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# Reliability Society Newsletter

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**Editors: Gary Kushner and Mark Synder**

**Vol. 37, No. 1, January 1991 (USPS 460-200)**

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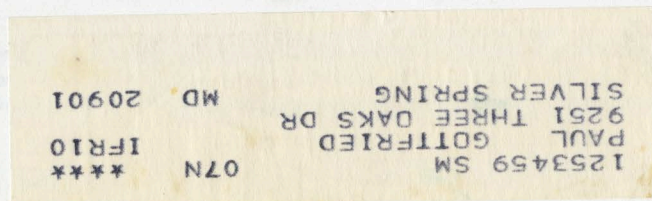
## Message from the President

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There are three things to talk about in this issue. First, we are continuing to push reliability in the college curriculum through the skillful hand of our own AdCom member, Dr. Thad Regulinski. You will note on the editorial page of the forthcoming special issue (edited by Thad) the changes that are now being made in the requirements for accredited engineering education. Reliability is no longer a proposed consideration, but a requirement in problem solution. This is progress! Thad hastens to point out, however, that this is only the beginning. We must raise the concept of reliability to one of prime consideration.

The AdCom met on October 11 in Leesburg, VA. The meeting was held at the successful conclusion of our sponsored Third Annual Conference on Reliability and Maintainability in CAD/CAM. Attendance was down slightly (aren't they all) but the papers were good and the discussion was lively. You will be getting a copy of the proceedings in a few months. This brings me to another important subject.

For many years all of us members have been receiving copies of the proceedings of the Annual Reliability and Maintainability Conference, the International Reliability of Physics Conference, and now the Proceedings of the Conference on R & M in CAD/CAE. This makes two large publications and a smaller one. The printing and mailing also account for a large expenditure of our funds — \$\$\$\$\$. Our reserves, money in the bank that allows us to operate, have been going down and this cannot continue. We have increased the dues from \$8 to \$10, but still **THE COST OF THE PUBLICATIONS IS SUBSTANTIALLY MORE THAN THE DUES!!** One of the active considerations before the ADCOM is to limit the distribution of the proceedings to only those that want them. For instance, you could select which of the major publications you wanted, and possibly pay extra if you wanted both. This is a serious question, and I invite your comments. Our decisions will affect you. Let us have your ideas!



## New Requirements for Inputs

As if this issue of the RS Newsletter, IEEE Publishing Services Newsletter operations have been transferred to the Magazine Group in Piscataway, New Jersey. This move enables the Newsletter to take full advantage of sophisticated electronic publishing capabilities. Therefore, all hardcopy inputs, as required by the scanning equipment, must be single spaced, typewritten pages on white, 8 1/2 X 11" paper. We can no longer accept Faxed inputs, Xerox copies with faint type or dot matrix printers with less than "letter quality." Beginning with the April 1991 issue, inputs not meeting these requirements will not be accepted. All RS newsletter inputs should be sent to one of the associate editors, Gary Kushner or Mark Snyder, per the following schedule:

For January Newsletter:	by October 25
For April Newsletter:	by January 25
For July Newsletter:	by April 25
For October Newsletter:	by July 25

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Sorry, but we can no longer accept handwritten inputs or FAXed inputs.

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## Chapter News

### Cleveland

The Cleveland Chapter has had two good meetings during this reporting period:

1. Our first meeting was on 3D Computer Graphics. This meeting was from the IEEE Learning Channel Video Conference Seminars via satellite. Three experts — Dr. Bruce Naylar, Dr. Patrick Hanrahan and Dr. Steve Feiner talked about:

Geometric Modeling Techniques

Challenges in Rendering 3D Computer Graphics

Graphical Users' Interfaces in the 1990's.

2. We tried something new for our second meeting. The Ford Motor Company, Engine Plant #1 in Brookpark, Ohio was visited by our tour group. It was very impressive to see how these complex electromechanical assemblies are made on a high volume production basis. Automation under the watchful eyes of the computer (CIM) has come a long way. A nice meal at the One Hundredth Bomb Group Restaurant topped off this activity.

All in all, here in Cleveland we are having fun serving our members and look forward to expanded activities in the future.

### Denver

The October meeting celebrated the 10th anniversary of the Denver Chapter. A local radio personality, Tom Martinus, was the featured speaker. He is the host of a call-in program that troubleshoots consumer problems with products and suppliers. This dynamic host and his staff investigate and resolve a wide range of consumer issues. He gets into legal, reliability and quality issues. Charter members of the chapter were also recognized at the meeting.

The chapter is also continuing its tradition of monthly software reliability meetings.

### Boston

The Boston Reliability Chapter has continued their busy program of monthly dinner meetings, lecture series, and technology development workshops. The October monthly dinner meeting featured Hal Becker of Codex Corporation who talked about Electrostatic Discharge Events from their source to their impact on industrial and commercial electronic equipment. Hal easily handled this touchy subject with aplomb and his talk was shockingly well received.

October also saw the start of the Chapter's 1990 Annual Fall Lecture Series on Total Quality Management. Indoctrinating the 25 attendees with TQM principles were Mark Snyder, Mary Ann Russo, and Bill Koury, all of Digital Equipment Corporation. The evening lectures were devoted to the basic concepts of TQM, the need for senior management commitment, the importance of teams and how to implement TQM.

At the November monthly meeting, Gene Carrubba of Codex Corporation spoke about the Changing Role of the Reliability Engineer. Two trends were noted: (1) customer quality expecta-

tions have risen such that product quality must be designed in up-front rather than "managed" later; and (2) reliability evaluation tools and techniques have moved more into the mainstream engineering disciplines. Reliability engineering in the future will thus play a much less reactive role at the end of the product design cycle and a much more proactive role in the up-front design process.

