Reliability Society Newsletter

October, 1977

President's Message

I attended the 1997 IEEE - USA Professional Activities Conference held in Florida over the Labor Day weekend. What are professional activities? They range from career enhancement activities (resume writing, effective communications, team training, etc.) to portable pensions, Engineering registration and licensure. This years conference had several sessions occurring concurrently, from "Planning your PACE activities" to "Handling office politics." (PACE, Professional Activities Committees for Engineers)

Society Presidents and Division Directors were informed that although IEEE-USA sponsors this yearly conference, professional activities are a worldwide interest and concern. Several polls conducted within IEEE indicate that non-US members want professional activities in addition to the technical programs they are accustomed to. Some Societies are including professional activity topics in their technical conferences, others are starting Consultant Networks within their societies.

Bob Gauger is our PACE representative and has submitted Newsletter articles informing us of PACE activities and news of general interest. He has arranged for the PACE display to be at the 1997 RAMS conference in Philadelphia, and is looking for more ways to enhance our PACE activities with the Society. If you have any ideas or would like to get involved, please contact myself or Bob.

There are many activities occurring within the Society, many of which are described elsewhere in this newsletter. Many of the activities occur through the technical committees such as standards, videos, etc. Two new technical committees have been formed this past year: Reliability Predictions (chaired by Sam Keene) and Reliability Physics (chaired by Marsha Abramo) and several of the committees have been revived by new chairmen. The annual Technical Operations Committee meeting, coming up in October, will detail the activities of the committees and encourage new projects like standards, videos, courses, etc. For those interested in participating, contact Ken LaSala.

Filming is complete on the Societies third video, *Designing Systems for Reliable Human Performance*, due for release later this year. Sam Keene, video coordinator, is already planning for the next two videos. Contact Sam if you have ideas or want more information. The Society ran a contest last year to select a new Logo. Several entries were received, but the selection committee voted to re-open the contest and create criteria by which the logo should represent the society the best. A new logo team has been selected and details on the new contest will be announced shortly.

I have been invited to speak by the Tokyo Chapter and am looking forward to visit them in December. Thank you, Tokyo Chapter, for the invitation.

I encourage everyone to get involved. Involvement doesn't require coming to the AdCom Meetings. Several of our communications occur electronically. Our AdCom has an alias, r07-adcom@ieee.org, which Dick Doyle updated for us as our email addresses change. This alias allows the elected AdCom members to stay in touch, and conduct business between AdCom meetings. The Society Webpage, which recently was migrated onto the IEEE server, contains information on the activities and people involved in the society. Bob Loomis, our Webmaster, is looking for ideas to enhance the Webpage and make it more beneficial to our members. The address is http://www.ieee.org/society/rs. Any ideas, contact Bob or myself.

Loretta Arellano
Reliability Society President

Editors Column

This is my first attempt at editing more than a small portion of the news letter, not to mention the advertising and publication tasks. While I always knew Bruce Bream was doing an outstanding job as our editor , my new perspective has given me an even greater appreciation for the tremendous effort he has

expended on our behalf. So bare with me as I attempt to follow his example. Any recommendations or comments on improving the newsletter, my editing included, would be greatly appreciated.

This is your news letter any technical articles that would to make the membership aware of new methods or technology are requested. Any views or opinions on the way we, as Reliability engineers, do business would be published in this column as a letter to the editor.

Thanks for your cooperation,
Dave Franklin
Editor

Chapter Activities
Boston Chapter
We began another season with a Monthly Meeting on Sept. 10, with Gene Bridgers of M/A-COM discussing "Benchmarking Planning" as it pertains to reliability engineering activities. Benchmarking has gained widespread appeal in the commercial world - Gene provides some specific examples of how to benchmark, based on his many years of practical experience.

Our annual Fall Lecture Series will be a four night event, two hours per night, entitled "Focus on Physics." The Lecture Series will be held on four consecutive Wednesday evenings starting Oct. 8. The underlying premise behind the "Focus on Physics" is that the reliability engineering professional will benefit from a stronger emphasis on physics, as opposed to more traditional, and perhaps outdated, methods based primarily on MIL-HDBK-217. The Lecture Series will cover a number of topics such as SMT, solder fractures, ESD damage, end of life failures for aluminum electrolytic capacitors, solder creep, and others. Attendees will benefit from the practical experience of a number of reliability and failure analysis experts in the local Boston area.

We also created a new Boston AdCom role this year - that of Data Manager. This position was created to enable us to most effectively use the power and convenience of the Internet for Chapter activities. We will be using our home page extensively to promote our activities, as well as related IEEE events and opportunities. Our home page is: http://www.channel1.com/users/ieee/home.html.

Philip Tsung
PWTsung@aol.com

Cleveland Chapter
Our May meeting was "How to Start a Business." Mr. Ernie Brass talked to us about the importance of planning, business organization, tax requirements, vendor's license, hiring employees, SBA guaranteed loans, small business, collateral required, loan advantages and provided a neat checklist for going into business. With the current climate at NASA many engineers are making career transitions, leaving the Lab and starting their own businesses. We had a packed house with standing room only; very useful material enjoyed by all.

Our July meeting was "The History of American Spaceflight." Mr. Vincent Lalli, NASA Speakers Bureau, talked to children, scout groups, and parents at the NASA VIC. Starting back in 1919, he traced NACA journey to excellence from Dr. George Lewis, who directed NACA research until 1947. Three new laboratories were opened: Moffett Field, Lewis, and Langley Research Centers. Research Programs involving cooperation of several government agencies, prominent manufacturers and universities were explained. In 1958 America entered the space age and NACA became NASA. Major programs like man in space, sending man to the moon, Russian Space Station MIR, and International Space Station were discussed. We look forward to meeting the challenge of our customers. If the next 20 years are like the last 20 years, it should be a very exciting time to be in the aerospace business.

We are helping the RS AdCom with the 98 RAMS Symposium. This is a world class Symposium that is a major service to our members. We hope you can arrange your schedule to attend and enjoy the program with some very interesting tutorials.

