part of the Society funds, as provided by the IEEE Bylaws. If any part of the Society funds are received and deposited separately, the terms and conditions shall be in accordance with IEEE Bylaws and subject to the provisions of the Society Bylaws and to any special limitations imposed by the AdCom.

Section 8. The duties and responsibility of the officers shall be as defined hereunder and in the Society Bylaws and as delineated by the AdCom.

Section 9. The Vice-Presidents, as soon as expedient after election, shall, with exception of the Membership Committee, appoint the standing Committees provided by the Society Bylaws. The Society President shall appoint the Membership Committee as provided by the Society Bylaws. Other special or ad hoc Committees may be authorized by vote of the AdCom and shall serve until their successors are appointed or the Committee dissolved.

Section 10. The President shall be an ex-officio member of all Committees of the Society. The President is a member of the IEEE TAB and, when notified of a meeting of said Board, shall represent the Society at the meeting, or send an alternate. If an alternate cannot be found, the

President shall present the views of the Society by a letter.

Section 11. The newly elected President, Vice-Presidents, and members of the AdCom shall assume office in January of each year, unless a different time is provided in the Society Bylaws. The newly elected AdCom members and the officers shall be installed at the January AdCom meeting.

Section 12. The officially constituted officers of the Society shall have the authority to obligate the funds and assets of the Society to promote the Society's activities, as prescribed in the IEEE Bylaws. Contracts may be executed only by the IEEE. Proposed contracts for Reliability Society activities shall be submitted to IEEE Headquarters for review and execution.

[Table of Contents](#)

Article VI - Nomination & Election of the Administrative Committee

Section 1. Nomination and election of the 18 members-at-large of the AdCom shall be as prescribed in the Society Bylaws. Provision shall be made for nominating petitions from the Society membership to place a name or names on the ballot.

Section 2. Within-term vacancies on the AdCom shall be filled by appointments, for the unexpired terms, by the President with the consent of the AdCom.

[Table of Contents](#)

Article VII - Meetings

Section 1. The Society may hold meetings, conferences, symposia, or conventions either alone or in cooperation with other IEEE entities, or other technical organizations, subject to the IEEE Bylaws. The Society shall sponsor at least one technical conference of national (USA) or international scope each year.

Section 2. Conferences or sessions on governmentally classified material are prohibited.

Section 3. The AdCom shall hold at least three meetings per year, one an Annual Meeting. Special meetings of the Committee may be called at the discretion of the President or upon request of three voting members of the AdCom.

Section 4. Seven voting members of the AdCom shall constitute a quorum. All voting members shall have an equal vote, both elected and ex-officio with vote.

Section 5. A majority vote of those voting members of the AdCom attending a meeting shall be necessary for the conduct of business, except as otherwise provided in this Constitution.

Section 6. Business of the AdCom may be handled by correspondence, telephone, or other electronic communication where, in the opinion of the President, matters requiring action can be adequately handled in that manner. All such actions shall be made a matter of record by citation in the minutes of the following AdCom meeting. A majority vote of the voting members of the AdCom is necessary for approval of actions handled in that manner, unless otherwise provided in the Constitution or Bylaws.

[Table of Contents](#)

Article VIII - Publications

Section 1. Publications undertaken by the Society shall be subject to IEEE policies and to any further guidance or controls prescribed by the AdCom or its duly appointed Committees. The Society shall be responsible for the financial aspects of its publications program.

Section 2. The President, with the advice and consent of the AdCom, shall appoint the Editor of each publication. Other editors may be appointed as prescribed in the Bylaws. The duties of an editor, and his compensation, if any, shall be as prescribed in the Bylaws.

[Table of Contents](#)

Article IX - Amendments

Section 1. Amendments to this Constitution may be initiated by petition submitted by twenty-five members of the Society, or by the AdCom. Amendments may be adopted by at least two-thirds of the voting members present in meeting assembled but not less than fifty percent of the total voting members of the AdCom, provided that notice of the proposed amendment has been sent to each members of the AdCom at least 20 days prior to such meeting; or amendments may be adopted by a two-thirds e-mail vote of the voting members of the AdCom provided a 30 day period is provided for such responses. Amendments to the Constitution must be approved by the TAB. After such approval, the amendments shall be published in the Society Newsletter, with notice that they go into effect unless 10 percent of the Society members object to the AdCom within 30 days after the effective publication date stated in the instructions in the publication. If such objections are received, a copy of the proposed amendments shall be mailed with a ballot to all members of the Society at least 30 days before the date appointed for return of the ballots, and the ballots shall carry a statement of the time limit for their return to the IEEE office. When a mail vote of the entire Society membership is necessary, approval of the amendments by at least two-thirds of the ballots returned shall be necessary for enactment.

Section 2. Suitable Society Bylaws, and amendments thereto, may be adopted by a two-thirds vote of the voting members of the AdCom present in meeting assembled, provided that notice of the proposed Society Bylaw, or amendment, has been sent to each member of the AdCom at least 20 days prior to such meeting; or a Society Bylaw, or amendment, may be adopted by a two-thirds e-mail vote of the voting members of the AdCom provided a 30 day period is provided for such responses. A Society Bylaw, or amendment, shall take effect upon AdCom approval and shall be published in the Society Newsletter for member notification and mailed to the TAB Secretary.

[Table of Contents](#)



The IEEE Reliability Society Scholarship

<http://www.ieee.org/portal/site/relsoc/>

Description:

This scholarship recognizes active students who are members of the IEEE and who demonstrate promise in their academic and/or professional Reliability Engineering accomplishments.

Prize:

Multiple \$2,000 scholarships are available per year.

Eligibility:

Full-time Graduate Students, Seniors, and Juniors in degree programs in engineering, computer science, or other well-defined reliability-related field who are active members or student members of the IEEE. At least one course in Reliability Engineering or closely related field should be completed. Minimum overall grade point average should be 3.0 for undergraduate students and 3.5 for graduate students.

Basis for Judging:

- Involvement in IEEE activities – 30%;
- Academic achievement (with preference given to those who demonstrate excellence in reliability) – 40%;
- Extracurricular activities related to your academic/professional interests – 10%; and
- Letter of evaluation by at least one of the instructors who taught you a course with reliability engineering content – 20%.

Deadline:

Multiple scholarships will be awarded each calendar year. Submission deadlines are:

- Summer Term – April 1st
- Fall Term – July 1st
- Winter Term – November 1st

Note: All material must be received by the submission deadline.

