

IEEE GROUP ON  
MICROWAVE THEORY  
AND TECHNIQUES

# NEWSLETTER

**EDITOR. Alvin Clavin,**  
**Assistant Editor: R. D. Randall**  
**Hughes Aircraft Company, Canoga Park, Calif., 91304**  
**Number 59, APRIL 1970**



## EDITORS NOTES

### A Surplus of Engineers

How many of you remember the outcry from Government and colleges regarding the upcoming shortage of engineers in the early '50's? These were the early cold war years and we needed many technical experts to keep us ahead of the Russians. The colleges joined in the chorus; in fact, Dr. DuBridge of Cal Tech, now science advisor to President Nixon, was one of the most vocal. Potential engineers poured into the colleges to be trained. The colleges started a vast expansion of their facilities to handle the load. The courses were tough and those who made it were ushered into the challenging technical work of the cold war.

But along came Sputnik and the propaganda increased, more students entered the universities and we were then entering into the era of oversupply of engineers.

That we have too many engineers today is patently obvious to those of us in the profession who are again living through the lay-offs that have plagued us in recent years. Some engineers have been able to find jobs in non-engineering activities; the vast majority, however, will be left stranded and forced into menial fields. It is doubtful that those engineers finding themselves in non-aerospace types of activities will again be attracted into this field regardless of the propaganda put forth in the future. They have been there once and it is doubtful that they will ever return again.

I can lay a great deal of the blame for the surplus on Government and colleges and believe it is their responsibility to help solve the problem. The colleges have a responsibility to formulate retraining programs designed for the technical specialist. These are well trained individuals and the programs should be geared to changing technologies rather than to the normal undergraduate curriculum. Government has a responsibility to help support the engineers while they are being retrained and to start study programs to help apply the systems approach to our problems of housing, transportation, pollution, etc. This will convert efficient teams and facilities to attack these important problems. If this is not accomplished soon, the country will lose one of its most important resources: technically trained specialists who could be easily redirected to solve some of our socially important problems. This is a problem-solving resource which, once lost, would be very difficult to regain.

As I have stated many times in these notes, I feel the IEEE should also be involved in the problems of the engineer in these non-technical areas. If they don't act soon in a positive and visible way — that all engineers can see — they will lose this charter and other (competing) organizations will spring up to fill the gap. Some of the things being done by other societies and associations to avoid the surpluses I have been talking about are to limit enrollment in universities or require the student to take a difficult comprehensive examination before being allowed to practice. While I do not intend to recommend these things, I do believe they should be studied by the IEEE so as not again to repeat this painful process of dissipating the country's present surplus of engineers. The members of MTT who feel IEEE should move out on programs of this type should write members of AdCom to help move the IEEE board of directors in this direction.



## CHAIRMAN'S VIEWPOINT

by John H. Bryant

One of the most important parts of the G-MTT organization is our Chapters, of which we now have 37, including two (Atlanta and Houston) formed last year and one (Fort Worth) thus far this year.

Undoubtedly a great deal more can be accomplished through our Chapters than has been accomplished in the past. One can, for example, see positive results from membership drive efforts that Chapters have been exerting.

One big question is: How can we better serve our members in the areas that do not contain a Chapter. Would it be possible to have a less formal organization than a Chapter for such an area? We should explore the possibility of increasing the size of certain Chapters geographically to take in some members not presently served.

The letter from J. B. Horton, Chairman of the Chapter Activities concerning Group-Section-Chapter Interrelationships printed on page 6 of this Newsletter gives subject for thought.

One of the important functions of a Chapter is the hosting of our G-MTT International Symposium. The Meetings and Symposia Committee, under the chairmanship of Frank Arams, has been working on a proposed guidelines for the preparation of proposals for hosting the Symposium. Their report is printed on page 3 of this Newsletter. There have almost always been competing proposals, which is very healthy. There have been times, however, when misunderstandings have led to disappointments on the part of certain Chapters. Better communications should minimize such occurrences.

Chapter Chairmen are non-voting members of G-MTT Administrative Committee (AdCom). They are invited to all G-MTT AdCom meetings and may participate in discussions of all matters before the Administrative Committee. We would like to have brief reports giving highlights of their activities and also any major questions or suggestions. I welcome their attendance at AdCom meetings and assure them a chance to report at a desirable time in the program.

#### CHAPTER CHAIRMAN'S REPORT

Chapter reports were presented by F. E. Emery from Dallas, J. B. Horton (for L. R. Whicker) from Washington, R. A. Sparks from Boston, C. Trembath (for D. F. Wait) from Denver, J. B. Horton (for G. C. DiPiazza) from New Jersey and G. P. Rodrigue from Atlanta. The chapters were very well represented at this AdCom meeting.

#### STANDARDS COORDINATING COMMITTEE

L. Young reported that R. W. Beatty is on an 18-month assignment to Japan. Thus, a replacement for R. W. Beatty as chairman will be made in the near future.

##### Microwave Magnetics Committee

L. Young reported that a second revision of a draft standard "The Quantity Magnetization in MKSA Rationalized Units" was discussed in detail at a recent committee meeting (March 13, 1970). The committee is trying to resolve the problem of the IEEE recommended use of SI units in which magnetization is expressed as amperes/meter whereas magnetization is nearly always expressed in gauss (EMU).

#### MEETINGS AND SYMPOSIA

The 1970 GMTT Symposium will have a panel session "The Engineer, Technology, and Society." This session is a departure from the normal programming and will be chaired by John Bryant. John Bryant asked for suggestions of constructive topics to be discussed at this session.

H. W. Cooper reported on the status of the GMTT Symposium student awards committee. A draft of the "Rules for Student Papers Contest" was submitted for evaluation by the AdCom.

AdCom received a request (via L. Young) to participate in the forthcoming "Carnahan Conference on Electronic Crime Countermeasures." W. W. Mumford moved that GMTT cooperate and after a second the motion was carried.

#### AWARDS

D. D. King presented a report concerning the W. W. Hansen Award. There was discussion concerning the size of the monetary award. T. Saad pointed out that IEEE policy places a \$500 limit on any single award (IEEE Statement of Policy Number 17 Item 4C). It was agreed that the Awards Committee would contact TAB/IEEE with a view to increasing this minimum to \$1,000.

#### DIVISIONAL DIRECTOR NOMINATIONS

A memorandum from Headquarters (R. M. Emberson) discussed the nomination and election of Divisional Directors for Division 4. The memo stated that "not less than two nominations are expected ...". D. D. King was nominated at the previous AdCom meeting and it was moved that the past chairman (L. Young) be selected as a second nomination. After a second this motion was carried.

#### MEMBERSHIP SERVICES

##### A. National Lecturer

J. B. Horton presented a proposed procedure to optimize the selection of the GMTT National Lecturer. This procedure is to be studied by the members of AdCom and discussed at the next meeting.

##### B. Newsletter

A. Clavin reported that he was receiving a great deal of mail for the Letters section of the Newsletter and that it is proving to be a good vehicle for the free expression of the opinions of MTT members.

##### C. GMTT Symbol

A. Clavin reported on the results of the MTT symbol selection contest. He moved that the first place symbol (number 6 in the January 1970 issue of the Newsletter) be officially adopted by GMTT. The motion was carried.

#### NEW BUSINESS

The next meeting of the AdCom will start at 2 P.M. on the 10th of May 1970 at the Newporter Inn, Newport Beach, California (the site of the 1971 International Symposium).



## ADCOM REPORT (ADMINISTRATIVE COMMITTEE)

by Sy Okwit

On the 23rd of March the first scheduled AdCom meeting for the year, under the chairmanship of John Bryant, was held at the New York Hilton Hotel, New York.

#### IEEE COUNCILS

##### A. QEC

The Sixth International Quantum Electronics Conference will be held in Kyoto, Japan on September 7th-10th. Charter flights to this conference are available through the American Physical Society.

The next conference on Laser Engineering and Application (CLEA) is to be held in 1971 and is jointly sponsored by IEEE and the Optical Society of America.

##### B. SSCC

H. W. Cooper and J. B. Horton presented a written report on the February meeting of the Solid-State Circuits Council held in Philadelphia.

John Linvill has retired as chairman of the group and was succeeded by Gordon Moore.

A draft set of bylaws was proposed for operating the SSCC which presently is operating on a plan provided by OpCom. Comments on the proposed bylaws were solicited.

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## G-MTT TECHNICAL COMMITTEES

D. B. Leeson (Coordinator) — California Microwave, Inc. 455 W. Maude Ave., Sunnyvale, Calif., 94086  
(408) 732-4000

## MTT-1 COMPUTER ORIENTED MICROWAVE DEVICES

Dan Varon — (Chairman), Dail-Data, Inc., 1001 Watertown St., Newton, Mass. 02158  
(617) 969-1800

## MTT-2 MICROWAVE ACOUSTICS

A. J. Bahr — Standard Research Institute, Menlo Park, Calif. 94025  
(415) 326-6200 x. 4631

## MTT-3 MILLIMETER WAVE AND SUBMILLIMETER WAVES

D. D. King — Philips Research Laboratories, 345 Scarborough Road, Briarcliff Manor, N. Y. 10510  
(914) 762-0300

## MTT-4 HOLOGRAPHY AND OPTOELECTRONICS

J. C. Palais — Arizona State University, Tempe, Arizona 85281  
(602) 965-3757

## MTT-5 MICROWAVE HIGH POWER

W. C. Brown — Raytheon Company, Microwave and Power Tube Div., Foundry Ave., Waltham, Mass. 02154  
(617) 899-8400 x. 4423

## MTT-6 MICROWAVE INTEGRATED CIRCUITS

W. H. From — Raytheon Company, Missile Systems Div., Hartwell, Mass. 01730  
(617) 274-7100 x. 3601

## MTT-7 MICROWAVE ACTIVE AND NON-LINEAR CIRCUITS

A. H. Solomon — Sylvania Electronic Products, Inc., 100 Sylvan Road, Woburn, Mass. 01801  
(617) 933-3500 x. 352

## MTT-8 MICROWAVES IN SPACE

W. F. Crosswell — NASA/Langley Research Center, M. S. 490, Langley Station, Hampton, Va. 23365

## MTT-9 GIGAHERTZ LOGIC

D. B. Leeson — (Acting)

## MTT-10 MICROWAVE BIOLOGICAL EFFECTS

J. M. Osepchuk — Raytheon Company, 28 Seyon Street, Waltham, Mass. 02154  
(617) 899-8400 x. 2475

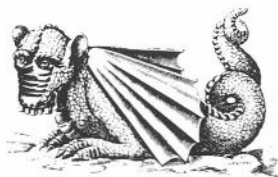
## MTT-11 MICROWAVE MEASUREMENTS

James Cheal — Omni Spectra, Inc., 24600 Hallwood Ct., Farmington, Mich. 48024  
(313) 255-1400

## MTT-12 MICROWAVE FREQUENCY AND TIME

R. W. Anderson — Hewlett Packard Company, 5301 Stevens Creek Rd., Santa Clara, Calif. 95050  
(408) 246-4300

Note that committees 10, 11, and 12 are recent additions.