All-in-all, here in Cleveland, we are having fun staying active and trying to serve the needs of our members,

Vincent Lalli, Chair
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Dallas Chapter

We are launching into a new program season with a new slate of officers and some interesting programs on board. The new officers are: Timothy Rost, Texas Instruments, Inc., Chair; Rich Dell, Raytheon TI Systems, Vice Chair; David Hannaman, Texas Instruments, Inc., Program Chair; Ted Freeman, Luminator, Membership Chair; Thomas Yohe, Alcatel, Treasurer; Lon Chase, Raytheon TI Systems, Secretary.

I would like to thank the past officers for their efforts in building this society to where it is today. We welcome the new officers and wish them success in their new positions.

The meetings for this chapter are normally on the 3rd Tuesday of each month. The upcoming programs that are scheduled include "Failure Analysis of Electronic Components: Analytical Techniques for Solutions" or "Who Killed Mr. Widget" which should be a fun and informative discussion of the analysis of electronic component field failures by Doug Stolk, President of Metallurgical Engineering Services Corporation, and his son, David.

The October meeting is by Dennis Spencer from Raytheon TI Systems on the "Reliability of Plastic Encapsulated Microcircuits".

We are also participating in the 3rd Annual Workshop on Accelerated Stress Testing that will be in Dallas, Texas, on October 15-17. This meeting is co-sponsored by the Component, Packaging , and Manufacturing Technology (CPMT) Society. This workshop is geared towards helping companies understand how to build reliability into their products and helping them build quality products with an early time to market.

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Los Angeles Chapter

Accelerated Life Test Techniques for Electronic Devices was presented by Mr. Richard Fettig at our June meeting. He explained how accelerated life testing techniques provide a method to investigate the reliability of electronic devices under extreme operating conditions with a mathematical relationship to normal operating conditions. This involves use of the Arrenhius equations, selection of accelerated parameters and accelerated stress levels. The discussion focused on the selection of accelerated stress levels in relation to normal operating conditions (i.e. use of temperature to compensate for aging characteristics), for parts within a circuit, and how careful planning will result in a meaningful accelerated test. This accelerated life approach is meant only to verify the design life of the unit, and not necessarily to precipate a specific failure mechanism.

Mr. Richard Fettig is the founder of Fettig Research Evaluation Enterprises (FREE, Inc.). He has been analyzing digital, linear and RF circuits for over 15 years. He has consulted for many aerospace companies on such programs as F-14, B-2, F-22, Space Station, C-17, 777, SDIS, as well as many commercial products such as network communication servers, communication satellites, etc.

In September we will hear Mr. William Zeller, of GM Hughes Electronics, Systems and Software Division, discuss Intellectual Property rights. Intellectual Property takes a variety of forms. The principal forms are Patent, Trademark, Service Mark, Copyright, Trade Secret, and lawsuit for unfair competition. All are based on the concept that one's intellectual work product has a value and is deserving of protection. If anyone should be recompensed for it, you should. Juxtaposed to this idea is the societal interest in availability of ideas or their manifestation. If you have a legally prosecutable interest in your intellectual property and someone else usurps it, i.e. without your permission, you should be able to sue. The starting point is the principle that you can't protect a mere idea. But if that idea is suitably embodied, i.e. in a recognized legal device, you can protect it. The issue of context is important. It's one thing if you're an inventor working in your own garage versus an employee creating a device on your employer's premises and time, and using your employer's assets. What if you have signed an agreement that your inventions belong to your employer? What's covered by employer/ employee agreements? Patents? Copyrights? or ? The talk will raise issues and discuss them. Don't expect final answers though, and please do not expect legal advice. That can only be given in the context of an attorney/client relationship.. If you have questions regarding your legal rights in regards to patents or other areas of intellectual property, you are urged to consult a legal specialist in these areas.

Bill Zeller has a degree in Physics from the University of California at Berkeley. Since then he has spent more than 20 years in aerospace. Some of these years were as a microwave tube design engineer. Later years were principally in Reliability Engineering. In the middle of all this, he went to Loyola Law School where he received a Juris Doctor degree.

Our November meeting will feature Mr. Fred Karlen, author, Academy Award and Emmy winning composer and musician speaking on Computer-Aided Music Composition for Film and Television. How does a modern composer create musical scores for movies and television with the demands of technology and performance in today's media industry? Modern production requirements virtually demand the intimate involvement of computer-aided composition in order to meet tight schedules and close audio-visual integration.

Composer, musician, author, Fred Karlen will describe the work methods and creative process involved in scoring a film or television project and the critical role that computers play in that process. He will explain the motivation behind the creative decisions made by composers and film makers in the use of music and will illustrate his talk with many audio-visual excerpts of his work. He will be accompanied by a colleague who is an expert in MIDI, musical instrument digital interface, technology, who will explain MIDI issues and demonstrate audio-visual synchronization techniques.

Fred's awards include: The Academy Award, Best Original Song, "For All We Know," from Lovers and Other Strangers; an Emmy for Best Original Score, The Autobiography of Miss Jane Pittman; NAACP Image Award for Best Original Score, Minstrel Man; Grammy Nomination for Best Original Soundtrack, The Sterile Cuckoo (featuring "Come Saturday Morning") with an additional 4 Academy Award Nominations and 12 Emmy Nominations. He has credits for thirty motion picture scores, including: Up the Down Staircase, The Stalking Moon, The Sterile Cuckoo, Westword, Futureworld, Lovers and Other Strangers, Leadbelly; and over one hundred television programs, including the miniseries: Robert Kennedy and His Times, The Awakening Land, Inside the Third Reich, Ike: The War Years, Dream West. Books he has written on the subject include: On the Track: A Guide to Contemporary Film Scoring (1990; w/ Ray Wright); This book is the definitive text on the subject, referred to as "The Bible" by teachers, professionals, and students all over the world. Listening to Movies: The Film Lover's Guide to Film Music (1994). He has recently produced and directed a documentary, Film Music Master: Jerry Goldsmith. Fred designed, created, and has taught the annual ASCAP, Fred Karlin Film Scoring Workshop, since 1988. He has released two CDs and been featured on trumpet by the American Jazz Philharmonic.