Submission Requirements:

- The IEEE RS Student Scholarship Application;
- An essay (not to exceed two pages) describing your academic accomplishments, professionally related extracurricular activities, work history, career goals, and the relevance of reliability engineering to them;
- An official academic transcript of all college courses completed;
- A degree plan with reliability-related courses clearly identified; and
- One or more recommendation letter(s) from the instructor(s) of reliability-related course(s) you have successfully completed.

Contact:

IEEE Reliability Society Scholarship
Attn: Dr. Robert Loomis
3865 Hidden Hills Dr.
Titusville, FL 32796



IEEE Reliability Society Scholarship Application

All APPLICANTS – Please provide the following information along with this application:

1. An essay describing your academic accomplishments, professionally related extracurricular activities, work history, career goals, and the relevance of reliability engineering to them.
2. An official academic transcript of all college courses completed.
3. A degree plan with your reliability-related courses clearly identified.
4. One or more recommendation letter(s) from the instructor(s) of reliability-related course(s) you have successfully completed.

Applications will be considered incomplete until all documents are received. With the exception of signatures and dates, documents should not be handwritten.

Please select your current level of education:

- Junior
 Senior
 MS/ME Student
 PhD/DE Student

Last Name	First Name	MI	GPA/Scale (e.g. 3.5/4.0)
Student Permanent Address		Student School Address	Student Telephone Number(s)
School Name and Address			School Telephone Number(s)

Major Field of Study (be specific – e.g. Electrical Engineering, Industrial Engineering, Computer Science, Physics, etc):

Email Address:

Authorization to Release Scholarship Information

Federal Law requires that we obtain written permission before releasing information to the news media regarding scholarship recipients. If you wish to give such permission, please sign. If you do not sign, we will not release information to the media. However, it will not adversely affect your scholarship application.

Applicant's Signature and Date

I certify that all statements in this application and related materials are correct.

Applicant's Signature and Date

Submission Deadlines (Note: All material must be received by the appropriate submission deadline):

- Summer Term – April 1st
- Fall Term – July 1st
- Winter Term – November 1st

Please submit all application material to:

IEEE Reliability Society Scholarship
 Attn: Dr. Robert Loomis
 3865 Hidden Hills Dr.
 Titusville, FL 32796

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 Newsletter Submission from the Boston Chapter November 2006

Greetings from the Boston Chapter! The 06-07 meeting season is in process & final plans for the remaining meetings through May 07 are nearly complete.

Several AdCom members & IEEE Boston Reliability chapter members have been active lately in attending & presenting at various conferences. Boston AdCom Members Gene Bridgers & Aaron DerMarderosian Jr. presented at the 2006 International Military & Aerospace / Avionics Commercial off The Shelf conference, August 21 – 23, Santa Clara, CA.



Gene presented a paper entitled “*COTs Quality is Curiouser & Curiouser*”, Aaron Presented: “*Failures Lead to COTS Integration Strategy*”. Attending & presenting as well were Dallas Reliability chapter chair Lon Chase & member Bill Sherchak, providing a great Reliability Society member networking opportunity.

Our September kickoff meeting was held at EMC Corporation in Franklin MA. This included an introductory facility talk by Brian Davis, EMC’s Senior director of product manufacturing, followed by tours of the operations assembly test facilities & the EMC supplier material analysis labs.



Meeting attendees gathering (Left), Brian Davis, EMC Corporation provides introductory talk (Right).
- images courtesy of AdCom member Aaron D. (Raytheon)

We had record attendance, with more than 62 participants at the meeting! The Boston Chapter AdCom would like to thank Lisa Letts (EMC tour coordinator), Brian Davis, Greg Lanzi, Gary Lefebvre, William Zayas, Fredrick Linden (EMC tour support) & Michael Sosnowski (EMC board supplier materials lab) for making this event so successful. We also thank AdCom members Eddie Robins & Jim Fahy (EMC Corporation) for their support & participation in this event.

In October, the chapter meeting was held at RSA the security division of EMC Corporation, Bedford MA. AdCom member Gene Bridgers, presented an update to his COTs presentation “*COTs Quality is Curiouser & Curiouser*”.



AdCom member Gene Bridgers presenting (Left), Interactive meeting participants discuss COTs (Right). - images courtesy of AdCom member Aaron D. (Raytheon)

Gene discussed observed quality trends in commercially available electronics industry components and the impact of “COTs” in products that require high reliability.

There were more than 41 people in attendance. Audience participation with several active discussions made this meeting interesting, successful and well worth attending! The IEEE Reliability Society membership & benefits slides were also presented at the start of this meeting. These were provided from the national AdCom, to increase membership and participation.

The Boston Reliability chapter hosted a “Reliability track” at the American Society of Quality (ASQ) 56th North East Quality Council conference (NEQC), October 17-18, Mansfield MA. Several Boston Reliability chapter members presented & participated at this conference. There were approximately 250-300 attendees total, with 12-20 participants at each of the Reliability presentations. The Reliability track session was lead and coordinated by Joe Dzekevich (IEEE Sr. Member, AdCom Vice-chair and ASQ member / volunteer).



AdCom member & Reliability session lead Joe Dzekevich introduces AdCom member Gene Bridgers presenter (upper left), Gene Bridgers Lectures on HALT/HASS (upper right). Reliability members John Cahill (lower left) & Dave Dwyer (lower right) lecture on Reliability growth estimates.

- images courtesy of AdCom member Aaron D. (Raytheon)

The NEQC, presented certificates of achievement and CE training credits for each presenter / attendee. The Boston Reliability chapter AdCom would like to thank and recognize the following, for participating in this year's 56th NEQC Reliability track:

Nihar Senapati (GE healthcare) *"Sample Size Conundrum for Reliability Testing: How Big or How Small?"*

Gene Bridgers (Mercury Computer) *"Comparison of HALT/HASS Implementations"*

Aaron C. DerMarderosian Jr (Raytheon) *"FRACA Process Overview Tools for Success"*

Dave Dwyer & Jonathan Cahill (BAE Systems) *"Hardware Reliability Growth Estimations and Projections What is Valid & What is Not"*

Obaid Quadri (EMC Corporation) *"Current State of Software Reliability"*

Upcoming meetings:

Registration is underway for our November monthly meeting. This will be held at Thermo-Electron Corporation in Lowell MA. Guest presenter Douglas Smith from D. C. Smith Consultants, www.dsmith.org will present: *"Unique practical techniques and tools for debugging difficult design problems"*. Doug Smith will lecture on design debug EMC / RFI techniques he has developed over the years and will be hosting local seminars at Thermo-Electron, the week of November 6th.

