

## EDITOR'S PROFILE of this issue

*from a historical perspective ...*

with Paul Wesling, SF Bay Area Council GRID editor (2004-2014)

October, 1969:

Cover: A representation of the Stanford Instructional Television Network's Black Mountain microwave relay system. From this location, SITN lectures could be sent to HP, Lockheed, and a dozen other companies with employees enrolled in Stanford's Honors Coop Program. See more on page 6.

Page 6: Don Grace of Stanford describes the SITN, and how bringing lectures to engineers at their workplaces can extend the half-life of what engineers learn in college and on the job. Half-life of information is estimated at 9 years. To compliment SITN, Stanford and local companies set up the Association for Continuing Education (ACE) to manage the academic and non-academic content for the network. It is ACE that allowed me to begin broadcasting IEEE short courses in the evening, which were "live" on campus and could be viewed at industrial facilities around the South Bay.

Page 12: Dave Leeson, president of California Microwave, talks about oscillator noise. He later becomes trustee for Stanford's student amateur (ham) radio station and does considerable research on past accomplishments by this club. His work has informed some of my lectures on the beginnings of Silicon Valley, which originated in radio experimenters from 1909 through the 1930's.



Archive of available SF Bay Area GRID Magazines is at this location:

[https://ethw.org/IEEE\\_San\\_Francisco\\_Bay\\_Area\\_Council\\_History](https://ethw.org/IEEE_San_Francisco_Bay_Area_Council_History)

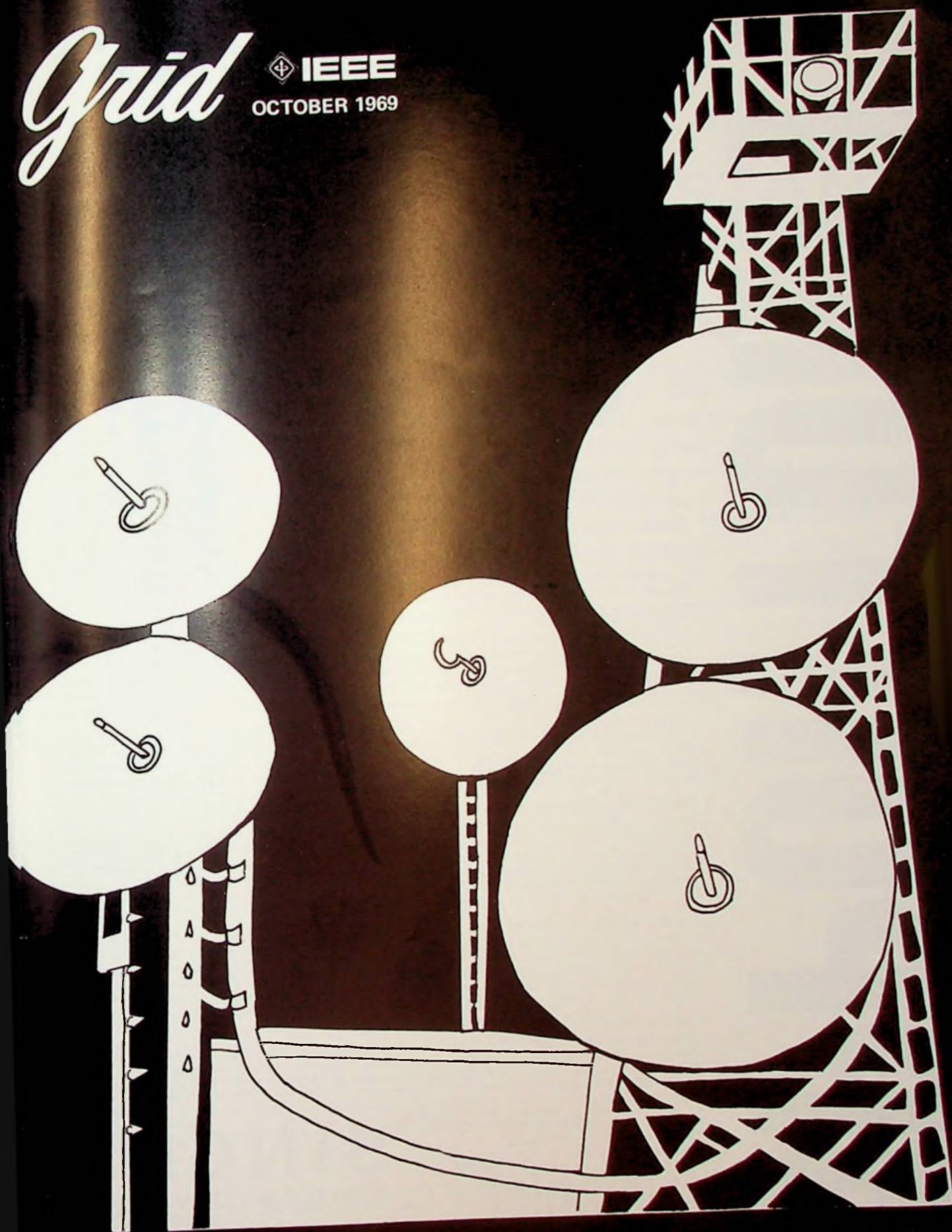
At time of scanning, the bound volumes are held by Paul Wesling.

April, 2025

Contact [p.wesling@ieee.org](mailto:p.wesling@ieee.org)

*Grid*

IEEE  
OCTOBER 1969





# OPPORTUNITY

## Systems for the New Generation

Friden Division of the Singer Company is expanding its third generation Management Information Systems Staff and is searching for qualified professionals for the following openings:

### Systems Programmer

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### Design Programmer

Under immediate supervision, assists more experienced programmers in the analysis, definitions, coding and testing of applications packages, acceptance tests and software offerings for stored program computer products. May also provide software support packages for other Friden EDP products. Reports to Software Development Supervisor.

### Senior Systems Programmer

Under general direction, designs microprogram logic, basic compilers, utilities and programming languages for Friden EDP products based upon hardware specifications. Works at the highest level of all technical phases of programming in providing the more complex software and in giving occasional guidance to less experienced programmers classifications. Reports to Software Development Supervisor.

### Communications Systems Analyst

Under the general direction of the Applications Engineering Supervisor and coordination of the Data Communications Product Line Manager, provide informational and technical interface for use of Friden Communications products in conjunction with all commonly used stored program computers offered by the various manufacturers. Participate in planning for new products by providing computer software/hardware facts and considerations to the Product Line Manager and Product Planning Specialists.

### Senior Applications Engineer

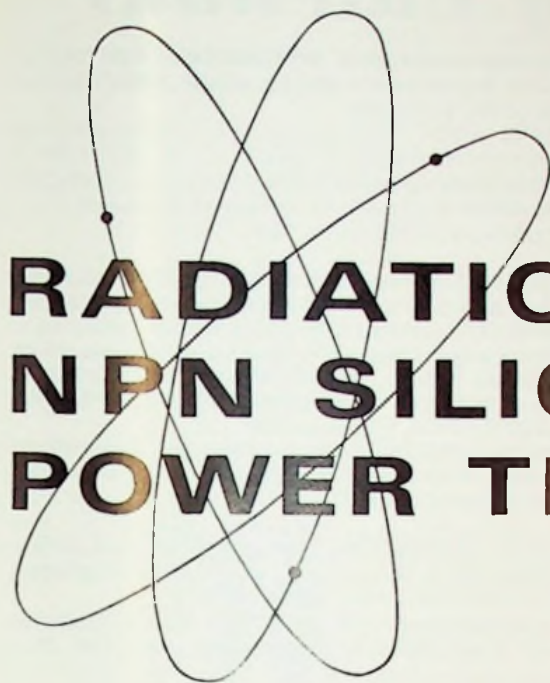
Under general direction, formulates hypothetical solutions to business, scientific and/or engineering problems as required by the Product Line Manager. Prepares procedures and programs for problem solution, software package offerings and language testing. Provides the "real world" interface in software development and gives guidance to less experienced programmer classifications. Reports to Applications Engineering Supervisor.

