
Reliability Society Newsletter

Editors: Gary Kushner and Mark Snyder
Vol. 31, No. 2, April 1985 (USPS 460-200)

Editor's Message

"A Funny Thing Happened on the Way to RAMS"

I looked forward to this year's Annual Reliability and Maintainability Symposium with a greater anticipation than most simply because the theme was a matter of personal importance and pride. Not only do the words "Customer Satisfaction" appear in my job title, but it's a concept that I have long since accepted, internalized and emotionalized as a member of the community of assurance scientists. Customer satisfaction has finally been recognized as a formal objective of business. It's no longer a vague attribute which comes right behind motherhood and apple pie. The trip started out just like any other business trip with a Monday morning departure: get in the car and head for Logan Airport in Boston. I was a little suspicious when the traffic on the Mass. Pike turned out to be lighter than usual and I just zipped through the Callahan tunnel in stride. A lucky window for a Monday morning, but I had no idea there would be a price to pay later on.

Things proceeded to go well; we boarded our plane on time and reached our assigned seats. When the departure time came, there was the feared announcement of a "gate hold." The voice assured us it would only be a short time, "15 minutes or so." It was! Smooth takeoff, a little chop, smooth landing, also a little chop. We came to a stop just away from the terminal at Philadelphia Int'l Airport, "waiting for a jetway to free-up for us." Minor wait; we got off the plane about a half hour later than the expected arrival time (usually tolerable by today's standards but still a 50 percent addition to the total). This would have been filed under "dissatisfied customer" until Jack Jackson reminded me at the RAMS banquet that the main objective of an airline is to "get the plane from point A to point B . . . WITHOUT CRASHING." No problem!

It was six degrees below zero when we arrived in Philadelphia that morning. I still had ample time to get to

the rental car office, get to the hotel and make the 1 p.m. AdCom meeting. This is where things began to go afoul. It looked a little odd to see all the people milling about the rental car office; very few were waiting in line. To make a long story short, they had run out of cars and those that were available had their hoods raised in surrender to the cold. The company (no name, but it's the one with the recent "He hates to wait" campaign) finally produced a car an hour later. We gleefully drove away to the tune of the engine about to explode at 40 mph. Transmission frozen in first gear. No problem getting a replacement, BUT at the end of the queue.

More to come, sparing the details: the replacement car had non-functional windshield washers, we missed the correct exit by several miles (inadequate map and road signs) and finally made the 1 p.m. meeting at 2:30. My spirits were still high; after all I had a fine symposium to look forward to. Following the long day and the AdCom awards dinner, it seemed natural to follow the thousands of people waiting on line Monday night for early registration. As I patiently approached the "M-Z" registration table, the events of the day were a distant memory. However, as I was informed that my company had never sent in my early registration, I knew it was a fitting end to the day.

The irony of it all! I had been a customer in a variety of situations throughout the day. I came up very short on customer satisfaction. Perhaps it was a matter of expectations, but I still believe that the customer "is always right." Sure, I was disappointed, but the disappointment only underscores the need for a symposium whose theme relates to customer satisfaction. Reliability and maintainability are key contributors to customer satisfaction. I'm proud to say that I was a satisfied customer of the fine material presented at the 1985 Annual Reliability and Maintainability Symposium.

Mark Snyder

RS Newsletter Inputs

All RS Newsletter inputs should be sent to one of the associate editors, Gary Kushner, 499 Brigham St., Marlboro, MA 01752, or Mark Snyder, Digital Equipment Corp., 14 Walkup Drive (YWO/G13), Westboro, MA 01581, per the following schedule:

For July Newsletter:	by 15 April
For October:	by 15 July
For January:	by 15 October
For April:	by 15 January

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President's Report

A. O. Plait, President

As I look back over the past two years, they have been fun-filled and productive. The enthusiasm and ability of the members of the AdCom have been contagious and invigorating. My thanks to the Sr. Past President, Thad Regulinski, and Jr. Past President, Carl Bird, for their total support and backing. Their advice and counsel helped make the few difficult times easier. The Vice Presidents—Tom Fagan, Irv Fiegenbaum, Al Plait and Maury Shumaker—have performed their duties admirably. Henry Malec got the minutes out in a timely fashion and Tony Coppola continued to safeguard our finances. An excellent team.

