

Reliability Society Newsletter

Editor: Susan Eames
Vol. 30, No. 1, January 1984 (USPS 460-200)

LOOKING FOR

Kam L. Wong would like to buy a copy of the book, "Reliability Engineering for Electronic Systems," by Myers, Wong, and Gordy, published by John Wiley and Sons in 1964. If you have such a book and are interested in selling it, please contact me at:

Hughes Aircraft Company
P. O. Box 902
El Segundo, CA 90245

(213) 616-6305

Thanks a lot!!

Call for Papers

If you wish to present papers on Software Reliability, please submit to:

Ron Watts
10440 State Highway 83
Colorado Springs, CO 80908, 303-594-1329

May 24, 1984 - Ball Aerospace will host a half day Technical meeting.

Jim Kaiser

Editor's Column

1984 is the Hundredth Anniversary of the IEEE. However, the Reliability Society has its history also. Here are the highlights on how we became the IEEE Reliability Society.

- In 1949 the IRE formed a Professional Group on Quality Control.
- In 1954 the name was changed to the Professional Group on Reliability and Quality Control.
- In 1963 we became the IEEE Professional Group on Reliability.
- In 1964, our name was changed to IEEE Reliability Group.
- In 1978, we became the IEEE Reliability Society, as we are known today.

RS Newsletter Inputs

All RS Newsletter Inputs should be sent to the Editor, Susan Eames, 2 Linda Street, Westborough, MA 01581 per the following schedule:

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

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PAUL GOTTFRIED
9251 THREE OAKS DR
SILVER SPRING
MD 20901
07N ***
DEC16

Reliability Society Officers

PRESIDENT N. J. McAfee Westinghouse Box 746, MS 433 Baltimore, MD 21203	VP MEMBERSHIP M. J. Shumaker Martin Marietta Aerospace Mail No. 8444 P. O. Box 179 Denver, CO 80201	VP TECH. OPERATIONS I. A. Feigenbaum COMSAT Laboratories Clarksburg, MD 20734	SECRETARY H. A. Malec ITT/ATC 1 Research Drive Shelton, CT 06484
JR. PAST PRESIDENT C. M. Bird IBM Corporation 102A353 Owega, NY 13827	VP MEETINGS A. O. Plait ManTech International Corp. 2341 Jefferson Davis Highway Suite 1111 Arlington, VA 22202	VP PUBLICATIONS T. L. Fagan General Electric Company 777 14th Street, N.W. Suite 1000 Washington, DC 20005	TREASURER A. Coppola Rome Air Development Center RADC/RBET Griffiss AFB, NY 13441

Reliability Society Chapter Chairmen

CHAIRMAN, CHAPTER ACTIVITIES Bernhard A. Bang Westinghouse Electric Corp. P. O. Box 1521, MS-3856 Baltimore, MD 21203	CONNECTICUT George Bartok (Acting) 15 Stony Brook Drive Marlborough, CT 06447	MONTREAL Mario Oligny Hydro Quebec 75 West Dorchester, 10 CD Montreal, Quebec, Canada H2Z 1A4	PHILADELPHIA Fulvio E. Oliveto 920 Snyder Ave. Philadelphia, PA 19148
BALTIMORE Thomas L. Bartolomeo 2405 Windsor Road Baltimore, MD 21234	DENVER John R. Adams 4 Mile Canyon Salina Road Boulder, CO 80302	NEW YORK/LONG ISLAND Esam Khadr Public Service Electric & Gas -M.S. T14A 80 Park Plaza P. O. Box 570 Newark, NJ 07101	SANTA CLARA VALLEY/SAN FRANCISCO/OAKLAND-EAST BAY Phillip Johnson Hewlett Packard 350 West Trimble Road San Jose, CA 95037
CENTRAL NEW ENGLAND COUNCIL Edward Naas GTE Sylvania MS-655/10 77 A Street Needham Heights, MA 02194	FLORIDA WEST COAST James N. Rutledge E Systems, ECI Division P. O. Box 12248, MS-31 1501 72nd St. North St. Petersburg, FL 33733	NORTH JERSEY Sergio W. Bogaenko 32 Melissa Drive Totowa, NJ 07512	TWIN CITIES Jon F. Yearous (Acting) Control Data Corp. Box 609 MS-HQG 326 Minneapolis, MN 55440
CHICAGO Arun K. Hundiwal TRW, Eagle Control Div. 1405 W. Fullerton Avenue Addison, IL 60101	LOS ANGELES COUNCIL Samuel N. Lehr TWR/ESG M5TN/1231 1 Space Park Redondo Beach, CA 90278	ONTARIO Dr. Ed So Nat'l Research Council of Canada Div. of Electrical Eng'g Montreal Road, Bldg. M-50 Ottawa, Ontario, Canada K1A 0R8	WASHINGTON/NORTHERN VIRGINIA Albert Kelly 1090 Broadview Drive Annapolis, MD 21401
CLEVELAND V. R. Lalli 21000 Brookpark Road MS 500 211 Cleveland, OH 44135	MOHAWK VALLEY Jerome Klion RADC/RBET Griffiss AFB, NY 13441		

Editor: Susan Eames

IEEE RS Newsletter
2 Linda Street
Westborough, MA 01581

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Chapter Reports

Shown below are the officers for the '83-'84 FY and our schedule of meetings planned for the '83-'84 term.

Chairman:	Thomas L. Bartolomeo Westinghouse Electric Corp. ILS Div., Bldg. 21, MS 7374 Hunt Valley, MD 21030
Vice Chairman:	Thomas Reid Westinghouse Electric Corp. DESC MS 4730 Baltimore, MD 21203
Secretary/Treasurer:	Walter Willing Westinghouse Electric Corp. ATD, MS 3856 Baltimore, MD 21203

October 13, 1983

Topic: VLSI Reliability and Test.
Speaker: Warren O'Reilly, Advisory Engineer with Westinghouse Defense Electronics Systems Center

December 5, 1983

Topic: Implementation of Computer Reliability from the Japanese Viewpoint.
Speaker: Naomi McAfee, Manager, Design Assurance and Operations at the Westinghouse Defense Electronics Systems Center

February 28, 1984

Topic: Cinch River Breeder Reactor Program—Reliability Considerations.
Speaker: William Reese, Engineering Branch of Cinch River Breeder Reactor Program

April 17, 1984

Topic: Moisture Measurement and Effects on Circuit Reliability.
Speaker: Bernhard A. Bang, Fellow Engineer with the Westinghouse Advance Technology Division

Thomas L. Bartolomeo

Chicago

The IEEE Reliability Society of Chicago presented a tutorial on the content and application of Military Handbook—217D, *Reliability Prediction of Electronic Equipment*. The meeting took place with full attendance on Saturday, October 15, 1983, from 8:30 a.m. to 3:00 p.m. It

was held at the Community Center, 625 Busse Highway, Park Ridge, IL.