In December, we will hold our annual past chairs dinner meeting at RSA, Bedford MA. This annual event recognizes the efforts of past & current Boston chapter AdCom chairs and includes a Reliability based presentation. This year, we have guest presenter David A Pinsky, from Raytheon Integrated Defense Systems, (*Engineering Fellow*). Dave will present: "*RoHS impact on Reliability, Tin whisker assessment & mitigation*". *Reduction of Hazardous Substances* is the restricted use & eventual elimination of 6 key substances. Dave will discuss the reliability implications and impact to the electronics Industry as the global implementation of RoHS takes effect.

Meeting plans for 2007: (Tentative)

Jan: RSA (Bedford), *in planning stages TBA shortly*

Feb: Textron Systems (Wilmington), facility tour & introductory talk

Mar: RSA (Bedford), Boston Reliability chapter spring lecture series, *in planning stages*

Apr: RSA (Bedford), *Open watch website for updates*

May: RSA (Bedford), *Open watch website for updates*

2007 AdCom officer election announcement:

On-line Boston chapter member elections to take place Nov-Dec 2006, members please vote!

The Boston Reliability Chapter elections will take place starting November 1st, 2006 through to December. Officer election results will be announced at the December monthly meeting.

For calendar year 2007, the nominees are:

Chair: Aaron C. DerMarderosian Jr. (Raytheon Company) *or Write In*

Vice-Chair: Joe Dzekevich (Raytheon Company) *or Write In*

Secretary: Edward Robins (EMC Corporation) *or Write In*

Treasurer: Don Markuson (ArrAy Inc.) *or Write In*

The Boston Reliability chapter advertises upcoming meetings, registers attendees & uploads past presentations on our IEEE hosted web-site.

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

Regards,

Aaron C. DerMarderosian Jr.

Chair, Boston Chapter

Dallas Chapter Report

By Lon Chase, Chair

The Dallas Chapter completed several technical meetings in the fall 2006 session.

September

Title: "RoHS Compliance Testing for the Electronics Industry"

Date: Tuesday, September 19, 2006

Speaker: Mr. Glenn Robertson, Process Science, Inc.

Program Summary:

RoHS and other legislative initiatives for the elimination of Lead and other materials in electronic products continue to create confusion. The number of analytical techniques to quantify the concentration of RoHS-restricted elements is limited. Most of these methods are destructive and rather costly.

One exception is analysis by X-ray Fluorescence, which is non-destructive and relatively fast and inexpensive. In this presentation we will discuss the operating principles of XRF, and the application of XRF and other analytical techniques to RoHS compliance testing.

Speaker: Glenn Robertson is a Process Engineer with Process Sciences, Inc. in Leander, Texas. He has worked in the fields of Optoelectronic components, Optical hybrids, and PCB assembly, and holds degrees in Physics and Materials Science.

October

Title: "Commercial Products in Military Hardware: Lessons Learned"

Date: Tuesday, October 17, 2006, 6:30 P.M.

Speaker: Mr. Bill Sterchak, Raytheon

Program Summary:

Military hardware has application requirements that are not necessarily typical in the commercial world. As producers of such hardware, we usually consider requirements carefully when selecting parts and materials for a given environment. However, there are other differences between commercial and military products that sometimes prove to be far more significant and are often overlooked.

Common problems with the application of commercial hardware in military systems often relates not to ultimate conditions in the field, but to other aspects of design and assembly. Several cases in which components failed not because of field application per se but because of unique assembly or system design constraints will be discussed.

The first item to be reviewed is an example of BGA devices that failed as a result of cleaning processes. These components perform well in a "no clean" assembly process, but could not withstand the cleaning processes typically used for military hardware. A second item relates to the sealed assemblies common in our products. In an effort to protect our systems from the outside environment we often seal in materials that outgas. These volatile constituents often prove hazardous

to motors and relays. In some cases, these outgas materials are flammable and have lead to fires. Finally, the desire to get as much capability into as limited a space as possible. Standard PWB technology is stretched to the limits to get as much circuitry into as small a space as possible. Otherwise, standard PWB productions techniques are used to produce PWB designs that are difficult to manufacture with significant risk for post separation, cracked vias and other critical defects.

This paper will discuss examples of problems related to the use of commercial parts in military systems where the difficulty was not directly related to the end use environment but rather to assembly or design issues that are related to military hardware.

Speaker:

Bill Sterchak is an applications engineer assigned to North Texas Parts Engineering. He has over 25 years of experience in defense electronics and manufacturing and has worked for Bendix, Allied-Signal, and Amphenol before starting with legacy Chrysler Defense (Electrospace Systems) in 1994. Past job functions have included production control and planning, technical writing, inside and field sales and program component engineer, all with increasing responsibility.

Most recently, Bill is the Applications Engineering (AE) Team leader and deputy manager for the department. AE consists of 4 engineers, 5 technicians and 2 specialists and duties include manufacturing and operations support as well as special projects.

Bill is an active participant and member of the Tin Whisker team, U of Maryland CALCE consortia, Actives RSP/RSS Content team, and is a counterfeit part subject matter expert. Bill has a BS in Biology from the U of South Carolina.

Red Sox fan, plays ice hockey in the winter, recovers all summer golfing.

November

Title: "Software Reliability Facts and Fiction"

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

Speaker: Ann Marie Neufelder, SoftRel, LLC

Program Summary:

In the last 30 years there has been more fiction concerning software engineering and reliability than there has been fact. Many practices executed today are based on fiction that has been repeated so many times that it has become fact despite little or no supporting evidence. Fiction costs money and wastes time. This presentation will reveal just a few of the many facts uncovered by years of quantitative benchmarking of more than 600 software development characteristics at more than 90 organizations. You will see how to apply the facts and avoid the fiction to optimize development cost, time and latent defects.

Speaker:

Ann Marie Neufelder is the director of SoftRel, LLC. She has been applying software reliability on real world applications for more than 20 years. She has measured more than 600 software characteristics at more than 90 organizations in order to determine what's important and what's not. Her research has resulted in a software reliability model that not only predicts defect density but also

predicts cost effective alternatives for reducing defects. Ann Marie has taught software reliability to more than 2000 people. She has published a hardback book on the subject as well as a military guidebook. Ann Marie is a 1983 graduate of Georgia Tech and resides in Lewisville, TX with her husband Tom and daughter Rachel.

