RELIABILITY GROUP NEWSLETTER

APRIL- 1970 VOL. XV- ISSUE 2 EDITOR: PAUL GOTTFRIED
Booz, Allen Applied Research
Bethesda, Md. 20014

"Material for the July issue must be in the editor's hands by May 29."

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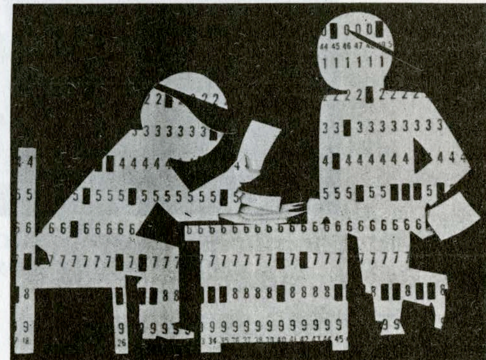
Editor's Notes



A reader -- W. O. Solberg -- responded to Ralph Evans' letter in the January Newsletter just in time. Four chapters mustered enough energy (in two cases, a lot of energy) to contribute to Chapter News at mid-season; some others didn't muster enough to bother with meetings. The rest of this Newsletter's contents come from G-R's national-level participants and from outside sources.

There is a temptation to believe that the Group membership seeks only the Group's larger-scale functions -- the Transactions, symposia, and perhaps the professional services performed by the few (members of formal committees) on behalf of the many (members of the Group). If this belief were valid, active chapters such as Boston and Philadelphia would not exist and new chapters such as Montreal would have remained unborn. It also seems unlikely that the membership of other chapters differs in kind from these.

The best guess is that the weaker chapters suffer from lack of support or push from the membership for the leaders. If you want a more active chapter, let your chapter officers know. (Sure, there's a "risk" that you'll be drafted into service -- but it only hurts for a little while.)

1969 Reliability Award

Harry Reese (left), G-R Chairman, presents the 1969 Reliability Award to "Deke" Slayton at the 1970 Symposium Banquet.

Each year the Reliability Group recognizes an exceptional contribution to the field of reliability. In 1969, we have witnessed an almost incredible display of reliability teamwork in the Apollo lunar landings. These have so captured the public admiration that our award would seem only a tiny gesture amongst the honors already bestowed by kings and presidents. There is, however, a behind-the-scenes achievement which we believe is most relevant to the massive problems facing the world. I hope that our award will serve to increase public awareness of this spin-off from the space effort.

There are today many intelligent people who fear that man may have reached the point where he is unequal to the task of controlling the forces he himself has set in motion. There is considerable evidence that man is often the weakest link in the systems he has created.

NASA has pioneered in designing total systems, considering man as an integral subsystem, and selecting and training man to effectively carry out his subsystem role. The same emphasis has been given to human reliability as to hardware reliability.

The resultant performance of the Apollo astronauts serves to renew our confidence that man's judgement can still be superior to his machines; that with liberal doses of patience, dedication, intelligence, and faith, man can still be made the most reliable subsystem of all. We might even be encouraged to think that this could be true in our social and environmental systems as well as our lunar landing systems.

The man responsible for astronaut performance has packed a lot of experience into a few years. He has logged 4,400 hours flying time as an Air Force pilot and a test pilot, and has held maintenance, inspection, and training responsibilities. He has his degree in Aeronautical Engineering, has engineering experience in the aircraft industry, and has been awarded Honorary Doctorates in both science and engineering. In 1959, he was named a Mercury astronaut, but when he developed a heart condition, his Mercury Atlas 7 mission was reassigned to Scott Carpenter. He became Coordinator of Astronaut Activities in 1962, and Director of Flight Crew Operations in 1963. In this position, he is responsible for the Astronaut Office, the Aircraft Operations Office and the Flight Crew Support Division.

For demonstrating that with proper preparation the human subsystem can be reliable in the most difficult of circumstances; for giving such inspiration at a time when it is sorely needed; our award goes to Mr. Donald K. "Deke" Slayton and his Flight Crew Operations organization.

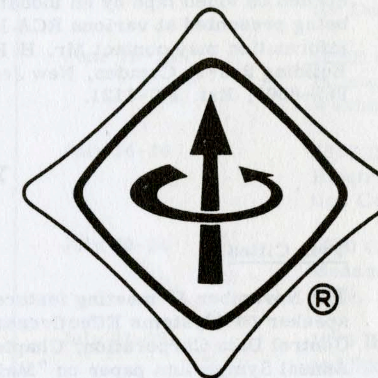
The Reliability Group Newsletter is published quarterly by the Reliability Group of the Institute of Electrical and Electronics Engineers, Inc. Headquarters address: 345 East 47th Street. New York, N. Y. 10017. Sent automatically and without additional cost to each member of the Reliability Group.