GUIDELINES FOR SUBMISSION OF PROPOSALS  
FOR HOSTING THE G-MTT SYMPOSIUM

by Frank Arams

While many organizations hold their meetings always at the same site, it has been the practice of the IEEE Group on Microwave Theory and Techniques to delegate the responsibility for its annual MTT International Symposium to a local MTT chapter under the aegis of the parent organization.

This procedure has worked out well over the years. It has the effect of significantly increasing interest in microwaves in the particular geographical region, and strengthening the MTT local chapter involved and its bonds to the MTT national organization.

Any MTT chapter can apply to the G-MTT Administrative Committee for the privilege of hosting the MTT Symposium. The site of a future MTT Symposium is normally selected two years in advance at the September meeting of the MTT AdCom. Thus, at the September 1969 meeting, the Washington D.C. chapter was successful in securing the Symposium for May 1971. The unsuccessful chapters are encouraged to resubmit their proposal the following year. (A proposal is rarely successful until the second year.)

The location is normally rotated in such a manner as to give an opportunity to all major areas. Hence the interested chapter would do well to recall where past meetings were held.

The following guidelines are set down here to assist in preparing the proposal. The proposal should discuss:

1. Introduction and Summary  
Site and proposed dates  
• Arguments favoring proposed site  
Microwave activity and number of MTT members in the area  
Special features of proposed technical program  
Arguments for accepting this proposal
2. Arrangements  
Hotel(s), distance from airport, available air and ground transportation  
The hotel, meeting rooms (number and capacity), number and rates of rooms set aside for Symposium, special rates if any for government and university attendees, special local facilities and amenities.
3. Technical Program  
Technical content and orientation, advanced areas to be included, invited papers  
Number of sessions, parallel sessions, keynote session, evening sessions, panel discussions, student papers, if any
4. Proposed Committee Appointments  
The following committees should be considered: Steering, Technical Program, Digest, Publicity, Finance, Local Arrangements, Ladies Program
5. Finance  
Detailed budget with conservative registration estimates
6. Local Arrangements and Special Events  
Tours, if any, of microwave facilities, cocktail party and banquet, ladies program
7. Proposed Schedule and Publicity
8. Symposium Digest
9. Endorsements  
From local IEEE Section, one or more G-MTT chapters in the area, etc.

Summarizing, the proposal should address itself as much to the technical program as to the other elements of the Symposium. The proposal should be submitted to MTT AdCom members at least 1 month ahead of the meeting. Distribution to AdCom members should be arranged through IEEE Headquarters. Any questions can be addressed to the Chairman, MTT Meetings and Symposia Committee. A representative should plan to attend the AdCom meeting for a personal presentation to either the entire Adcom or its Meetings and Symposia Committee.



## OPINIONS

### TOWARD SAVING AEROSPACE JOBS

Sen. Alan Cranston (D-Calif.) made a speech not long ago in which he warned of an "inevitable shrinkage" in defense and space expenditures — a shrinkage that will imperil the jobs of thousands of Californians unless offsetting actions are taken.

"California's dependence on defense and aerospace industries for new manufacturing jobs is illustrated," he pointed out, "by the fact that toward the end of the 1960s, four of every five of our new manufacturing jobs were in this field. Clearly this is not a healthy situation."

Cranston urged more vigorous and imaginative government action to help aerospace companies diversify into fields which are not dependent upon high defense spending.

Not everybody is convinced that the spectre of aerospace unemployment is as serious as the senator indicates. But certainly it is bad enough.

Thousands of highly skilled workers in this area already have been laid off — and many are having a hard time finding new jobs because of reduced government contracting and recession in the economy generally. Given the certainty of still more cutbacks in work for defense and space contractors in the next 18 months, things may well grow worse.

President Nixon, since taking office 14 months ago, has reduced the defense budget by well over \$10 billion. One result is that by mid-1971 defense contractors will need 600,000 fewer workers than now.

Loss of another 50,000 jobs is expected among workers on space agency contracts.

Considering that almost a million Californians work on defense-related projects, and that the economic activity thereby generated creates employment for hundreds of thousands more, the cuts are bound to have a major impact in this state.

There is still reason to hope that the readjustment process will not be severe. To begin with, work on commercial airliners should take up a great deal of the slack. California aerospace firms can reasonably expect, too, to share importantly in work on the space agency's projected manned space station and space shuttle, as well as the F-15 fighter and the proposed B-1 bomber.

The catch is, however, that the anticipated contracts may not be forthcoming if the anti-preparedness mood in Congress gets out of hand, or arms control talks with the Soviet Union achieve early results.

Californians are of course as anxious as anybody else that the strategic arms limitations talks succeed. We neither deserve nor expect "make work" contracts from the Pentagon.

The pool of skilled technological manpower represented by the California aerospace industry is too vital a national resource, however, to be frittered away in retrenchment based on nothing more than wishful interpretations of Soviet intentions.

Certainly, the federal government should do more to encourage use of these technological skills for such non-defense government programs as urban transportation, air traffic control, police computer systems, etc.

This type of diversification is not likely to be sufficient in the long run, however. The aerospace companies have made considerable strides toward diversification into strictly commercial areas, but they are going to have to do more.

Meanwhile, one suspects that the Pentagon itself could contribute to stability in the aerospace industry by doing a better, more deliberate job of contracting for the defense business that is available, so that disruptive cutbacks, cancellations and renegotiations would be less frequently necessary.

— Los Angeles Times, 23 March 1970

### SEAT OF THE PANTS MANAGEMENT

In the early days of bush flying, pioneering Canadian pilots flew by the seats of their pants. This meant that with little more than a compass and an altimeter they depended on visual navigation, combined with an innate homing instinct, to get them wherever it was they wanted to go. But it entailed far more than that. These men had an intimate knowledge of the country, its climate, its geographical features and its vagaries; they knew the signs that foretold sudden weather changes, visibility conditions, freeze-up possibilities, ground haze, fog and whiteouts. They lived intimately with nature and knew how to adapt themselves to its ever-changing conditions and to use these to their advantage. They were self-reliant, cool, courageous, adventuresome, confident and dependable. In many cases they were capable businessmen.

Along with the pilot went his mechanic. Together they formed a unified team, an efficient operating unit based on mutual trust, respect, confidence and fellowship. Neither could function for long without the other. They knew each other and their ship intimately. They depended on each other's competence and integrity for their lives and the lives of any passengers they carried. They both operated by the seats of their jeans. Or did they?

In this era of pioneering flying these men did not have beacons, radar, electronic navigational aids, radio communication equipment, weather information, and a cockpit lined with instruments without which no commercial pilot would leave, or be allowed to leave, the ground today. What they did have was knowledge, a very deep knowledge and understanding of their ship and its capabilities; a very high degree of skill as pilot and navigator, and as mechanic; a highly developed understanding of their environment and of the people with whom they dealt; an ability to make quick, sound and usually correct decisions when faced with crucial problems; a capacity to inspire confidence in and obtain the cooperation and assistance of others whenever the need arose. They were highly skilled in the complex requirements of their professions.

It is herein that a very wide gulf exists between flying an aircraft by the seat of one's pants and managing a company, a plant, a business, or any other organization by the seat of one's britches. For most of the people I've known who depend on this tailpiece philosophy as their criterion for sound management are so blinded by the shine on the posteriors of their jodphurs that they are unable to see the glaring defects in the applications of their managerial techniques. As one wit put it, many of these seat o' the pants managers learn so well from their past mistakes that they are able to continually refine their abilities to make bigger and better ones. Be that as it may, the days of the on-the-job, cut-and-try, methods of management are rapidly coming to an end, at least in the more progressive and efficient organizations. As might be expected, there still remain many pockets of pathetically inept administration, particularly in the government services, wherein obsolescent, old-line executives hang on tenaciously to their carefully nurtured prerogatives. But their days are numbered. The present tendency in North America, and to an increasing extent in Great Britain and Western Europe, is to require an extensive period of formal pre-management training before potential new employees are acceptable for, or old employees are promoted to, management functions. It is now increasingly recognized that effective management comes about as the result of the

acquisition of a great many complex skills, only a few of which can be gained through on-the-job, seat of the trousers experience. The rest, and the most difficult, can be learned only through a long period of intensive formal training, such as given at a university school of business administration. Usually, this must be followed by a number of years of specialized training under the auspices of the employing organization.