-

Denver Chapter News

Two members of the Denver Chapter were selected to make presentations at Denver Tech Week Conference held in September. ♦
Sam Keene presented Six Sigma Contributions to Product Design and
Thomas Basso presented Reliability Considerations to the Electrical
Grid Reliability.



Report by Singapore REL/CPMT/ED Chapter (Nov 2006)

1. Short Courses

- 6 November 2006, “Thermal Test Methods for Integrated Circuits” by **Bernie Siegal**, *Thermal Engineering Associates Inc, USA*.

2. Distinguished Lectures

- 2 August 2006, “Post-breakdown Conduction in Ultra-thin Gate Oxides: From Physical Models to Circuit Applications”, **Prof. Enrique Miranda**, Electronics Engineering from the Universitat Autònoma de Barcelona (UAB), Spain.
- 7 November 2006, “Key Differences between EU RoHS and China RoHS”, **Dr. John Lau**, ASME Fellow, IEEE Fellow.

3. Technical Talks

- 28 August 2006, “Advanced Gate Stack for Nano Silicon Devices”, **Dr. Yu Hong Yu**, IMEC, Belgium.

4. Conferences

EPTC2006

The 8th Electronics Packaging Technology Conference (EPTC 2006) will be held on 6-8 December 2006 at the Pan Pacific Hotel Singapore. It is an international conference event organized by the IEEE Reliability/CPMT/ED Singapore Chapter, sponsored by IEEE CPMT Society. EPTC 2006 will feature technical sessions, short courses and exhibitions. The conference has received a total of 194 abstract submissions coming from 22 countries and the Technical Committees will complete the abstract reviews by 31 July 2006. Further details can be found at the conference website (<http://www.eptc-ieee.net>).

5. Others

Educational Activities for Students

- The Chapter donated a sum of S\$400 for one student activity organized by the Student Chapter of the National University of Singapore (NUS) branch. The Macromedia Flash Course and Flash Presentation Competition was organized by the NUS Student branch on 19th, 20th & 23rd October.



EDS 2006 Best Chapter of the Year Award

- Zhou Xing (EDS ADCOM member) represented the REL/CPMT/ED Chapter to receive the EDS 2006 Best Chapter of the Year Award on behalf of Chapter Chair Wilson Tan during the recent ADCOM meeting held in San Francisco on the week of 10-14 Dec.



Zhou Xing receiving the EDS 2006 Best Chapter of the Year Award

Reliability Society 2005 Best Chapter of the Year Award

- Our Chapter also recently won the Reliability Society 2005 Best Chapter of the Year Award, as announced on 23rd August 2006, and ranked ahead of the Dallas Chapter (2nd) and Boston Chapter (3rd).

Meetings

- Dr. Alastair Trigg represented IPFA06 as General Chair & the IPFA Board to attend the ISTFA'06 conference/meeting held on 12-16 Nov 2006 in Texas, USA.

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

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

Minnesota Reliability Consortium ♦ or the Twin Cities Reliability Society

MRC Report for Fall, 2006 ♦

During the fall of 2006 year the Twin Cities chapter of IEEE RS held a planning meeting August 17 for the 3 officers and 4 directors. This led to the formation of an excellent fall lineup of speakers.

In September, 2006, Barbara Ashley, Corporate legal council for Medtronic, spoke on ♦Avoiding the Legal Process♦. Twenty six people attended and took notes.

On October, 17, 2006, Reggie Robinson, trainer for Medtronic, spoke on ♦Triz: Funtional Modeling and Trimming♦. Twenty six people attended and asked lots of questions about Triz and how it integrates into the reliability tool kit.

A special November, 1, 2006, was devoted to Dr Wayne Taylor, well know Six Sigma expert, talking about ♦Tolerance Analysis for reliability enhancement.♦ Thirty-one people attended our largest session this year.

Our regular November, 21, 2006, meeting will be by Mingxiao Jiang, of Seagate speaking on ♦Accelerated Life Test of small actuators♦ This will be our last session until the new year.

The winter will have a plant tour as well as a special event.

The website for the Twin Cities RS chapter can be reached at their website

<http://www.tc-ieee.org/content/view/33/53/>

Contact James McLinn at 763 498-8814 or JMReL2@Aol.com for more details of Chapter activities.



- 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



◆
PHM Sessions at RAMS 2007
January 22 - 25, 2007
Rosen Shingle Creek Resort & Golf Club
Orlando, Florida

◆ January 2007 is fast approaching and that means that it is time for the Reliability and Maintainability Symposium (*Web: <http://www.rams.org>*).◆ The theme for RAMS 2007, the 53rd Annual RAMS◆, is◆ Reliability and Maintainability in the New Frontier.◆◆ The R&M discipline is being challenged as never before.◆ In addition to the need for highly reliable and maintainable equipment, there are now the challenges of working the terrorism and electronic commerce angle.◆ Continued globalization has also increased the demand for reliable products.◆ These products are designed, manufactured, and marketed by brand without regard to country of design or manufacture.◆ R&M must help facilitate the processes and strategies to work and compete in the enlarging global markets.

◆ One of the areas that can supplement and aid the availability of the equipment is Prognostics and Health Management.◆ On-Condition Maintenance and known health status can greatly aid turnaround times and maintenance planning thus lowering overall operational and supportability costs.◆ This year, RAMS will dedicate three sessions to PHM technology.◆ These sessions are defined below:

◆
10:15 AM ◆ 12:15 PM, Tuesday

Session 6A Catlin A-1

HEALTH MANAGEMENT SYSTEMS-AN ENABLER TO AVAILABILITY

Moderator: Dennis R. Hoffman, Lockheed Martin Aeronautics

Increasing Mission Effectiveness with Diagnostics/Prognostics

**6A1 EMBEDDED DIAGNOSTICS ENABLE MILITARY GROUND VEHICLE
AUTONOMIC LOGISTICS**

Jeffrey Banks, Penn State Applied Research Laboratory

Development/Implementation of HMS in a HEMTT Vehicle

6A2 REAL TIME CONSEQUENCE ENGINE

Daniel Briand and Dr. James E. Campbell, Sandia National Laboratories

Increasing Mission Effectiveness Using HMS tool to Predict Maintenance Needs

6A3 ENERGETIC MATERIAL/SYSTEMS PROGNOSTICS

David K. Han, Dr. Michael G. Pecht, PE, and Davinder K. Anand, University of Maryland

Developing Robust Prognostic Techniques for Energetics

6A4 ELECTRONIC PROGNOSTICS FOR COMPUTER SERVERS

Aleksey Urmanov, Sun Microsystems

Electronic Prognostics (EP) relates measurable precursors of failures to remaining-useful- life predictions for electronic systems, and when coupled with condition-based maintenance, EP promises to substantially increase system availability while reducing Un-trouble-found events.