We started the year in San Francisco by awarding IEEE Centennial Medals to: Carl M. Bird, Anthony Coppola, Ralph A. Evans, Paul Gottfield, Kurt Greene, C. Raymond Knight, Naomi J. McAfee, Valdemar R. Monshaw, Alan O. Plait, Harry E. Reese, Thaddeus L. Regulinski, Marion P. Smith and J. W. Thomas. The Centennial year celebration continued with the special issue of the *Transactions* on the *History of Reliability* ably handled by guest editor, Dr.

Thaddeus L. Regulinski. The Centennial year was concluded with the Centennial Keys to the Future Program which recognized outstanding young engineers. Dr. Julia Bukowski, Assistant Professor of Systems Engineering, University of Pennsylvania, was the Reliability Society representative.

Chapter Awards were presented to the outstanding Chapters. First Place went to Washington/Northern Virginia Chapter, second place to Philadelphia Chapter and third place to the Denver Chapter. Congratulations to all.

The 1984 Annual Reliability Society Award recipient was Dr. Murray H. Woods of Intel Corporation. Dr. Woods was cited for his accomplishments in improving the reliability of microelectronic devices.

There were major problems during the year with the *Transactions* publication schedule. Those have been resolved and the *Transactions* will be back on schedule with the April issue.

Thanks for allowing me the privilege of serving as your President. It has been an exhilarating experience.

Central New England Council

The Central New England Council has conducted a highly successful series of monthly meetings during January, February and March, 1984. The January meeting was entitled "Some Problems and Pitfalls in Reliability Modeling" and was presented by Mr. J. W. Sullivan of Raytheon Co. The February meeting was entitled "Directions in Reliability Document Standardization" presented by Mr. E. R. Carubba of Digital Equipment Corp. The March meeting was entitled "Directions in Reliability Testing" by Mr. M. Johnson of RCA.

Our twenty-third annual spring seminar was entitled "Customer Satisfaction Through Product Assurance Technology."

Gary Kushner, Chairman

Cleveland Chapter

The Cleveland Chapter has conducted three successful meetings in 1984, which included such topics as: Reliable Crimping and Wire Wrapping Connections; and IEEE 488, RS232C and RS422 Communications. We conducted meetings in the areas of Biomedicine and Instrumentation. We are also working on the Home Study Course for RS: Chapter 8 on "Software Quality Assurance" was edited. All the reviewer comments have been incorporated. Multiple choice answers to the seven problems are being prepared.

A suggestion to prepare these mats on the word processor was evaluated. The equations, figures, and tables require hand preparation. Pica typing with the cut and paste method will cost RS around 50 percent less than the word processing. We suggest that the standard method of preparing mats be used. We will prepare the mats, get 300 books printed and set up the course for RS through IEEE headquarters for home study use in about 12 months ARA.

All in all, it was a good year in Cleveland. We are having fun serving the membership in our area.

Denver Chapter

After concluding 1984 with a social dinner-theater meeting, the Denver Chapter kicked off 1985 with a technical meeting on January 10th. At the meeting, Mr. John Wargo of Martin Marietta gave a lecture on the PREDICTOR reliability computer program. PREDICTOR (written by Management Science) is a powerful program covering reliability predictions per MIL-HDBK-217, FMECA, Fault Tree Analysis, and Maintainability Analysis. Mr. Wargo previously worked at Management Science and was, therefore well qualified to speak on the subject.

Our February meeting was a half day joint meeting with ASQC on February 7th. The topic was on vendor relations from the viewpoint of the supplier and manufacturer's representative. We will be holding an evening technical meeting in March and in May we will be holding our annual full day seminar on software reliability at Ford Aerospace in Colorado Springs. For further details on the May software meeting contact Mr. Ron Watts at (303) 471-9110 x4152.

Tri-Cities Chapter

In the Spring of 1984 the Chapter had a tour and briefing on the reliability activities of the Texas Instrument Plant in Johnson City, Tennessee. This year our goals are to double our membership, provide a reliability speaker for our IEEE Section (done/September), and tour the Sperry Plant in Bristol and the Raytheon Plant in Bristol (arrangements made but not yet scheduled).