The Executive Committee members of Chicago's Reliability Society were the instructors, namely: Hugh Edfors, Ray Schirmer, Warren Foxwell, Don Kopp, Rod Garcia and Arun Hundiwal. The tutorial focused on introduction of Reliability Principles and Reliability Stress Analysis Methods for integrated circuits, discrete semiconductors, resistor and capacitor models. Also, other specifications, standards and data banks were discussed as they related to the overall reliability prediction methodology. All the attendees highly praised the tutorial which concluded with a summary and a question/answer period.

The next chapter meeting was held on November 15, 1983, 5:30 p.m., at the Holiday Inn in Oak Brook, IL. Our guest speaker, Mr. Larry O'Neill, a Static Analyst of 3M presented a seminar entitled "Electrostatic Discharge Awareness." Presentations of device susceptibility, recommended practices, and other related information including demonstrations, were given.

Arun K. Hundiwal

Denver

The Denver Chapter of the IEEE Reliability Society began its 1983-84 year with a dinner meeting featuring Naomi J. McAfee, the President of the National Administration Committee for IEEE Reliability. Naomi spoke of the future of reliability engineering in the fields of software accuracy and software security.

An awards ceremony was held during which Sam Keene received an award for his exceptional efforts in founding our Chapter and making it a continuing success. John Adams also presented the Chapter with the Chapter of the Year Award he received last summer from the IEEE Reliability Society.

Finally, a business meeting was held to discuss and formulate our 1983-84 meeting schedule and topics. The results follow:

November 17, 1973 - Dale Vander Linden of Ball Aerospace talked on "Effective Presentations."

January 19, 1984 - Joint meeting with IEEE Aerospace Chapter—Subject to be announced.

February 17, 1984 - Dr. Randal Fleming of Systems Control Technology will talk on "Specification or Fault—Tolerant System Design."

March 13, 1984 - Joint meeting with ASQC Reliability Chapter—Subject to be announced.

April 27, 1984 - Annual Ford-Aerospace Software Reliability Seminar.

Cleveland

The Cleveland Chapter planned 5 meetings for the coming service year:

Date	Topic	Remarks
10/4, 5/83	CECON '83	Conference
11/17/83	Radiographic Inspection	Lunch Meeting
02/16/84	Dinner/Dance	Social
03/24/84	Computer Data Acquisition	Dinner Meeting
04/19/84	Manned Space Program	Joint CES
05/17/84	Student Papers	Poster Presentation at CSU

CECON '83 had 20 technical papers, 7 workshops and 20 exhibitors. Attendance was down on Tuesday but improved considerably on Wednesday. The Conference Record caused some excitement but worked out okay. All in all it was a nice service for our membership in the Cleveland area.

We are making some progress on the Home Study Course. The draft copy was mailed to 16 ADCOM members for constructive review and comments within 30 days. We may get permission to go ahead with the mats by 1/1/84. One member called and asked to be signed up for the course the next time it is offered. We will not offer the course again until the Home Study Text has been completed—hopefully by 9/1/84.

Vince Lalli,
Chairman

Los Angeles Council

A seminar on "Test, Repair and Fault Diagnosis of Computer Systems" will be held March 3, 1984 at the TRW Forum, Space Park, El Segundo, CA (L.A. airport area). Authorities in the areas of failure analysis, ATE, BIT/Diagnostic programming and repair will present papers. For information, contact Sam Lehr, P. O. Box 1285, Pacific Palisades, CA 90272. Telephone: 213-535-2905. This seminar is jointly sponsored by the Los Angeles area IEEE Reliability and Computer Societies.

Caesar F. Chavez

Washington DC/Northern Virginia

The current Chapter officers of the Washington DC/Northern Virginia Chapter are as follows:

Chairman: A. L. Kelley
Vitro Corporation
COF-1/12-2002
14000 Georgia Ave.
Silver Spring, MD 20910

Executive Vice Chairman: Ruth G. Smith
4852 Ten Oaks Rd.
Dayton, MD 21036

Program Vice Chairman: W. L. (Larry) Shapleigh
3723 Randolph St.
Fairfax, VA 22030

Secretary: Dr. Robert E. Waterman
Vitro Corporation
TDD/12-2009
14000 Georgia Ave.
Silver Spring, MD 20910

A. L. Kelley
Chairman

Color TV Technology Featured In New IEEE Press Volume

The publication of *Color Television*, a Book of Selected Reprints, has been announced by the IEEE PRESS. This volume, sponsored by the IEEE Consumer Electronics Society, was edited by Ted Rzeszewski of Bell Laboratories, with the assistance of Anthony Troiano of the RCA David Sarnoff Research Center.

Over the past decade, color television signal processing has rapidly become more sophisticated with the introduction of new developments in tuning systems, IF and composite video detection, and post-detection processing. This reprint book is designed to provide a state-of-the-art survey of these important advances, approaching the subject from a television receiver perspective.

First, introductory material on the theory of color television is presented to give the reader the background necessary to appreciate the more receiver-oriented parts which follow. The 35 papers reprinted in this volume are organized into four parts, as follows: Background, Tuning, IF and Composite Video Detection, Post-Detection Processing.

The papers discuss important trends in signal processing, including the development of remote control, use of synchronous detection of the composite video, and progress in integrated circuit technology. After each part there is a bibliography which provides a rich source of additional information.

Color Television is priced at \$44.95. IEEE members may buy this book for \$26.95, a 40% discount. This 400-page volume may be ordered postpaid from the IEEE Service Center, 445 Hoes Lane, Piscataway, NJ 08854.