◆
1:30 PM ◆ 3:30 PM, Tuesday

Session 7A Catlin A-1

HEALTH MANAGEMENT SYSTEMS-AN ENABLER TO MISSION ASSURANCE

Moderator: Joseph A. Dzekevich, Raytheon

Justifying, Developing & Integrating HMS in Systems

**7A1 COST BENEFIT ANALYSIS FOR ASSET HEALTH MANAGEMENT
TECHNOLOGY**

Jeffrey Banks, Penn State Applied Research Laboratory

An HMS ROI Methodology - Key for Management Action

7A2 PROGNOSTICS IMPLEMENTATION METHODS FOR ELECTRONICS

Jie Gu, Nikhil M. Vichare, Terry Tracy, and Michael G. Pecht, University of Maryland

Selecting the Optimum Level (component/circuit card/system) for ePHM

7A3 INTEGRATED MANAGEMENT OF SYSTEM HEALTH IN SPACE APPLICATIONS

Dr. Karl M. Reichard, Eddie C. Crow, and Timothy D. Bair, *The Pennsylvania State University*

Integrated Management of System Health in Space Applications

7A4 DIAGNOSTICS TO PROGNOSTICS ♦ A PRODUCT AVAILABILITY TECHNOLOGY EVOLUTION

Keith M. Janasak and Raymond Beshears, *Raytheon*
Diagnostics/Prognostics Development, a Phased Activity



3:45 PM ♦ 5:45 PM, Tuesday

Panel 8A Catlin A-1

HEALTH MANAGEMENT SYSTEMS - SUCCESSES IN INDUSTRY / CHALLENGES TO FUTURE

Moderator: Jim Lauffer, *DSI International*

HMS, Current Research Activity to Today's Fielded HMS Capability

Panelists:

Kenny Gross, *Sun Microsystems*

Pat Kalgren, *Impact Technologies*

Ernie Waldron, *GE Medical*

Dave Tyler, *Institute: AAC*

Dr. David Mortin, *AMSAA*



Attend RAMS 2007 in January, learn, and make contacts. ♦ See you there.

FINAL CALL FOR PAPERS DEADLINE EXTENDED!!

www.ieee-portable.org/2007



IEEE PORTABLE 2007 seeks technical papers tutorial presentations, panel discussions, and trade-show-like demonstrations on different aspects of PID engineering



Schedule Paper Submissions:

Full-Length Paper Due: **15 September 2006**

Notification of Full Paper Acceptance: **15 November 2006**

Final Papers Due: **6 January 2007**



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.



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



To unsubscribe from this IEEE Communications Society Meetings and

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and the list name (IEEEPortables@comsoc.org) to

ComSoc List Removal - IT

3 Park Avenue, 17th Floor
New York, NY 10016 USA

CALL FOR PAPERS

2007 IEEE Sensors Applications Symposium

6-8 February 2007

San Diego, California, USA

www.sensorapps.org

The 2007 IEEE Sensors Applications Symposium (SAS-2007) provides a unique forum for sensor users and developers to meet and exchange information about novel and emergent applications in smart sensors, biology, homeland security, system health management, and related areas. Collaborate and network with scientists, engineers, developers and customers, in a balance of formal technical presentations, workshops, and informal interface meetings-

A unique feature of this conference, found nowhere else.

SAS-2006 had the following tracks:

Sensors:

- ◆ Smart sensors and standards (IEEE 1451.X)
- ◆ Wireless and networked sensors
- ◆ Biosensors
- ◆ MEMS and nanosensors
- ◆ Virtual sensors

Sensor Applications:

- ◆ Homeland security
- ◆ Multisensor data fusion
- ◆ Nondestructive evaluation and remote sensing
- ◆ Integrated system health management (ISHM)
- ◆ Commercial development

Additional topics for workshops and new session tracks are especially welcome-please contact the Program Chairs.

Important Dates:

- ◆ 01 October 2006:
- ◆ 01 December 2006:
- ◆ 01 January 2007:

- ◆◆◆◆ Abstract submission deadline
- ◆◆◆◆ Notification of acceptance
- ◆◆◆◆ Final manuscript submission deadline

For Additional Information:

John Schmalzel
General Chair
+(856) 256-5332
j.schmalzel@ieee.org

◆◆◆◆ Shreekanth Mandayam
◆◆◆◆ Vice Chair
◆◆◆◆ +(856) 256-5333
◆◆◆◆ shreek@ieee.org

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Visit the Sensors Applications Symposium website at: <http://www.sensorapps.org>

**CALL FOR AWARDS NOMINATIONS -
IEEE Nanotechnology Council**

The IEEE Nanotechnology
Council is calling for
nominations for 3 awards

- Pioneer Award
- Early Career Award
- Distinguished Service Award

to be presented at IEEE NANO
2007 in Hong Kong. All
nomination material including
reference letters should
reach the NTC awards
committee by October 15 2006.
Call for Nominations,
Nomination Form and Awards
Committee Roster can be found
online at the ARCNN web page

[http://www.ausnano.net
/content/IEEE-NCA](http://www.ausnano.net/content/IEEE-NCA)

Please send
nominations(electronic and
one hard copy) with
supporting material to Prof
Chennupati Jagadish, IEEE NTC
Awards Committee, Research
School of Physical Sciences
and Engineering, The
Australian National
University, Canberra, ACT
0200, Australia, Email:
c.jagadish@ieee.org



Call for Papers

1st Annual IEEE Systems Conference

April 9-12, 2007

Hyatt Regency Waikiki, Honolulu Hawaii USA

V7

Conference Theme

The theme of the IEEE Systems Conference is Engineering Complex Integrated Systems and Systems-of-systems – Implications for Systems Engineering, Systems Integration, and Systems Thinking.