In addition the Chapter planned to develop a statistical cross-section of the Tri-Cities Section as pertains to the type of membership, education, etc.

Seventh Annual Awards Program

The seventh annual awards program of the IEEE Reliability Society was conducted on Monday evening, January 21, 1985 in conjunction with the RAM Symposium in Philadelphia. A delightful after dinner treat was provided in the form of an operatic performance by Marci Plait accompanied by Paul Chandley at the piano.

Proceedings of the awards program are as follows:
Introduction and Program Proceedings
—Ms. N. J. McAfee

Guest Editor Award (for Transactions special issue)
—Dr. T. L. Regulinski

The Annual IEEE Reliability Society Awards (for contributions to the Reliability of Microelectronic Devices through Research and Reliability Physics . . . refer to January 1985 issue of RS Newsletter for details and biography)
—Dr. Murray H. Woods

Installation of AdCom Officers
—Mr. A. O. Plait, President
—Mr. I. A. Feigenbaum, VP Membership
—Dr. R. A. Kowalski, VP Publications
—Mr. M. P. Shumaker, VP Meetings
—Mr. D. I. Troxel, VP Technical Operations
—Mr. T. L. Fagan, Secretary
—Mr. A. Coppola, Treasurer

President's Concluding Remarks
—Mr. A. O. Plait

A special award was also presented to Ms. Naomi McAfee by Carl Bird in recognition of her contributions to the IEEE Reliability Society AdCom.

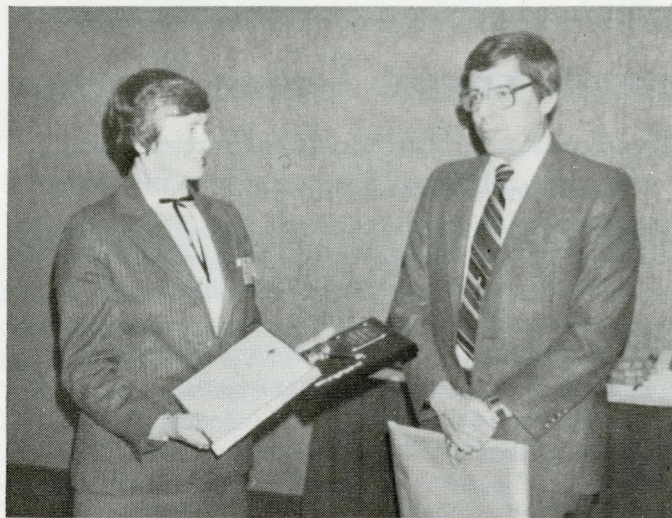
Please join us in congratulating the recipients of these special awards and wishing the new AdCom officers a very successful year in their new positions.



Dr. Murray H. Woods receives society award from Naomi McAfee.



Installation of officers: Al Plait, Irv Feigenbaum, Dick Kowalski, Dave Troxel and Naomi McAfee.



Ms. McAfee receives special award of appreciation from Mr. Carl Bird.



Incoming President Plait with Jr. Past President McAfee.

P. K. McElroy Award, 1985 RAMS Banquet

Remarks to the Reliability and Maintainability Symposium, January 23, 1985, Rod McElroy

I was reminded by Harry Reese that my Dad loved limericks. Harry had to tell me because I was never privy to them. Dad would start to tell about a young hermit named Dave and mother would say—as only she could—“P. K., not in front of the children.” So I had to do a little research on limericks. Permit me to tell you a few that will allow Mother to maintain her Yankee dignity while at the same time offering some insight into my Dad’s enthusiasm for life and for reliability and maintainability.

What meant Dad’s talk of I.R.E.
And further discourse about I triple E.
My Dad was reliable
His patience oft triable
As he raised my two brothers and me

Each project undertaken was done with precision
The slow start on his family led to derision
He’d wink and say “Ask us.
‘Cause quality takes practice.
Pills helped us to make the additions.”