For information on future LA Chapter programs contact the LA Council Homepage http://www.ieee-lac.org /ieee-lac/.

Dave Franklin

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Philadelphia Chapter

At our May meeting Dr. Michael P. McCann presented, Use of Computer-Aided Image Analysis in Developmental Systems. Recent advances in charge coupled device (CCD) camera technology, as well as in optical scanner systems, allows for easy analysis of a variety of parameters in biological systems. This talk focused on the application of these technologies to the quantification of amounts of DNA in nuclei of pathogenic fungi and in the quantification of protein synthesis rates in a bacterial developmental system.

Our second presenter, Mr. Carl Tuschak, talked about the CYPRIS_ - A High Performance Cryptoprocessor. The Cryptographic Reduced Instruction Set (CYPRIS) microprocessor is a high performance, multi-algorithm cryptoprocessor. It was specifically designed to achieve up to 40Mb/s for a wide range of Type-1 crypto-algorithms. Traditional cryptographic devices implement a single algorithm that is hardwired to the device. However, CYPRIS provides the flexibility of changing algorithms in real-time in response to the user's communication demands. The most distinguishing feature of CYPRIS is the combination of a cryptographic and a RISC CPU. CYPRIS can achieve rates of up to one bit per clock, and a user can quickly reconfigure for a new algorithm under software control. The RISC CPU is a 16-bit microprocessor core design with a four stage pipeline. A new instruction enters the pipeline each clock cycle. Clock cycle stretching can be programmed for slower I/O. The CPU can efficiently interact with a variety of memory-mapped function units or accelerators.

Fulvio E Oliveto
Philadelphia Section
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Tokyo Chapter

It is our greatest pleasure and honor to announce that our President, Ms. Loretta Arellano, will visit the Tokyo Chapter for the first time in our history, and will give two Special Lectures to our members in early December this year. This special event is supported jointly by IEEE Reliability Society, IEEE Tokyo Section, IEEE Reliability Society Tokyo Chapter and Kyoto University. Details are as follows: Special Invited Lectures by Ms Loretta Arellano, President of IEEE Reliability Society, on Reliability, Maintainability, Supportability and System Safety (RMSS) as it relates to Systems Engineering, will take place first in the afternoon, December 2nd, 1997 at Tokyo University of Mercantile Marine, Tokyo and second in the afternoon, December 4th, 1997, at the Department of Aeronautics and Astronautics, Kyoto University, Kyoto. Admission is free to both members and non-members.

In addition to the above, some other social events are planned. Among them, a welcome and get-acquainted party is scheduled on December 2nd after the Special Lecture in Tokyo.

You are cordially invited to join these events. Each member of the Tokyo Chapter will receive an invitation to the events directly by mail in September.

For more information, please e-mail the Chairman of Tokyo Chapter, or visit our new Internet WWW home page at http://launcher.g-search.or.jp/ieeetokyo/r.htm (in Japanese), or http://launcher.g-search.or.jp/ieeetokyo/r_e.htm (in English).

Koichi Inoue, Chairman
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Request from Membership V.P.

Send me your E-mail Address

We have a great Society with many active and knowledgeable Reliability Engineers. With our IEEE communications (E-Mail) technology we should be able to communicate freely. However, there is a

limitation that can be corrected.. Our Database for all the Reliability Society does not contain E-mail addresses for all our members.

Please send me your E-mail Address to: jadams@pfizer.com as soon as possible.
In return I will update our Database with your addresses. Then I will E-Mail a Membership list with the new E-mail addresses to each Chapter Chairman.

BENEFITS: Each Chapter can then get Meeting Notices out to their members quickly with easy replies from each member. Ideas about what the meetings should cover can also be gathered from all the Chapter members.

Bottom Line: As Engineers, we should make use of this convenient and nearly free mode of communication, E-Mail. Your quick responses are needed to do this: (Send me your E-Mail Addresses now!)

John Adams
Membership V.P.

AdCom Meeting Minutes
Turf Valley Resort Hotel and Conference Center, Ellicott City, July 19, 1997

Attendance:

NAME	ADCOM Position
Loretta Arellano	1997 President
Harry Ascher	Guest
Joe Caroli	DSC Chair
Dave Franklin	ADCOM Member
Bob Gauger	PACE
Paul Gottfried	VP Publications
Christian Hansen	Chair, Advanced Reliability Techniques
Henry Hartt	Liaison, RAMS VC
Dennis Hoffman	VP Meetings
Richard Kowalski	Treasurer
Ken LaSala	VP Technical Operations
Naomi Mcafee	'98 RAMS Chairperson
Dev Raheja	IEEE President
Marvin Roush	Speakers Committee
Bud Trapp	Member-Chapter Coordinator
Bill Wallace	Test & ESS
Rick Wells	Guest

Loretta Arellano called the meeting to order and went over the agenda.. The. Minutes of the 4/6/97 AdCom meeting were reviewed and approved.

The next AdCom meeting will held on Saturday 10/4/97 in Albuquerque, NM at the Albuquerque Marriott preceded on Friday 10/3/97 by a meeting of the Technical Operations Committee. The AdCom banquet will be on Friday evening.

Future AdCom meetings will be on 1/18/98 at the Anaheim Marriott, Anaheim, CA and on 3/29/98 at the Reno Hilton, Reno, NV. The 1/18/98 meeting will be held in conjunction with the RAMS Symposium and will include an ADCOM/Awards banquet. The 3/29/98 meeting will be held in conjunction with the IRPS Symposium and will include an ADCOM/Chapter Awards banquet.

The Reliability Society will be co-sponsoring the International Conference on Probabilistic Safety Assessment and Management (PSAM 4) to be held September 13-17, 1998.

Membership. Loretta Arellano presented the membership report from John Adams. There were 3160 active (paid up) members in the Society as of 6/15/97. Increased efforts will be necessary to maintain our membership. Several ideas were presented including proceeding with the development of a brochure promoting the Reliability Society, consistently sending second and third follow-up membership renewal notices, asking for suggestions to improve the Society in renewal notices, and sending welcoming letters to new members.

Publications VP, Paul Gottfried reported that there is still a need for good papers to be submitted for the Transactions. The current backlog is low, and recent editions have been running with approximately 20 pages less than planned per issue.