John Chapin of Chapin Consultants continued in this vein at the December monthly meeting with a talk on the quality and reliability requirements to be mandated by the European Community in 1992 — ISO 9000. This term has sown fear in traditionally-managed companies that must modernize their corporate culture and quality commitments or be barred from trade.

Also in December, the Chapter co-sponsored with the Control Systems Chapter a talk on the Evaluation and Supportability of Space-Based Assets by Joel Luna of Dynamics Research Corporation. Joel's presentation on satellite life-cycle considerations was truly multi-disciplinary bringing together reliability modeling to assess the cost-benefits of fault-tolerant redundancy, celestial mechanics to determine fuel costs, and queuing theory to assess service policies and repair costs.

The Technology Development Workshop continued to whittle down what it wants to accomplish regarding Environmental Stress Screening. The ESS focus of the group was set at the September meeting with a proposal to produce a guide that would benefit the engineering community by summarizing and/or supplementing existing material. Action items to research current ESS publications and data availability from members respective companies.

The October workshop reviewed this research and not surprisingly confirmed how reluctant companies are to divulge ESS-related data in a non-proprietary forum. Nonetheless, at least two commercial companies have offered data from opposite ends of the ESS strength spectrum. The group identified two general areas in need of better information: 1. Engineering issues, and 2. Management issues. The November workshop began a broader focus on the engineering issues.

Future Chapter activities continue with monthly meetings on Software Reliability Modeling, Accelerated Life Testing, and a social gathering in May. April brings the 29th Annual Boston Reliability Chapter All Day Seminar with the theme "Staying Competitive in the 90's: Reliability, Maintainability, and Quality for a Changing World."

### Los Angeles

We have had 6 technical meetings:

1. 4/26/90 — Dwight Borses of National Semiconductor spoke on Future-Bus: A Next Generation Backplane.

2. 5/31/90 — Dr. Daniel Binder, formerly of Hughes Aircraft; Mal Kong and Mark Kaczmarek of TRW spoke on Satellite Vulnerability: Radiation Effects vs. Electronics.

3. 6/21/90 — A lecture of the Los Angeles Metro Rail was held and a tour of the facility was held the following Saturday. Free rides were given on the then unopened Blue Line.

4. 7/26/90 — Mr. Mark Gibbel of Gibbel Corp spoke on The Awful Truth about Thermal Analysis.

5. 8/23/90 — Ms. Diana Nickelson of TRW spoke on the Fundamentals of Concurrent Engineering Principles and then Mr. John Fialko of Hughes Aircraft concluded by speaking on these principles as applied to an existing program at Hughes.

6. 9/27/90 — A panel discussion on ASIC/VHSIC Possibilities was conducted with panel members Dave Franklin, Charles Finnilla, and Bill Farwell from Hughes Aircraft and Gerry Neilson of TRW.

One two day mini-course was conducted on Improving the Process. Irv Doshay of Hughes Aircraft, Mark Gibbel of Gibbel Corp, and Ken Blummel of Management Sciences lectured on designing, developing and producing better hardware/software systems.

Upcoming meetings include:

1. New ESS (Environmental Stress Screening) Findings and Techniques

2. Tomorrow's Electric Car

3. Computer Generated Music

4. Sneak Circuit Analysis — New Software Developments

5. Robotics

One seminar is planned for October on Thermal Design and Testing of Space Flight Electronic Systems.

Our Bulletin Board activity is consistent with over 100 subscribed members. Membership is free. We offer meeting information, Jobline, E-Mail, Video Tape Exchange information, Shareware and Demos. Phone # is (818) 768-7644, 300-2400 Baud.

### Dallas

The Dallas Chapter of the Reliability Society has expanded the scope of its programs for the 1990 - 1991 time period. In the past, meetings were held only in alternate months. Programs are now being held monthly through May 1991. These programs cover a broad range of topics related to reliability. Subjects for 1990 - 1991 meetings include:

Date Subject

09/11/90 Reliability test results of hermetic leadless carriers on surface mount boards

10/16/90 Understanding VLSI failure mechanisms

11/13/90 Developing a reliability growth test plan

01/15/91 Super collider reliability

02/19/91 IC Packaging

03/19/91 Overview of NSIA concurrent engineering study

04/16/91 Is your software ready for release?

05/21/91 Assessment of solder joint field reliability via military/contractor repair survey

### Philadelphia

The Philadelphia Chapter is pleased to report the following meetings:

September 18, 1990

How the West Was Won or How the Western Electronic Semiconductor Technology Was Won by The Japanese, A Modern Lesson in History

Mr. Stu Levy

October 16, 1990

Alternative Communication (Disaster Recovery) Via Fiber Optics

Mr. Donald S. Modaro

### Washington/Northern Virginia

The Washington/Northern Virginia Chapter opened its technical meeting season on 18 October, when Dev Raheja of Technology Management, Inc. presented a talk on "What Is Wrong With Total Quality Management Programs?". Although not all of Mr. Raheja's alternatives met with universal approval, not one member of the audience arose to defend TQM against his criticisms. (Could this be an indication that the members of the Society don't think much of TQM, or is it an indication that the members of the Society don't much think of TQM?)

Society members may also be interested in the fact that Mr. Raheja is the author of a newly published book "Assurance Technologies, Principles and Practices," which is available from McGraw-Hill.