Nevertheless, as pointed out previously, there still remain in seats of power many seat-of-the-underpants type executives whose ambitions for power and prestige far exceed their talents for management. They have learned to make decisions and stick to them, no matter how wrong they are. In fact, once their minds are made up they not only refuse to be confused by facts, but can be depended upon to reduce the simplest matters to their most complicated proportions. Some of the more enlightened ones have even been known to specify that some research be undertaken when matters get really muddled. This, as every schoolboy knows, is what you do when you don't know what you are doing. The end result of this, of course, is to bring to maturity the fruits of confusement for which the seedlings had long been cultivated. When the organization reaches this stage, it is time for the responsible executives to think seriously of retiring from the fray and going into politics. The opportunities for men of their type therein are unlimited.

P. A. Fields

(Reprinted from Ottawa Section Bulletin)



## CHAPTER ACTIVITIES

by J. B. Horton

Reports from chapters at the March 23 ADCOM meeting showed an increase in chapter-sponsored seminars and special meetings. L. R. Whicker reported that the one-day Symposium on MIC Technology held in Washington on March 10 was successful in all respects. The meeting included five speakers and a panel discussion; attendance was 149. A few copies of the Symposium Digest are probably still available (L. R. Whicker, 301/765-6349). F. E. Emery reported that Dallas' plans for the Microwave session at the 1970 SWIEEEO are complete. The session includes six speakers on recent results in devices and component design, and is scheduled for Thursday afternoon, April 23, at the SWIEEEO in Dallas (F. E. Emery, 214/238-2951). Dave Adams (415/969-9304) reported that San Francisco plans an evening seminar on May 7. The subject is "Microwave Techniques in High Speed Communications." Lou Cuccia will chair the meeting. G. C. DiPiazza reported that the North Jersey Chapter will hold an afternoon seminar on "Recent Highlights in Microwave Engineering." The seminar will be held at the Newark College of Engineering on May 28 (G. DiPiazza, 201/386-6050). R. A. Sparks (617/274-7100) reported that Boston's seminar on phase shifters has been postponed until fall. Other reports included plans for microwave sessions at the 1970 NEC in Chicago (Bob Knox, (312/225-9630) and participation of members of the Denver chapter in the NBS sponsored seminar on "High Frequency and Microwave Noise" (D. F. Wait, 303/447-1000).

The 1970 Committee Directory was mailed to all G-MTT members on February 4. When you review your copy, please make note of errors and send the corrections to Al Clavin or J. B. Horton. Also, additional copies are available (J. B. Horton, 214/238-2434).

Harold Sobol, 1970 B-MTT National Lecturer, reports that his schedule is complete for this spring, but he probably can arrange for one or two additional talks in the fall. His schedule for the remainder of the year includes the following chapters:

Connecticut	April 15	Orange County	Oct. 6
St. Louis	May 19	San Diego	Oct. 7
Chicago	Sept. 15	Schenectady	Oct. 20

Meetings of major concern to Chapter Activities in the near future are the ADCOM meeting on the afternoon of Sunday, May 10, and the Chapter Chairmen's meeting scheduled for 8:00 p.m. on May 10. Both meetings will be held at the Newporter Inn just prior to the 1970 G-MTT International Symposium.

1969 G-MTT CHAPTER MEETINGS & ATTENDANCE													
CHAPTER	Joint With	J	F	M	A	M	J	J	A	S	O	N	D
Atlanta	AP									22	26	42	
Baltimore	GAP	19	20	16	19	21				69	34	28	
Boston		15	17	132	44	89				69	34	28	81
Buffalo	GAP												
Chicago		25			25					15		20	
Columbus	GAP	30	34	27		31							
Connecticut	GAP		87		10							15	
Dallas		57	46	43	30	730	25				52	47	
Denver			28										
Florida/ West Coast				13		21	18	15			26	28	
Foothills/ Calif.	GAP		38	56									
Houston (New Chapter)	AP/ED/ MAG											14	
Huntsville	GAP	20	20	25	12					10			
Kansas City	GAP												
Long Island			37										
Los Angeles			33		69		89				56		
Milwaukee	ED			94	76	23				68	23	44	
Montreal	GAP												
New Hampshire	GAP												
New York													
North Carolina		11											
North Jersey	AP			33	35						45		
Orange Co./ Calif.	GAP		29	19	40	32					24	23	
Orlando		18		16	13	37	9						
Philadelphia	GAP		24	38		30					25		
Phoenix		35				31				42	16	26	20
San Diego	GAP			11	22	21					24		
San Francisco		80			292					35	87	85	
St. Louis	GAP/GED			30	24						15	16	
Schenectady		11		14			12				27		
Seattle	GAP	14	12		7	12				20			
Southeastern Michigan	GAP/GED	54	21	38						28	15		
Syracuse	GAP	43			26								
Tokyo										13			
Toronto	GAP												
Tucson	GAP												8
Washington, D.C.		28	55	70		19				22	16	23	10

**MICROWAVE INTEGRATED CIRCUIT TECHNOLOGY**

by Lawrence R. Whicker

On Tuesday, March 10, the Washington MTT Chapter with the cooperation of Antennas and Propagation, Electron Devices, and Washington IEEE Section held a one-day "Symposium" on Microwave Integrated Circuit Technology in Auditorium Building No. 3 - Goddard Space Flight Center. We had a good turn out for the meeting with 149 attendees.

The speakers at the symposium all did good jobs with a particularly witty presentation by Dr. Sodomsy. Presentations by the speakers was followed by a lively panel discussion with the symposium attendees making significant contributions. In addition to the speakers listed in the Symposium Digest, Mr. Philip J. Klass from Aviation Week participated in the panel discussion. A dinner for the symposium workers and speakers followed the symposium.

I have talked to members of the Washington MTT Executive Committee and several attendees of the conference. All feel that the conference was worthwhile and the younger engineers gained good insight into this area of technology.



Panel Session - Washington G-MTT Symposium on Microwave Integrated Circuit Technology. From Left to Right: Will Workman, Symposium Chairman; Dr. George Bodway; Cliff Snelling; Warren Cooper, Moderator; Phil Klass, Aviation Week; Rob Kleppinger; Dr. Ken Sodomsy; Dr. Larry Whicker, G-MTT Washington Chapter Chairman.

**GROUP-SECTION-CHAPTER INTERRELATIONSHIPS**

(Excerpts from a memo from J. B. Horton to  
D. S. Brereton, IEEE RAB-TAB Liaison  
Committee Chairman)

**A. Section-Chapter Relations**

The existing relationship between Sections and Chapters works reasonably well if the Section places sufficient emphasis on Chapter activities. I believe that for routine activities such as finances, meetings, publicity, records, etc., the Section does a service for the Chapters. My suggestions to improve the service the Sections can give to the Chapters is to establish a Section executive function, such as the Vice-Chairman, Technical Activities you suggest, to handle Chapter functions and provide support as needed. My experience in dealing with Sections has shown that in many instances the Section officers are slow to react to Chapter problems such as special publicity and finances for Chapter sponsored events, etc. I believe more emphasis by the Sections on support of individual Chapter activities would help the Chapters.

**B. Group-Section Relations**

G-MTT AdCom has a Membership Services Committee which has several sub-committees that deal directly with Chapters. The G-MTT Newsletter provides Chapter publicity, the Chapter Activities subcommittee deals directly with Chapter Chairmen and Chapter records, the Membership subcommittee deals with Chapter membership, and the G-MTT National Lecturer (sponsored by G-MTT) travels to Chapters as a meeting speaker and AdCom representative.

We do not have an active campaign to establish new chapters, although two were formed last year and a third is now being organized. Since the success of most chapters depends a great deal on having a local "interested group of active members," we have encouraged Chapter formation through these individuals rather than through the Sections.

I do not believe that having a Region Vice Chairman, Technical Activities, will be helpful in improving the Section-Chapter relationship. Most technical activities and conferences sponsored by MTT chapters are organized by the chapters with technical assistance by the Group and/or Group Committees (MTT has twelve Technical Committees at present). Administrative functions such as publicity, etc., could best be served by the Section and Group when needed.

**C. Group Technical Conferences**

G-MTT sponsors the annual G-MTT International Microwave Symposium and co-sponsors many other symposia with Sections. In almost all conferences the Sections have cooperated fully in support of Chapters and the Group. The annual Symposium is sponsored by one of the Group Chapters, usually in conjunction with the Section, but the financial terms have been that all proceeds of the Symposium were returned to the Group.

Some of the Chapters have sponsored sessions at Regional Conferences. This arrangement has been very successful. I believe sponsorship of sessions creates an "esprit de corps" among the Chapter members, second only to sponsorship of the Group Symposium, and I suggest that the Chapters be encouraged by the Regional offices to participate in these conferences.

**D. Regional Newsletter**

I do not believe that a Regional Newsletter to Section and Chapter officers would be useful at present. Generally, the chapters look to the Sections for local organization and the Groups for National organization. Technical conferences are usually held on the same basis. Except in special cases where the conference is sponsored by the Region, it appears that the needs for publicity, etc., can be served by the Sections and Groups.

Concerning Mr. L. C. Holmes' article on these interrelationships (IEEE Transactions - IGA; March/April 1969), I think that most of his observations on page 111 are still valid. However, I would like to emphasize Nos. (4) and (8). We have found that direct communication with Chapter Chairmen and members, with particular attention to local problems, has been the best method of creating and keeping active chapters. Support of the chapters by the Sections at the local level should be encouraged.

---One last thought. Should IEEE increase the funds allotted to chapters and to chapter support? Please consider this factor when asking more from the Sections.





This is it! Entry number 6, submitted by Raymond A. Patrin, received the most votes. A close second was the Magic T-T's as submitted by Robert E. Puttre.

MTT ADCOM was very receptive to the readers' choice and agree with the comments accompanying the votes: —the observer would grasp the idea of this being an IEEE group, without any guesswork or doubt in his mind as to the root and meaning of this symbol —all group publicity must show the IEEE affiliation —the IEEE is the umbrella under which all the groups operate —this could be a form factor that all the groups could use.