Presented to P. K. at the Fountainbleau
The Reliability Award was the hit of the show
It did nothing to muffle
The canny Scot’s hustle
To make the Society grow

P. K. had an editor’s burning desire
For perfection in the *Proceedings* he’d inspire
The writers of the words
To avoid the absurds
Elevating grammar to Shakespearean spires

The P. K. McElroy Award for the Best
Honors a man who loved limericks and jest
For whom quality in writing
Was almost as exciting
As well turned gams in a black satin dress

Here at the symposium reliable
Are assets quite quantifiable
Such talents among them
As Foreman and Malcolm
For whose efforts this award’s justifiable.

1985 International Reliability Physics Symposium

March 26-28, 1985 • Sheraton-Twin Towers Orlando, Florida

The twenty-third Annual Symposium, cosponsored by the IEEE Reliability and Electron Devices Societies, emphasizes device reliability as the dominating influence in the development of new VLSI technologies and circuit designs. With awareness that today high reliability is the norm for VLSI, the 1985 Symposium will emphasize the role of design, processing, packaging and testing for building-in high reliability. Work in all areas of reliability physics will be included in the program.

Papers will deal with work on:

- Physics of Failure Mechanisms—Quantitative models and mechanisms of component failure.
- Failure Analysis Techniques—Advanced or simplified, as they are applied to specific problems.
- Accelerated Testing and Screening—Emphasizing the physical mechanisms which validate testing and screening techniques.
- Design and Process Control for Reliability—Relating specific design concepts and process controls to part reliability.

In the following or related areas:

- VLSI (Microprocessors, Memory, PLA, Redundan-

cy, etc.)—MOS, Bipolar, CMOS, I²L, SOS.

- Semiconductor/Insulator Interfaces, Contacts and Metallization
- Packaging, Bonding, Die attach, Coatings and Encapsulation
- Hybrids (Materials, Processes and Components)
- Displays, Sensors, and Solar Cells
- Microwave, Optoelectronic, and SAW Devices
- GaAs Devices and Interface Effects on III-V Devices
- New Devices and Technologies
- Passive Components
- Attachment of Leadless Ceramic Chip Carriers

A special one-on-one session also planned for significant papers on very specialized subjects and papers with high mathematical content. In this session, authors will display significant data, equations and a summary of their work on posters or other suitable format and be available during the entire session to discuss their work.

For general conference information contact:

John W. Peebles, General Chairman
1985 International Reliability Physics Symposium
NCR Corporation
3325 Platt Springs Rd.
West Columbia, SC 29210
(803) 796-9250

Index to IRPS Symposium Proceedings 1979 to 1984

The Reliability Analysis Center (RAC) has prepared and plans to release in late February 1985 a new Search and Retrieval Index for the Annual Proceedings of the “International Reliability Physics Symposium” (IRPS). This index covers the years 1979 to 1984 and is ordered as TRS-2A. The RAC also has available the IRPS Search and Retrieval Index for the period of 1968 to 1978 (TRS-2)

The Search and Retrieval Index to IRPS Proceedings—TRS-2 1968 to 1978 and TRS-2A 1979 to 1984—have been designed to make possible rapid information retrieval on reliability physics topics which have been the subject of papers published in IRPS Proceedings during the years 1968 (7th Annual) through 1978 (16th Annual). There was no symposium in 1969 and only selected papers of the 1968 symposium were published as a special edition of the *Transactions on Electron Devices* (vol. ED-16 No. 4, April 1969). Only the published papers have been included in the Index.

The subject matter of the papers referenced in this docu-

ment covers all facets of electron device technologies, testing, screening, environments, uses and applications. The diversity of the subject matter can only be suggested here. It is limited only by the number of papers reproduced in the Annual Proceedings. The papers portray the most vital, complex, innovative and up-to-date work being done in the ongoing effort to put forth by the electronics community, to understand, and overcome the physics of failure in electron devices.

Under a cost-recovery directive from the U.S. Department of Defense, the RAC offers these informative and extremely useful publications at \$24 per copy in the U.S., \$34 non-U.S. Prepayment is required. Ordering No. TRS-2 Index 1968-1978; TRS-2A Index 1979-1984.