### Systems Writer

Under the general supervision of the Technical Documentation Supervisor, prepare accurate and complete written documents, suitable for publication, that describe and detail the software, higher level languages and simulators used with Friden EDP equipment and other major computers.

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							25°C CASE W	I <sub>C</sub> A	h <sub>FE</sub> ⊙ — (min)	V <sub>CE(s) Δ</sub> V(max)	I <sub>C</sub> A	h <sub>FE</sub> ⊙ — (min)	V <sub>CE(s) Δ</sub> V(max)	
BR100A	2N5527		TO-5	60	40	5	5	3	40	1	3	15 ⊙	2 ⊙	15
BR100B			MT-27	60	40	5	7.5	3	40	1	3	15 ⊙	2 ⊙	15
BR100C	2N5528		TO-59	60	40	10	35	3	40	1	3	15 ⊙	2 ⊙	3.5
BR100D			TO-60	60	40	10	35	3	40	1	3	15 ⊙	2 ⊙	4
BR100E	2N5529		TO-61	60	40	10	35	3	40	1	3	15 ⊙	2 ⊙	2.5
BR100F	2N5530		TO-61*	60	40	10	35	3	40	1	3	15 ⊙	2 ⊙	3
BR101A	2N5531		TO-5	90	75	5	5	3	30	1	3	7 ⊙	3 ⊙	15
BR101B			MT-27	90	75	5	7.5	3	30	1	3	7 ⊙	3 ⊙	15
BR101C	2N5532		TO-59	90	75	10	35	3	30	1	3	7 ⊙	3 ⊙	3.5
BR101D			TO-60	90	75	10	35	3	30	1	3	7 ⊙	3 ⊙	4
BR101E	2N5533		TO-61	90	75	10	35	3	30	1	3	7 ⊙	3 ⊙	2.5
BR101F	2N5534		TO-61*	90	75	10	35	3	30	1	3	7 ⊙	3 ⊙	3
BR200A	2N5535		TO-61	60	50	25	50	5	50	1	5	15 ⊙	2 ⊙	2.5
BR200B	2N5536		TO-61*	60	50	25	50	5	50	1	5	15 ⊙	2 ⊙	3
BR201A	2N5537		TO-61	90	75	25	50	5	40	1	5	10 ⊙	2.5 ⊙	2.5
BR201B	2N5538		TO-61*	90	75	25	50	5	40	1	5	10 ⊙	2.5 ⊙	3
BR300A			TO-61	60	50	25	50†	10	60	1	10	15 ⊙	2 ⊙	2
BR300B			TO-61*	60	50	25	50†	10	60	1	10	15 ⊙	2 ⊙	2
BR301A			TO-61	90	75	25	50†	10	60	1	10	10 ⊙	3 ⊙	2
BR301B			TO-61*	90	75	25	50†	10	60	1	10	10 ⊙	3 ⊙	2
BR400A			TO-61	60	50	25	50†	5	60	0.5	5	12 ⊙	2.0 ⊙	2
BR400B			TO-61*	60	50	25	50†	5	60	0.5	5	12 ⊙	2.0 ⊙	2
BR401A			TO-61	90	75	25	50†	5	60	0.5	5	7 ⊙	2.5 ⊙	2
BR401B			TO-61*	90	75	25	50†	5	60	0.5	5	7 ⊙	2.5 ⊙	2

Base Width ≈ 0.6 microns. ★ With isolated collector. All other TO-61 packages with collector connected to case. ⊙ V<sub>CE</sub> = 5V.

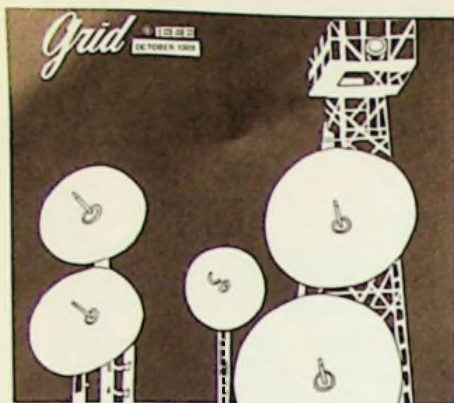
Δ I<sub>C</sub>/I<sub>B</sub> = 5. ⊞ φ = 1 x 10<sup>14</sup> n/cm<sup>2</sup>. ⊞ φ = 3 x 10<sup>14</sup> n/cm<sup>2</sup>. P<sub>T</sub> @ 100°C case.

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### ON THE COVER

Transmitter facility of the Stanford Instructional Television Network located on Black Mountain in the Coast Range will be described at the PGEM meeting on October 8. Television signals, transmitted by microwave from the Stanford campus, are broadcast from this site to receiving classrooms in industries and organizations throughout the Bay Area. The tower was formerly used to support an airways beacon. Drawing by artist Nancy Chin.

*Grid*

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# Meeting Calendar

AEROSPACE &  
ELECTRONIC  
SYSTEMS  
OCT. 16

Story on  
page 6

MICROELECTRONICS DISCUSSION AND TOUR,  
led by Ed Thompson, Project Leader, LMSC Micro-  
electronics, Sunnyvale.

OCT. 16, Thursday, 7:30 PM, Lockheed Microelectronics Center. Meet in the lobby of Bldg. 151, LMSC main plant in Sunnyvale. Event will be limited to 40 people. For reservations call Roger Winslow, 326-4350, ext. 6143 by Oct. 13th.

ANTENNAS &  
PROPAGATION  
OCT. 15

Story on  
page 4

THE APPLICATION OF COMPUTER TECHNIQUES  
TO THE SOLUTION OF PRACTICAL ELECTRO-  
MAGNETICS PROBLEMS: Part 1: What, Why and  
How of Integral Equations. Dr. Ken Mei, University of  
California, Berkeley. FIRST OF SERIES OF TUTORIAL  
LECTURES TO INTRODUCE COMPUTER-  
AIDED DESIGN TECHNIQUES.

OCT. 15, Wednesday, 8:00 PM, Philco-Ford Bldg. 56, Cafeteria Conference Room, 3825 Fabian Way, Palo Alto. Dinner: 6:00 PM, Rick's Swiss Chalet, 4085 El Camino Way, Palo Alto. No reservations. (See map with story for directions.)

AUTOMATIC  
CONTROL  
OCT. 21

Story on  
page 7

STATE ESTIMATION FOR LARGE-SCALE SYS-  
TEMS. Laszlo P. Hajdu, Senior Research Engineer,  
Wolf Management Services, Palo Alto.

OCT. 21, Tuesday, 8:00 PM, Lockheed Auditorium, Bldg. 202, 3251 Hanover St., Palo Alto. Dinner: 6:15 PM, Rick's Swiss Chalet, 4085 El Camino Way, Palo Alto. No reservations.

CIRCUIT  
THEORY  
OCT. 15

Story on  
page 8

DESCRIPTION AND APPLICATIONS OF THE FAST  
FOURIER TRANSFORM. Agostan Z. Kiss and Peter  
R. Roth, Hewlett-Packard, Santa Clara.

OCT. 15, Wednesday, 8:00 PM, Room 134, McCullough Hall, Stanford. Dinner: 6:15, Stickney's Hick'ry House, Town and Country Village, Palo Alto. Reservations: Section Office 327-6622, by Oct. 14th.