A special section of the edition of the Transactions preceding the 1999 RAMS symposium will be published celebrating the 50th anniversary of the Society. Tony Coppola will be the Editor.

All Society members are encouraged to write editorials for publication in the Newsletter as they see the need.

Dick Kowalski presented the Treasurer's Report. We are on budget and we were able to add to our reserve account with the IEEE..

The Technical Operations report by Ken LaSala informed us that Christian Hansen has succeeded Tony Coppola as Chairperson of the Advanced Reliability Techniques Committee giving Tony the time needed to prepare the special issue of the Transactions. **A Chairperson is needed for the Energy Systems Committee, and people are needed to replace current Chairpersons on the Maintainability, Nuclear, and Vehicular Committees. All members are encouraged to recommend candidates to Ken LaSala. Please verify the persons willingness to serve before making the nomination.**

There are now 17 people serving on the Test and Screening Committee. (Outstanding!).

The new Physics of Failure Committee established at the April 1997 AdCom meeting has begun activity. The Nuclear Committee and a number of the other Committees have seen increased activity during the last quarter as well. The Energy Systems Committee is still inactive. (No Chair.)

The Human Reliability video development went well; IEEE staff provided good support for the effort. Ken gave Sam Keene a copy of the lessons learned.

The Speakers List: Marvin Roush, reported, is expanding.. **Anyone wishing to be listed as a speaker or to recommend someone to be listed as a speaker should contact Marvin Roush**.. Marvin also discussed the University of Maryland's graduate Reliability Engineering programs. The classes may be taken by video tape or by direct satellite links; however, a year on campus is necessary for the dissertation required for Ph.D. programs. MS in Engineering, MS in Science, and Ph.D. degrees are offered. The programs are "portable" through the use of video tapes and direct TV links.

Joe Caroli. presented the status of the standards development activities, which are making progress. The AdCom requested Joe to take the following action items to address their concerns related to the rate of progress.

1. Encourage the chairperson to set a completion date for the Reliability Program standard. (There is another Society preparing a competing Reliability Program standard.)
2. Determine the full membership of the committees.
3. Determine which members did not respond to the balloting on the Reliability Program standard and why.
4. Determine who are on the ballot groups for each of the standards.
5. Call a meeting of the standards development working groups. It was recommended that the meeting be held in conjunction with the Technical Operations Committee meeting preceding the October AdCom meeting in Albuquerque.
6. Conduct a survey on the Web asking what we should be doing in the standards development area, and publish the results in the Newsletter.
7. Provide AdCom the opportunity to look at PARs before they are submitted to the standards board.

Joe Caroli also discussed the status of the Reliability Society relationship with the Partnership in RMS Standards Consortium, and will look in to the possibility of expanding our role. The Reliability Prediction standard development effort will be moved under Sam Keene's committee.

The Nominations Committee. report was presented by Loretta Arellano. She discussed the nominations process and results.. Headquarters will again do our balloting for us for the upcoming elections.

Loretta Arellano discussed the status of the **video program**. We now have a signed contract with Headquarters for the Human Factors video. Henry Hartt reported that the RAMS committee is investigating taping of RAMS sessions during 1998 RAMS symposium this year. Loretta will ask Sam Keene to discuss the matter with Rick Jones.

Bud Trapp's Chapter Activities report was encouraging. There is interest in establishing new Chapters in Orlando and in San Diego. Bud discussed the success experienced by the EDS in establishing new Chapters and some of the practices that have contributed to their success. The EDS has established 30 new Chapters in the last few years. Bud recommended that we do similar things to improve our success.

RAMS Financial Status. Naomi McAfee presented an overview of the RAMS financial situation. A surplus is expected this year, but attendance has steadily declined since 1989.

PACE Activities were reviewed by Bob Gauger. Bob went over the responsibilities of the PACE Chair and summarized the PACE activities. Through PACE, Reliability Society members receive the benefits of the PACE Display (a really nice display, which is available for symposia and seminars), the PACE Newsletter, the Salary Survey, the Consultant Directory (A new issue has just been completed. Bob gave a copy to the AdCom members present.), and employment assistance through the IEEE Employment Service.

Loretta Arellano presented an item from the TAB, Technical Activities Board, regarding the Design for Manufacturing Engineering (DME) Committee. The TAB no longer has funds to support committees; they must now be fully supported by the Societies. Accordingly, Loretta asked the ADCOM to consider bringing the DME Committee under the Reliability Society sponsorship. Loretta will follow-up on the matter before the next TAB meeting in November.

The Reliability Society Web Page is now on the IEEE system. The address is: http://www.ieee.org/society/rs.

The Fellow Committee report from Thad Regulinski was presented by Lorreta Arellano. There have been 3 Fellow nominations and six other requests for Fellow nomination packages or information, some of which are from the Tokyo Chapter, which is relatively new. The committee is taking action on the three nominations. Nomination packages were sent in response to the other requests.

Loretta Arellano initiated a discussion of the subject of Reliability Society President visiting Chapters at home and abroad in response to a request from the Tokyo chapter. They had written Loretta asking how to improve Society participation by the Tokyo Chapter and inviting her to visit for a week in early December. It was a consensus of the AdCom that Loretta should make this visit with others as well. The AdCom further determined that the President should visit Chapters periodically both here and abroad to promote the activities of the Society. Henry Hartt reported that the next meeting of the 50th anniversary celebration committee will be 10/6/97 following the AdCom meeting.

ATT/Bell Labs has written a Stress Testing Handbook and have approached IEEE Press to publish it. The IEEE press requested that the Reliability Society review it. They will publish it based on our recommendation.

The Power Engineering Society has proposed that the Reliability Society consider a project to develop a separate reliability text book addressing reliability as it pertains to each particular field-e.g. autos, power, semiconductors, etc. The IEEE press will be invited to the next AdCom meeting to discuss the project.

A concern was expressed that perhaps we need to look into revising the Reliability Society Field of Interest. Accordingly, a committee was formed to develop recommended revisions to the Reliability Society Field of Interest statement.