1984 Conference and Course Calendar

Date	Conference or Course	Location	More Information
Jan. 23-25	OFC '84	Hyatt Regency New Orleans, LA	Optical Society of America (202) 223-8130
Jan. 24-26	1984 Reliability & Maintainability Symposium	St. Francis Hotel San Francisco, CA	K. J. Ravizza (408) 256-1242
Feb. 22-24	1984 IEEE International Solid-State Circuits Conference	San Francisco, CA	Lewis Winner (305)446-8193
Mar. 19-21	Phoenix Conference on Computers and Communications	Phoenix, AZ	Susan C. Brewer Honeywell, LCPD, MS/222 P. O. Box 8000F Phoenix, AZ 85066
Mar. 19-21	IEEE 1984 International Conference on Acoustics, Speech, and Signal Processing	Sheraton Harbor Is. Hotel San Diego, CA	Prof. Sydney Parker (408) 646-2788
Apr. 3-5	1984 International Reliability Physics Symposium	Caesar's Palace Las Vegas, NV	George Ebel (201) 785-6656
Apr. 4-6	11th Inter-RAM	Riviera Hotel & Conv. Center Las Vegas, NV	Mr. Dev Raheja Technology Mgmt, Inc. 9811 Mallard Dr., Suite 213 Laurel, MD 20708
Apr. 18-20	Spring '84	Monterey Conf. Ctr. Monterey, CA	Optical Society of America (202) 223-8130
Apr. 24-26	Seventh Topical Meeting on Integrated and Guided Wave Optics	Orlando Hyatt Hotel Kissimmee, FL	Opt. Soc. of America Integrated Optics Mtg. 1816 Jefferson Pl., NW Washington, DC 20036
Apr. 24-26	IEEE 1984 National Symposium on Electromagnetic Compatibility	Hyatt Regency Hotel San Antonio, TX	William McGinnis (512) 684-5111 X2721
Apr. 26	Twenty-Second Annual Spring Reliability Seminar	Boston, MA	Gene Bridgers (617) 762-5300 X2286
May 7-10	1984 IEEE International Symposium on Circuits and Systems	Queen Elizabeth Hotel Montreal, Canada	Dr. R. Schaumann (612) 373-2483
May 14-16	34th Electronic Components Conference	Hyatt Regency Hotel New Orleans, LA	Leo Feinstein Sprague Electric Co. 115 Northeast Cutoff Worcester, MA 01606
May 21-23	Custom IC Conference	Rochester, NY	Dr. Savvas Chamberlain (519) 885-1211 X3330
May 30-June 1	1984 IEEE MTT-S International Microwave Symposium	San Francisco, CA	Donald Chambers (415) 857-2936
Jun. 18-21	IQEC	Anaheim, CA	Opt. Soc. of America (202) 223-8130
Jun. 18-24	Fifteenth Power Electronics Specialists Conference	Gaithersburg, MD	Dr. Donald Bosack (312) 640-4410
Jun. 19-22	CLEO '84	Anaheim, CA	Opt. Soc. of America (202) 223-8130
Oct. 22-24	1984 International Symposium on Noise and Clutter Rejection in Radars and Imaging Sensors	Tokyo, Japan	Prof. Hisanao Ogura (075) 791-3211 X620

Highlights from TAB OpCom Meeting August 11, 1983

Student Fees—Currently, Student members pay the same basic fee for membership in any Society regardless of the higher grade member Society fee, which may vary greatly among the Societies. The TAB Finance Committee has proposed that the basic Student Society membership fee be established as a uniform percentage of the higher grade member fee and TAB OpCom approved this change from a flat rate to a uniform percentage for submission to RAB and TAB.

Minimum Income Level—The Regional Activities Board's request to change the date by which it must recommend to the Executive Committee the minimum income

level for the 50% reduction in dues, fees and regional assessments was endorsed with the recommendation that members who qualify under the Bylaw be allowed to join only one Society at the 50% reduced rate and that all additional Society fees be charged at 100%.

Waiver of IEEE Entrance Fee for Society Affiliates—In the context of budgetary discussions, TAB OpCom recommended to the Executive Committee that the IEEE entrance fee be waived for Society Affiliates who become full IEEE members and that this waiver become effective immediately.

IEEE Press Publishes "Biological Effects of Electromagnetic Radiation"

The publication of *Biological Effects of Electromagnetic Radiation*, a Book of Selected Reprints, has been announced by the IEEE Press, book publishing arm of the Institute of Electrical and Electronics Engineers, Inc. The volume was sponsored by the IEEE Committee on Man and Radiation and edited by John M. Osepchuk of the Raytheon Research Division.

Engineers, biologists, physicists, health professionals, lawyers, legislators and the informed public—all have a need to know about the interaction of nonionizing radiation with living systems, particularly with humans. The literature on this complex subject is vast and in some cases confusing and contradictory.

The goal of this book is to bring together a collection of key papers, carefully selected to reflect the spectrum of subjects and schools of thought, so that the reader is given a coherent history and overview.

The 61 papers, one of which was specially written for

this volume, are arranged by subject into seven parts: Quantitation of Electromagnetic Fields in Biological Systems; Biophysical Chemical Basis of RF Field Interactions; Effects of Radio Fields on the Central Nervous System; Pathophysiologic Aspects of Microwave/RF Energy; Medical Applications of Electromagnetic Fields; Safety Standards; Interference Effects.

The editor and his six associate editors each concentrated on organizing one of these parts. The reprints in each part are preceded by specially written material giving introductory, background, and bibliographic information.

The resulting book provides a much-needed state-of-the-art tutorial on a subject of increasing concern.

Biological Effects of Electromagnetic Radiation (PC01594) is priced at \$79.95. IEEE members may purchase this book for \$47.95, a 40% discount. This 593-page volume may be ordered postpaid from the IEEE Service Center, 445 Hoes Lane, Piscataway, NJ 08854.

NSF Engineering Activities to Receive New Direction

The NSF has been asked to refocus its engineering support division in order to give greater attention to "engineering and manufacturing processes that have emerged from the dramatic advances of recent years." The prescription for change was made on August 18, by the Foundation's policy body, the National Science Board. The

Board's conclusions represented a blend of suggestions from the U.S. engineering community and from a special panel convened by the National Academy of Engineering.

The Foundation was asked to design and set up a program of activities in the following four specific areas:

1) *Investigator-initiated research in engineering science.*

NSF should develop a plan to expand its role in the engineering sciences and to initiate, in parallel, a study of the full scope and status of engineering research.