ADCOM and your Editor sincerely appreciate the response received to this contest. Not only does G-MTT have a symbol that will be used with its publicity, but the Group has visual evidence of the interest of its members in the organization. Congratulations to you all!



## CHAPTER NEWS

### BALTIMORE CHAPTER

#### Program Summary for 1969-70

Date: October 2, 1969  
 Speaker: Mr. Paul Barritt  
 Affiliation: NASA Headquarters  
 Abstract: Tracking Apollo 11 With Microwaves

Date: November 6, 1969  
 Speaker: Mr. Maxwell Michaels  
 Affiliation: Amana/Raytheon  
 Abstract: Space Age Cooking With Microwaves

Date: December 4, 1969  
 Speakers: J. Frank and E. Byron  
 Affiliation: JHU/APL  
 Abstract: Phased Array Aperture Matching Concepts and Techniques

Date: January 8, 1970  
 Speaker: Mr. Robert Moore  
 Affiliation: NWCCL  
 Abstract: Mapping by Microwave Radiometry

Date: February 5, 1970  
 Speaker: Mr. R. Lodwig  
 Affiliation: Wheeler Laboratories  
 Abstract: Microwave Communication for High Speed Trains

Date: March 5, 1970  
 Speaker: Mr. Carl Blake  
 Affiliation: MIT/Lincoln Labs  
 Abstract: Trends in Phased Array Technology

Date: April 2, 1970  
 Speaker: Dr. Charles M. Johnson, Technical Director  
 Affiliation: Safeguard System Office  
 Abstract: Ballistic Missile Defense Radars

Date: May 7, 1970  
 Speaker: Prof. George Haddad  
 Affiliation: U. of Michigan, Editor MTT Transactions  
 Abstract: Operating Characteristics of Avalanche Diodes

### BOSTON CHAPTER

#### Future Meetings

Date: April 16, 1970  
 Location: General Telephone & Electronics Labs, 40 Sylvan Road, Waltham  
 Speaker: M.C. Horton and R.J. Wenzel,

Affiliation: Bendix Research Laboratories Southfield, Michigan  
 Subject: Digital Computer Use in Distributed Network Synthesis

Date: April 23, 1970  
 Location: General Telephone & Electronics Labs 40 Sylvan Road, Waltham  
 Speaker: H.J. Carlin  
 Affiliation: Cornell University Ithaca, New York  
 Subject: Computer-Aided Synthesis of Microwave Filters

Speaker: R. Levy  
 Affiliation: Microwave Development Labs, Needham Heights, Mass.  
 Subject: Synthesis of Practical Microwave Components

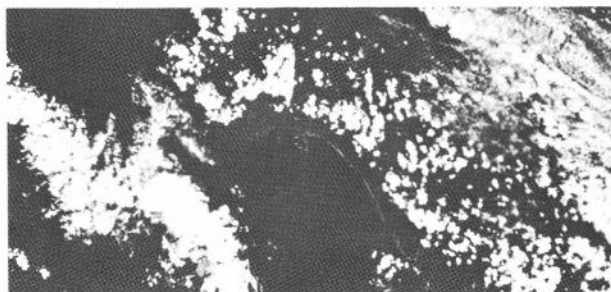
Date: April 30, 1970  
 Location: General Telephone & Electronics Labs, 40 Sylvan Road, Waltham  
 Speaker: H. Howe Jr.  
 Affiliation: Microwave Associates, Inc. Burlington, Mass.  
 Subject: Computer Techniques for Stripline Component Design

Speaker: H. Stinehelfer  
 Affiliation: Microwave Associates, Inc. Burlington, Mass.  
 Subject: Computer Techniques for Microstrip Component Design

Date: May 7, 1970  
 Location: General Telephone & Electronics Labs, 40 Sylvan Road, Waltham



# G-MTT INTERNATIONAL SYMPOSIUM NEWPORT BEACH, CALIFORNIA MAY 11 - 14 1970



MICROWAVES  
THE FOURTH DECADE

Modern MTT started in the early 40's with the advent of World War II (1st Decade). Great advances in Radar and Communications occurred in the 50's (2nd Decade). The 60's opened up the area of Space, climaxed with the landing of a man on the moon (3rd Decade). Now we stand at the beginning of the 4th decade; the challenges are many — the opportunities great. The challenge of the 4th decade is depicted by this photo (NASA) of the Southern California coast (Site of the 1970 International Symposium) as seen by Apollo 9, March 3, 1969. Los Angeles harbor is visible at the center.

### SYMPOSIUM HIGHLIGHTS

The Symposium will be held at the Newporter Inn, Newport Beach, California.

The Technical program consists of 92 papers, presented in 15 scheduled day sessions. Of these papers, 17 are non-USA and 8 are invited. Sessions include topics on: Computer Oriented Microwave Practices; Solid State Sources and Devices; Microwave Integrated Circuits; Microwave Acoustics; Microwave Imaging; Ferrite Devices; Microwave Filters and Couplers; Guided Waves and Stripline; Diffraction; and Millimeter Waves.

NOTE that there are concurrent (double) sessions. (See condensed program for details.)

A panel session will be held on Monday night concerning "The Engineer, Technology, and Society," chaired by Dr. John H. Bryant. Panel discussions will be held Tuesday night on microwave integrated circuits and computer aided design. Demonstrations of computer techniques are also included.

On Sunday, May 10, the MTT Administrative Committee will hold their regular business meeting at 2:00 PM. Check the information desk for Room. A chapter chairmans meeting is scheduled for 8:00 PM that evening in the Del Mar Room. Technical committee meeting and other business meetings will be scheduled on Sunday. Check with your committee chairman for details.

On Monday, May 11, the Symposium opens with Dr. S. Sensiper, Symposium Chairman, introducing Mr. H. G. Oltman, Chapter Chairman of the Los Angeles Chapter, Symposium Host, and Dr. John H. Bryant, Chairman G-MTT Administrative Committee, who will greet the attendees.

The Keynote address will be given by Dr. John Granger, IEEE President and a pioneer in Microwave Technology.

The annual Symposium Cocktail Party and Banquet will be held on Wednesday, May 13. The banquet speaker is Dr. Harold I. Ewen, President of Ewen Knight Corp. of East Natick, Mass. Dr. Ewen received the IEEE Morris E. Leeds Award in Measurements "for contributions to the design of sensitive radiometric systems, and for the co-discovery of the 21 cm spectral line of interstellar hydrogen."

### LADIES' PROGRAM

An exciting and varied program has been planned for the ladies while the technical sessions are in progress.

#### Monday, May 11

8:30 - 10:00 AM Continental breakfast at the Newporter Inn.

10:00 AM "Marineland Tour"

Lunch at the LaVenta Inn before the tour.

#### Tuesday, May 12

9:30 AM "Shopping Expedition"

A London "double-deck" bus trip for a morning shopping spree at Fashion Island.

#### Wednesday, May 13

9:30 AM "Visit to Laguna Beach and Mission San Juan Capistrano."

#### Thursday, May 14

9:30 AM "A Morning with the Glamorous Movie World."

A conducted tour, by tram, through Universal Studios.

### CONDENSED PROGRAM

#### SUNDAY, MAY 10

1400	ADCOM Business Meeting
1500-1900	Registration
1830	No-Host Cocktail Party
2000	Chapter Chairman's Meeting

#### MONDAY, MAY 11

0800-1500	Registration
0900-0930	Welcoming Remarks and Keynote Address
0940-1200	Microwave Integrated Circuits I
MAM-1	MAM-2 Diffraction MAM-3 Late News Items
1400-1700	Microwave Filters and Couplers
MPM-1	MPM-2 Millimeter Waves MPM-3 Microwave Imaging
MEV	Panel Discussion: "The Engineer, Technology, and Society"

#### TUESDAY, MAY 12

0800-1500	Registration
1800-1900	
0900-1200	Computer-Oriented Microwave Practices
TAM-1	TAM-2 Oscillator Noise and Stabilization
1400-1700	Microwave Integrated Circuits II
TPM	
TEV-1	Panel Discussion I The Microwave Engr. & The Computer
	TEV-2 Panel Discussion II Applications of Microwave Integrated Circuits

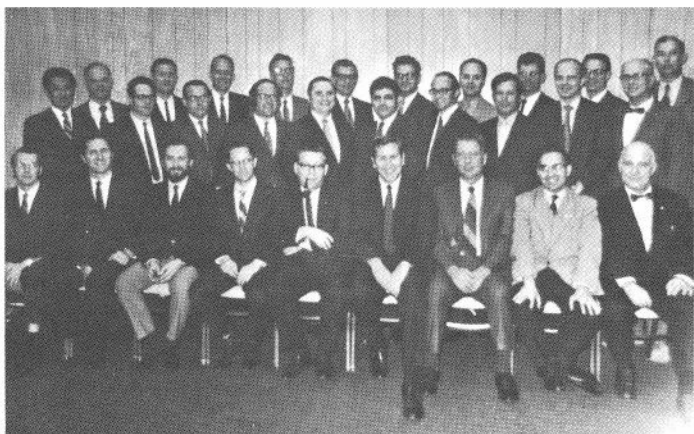
#### WEDNESDAY, MAY 13

0800-1400	Registration
0900-1200	Gunn Effect Devices
WAM-1	WAM-2 Guided Waves and Stripline
1400-1700	Avalanche Diodes
WPM-1	WPM-2 Acoustics I WPM-3 Late News Items
1830	Cocktail Party
1930	Banquet

#### THURSDAY, MAY 14

0800-1200	Registration
0900-1200	Ferrite and Diode Phase Shifters
THAM-1	THAM-2 Acoustics II
1400-1700	Ferrite Components — General
THPM	
1830	Industry Sponsored Cocktail Party

SYMPOSIUM COMMITTEES



Technical Program Committee

1970 Microwave Theory and Technique Symposium, Newport Beach, California

Left to right. Back row: D. Anderson, J. Horton, G. Oltman, E. DuFort, J. Cacheris, N. Lipetz, A. Bahr, R. Hall, D. Parker, G. Harrison. Second row: G. Kasai, D. Varon, W. Jones, D. Leeson, H. Chait, G. Haddad, J. Palais, S. Cohn, C. Boyd, G. Matthaei. Front row: A. Villeneuve, D. Adams, A. Wexler, R. Garver, L. Swern, A. Clavin, R. DuHamel, L. Young, P. Coleman.