There is a need to develop a long term vision and strategic plan (roadmap) for the Reliability Society. It was resolved to form a committee for a limited length of time to lay the ground work. Dennis Hoffman will serve as Chair.

There was a brief discussion on awards including Chapter Chairperson's Certificates and best paper awards.

The recent Reliability Society logo contest produced no entries that considered sufficiently reflective of the Society. Accordingly, it was determined to rejuvenate the old committee and run the contest again.

Call for Papers

In 1999, the IEEE Reliability Society will celebrate the 50th Anniversary of its founding. To mark the occasion, a special issue of the IEEE Transactions on Reliability will be published in December 1998. Contributions are solicited for this special issue.

Articles desired are historical perspectives on reliability specialties such as Electronics reliability, Mathematical Theory, Reliability Education, Space, Reliability Technology, Nuclear Power Plant Reliability, Software Reliability, Maintainability, Reliability Prediction, Physics of Failure, etc.

Potential authors may find the April 1984 Transactions special issue marking the IEEE Centennial useful as a model.

Schedule: Abstracts due to special edition editor on 1 December, 1997. Notification of acceptance provided by 30 December 1997. Draft papers due 30 March 1998. Papers will be refereed, and comments provided to authors. with Final papers due 1 August, 1998.

Special feature - "Call for Memories"

It is planned to include a special feature similar to an expanded letters to the editor section, to present interesting memories of those in the product assurance professions. Your funny, poignant or historically relevant memories are wanted. **Short reminiscences may be submitted at any time up to 1 August, 1998.** Reminiscences will not be refereed, but will be edited to fit the available space.

All submissions should be sent to the special issue editor:

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Using Integrated Circuits in Critical Applications Workshop

Integrated Circuits (ICs) are finding extensive use in products and systems that have extremely high consequences of failure. Example applications include defense systems, medical electronics, communications, transportation, satellites and electronic commerce. Failures of ICs in these applications can result in loss of life, threaten the public safety, imperil the national defense, and/or cause significant financial loss. The challenge of confidently assuring the required reliability without significant cost, performance, or time penalties is growing. Past approaches to developing and qualifying critical ICs (e.g., custom manufacturing, Mil Specs) are becoming less viable. Increasingly, users of critical ICs must rely on commercial products (e.g., the DOE and DOD push to COTS). At the same time, the risk of unknown reliability problems in commercial ICs is growing as diverse functions (DRAM, microprocessor, SRAM, sensors, are being integrated on one chip, technology is rapidly scaled, and new, incompletely

characterized, materials are being used. ICs for high consequence of failure applications will be a niche market that will require new reliability approaches and technologies. This will be especially true for applications with long lifetimes, that use ICs outside of benign environments, or that use leading-edge products.

The scope of the conference is the strategies and technologies for the design, manufacturing, testing, qualification, surveillance, and failure analysis of high consequence ICs (including packaging). Strategies for mitigating risk and improving parts procurement will be discussed. Existing solutions will be shared and future trends/needs will be identified.

The purpose of this workshop is twofold. First, to synergistically bring together manufacturers, end-users and other people involved in the diverse markets that require critical ICs. Current approaches, new solutions, and future needs will be discussed in a series of invited and contributed papers, as well as in panel sessions. Ways to efficiently and effectively meet the needs of this community on a continuing basis will be considered. A tour and demonstration focused on ICs and micromachines will be conducted.

The second purpose of the meeting is to develop a national roadmap of the special technical needs of this market segment. This specialized Critical ICs Technical Roadmap will complement the 1997 National Technology Roadmap for Semiconductors which deals with the needs of the mainstream commercial IC industry. Meeting attendees will be given a pre-roadmap document outlining some of the key issues. At the meeting, the issues will be discussed and final recommendations developed. After the meeting, the input will be published as a written roadmap. The recommendations of this Critical ICs Technical Roadmap will be used as a vehicle to influence the direction of the R&D community.

For more information contact: Tel: (505) 845-8614, Fax: (505) 844-6735.

Call For Papers: Probabilistic Safety Assessment and Management
Dear Risk Assessment Colleague:

The 4th International Conference on Probabilistic Safety Assessment and Management (PSAM 4) will take place at the Grand Hyatt Hotel in New York City on September 13-19, 1998. The purpose of the conference is to provide a forum for presentation of innovative methods and applications of risk-based approaches to improve the design and operation of technological systems and processes from the economic and safety points of view.

NASA is a sponsor of this conference; I am serving with Dr. Christian Preyssl (ESA), as a Space Technology Area Co-Coordinator. Knowing that you have an interest in risk assessment and/or reliability, I thought you might be interested, or know of others who might be interested in participating in PSAM 4 by submitting a technical paper for presentation at the conference. Additional information about PSAM 4 (and about previous PSAMs) and the Call for Papers may be found on the PSAM 4 home page at: **http://www.enre.umd.edu/ IAPSAM**

The call for papers requests that 400-600 word summaries of proposed papers be submitted by November 1, 1997; authors will be notified by February 15, 1998; and full papers must be submitted by May 1, 1998.. I can FAX or mail you a paper copy of the Call for Papers—just e-mail me with your FAX number or mailing address.

Please feel free to forward this e-mail message to others, especially those in the space technology area, who may have an interest.

Regards,
Pete Rutledge, Ph.D.
prutledg@hq.nasa.gov
Risk Management Lead, Office of Safety and Mission Assurance
NASA Headquarters

Produce Clean Software Designs
Take An Object-Oriented Analysis Challenge

PISCATAWAY, NJ, August 10, 1997 — The process of developing software is extremely creative and potentially satisfying, but often fraught with pitfalls, delays, and "bugs" resulting in frustration. A new self-study course on analyzing and designing object-oriented (OO) systems from The Educational Activities Board of The Institute of Electrical and Electronics Engineers can help reduce the level of frustration and software programming flaws increasing reliability.

This continuing education course, authored by Dr. Eric J. Braude of Boston University, consists of a textbook — Object Oriented Modeling and Design, (Rumbaugh et. al, Prentice Hall) — a study guide, a workbook and a final exam. Those who receive a passing grade on the final exam, will be awarded eight Continuing Education Units (CEU's) and an IEEE Certificate of Achievement.