COMPUTER  
OCT. 28

Story on  
page 12

WHAT'S BEST FOR YOU - SUPER CALCULATOR,  
MINI COMPUTER, TERMINAL? Tom Osborne, Hew-  
lett-Packard Co., Palo Alto.

OCT. 28, Tuesday, 8:00 PM, Room 134, McCullough Bldg., Stanford. Dinner: 6:15 PM, Rick's Swiss Chalet, 4085 El Camino Way, Palo Alto. Reservations: Salli Burns, 321-3300, ext. 258 by Oct. 27th.

EAST BAY  
SUBSECTION  
OCT. 27

Story on  
page 10

TOUR OF FAA AIR ROUTE TRAFFIC CONTROL  
CENTER. Limited to 40 persons. See story for direc-  
tions.

OCT. 27, Monday, 8:00 PM, FAA Control Center, 5125 Central Ave., Fremont. Cocktails 6:00 and dinner 6:30 PM, Fremont Ranch Restaurant, 681 Peralta Blvd., Fremont. Reservations for tour and dinner: Oakland - Florence Wanser, 835-8500, ext. 53; San Francisco - Mary Vilter, 399-4974; San Jose - Linda Jarrett, (408) 291-4567 by Oct. 22nd.

EDUCATION  
OCT. 25

Story on  
page 6

DEGREES AT A DISTANCE - A DISCUSSION OF  
THE STANFORD TV SYSTEM, FOLLOWED BY A  
DEMONSTRATION AND TOUR OF THE INSTAL-  
LATION. Dr. Donald J. Grace, Director of Stanford  
Instructional Television Network.

OCT. 25, Saturday, 10 AM, Room 191 (upper level) Skilling Bldg., Stanford. Coffee time 9:30 AM; no-host luncheon at Tressider Student Union at noon. No reservations. (See map).

ELECTROMAGNETIC  
COMPATIBILITY  
OCT. 20

Story on  
page 5

THE ROLE OF IMPEDANCE IN THE MEASURE-  
MENT AND SUPPRESSION OF CONDUCTED EMI.  
A. T. Parker, President, Solar Electronics Co., Holly-  
wood.

OCT. 20, Monday, 8:00 PM, Hewlett-Packard Auditorium, 1501 Page Mill Road, Palo Alto. Dinner: 6:00 PM, Rick's Swiss Chalet, 4085 El Camino Way, Palo Alto. Reservations: Richard Kelkenberg, 742-8831 by Oct. 17th.

ELECTRON  
DEVICES  
OCT. 23

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BULK GaAs and IMPATT MICROWAVE SOURCES.  
Dr. W. Keith Kennedy, Watkins-Johnson Co.

OCT. 23, Thursday, 8:00 PM, Bold Knight, 769 N. Mathilda, Sunnyvale. Cocktails: 6:00 PM, dinner 6:30 PM. Reservations: Section Office, 327-6622 by Oct. 17th.

ENGINEERING  
MANAGEMENT

INSTRUCTIONAL TV OVERCOMES ENGINEER-  
ING OBSOLESCENCE - DEMONSTRATION, TOUR



OCT. 8

Story on  
page 6

**AND DISCUSSION OF NEW STANFORD TV FACILITIES.** Dr. Donald J. Grace, Director of Stanford Network and Robert Turk, General Manager of Association for Continuing Education (ACE).

OCT. 8, Wednesday, 8:00 PM. Room 191 (upper level) Skilling Bldg., Stanford. (See map with story). Coffee and cookies at 7:30 PM. Meeting will start promptly at 8.

**GOLDEN GATE  
SUBSECTION  
OCT. 29**

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page 8

**BAY AREA RAPID TRANSIT INSPECTION OF: TRAIN COMPUTER DISPATCH, MASTER CONTROL ROOM, TRAINWAY AND OAKLAND STATION COMPLEX.** John V. Andrews, Senior Engineer, BART Electronics & Communication Section, plus staff.

OCT. 29, Wednesday, 6:30 PM for Field Trip. Social hour at 7:30; dinner at 8:00. Review of project and short movie of BART project at 8:45. Field trip at BART Laki Merritt Station, 8th & Oak Sts., Oakland. Dinner and project review at Frere Jacque Restaurant, 601 Jackson St., Oakland. All Chapters and Subsections invited with guest and ladies. Reservations required — taken on first call basis. Please call Art Wells 467-1880 or Roland Grannis, 982-8729, or the Section Office, 327-6622, by Oct. 10th.

**INFORMATION  
THEORY  
OCT. 16**

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page 10

**PATTERN RECOGNITION USING NEAREST NEIGHBOR TYPE RULES.** Dennis L. Wilson, Adv. Dev. Engineer, Sylvania Electronic Systems, Mt. View.

OCT. 16, Thursday, 8:30 PM, Stanford Research Institute, Bldg. 1, 333 Ravenswood Ave., Menlo Park. Dinner: 6:15 PM, Ming's of Palo Alto, 1700 Embarcadero Rd., East Palo Alto. Reservations: Mrs. Mary Rodimon, 966-2092 by Oct. 15th.

**MAGNETICS  
OCT. 14**

Story on  
page 9

**1. DESCRIPTION OF THE NEW VIDEOFILE\* SYSTEM.** R. B. Altermatt, Product Manager for the Videofile Information Systems Div. of Ampex Corp.

**2. DESCRIPTION OF THE AMPEX TBM\* MEMORY SYSTEM.** Victor Ragsone, Manager of the Research Dept. at Ampex Corp.

OCT. 14, Tuesday, 8:00 PM. Ampex Cafeteria, 401 Broadway, Redwood City. No dinner.

**MICROWAVE  
THEORY &  
TECHNIQUES  
OCT. 8**

Story on  
page 12

**SYSTEM REQUIREMENTS FOR OSCILLATOR NOISE.** Dr. David B. Leeson, President, California Microwave.

OCT. 8, Wednesday, 8:00 PM, Hewlett-Packard Auditorium, 1501 Page Mill Road, Palo Alto. No dinner.

**NUCLEAR  
SCIENCE  
OCT. 21**

Details of this meeting to be announced by mail. For information, contact L. L. Moon, Lawrence Radiation Lab, L-121, P.O. Box 808, Livermore. Phone: 447-1100, ext. 8318.

**POWER  
OCT. 14**

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page 11

**750 kv DC CELILO-SYLMAR TRANSMISSION LINE OF THE PACIFIC INTERTIE.** F. Carl Osborn, Engineer of Transmission and Communications, Power Operating & Maintenance Div., Los Angeles Dept. of Water and Power.

OCT. 14, Tuesday, 7:30 PM, Engineers Club of San Francisco, 160 Sansome St., S.F. Cocktails 5:30 PM, dinner 6:30 PM. Reservations: 421-3184 by Oct. 13th.

**RELIABILITY  
OCT. 9**

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**RELIABILITY CONSIDERATIONS IN THE DESIGN OF COMMERCIAL POWER SUPPLIES.** Dr. David Simmons, Vellonex Corp.

OCT. 9, Thursday, 8:00 PM, PH 104, Stanford University. "Meet the Speaker" dinner at 6:30 PM, Stanford View Restaurant, 1921 El Camino, Palo Alto. Reservations: W. L. Finch or Fran Hamada, 743-1577 by Oct. 8th.

**SYSTEMS  
SCIENCE &  
CYBERNETICS  
OCT. 23**

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page 8

**PREVENTATIVE MEDICINE AND SYSTEM SCIENCE.** Dr. Joe Chadwick, Program Director in Health, Stanford Research Institute, Menlo Park.