Steering Committee

1970 G-MTT International Symposium

Left to right, Back Row: D. Anderson, E. N. Torgow, R. C. Hansen, G. Kasai, N. C. Silence. Front Row: A. Clavin, W. C. Perry, R. H. DuHamel, S. Sensiper, D. P. Martin.



Ray DuHamel, Chairman of the Technical Program Committee, leads discussions on session arrangement.



George Haddad ponders about the merits of a paper.



Technical program committee members pictured during heated discussion on Symposium plans

HOTEL ARRANGEMENTS

Symposium Headquarters: Newporter Inn, Newport Beach, Calif. The Newporter Inn has reserved a block of 250 rooms with rates as follows:

Singles	\$16.00 & \$17.00 per day
Twins	\$22.00 & \$26.00 per day
Suites	\$45.00 & \$55.00 per day

To assure accommodations in the headquarters hotel, mail a first night deposit to The Newporter Inn, 1107 Jamboree Road, Newport Beach, CA 92660, Att: Reservations. Mail no later than April 24, 1970.

In the event that all the assigned rooms at the Newporter Inn are taken, the Newporter will reserve a room for you at one of the following motels:

- Jamaica Inn, Corona Del Mar (Singles \$12 - \$15)
- Airporter Inn, Newport Beach

In this event, confirmation will come from the alternate motels. Courtesy bus transportation to and from these alternate motels and the Newporter is available morning, noon and evening.

1970 G-MTT INTERNATIONAL MICROWAVE SYMPOSIUM  
NEWPORTER INN, NEWPORT BEACH, CA  
May 11 - 14, 1970

Check Appropriate Boxes		Postmarked --	Before Apr. 24	After Apr. 24
Registration:	Member		\$14.00	\$17.00
	Non-Member		\$22.00	\$25.00
	Student		\$ 3.00	\$ 4.00
Banquet			\$12.00	\$14.00
Cocktail Party			\$ 2.00	\$ 3.00
Ladies Program			\$20.00	\$25.00
Additional Copies of Digest:	Member		\$ 4.00	\$ 4.00
	Non-Member		\$ 8.00	\$ 8.00
	Institution		\$ 6.00	\$ 6.00
Total Remittance --			\$	\$

Make Checks Payable To: 1970 G-MTT International Microwave Symposium  
Mr. Warren Perry, Microwave Products Inc,  
9533 Irondale, Chatsworth, CA 91311

Speaker: D. Varon  
 Affiliation: Dial Data, Inc.  
 Newton, Mass.

Subject: Microwave Network Analysis on  
 Batch and Time Sharing Computers

Speaker: V.G. Galnovatch  
 Affiliation: U.S. Army Electronics Command  
 Fort Monmouth, N.J.

Subject: Dimension Error Method of  
 Optimizing Networks

Date: May 7, 1970  
 Location: Ford Motor Co.,  
 Dearborn, Michigan

Speaker: C. Lester Hogan  
 Affiliation: Fairchild Cameras and Instrument  
 Corporation

Topic: Semiconductor Technology  
 Advances in the 1970's

Abstract: We are moving into an electronics  
 age based on semiconductor tech-  
 nology as applied to aerospace, con-  
 sumer and automotive systems.  
 Cooperation of these industries with  
 the semiconductor manufacturers  
 will create new electronic systems  
 for aerospace, consumer and high-  
 way vehicles. Ultimately the con-  
 sumer will benefit with more useful  
 and less expensive electronic  
 products.

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#### DALLAS CHAPTER

Past Meetings:

Date: January 14, 1970  
 Attendance: Thirty-eight  
 Location: Dallas Power & Light Co.  
 Dallas, Texas

Speaker: Dr. Dayton Eden  
 Affiliation: LTV Research Center, Grand Prairie,  
 Texas

Abstract: Dr. Eden presented a paper in which  
 he described some close interactions  
 between optics and solid state pro-  
 cesses. An example of interest is the  
 interaction of light with Gunn oscil-  
 lations which can lead to operations  
 equivalent to those performed by  
 binary networks, i.e., "and" and  
 "nor" gates timing circuits and  
 analog-to-digital converters.

The role of Holography in optical  
 processing was also presented. Of  
 particular interest was the use of  
 holograms in data storage and  
 retrieval.

Date: February 18, 1970  
 Attendance: Thirty-nine  
 Location: Dallas Power & Light Co.  
 Dallas, Texas

Speaker: Don P. Smith  
 Affiliation: Food Tech Corporation,  
 Dallas, Texas

Abstract: Mr. Smith talked to the MTT mem-  
 bers and their wives about the appli-  
 cation of microwave energy to foods.

The relative merits of microwave  
 cooking was discussed and a demon-  
 stration of a domestic microwave  
 oven was presented.

Date: March 18, 1970  
 Attendance: Thirty-nine  
 Location: Dallas Power & Light Co.  
 Dallas, Texas

Speaker: Dr. Sander Weinreb  
 Affiliation: National Radio Astronomy  
 Observatory, Charlottesville,  
 Virginia

Abstract: Dr. Weinreb presented a brief  
 description of the sources, spectra,  
 and the spatial variation of extra-  
 terrestrial signals. Radio telescopes  
 and receivers were described. Some  
 of the latest discoveries in radio  
 astronomy, such as pulsars and  
 molecular lines were discussed. The  
 talk was concluded with a descrip-  
 tion of a very large array antenna  
 that has been proposed.

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#### FLORIDA WEST COAST CHAPTER

Past Meetings

Date: January 21, 1970  
 Attendance: Sixty-Three  
 Location: Holiday Inn, U.S. 19 So.  
 Clearwater, Florida

Speaker: Dr. W.L. Barrow  
 Affiliation: (Retired) Sperry Gyroscope Div.,  
 Sperry Rand Corporation

Abstract: Dr. Barrow presented highlights of his  
 life with Microwaves

Date: February 19, 1970  
 Location: Ramada Inn, Clearwater, Florida

Speaker: Dr. George Zorbist  
 Affiliation: University of So. Florida

Abstract: Dr. Zorbist's topic was on Compu-  
 ter Aided Design of Systems and  
 Networks

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#### LOS ANGELES CHAPTER

Future Meetings

Date: April 23, 1970  
 Location: Surf Rider Inn, 1700 Ocean Ave.,  
 Santa Monica, California

Speaker: Jeffrey H. Collins  
 Affiliation: North American Rockwell  
 Corporation

Title: The Status of Microwave Acoustic  
 Engineering

Abstract: Microwave solid-state delay lines  
 utilizing either bulk acoustic waves  
 or surface acoustic waves have  
 matured to practical component

status. Replacement of conven-  
 tional, coaxial and waveguide delay  
 lines with these smaller and lighter  
 devices up to X-band frequencies is  
 under way. Of greater significance  
 to the microwave engineer, how-  
 ever, is that acoustic engineering  
 provides functions not previously  
 available at microwave frequencies:  
 namely, several microseconds of  
 delay in moderate passive two-  
 port units, active delay lines, large  
 time-bandwidth product pulse com-  
 pression and expansion filters, tapped  
 delay lines for communication codes,  
 and instantaneous broadband signal  
 processing on a single chip.

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#### MILWAUKEE CHAPTER

Past Meetings

Date: March 16, 1970  
 Attendance: Sixty-five  
 Speaker: Carl F. Klein  
 Affiliation: Johnson Service Company  
 Milwaukee, Wisconsin

Title: Applying Microstrip Integrated  
 Circuit Techniques to Microwave  
 Oscillator Design

Date: April 7, 1970  
 Speaker: Harold Sobol  
 Affiliation: RCA Electronic Components  
 Somerville, N.J.

Abstract: The state-of-the-art of microwave  
 integrated circuits (MICs) has  
 advanced significantly in the past  
 several years. Nearly every medium  
 and low-power microwave function  
 has been performed with MICs. The  
 various technologies and circuit  
 techniques used in current MICs  
 were discussed. Electrical and  
 material design considerations  
 were given. Examples of circuits  
 illustrating the different approaches  
 to integrating microwave circuits  
 were shown. Examples of sub-  
 systems and systems constructed  
 with MIC components were  
 presented.

#### Future Meetings

Date: April 20, 1970  
 Speaker: Wayne A. Schaefer  
 Affiliation: A.C. Electronics Division  
 General Motors Corporation

Title: Device Application in Night  
 Vision Systems

Abstract: The application of photosensitive  
 electron devices as image sensors  
 in the near and far infrared has been  
 extensive since the introduction of  
 the sniper scope during World War II.  
 A survey of the field of night vision  
 technology will be presented.

Included will be a discussion of the fundamental characteristics of the spectral regions, detectors, and techniques commonly utilized. Techniques considered will be near infrared image intensification, low light level television, and far infrared discrete element thermal imaging.

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#### NORTH JERSEY CHAPTER

##### Future Meetings

Date: May 28, 1970  
 Location: Newark College of Engineering  
 Speakers: Mr. B.E. Berson  
 Solid State Devices — RCA  
 Dr. A.A. Oliner  
 Polytechnical Inst. of Brooklyn  
 H. Seidel  
 Bell Telephone Laboratories  
 Dr. A.A. Ksienski  
 Ohio State University  
 A.M. Briano  
 Missile Systems Division  
 Raytheon Company  
 C.E. Barnes  
 Bell Telephone Laboratories  
 Abstract: This will be a seminar in recent highlights in microwave engineering.  
 Time: 1:00 P.M. to 5:30 P.M.