Second-class postage is paid at New York, N. Y.

Personalia

William C. Green, a member of the Washington Chapter, has retired as President and Chairman of National Scientific Laboratories and organized his own engineering company, William C. Green Associates, in Washington, D.C.

Chapter News



Boston

The Chapter's very active season, which began with the September 11 meeting reported in the last Newsletter, continued with a joint meeting with ASQC on October 9. That meeting was addressed by T.A. Ford of the law firm of Bender, Hesson, Ford and Grogan on the subject of "Corporate Liability for Defective Products". On November 13, William Cowin, Chairman of Commission of the Department of Public Utilities, spoke on "State Regulation of Utilities". The December 11 meeting, joint with the G-NS Chapter, featured Joseph Finnell of AVCO in a talk on "Reliability Under a Radiation Environment". At a joint meeting with SAVE and ASQC on January 15, "Consequences of Product Failure". "Computer Reliability/Maintainability in Operation" was presented by Jack Bush of Honeywell EDP at the February 12 meeting, and Mrs. Virginia Knauer, Special Assistant to President Nixon, spoke on "Consumer Affairs" at another joint meeting with SAVE and ASQC on February 25.

Philadelphia

Philadelphia also has continued a strong program. The Chapter's September 17 meeting on "System Reliability via Analytic Simulation" was addressed by P. Giodano of Bradford Computer Systems and S. Orbach of the U.S. Navy Applied Sciences Laboratory. On October 21, H.R. Barton of RCA discussed "Availability Assurance by Optimal Selection". R. Kleppinger and J. Lukach, both of RCA, lectured on "Design for Microwave Integrated Circuit Reliability" at the November 20 meeting. "Reliability/Availability Incentive Contracting" was the subject of the February 11 meeting and was presented by William J. O'Leary of RCA. The March 10 meeting featured Dr. Michael Gordon Taylor of Bell Telephone Laboratories in a talk on "Reliable Computers from Unreliable Components".

(Continued)

(Philadelphia Continued)

The Chapter has scheduled another meeting for April 16 at the Presidential Apartments, City Line Avenue and Schuylkill Expressway; subject and speaker identification were unavailable at press time. Elections will also take place at this meeting, with nominations remaining open until then. The Chapter also will hold its Third Annual Failure Analysis Seminar on May 21 (see announcement elsewhere in this Newsletter).

The talk on "Microwave Integrated Circuit Reliability" presented at the November 20 meeting was subsequently videotaped by RCA -- possibly the first time that a Chapter meeting program has been recorded on video tape by an industrial organization. The tape is now being presented at various RCA locations. Anyone desiring more information may contact Mr. H. E. Schock at RCA Corporation, Building 2-5-1, Camden, New Jersey 08102, or call him at (609) 963-8000, Ext. PC-6121.

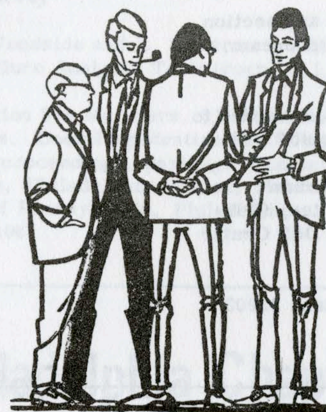
Twin Cities

The November 17 meeting featured Jan Pukite of Honeywell as the speaker on "Systems Effectiveness Modeling". Dan Lowrey of Control Data Corporation, Chapter Chairman, re-presented his 1970 Annual Symposium paper on "Maintainability Demonstration Performed on a Computer System" at a luncheon meeting on January 28. On March 26, Bill Fitch of Motorola's Advance Products Division addressed another luncheon meeting on "Advances to be Made in MSI/LSI Reliability". Chapter elections are scheduled for the April 22 meeting.

Washington

Dr. Nozer Singpurwalla, George Washington University, discussed "Accelerated Life Testing" at the Chapter's January 21 meeting. The February 9 Washington Section meeting was sponsored by the Chapter and featured Dr. W. W. Happ of NASA's Electronics Research Center in a lectured on "Challenges Remaining for Flow Graph Techniques" On March 18, Henry Collins, Assistant to the President of Underwriters Laboratories, discussed "Product Safety, and Associated Warranty and Certification Problems" at a joint meeting with G-PMP.