2) *Computational capabilities.* NSF should promote computer use in all phases of engineering education and research; should study availability of software and hardware including networking of computers; and should promote computer engineering and other areas fundamental to computer design and implementation.

3) *Engineering processes, materials processing, and manufacturing engineering.* "Topics such as engineering design and analysis, materials processing, risk analysis, manufacturing engineering, testing, and quality control have not had an academic focus adequate to provide leading-edge concepts and trained engineers to anticipate the nation's future engineering needs . . ."

4) NSF was asked to take a renewed interest in upgrad-

ing both *Engineering Faculty and Research Facilities*. "The foundation should not support the 'clinical' practice of engineering; the development of specific products and solution of commercial problems should be left to the private sector," the NSB statement said. "However, the linkage between the applications of engineering principles in industry and the research and teaching of our engineering schools should be close and mutually supportive. NSF policies should encourage this linkage."

The board report also had some recommendations for action by the engineering profession. The profession should work with NSF in "assessing the strengths and future directions of engineering research and education" and should join with industry, academia and other Federal agencies in identifying priorities and programs to strengthen basic engineering capabilities in universities.

Tough Job to Draft Right Law for Computer Chip Protection

USAB's Patent Task Force has told a Senate Subcommittee that legislative efforts to prevent chip piracy are laudable but there are technical pitfalls in the bills now being considered. The Senate bill under study is S. 1201, sponsored by Sens. Mac Mathias (R., Md.) and Gary Hart (D., Colo.). Companion legislation in the House (H.R. 1028, Feb. 24, 1983) is sponsored by two Silicon Valley members, Reps. Don Edwards and Norman Mineta, both California Democrats.

The patent Task Force, after considerable study, has issued a word of caution to the Senate Judiciary subcommittee with jurisdiction. In testimony submitted June 6, 1983, Chairman Bob Frank conceded that the problem of chip protection "is real" and that "present law is insufficient to deal with the problem." He offered the subcommittee the talents of the Patent Task Force in trying to get a better handle on the problem—talents that include two dozen professionals drawn from the technical arts, business, and the field of intellectual property law. "Legislation is clearly needed," Frank concluded, and "it should have a strong basis in legal theory. Of greatest importance, it should protect the innovative ability of industry that has served America so well."

In introducing S. 1201 on May 4, Sen. Mathias said the ingenuity and creativity of legitimate chip manufacturers must be protected and their investment in R&D safeguarded. "Chip production is a fine and costly art," he said. "Chip piracy reduces the incentive for our innovative semiconductor industry to invest in the development of new chips." He added that the bill is not a "protectionist" instrument. And the cosponsor, Sen. Hart, said enactment would give "America's innovative semiconductor companies the protection they need in two ways. It grants 10

years of copyright protection to those who develop new integrated circuit mask designs . . . and protects users of semiconductor chips from liability for innocent conduct."

In his testimony, Frank observed that the approach of S. 1201 is to copyright the masks used in semiconductor fabrication. In drafting exact and "fitting" legislation, legislators must differentiate piracy from legitimate competition and must weigh protection against the realities of the free market. "Our reservations about the bill do not question the economy of the approach," Frank continued. "They revolve around specific features in the relationship between masks, semiconductors, and copyright. Mask works are the best target for use of copyright but they bring their own special set of problems. For instance, some circuits are so fundamental that essentially one variation serves the entire industry."

Frank's summary of the difficulty of fitting copyright law to chip protection follows:

Copyright law applies to some aspects of this problem but not to other aspects. Generic expressions are not protected, and manufacturers could not protect generic portions of mask layouts using copyright registration. To the extent that this allows original design to flourish unhampered by unavoidable similarities, it is a key virtue of copyright. To the extent that it allows outright appropriation of mask design, as commonly practiced in semiconductor piracy, it represents a significant failure of protection. It is not copyright law that has failed, rather, it is the fit of copyright law to semiconductors.

Not long after the Senate hearings, a Federal appeals court (the U.S. Court of Appeals for the Third Circuit, in Philadelphia) ruled that all computer programs can be copyrighted, even if they are an integral part of the com-

puter's circuitry. In a decision handed down September 2, the three-judge court ruled unanimously in favor of Apple Computer. The court rejected the contention of the defendant, Franklin Computer Corp., that the program embodied in computer hardware is part of the machine and not a literary work covered by copyright law.

"It is not hard to agree with the court's decision, a *Washington Post* editorial (on Sept. 6) said. "If it is important to provide an economic incentive for innovators to produce ever more capable software, there is no good reason to discriminate against types of software on the basis

of where they make their permanent homes." However, the editorial observed that lawyers and judges will be busy for years to come in puzzling out "whether a particular computer program is an out-and-out copy of an original form of expression or a legitimate variation or enhancement."

Principal authors of the testimony presented to Sen. Mathias' subcommittee are Orin Laney of the West Coast Patent Subcommittee of USAB, and Richard Stern and Peter Rony of the IEEE Computer Society.

Portable Pension Legislation to Be Introduced Soon

IEEE won a stunning victory in 1981 when Congress passed a law allowing engineers and other "mobile" employees to invest in IRAs despite being covered by employer pension plans. IEEE has been involved for ten years or so in pressing for this reform—The Limited Employee Retirement Account legislation. Now, however, some legislators see the possibility of passage of a true portable pension law.

Current discussions on pension reform are focused on three fundamental problems in the present system. First, most workers covered by pension plans must work ten years for the same employer just to qualify for a pension. Second, those who qualify often find that their pension is worth far less than they expected because the law allows plans to take social security payments into account in

calculating private pension benefits. Third, the system makes it difficult to transfer credits from one plan to another—from one employer to another. The engineer, of course is affected.

These three basic problems—vesting, integration, and portability—will be addressed in legislation expected to be introduced soon by Sen. Ted Kennedy and Rep. Geraldine Ferraro.

Under drafts being considered, employees would be able to vest in a pension after five years of service. According to the Bureau of Labor statistics, 88% of full-time employees in large and medium-size firms are covered by plans with ten-year vesting rules. Fewer than one of five women and one of three men have been in their current jobs that long.