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#### PHOENIX CHAPTER

##### Past Meetings

Date: December 15, 1969  
 Attendance: Twenty  
 Location: Bull Pen Restaurant,  
 Phoenix, Arizona  
 Speaker: Robert Wenzel  
 Affiliation: Bendix Research Laboratory  
 Southfield, Michigan  
 Subject: New Techniques for the  
 Design of Microwave Networks  
 Abstract: Mr. Wenzel described how to use Richards' transformation to synthesize filters using realizable elements in the microwave region. He showed how recent application of this technique was utilized in the exact design of an elliptic filter.  
 Date: January 19, 1970  
 Attendance: Twenty-four  
 Location: Holiday Restaurant,  
 Phoenix, Arizona  
 Speaker: Dr. Keith Kennedy

Affiliation: Watkins-Johnson  
 Subject: Avalanch and Bulk Effect Microwave  
 Sources with Electronic Tuning  
 Abstract: Dr. Kennedy discussed the present state of the art and relative merits of avalanch (IMPATT and anomalous) diodes and bulk GaAs devices. The parameters of both mechanically and electronically tuned devices at X-band were presented.

Date: February 16, 1970  
 Attendance: Twenty-eight  
 Location: Holiday Restaurant,  
 Phoenix, Arizona  
 Speaker: Edwin M. Turner  
 Affiliation: Air Force Avionics Lab.  
 Wright-Patterson AFB  
 Subject: Electrically Small Antennas  
 Abstract: Mr. Turner summarized the important new antenna designs in the last twenty years and then indicated areas where new designs will be utilized in the future. He emphasized the importance of integrating active devices into the antenna structure. Impedance and antenna pattern plots were shown for numerous antennas including the multi-mode slot and variations on a folded dipole.

Date: March 16, 1970  
 Attendance: Twenty-seven  
 Location: Holiday Restaurant  
 Phoenix, Arizona  
 Speaker: Dr. Harold Sobol  
 Affiliation: RCA Components Division  
 Somerville, N.J.  
 Subject: Microwave Integrated Circuits  
 Abstract: Dr. Sobol discussed the various microwave-integrated-circuits technologies and circuit techniques along with electrical and material design considerations. Examples of circuits illustrating the different approaches to integrated microwave circuits, and subsystems and systems constructed with MIC components were presented.

#### PHOENIX CHAPTER OFFICERS

Position	Name
Chairman	Donald Stelzer Omni Spectra, Inc.
Vice Chairman	Murray Sirkis Arizona State University
Secretary	Susumu Cho Motorola, Inc.
Publicity	Thomas DeMassa Arizona State University
Financial Secretary	Gerald Williams, Jr. Goodyear Aerospace
GMTT Group Representative	Irving Kaufman Arizona State University

#### ST. LOUIS CHAPTER

Date: January 20, 1970  
 Attendance: Fourteen  
 Speaker: Tony Bertolino  
 Affiliation: Emerson Electric Co., St. Louis  
 Subject: Control of Phased Array Antennas  
 Abstract: Methods of controlling phased arrays including corporate, series, and optically fed single and two axis scanning arrays will be discussed. The control hardware and its performance will also be discussed.

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#### SOUTHEASTERN MICHIGAN CHAPTER

##### Future Meetings

Date: April 14, 1970  
 Location: North Campus Commons Cafeteria  
 The University of Michigan  
 Speaker: Professor A.A. Ksienski  
 Ohio State University  
 Title: Adaptive Arrays  
 Abstract: An adaptive array is one that modifies its performance in response to changes in the received signals. Various forms of adaptive arrays with various levels of adaptivity have been suggested and some of them have been implemented and tested. Recent work in this field performed at The Ohio State University will be discussed. In particular the performance of an array of antennas operating coherently in receive and transmit modes will be presented. Next, arrays capable of discriminating against undesired signals while coherently combining the desired signal will be discussed. The experimental performance of such arrays will be described and the implication of these techniques with respect to both communication capabilities and future antenna design will be discussed.





**ONE DAY SEMINAR  
ELECTRICAL NOISE AND ITS CONTROL  
May 19, 1970  
UNIVERSITY OF PENNSYLVANIA  
PHILADELPHIA, PENNSYLVANIA**

Full morning and afternoon sessions followed by a regular evening Chapter meeting will feature a series of presentations addressing the many aspects of electromagnetic interference, its diverse affects, and means for its effective control. Papers will be presented by renowned educators and leaders in the field of electrical noise control.

Advance registration, IEEE members, \$10.00; non-members, \$12.00: Includes luncheon and parking. For advance registration form or additional information, write to Miss Helen Yonan, IEEE Office, Moore School of Electrical Engineering, 33rd & Walnut St., Phila., Pa. 19104, or phone area 215, 594-8106.

**CALL FOR PAPERS  
1970 IEEE INTERNATIONAL SYMPOSIUM  
ON CIRCUIT THEORY  
DECEMBER 14-16, 1970  
SHERATON-BILTMORE HOTEL  
ATLANTA, GEORGIA**

The IEEE International Symposium on Circuit Theory sponsored by the IEEE Circuit Theory Group features the presentation of original research papers and invited papers by authors from government, industry and universities. One of the goals of the 1970 Symposium will be to illustrate and emphasize the impact of new disciplines and technologies on circuit theory. Accordingly, authors are encouraged to submit papers which bear on circuit theory as related to topics such as integrated circuits, computers and computer networks, digital filters, information retrieval, large-scale systems, biological systems, and transportation and traffic networks. Of course, high quality papers on any topic in circuit and system theory are welcome as always.

Contact: Mr. I. T. Frisch  
Network Analysis Corporation  
Bechwood  
Old Tappan Road  
Glen Cove, New York 11542

**CALL FOR PAPERS**

A Special Issue of the PROCEEDINGS of the IEEE devoted to Atomic and Molecular Plasmas is to be published in March 1971.

The issue is to present results of studies of devices and applications of the electrical, thermal, radiative, and convective properties of plasmas. These studies are to relate to the engineering application of plasmas in such areas as gas lasers, circuit breakers, planetary entry, discharge light sources, and lightning. Excluded from the issue are papers dealing with thermonuclear fusion and ionospheric phenomena.

Contributed papers for this issue shall be concerned with applications or devices in which an essential role is played by the atomic or molecular species present in the plasma.

Papers dealing with the measurement or prediction of basic gas properties important to these engineering applications are also solicited.

Persons desiring to submit a paper for this special issue are requested to send a summary by May 1, 1970 to the Chairman of the Special Issue Editorial Committee. The Editorial Committee is as follows:

Dr. Charles H. Church, Chairman  
Advanced Research Projects Agency  
903 Waynewood Blvd.  
Alexandria, Va. 22308

**Biological Effects of Microwaves**

The IEEE Group on Microwave Theory and Techniques is publishing a special issue of its Transactions on "Biological Effects of Microwaves". Papers are being solicited in the areas of biological experiments with microwave radiation, biophysical mechanisms of interaction of microwaves with biological tissue, prediction and measurement of microwave fields in potential hazard areas or with relation to biological experiments, and engineering reports on microwave radiation hazards and their control.

Both full length papers and brief communications are being sought. A fast response is necessary, however, since the issue is scheduled for September 1970 and final manuscripts from authors are due on May 1, 1970.

Please submit any papers or correspondence relating thereto to John M. Osepchuk who is acting as editor of this special issue.

**CONFERENCE ON PRECISION ELECTROMAGNETIC MEASUREMENTS**

The 1970 Conference on Precision Electromagnetic Measurements will be held June 2-5 at the NBS Boulder (Colorado) Laboratories (U.S. Department of Commerce).

The aim of the Conference is to advance electromagnetic measurements at levels of precision and accuracy appropriate to national standards laboratories. The traditional fields of direct current, low frequency, high frequency, and microwave measurements together with related physical studies provide the core of the Conference subject matter. The rapidly developing field of precise measurements at very low temperatures will be emphasized. Methods for automated measurements will also receive special attention.

**Engineering Education**

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.

**SYMPOSIUM ANNOUNCEMENT**

A Symposium on The Entry Plasma Sheath and Its Effects on Space Vehicle Electromagnetic Systems (4th Plasma Sheath Symposium) will be sponsored by the NASA Langley Research Center, Hampton, Virginia, and will be held at the Center on October 13-15, 1970. It is planned that two days will be devoted to unclassified sessions and one day to classified sessions (Confidential and Secret). The symposium will bring together representatives of organizations working on problems related to electromagnetic radiative systems for entry vehicles and will discuss the entry plasma sheath and its effect upon communication, telemetry, ECM, and navigational functions.

Specific plasma related topics of interest include:

1. Recent or current research and flight programs
2. Antenna theory and performance
3. Entry plasma and wake description, including ablation
4. Plasma modification and blackout alleviation
5. Plasma diagnostics
6. Future entry communications and tracking problems
7. Missile communications problems
8. Alleviation techniques for entry missiles

Those interested in submitting unclassified or classified papers for the symposium should send three (3) copies of a detailed abstract of at least 1000 words, along with a few rough draft figures which are representative of the technical content (principal results, etc.) no later than June 15, 1970 to:

Mr. Paul W. Huber  
Mail Stop 160  
NASA, Langley Research Center  
Hampton, Virginia 23365

Only those classified abstracts that are accompanied by a security approval by the sponsoring agency will be considered. Authors will be notified of acceptance by July 6, 1970. Accepted unclassified and classified papers will be published by NASA as separate volumes of a Symposium Proceedings Special Publication.