CONFERENCES



Date	Conference
May 4-6	1970 IEEE Transducer Conference, National Bureau of Standards, Gaithersburg, Maryland
May 4-7	1970 Industrial & Commercial Power Systems & Electric Space Heating & Air Conditioning Joint Technical Conference (G-I&GA, San Francisco Section), Jack Tar Hotel, San Francisco, California
May 4-8	5th International Research Symposium on Electric Contact Phenomena (Verband Deutscher Elektrotechniker), Munich, Germany
May 5-6	1970 Annual Appliance Technical Conference, Leland Motor Hotel, Mansfield, Ohio
May 5-7	1970 Spring Joint Computer Conference (AFIPS), Convention Hall, Atlantic City, New Jersey
May 7-8	Midwest Symposium on Circuit Theory (G-CT, University of Minnesota), Minneapolis, Minnesota
May 13-15	1970 Electronic Components Conference (IEEE, EIA), Statler-Hilton Hotel, Washington, D.C.
June 2-3	Silicon Device Processing Symposium, National Bureau of Standards, Gaithersburg, Maryland
June 15-19	1970 IEEE International Symposium on Information Theory (IEEE, Union Radio Scientifique Internationale), Hotel Huis ter Duin, Noordwijk, The Netherlands
June 16-18	IEEE Computer Group Conference -- International, Washington Hilton Hotel, Washington, D.C.
July 14-16	1970 IEEE International Symposium on Electromagnetic Compatibility, Convention Center, Anaheim, California
July 20-24	1970 Conference on Dielectric Materials, Measurements and Applications (IEEE, IEE), London England
July 21-23	1970 IEEE Annual Conference on Nuclear and Space Radiation Effects, University of California, San Diego, California
August 18-21	International Conference on Microelectronics, Circuits and System Theory (IEEE, The University of New South Wales, IREE Australia, IEE), Sydney, Australia
August 24-27	1970 Mexican Electrical Insulation Conference & Exhibition (IEEE Mexico Section, Mexican Society of Electrical and Mechanical Engineers), Mexico City
September 21-24	1970 IEEE International Conference on Engineering in the Ocean Environment (IEEE Oceanography Coordinating Committee and Panama City Section, with participation by U.S. Naval Ship Research and Development Laboratory, Florida State University, Louisiana State University), Panama City, Florida
September 21-25	1970 Intersociety Energy Conversion Engineering Conference (G-ED, G-AES, et. al.), Las Vegas, Nevada
October 6-8	GOMAC 70 -- 1970 Government Microcircuit Applications Conference, Fort Monmouth, New Jersey
October 26-28	EASCON -- 1970 IEEE Electronic and Aerospace Systems Convention, Sheraton Park Hotel, Washington, D.C.

G-R Educational Services

The Education Committee of G-R has compiled a list of books in the Reliability and Maintainability fields. Some of the books have also been reviewed and copies of these reviews are available.

We are also keeping an up-to-date listing of all courses in our field which have been granted use of our mailing list.

The Education Committee will also be happy to help any section arrange a training course or set up a student award program. For the latter we can also furnish money.

A letter to the chairman of the committee is all that is needed to take advantage of any of these services. Why not do so?

H. C. Jones, Chairman
Education Committee, G-R
c/o Westinghouse D&S Center
MS 440
P. O. Box 746
Baltimore, Maryland 21203

Short Courses

Newsletter policy with respect to short-course announcements, as established by the AdCom, is to provide publication for information only. No endorsement is implied, and no check on course content or instructor qualifications has been accomplished.

University of Michigan

Design and Analysis of Engineering Experiments: July 6-17. Two weeks, $350. Contact: Professor Charles Lipson, The University of Michigan, Ann Arbor, Michigan 48104.

Probability and Random Processes for Engineers and Scientists: July 6-17. Two weeks, $400. Contact: Professor Ralph L. Disney.

Human Factors Engineering (Fundamentals: July 20-24; Advanced Concepts: July 27-31). One week $225, two weeks $350. Contact: Professor Richard W. Pew.

University of Wisconsin

Electrical Encapsulation Seminar: May 21-22. Two days, $70. Contact: Donald E. Baxa, Institute Director, 725 Extension Building, 432 North Lake Street, Madison, Wisconsin 53706.

Solid State Parameters and Models: May 12-13. Two days, $100. Contact: David P. Hartmann (address as above).