OCT. 23, Thursday, 8:00 PM, Conference Room B, SRI, 333 Ravenswood Ave., Menlo Park. Dinner: 6:00 PM, Coach & Six, El Camino Real, Menlo Park. Reservations: Carolyn Smith, 326-6200, ext. 2312 by 3 PM, Oct. 22nd.

**VEHICULAR  
TECHNOLOGY  
OCT. 20**

Story on  
page 9

**1. PUBLIC SAFETY COMMUNICATIONS IN SAN MATEO COUNTY.** William D. Goheen, Supervisor, Communications, San Mateo County.

**2. CHICAGO POLICE COMMUNICATIONS SYSTEM.** Al Isberg, Consulting Communications Engineer, Berkeley.

OCT. 20, Monday, 8:00 PM, Howard Johnson's Restaurant, Veterans Blvd. and Whipple Road, Redwood City. Cocktails 6:30 PM; dinner 7:00 PM. Reservations: 328-1200, 433-3800 or 526-1446, by noon Oct. 20th.



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# Section Chairman's Message

"The Greatest Show on Earth" is a phrase that aptly describes WESCON. Held in our beloved city of San Francisco during the week of August 19-22, 1969, it seems almost unnecessary to say that a record-breaking crowd of 45,226 attended, that the full exhibiting capacity of 1196 booths was sold out and that of 23 technical sessions only 2 had an attendance of under 100. This notable success is the direct result of the inspired leadership and the hard work of our WESCON team of WEMA and IEEE. Space does not permit a listing of all those who contributed so generously with their efforts. To each and every one who participated in WESCON I extend the thanks and gratitude of the San Francisco Section of IEEE.

Particular honor and credit is due to five gentlemen whose astute handling of WESCON affairs guaranteed success. They are Emmet G. Cameron, WESCON Executive Committee Chairman; John C. Beckett, WESCON Board Chairman; Fred J. MacKenzie, WESCON Convention Director; William H. Heflin, WES-

CON Show Director and, last but not least, Don Larson, WESCON General Manager, who year after year quietly manages to top his own records.

What does all this mean to you and me we might ask? First of all WESCON enriches us professionally. Its carefully planned technical sessions keep us abreast of the state of the art. It provides a forum for the discussion of technical problems. It brings together exhibitors from all over the world permitting us to glimpse the relative status of their emerging technology. It encourages young "future engineers" by displaying their technical achievements. It stimulates excellence in design by presenting awards to deserving designers.

But WESCON is not all work and no play. The opportunity to renew old acquaintances and to meet new friends is an important and pleasant social aspect of WESCON. Anyone who attended any of the many cocktail parties, luncheons and dinners could not help but come away a little bit richer for the experience. And what about the ladies! Didn't

they have a wonderful program! Millie Leadabrand and her "girls" started things off with a "Champagne Reception" at the St. Francis Yacht Club, followed by a "Turn of the Century Fashion Show Luncheon" and finally a Continental Breakfast and a guided tour of WESCON.

Last, and a very important aspect of WESCON, is the financial reward that it furnishes us. Any surplus generated by WESCON is divided between WEMA and Region 6 of IEEE. The IEEE share is divided among all the Sections in Region 6. This support makes it possible for your Section and others to carry out programs that would otherwise be impossible and to do so without depleting an already overburdened Headquarters Budget.

The fruits of WESCON can therefore be listed as technical, social and financial. On behalf of the San Francisco Section, I say "Well done WESCON! We are proud of your magnificent accomplishment and you can count on our continued support and our eternal gratitude."

John B. Damonte  
Chairman

IEEE, San Francisco Section

## What, Why and How of Integral Equations

A series of tutorial lectures intended to introduce computer-aided design techniques to engineers interested in solving practical electromagnetic design problems will begin with the Antennas and Propagation meeting on Wednesday, October 15.

The first lecture will be presented by Dr. Ken Mei of the University of California, Berkeley. Dr. Mei will discuss the application of the computer in solving field problems by the integral equation method. The applications of integral equations in solving field problems have become more and more popular with the increasing availability of high speed computers. While the integral equation method has been popularized very recently, it is neither new nor difficult. In fact, the only prerequisite for learning integral equation methods is the knowledge of Coulomb's law and linear simultaneous equations. Starting from a very elementary viewpoint, this lecture will illustrate why the integral equation method is advantageous over the conventional methods, how to reduce a field problem to an integral equation and where the computer can take over the work of solution.



### PALO ALTO FACILITIES



Dr. Mei is an Associate Professor of Electrical Engineering and Computer Sciences. He has been engaged in the research of numerical methods, antennas and plasmas since he joined the University in 1962. He is a recipient of the G-AP achievement award of 1967.

The meeting will be held at 8:00 PM. Dinner is planned for 6:00 PM. Complete information in Calendar.



Dr. Ken Mei



# Magnetics Chapter Hears Two Speakers

Large numbers of documents, extensive storage areas, multiple users and high activity bring monumental challenges to information management. Manual or semi-automatic methods of handling these large collections of documents are often inefficient and costly. The Videofile\* system is designed to cope with these large and active files by handling the documents in the form of television-type electronic images. A Videofile\* system can provide a wide degree of automation to file operations ranging from fast filing and automatic retrieval to the potential elimination of all paper document flow. It is built up from basic modules, making it flexible and adaptable to the application to many information management problems.



Very large files can be used with relatively small systems since equipment size and file size are not directly related.



Robert B. Altermatt



Victor Ragosine

The Magnetics Chapter will have two speakers at its Tuesday, October 14 meeting to be held in the Ampex Cafeteria in Redwood City. Robert B. Altermatt will give a brief introduction to the recording methods used in Videofile\*

Tape Sections and (disk) Buffer Sections followed by a discussion of the overall system and its use. Slides will be used to show the various system modules. Questions from the floor will be solicited after the formal presentation.

The second speaker, Victor Ragosine, will present a description of the Ampex TBM\* Memory System. A large-capacity ( $2 \times 10^{12}$  bits) on-line memory system, TBM\* utilizes a digital adaptation of transverse video recording techniques to achieve high packing density and excellent data reliability. Some comparisons of electron beam, laser beam, laser-holographic and magnetic recording techniques for mass memories will be pro-

vided.

Mr. Altermatt is presently a Product Manager for the Videofile\* Information Systems Division of Ampex Corporation. Previous Ampex activities include Application Engineering and Product Management in the Instrumentation Division. Mr. Altermatt, a member of IEEE, is a Registered Professional Engineer.

After attending Columbia College and the Columbia University Graduate School, Victor Ragosine has occupied a number of positions in government and industrial research laboratories. He is currently Manager of the Research Department at Ampex Corporation.

## A.T. Parker Speaks to EMC Chapter

Measured impedance values of power lines in aircraft, spacecraft, screen rooms and other environments will be compared with the impedances used in conducted EMI measurements by A. T. Parker at the October 20 EMC meeting. Measured impedance values of various test samples will be presented by Mr. Parker and the effect of the actual line impedance on the measured levels of EMI current will be shown. Mr. Parker will give filter design details to show the techniques needed for differing termination impedances. He will explore the differences between low frequency and high frequency filter design. He will give practical demonstrations of an instrument for measuring line impedance while the test sample is operating and drawing power current. The need for expressing conducted EMI in terms of power rather than voltage or current

will be introduced. The relation between active EMI power and apparent EMI power will be demonstrated. Suggested specification limits for "conducted EMI power" will be shown based on the impedance in the test setup and the EMI current limits of MIL-STD-461A.