Augmenting and explaining the OMT methodology of Rumbaugh, et. al, this course incorporates useful elements of the Unified Modeling Language, Design Patterns, and the Booch, Jacobson, Coad/Yourdon and Shlaer/Mellor methodologies. Included into contents are: class selection, class relationship, attribute and operation selection, dynamic and function models, system design, and object design.

Performing object-oriented analysis before programming makes the software-development process more grounded, more professional and more orderly. Dr. Braude aimed this course to provide a practical roadmap for designing object-oriented applications. His goal is to prepare the software engineer to develop OO systems and code with a clarity and minimum of rework. Also provided is a clear sequence of steps for the design of OO applications. Although the text includes fragments of C++ and Java, knowledge of them is not required. This course will guide the users through the analysis, system design and object design phases of system building.

Among the many objectives, this course will teach the following: the key reasons for using OO methods, the three parts of the OMT development process, and the selection of good class candidates.

Every unit of this highly applied course has self-testing questions and problems as well as hands-on exercises to ensure better understanding and usefulness. When completed, the course package can also serve as a valuable reference.

The product number is HL5733. Member price, $249. List price, $299 call 1-800-678-IEEE; for additional information or to place orders.

Reduce Human Error In Systems and Process Operations
New Video Tutorial Co-Sponsored by Educational Activities and The IEEE Reliability Society

Learn an effective design process for Reliable Human Performance. In any type of system, process, or product operation, technical or non-technical, human error accounts for as much as 70% of the failures. Another factor which come into play is the industrial process design. These two factors combined can create significant consequences such as expensive product liability claims.

To reduce the likelihood of human error and liability claims, IEEE Educational Activities Board and the IEEE Reliability Society co-produced a video tutorial titled *Designing Systems For Reliable Human Performance*. This presentation, which runs two hours and 30 minutes, discusses the important factors, techniques, tools, and data that form the foundation of an effective design process for reliable human performance. The program also covers the rules for setting reliability and maintainability requirements for systems, processes, and products that include humans. It also describes how to test the human-machine designs for compliance with the requirements. It is segmented into nine sections: Basics of human error, Factors affecting the reliable performance of humans. Models of human performance, Allocating requirements, Sources of human performance reliability data, Methods for designing systems that include humans, Predicting the reliability of human performance, Testing methods for systems that include humans, and Designing human-computer interfaces.

The video tutorial is an essential educational tool for system, reliability, human factors, and maintainability engineers, as well as program managers.

The presentations are divided between the following four presenters: Kenneth P. LaSala, Ph.D. a systems engineer for the National Oceanic and Atmospheric Administration Systems Acquisition Office. Dr. LaSala has made reliability, maintainability, and systems engineering contributions to a wide range of military and non-military systems; Lucia Filgueiras, Ph.D. is a professor of Computer Engineering at Escola Politecnica, University of Sao Paulo, Brazil. She is an independent consultant with a focus on the human-computer interface. Helen M. Gigley, Ph.D. is a Program Officer at the Office of Naval Research who has an extensive background in computational neurolinguistic modeling and extensive experience in computer systems design. Richard S. Ullman is the Vice President, Product Assurance and Manufacturing for ITT Defense and Electronics, a 241.6 billion dollar company that supplies both military and commercial products worldwide. Dr. Samuel J. Keene served as the technical editor for the presentation. Dr. Keene is an IEEE Fellow and past president of the IEEE Reliability Society. He authored over 100 papers and several chapters for books on reliability and management.

All video products are available in either NTSC or PAL standards. To order the video which consists of two tapes, use IEEE product number: HV6979.NTSC or HV6980. PAL Member price, $399.00. List price: $449.00. For ordering information call **1-800-678-IEEE.**

A New Process Grading Reliability Model

System failures predominantly come from causes other than intrinsic part failures. In our experience the Preto rule holds true in system failures, such that in the hardware realm, a few percent of all the Field Replaceable Units (FRUs) contribute to nearly all of the system hardware failures. These failures are not randomly caused, but are attributable to specific, resolvable causes. Statisticians call these "special cause" failures. They are remediable failure problems. The underlying failure cause can be fixed so that the problem will not reoccur. The FRU failure rate will be lower thereafter.

The following is an example of a recent special cause "design" problem. A medical company's instrumentation was experiencing excessive failures in a Paris operating room. Investigation discovered that a surgeon was using a cellular phone in the operating room. The phone's RF emissions interfered with the medical equipment, causing it to fail. Once the problem was understood, the equipment manufacturer redesigned the equipment housing to reduce the size of the ventilation openings in the cabinet, thus blocking out the interfering emissions.

Since the majority of system failures stem from "special cause" problems, it seems most appropriate to explicitly account for these problem drivers. The new reliability model uses process grading. Failure rate is predicted as a factor of the following causal areas:

1. induced (random)
2. design
3. manufacturing
4. parts quality
5. system management
6. could not duplicate
7. software

One topic in the above list new to most reliability engineers is "system management". Or, more properly, "system mismanagement" failures. These failures result from deficiencies in requirements and/or interface specifications. Some reliability practitioners claim that failures in computer systems have almost no origin in traditional parts failure causes. Their observation is that system management failures predominate [Murphy, Brendan and Gent, Ted, "Measuring System and Software Reliability Using an Automated Data Collection Process", Quality and Reliability Engineering International, CCC 0748-8017/95/050341-13 pp., 1995.

In the new model, each of the seven failure cause areas listed above is graded according to a listing of development initiatives from the best practices or lessons learned. These development initiatives ensure a more reliable product. The model is calibrated to estimate the failure rate mitigation from incorporating these development initiatives. The model also promotes "lessons learned" and better development practices for achieving reliable products. There are other process innovations in this model. These will be presented at RAMS in the paper session and expanded upon in the CAD workshop Monday afternoon, or contact the authors directly for more information.