Third Annual Failure Analysis Seminar

The Philadelphia Chapter, in conjunction with the Philadelphia Section if IEEE, will conduct its Third Annual Failure Analysis Seminar on May 21 at the University of Pennsylvania's Alumni Hall, Towne School, 33rd and Walnut Streets. The program includes:

Morning Session: Recent Developments in Failure Analysis

Moderator: Dr. D. Outlaw, G.E.

D.M. Cathon, Martin-Marietta Corp.: "Effect of Non-Steady Avionic Cooling Requirements on Electronic Part Reliability"

William J. Maloney, GE/RESD: "GE/RESD Failure Analysis System"

Dr. Henry E. Frankel and A. Babecki, Goddard Space Flight Center: "Metallurgical Implications in Failed Electrical and Electronic Devices"

G. DiGiacomo, S. Goldspeil, J.R. Crisci, U.S. Naval Applied Science Lab: "Ultrasonic Method for Measuring Crack Depth in Structural Weldment"

E. Hakim, U.S. Army Electronics Command: "Semiconductor Failure Analysis, Simulated Testing, and Corrective Action"

(Continued)

Third Annual Failure Analysis Seminar

Luncheon:

Dr. John Condon, NASA Headquarters: "Reliability Management for the 70's"

Afternoon Session: Failure Analysis in Microelectronics

Thomas J. Rossiter, RADC: "Ambient Effects on Gold Aluminum Bonds"

B. Tiger, RCA: "Micro-Electronic Reliability Prediction via Failure Mechanisms"

David B. Christian, XEROX: "Current Concepts in Failure Analysis"

Dr. John F. Schenck, G. E.: "Time Dependence of Thermal Runaway"

A. Clifford Woodside and L. Silverman, IBM: "A Survey of Failure Analysis Techniques for I. C. 's"

Advanced Registration $14 Members, $17 Nonmembers, $5 Student Members. Door Registration $20. Registration includes luncheon, proceedings, parking. Contact: Helen B. Yonan, IEEE Office, Philadelphia Section, Moore School of E. E., University of Pennsylvania, Philadelphia, Pennsylvania 19104, (215) 594-8106.

Philadelphia Chapter To Present Gift

The Philadelphia Chapter, in appreciation for the free use of University of Pennsylvania Towne Building facilities for three successive years for the Annual Failure Analysis Seminar, will, on behalf of the IEEE Philadelphia Section, make a gift presentation to the University.

The presentation will be made by Chapter Chairman Jim Goodman to Dr. Carl C. Chambers, Vice President of Engineering Affairs, who will be accepting it on behalf of the University, and Dr. Gaylord P. Harnwell, President.

Publications

From the National Bureau of Standards, available through the Superintendent of Documents, U.S. Government Printing Office, Washington, D.C. 20402:

NBS Technical Note 487, "Consideration in Computing the Useful Frequency Range of Piezoelectric Accelerometers", July, 1969, 30 cents.

NBS Technical Note 511, "Measurement Methods for the Semiconductor Device Industry -- A Summary of NBS Activity", December, 1969, 24 pages, 30 cents (SD Catalog No. C13. 46:511).

Special Issue: IEEE Proceedings

A special issue of the Proceedings of the IEEE is planned for mid-1971 on the subject of engineering education. The issue will include both invited and submitted papers.

Prospective authors are invited to submit contributions on any of the following aspects of engineering education: general or specific curricular questions; technological aids to education; experiments in relating engineering education to the problems of society; relations between universities and government; optimum use of the computer in typical engineering courses; unique laboratory experiences; motivation and counseling toward majors in engineering; other related matters. Authors are urged to give specific experiences rather than broad philosophical treatments, and to choose topics of long-term concern appropriate to an archival publication.

Because only a limited number of contributed papers can be accepted, prospective authors are asked to submit a summary of from 500 to 750 words before undertaking the work of preparing the whole manuscript. Summaries should be sent to the guest editor, Professor J. R. Whinnery, Department of Electrical Engineering and Computer Sciences, University of California, Berkeley, California 94720 by July 15, 1970. Completed manuscripts will be due no later than October 1, 1970.

Letter To The Editor

Ralph Evans' definition of a wearout process is rather general to avoid confusion in the use of the term wearout.

In a sense all failure proceeds from wearout at small sites within the structure. If each of these sites undergoing wear or decomposition proceeds in its own way toward failure, without influence from the state of wear of adjacent sites the failure distribution is extremal in nature. As such it may have a Weibull shape factor above, below, or equal to one. If, however, the degradation at one site influences the rate of degradation of adjacent sites as by releasing reactive decomposition products, by producing heat, by changing the stress distribution, or by other means too numerous to mention, then failure is by wearout as used by many people. The latter process will always, to the best of my knowledge, be described by a distribution whose hazard rate increases with time.