In mid-1960, Mr. Parker resigned his position at Stoddart Aircraft Radio Company, where he had been employed for 13 years, to form his own firm of electronic consultants. In this activity he has been personally active as an RFI/EMC Specialist and in the design of various solid state devices. Mr. Parker is nationally known as an RFI/EMC Consultant and is personally acquainted with most of the promulgators of existing RFI government specifications. He has served on RFI Committees such as SAE Vehicular Interference Subcommit-



A. T. Parker

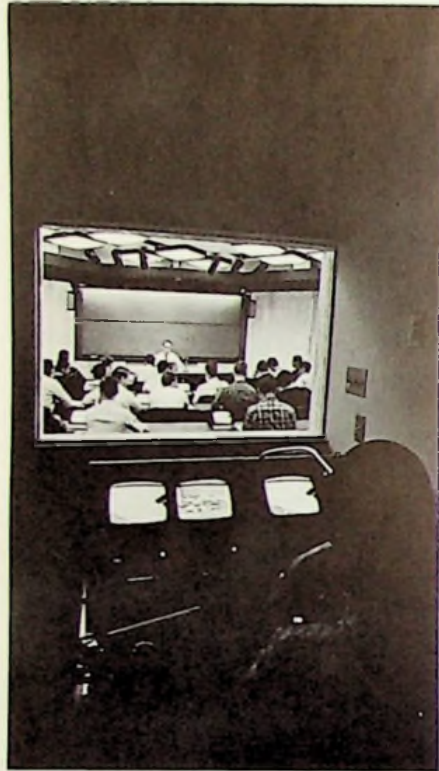
tee, SAE AE-4 Electromagnetic Compatibility ASA C63 Subcommittee on RFI. He is a past chairman of the Los Angeles District of IEEE-EMC Group and was an appointed member of the United States delegation to the International RFI Committee, CISPR.

Dinner at 6:00 PM, Rick's Swiss Chalet, will precede the 8:00 PM meeting.



## Topic for Education. . . "Degrees at a Distance"

The School of Engineering at Stanford University will play host to the Professional Group on Education at their meeting on October 25, where Dr. Donald J. Grace will describe the Stanford University Instructional Television Network and discuss its impact on graduate engineering education in the Bay



**VIEW FROM A STANFORD TELEVISION CONTROL ROOM.** Professor James Angell is lecturing. Monitors show the classroom scene as well as lecturer's notes.

Area. The meeting will be held at 10:00 AM in Room 191 of the Skilling Building, which is one of the new studio-classrooms from which live lectures are being broadcast by the Stanford faculty members to students in remote classrooms located where they work. The discussion will be focussed on the academic and administrative operation of the system, but there will also be a brief technical description and a tour of the facilities. Coffee time at 9:30 AM will precede the meeting and there will be a no-host luncheon in a private dining room at the Tressider Student Union on the campus after the meeting.

Dr. Grace will present a paper concerning the Stanford Instructional Television Network at the 1969 Asia Electronics Conference in Taipei, Taiwan to be held November 24-29. The title of his paper will be "An Operating Four-Channel System Interconnecting the University with the Surrounding Industrial/Government Community."

## "Extending the Half-Life"

A unique method to aid in coping with the "information explosion" will be demonstrated at this season's kickoff meeting of the Engineering Management Chapter on Wednesday, October 8 in Room 191 of the Skilling Building at Stanford. Coffee and conversation will be served in that order at 7:30 PM.

Latest estimates indicate that the technological half-life of the recent engineering graduate is only nine years! To counter the effects of technical obsolescence, engineering managers encourage their employees to keep up with the rapidly-increasing volume of new knowledge by urging membership in technical societies, providing tuition refunds to promote continuance of education, furnishing facilities for in-house training, and participating in such plans as the Stanford Honors Cooperative Program.



**Dr. Donald Grace**

As an extension of the latter Program, Stanford began last April to telecast some of its regular graduate engineering courses to students located in their plants throughout the Bay Area. Dr. Donald J. Grace, Associate Dean of the School of Engineering and Director of the Stanford Instructional Television Network will describe the many novel features of the system.

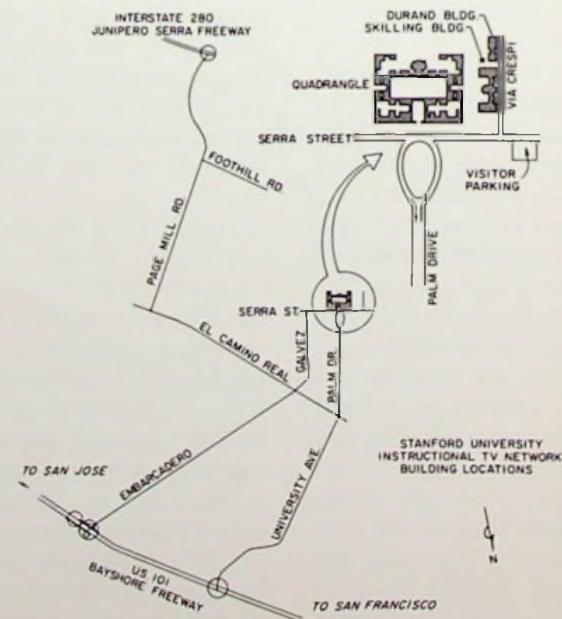
To utilize the installation in the early morning and evening hours when not required for Stanford courses, participating companies and organizations have formed a non-profit corporation



**Robert H. Turk**

the Association for Continuing Education (ACE). ACE uses the Stanford facilities to conduct a large-scale program of academic and non-academic courses. Robert H. Turk, General Manager of ACE, will discuss the pioneering concepts of the Association and how it aids in extending the technical half-life of engineers (and their managers).

Donald J. Grace received his doctorate from Stanford University in 1962. He has been with Stanford since 1951 as a research associate, teacher, faculty advisor, and Director of the Systems Techniques Laboratory. Dr. Grace was named Associate Dean of the School of Engineering and Director of the Stanford Instructional Television Network in 1967. Robert H. Turk was granted the B.S. degree in Industrial Relations and Personnel Management from San Jose State College in 1965. He was a Training Specialist at Lockheed Missiles and Space Company from 1961 until his appointment as General Manager of ACE in March, 1969.





## State Estimation for Large-Scale Systems

L. P. Hajdu, a Senior Research Engineer on the staff of Wolf Management Services, Palo Alto, will treat state estimation techniques and their application to large, interconnected electric power systems in a discussion to be presented at the Automatic Control meeting, 8:00 PM, Tuesday, October 21. This technique involves the optimal use of all available measurement data — which may often be insufficient, noisy, delayed or unreliable — to estimate the system state variables in real time. The estimator processes the imperfect information and produces the best possible estimate of the true state of the system.



Laszlo P. Hajdu

Mr. Hajdu is presently project manager of the company's consulting, research and software development work on the Advanced Dispatch and Control Center of the Bonneville Power Administration. He has a long experience in the field of electric power systems, including the application of computers to problems in system planning, operation and automatic controls. He has also been active in the design optimization and evaluation of ground transport systems, including modern automated transportation concepts as well as vehicular electric drive systems.

Mr. Hajdu, a Senior Member of IEEE, is the author or co-author of a dozen technical papers and published reports, including an invited article in the IEEE Proceedings special issue on Transportation.

Check Calendar for meeting details and information concerning the dinner scheduled to precede the meeting.

### REMINDER . . .

We continually urge program chairmen to give us more vivid and informative meeting announcements — photos of lecturers with biographies. Be sure to get all meeting data to Section Office by first of month preceding publication.