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Up-To-Date Status of US Military Reliability and Maintainability Standardization Documents (As of Sep 1997)

Joe Caroli, Chairman IEEE Reliability Society Definitions & Standards Committee

DOCUMENT # Date-Most Recent Issue/Notice	Title	Current Status/Planned Actions	FSC AREA	Preparing Activity
MIL-HDBK-189 Feb 1981	Reliability Growth Management	Active	RELI	CR
MIL-HDBK-217 Feb 1995	Reliability Prediction Of Electronic Equipment	Retained as a handbook. Issued a change notice clarifying that it is for guidance only.	RELI	17
MIL-HDBK-251 Jan 1978	Reliability/Design Thermal Applications	Active	RELI	SH
MIL-HDBK-344 Aug 1993	Environmental Stress Screening of Electronic Equipment	Active	RELI	17
MIL-HDBK-338 Oct 1988	Electronic Reliability Design Handbook	Retain as a handbook. Issued a change notice clarifying that it is for guidance only. Revision ongoing, ECD Sep 1997.	RELI	17
MIL-HDBK-470A Aug 1997	Designing and Developing Maintainable Products and Systems	Active -**NEW**	MNTY	17
MIL-STD-470 May 1989	Maintainability Program For Systems And Equipment	July 95: Canceled by redesignating as MIL-HDBK-470 Aug 97: Superseded by MIL-HDBK-470A	MNTY	17
MIL-STD-471 Jan 1975	Maintainability Verification/Demonstration/Evaluation	July 95: Canceled by redesignating as MIL-HDBK-471 Aug 97: Superseded by MIL-HDBK-470A	MNTY	17
MIL-HDBK-472 Jan 1984	Maintainability Prediction	Active	MNTY	AS
MIL-STD-690 Mar 1993	Failure Rate Sampling Plans and Procedures	Active. Plan to convert to a "standard practice" document and to move from RELI FSC area to 59GP area.	RELI	ES
MIL-STD-721 Jun 1981	Definition of Terms for Reliability and Maintainability	Canceled 12/95. Contents will be retained in MIL-HDBK-338.	RELI	17
MIL-STD-756 Aug 1982	Reliability Prediction and Modeling	Canceled 2/96. Contents will be retained in MIL-HDBK-338.	RELI	17
MIL-STD-757	Reliability Evaluation from Demonstration Data	Canceled 12/81.	RELI	AS
MIL-STD-781 Oct 1986	Reliability Testing For Engineering Development, Qualification, And Production	Canceled, contents incorporated into Mil-HDBK-781.	RELI	EC

MIL-HDBK-781 Apr 1996	Reliability Test Methods, Plans, And Environments For Engineering, Development, Qualification, And Production	Active	RELI	EC
MIL-STD-785 Aug 1988	Reliability Program For Systems And Equipment Development And Production	Cancel after publication of a suitable non government standard. The IEEE and SAE are presently working on new standards. ECD for both: 12/97	RELI	11
MIL-STD-790 Aug 1995	Reliability Assurance Program for Electronic Parts Specifications	Still active. Converted to a "standard practice" document. Moved from RELI FSC area to 59GP FSC area.	59GP	ES
MIL-HDBK-791(SY) Mar 1988	Maintainability Design Techniques	Active, limited coordination. Moved from MNTY FSC area to MISC FSC area.	MISC	SY
MIL-STD-810	Environmental Test Methods And Engineering Guidelines	Retain as a test method standard.	ENVR	11
MIL-STD-883 Mar 1995	Test Methods And Procedures For Microelectronics	Retain as a test method standard until a suitable non government standard is available for use. Ref ANSI/J-STD-003. Defense Supply Center Columbus (DSCC) has contacted NGS bodies - none are interested in maintaining entire doc. some are developing individual test plans, DSCC will keep abreast and adopt individual plans as available	5962	ES
MIL-STD-1543 Oct 1988	Reliability Program Requirements For Space And Missile Systems	Cancel after publication of a suitable non government standard. This action will occur simultaneously with the replacement of Mil-Std-785.	RELI	19
MIL-STD-1591 Jan 1977	On-Aircraft, Fault Diagnosis, Subsystems, Analysis/Synthesis of	Canceled 7/95	MNTY	17
MIL-STD-001591A Dec 1978	Command, Control and Communications (C3) System & Component Fault Diagnosis, Subsystems, Analysis/Synthesis of	Canceled 7/95	MNTY	17
MIL-STD-1629 Nov 1984	Procedures For Performing A Failure Mode Effects And Criticality Analysis	Cancel after publication of a suitable non government standard. The Society of Automotive Engineers (SAE) is presently working the standard. Estimated completion: 1Q 1998.	RELI	17
MIL-STD-1635 Oct 1986	Reliability Growth Testing	Canceled.	RELI	EC
MIL-STD-1843 Feb 1985	Reliability-Centered Maintenance for Aircraft, Engines and Equipment	Canceled	ILSS	10
MIL-STD-2068 Jan 1987	Reliability Development Test Program	Canceled 7/87, "Use Mil-Std-781".	RELI	AS
MIL-STD-2074 Aug 1994	Failure Classification for Reliability Testing	Canceled	RELI	17

MIL-STD-2084(AS) Jul 1991	General Requirements For Maintainability Of Avionic And Electronic Systems And Equipment.	Canceled via publication of a notice redesignating as a handbook. Handbook dated 31 Jul 95 MIL-HDBK-2084	MNTY	AS
MIL-STD-2155 Dec 1995	Failure Reporting, Analysis and Corrective Action System (FRACAS)	Canceled via publication of a notice redesignating as a handbook. Handbook dated 11 Dec 1995 MIL-HDBK-2155	RELI	AS
MIL-STD-2164	Environmental Stress Screening Process For Electronic Equipment	Canceled via publication of a notice redesignating as a handbook. MIL-HDBK-2164	RELI	SH
MIL-STD-2165 Feb 1993	Testability Program For Systems And Equipments	Canceled via publication of a notice redesignating as a handbook. Handbook dated 31 Jul 95	MNTY	AS
MIL-M-38510	General Specification For Microcircuits	Reclassified to Inactive for New Design in 1993; superseded by Qualified Manufactures List (QML) document MIL-PRF-38535C dtd Mar 14, 1995.	5962	ES
MIL-PRF-38534 Aug 1995	General Specification For Hybrid Microcircuits	Active as a Performance Based Spec	5962	ES
MIL-PRF-38535 Oct 1995	General Specification For Integrated Circuits (Microcircuits) Manufacturing	Active as a Performance Based Spec	5962	ES