Welcome to New Members

The names and addresses of new members who joined, the IEEE Reliability Society from April 1, 1983 through September 30, 1983 are listed below. For U.S.A. members, they are listed in alphabetic order of their states. Members outside the U.S.A. are listed in alphabetic order of their country's English name.

WELCOME TO THE RELIABILITY SOCIETY!!!!

ALABAMA

Edward Freeman
General Research
307 Wynn Dr.
Huntsville, AL 35805

David L. Guice
Rt. 4 Box 389
Athens, AL 35611

ARIZONA

Stephen J. Doyle
2340 W. 10th Pl.
Tempe, AZ 85281

Donald G. Dudley
2137 E. Adams St.
Tucson, AZ 85719

Diane N. Karr
TIC DVI-106
Intel Corp.
2402 W. Beardsley Rd.
Phoenix, AZ 85027

Kenneth R. Lindner, Jr.
2405 W. Anderson Ave.
Phoenix, AZ 85023

Lewis A. Moyer
8331 E. Clarendon
Scottsdale, AZ 85251

CALIFORNIA

James Bennie
c/o Burroughs Corp.
5411 N. Lindero Canyon Road
Westlake Village, CA 91362

Frank M. Betley
745 University Dr.
Menlo Park, CA 94025

Alfredo Carbonel
SD/YKXT
P.O. Box 92960
Worldway Postal Center
Los Angeles, CA 90009

David M. Clickner
721 Old San Francisco Rd.
Sunnyvale, CA 94086

George O. Compton
547 Martiniue Dr.
Redwood City, CA 94065

James D. Cummings
3567 Ruffin Rd.
Apt. #234
San Diego, CA 92123

Randall E. Fleming
4107 Alpine Rd.
Portola Valley, CA 94025

Laszlo V. Gal
1334 Oahu St.
West Covina, CA 91792

Rodney L. Gandy
13330 Mission Tierra Way
Granada Hills, CA 91344

Gary I. Geschwind
Raychem Corp.
300 Constitution Dr.
Menlo Park, CA 94025

Evelyn L. Goodrich
231 Fernando Ave.
Palo Alto, CA 94306

Peter W. Gorian
Aussat 999 N. Sepulveda Blvd.
Suite 616
El Segundo, CA 90245

Irvin W. Graves, Jr.
P.O. Box 7532
San Jose, CA 95150

H. J. Hansen, Jr.
General Motors Corp.
Santa Barbara Operations
6767 Hollister Ave.
Goleta, CA 93117

James H. Hoffman
3707 Poinciana Dr.
#152
Santa Clara, CA 95051

Douglas Kiely
Nor Corp
E&M Division
16550 W. Bernardo Dr.
San Diego, CA 92127

Louis H. Lenert
121 Red Rock St.
Anaheim, CA 92807

Paul W. Li
6047 Scotmist Dr.
Roho Palos Verde, CA 90274

Rodrigo Magallanes, Jr.
2891 Alma
Apt. #c
Palo Alto, CA 94306

Laurence C. Malang
600 South 14th St.
San Jose, CA 95112

Michael C. Mattson
1502 Kennewick Dr.
Sunnyvale, CA 94087

Richard H. McClelland
1441 Hester Ave.
San Jose, CA 95126

H. S. Mitsanas
725 Holly Hill Ct.
Redwood City, CA 94061

Michael D. Narimatsu
326 Haddon Rd.
Oakland, CA 94606

Daniel N. Oliver
3873 Glengrove Wy
San Jose, CA 95121

Arvind R. Patel
1229 Isengard Dr.
San Jose, CA 95121

Yule S. Peterson
120 E. Remington Dr.
Apt. #104
Sunnyvale, CA 94087

Elmer Hibbs
15642 Sunburst Ln.
Huntington Beach, CA 92647

Larry D. Reeves
1772 Trudean Way
San Jose, Ca 95132

Nancy K. Walton
American Microsystems Inc.
2800 Homestead Rd.
Bldg. 800
Santa Clara, CA 95051

Wendell C. Wenjen
Harvey Mudd College
Platt Campus Ctr.
Claremont, CA 91711

Al N. Wilcox
1424 Fountain Grove Pkwy.
Santa Rosa, CA 95401

Wilhelmsen
19922 Winter Ln.
Saratoga, CA 95070

Timothy P. Yeh
17266-C Nisson Road
Tustin, CA 92680

Peter J. Zantos
11451 Rainier Court
Garden Grove, CA 92641

Steven S. Zyski
2925 Sycliffe Ct.
San Jose, CA 95148

COLORADO

Charles E. Fleener
1 Seattle Ln.
Longmont, CO 80501

Mary C. Jennings
Hewlett-Packard Co.
3404 E. Harmony Rd.
Fort Collins, CO 80525

Steve Kendall
8354 West 90th Ave.
Broomfield, CO 80020

John B. Reisdorf
2008 S. Macon Way
Aurora, CO 80014

CONNECTICUT

Peter Stein
12 Eastview Dr.
Simsbury, CT 06070

FLORIDA

Walter V. Discenza
General Electric Co. SCSB
P.O. Box 2500
Room 4112
Daytona Beach, FL 32015

Dale N. Strickland
9483 Burlington Pl.
Boca Raton, FL 33434

Mary Jean Weber
Midway Colony
Apt. #39
2501 S. Harbor City Blvd.
Melbourne, FL 32901