Background

The IEEE Systems Council facilitates interactions among communities of interest on system-level problems and applications. System-level thinking is essential in the world today, not only for technical systems but also for society at large. The Council addresses the discipline of systems engineering, including the issues and complexities of system-level and system-of-systems applications, focusing on the total systems effectiveness of complex integrated systems of national and global significance.

Conference Objectives

This conference seeks to create an interactive forum for the advancement of the practice of system design, development, and management, across the multiple disciplines and specialty areas associated with the engineering of systems. The conference will provide a venue for systems engineering practitioners, managers, researchers, and educators to exchange innovative concepts, ideas, applications, and lessons learned addressing:

- Applications-oriented topics on large-scale systems and system-of-systems in topics noted below
- Systems engineering, education, standards, processes and methodologies for the system-of-systems environment
- Research opportunities and results relating to system-of-systems

Topic areas for consideration include:

- System architecture, especially at the system-of-systems level
- Engineering systems of systems including risk management
- Systems reliability
- Engineering Processes for the system-of-systems design environment
- Systems engineering quality management
- Systems modeling & simulation
- Systems Verification and Validation
- Systems engineering education and training
- Program/Project management for system-of-systems
- “Systems thinking” benefits
- Technology transfer between academia and industry
- Societal and Political impacts of systems and systems design
- The impact of systems engineering on other engineering fields
- Systems considerations such as:
 - Disaster response

- Energy management & sustainability, including renewable energy
- Communications systems
- Medical systems
- Gaming and entertainment systems
- Transportation Systems
- Global Earth Observation
- Sensors integration and Application for a Net-centric environment
- Large-scale systems integration in any application area

We invite authors to submit short (not to exceed 750 words) abstracts of proposed technical papers. Abstracts must fully describe the planned content. Abstracts must include the following administrative information: paper title, author's name(s) and title, e-mail address, phone number(s), mailing address and organization.

Abstracts should be submitted electronically to the Technical Program Chair, Paul Croll, at pcroll@csc.com

IMPORTANT MILESTONES:

Abstract Submission Deadline: **November 01, 2006** *Deadline Extended*

Acceptance Notification and Author Instructions: **November 30, 2006**

Submission of Camera-Ready Papers: **February 01, 2007**

<p>Technical Program information contact: Paul R. Croll, Technical Program Chairman Computer Sciences Corporation 5166 Potomac Drive King George, VA 22485 (540) 644-6224 pcroll@csc.com</p>	<p>Conference information contact: Bob Rassa, General Chairman Raytheon Company 2000 E. El Segundo Blvd, MS R01/B523 El Segundo, CA 90245 (310) 334-0764 RCRassa@raytheon.com</p>
--	--

About the IEEE Systems Council:

The IEEE Systems Council is the newest Technical Activities Board organization and was formed in June 2005. The Field of Interest for the Council follows:

This Council integrates IEEE activities regarding aspects of multiple disciplines and specialty areas associated with the engineering of systems. This Council covers, but is not limited to the following:

- *Systems engineering, education, standards, processes and methodologies*
- *Modeling, simulation and integration related to design, testing, production and support*
- *Design aspects for robust design, human factors, safety, security and usability*
- *Transition of products from design to production, deployment and use*
- *Quality control and system management*
- *Program/product/project management interactions*
- *Risk Management*
- *Systems Architecture*

Member Societies of the Council are:

§ Aerospace & Electronic Systems (AES) § Systems, Man & Cybernetics (SMC) § Engineering Management (EMS) § Instrumentation & Measurement (IMS) § Circuits And Systems (CAS) § Microwave Theory & Techniques (MTT) § Computer (CS) § Communications (ComSoc) § Oceanic Engineering (OES) § Computational Intelligence (CIS) § Product Safety Engineering (PSES) § Power Electronics (PELS) § Control Systems (CSS) § Reliability (RS) § Robotics & Automation (RAS)



Call for Papers

11th Annual IEEE International Symposium on Consumer Electronics (ISCE 2007)

June 20th-23th, 2007, Dallas, Texas, USA
www.isce2007.dallasces.org

Planning Committee

Chairman

William Lumpkins

Vice-Chairman

Sam Broyles

Technical Committee Chairs

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Dr. Peter Raad
Dr. BaoWei Ji
Dr. Cy Cantrell
Dr. Sue Hui
Dr. Clement Cervenka

Secretary

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Daniel Wu

International Liaisons

Dr. Simon Sherratt
Sang Young Youn

Website

www.isce2007.dallasces.org

Request for Information

isce2007@dallasces.org

In cooperation with the IEEE Consumer Electronics Society, IEEE Dallas Section, and IEEE Consumer Electronics Dallas Chapter

From the heart of the Telecom Corridor® area, the Dallas Chapter of the IEEE Consumer Electronics Society brings together international experts, educators, and colleagues for a four-day symposium of workshops and technical sessions to address emerging technologies and their applications.

Organization

ISCE 2007 will provide a forum for researchers, system developers, and service providers to share ideas, designs, and experiences on emerging technology. ISCE 2007 will be held in Dallas, Texas, USA hosted by the Dallas Chapter of the IEEE Consumer Electronics Society.

Topics of Interest

Digital Rights Management & Security, Broadband Wireless Access, Sensor Networks, Wireless Security, Dependable Networks, Channel Access, Novel Network Protocols, 3G/4G Systems, Internetworking, Automotive, Home Electronics & Communication, Mobile Computing, Internet Applications, Multimedia Video Technology, Audio Technology, RF & Wireless, User and Human Interfaces, Digital Imaging Technologies, Gaming, Home Networking, Home Theater/Video, Wireless Technologies and Emerging Technologies.

Submission

Authors are required to submit a one page abstract for each paper, demo, or poster by February 2, 2007 to isce2007@dallasces.org. The appropriate committee chair will notify each author of their acceptance status by February 16, 2007.

Papers must be submitted by April 27, 2007, to the appropriate committee chair. The length of research papers should not exceed 6 pages. Submitted papers will be peer-reviewed by the technical committee based on originality, significance, technical soundness, and clarity of exposition. Any critical feedback from the technical review committee will be provided by May 11, 2007. The final, camera-ready paper is due by May 25, 2007.

Format

Authors should follow IEEE Proceedings Manuscript submission guidelines and submit PDF files. A link to these guidelines will be provided at www.isce2007.dallasces.org

Publication

Accepted papers will be published in the electronic & paper conference proceedings with an ISBN.