Last year the Chapter sponsored a seminar on Software Quality Auditing in the Washington area. The focus of that seminar was on auditing during development. Consideration is being given to continuing the series with a seminar either on auditing during maintenance or on auditing of software configuration management. Reactions from Society members as to which would be the more useful topic would be appreciated and should be addressed to:

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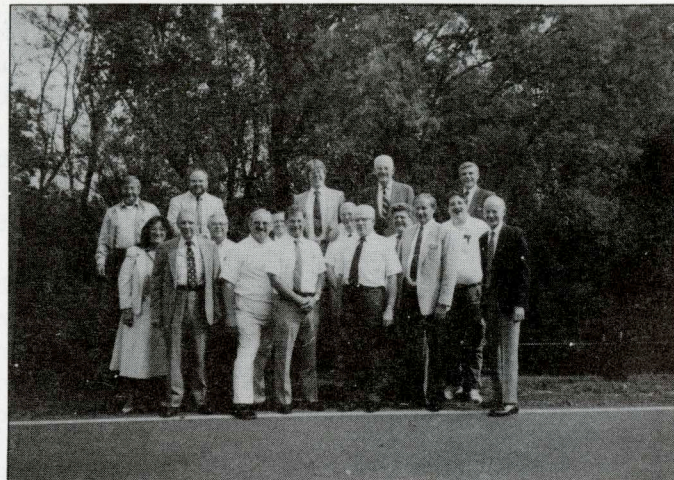
## IEEE RS ADCOM Meeting Report

Your ADCOM met during the course of the 4th annual CAD/CAE workshop held in Leesburg, VA on October 11, 1990 to review past actions and to plan for future activities. During the course of the meeting we adjourned outdoors on the grounds of the Xerox Training Center (where thousands of deer run wild) for a group shot.

As part of the meeting, Alan Plait gave a report as the new chapter historian. During the previous meeting Alan was appointed as the historian by Bernhard Bang. The purpose of the office is to collect and retain information and archival documents relating to the history of the IEEE Reliability Society and its predecessor organizations.

An exciting and memorable input to such matters was provided by Dr. Thad Regulinski (former president, 13th and current Senior Associate Editor of the Transactions) when he published the IEEE Centennial Edition of the transactions in April 1984. His diligence and research provided us with a fascinating view of the Society's early days. Since then, we had a 40th anniversary celebration, reported in a Newsletter of last year (1989).

It will be Alan's task to update the information obtained by Dr. Regulinski and to assist IEEE headquarters in obtaining any missing or supplemental documents for our archives.



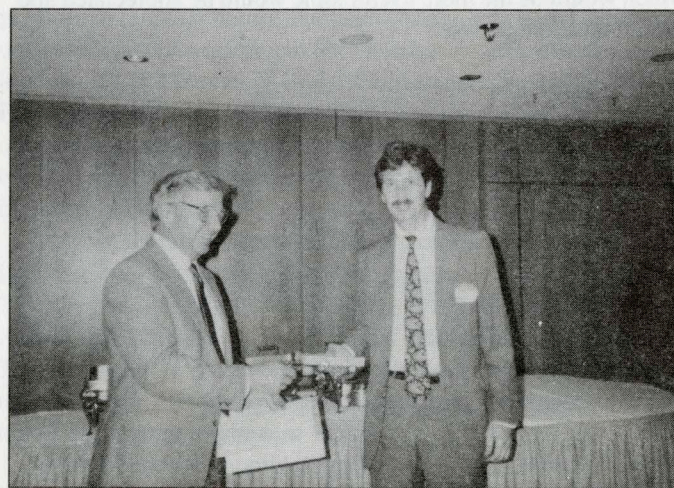
Back row left to right (Dale Butler, Mark Snyder, Don Markuson, Howard Kennedy, and Richard Kowalski) front row left to right (Loretta Arellano, Bernhard Bang, Bill Wallace, Al Plait, Tom Fagan, Kurt Greene, Henry Hartt, Paul Gottfried, Tom Weir, Sam Keene, Robert Schlentz, and Harry Reese)

## Chapter Awards

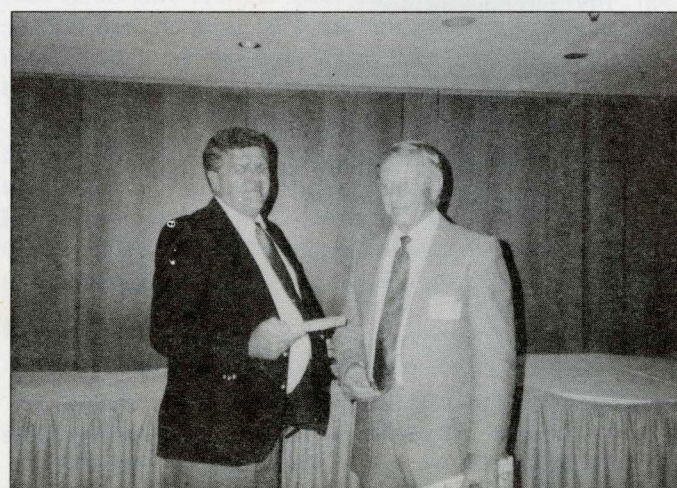
The Reliability Society AdCom held its Annual Chapter Awards Dinner at the Xerox Training Center in Leesburg, Virginia, on Thursday evening, October 11, 1990. Dale Butler,

Chairman of the Chapter Awards Committee, reported that ten chapters had completed awards questionnaires:

Boston                      Ottawa  
Cleveland                  Philadelphia



Dale Butler (left) presents first-place award to Nino Ingegneri of the Washinton/Northern Virginia Chapter



Tom Weir accepts second-place award for Philadelphia

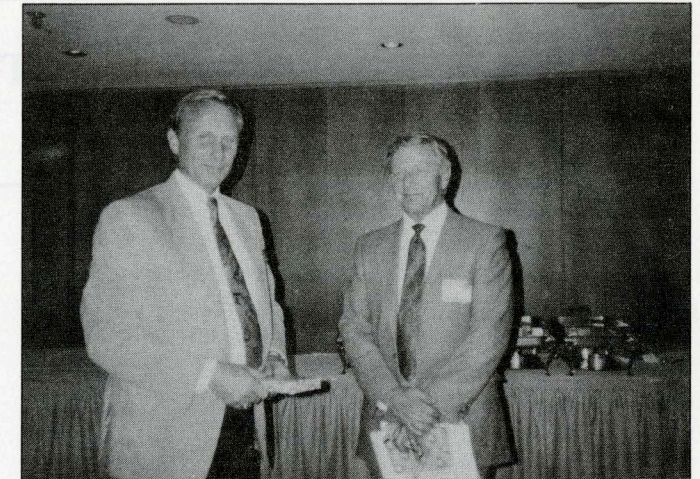
Dallas                      Santa Clara  
Denver                      Tokyo  
Los Angeles              Washington/Northern Virginia

Their responses included information on chapter activities, technical publications, and membership growth. Dale applauded the efforts of each participating chapter and the thoroughness and completeness of their responses.

The winning chapters and awards were:

First Place: Washington/Northern Virginia  
\$500.00 for Chapter Expenses  
Second Place: Philadelphia  
\$150.00 for Chapter Expenses  
Third Place: Denver  
\$100.00 for Chapter Expenses

The Reliability Society AdCom congratulates the winning chapters and all the participating chapters for a fine year of activities.



Sam Keene accepts the third place award for Denver

## Annual IEEE Reliability Society Award

The Annual IEEE Reliability Society Award is presented each year to an individual who has made significant contributions to the field of reliability. The contributions can be in the areas of scientific development, professional achievement or management. Selection of the winner is based on the overall impact of his or her contribution to the advancement of reliability theory, education, engineering, or its management. The award is presented at the Reliability Society awards function in January each year.

The recipient of the 1990 Annual Award is Colonel Domenic F. Basile. Colonel Basile has been cited for his direction and leadership in the Army's Single Channel Ground and Airborne Radio System (SINCGARS), which has resulted in 15 to 1 improvement in system reliability.

Colonel Domenic F. Basile became the SINCGARS Project Manager in July 1986. A native of Philadelphia, he graduated from LaSalle College in 1964 as a distinguished military graduate and was commissioned as a Second Lieutenant in the Regular Army Signal Corps.

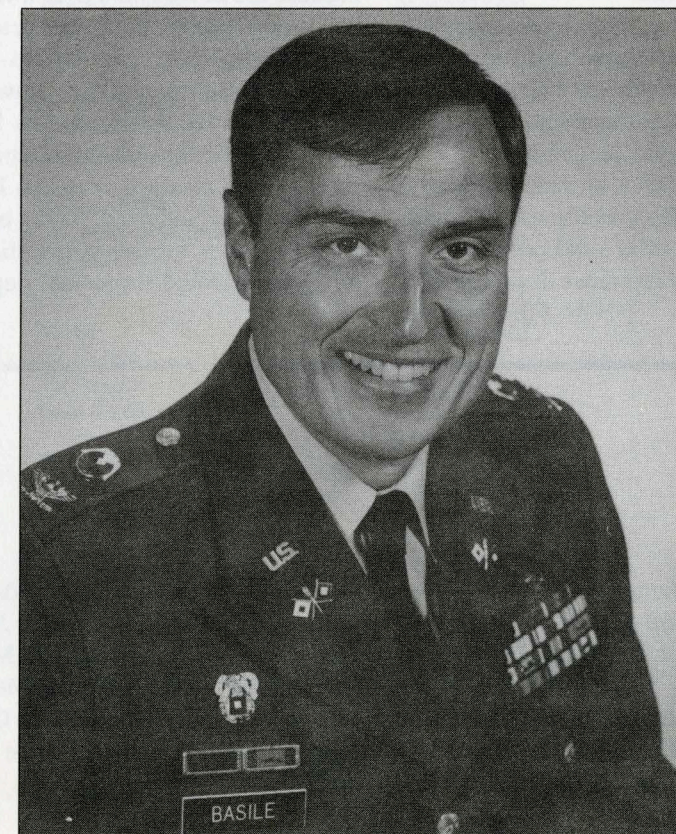
Later, he was awarded a Master of Science degree from Rutgers University.

His military education includes the Basic and Advanced Signal Officer courses, Command and General Staff College, Industrial College of the Armed Forces and the Defense Systems Management College.

Following airborne training, Colonel Basile served a tour of duty in Korea, first as platoon leader, then as company commander of the 227th Signal Company. Later, he was the company commander of B Company, 41st Signal Battalion in Vietnam. He returned to Korea in 1982 and commanded the 41st Signal Battalion after its redeployment there.