This definition has the practical advantage of providing for physical as well as statistical measurements confirming the existence of a wearout process. For example, a wearout failure so defined will give evidence of its approaching failure by gradual degradation of appropriate characteristics. Also unfailed remnants of the failed piece will show pronounced degradation. Neither of these symtoms are usually found in failures of the isolated site type.

W. O. Solberg
General Electric Company
Capacitor Department
Hudson Falls, New York 12839

IEEE Reorganization

The "cluster" concept for reorganization of the IEEE was approved unanimously at the December meeting of TAB. The effect will be to increase technical representation on the Board of Directors from one to eight over a three-year period, with Directors at Large being phased out. However, the cluster to which G-R has been assigned is not among those electing directors in 1970.

The cluster arrangement is as follows:

Division 1

G-1	Audio & Electroacoustics	4,200
G-4	Circuit Theory	8,000
G-12	Information Theory	4,300
G-23	Automatic Control	6,200
		22,700

Division 2

G-16	Computer	13,700

Division 3

G-2	Broadcasting	1,800
G-8	Broadcasting & TV Receivers	2,100
G-10	Aerospace & Electronic Systems	8,000
G-19	Communication Technology	8,100
G-27	Electromagnetic Compatibility	1,600
		21,600

Division 4

G-3	Antennas & Propagation	4,500
G-15	Electron Devices	8,200
G-17	Microwave Theory & Techniques	5,900
G-20	Sonics & Ultrasonics	1,100
G-21	Parts Materials & Packaging	1,900
G-33	Magnetics	1,900
		23,500

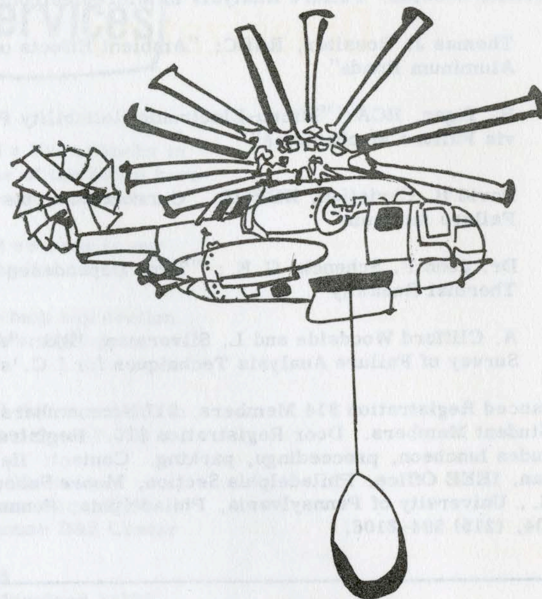
Division 5

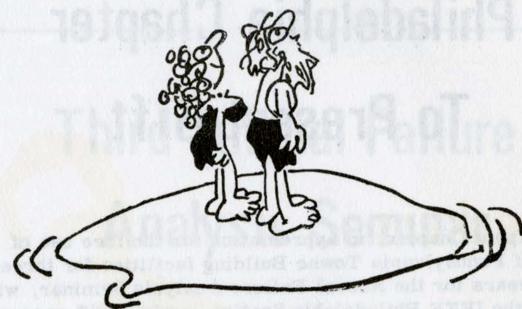
G-5	Nuclear Science	2,200
G-6	Vehicular Technology	2,000
G-9	Instrumentation & Measurement	4,200
G-13	Industrial Elec. & Control Instru.	2,900
G-31	Power	12,100
G-32	Electrical Insulation	1,100
G-34	Industry & General Applications	4,500
		29,000

Division 6

G-7	Reliability	2,200
G-14	Engineering Management	5,700
G-18	Engineering In Medicine & Biol.	4,300
G-25	Education	1,700
G-26	Engineering Writing and Speech	1,900
G-28	Man-Machine Systems	1,200
G-29	Geoscience Electronics	1,400
G-35	Systems Science & Cybernetics	3,800
		22,200

Lost, Strayed Or....?





As of this issue of the Newsletter, it is no longer possible to report on the activities of chapters not in communication with the Editor. Until this year, chapter meeting reports wound their way through channels to IEEE Headquarters and from there back to the Newsletter -- a slow route, but better than nothing. Under a new policy, Headquarters will get only annual reports from IEEE Sections and the Newsletter will have to rely on direct inputs from chapter officers.