Important Dates for 2007

Abstract Due:	February 2
Notification of Acceptance:	February 16
Complete Paper Due:	April 27
Committee Review:	May 11
Camera Ready Paper Due:	May 25
Symposium:	June 20–23

Location

The Westin Dallas Fort Worth Airport
4545 West John Carpenter Freeway
Irving, Texas 75063, United States

Early Registration (before April 2nd):

Non-Member	\$495
IEEE Member *	\$455
IEEE CE Society Member	\$435
Student Non-Member	\$395
Student IEEE Member *	\$375
Student IEEE CE Member	\$365

Late Registration (after April 2nd):

Non-Member	\$545
IEEE Member *	\$505
IEEE CE Society Member	\$485
Student Non-Member	\$445
Student IEEE Member *	\$425
Student IEEE CE Member	\$415

* includes CE Society Membership

CALL FOR WORKSHOP PROPOSALS

COMPSAC 2007- 31st Annual International Computer Software
and Applications Conference

Beijing, July 24-27, 2007

I'd like to inform fellow members of The IEEE Reliability
Society about an opportunity to propose and run workshops on
the Society related subjects in conjunction with the 31st
COMPSAC.

Workshops of COMPSAC 2007- 31st Annual International
Computer Software and Applications Conference
July 24-27, 2007
Beijing, China

Proposals for workshops are solicited for consideration of
affiliation with COMPSAC 2007. Affiliated workshops will be
held in conjunction and co-located with the conference and
other affiliated workshops.

The deadline for initial workshop proposals is 08 December
2006.

Dec. 15, 2006: Feedback provided to the workshop proposers
Dec. 31, 2006: Final workshop proposal submission

The formats for initial and final proposals are available at
the conference site.
The full CFP is attached.

Enquiries:

Atila Elci, aelci@ieee.org,

T: +903926302843

F: +903923650711

Web address:

<http://conferences.computer.org/compsac/2007/workshop.html>.

Sponsored by: IEEE & IEEE Computer Society



Greetings,

Have a good day. / İyi günler dilerim.

Atila Elci

<http://cmpe.emu.edu.tr/aelci/>

<http://conferences.computer.org/compsac/2006/ESAS.html>

<http://www.sinconf.org/> <http://www.abg-sinconf.org/>

<http://conferences.computer.org/compsac/2007/>

CALL FOR WORKSHOP PROPOSALS

COMPSAC 2007- 31st Annual International Computer Software
and Applications Conference

Beijing, July 24-27, 2007

COMPSAC is a major international forum for researchers,
practitioners, managers, and policy makers interested in
computer software and applications. Starting with 2006,
COMPSAC is designated as the IEEE Computer Society Signature
Conference on Software Technology and Applications. Based on
this designation COMPSAC organizers are able to work with

other key functions of the Computer Society to create more values for the conference volunteers and participants.



Proposals for workshops are solicited for consideration of affiliation with COMPSAC 2007. Affiliated workshops will be held in conjunction and co-located with the conference and other affiliated workshops. The purpose of these workshops is to provide a platform for presenting novel ideas in a less formal and possibly more focused way than the conference itself. As such, they also offer a good opportunity for young researchers to present their work and to obtain feedback from an interested community. Workshop organizers are responsible for establishing a program committee, collecting and evaluating submissions, notifying authors of acceptance or rejection in due time, and ensuring a transparent and fair selection process, organizing selected papers into sessions, and assigning session chairs.

Researchers and practitioners are invited to submit a one-page concept paper proposing a workshop to the 31st COMPSAC Workshop Chair, Atilla Elci (atilla.elci [at] emu.edu.tr), by Dec. 8, 2006. Submission may be made by e-mail with "COMPSAC Preliminary Workshop Proposal" in the subject header and supplying data on the Preliminary Workshop Proposal Format. Feedback will be provided to the workshop proposers by Dec. 15, 2006. An accepted proposal will then be detailed using the Final Workshop Proposal Format by its organizers. Other important due dates are mentioned below.

The selection of the workshops to be included in the final COMPSAC program will be based upon several factors, including the scientific / technical interest of the topics, the quality of the proposal, balance and distinctness of workshop topics, and the capacity of the conference workshop program.

Workshops use the same paper submission system with COMPSAC 2007. Proceedings of the COMPSAC Workshops will be printed as a separate volume by IEEE Computer Society Press to be made available to all conference registrants on site. All workshop papers will as well be electronically available through IEEE Xplore Digital Database. Any further information needed for preparing a workshop proposal can be obtained by contacting the COMPSAC Workshop Chair. 31st COMPSAC web site, too, (<http://www.compsac.org/>) is a source of first hand information.

31st COMPSAC Preliminary Workshop Proposal Format:
(Limited to 1-page, typed double space in 11 pt Times New Roman)

Workshop title: ...
Primary organizers, their affiliation, and contact details:
...
Proposed duration (select one: 1 / 2 / 3 / 4 sessions; 1 session=90 minutes): ...
A statement of goals for the workshop: ...
Workshop theme: ...
Likely participants: ...

31st COMPSAC Final Workshop Proposal Format:

(Limited to 3-pages, typed double space in 11 pt Times New Roman)

Workshop title: ...

Primary organizers, their affiliation, and contact details:

...

Proposed duration (select one: 1 / 2 / 3 / 4 sessions; 1 session=90 minutes): ...

A statement of goals for the workshop: ...

Workshop theme: ...

Likely participants: ...

Description of the workshop: suggested items are as follows: expected achievements, importance, program committee, format (paper presentations, discussion sessions, etc.), plans for call for papers / participation, plans for publicity,...

31st COMPSAC important dates for workshops:

Dec. 08, 2006: Preliminary Workshop Proposal submission

Dec. 15, 2006: Feedback provided to the workshop proposers

Dec. 31, 2006: Final workshop proposal submission

Feb. 23, 2007: Full paper and short paper due

Mar. 15, 2007: Decision notification (electronic)

Apr. 15, 2007: Camera-ready copy and author registration due

Note: The 31st COMPSAC Steering Committee will allocate sessions to each workshop within the constraints of space availability and the likely interest of the attendees in the workshop. Please be advised to organize your workshop early and request for adequate space as soon as your effort turns out to be fruitful. The COMPSAC Workshop Chair will work closely with the primary organizers to ensure a successful workshop.

Issue Date: Oct. 16, 2006.