IDAHO

E. Jeffrey Peone
7110 North 4th St.
Hauser Lk, ID 83854

ILLINOIS

Alan H. Ast
552 E. Ryan Pl.
Lake Forest, IL 60045

Joseph A. Dipaolantonio
304 Court of Elm
Vernon Hills, IL 60061

Michael I. O. Ero
24 W. 460 Arrow Court
Naperville, IL 60540

INDIANA

Joseph H. Gardner
Broadview Addition RR4
Princeton, IN 47670

KANSAS

Paul P. Fessler
RT #2 P.O. Box 724 Z
Mulvane, KS 67110

LOUISIANA

Gunawan Rahardja
P.O. Box 16046
Baton Rouge, LA 70893

MARYLAND

H. Scott Goedeke
13913 Briarwood Dr.
Apt. 133
Laurel, MD 20708

Lawrence M. Hilliard
412 Ridge Rd., Apt. 11
Greenbelt, MD 20771

Patrick R. Hoff
12301 Treetop Dr.
Apt. #13
Silver Spring, MD 20904

Thomas F. Leedy
15720 Comus Rd.
Clarksburg, MD 20871

Naomi A. Pegors
13901 Briarwood Dr.
Apt. 721
Laurel, MD 20708

William D. Pierson
10 Patapsco Ave.
Dundalk, MD 21222

Marvin L. Roush
7613 16th Ave.
Takoma Park, MD 20912

Robert E. Waterman
9356 Dewlit Way
Columbia, MD 21045

MASSACHUSETTS

Howard D. Boardman
23 Curley Dr.
Hudson, MA 01749

Lawrence J. Dion, Jr.
6 Janet Rd.
Apt. 1
South Easton, MA 02375

Jane L. Ferguson
3 Commonwealth Ave.
Apt. E-4
Attleboro, MA 02703

Richard W. Griffith
142 Great Neck Rd.
Wareham, MA 02571

Edward J. Kross
166 Grant St.
Apt. 2
Framingham, MA 01701

Matthew L. Lena
C/O H. R. Lewis
Aiken Comp. Lab
Harvard Univ.
Cambridge, MA 02138

Richard S. Teal
362 Memorial Dr.
Cambridge, MA 02139

Walter J. Tomczykowski
483 Western Ave.
Lynn, MA 01904

Thomas S. Wein
One Whispering Hill Rd.
Woburn, MA 01801

MICHIGAN

Richard F. Baranowski
6728 Smith Ct.
Troy, MI 48098

MINNESOTA

David M. Conwell
13050 Harriet Ave. S
Apt. #343
Burnsville, MN 55337

Arthur C. Downing
4029 Silver Lake Terr
Minneapolis, MN 55421

Robert F. Kiszewski
P.O. Box 6690
Duluth, MN 55806

Andrew D. Kostic
Medtronic
P.O. Box 1453
3055 Old Highway Eight
Minneapolis, MN 55440

N. C. Li
1008A 27th Ave. SE
Minneapolis, MN 55414

MISSISSIPPI

Dennis M. Bogden
5430 Copley Sq. Rd.
Grand Blanc, MS 38439

MISSOURI

Asit P. Basu
Univ. of Missouri
Dept. of Statistics
Columbia, MO 65211

Kent R. Floyd
9 South Schlueter Ave.
St. Louis, MO 63135

NEW HAMPSHIRE
Melvin L. Biggs
Creare Innovations
P.O. Box 68
Hanover, NH 03755

Richard A. Greene
3 Sanborn Dr.
Nashua, NH 03063

NEW JERSEY
Edward Demko
12 Overlook Rd.
Caldwell, NJ 07006

Ricky John
P.O. Box 145
Jersey City, NJ 07303

Way Kuo
17 Alyssa Lane
Red Bank, NJ 07701

Kenneth N. Lackey
RCA Astro Electronics
P.O. Box 800 MS 93
Princeton, NJ 08540

NEW MEXICO
Kenneth G. Blemel
6022 Constitution NE
Albuquerque, NM 87110

Michael A. Ussery
6611 Mia NE
Albuquerque, NM 87109

NEW YORK
John A. Bodine
276 Grayshore Road
Geneseo, NY 14454

William M. Colon
37 Angler Ln.
Port Washington, NY 11050

Anne A. Davis
RD 1 Box 64
Lake Katrine, NY 12449

Heather B. Dussault
102 Wager Dr.
Rome, NY 13440

Marius Gafen
Mashan 5 06655582
850 Third Ave.
STE 607
New York, NY 10022

Sy Glasser
380 McLean Ave.
Yonkers, NY 10705

William F. King
2033 Freeman Ave.
East Meadow, NY 11554

Fred Kohansedgh
102-10 66th Rd.
Apt. #23D
Forest Hills, NY 11375

Zolton Papp
12 East Salem Rd.
Fishkill, NY 12524

David J. Simkins
IBM Corp.
Bodie Hill Rd.
Owego, NY 13827

Andrew S. Thyne
4750 Woodward Way
Apt. H-12
Liverpool, NY 13088

Zia A. Yamayee
Clarkson College
Dept. of ECE
Potsdam, NY 13676

NORTH CAROLINA
Amy R. Dunham
311 S. Lasalle St.
Apt. #4B
Durham, NC 27705

Roy H. Propst
Univ. of NC
Biomed Micro Lab
Box 10 Bldg. E
Chapel Hill, NC 27514

Joseph B. Wood
Box 6161 College Station
Durham, NC 27708

OHIO
Dale M. Butler
6410 Fireside Dr.
Centerville, OH 45459

Komin Chang
598 Stinchcomb Dr.
Apt. 6
Columbus, OH 43202

Dalen T. Chiang
3380 Belvoir Blvd.
Beachwood, OH 44122

Walter M. Gildemeister
3050 Victoria Ave.
Cincinnati, OH 45208

Mendo Jonovski
5915 Seiler Dr.
Cincinnati, OH 45239

Robert K. Veale
1358 South Belvoir
South Euclid, OH 44121

OREGON
Robert G. Abramovitz
VP Engineering
Sanscript Corp.
2235 SW Glenhaven
Lake Oswego, OR 97034

Lynne V. Romans
Intel Corp. TIC
2111 NE 25th Ave.
Hillsboro, OR 97123

John G. Vance
14245 NW Belle Ct.
Portland, OR 97229

Gregory Vaupotic
13135 SW Oakwood
Beaverton, OR 97005

Harvey D. Werner
2746 SE Aspen Ct.
Hillsboro, OR 97123

PENNSYLVANIA
Thomas H. Gaidry
2713 Tischler Rd.
Bethel Park, PA 15102

Robert J. Masarik, Jr.
1020 Carlisle St.
Natrona Heights, PA 15065

Mainak Mazumdar
Industrial Engineering Dept.
Univ. of Pittsburgh
Pittsburgh, PA 15261