Colonel Basile has had various procurement assignments preparatory to his current position as project manager. In the early 70's, he completed successive communications-electronics acquisition assignments in Philadelphia and Fort Monmouth. Later he served with the Royal School of Signal in the United Kingdom, modeling the British Army's tactical communication system, Ptarmigan. After returning to the United States, he was assigned as Chief of the Procure-

(continued on next page)



Colonel Domenic F. Basile, Winner of 1990 Award

## The Turbo-Encabulator Reliability Simulator Equipment (Terse)

For a number of years now, work has been proceeding in order to bring to perfection the crudely conceived idea of a reliability simulator that would not only employ inverse reactive current for use in unilateral failure detractors, but would also be capable of synchronizing cardinal gammeters at rates which vary anisotropically with the square root of failure propensity. Such a machine is the Turbo-Encabulator. Basically, the only new principle involved is that instead of input power being generated by the relative motion of conductors and fluxes, it is produced by the modial interaction of magneto-reluctances and capacitive directance in a non-stressed environment.

The original simulator had a base plate of prefabricated Amulite, surmounted by a malleable logarithmic casing, in such a way that the two spurving bearings were in a direct line with the pentametric fan. The latter simply consisted of six hydroscopic marzelvanes, so fitted to the ambifascient lunar wan shafts, that side rumbling was effectively prevented and Weibull wearout was reduced to epsilon dimensions. The motron winding is of the Lotus-O-Delta type, placed in panendermic semi-boloid slots in the rotor, every seventh conductor being Normally connected by a Tremie tube to the differential girdle spring on the "up" end of the gammeters so that k-out-of-n redundancy could be generated.

Forty-one monestically spaced grouting brushes were arranged to feed a mixture of high "s" value Phenylhydrobenzamine and five percent reminative Tetraliodohexamine into the rotor slip stream. Both of these liquids, used to reduce the ! parameters of failure multipliers by cooling the panendermic slots, have a specific periscocity.

Where n is the diathetical evolute of retrograde temperature phase disposition and C is Cholmondeley's annular grillage coefficient. Initially, n was measured with the aid of a metapolar refractive pilfrometer. (For a description of this ingenious device, see I.E.

Rumpelverstein's "Zeitschrift fur der Electrotechnishes Statisches Donnerblitze Apparat", Vol. 2.) But up to the present date, nothing has been found to equal the transcendental Hopper-Dadescope. (See Proceedings of the Peruvian Academy of Skatalogical Sciences, June 1981.)

Electrical engineers will particularly appreciate the difficulty of nubbing together a regurgitative purwell and a supremitive wennelsocket. Indeed, this proved to be a stumbling block to further development of the simulator until, in 1981, it was found that the use of anhydrous nangling pin assemblies enabled a kryptonastic bolling shim to be tankered.

Early attempts to construct a sufficiently robust and failure-free spiral decommutator failed due, largely, to lack of appreciation of the excessive quasi-plastic stresses in the gromell studs. The latter were especially designed to hold the roffit bars to the spim shaft. When, however, it was discovered that wending would be prevented by the simple addition of livring sprockets to the shaft, perfect running was assured.

The operating point of the high frequency rempeaks was maintained, as near as possible, to the bituminous spandrels, by constant fromaging. Thistle sheaves were then discarded because the new system does away with dramcock oil, which had used after the failure detractors had remissed.

Undoubtedly, the Turbo-Encabulator Reliability Simulator Equipment has now reached a high level of technical development. It has been successfully used for increasing operational availability of such sophisticated mechanisms as nofer trunions. In addition, when barescent skor motion is required, it may be employed (in conjunction with a drawn reciprocating dingle arm) to reduce axial misanthropia and sinusoidal depletion of MTBF.

Defense Meritorious Service Medal, Meritorious Service Medal (with two Oak Leaf Clusters), Joint Service Commendation Medal, Army Commendation Medal (with three Oak Leaf Clusters), the Vietnam Service Medal, Vietnam Commendation Medal, and the Meritorious Unit Citation.

He and his wife, Elaine, have three children, Dana, Frank, and Douglas.

### Society Award (continued from p.7)

ment Division and Regular Army Signal Corps. Later, he was awarded a Master , later, as Executive Officer at the Defense Personnel Support Center, Philadelphia. At the Office of the Assistant Chief of Staff of the Army for Information Management, he served as Chief of the Acquisition and Policy Division and later Director of the Policy and Strategy Directorate.

Colonel Basile has received the Legion of Merit, the Bronze Star Medal with "V" device (with one Oak Leaf Cluster), the

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## IEEE Fellow Nominations

It is time to consider any members of the Reliability Society who have earned the honor of being advanced to Fellow grade. The IEEE bylaws define the Fellow grade as one of unusual distinction in the profession, to be conferred only by invitation of the Board of Directors upon a person of outstanding and extraordinary qualifications and experience in IEEE designated fields who has made important individual contributions to one or more of these fields. A nominee must be a Senior member of the institute, and have been a member in any grade for at least five years prior to January 1 of the year of election.

The Fellow Committee, appointed by the Board of Directors, has the responsibility of making recommendations to the Board of Directors for nominees to be conferred to the grade of Fellow. The Fellow Committee depends primarily upon information furnished by a nominator to point out the qualifications and unique contributions of a candidate. This information is supplemented by an evaluation by the appropriate society and comments from Fellow grade references who can attest to the candidate's achievements.

Any person who is sufficiently knowledgeable of a candidate's achievements can serve as a nominator. If you are aware of a deserving candidate and would like to pursue a nomination, please contact Dr. Thad Regulinski (Reliability Society Awards and Nominations Chairman) for assistance.