ESRA PSRA

First Announcement & Call for Contributions

Summer Safety & Reliability Seminars

SSARS 2007

22-29 July 2007
Sopot, Poland

Organisers

European Safety and
Reliability Association
Polish Safety and Reliability
Association

Secretariat

Maritime University
Department of Mathematics
ul. Morska 81-87
81-225 Gdynia, Poland

e-mail: ssars2007@am.gdynia.pl

phone: + 48 58 6901587, fax: + 48 58 6206701

Website

<http://ssars2007.am.gdynia.pl>

Scope & Structure

The annual one-week *Summer Safety and Reliability Seminars* are organised to develop advanced methods of safety and reliability analysis of complex systems and processes and to disseminate the newest achievements in the field. The subjects of the Seminars vary from year to year, as chosen by the Scientific Boards in an effort to dynamically represent the methodological advancements developed to meet the newly arising challenges in the field of safety and reliability.

Contributions are in the form of 1-2 hours lectures on advanced methods (with corresponding full text of up to 12 pages) and technical papers of 20-30 minutes on applications of such methods (with corresponding full text of up to 8 pages).

The extended abstracts of all accepted lectures and technical papers will be collected in the form of SSARS Proceedings to be distributed to the participants as a reference textbook.

Lectures will be presented during the plenary sessions and the technical papers during the seminar sessions. Potential improvements of the works presented will be thoroughly discussed with the aim of achieving the quality for publication in relevant scientific journals.

Location & Appointed Time

The SSARS is to be held annually (or alternatively biannually) at the end of July (22-29) in the neighbourhood of Sopot, the "Summer Capital of Poland".

The hotels to be considered are:

- **Prawdzcic**
<http://prawdzic.com.pl/>
ul. Piastowska 198
80-341 Gdansk/Sopot-Jelitkowo, Poland
e-mail: prawdzic@prawdzic.com.pl
- **RzemieŃnik**
<http://rzemieslnik.pl/>
ul. Piastowska 206
80-341 Gdansk/Sopot-Jelitkowo, Poland
e-mail: biuro@rzemieslnik.pl

Diplomas

Attendance diplomas will be given to the participants, with the possibility of recognition of 5-10 ECTS for PhD students.

Registration

Participants are requested to fill in the Registration Form available on the Website and submit it automatically to the Secretariat.

Contributions

Authors are requested to submit their lectures and papers automatically to the Secretariat using the Website.

The submitted contributions will be reviewed for acceptance by the members of the Scientific Boards. Only those contributions prepared according to the Contribution Template given on the Website will be considered.

Fee

The SSARS Fee is expected to be about 800-900 € and to include: Sessions Attendance, Proceedings, Programme, Accommodation and Subsistence in Prawdzcic and RzemieŃnik Hotels and Organised Social Events (Picnic, Boat Trip to Hel Peninsula, Other).

Language

The Seminars language is English.
No translation will be provided.

Deadlines

- Submission of Registration Form November 30, 2006
- Submission of Lectures & Papers January 31, 2007
- Acceptance of Lectures & Papers February 28, 2007
- Submission of Final Versions March 31, 2007
- Payment of SSARS Fees March 31, 2007
- SSARS Meeting July 22-29, 2007

Scientific Boards

Programme Board - Chairmen

- Members responsible for selecting the annual seminars' topics

Advisory Board

- ESRA and PSRA representatives and selected journals editors

Editorial Board

- Members responsible for the selection of the contributions and for the preparation of the SSARS Proceedings

Invited Professors

- Members responsible for plenary lecturing, seminar session chairmanship, consulting and identifying the potential improvement of the contributions and selecting those improved lectures and papers worthy of publication in scientific journals

Speakers - Authors of Lectures & Papers

- Plenary Session Speakers
- Seminar Session Speakers

Organising Board

- Members responsible for fluently running SSARS Meeting



SSARS 2007

Summer Safety & Reliability Seminars

22-29 July, 2007, Sopot, Poland

Scientific Boards

Programme Board

Chairmen/Co-ordinators

Krzysztof Kolowrocki, Gdynia Maritime University, Poland
Enrico Zio, Politecnico di Milano, Italy,

Advisory Board

Robert A. Ainsworth, International Journal of Pressure Vessels and Piping
John Andrews, Journal on Risk and Reliability
Alfred Brandowski, Polish Safety and Reliability Association
Jerzy Girtler, Polish Maritime Research
Carlos Guedes Soares, Reliability Engineering and System Safety
Napat Harpornchai, International Journal of Materials and Structural Reliability
Jerzy Jazwinski, Exploitation Problems of Machines
Way Kuo, IEEE Transaction on Reliability
Guoping P. Liu, International Journal of Automation and Computing
Christian N. Madu, International Journal of Quality and Reliability Management
Ioannis A. Papazoglou, European Safety and Reliability Association
Hoang Pham, International Journal of Reliability, Quality and Safety Engineering
Zbigniew Smalko, Archives of Transport

Editorial Board

Vladimir Aleshin, Russia
Agnieszka Blokus-Roszkowska, Poland
Marko Cepin, Slovenia
Jose Caldeira Duarte, Portugal
Bozena Kwiatkowska-Sarnecka, Poland
Krzysztof Kolowrocki, Poland
Pierre-Etienne Labeau, Belgium
Uwe K. Rakowsky, Germany
Tadeusz Salamonowicz, Poland
Vadim Seleznev, Russia
Joanna Soszynska, Poland
Enrico Zio, Italy

Speakers & Session Chairmen (Topics)

Plenary Session Speakers and Seminar Session Chairmen Invited Professors

Peter van Gelder, Delft University, Netherlands (Natural Hazards Analysis and Environment Protection Modelling)
Olgiard Hryniewicz, System Research Institute, Poland, (Reliability and Safety Data Collection and Analysis)
Nikolaos Limnios, Universite de Technologie de Compiègne, France, (System Safety and Reliability Modelling, Dependence, Dynamic Reliability)
Marvin Rausand, Norwegian University of Science and Technology, Norway, (Risk Assessment and Management)
Enrico Zio, Politecnico di Milano, Italy, (Maintenance Modelling and Optimisation)

Seminar Session Speakers

Authors of Contributed Lectures and Papers

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Organising Board

Agnieszka Blokus-Roszkowska
Tymoteusz Budny
Sambor Guze
Bozena Kwiatkowska-Sarnecka
Joanna Soszynska