Order from and make checks payable to: Reliability Analysis Center, RADC/RAC, Griffiss AFB, NY 13441-5700.

IEEE Transactions on Reliability—Free Offer

If you have been wondering what happened to your 1963, 1965 through 1983 *IEEE Transactions on Reliability* and you wondered how you can replace them, Mr. Joe Malizia has copies of these valuable documents and is looking for a good home for them. If you need the following issues, contact Joseph Malizia, Woolwich, ME (207) 443-2711. All you pay is the postage.

Year	Volume	Issue No.
1983	R-32	1-5
1982	R-31	1-5
1981	R-30	1-5
1980	R-29	1-5
1979	R-28	1-5
1978	R-27	1-4

1977	R-26	1-5
1976	R-25	1-5
1975	R-24	1-5
1974	R-23	1-5
1973	R-22	1-5
1972	R-21	1-4
1971	R-20	1-4
1970	R-19	1-4
1969	R-18	1-4
1968	R-17	1-4
1967	R-16	1-3
1966	R-15	1-3
1965	R-14	1-2
1963	R-12	3

Reliability Prediction Software Available

The RelCalc 2 software package automates the part stress reliability prediction procedure of MIL-HDBK-217D, providing an alternative to the tedious, time consuming, and error prone manual method.

RelCalc 2 features include: quick and easy part parameter entry and editing; single screen part forms with menu windows for each field entry; global editing functions for quick what-if? trials; reports which organize results for easy analysis; part library database functions for rapid recall of often used parts; fast and accurate, with thorough error trapping.

RelCalc 2 is available now for the IBM PC, PC-XT, and full compatibles, and runs under PC-DOS (MS-DOS) version 2.

For further information, please contact:

T-Cubed Systems
31220 La Baya Drive Suite 110
Westlake Village, CA 91362
(818) 991-0057

In Memorium:

George T. Bird, 68, President and founder of Bird Engineering-Research Associates, Inc., Vienna, Virginia, died of a heart ailment December 8, 1984. He was one of the small group at Aeronautical Radio, Inc. that made the initial studies in the field of reliability on airborne electron tubes in the 1950's. He has authored a number of hand-

books, training films and technical papers on the subject. A graduate of Texas A&M, he was formerly in the Army Air Force and an associate professor of electrical engineering at the University of Houston. He was a Senior Member of the IEEE and a registered professional engineer.

How to Analyze Reliability Data

This one day course covers the basics of collecting and analyzing reliability to make informed decisions on warranty costs, preventive replacement, design changes and comparisons of vendors, materials, operating environments, etc. This course is aimed at engineers and others involved in reliability testing, design, product service, maintenance of production and plant equipment, and field data collection and analysis. Topics include use of Exponential, Weibull, Poisson and other distributions for reliability estimation using simple graphical and numerical methods and computer

packages. Sources of further information are surveyed. The course will be held on Sunday, May 5, at the Hyatt Hotel, Baltimore, MD in conjunction with the 1985 Quality Congress of the A.S.Q.C., which hosts the course. The course fee includes the ASCC booklet, "How to Analyze Reliability Data," authored by the instructor, Dr. Wayne Nelson.

For more information, call or write Registrar Wayne Nelson, (518) 370-6229, or Inst. of Adm. and Mgt., Bailey Hall, Union College, Schenectady, N.Y. 12308.

Books

We have received correspondence from one of the authors of: *Repairable Systems Reliability Modeling, Interference, Misconceptions, and Their Causes*, by Harold Ascher, Naval Research Laboratory, Washington, DC and Harry Feingold, Naval Ship Research and Development Center, Bethesda, MD. Published by Marcel Dekker, Inc., July 1984, 232 pages, illustrated. This book:

- distinguishes reliability analysis of repairable systems from reliability analysis of nonrepairable systems—a key source of misunderstandings
- analyzes several sets of real field data, demonstrating how to treat repairable systems failure data
- explains the differences between part wearout and system deterioration, covering the different types of analysis required in each case
- corrects the potential for serious misinterpretation of data by clarifying numerous widespread misconceptions.