Reliability Training Institute  
PO Box 31113  
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You may also obtain a nomination kit by request to:

Staff Secretary  
IEEE Fellow Committee  
345 East 47th Street  
New York, NY 10017  
(212) 705-7750

## More on Reliability Engineering in Japan

### Paul Gottfried Vice President — Publications

In the October issue, I reported on some observations and discussions concerning the practice of reliability engineering in Japan. Copies of that article were sent to the participants in a meeting (at ISRM 90) that was the source of much of my information. I encouraged these participants to comment on my report. Two of them have sent me comments (largely in Japanese, translated for me by my wife) that I'd like to pass along in summary form:

Mr. Wataru Ohtsu stated that, for certain equipments and systems, Japanese government agencies such as NASDA and quasi-public organizations such as NTT and Japanese Railways do require MIL-style quality and reliability programs. Often, as in the U. S., these programs require too much paper and a great deal of effort.

Prof. Yoshihisa Suzuki stressed his belief that Japanese product reliability is the result not of organization, but of culture — corporate commitment to doing things right, and to fixing products (if necessary) regardless of specifications or contract requirements, in contrast to American and European practices.

This Tokyo Chapter report comes from the Chapter Chairman, Prof. Masayoshi Furuya, via Paul Gottfried.

The Chapter's Annual Technical Meeting was held from 2 to 5 pm. on Monday, September 15. The speakers were Katsuyuki Shimohira of the space agency, NASDA, and Prof. Michio Horigome of the Department of Control Engineering, Tokyo University of Mercantile Marine. (Prof. Horigome's presentation, on a Bayes Empirical Bayes Reliability Growth Model, was based on an earlier paper coauthored by Prof. Furuya and on some work with Profs. Singpurwalla and Soyer of George Washington University.)

## Chapter Inputs

### Alan Plait Technical Director ManTech Field Engineering Corp.

Dear Editors:

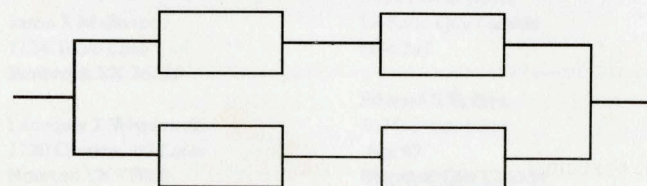
I would like to expand on Dr. Keene's Tech Topic on Quad Redundancy in the July Issue of the Newsletter. (Note: Equation 7 should read  $\theta = \frac{3}{2\lambda}$ .)

In a previous paper\*, I developed the equations related to quad redundancy using factors associated with the parts' tendency to fail short ( $K_S$ ) or open ( $K_O$ ). If these are the supposed only conditions of failure, then

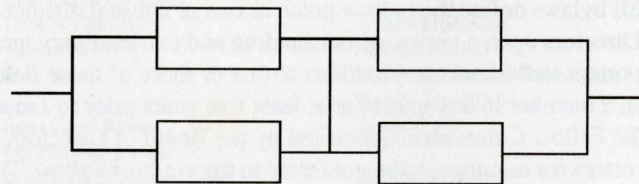
$$K_O + K_S = 1$$

For comparison purposes, the results were computed for carbon composition resistors and simple diodes.

Two quad configurations were also used, as with Dr. Keene's examples. The simple configuration (S-quad):



and the bridge or bar configuration (B-quad)



indeed have different reliabilities, depending upon the predominant failure mode (short or open).

Because of the basic symmetries of the defining equations if  $K_O = K_S = 0.5$ , the reliability of both quad configurations is the same.

However, as  $K_O$  increases, the B-quad yields a higher reliability than that of the S-quad, (and vice-versa). In other words, for parts having a high probability of experiencing an open failure mode, the B-quad configuration should be used to improve reliability.

In fact, if,  $K_O = 0.99$ , the reliability comparison between a single part and a B-Quad configuration shows an improvement of three orders of magnitude. That is, the reliability has three 9s inserted after the decimal point: if the single part reliability is 0.984, the B-quad yields 0.999984. Another way of saying the same thing is that the failure rate is reduced by a factor of 1000.

\* "When is Reliability Improved by Quad Redundancy?", Alan Plait, Space/Aeronautics Magazine, March 1962

## AAIA Software Reliability Working Group

### Rich Karcich

Approximately two years ago the American Institute of Aeronautics and Astronautics (AIAA) held the first formal meeting of its Space-Based Observation Systems Committee on Standards (SBOS COS). The SBOS COS is developing standards that will help improve reliability, safety, and reusability while reducing life-cycle costs for space-based missions, both manned and unmanned. One of the current SBOS projects, of particular interest to the software engineering community, is the formation of a Software Reliability Working Group.

The Software Reliability Working Group of the AIAA Space-Based Observation Systems Committee on Standards has been active for approximately one (1) year and is chaired by David M. Siefert of NCR Corporation. John Musa of AT&T Bell Laboratories is Vice-Chair. The group has assembled a Blue-Ribbon panel of software reliability experts and is moving rapidly along several fronts, 1.) developing a viable software reliability model that permits quantitative assessment of risk and prediction of failure rates, 2.) establishment of an operational software reliability database, and 3.) publishing a software reliability handbook. Additionally, automated tools will be identified and 'Best Current Practices' will be developed to support the practical use of these products.

Establishment of an operational software reliability database is a cornerstone in the working group's overall thrust. Our goal is to have a high-integrity database which will be useful to both practitioners and researchers. Currently, members of the working group have completed a pilot-load of data into the new database maintained by the Data & Analysis Center for Software (DACs). Future application areas to be represented in the database include:

- Astro-Aeronautics
- Telecommunications
- Scientific (signal processing medical imaging, engineering simulation, etc.)
- Industrial Processing
- Business/MIS

You can contribute to this effort and gain the satisfaction of participating in what promises to be a significant advance in the field of Software Reliability Engineering by submitting your high quality project data. We assure complete confidentiality to participants.