## 16th Nuclear Science Symposium in S.F.

The IEEE 1969 Nuclear Science Symposium returns to San Francisco this year and will be held October 29, 30, and 31, at the Sheraton-Palace Hotel. The conference is organized by the Nuclear Science Group of IEEE and sponsored by the AEC and NASA.

Topics of invited keynote papers include:

"Pollutants and Natural Minor Constituents of the Upper Atmosphere"

"The Chemical Invasion of the Oceans by Man"

"Stable Isotope Measurement of Sulphur Pollutants"

"Low Dose Radiation, Chromosomes and Cancer"

"Progress in Fast Breeder Reactors"

Symposium luncheon guest speaker will be Dr. Hans Mark, Director of Ames Research Center, NASA.

Technical Sessions are as follows:

Wed. Oct. 29 PM — 1C — "Detectors and Instruments"; 1D — "Space Applications"

Thurs. Oct. 30 AM — 2A — "Interfacing of Data Acquisition Systems to Computers"; 2B — "Biomedical Applications"

Thurs. Oct. 20 PM — 2C — "Data Acquisition Systems for Nuclear Physics"; 2D — "Geophysical Applications"

Fri. Oct. 31 AM — 3A — "Instrumentation"; 3B — "Oceanographic Applications"

Fri. Oct. 31 PM — 3C — "Instrumentation"; 3D — "Advanced Instrumentation for Reactors"

A three-day of tutorial/seminar type of meetings is being held at the same time jointly sponsored by the Power Group and Nuclear Science Group. It will feature topics of immediate current interest to electrical engineers in the Nuclear Power Generating Industry. These will include standards and licensing; reactor controls and system, auxiliary power, simulators and a number of other areas.

Programs or further information may be obtained from the registration chairman:

A. L. Stripeika, L121  
Lawrence Radiation Laboratory  
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# Fast Fourier Algorithm Discussed

Our life has been strongly affected in the past decade by the explosive growth of digital computers for scientific, engineering and business use. Application of digital computers to signal processing has been greatly enhanced by the "Cooley-Tukey Fast Fourier Algorithm." This algorithm will be the topic of discussion by Agostan Kiss and Peter Roth at the Wednesday, October 15 meeting of the Circuit Theory Chapter.

Three major subjects will be discussed. The Fast Fourier Algorithm will be described but the really pertinent questions relate to the applications and peculiarities of digital signal processing. A tremendous variety of problems can be solved by the proper application of digital signal processing methods — spectrum analysis, power spectrum density measurements, auto- and cross-correlation, digital and inverse filtering, etc. — but the improper or haphazard use of these methods creates almost as many problems as proper use solves. Results



Agostan Z. Kiss



Peter R. Roth

of digital signal processing can vastly differ from "textbook" results for two main reasons: the signals to be analyzed are represented in FINITE number of SAMPLES. The effects of these on the results and their correct interpretation will be discussed.

Agostan Z. Kiss joined Hewlett-Packard Company, Santa Clara Division, in 1965 where he initially worked on character recognition problems. He is now in charge of the Fourier Analyzer projects of the Santa Clara Division.

IEEE member Peter R. Roth joined HP, Santa Clara Division in 1965. He was responsible for the development of the 5210A Frequency Meter. In 1967 he joined the Fourier Analyzer group and as project leader was responsible for the development of the 5450A Fourier Analyzer.

Dinner is planned at Stickney's in Palo Alto before the meeting which will be held in Stanford's McCullough Hall. See Calendar for details.

## Preventative Medicine and System Science

Preventative medicine is a very natural field for application of system science concepts, being more amenable to such analysis than are the medical aspects of acute care. Joseph H. Chadwick, speaker at the System Science and Cybernetics meeting, October 23, will give examples of the role that system analysis can play in preventative medicine. He will discuss various aspects of multiphasic health testing and cardiovascular screening. He will also cover the interplay of medical and economic factors.

Dr. Chadwick is associated with the Stanford Research Institute as Director of the Institute-wide Health Program. His talk will be based on work now underway at SRI under contract and internal sponsorship. Dr. Chadwick has an extensive background in the technical and management aspects of large-



Dr. Joseph Chadwick

scale electronic system design. Prior to joining SRI he was the engineering manager, at Sperry Rand, for the Polaris Navigation Subsystem development program. He received a BS in EE from Caltech in 1944 and a Ph.D. in EE from Stanford in 1951.

The meeting is scheduled for 8:00 PM at SRI with dinner planned for 6:00 PM at the Coach and Six. Complete information in Calendar.

## GGSS Field Trip to BART Station

Wednesday, October 29 is the date scheduled by the Golden Gate Subsection for an inspection trip of the Bay Area Rapid Transit District's \$26 million train control system. GGSS members and guests will visit the recently completed automatic electronic brain center of BART, as well as the computer room and overall Oakland headquarters and complex.

The inspection trip will start at 6:30, with groups being ushered through the complex as they arrive. The meeting place will be the Lake Merritt Station, 8th and Oak Sts.

Following the trip, dinner will be held at the nearby Frere Jacques Restaurant. The program consists of a social period at 7:30, dinner at 8:00 and a Project Review at 8:45 by John V. Andrews, Senior Engineer of the BART Electronics and Communication Section, who will also present a short film on the construction phase of the project.

Reservations are required for both the inspection trip and the dinner as a large turn-out is anticipated. Reservations will be on a first-call basis. Those desiring rides and those offering to assist in transportation from San Francisco should also advise. Check Calendar for full information.

## AES Microelectronics Discussion and Tour

The October meeting of the AES group will feature an open discussion on microelectronics and a tour of the new Lockheed Microelectronics Center in Sunnyvale. This facility was built to provide a sophisticated microelectronics capability with unrestricted technology, and is only limited in total capacity. The event will start with a short open discussion on microelectronics, in which interested engineers are invited to participate. This will be followed by a tour of the facility. The tour will highlight hybrid construction techniques to support advanced electronics programs.

The discussion and tour will be led by Mr. Ed Thompson, Project Leader, LMSC Microelectronics. The meeting will be on Thursday, October 16, at 7:30 PM. Meet in the lobby of Building 151, which is near the Shell Station on the West side of the LMSC Sunnyvale main plant. For reservations, contact Roger Winslow at 326-4350, extension 6143. Attendance will be limited to 40 persons on a first-come, first-served basis.



# Bulk GaAs and IMPATT

W. Keith Kennedy will discuss the present state of the art and relative merits of avalanche (IMPATT and anomalous) diodes and bulk GaAs devices at the Electron Devices meeting on Thursday, October 23.

Rather than a detailed discussion of the various modes of operation for each type of device, the emphasis will be placed upon broad areas of frequency and power over which devices are now commercially available, both as product lines and prototype units. Specifically, the parameters of both mechanically and electronically tuned devices at C, X, and Ku-band will be presented. Pulse sources for single device transmitters as well as for phased array systems and their advantages over conventional devices will also be discussed.

Dr. Kennedy received his formal education at Cornell University receiving his EBSEE in 1966 and Ph.D. in 1968. Since 1965, he has been engaged in research on bulk microwave sources and the supporting materials technology. While at Cornell, he was primarily involved in high pulsed power generation with GaAs devices. From 1967 to 1968, he worked at Cayuga Associates developing high



Dr. Keith Kennedy

pulsed power sources between 4 and 35 GHz. Since joining Watkins-Johnson Co. in 1968, he has been concerned with the design and development of both avalanche and bulk GaAs sources at microwave and millimeter frequencies.

A member of the IEEE, Dr. Kennedy is the author of several papers on bulk semiconductor sources. He is also affiliated with Eta Kappa Nu, Tau Beta Pi, Phi Kappa Pi, and Sigma Xi.