For additional information, contact:

Mr. Harold Ascher
Naval Research Laboratory
Code 1206
Washington, DC 20375
(202) 767-3745

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Preliminary Call for Papers: Conference on Software Tools

Sponsored by the Center for Advance Telecommunications Technology of the Polytechnic Institute of New York, with the Technical Cooperation of the IEEE Computer Society TCSE, the ACM SIGSOFT, and the Software Committee of the National Security Industrial Association.

A three day conference on state-of-the-art software tools will be held in New York City on April 15-17, 1985. Proceedings will be published. Tutorials, research papers, and proposals for panel sessions are invited in the following areas:

Software Engineering and Development:

- Requirements
- Design
- Implementation
- Testing/Verification
- Maintenance
- Configuration Control
- Project Management
- Workstations

Programming Environments:

- Ada+ Language
- UNIX* System
- DOD/Embedded Software
- Personal Computers

Application Areas:

- Banking
- Insurance
- Investment and Securities
- Modeling and Simulation
- Knowledge Based/Expert Systems
- Telecommunications
- Office Automation
- Scientific
- MIS

Potential authors should contact one of the following people as soon as possible:

George E. Estes or Marianne E. Erdos
 AT&T Network Systems Hazeltine Corp.
 6 Corporate Place, Research Laboratories
 Rm 1E229 Greenlawn, NY 11740
 Piscataway, NJ 08854 (516) 261-7000
 (201) 981-3864

+ Ada is a trademark of the U.S. Government.
 * UNIX is a trademark of AT&T Bell Laboratories.

Inter-RAM

INTER-RAM, the International Reliability-Availability-Maintainability Conference for the Power Industry will hold its 12th Annual Meeting April 9-12, 1985 at the Hilton Hotel, Baltimore, MD. Further information may be obtained by writing:

Mrs. Melissa Bradley
 Technical Program Chairman
 Baltimore Gas and Electric Co.
 Fort Smallwood Road Complex
 P.O. Box 1475
 Baltimore, MD 21203

Conference and Course Calendar

DATE	CONFERENCE	PLACE	CONTACT
1985 March 26-28	1985 International Reliability Physics Symposium	Orlando, FL	Dave Yaney 1985 Int. R. Physics Symposium AT&T Bell Labs 555 Union Blvd. Allentown, PA 18103
April 9-12	INTER-RAM	Baltimore, MD	Mrs. Melissa Bradley Tech. Program Chairman Baltimore Gas and Electric Co. Fort Smallwood Road Complex P. O. Box 1475 Baltimore, MD 21203
April 15-17 Call for Papers	Conference on Software Tools	New York City, NY	Marianne E. Erdos Hazeltine Corp. Research Laboratories Greenlawn, NY 11740
April 25	23rd Annual Spring Reliability Seminar	Sheraton Tara Framingham, MA	Jane Ferguson Haemonetics Corp. 400 Wood St. Braintree, MA 02184 (617) 848-7100 X261
May 20-22	Electronics Components Conference	Capital Hilton Hotel Washington, DC	Electronic Industries Association 2001 Eye St., NW Washington, DC
June 23-26	Intern. Conference on Communications	Palmer House Chicago, IL	Elmer Scherman (312) 681-7341
June 23-27	1985 IEEE Third Conference on Human Factors and Power Plants	Monterey, CA	Howard (Jack) Parris EPRI, P.O. Box 10412 Palo Alto, CA 94303 (415) 855-2776
July 1-3	International Workshop on Timed Petri Nets	Torino, Italy	Prof. M. A. Marsan Dipartimento Di Elettronica, Politecnico di Torino Corso Duca Degli Abruzzi, 2 10129 Torino, Italy

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DATE 1985	CONFERENCE	PLACE	CONTACT
Aug. 26-30	Relectronic '85	Budapest, Hungary	Scientific Society Telecommunication Organizing Committee of Relectronic '85 H-1372 Budapest P.O. Box 451 Hungary 531-027
Oct. 8-10	Melecon '85	Madrid, Spain	Prof. A. Luque Instituto de Energia Solar E.T.S.I. Telecomun. UPM Ciudad-Univer Madrid-3, Spain

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