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**1971 EUROPEAN MICROWAVE CONFERENCE**  
August 23-28, 1971, Stockholm

International conference, organized by the Royal Swedish Academy of Engineering Sciences in cooperation with IEE (England), IEEE (region 8) and the Swedish National Committee of URSI.

The main topics of the conference will be:

- Microwave: solid state devices
  - components and computer analysis
  - integrated techniques
  - antennas
  - applications
  - acoustics

Call for papers and further conference details will be published in due course. Advance information is available from: Dr. H. Steyskal, Secretary General, 1971 European Microwave Conference, Fack 23, 104 50 Stockholm 80, Sweden.

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**COMPUTER TECHNIQUES FOR  
ELECTROMAGNETICS AND ANTENNAS**

University of Illinois  
Urbana, Illinois 61801  
September 28 - October 1, 1970

Engineers, scientists and numerical analysts are invited to attend a four day seminar series and workshop on "Computer Techniques for Electromagnetics and Antennas" to be offered at the University of Illinois, Urbana, Illinois on September 28 - October 1, 1970. List of topics and speakers will include:

1. Wire Antennas, Professor G. Thiele, Ohio State
2. Variational and Iteration Techniques, Dr. C. P. Wu, Bell Telephone Laboratories
3. Numerically Efficient Methods, Professor R. Mittra, University of Illinois
4. Scattering I, Dr. P. C. Waterman, Mitre Corporation
5. Scattering II, Dr. E. K. Miller, MB Associates
6. Time Domain Techniques, Dr. A. J. Poggio, MB Associates
7. Inverse Scattering and Remote Probing, Professor R. Mittra
8. Workshop on Computer Techniques in Electromagnetics, Staff

A limited number of fellowship grants will be available for faculty and graduate students from other universities. Inquiries for further information may be directed to Dr. M. E. Krasnow, College of Engineering, University of Illinois, or Professor R. Mittra, Department of Electrical Engineering, University of Illinois, Urbana, Illinois 61801.

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**1970 INTERNATIONAL IEEE/G-AP SYMPOSIUM**  
14-16 September 1970  
**FALL USNC/URSI MEETING**  
15-17 September 1970

To be held at  
The Ohio State University  
Columbus, Ohio 43210

URSI and IEEE G-AP technical programs will be separately arranged except for appropriate coordination. Papers are solicited in all theoretical, experimental and developmental fields of interest to

URSI Commissions:

- I. Radio Measurement Methods and Standards
- II. Radio Propagation in Non-Ionized Media
- III. Ionospheric Radio
- IV. Magnetospheric Radio
- VI. Radio Waves and Transmission of Information [Note June 1 deadline]

The deadline for Commissions I, II, III, and IV is June 22, 1970. The deadline for Commission VI is June 1, 1970. Originals and two copies of abstracts of 200 words should be submitted stating Commission preference to Dr. Curt A. Levis, P.O. Box 3115, The Ohio State University, Columbus, Ohio 43210.

G-AP under the following topics:

- Antenna Theory
  - Antenna Designs and Implementations
  - Array Technology
  - Electromagnetic Theory
  - Numerical Methods in Electromagnetics
  - Radio, IR, and Optical Propagation
  - Scattering and Diffraction (Radio, IR, Optical)
  - Radio and Radar Astronomy
  - Plasmas and Their Electromagnetic Effects
- A 400-600 word summary of any paper for presentation at G-AP sessions should be submitted before June 1, 1970 to Dr. Curt A. Levis, P.O. Box 3115, The Ohio State University, Columbus, Ohio 43210

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**CONFERENCE ON TRUNK COMMUNICATIONS  
BY GUIDED WAVES**

London  
29 September - 2 October

**Aim**

The aim of the Conference is to survey and to assess current achievements, problems and prospects in regard to the development of trunk telecommuni-

cations systems by guided waves at millimetric and optical frequencies with special reference to the following aspects:

- (a) Systems aspects and modulation and multiplexing techniques.
- (b) Guiding structures including transmission imperfections and fabrication and installations.
- (c) Terminal and repeater equipment.
- (d) Measurement techniques.
- (e) Components.

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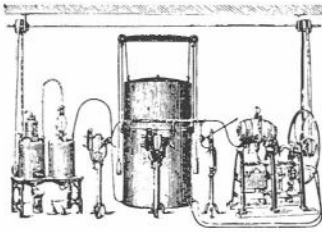
**1970 IEEE INTERNATIONAL SYMPOSIUM  
ON  
CIRCUIT THEORY**  
December 14-16, 1970  
Sheraton-Biltmore Hotel, Atlanta, Georgia

THE IEEE International Symposium on Circuit Theory features the presentation of original research papers and invited papers by authors from government, industry, and universities. One of the goals of the 1970 Symposium will be to illustrate and emphasize the impact of new disciplines and technologies on circuit theory. Accordingly, authors are encouraged to submit papers which bear on circuit theory as related to topics such as integrated circuits, computers and computer networks, digital filters, information retrieval, large-scale systems, biological systems, and transportation and traffic networks. Of course, high quality papers on any topic in circuit and system theory are welcome as always.

**INSTRUCTIONS FOR AUTHORS:** Two copies of an abstract of 100 to 250 words must be submitted by **June 1, 1970** to aid the program committee in the planning of sessions. Four copies of regular and short papers must be submitted before **July 1, 1970**. All manuscripts are to be in the standard format of contributions to the IEEE Transactions on Circuit Theory, with short papers prepared as letters-to-the-editor. Consult the back cover of the Circuit Theory Transactions for manuscript preparation instructions. Manuscripts will be simultaneously considered for oral presentation at the Symposium and inclusion in the IEEE Transactions on Circuit Theory. Authors of accepted papers will be requested to provide a short summary to be published in a digest available at the Symposium.

Deadline for submission of abstracts is June 1, 1970. Deadline for submission of papers is July 1, 1970. The Technical Program Chairman will notify authors of accepted symposium papers by October 1, 1970. Abstracts and papers are to be submitted to the Program Chairman:

I. T. Frisch  
Network Analysis Corporation  
Beechwood  
Old Tappan Road  
Glen Cove, New York 11542



## TECHNICAL NOTES

### MICROWAVE THESES

CATHOLIC UNIVERSITY OF LOUVAIN  
Electronic Research Laboratories  
94, Kardinal Mercierlaan,  
HEVERLEE (BELGIUM)

Fred E. Gardiol  
"PROPAGATION IN RECTANGULAR WAVE-  
GUIDES LOADED WITH SLABS OF ANISO-  
TROPIC MATERIALS"

Doctorate in Applied Sciences, June 1969 (in  
English). Copies can be obtained from the  
author, at the above address.

### N.B.S. CALIBRATION OF COAXIAL NOISE SOURCES FITTED WITH 14 MM CONNECTORS

The National Bureau of Standards announced  
that it has initiated a calibration source for coaxial  
noise sources fitted with 14 mm precision connectors.  
Calibrations are performed in selected frequencies  
in the frequency range of 2.60 to 3.95 GHz.

For further information contact the National  
Bureau of Standards Engineering Division, Boulder,  
Colorado.

### SHORT COURSE ON MICROWAVE ANTENNA MEASUREMENTS

July 20-24, 1970

The Georgia Institute of Technology

This course is an intensive study of the measure-  
ment of microwave antenna radiation characteristics  
including directivity, gain, pattern, boresight, polar-  
ization and phase. Radome and reflectivity measure-  
ments will also be treated.

The course covers the theoretical basis of the  
measurements as well as current techniques including  
the analysis of error. An important segment deals  
with the design and evaluation of antenna measure-  
ments facilities.

This will be the second in a series of yearly short  
courses which are anticipated to be offered alternately  
between Georgia Tech and San Fernando Valley State  
College. A text written for the series, and revised this  
year, will be used in the course.

The course fee of \$275.00 includes all necessary  
texts and supplies.

For more information and final announcements,  
write or call:

Director  
Department of Continuing Education  
Georgia Institute of Technology  
Atlanta, Georgia 30332  
Phone: (404) 873-4211, Ext. 343

Short Course in

### MICROWAVE THEORY AND MEASUREMENT

September 21-25, 1970

GEORGIA INSTITUTE OF TECHNOLOGY

The course is specifically aimed at improving the  
ability of engineers and scientists in the areas of micro-  
wave theory, devices, and measurements. Emphasis  
will be placed on fundamental techniques and topics of  
current interest.

The course fee of \$225.00 includes all necessary  
books and supplies.

For more information and final announcements,  
write or call:

Director  
Department of Continuing Education  
Georgia Institute of Technology  
Atlanta, Georgia 30332  
Telephone: (404) 873-4211, Ext. 343

### Short Course on FORTRAN IV

The University of Missouri-Rolla department of  
electrical engineering and extension division will offer  
a short course in FORTRAN IV programming and  
Computer Application to Electronic Circuit Analysis  
August 17-28 on campus.

This intensive 10-day workshop is designed for  
the engineer, scientist and physicist of the technical  
communities who are particularly interested in the  
expansion of their current knowledge and efforts into  
the realm of computers, programming and computer  
applications to the problems of electronic circuit  
analysis.

A bachelor's degree in engineering or science is  
the only prerequisite since the workshop is designed  
to develop the participant who is inexperienced in  
computer programming and computer applications to  
a proficient level of understanding and use.

Technical problems and theories will be fully  
reviewed and will be presented in both lecture and  
laboratory sessions. Continuous individual assistance  
by the lecturers will further enable the participants to  
develop this proficiency.

Further information may be obtained from  
Dr. Robert Peirson, course director and UMR assistant  
professor of electrical engineering, or from the UMR  
extension division.



## PERSONALITIES

Your Editor just received a cheery post card from  
Bob Beatty of the National Bureau of Standards. Bob  
has reported for one year duty for the NBS Electro-  
technical Laboratory and would like to hear from his  
MTT friends. His office in Boulder will forward all  
mail.