Legend

FSC - Federal Supply Class

FSC Area Codes

RELI -   Reliability
MNTY - Maintainability
MISC -   Miscellaneous
59GP -   Electrical and Electronic
              Equipment Components
5962 -   Microcircuits Electronic
ENVR -   Environmental Requirements
              & Test Methods
ILSS -   Integrated Logistics Support

Preparing Activity Codes

10 -Air Force Materiel Command (AFMC/ENPD)
11 - Aeronautical Systems Center
17 - Rome Laboratory (AF)
19 - Space and Missile Systems Center (AF)
AS - Naval Air SystemsCommand
CR - Communications-Electronics Command (Army)
EC - Space and Naval Warfare Systems Cmd
ES - Defense Supply Center Columbus
SH - Naval Sea Systems Cmd
SY - Army Materiel Systems Analysis Activity

To Order US Military Standardization Documents

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700 Robbins Avenue, Bldg. 4D
Philadelphia, PA 19111-5094
(215) 697-1187 thru 1198
Fax: (215) 697-1462

3510	General Specification For Microcircuits	Reclassified to Inactive for New Design in 1993; superseded by Qualified Manufactures List (QML) document MIL-PRF-38535C dtd Mar 14, 1995.	5962	ES
-38534	General Specification For Hybrid Microcircuits	Active as a Performance Based Spec	5962	ES
-38535	General Specification For Integrated Circuits (Microcircuits) Manufacturing	Active as a Performance Based Spec	5962	ES

eral Supply Class

Codes   Preparing Activity Codes

Reliability   10 - Air Force Materiel Command (AFMC/ENPD)
Maintainability   11 - Aeronautical Systems Center
Miscellaneous   17 - Rome Laboratory (AF)
Electrical and Electronic   19 - Space and Missile Systems Center (AF)
Equipment Components   AS - Naval Air Systems Command
Microcircuits Electronic   CR - Communications-Electronics Command (Army)
Environmental Requirements   EC - Space and Naval Warfare Systems Cmd
& Test Methods   ES - Defense Supply Center Columbus
Integrated Logistics Support   SH - Naval Sea Systems Cmd
               SY - Army Materiel Systems Analysis Activity

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Finding Employment As A Reliability Engineer

Are you an employer looking for a qualified reliability engineer, or are you that engineer? If you are that engineer, are you a Reliability Society member and ready for a change? If you are, the RS is prepared to help you!

As you have heard me say before, the IEEE has the most comprehensive employment assistance program of any of the engineering societies. For your first step, take advantage of it.

For example: If you are an employer and want your jobs listed on the web and accessible by e-mail, contact Bill Anderson at w.anderson@ieee.org or fax him at (202) 785-0835 for details about IEEE's award-winning job listing service. The lists are regional, updated weekly, and get results.

If you are a member looking for a job, also see the weekly job listing, but the IEEE has a dozen other services (all free) to assist you in your job search. Many of them were listed in the April Reliability Society Newsletter, but I recommend that you ask for a copy of IEEE's new tri-fold brochure, entitled "IEEE-USA Employment Assistance." It too can be obtained from Bill Anderson, or anyone at the IEEE-USA office .

It is hard to beat what the IEEE already has to offer, but your RS is now prepared to provide an additional personalized service, specifically for reliability engineering opportunities. This idea was originally proposed by past-president Dick Doyle and current- president Loretta Arellano. At the July AdCom

meeting, several alternate and more elaborate formats were discussed, but we decided to go with this basic "needs and leads" matching program and see if it meets your needs.

As a reliability engineering consultant, I maintain a home office. Until I become overwhelmed with your listings, I will serve as the central clearing house. Because I am out of the office much of the time, it is best to contact me by e-mail (r.gauger@ieee.org) or by fax (714-733-1284), though snail mail also works (R.H. GAUGER, P.E. at 5 Roanne Circle, Irvine, CA 92604).

If you are an employer, send me a brief job listing, job location, special requirements, whether your needs are full time, part time, contract, if you could use a consultant, and whether or not you are an employment agency. Submission by e-mail is preferred as I can relay your needs immediately to our list of interested Reliability Society members. If you are the RS member looking for the job change, send me a short list of your reliability related specialties, the locations where you are willing to work, when you will be available, and how we can contact you. Again, e-mail is preferred as I can forward the employer inquiry directly to you. Also, send me permission to release your name to prospective employers. This service does not offer anything that you could not do for yourself, but by having the job openings and the engineers listed in one place, we can reduce your search time and fill the job before someone else does There is no charge to employers or RS members.. Let me know of your results.

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Preliminary Release of a Great New Tool!!
(PSAP INFORMATION BULLETIN #97.4 Date: June 30, 1997)

This bulletin announces the Preliminary Release of a Great New Tool for EEE parts (Components) selection. The NASA Parts Selection List (NPSL) Accessible by pointing your browser to:

http://epims.gsfc.nasa.gov/npsl

The NPSL provides a detailed listing of EEE part types which the NASA EEE Parts and Advanced Interconnect Program recommends for use in NASA flight projects. Our parts selection tables include such information as: the Full Part Number, Part Number Ordering Explanation, Critical Device Parameters, Available Sources of Supply, Application Notes, Links to Radiation Test Databases (GSFC and JPL), and Links to Supplier Homepages and the Defense Supply Center Columbus (DSCC).

As part of this "Preliminary Release", prototype commodity sections for Capacitors and Microcircuits have been developed in their entirety. Please visit our NPSL Homepage. Have a look around and tell us what you think. We need your feedback, comments, and suggestions, to help guide the final format of this tool so that it can truly benefit the NASA parts community.

It is unlikely that NASA's "Standard" Parts List (MIL-STD-975) and GSFC's Preferred Parts List (PPL-21) will be updated in the future. In their place, we hope the on-line NPSL tool can help provide you with "guidance" for EEE parts selection. We look forward to hearing from you very soon!!!

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