Location of the evening's program, which consists of cocktails at 6:00 PM, dinner at 6:30 and meeting at 8:00, will be the Bold Knight in Sunnyvale. Reservations can be made at the Section Office, 327-6622, by October 17.

## Public Safety Communications

Public safety communications in large metropolitan urban areas is becoming more complex and requires very efficient coordination between adjacent cities and counties. At the Vehicular Technology meeting on Monday, October 20, at 8:00 PM, Bill Goheen, Supervisor of Communications in San Mateo County and President of the Northern California Chapter of the Associated Public Safety Communications Officers, Inc., will explain how San Mateo County and its cities cooperate in their coordinated communications system and how the system will be improved and expanded.

The county owns and operates a microwave system extending from Daly City to Menlo Park which is used for the rapid exchange of information between various agencies. The system also includes a data buffer system which stores and forwards information to the proper destination. Ultimately, the system will have 19 terminals on the directed message network, 19 terminals on the all-points network and 4 high speed input and output terminals for interfacing on high speed computers. A new control center is planned and will be located in

the new San Mateo County office building.

Al Isberg will also describe his recent tour through the Chicago Police Communication Center which is claimed to be the fastest large city police dispatching center in the world. It controls 1800 vehicles, covering 224 square miles and serving 3,500,000 people. Chicago is divided into 8 communications zones, corresponding to the telephone exchange boundaries. All police calls within a given exchange are received at one set of consoles, consisting of a primary telephone answering console with a radio dispatching console on each side. An incoming call is immediately dispatched and the record card is continuously available to all who handle the call until the requirement has been completed. Since the Chicago police communication unit operates according to telephone exchange areas instead of civil boundaries, it can ideally accommodate the proposed 911 nation-wide emergency telephone calling code. How the 911 code might be accommodated in the San Francisco/Oakland metropolitan bay area is an interesting topic for a future meeting.

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# Pattern Recognition Using Nearest Neighbor Type Rules

Nearest Neighbor Rules can have good performance in pattern classification when the only information about the patterns is contained in a few samples from each pattern class. Some related rules can have performance which approaches the performance of the Bayes rule quite closely in practical problems.

The aspects of probability theory which cause the performance of Nearest Neighbor Rules to be good will be explored by Dennis L. Wilson at the Information Theory meeting on Thursday,



Dennis L. Wilson

October 16, at 8:30 PM. One facet considered will be the rate of convergence of performance as the number of pre-classified samples becomes large. Estimation of the Nearest Neighbor Risk before using the rule will be examined. Finally, techniques for the practical utilization of the Nearest Neighbor Related Rules on a digital computer will be discussed.

Dennis Wilson received the BSEE from Virginia Polytechnic Institute in 1960 and the M.S. in electronic science from Stanford in 1962. From 1956 to 1961 he was a student trainee with the Sound Division, Naval Research Laboratory, Washington, D.C. In 1962 he joined Sylvania Electronic Systems in Mountain View where he is now working in the area of data processing and pattern recognition for military command, control, communication and sensory systems.

The meeting, to be held at SRI, will be preceded by a dinner at Ming's of Palo Alto. See Calendar for complete information.

## EBSS Tours Center



EBSS will tour the FAA Air Route Traffic Control Center in Fremont on October 27. In the conference room there will be a movie showing the NAS IBM 9020 Computer and how it is used in air traffic control. Then they will tour the control "floor" where all controllers and operators work, and get a graphical display of what goes on there. They will see and hear how the men communicate and how they identify through radar, and how an airplane looks on radar. A question-and-answer period will then be held in the conference room.



Cocktails and dinner are scheduled at the Fremont Ranch Restaurant before the tour. To reach the restaurant, take the Nimitz Freeway (No. 17) to Thornton Ave., go east to Fremont Blvd. two or three blocks to Peralta and turn left to the restaurant. To get to the Traffic Control Center, go back down Peralta to Fremont, cross Fremont and stay to the left. Peralta will change to Williams. Stay on Williams to Central Ave. and turn right. The Control Center is just west of Blacow Road on the north side of the street.

The tour is limited to 40 persons, so make reservations early. See Calendar for details.

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# HVDC Pacific Intertie Discussed

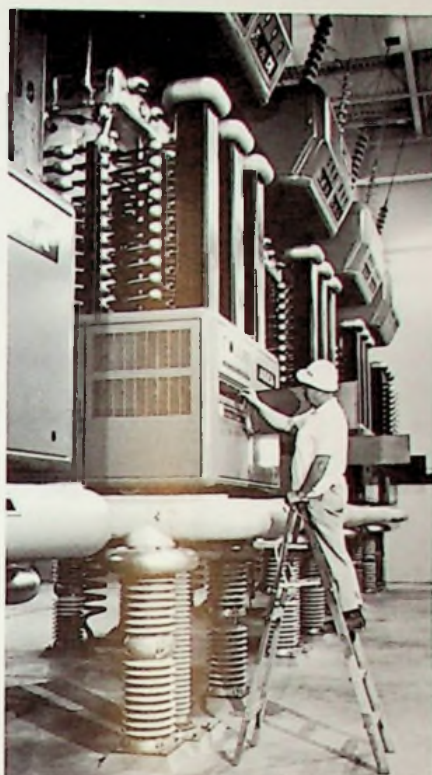
Radio noise suppression and other design and operating considerations involved with the 750-kv DC transmission line of the Pacific Intertie will be discussed at the Power Group's meeting October 14. The subject is particularly timely since the facilities are now undergoing extensive testing before commercial operations begin next spring.

Mr. F. Carl Osborn of the City of Los Angeles Department of Water and Power will be the speaker. Mr. Osborn has been involved with the HVDC project for over five years and has inspected most of the DC transmission projects of the world, including those in New Zealand, Japan, Europe and Russia. Of his 22 years with LADWP, 18 were in design of power system facilities. For two years, Mr. Osborn was responsible for system load dispatching and station operation and maintenance.



Carl Osborn

Due to the great number of communication circuits through the Sylmar area of LADWP's ac/dc converter station at the southern terminal of the transmission line, huge RI shielding screens had to be erected to enclose much of the outdoor equipment. Large banks of series capacitors were also necessary to suppress harmonics reflect-



Mercury arc valves installed in the 650-KV BIL bridge room, Sylmar Converter Station. Los Angeles Department of Water and Power.

ed on associated ac lines of DWP and SCE that carry the electricity to Southern California loads.

Planning, design and operation of the Sylmar station and the 853-mile line to Bonneville Power Administration's Celilo converter terminal at The Dalles, Oregon, will be covered in detail. The advantages of DC for this application and contractual arrangements for power sales and interchange between the Pacific Northwest and Southwest will also be discussed.

The meeting is scheduled for 7:30 PM at the Engineers' Club with cocktails at 5:30 and dinner at 6:30. See Calendar for details.

## Commercial Power Supply Design

Reliability considerations in the design of commercial power supplies will be discussed October 9 by David Simmons of Vellonex at the Reliability Engineering Chapter meeting. The speaker has been engaged in the design and manufacture of 3 volt to 30KV power supplies for 10 years. Emphasis of the evening's talk is on power supplies for the commercial market, as contrasted with military and space equipment.

Dr. Simmons received his Ph.D. in

physics at the University of Birmingham in England. In addition to his technical knowledge, he brings an extensive management background and some challenging — perhaps fighting — opinions regarding the field of reliability engineering.

The meeting will be held Thursday, October 9, at 8:00 PM in room PH104, Stanford. The regular "Meet the Speaker" dinner will be held at 6:00 PM at the Stanford View Restaurant on El Camino Real, Palo Alto.