### SPERRY RAND SCIENTIST TO LECTURE IN THE SOVIET UNION

Dr. Richard W. Damon, of West Concord,  
Massachusetts, Associate Manager of the Solid State  
Sciences Laboratory at the Sperry Rand Research  
Center in Sudbury, has recently been invited by the  
Academy of Sciences of the USSR to visit the Soviet  
Union for two weeks of lectures and meetings with  
Soviet colleagues at various Institutes. It is expected  
that Dr. Damon will lecture at the Institute of Radio  
Engineering and Electronics and at Moscow State  
University in Moscow. He will also visit Novosibirsk  
which is the center of science in the Soviet Union as  
well as lecture at the Semiconductor Institute in  
Leningrad.

Upon his return from Russia, Dr. Damon will be  
presenting a paper in Los Angeles at the Electro-  
chemical Society Meeting on May 14th and will be  
receiving a citation on May 13th at the Microwave  
Symposium being held at Newport Beach, California.  
He is being honored for his activity as National Micro-  
wave lecturer for the year 1969.

### PRIZE PAPER AWARD ANNOUNCED BY IEEE

The Browder J. Thompson Memorial Prize Award  
was presented to JOHN D. RHODES, Microwave Devel-  
opment Laboratories, Natick, Massachusetts, for his  
paper entitled "The Stepped Digital Elliptic Filter"  
(IEEE Transactions, Vol. MTT-17 No. 4, April, 1969).  
Mr. Rhodes receives a certificate and honorarium of  
\$1000 under the provisions of this IEEE Prize Award,  
which was established in 1945 for the best paper ap-  
pearing in any IEEE publication by an author (or  
authors) under 30 years of age.



## BOOK REVIEW

by Nathan Pelner  
REVIEW EDITOR

PRINCIPLES OF MICROWAVE FERRITE ENGINEERING, J. Helszajn — John Wiley and Sons, Inc., New York, N.Y., 1970, 251 pages, \$12.50.

This recent book is one of the first to appear since the early '60's when several authoritative books were written on the subject of microwave ferrites. The book gathers together recent developments and integrates the various earlier works into a comprehensive text on the subject. The text is broken up into 11 chapters, each of which is followed by a comprehensive bibliography on the chapter contents.

In the first chapter the linearized equations of motion are studied under the influence of various driving fields. Chapter Two presents the theory of non-uniform modes to account for the non-linear behavior of ferrites at large signal levels. In Chapter Three perturbation theory is introduced in connection with the microwave measurements of fundamental quantity appearing in the equation of motion. Non-linear theory is treated in Chapter Four in the ferrite amplifier and frequency doubler is described. In Chapter Five, the tensor permeability is used in conjunction with Maxwell's equations to study propagation in an infinite medium. Propagation in circular waveguides is described in Chapter Six and special emphasis is placed on the structures required for Faraday rotation.

Chapter Seven deals with ferrite loaded rectangular waveguides which leads to the theory of non-reciprocal ferrite phase shift and its application to the differential phase shift circulator. The junction circulator is described in Chapter Eight and is recognized as one of the most important ferrite devices yet known. In Chapter Nine coupled wave theory of ferrite devices is introduced and Faraday rotation as well as the cutoff modes of the tetrahedral junction and R/S phase shifter are described by the use of coupled wave theory. Chapter Ten discusses single crystal narrow band tuneable filters and coincidence limiters are included. The book is concluded in Chapter Eleven with a description of microwave switching using ferrite devices.

The book does not emphasize experimental results but does reference excellent experimental works in the bibliography. I believe this to be a good book for graduate students in electro-magnetic theory and will be welcomed by practicing microwave engineers who will be interested in some of the newer material, for example, the coupled wave theory, junction circulator, and latching ferrite switch.

A. Clavin  
Hughes Aircraft Co.  
Canoga Park, Calif.



## LETTERS TO THE EDITOR

Editor, MTT Newsletter

I read your note on "How Does the Engineer Build An Equity" in the Jan. Newsletter and I also feel that there is an urgent need for the IEEE to step forward and help save engineering in this country.

This topic has been discussed many times among my colleagues at work. The unanimous conclusion reached was that not only is a unified retirement plan needed but also the need for a strong society that will safeguard the engineering needs; such as that afforded the medical profession by the AMA.

As you mentioned in your article, the shifting of defense contracts has put the engineer in the migrant labor class. His longevity has become cyclic along with his salary and benefits. It is this insecure feeling that will lead to the engineer becoming extinct. The only solution to this problem is to have either government control or a strong professional union. I favor the latter solution and I am sure that if the IEEE polled its members, the vote would be overwhelmingly in favor of a strong and protective representation.

It is during times of increasing unemployment in the engineering community that causes concern and alarm. These times are upon us now. I think that once and for all we should act and act now. Thank you very much.

Very truly yours,  
Donald H. Bond  
Melville, New York

P.S. Attached is a list of 6 persons supporting the views expressed in your editorial and this letter.

Editor, MTT Newsletter

I have read with great interest your note in the January, 1970, GMTT Newsletter, and I favor the second recommendation contained therein, i.e., to establish a uniform industry-wide retirement plan, possibly administered by the IEEE. This would be similar to the TIAA-CREF plan that has been available to college teachers for some time.

I should also like to comment on the widespread acceptance, apparently condoned in your note, of "Most engineers" being "somewhat like nomads." The depressing docility with which engineers in this country have become migrant laborers in order to follow the Government-induced project pistons has not helped either their equity or their professional image in the community at large. The wave of cutbacks in all phases of R&D funding both by Government and by industry, with their resultant disastrous effect on the employment situation, might have taken place far less precipitously if engineers were not well-known to be such a passive lot, never to speak up or to fight back.

It is clear that this country at present has an oversupply of trained technical manpower, and if we can be spared any more cries of "engineering shortage" by people in a position to know better, this oversupply hopefully will soon dwindle. While it exists however, I think the engineers should now raise a strong voice of protest, through their professional organizations, against the incredible callousness with which industry and indirectly, the Government impose migrant-labor status on people who in terms of their education and their accomplishments are still an important national asset.

Certainly the current efforts to help engineers protect their retirement equity are a needed and welcome step in the right direction. However, I feel that since a national organization such as the IEEE is in such a unique position to watch over the status of the profession and to make use of publicity and political pressure to protect the interests of its members, stronger action should be taken under the present crisis conditions.

Very truly yours,  
Bernhard Kulke  
Wellesley Hills, Mass.

Editor, MTT Newsletter

In response to your last editorial regarding engineers and retirement, I believe that the "Keough Plan" would be the most satisfactory in the long run. It will allow a retirement plan that is independent of the employer — even if the engineer drops out of the engineering profession. The publicity obtained in pushing with legislation will also serve as a means of educating the public just "what an engineer is" and help restore the professional attitude.

Should the IEEE be a party to an Engineer's Union? Yes! However I envision an organization which is "professional" as has been partly achieved by the AMA and the Bar Association.

Cordially,

Fred Hand

North Hollywood  
California



Editor, MTT Newsletter

I read with interest your note pertaining to building up of equity, or more specifically, to preservation of retirement benefits when changing employment. The engineers with whom I am in daily contact with (Lockheed) have discussed the same subject off and on, for a good many years, but your note is the first instance, that I am aware of, that the matter was taken out of mere talking stage. I wish to strongly urge you to carry the matter to IEEE Headquarters, and give that organization an opportunity to be of value to the members in a more tangible manner than just issuing technical publications.

Very truly yours,  
Boris S. Maximoff  
Los Altos, Calif.

Editor, MTT Newsletter

After reading your editorial in the January, 1970 issue of the Newsletter I wish to add my support to your efforts to improve the equity situation of engineers. As a student I feel I am among those who could profit most, in the long run, from such improvements.

Sincerely,  
James Minor  
Providence, Rhode Island

Editor, MTT Newsletter

I agree whole-heartedly with your article in the Jan 70 Newsletter "How Does The Engineer Build An Equity?" I suspect you will find a very high percentage of engineers who never quite qualify for the existing types of company plans for retirement but who feel they should be covered by some plans such as those recommended by you.

Sincerely yours,  
Theodore Roumbanis  
Los Altos, Calif.

Editor, MTT Newsletter

I have just read your article in the January Issue of Newsletter "How Does The Engineer Build An Equity?" I do agree that the cause of engineer's equity is worthy of my support.

Please let me know what I can do to bring this message to the attention of GMTT ADCOM.

Sincerely,  
Donald M. Dible  
MELABS, Inc.

# PRESS TIME RELEASE



## IEEE GROUP CORRESPONDENCE

### ADVANCED CALL FOR PAPERS

Vehicular Technology Group  
Twenty-First Annual Conference  
1970

The 1970 IEEE Conference on Vehicular Technology will be held on December 2-4, 1970 at the Statler-Hilton Hotel, Washington, D.C.

The conference will be a comprehensive unclassified program covering new developments pertinent to the field of Vehicular Technology. Papers describing significant contribution in the following or related areas are invited:

- Mobile Communications
- Spectrum Management in the Mobile Radio Bands
- Electronics in Traffic Control
- Electronics in Traffic Surveillance
- Vehicle Guidance and Control
- Highway Electronics
- Vehicular Electronics
- Electric Automobile Technology
- Maritime and Aviation Techniques
- Application of Aerospace Technology

Prospective authors are requested to submit six (6) copies of a 800 to 1,000 word summary of their paper, single spaced with a 2-inch left hand margin and typed in a 4 1/4 inch column. The cover page should include the name, title, company affiliation and address of the author or authors. Paper summaries will be published in the Conference Technical Digest which will be distributed at the Conference.

Summaries must be submitted by June 15 to the 1970 Technical Program Chairman:

Dr. Peter M. Kelly  
Kelly Scientific Corporation  
3900 Wisconsin Avenue, N.W.  
Washington, D. C. 20016

Third Class



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