Robert C. McConnell
7220 Walker St.
Philadelphia, PA 19135

Hilding M. Olson
1940B Alsace Rd.
Reading, PA 19604

Howard D. Sheetman
83 Gregory Pl.
Richboro, PA 18954

Jia-Her Yan
232 Meyran Ave.
Pittsburgh, PA 15213

Chi Kang Yin
P.O. Box 7191
Pittsburgh, PA 15213

PUERTO RICO
Iris Cordero
P.O. Box FF
Juncos, PR 006666

Lidio Kercado
P.O. Box 568
Toa Alta, PR 00758

Juan A. Torres
122 Matienzo Cintron
Hato Rey, PR 00917

RHODE ISLAND
Robert N. Charette
218 Indian Ave.
Portsmouth, RI 02871

David B. Collins
4001 Main Rd.
Tiverton, RI 02878

TENNESSEE
P. L. Clemens
809 Bragg Circle
Tullahoma, TN 37388

L. E. Johnson, Jr.
Vanderbilt Univ.
Box 1722 STA B
Nashville, TN 37235

Bruce F. Siefken
Tennessee Valley Authority
400 Commerce Ave.
251 HBB-K
Knoxville, TN 37902

TEXAS
Robert L. Barry
B. Square Inc.
Suite 100
777 So. Central Expressway
Richardson, TX 75080

Barry L. Ferrell
1400 Timbercrest Dr.
Benbrook, TX 76126

John L. Orth
Burroughs Corp.
Austin Research Center
12201 Technology Blvd.
Austin, TX 78759

Joseph W. Reynolds
504 Romero
P.O. Box 1853
Fritch, TX 79036

Theodora S. Saunders
3010 Carolyn Ct.
Bedford, TX 76021

Robert B. Small
322 Banyon Dr.
Lake Jackson, TX 77566

Joseph N. Steingasser
8005 Parliament Pl.
Austin, TX 78759

VIRGINIA
Edward C. Field, Jr.
Rt. 1 Sherwood Farms
Charlottesville, VA 22901

Russell L. Madison
11710 Lariat Ln.
Oakton, VA 22124

Charles R. Pfeiffer
4601 Powhatan Ave.
Apt. NN 4
Norfolk, VA 23508

WASHINGTON
Madjid T. Dormiani
P.O. Box 85494
Seattle, WA 98105

WISCONSIN
Marc A. Hanlan
1501 South Mason St.
Appleton, WI 54911

INTERNATIONAL
AUSTRALIA
Fadel G. Beyrouth
P.O. Box A476
Sydney NSW 2000
Australia

David J. Cashmore
P.O. Box 2227
Mount ISA QLD 4825
Australia

John R. Crowley
3 Targo Pl
Forestville
Sydney NSW 2087
Australia

BRAZIL
Lavinia Napoleao
Rua Jan Sibelius 374
Campo Belo
Sao Paulo SP Brazil 04624

Mancel F. Da Silva
Div De Servicos Auxiliares
Chesf No. 333
Rua Elphego Jorge De Souza
50000 Recife Pern Brazil

CANADA
Guy J. Farley
532 Straby Ave.
Ottawa Ont Canada
K1K 1H1

G. K. Freil
106 Oakmeadow Blvd.
West Hill Ont Canada
M1E 4G7

D. Wade Frembd
Gandalf
Gandalf Plaza
9 Slack Road
Ottawa Ont Canada
K2G 0B7

Dennis L. Hanchar
180 Teefy St.
Iroquois Falls A Ont Canada
P0K 1G0

John W. Kemp
Box 198
St. George Ont Canada
N0E 1N0

Dave Ryan
1234 Woodroffe Ave.
Ottawa Ont Canada
K2C 2T5

Arnold F. Weisbrot
51 Priam Way
Nepean Ont Canada
K2H 8S7

CHILE
Hector D. Cerda
Gregorio Maranon 1452
Vina Del Mar Chile

CHINA
Tan-Wei Kang
Dept. of Electronic Eng.
Northern Jiaotong Univ.
Peking China

COLOMBIA
Gustavo Perez
Apartado Aereo 54848
Bogota Colombia

DENMARK
Kurt E. Forslund
Christian Rovsing Int A/S
Tempovej 7-11
DK 2750 Ballerup
Denmark

EGYPT
Mohamed Y. Abdelfattah
5 Amin Yehia St Appt 6
Zizinia
Alexandria Egypt

ENGLAND
Koorosh Khodabandehloo
69 Hayday Rd.
Canning Town
London England E16 4BA

Abdullah M. Shaalan
10 Shownham Chase
Timperley Cheshire WA15 7TJ
England

FINLAND
Christer P. Helenelund
Raiviosuonmaki 4 A 3
SF-01620 Vantaa 62 Finland

FRANCE
Jean P. Baconnet
56 Rue R. Salengro
Fontenay-Sous-Bois
94120 France

Francois L. Dayres
23 Rue D'Acheres
78600 Maisons-Laffitte France

Philippe Dumoulin
IBM France BP 27
33170 Gradignan France

Francis Lang
3 Avenue DMC
68200 Mulhouse France

Gerald D. Praline
41 Avenue De La Californie
33600 Pessac France

INDIA
Rathindra K. Mitra
Keltron Controls
Quality Assurance Dept.
Sasthamangalam
Trivandrum-695010 India

IRAN
Amir H. Hashemi
Afrigha Expressway
Golafshanalley
No 39-2nd Floor
Tehran Iran 19157

IRELAND
Sean C. O. Mathuna
Well House
New St. Macroom
Co Cork Ireland

ISRAEL
Manoch Fenichel
POB 1044
Ramat Hasharon 47100
Tel Aviv Israel

Paul Fenster
Elsclint Ltd.
POB 5258
Haifa 31051 Israel

ITALY
Faglioni Auro
Via S. Banfinr 1
21047 Saronno Italy

Enzo Battaglia
C/O Via Valdilocchi 15
19100 La Spezia Italy

Giuseppe Canepa
V Hermada 6
Genova Italy

Angelo U. Dufour
Ansaldo-DTE/RIS
Via Nicola Lorenzi 8
Genova Italy

Carlo G. Fantozzi
C/O Zeltron
Via Principe Di Udine 66
33030 Campopornido UD Italy

Dante Tognetti
Zanussi Elettronica SPA
Personale/Servizi Generali
C P 227 33170 Pordenone Italy

Pierangelo Vismara
Magrivi Galileo
Servbiblioteca
Via Magrini 7
24100 Bergamo Italy

JAPAN
Yoshiki Matsuura
1-58-17 Mitsufuji
Musashimurayama-Shi
Tokyo Japan 190-12

George Motosugi
Atsugi Ecl NTT
1839 Ono
Atsugi-Shi
Kanagawa 243-01 Japan

Yukitoshi Nabeshima
IBM Japan Ltd.
800 Ichimiyake Yasu-Cho
Yasu-Gun
Shiga-Ken 520-23 Japan