As a parting gesture, IEEE Headquarters has furnished a tabulation of chapter meetings reported to IEEE for 1966 through November 1969. The New Jersey Coast, Huntsville, and San Diego chapters reported no meetings during the first eleven months of 1969; the Chicago Chapter has reported no meetings in the four-year period!

The Newsletter attempts to maintain at least one-way communication with all chapters through quarterly reminders of deadlines. The last thread to San Diego has just been lost -- lacking address or identity of the chairman for the last couple of years, the reminders for that Chapter have been directed to a past chairman. Apparently he has changed jobs, and his former employer is not forwarding his mail.

Any signs of life from these chapters will be welcomed.

AdCom Organization

Current officers of the AdCom are:

Chairman	H.E. Reese
Vice Chairman/Education, Development and Standards	V.R. Monshaw
Vice-Chairman/Technical Operations	W.T. Sumerlin
Vice-Chairman/Publications	P.K. McElroy
Vice-Chairman/National Meetings, Chapters and Membership	L.J. Paddison

Newly elected AdCom members for three-year terms expiring December 31, 1972 are:

Dr. John E. Condon	Mr. P.K. McElroy
Mr. H. Donnell Hulme	Mr. J.J. Naresky
Mr. Richard M. Jacobs	Mr. A.R. Park

Speakers Who's Who In Reliability

Issue #7 of the Speakers Who's Who, a publication of the Joint Speakers Committee of G-R, ASQC Electronics Division and ASQC Reliability Division, is scheduled for early summer. If you have not received your copy of the questionnaire and you are a candidate for inclusion, send a request to:

James H. King, Jr.
Westinghouse Electric Corp.
Aerospace Division MS 525
P. O. Box 746
Baltimore, Maryland 21203

Call For Papers: 1971 Annual Symposium On Reliability

May 1 is the deadline for submission of the paper title and an abstract of 250 to 800 words for papers to be considered for the 1971 Symposium (to be held in Washington, D.C., January 12-14). Send ten copies of title, abstract, and biographies -- or your request for further information -- to:

J.W. Thomas
Program Chairman
Annual Symposium on Reliability
Vitro Laboratories
14000 Georgia Avenue
Silver Spring, Maryland 20910

Product Liability Prevention Conference

A conference on the systems approach to product liability prevention will be held at the Newark College of Engineering, Newark, New Jersey, August 26-28. The conference is sponsored by the North Jersey sections of IEEE, ASQC, and the American Society of Safety Engineers, and supported by Associated Testing Laboratories. Papers and attendees are welcome; for information, contact Dick Jacobs at the Newark College of Engineering (201) 645-5340.

Computer- Aided Reliability Analysis & Design

As many of you (including the G-R members who receive it) know, CADAR (operating under the IEEE Technical Activities Board) publishes a newsletter available for the asking (via Richard Emberson, IEEE Headquarters). Within G-R, CARAD pursues the aspects of computer-aided design most closely related to Reliability. Clint Purdue functions as Chairman of both CARAD and CADAR.

The kind of information represented by the three program descriptions that follow appears regularly in the CADAR Newsletter. If the G-R membership expresses interest, it can become a regular feature in the Reliability Newsletter.

One measure of interest will be your response to the questionnaire provided elsewhere in this issue. Please send yours to Clint at the address indicated.

Program: ECAP (Electronic Circuit Analysis Program)

Developed By: IBM

Computers: IBM 1620, 7090, System 360, 1130 System

Memory: $\geq$ 32K

Language: FORTRAN

Description: ECAP is a general purpose computer program which can be used to calculate the DC Steady State, AC Steady State and Transient characteristics of linear circuits. No knowledge of computer programming is required. The circuit to be analyzed must be converted to an equivalent circuit after which the elements can be assigned branch labels, nodes numbered, etc. The input data is a listing of the elements, nodes and values of the circuit. No stored device models are available to the user. Initial D.C. conditions must be specified for a transient analysis.

The output data must be specified and is a listing of the calculated node voltages and branch currents.

Documentation: IBM Application Program
1620 Electronic Circuit Analysis Program
(ECAP) (1620-EE-02X)
Users Manual
Order through local IBM office

Consultant: Contact local IBM office

Status: Available through local IBM office

NOTE: A version of ECAP is operational in the GE Mark II Time Share System in Los Angeles. Contact nearest GE Time Share Service Office for details.