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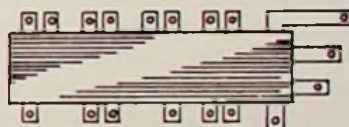
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## What's Best for You?

The categories of calculator and computer have been on a collision course for several years with the first significant overlapping of the disciplines occurring in the past two years. What are the relative strengths and weaknesses of the modern calculator, mini computer and terminal? What will result from the impending large-scale overlapping of these disciplines? What ground rules will influence the design of future generations of super calculators, mini computers and terminals? These questions and others will be discussed by Tom Osborne at the October 28 meeting of the Computer Chapter.



Tom Osborne

Mr. Osborne received his BSEE from the University of Wyoming and his MSEE from the University of California, Berkeley. He has been involved in the large calculator/small computer area for the past eight years. He was a significant contributor to the design of the Hewlett-Packard 9100A Desk Calculator/Computer and is currently a technical advisor to the Data Products Group of Hewlett-Packard.

The meeting is scheduled for 8:00 PM in Stanford's McCullough Bldg. and will be preceded by dinner at Rick's Swiss Chalet at 6:15.

## System Requirements for Oscillator Noise

The Microwave Theory and Techniques Chapter will meet at 8:00 PM Wednesday, October 8 to hear Dr. David B. Leeson speak on system requirements and limitations on oscillator noise, as well as general theory of noise in oscillators and its measurement.

In all systems which function by virtue of particular spectral characteristics, oscillator noise due to short term frequency instabilities can be a limiting factor. Doppler radar and FM point-to-point relay are two major examples. In general, FM noise predominates over AM noise as a system consideration, due both to AM reduction by limiting and to enhancement of FM noise in oscillators by positive feedback.

Quiescent and environmental noise spectrum requirements of a typical multi-mode radar and a multihop telecommunications relay will be outlined. Remarks will touch on the following aspects of signal source noise: How do requirements relate to performance? What can one expect in theory? What is available in practice? How is this measured?

Dr. Leeson was founder and director of the Microwave Laboratory of Applied Technology, Inc. (now a division of Itek Corp.) He was with Applied Technology from 1965 to 1968, and was principal designer of signal sources produced there. Dr. Leeson is now President of California Microwave, Inc., Sunnyvale. A Senior Member of IEEE, Dr. Leeson is a member of an IEEE national technical committee and subsection executive committee, and serves as technical committee coordinator for the G-MTT. He is the author of several IEEE Proceedings papers in the areas of precision frequency control and mea-



Dr. David B. Leeson

surement, doppler radar, and microwave signal generation. He has also assisted as organizer, program committee, invited panel member, or editor of several microwave symposia and proceedings.

The meeting will be held in Bldg. 5M, Hewlett-Packard, 1501 Page Mill Road, Palo Alto.

## 8 Power Lectures

The IEEE Power Group is again sponsoring a series of 8 lectures on Protective Relaying this fall. The series will be on Mondays from 6 to 8 PM, starting on October 13, in Room 210 of PG&E's San Francisco Division office at 375 Mission Street. The course schedule and description will be mailed in the first Power Group mailing and will be posted on various company bulletin boards. IEEE members (\$7.50) will have preference, but non-members (\$10.00) are welcome. Contact Bryan Baarts, PG&E Co., 245 Market St., San Francisco 94106, or call him at 781-4211, ext. 2327 for further information.

## 1969 Thermionic Energy Conversion Conference

The annual unclassified meeting of specialists in thermionic energy conversion will be held on October 21, 22 and 23 at the Holiday Inn, Carmel. The Conference will be sponsored by the Energy Sources Division of the Electron Devices Group of IEEE. Proposed topics include: thermionic energy conversion systems, devices, materials including fuels, plasma phenomena and surface phenomena. The papers presented at this conference will be printed in a Conference Record which will be sent to all attendees as soon as possible after the Conference. If you have any questions, please contact Mr. W. E. Harbaugh, RCA, Electronic Components, Lancaster, Penn. 17604.

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## An Event From the Past in Electronic Countermeasures

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Just in case you haven't heard about the Wanlass Paraformer®, let's describe it briefly as a remarkable new AC line voltage regulator and line power filter that prevents line voltage fluctuations (such as noise, distortion, etc.) from reaching the load. It does all this by rhythmically varying the inductance of a magnetic circuit to achieve transient free energy without relying on mutual inductance in electrical energy transformation. No mechanical or solid-state elements are used. Just parametric techniques.

The diagram below shows how a Paraformer® is used in a Wanlass DC power supply assembly to replace the primary magnetics found in classically regulated DC power supplies. In this design, the Paraformer® serves as a preregulator, eliminating line transients, noise, etc. (It will even arrest lightning!) The result is complete isolation of the rectifying and control circuitry from the AC input...plus a high level of filtering: 100 db!

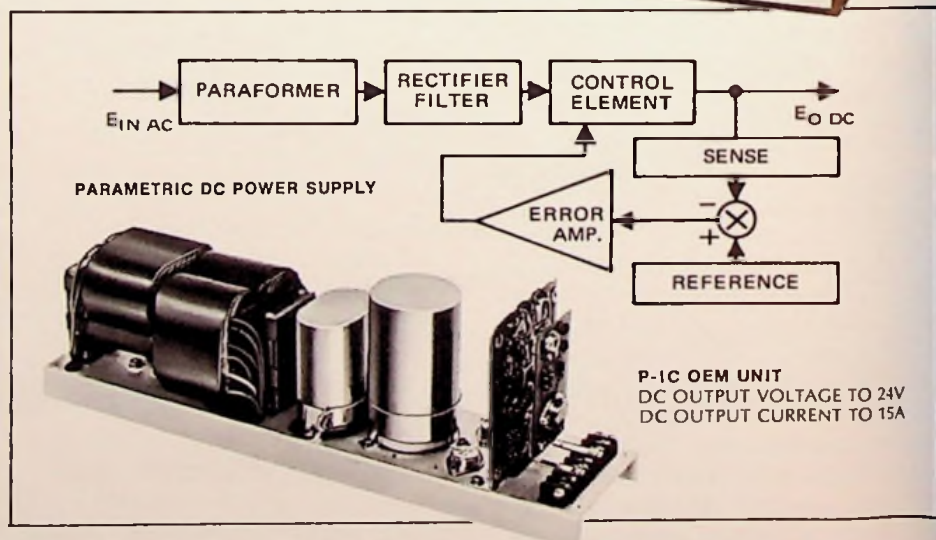
But 100 db filtering to 1 MHz is not all! Response time for noise and spikes is zero; line and load regulation to as tight as 0.005%; ripple as low as 100 microvolts rms; and operation over an input voltage range of 50-150 volts are typical specs.

Wanlass Parametric® DC Power Supplies are available from our Instrument Division in the PCD bench or lab series or in the PSS systems or slot series. In either series you'll get the most sophisticated DC power supply on the market today...unsurpassed in specifications and performance. Write for the new 8 page Instrument Division catalog.

For OEM applications, get the same performance from the P-IC and PHP-IC series of Paraformer® DC Power Supplies now stocked in 12 models by more than 100 distributors throughout the country.

If you can't find the answer you need in a standard lab or off-the-shelf OEM distributor model, call us collect and ask for the Custom Products Division. We'll make it there!

**PDC LAB UNIT DC OUTPUT: 0-40VDC @ 1.6A  
0-16VDC @ 4.0A**

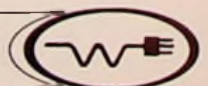


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(In California and Canada call (714) 545-8467 Collect)

**WANLASS ELECTRIC COMPANY**

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