For more information on the AIAA Software Reliability Working Group and how you might contribute to the growth of this emerging technology, please contact either myself on (303) 673-6223 or Dave Siefert at (513) 445-6948.

## Technical Topics Reports

The Technical Operations Committee is developing a set of monographs on specialty areas in reliability and maintainability topics. These monographs will include but not be limited to:

- Compendium of Part Failure Modes
- Fault Tolerant Techniques
- Experimental Design Approaches
- Software Reliability
- Mechanical Reliability
- Environmental Stress Screening
- Human Reliability
- Etc.

The first monograph has been developed on "fault tolerant" techniques. If anyone is interested in participating in the development of these monographs, please contact Dr. Samuel Keene (address on inside cover). He will send you a draft of the first monograph and facilitate your participation.

The goal is to make the ensemble of technical monographs available to society members when sufficient monographs have been developed.

## Technical Information Packets Available

The Boston Chapter of the IEEE Reliability Society announces the availability of two technical information packets as part of the member services. They are:

1. A commercial IC data base containing over 700 parts. The list contains the parameters necessary to perform a MIL-Handbook-217 type stress prediction.
2. A commercial electrical part Derating Guide suggested for typical computer type of products which are expected to operate in a comfort-controlled environment.

Either packet is available to IEEE members upon request from Gene Bridgers at 28 Longmeadow Lane in Sharon, MA 02067. Phone requests should use (617) 784-6855. Please provide your IEEE membership number in any correspondence.

### Commercial Data Base Description

The data offered consists of over 700 parts, concentrating on commercial grade parts. The data is believed to be appropriate for performing Reliability predictions using the Mil-Handbook-217D or E. The data base contains:

**Part Number:** Based on vendor number but omitted prefix and screening but added suffix for package (usually P for plastic and C for ceramic).

**Part Name:** Abbreviation of vendor part name.

**Rated Power:** Vender rating.

**Typical Power:** Estimate of the actual power dissipation used.

**Theta JA:** Typical value.

**Theta JC:** Typical value.

**Pin Count:** Per vendor data.

**Complexity:** Estimate of gates or transistors or bits as needed.

**Package:** The package assumed for the data.

**Technology:** Technology suggested for protection.

A few supplementary comments are offered to the purist of 217. Some parts are classified as "digita;" that others may classify as "linear." Specifically, these include line drivers, line receivers, and D-to-A devices. For Gate Arrays, the complexity is the maximum possible rather than the gate count actually being used by a specific implementation.

Please read the Data Disclaimer at the end of this announcement.

### Design Derating Guide

This is a suggested Derating Guide for commercial equipments that use plastic IC's and operate in a typical office environ-

ment. A "Commercial Version" is needed because the commercial grade parts are not usually rated for as wide a temperature range and the equipments are not used in as wide a range of environments. It is available from Gene Bridgers at the location described above. This information is available as an 8½ x 11 inch hardcopy or on a 5¼ inch DSDD IBM PC compatible floppy in either ASCII or leading Edge Word Proceeding format.

RADC will provide the military recommended derating limits in a handy circular slide rule style, by calling (315) 330-4920.

### Requests for Information to Contribute

If you have information to share for the benefit of the membership, please provide it and a written release to get this into the hands of the interested technologist. You can send requests, ideas, objections, and other material which we might distribute.

We suggest the release might be as simple as to state:

1. What is being offered.
2. What are the restrictions.
3. How do you want yourself and/or your organization to be identified as the contributors.
4. Any comments or constructive suggestions.

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A few issues ago, the 4,000 recipients of the Reliability Society Newsletter received a survey from the Boston Reliability Chapter's Technology Development Committee. The survey asked several questions relative to the MIL-HDBK-217E quality factor for commercial ICs. 47 responses were received. About 60% of the responses were from commercially oriented companies, and about 40% from defense oriented companies. 85% of the responses were from the U.S., while 15% were from other countries. The results are tabulated below.

	YES	NO
Is the quality factor for commercial IC's too pessimistic?	46	1
Have you data to support your opinion?	26	21
May your data be published without restrictions?	2	24
May your data be published with restrictions?	7	17

As can be seen, almost all of the respondents are of the opinion that the IC quality factor of MIL-HDBK-217E is pessimistic, and most of the respondents have data to support their opinions. Unfortunately, much of the data is not available for publication.

There is on-going spirited discussion on the merits of reliability prediction using the techniques of or similar to MIL-HDBK-217E. We had hoped to receive responses backed up by data that would add to the discussion. We received the

responses, but not the data, as the data appears to be proprietary. We did receive 2 offers of non-restricted data. One referenced a Norwegian Institute of Technology Report STE75-A87006, dated 10 March 1987, which concludes that commercial ICs are 4 times as reliable as shown by MIL-HDBK-217D. The other offer was from P.D.T. O'Connor, well known in the debate on reliability predictions. Mr. O'Connor is also a contributor to the recent ASQC Reliability Review (September 1990) which was

devoted to the subject of reliability predictions.

In following up on the data that is available on a restricted basis, we reached the conclusion that many commercial companies are successfully using MIL-HDBK-217E in reaching economic decisions on warranties and service contracts. However, each of these companies uses an adjustment factor, in some cases substantial, beyond the factors provided by the handbook.