Masahide Nishida
Yokogawa-Hewlett-Packard Ltd.
9-1 Takakura-Cho Hachioji-Shiq
Tokyo 192 Japan

Nobukazu Ohno
3-6-7 Shinjyuku
Zushi-City
Kanagawa Japan 249

Hideo Suzuki
3 Yama-Ohyodo Meiwa-Cho
Taki-Gun
Mie-Pref 515-04 Japan

Hiroshi Yoshida
Kagoshima Univ
Chuo-Toshokan
Koorimotocho
Kagoshima 890 Japan

Takuya Yoshimoto
C/O Teac Corp.
3-7-3 Nakacho Musashino
Tokyo 180 Japan

KOREA
Sang-Woo Kim
Dept of Cont & Inst En
N U Shinrim-Dong
Kwanak-Ku
Seoul 151 Korea

Woo J. Kim
CPO Box 5729
Seoul Korea 100

Jin-Heung Kong
82-3 Dodang-Dong
Buchun
Kyunggi-Do Korea

Jae Dong Yang
Dept of CS
P.O. Box 150 Cheongryang
Seoul Korea 131

MALAYSIA
Tai Eu Chuah
79 Jalan SS24/12 Taman Megah
P Jaya
Selangor Malaysia

MEXICO
Ruben Kleiman
Monte Morelos 299
Frac Loma Bonita
Guadalajara Jal Mexico

Juan B. Mesa
Rio Sena #49 80 Col Cuauhtemec
06500 Mexico DF Mexico

NORWAY
Runar Oestebøe
Rogaland Research Inst.
Box 2503 Ullandhaug
4001 Stauanger Norway

PERU
Victor M. Ormeno
Valle Riestra 676-B
Lima 21 Peru

SOUTH AFRICA
Schalk J. Claasen
Univ of Pretoria
Dept of Industrial Eng.
Brooklyn Pretoria 002
South Africa

D. J. Debeer
54 Eider Road
Florida
1710 Johannesburg South Africa

SPAIN
James C. Miranda
Escipion 20B1s 1 0 3 0
Barcelona 23 Spain

SWITZERLAND
Paul Messmer
Rue Des Alpes 31
CH 1030 Bussigny Switzerland

WEST GERMANY
Bernd Lehmann
7 S-Geschwader
2300 Kiel West Germany

Highlights from the September 23, 1983 AdCom Meeting

1. *Vice President—Membership: Maurice Shumaker*

- Membership as of August 31, 1983 stands at 3842 for the Reliability Society.
- The new Ottawa Chapter (Canada) headed by Dr. Ed So is now in operation. They will be granted a charter as soon as all Chapter Officers become fully paid Reliability Society members.
- The slightly updated Reliability Society brochures have been printed. A supply will be provided to each Society Chapter as soon as they are returned from the printers.
- The Chapter Awards Program for 1982-1983 was rescheduled to coincide with the AdCom meetings. The response from the chapters was good this year, 9 out of 16 responded with completed questionnaires. The chapters which responded were:

Denver
Central New England
Washington/Northern Virginia
Los Angeles
Montreal
Santa Clara Valley/San Francisco/Oakland-East

Bay

Cleveland
Chicago
Baltimore

The goals for the next award year are:

1. Increase the chapter participation.
2. Expand the committee membership.
3. Review the rules to determine if any refinements are needed.
4. Publish a summary of the chapter awards history.

For the 1983-1984 year, it is anticipated that the awards schedule will remain the same as this year's.

2. *Vice President—Technical Operations: Irwin Feigenbaum*

- Human Performance Reliability: Arthur Siegel. Correspondence has been initiated to ensure that human performance reliability is adequately represented in the new edition of "The Handbook of Reliability Engineering and Management" to be edited by W. Ireson and C. Coombs, Jr., and to be published by the McGraw-Hill Book Company. This is being done to attempt to extend the current human engineering oriented coverage to include a greater emphasis on human performance reliability. Currently, it appears that the proposal will be accepted by the editors. If it is accepted, a suitable chapter will be produced, authored by A. Siegel and K. LaSala.
- Standards and Definitions: Gus Constantinides
The following documents have been reviewed in 1983

by the committee:

- a. MIL-HDBKXXX, Electronic Reliability Design Handbook, Volumes I and II, proposed, A. Feduccia, RADC, Sponsor.
 - b. Publication EEO90-CA-PRO-010/8131, RELTEST, Low Cost Reliability Demonstration Test Procedures, W. Wallace, NAVELEX, Sponsor.
 - c. IEEE Standard 352, R. Olson, IEEE Working Group Chairman, sponsor.
- Nuclear Systems Reliability and Safety: Jerry Fussell
Plans are being formulated to establish a working group whose charge will be to produce a document describing methods for performing dependent failure analysis as a part of nuclear power plant probabilistic risk assessments.
The dependent failure analysis document will describe concepts of systems interactions analysis and common cause failure analyses that integrate these analyses in a manner that makes dependent failure analysis of probabilistic risk assessment accident sequences a tractable problem.
 - International Reliability: Marion Smith
In a recent development the Swedish National Committee has agreed to undertake the sponsorship of the secretariat for IEC TC#56. This should provide good continuing international support needed for the operation of this international activity. The sponsorship of the secretariat had remained open since the U.S. relinquished this position at the beginning of 1983.
 - Energy: Henry Wolf
A proposal to form a subcommittee on Energy Technologies Assessment was accepted by the Energy Committee with H. Wolf appointed as chairman. This subcommittee is being organized, its scope defined, and a position statement being drafted. Volunteers from the Reliability Society interested in participating in these efforts are urged to contact the chairman.
 - Mechanical Reliability: Henry Hegner
The primary objective of the IEEE Mechanical Reliability Committee for 1983 was to aid communications between those involved with the reduction of mechanical failures through Mechanisms of Failure; Detection, Diagnosis and Prognosis; Materials Durability Evaluation; and Design. The symposiums held during 1983 made progress toward this objective by means of symposiums in the areas of material durability evaluation and design. There were two symposiums held during 1983 and a Spring Symposium is scheduled for 1984.