Program: SCEPTRE (System for Circuit Evaluation and Prediction of Transient Radiation Effects)

Developed By: IBM under contract to AFWL

Computer: IBM 7090, 7094, CDC 6600

Memory: $\geq$ 32K; 64K required if IBSYS overlay features are not available.

Language: FORTRAN IV

Description: The SCEPTRE general purpose computer program can be used to calculate the DC Steady State and Transient behavior characteristics of electrical circuits. No knowledge of computer programming is required. The input data is a listing of the circuit elements, the connection points (nodes) and element values.

The capability exists for using a variety of device models, however, the user must implement this facility, which requires considerable skill on the part of the user.

The output data must be specified, however, all of the circuit performance characteristics are available.

Documentation: Air Force Weapons Laboratory Report No. AFWL-TR-66-126 Vol. 1 and Vol. 2. Automated Digital Computer Program for Determining Responses of Electronic Circuits to Transient Nuclear Radiation - SCEPTRE Users Manual.
Harry W. Mathers, Stephen R. Sedore and John R. Sents - IBM

Consultants: Capt. John Anderson, AFWL - (WLET)
Kirtland AFB, New Mexico 87117

Status: Available from Consultant after approval. Requires 1 reel of 1/2" magnetic tape.

CARAD

Program: NET-1 (Network Analysis Program)

Developed By: A. F. Malmberg and F. L. Cornwell, Los Alamos Scientific Laboratory (LASL)

Computers: IBM 7040, 7044, 7090, and 7094

Memory: _ 32K

Language: FAP (MACHINE)

Description: The NET-1 general purpose computer program can be used to simulate the DC Steady State and Transient analysis characteristics for a large class of electrical circuits. A knowledge of computer language or programming is not required in order to use NET-1. The input data is a listing of the circuit elements, the connection points (nodes) and the element values. Built-in models are used for diodes and transistors (modified Ebers-Moll). Initial conditions for transient analysis are calculated automatically. The output data is a tabular listing of the node voltages and device currents for both the DC Steady State and Transient portions of the program.

Documentation: Users Manual - LA-3119
NET-1 Network Analysis Program
7090/94 Version by Allan F. Malmberg
Fred L. Cornwell and Florian N. Hofer

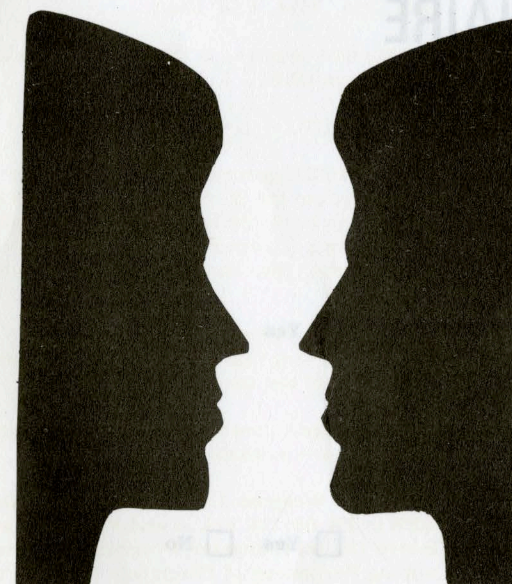
Consultant: Fred L. Cornwell, T7 - LASL
P.O. Box 1663, Los Alamos, New Mexico 87544

Status: Available from Consultant. Requires two reels of 1/2" magnetic tape. Specific program must be specified; i.e., 7090, etc.

Users Manual may be obtained at a present cost of $3.00 from: Clearing House for Federal Scientific and Technical Information
National Bureau of Standards
U.S. Dept. of Commerce
Springfield, Virginia 22150

NOTE: Above price subject to change.

G-R Membership Interest Profiles



Ray Knight, Chairman of the Advanced Techniques Committee, has submitted his committee's proposed interest profile for the "70's." The profile's purpose is to provide the IEEE Headquarters staff information enabling them to reduce overlaps and gaps between Groups and to aid in matters of organization.

The proposed profile is reproduced below so that members may comment on possible additional areas of interest, deletions, or other modifications. All comments should be addressed to Mr. Stanley T. Karachuk, Manager, Reliability, Perkin Elmer Corporation, Optical Technology Division 77, Danbury Road, Wilton, Connecticut 06852.