## MIL-HDBK-217E, NOTICE 1 SOFTWARE

### RELIABILITY PREDICTION PROGRAM VERSION RPP-4.0 AVAILABLE

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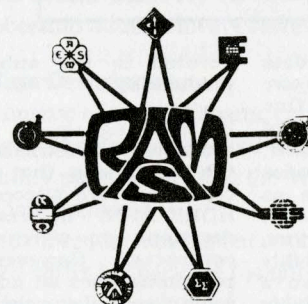
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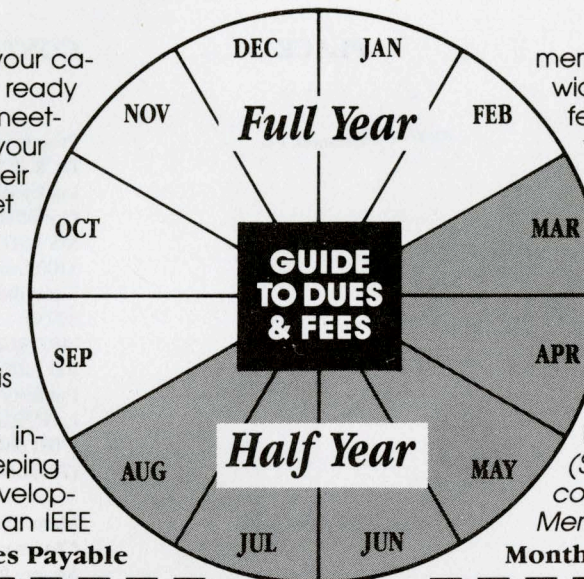
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## Conference Calendar

DATE	CONFERENCE	PLACE	CONTACT
<b>1991</b>			
Jan. 29-31	Annual Reliability and Maintainability Symposium	Orlando, FL	Program Chairman Dr. R. J. Lumas Lockheed Space Operations Operations MS LSO 291 1100 Lockheed Way Titusville, Florida 32780 (407) 867-5921 Fax (407) 867-2131 Publicity L. M. Rabon Jr. (703) 664-1003 (703) 664-2502
Mar. 5-7	The 17th Convention of Electrical and Electronics Engineers in Israel	Tel-Aviv, Israel	Marcel Friedman Chairman — Reliability Society Chapter IEEE Box 413 Rishon Le Zion, Israel 70103
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Mar. 18-21	IEEE International Conference on Microelectronic Test Structures	Kyoto, Japan	Yukinori Kuroki Microelectronics Research Laboratories NEC Corporation 1120, Shimokuzawa, Sagamihara-Shi Kanagawa 229, Japan Tel: 81-427-71-0801 Fax: 81-427-71-0886 E-Mail: YKUROKI@NSIS86.CL.NEC.CO.JP
Apr. 8-11	1991 International Reliability Physics Symposium	Las Vegas, NV	General Information: Patrick E. Kennedy General Chair, 1991 IRPS MSI (714) 970-6546
Apr. 18-20	11th Advances in Reliability Technology Symposium	Liverpool, England	Mrs. Ruth Cambell 11th Advances in Reliability Technology Symposium National Centre of Systems Reliability Ukaea, Wigshaw Lane Culteth, Warrington WA3 4NE UK Tel (0925) 31 244 X4243 Fax (0925) 766 681
Apr. 25	29th Annual Spring Reliability Seminar	Framingham, MA	General Information: Anita Cederholm Codex Corporation 20 Cabot Blvd. Mansfield, MA 02048-1193 (617) 821-7521

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Apr. 24-25	Tri-Service Ramcad Group 6th Technical Interchange Meeting	Arlington, VA	Contact: 6th Ramcad Tim Committee c/o Washington, DC Chapter of Sole PO Box 2645 Arlington, VA 22202 (703) 664-5771
Jun. 5-8	International Symposium on Reliability and Maintainability	Tokyo, Japan	ISR&M 1990 Tokyo Union of Japanese Scientists and Engineers 5-10-11 Sendagaya, Shibuya-Ku, Tokyo 151 Japan 03-352-2231 Fax 03-225-1813
Jun. 18-22	7th International Conference on Reliability and Maintainability	Brest, France	Secretariat for the 7th Conference CNET Division LAB/IFE BP40 22301 Lannion Cedex France 96 052430 Fax 96 052372
Aug. 26-30	8th Reliability in Electronics Symposium (Relectronic '91)	Budapest, Hungary	Dr. Albert Balogh Scientific Society for Telecommunication H-1372 Budapest P.O. Box 451 Hungary
Sep. 24-26	1991 IEEE Autotestcon	Anaheim, CA	Robert C. Rassa Mantech Advance Systems International 150 S. Los Robles Ave. Suite 350 Pasadena, CA 91101
Oct. 1-2	Reliability and Safety of Processes and Manufacturing Systems	Tampere, Finland	Yngve Malmen Technical Research Centre of Finland (VTT) Safety Engineering Lab. PO Box 656, SF-33101 Tampere, Finland +358 31 163 276 (Phone) 22313 tktr sf (Telex) +358 31 163 495 (Fax)
Nov. 11-15	Third International Symposium on the Physical and Failure Analysis of Integrated Circuits	Singapore	IPFA 91 Technical Program IEEE Singapore Section 16A Science Park Drive #03-03 The Pascal Singapore Science Park Singapore 0511 Tele: 773-0056 Fax: 773-0054
Dec. 20	International Conference on Safety	Tokyo, Japan	Dr. Y. Suzuki Tokyo Metropolitan Institute of Technology 6-6 Asahigaoka, Hino-City Tokyo 191 Japan

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