IEEE RELIABILITY GROUP
1975 MEMBERSHIP INTEREST PROFILE

1.0 FUNDAMENTAL RELIABILITY THEORY AND TECHNIQUES

- 1.1 Basic principles
- 1.2 Assurance program structure and management
- 1.3 Mathematics/Statistics
- 1.4 Prediction and assessment
- 1.5 Analysis, review and audit
- 1.6 Reliability and Physics
- 1.7 Testing and measurement

2.0 RELIABILITY PROGRAM MANAGEMENT

- 2.1 Requirements analysis and definition
- 2.2 Program planning and direction
- 2.3 Program evaluation and risk assessment
- 2.4 Resource utilization tradeoffs
- 2.5 Interrelation of assurance disciplines
- 2.6 Education and motivation
- 2.7 Configuration management

3.0 RELIABILITY AND PROCUREMENT

- 3.1 Contracting and negotiation factors
- 3.2 Incentive structures
- 3.3 Guarantees and warranties
- 3.4 Vendor and subcontractor control

4.0 RELIABILITY AND COST

- 4.1 Total cost-of-ownership concepts
- 4.2 Life cycle costing principles and techniques
- 4.3 Value tradeoffs in program planning
- 4.4 Product service analysis

5.0 SYSTEM DISCIPLINES

- 5.1 Systems effectiveness - analysis and assessment
- 5.2 Failure modes and effects and criticality analysis
- 5.3 Availability analysis
- 5.4 Software reliability
- 5.5 Human effects - human reliability
- 5.6 Computer techniques
- 5.7 Modelling
- 5.8 Optimization techniques
- 5.9 Logistics and spares provisioning

(Continued)

1975 Membership Interest Profile

6.0 MAINTAINABILITY

- 6.1 Design considerations
- 6.2 Detection and diagnostic techniques
- 6.3 Recovery rates - prediction and assessment
- 6.4 Human factors and training

7.0 PARTS, MATERIALS AND INTEGRATED CIRCUIT RELIABILITY

- 7.1 Failure rates and device models
- 7.2 Failure mechanisms and degradation analysis
- 7.3 Screening techniques
- 7.4 Environmental effects
- 7.5 Selection and application control techniques
- 7.6 Packaging and connections

8.0 PRODUCT DESIGN FOR RELIABILITY

- 8.1 Engineering analysis and evaluation
- 8.2 Review techniques
- 8.3 Design margins control
- 8.4 Design features for contamination control
- 8.5 Evaluation and qualification test techniques

9.0 PRODUCT DESIGN FOR SAFETY

- 9.1 Specifications and requirements
- 9.2 Engineering analysis and evaluation
- 9.3 Review techniques
- 9.4 Design margins (safety factors)
- 9.5 Design features for hazard control
- 9.6 Evaluation and test techniques

10.0 RELIABILITY IN MANUFACTURING

- 10.1 Specifications and producibility
- 10.2 Process evaluation and control
- 10.3 Statistical control techniques
- 10.4 Defect reporting and analysis
- 10.5 Contamination control
- 10.6 Screening and conditioning
- 10.7 Acceptance testing techniques

11.0 RELIABILITY TESTING AND DEMONSTRATION

- 11.1 Statistical test design techniques
- 11.2 Reliability test planning
- 11.3 Test data analysis
- 11.4 Reporting, analysis, and corrective action systems
- 11.5 Measurement capability and techniques
- 11.6 Environmental and mission simulation techniques
- 11.7 Accelerated testing

12.0 PRODUCT RELIABILITY TECHNIQUES AND EXPERIENCE

- 12.1 Aircraft
- 12.2 Bio-medical instrumentation
- 12.3 Defense products
- 12.4 Electrical Power
- 12.5 Ground Transportation
- 12.6 Home appliances
- 12.7 Home entertainment equipment
- 12.8 Industrial control
- 12.9 Information systems
- 12.10 Marine products
- 12.11 Nuclear systems
- 12.12 Space systems

CARAD QUESTIONNAIRE

Name ______________________

Company ______________________

Address ______________________

Phone No. ______________________ ☐ Office ☐ Home

1. DO YOU USE A COMPUTER TO SOLVE RELIABILITY PROBLEMS ☐ Yes ☐ No

   If "yes", what kind of program or programs do you use?

   On what computer?

2. DO YOU USE CIRCUIT ANALYSIS PROGRAMS ☐ Yes ☐ No

   If "yes," please check the appropriate box or boxes:

   ☐ ECAP ☐ CIRCUS ☐ NET-1 ☐ SCEPTRE ☐ Other (Specify)

Please send the completed questionnaire to:

C. H. Purdue, 2442
Sandia Laboratories
P. O. Box 5800
Albuquerque, New Mexico 87115