IEEE

VEHICULAR TECHNOLOGY SOCIETY NEWSLETTER

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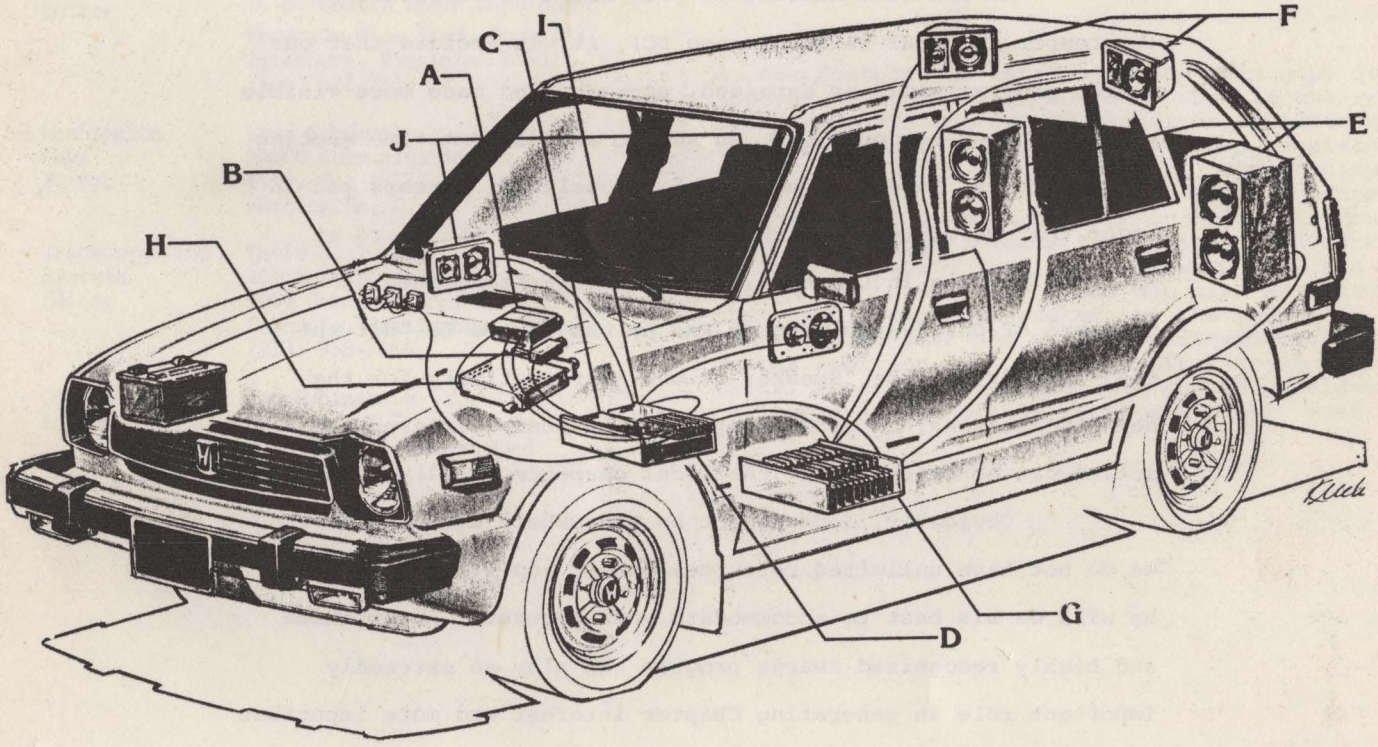
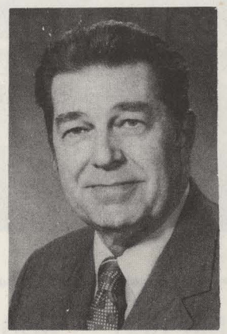


A State-of-the-Art Custom Sound System

See Automotive Electronics by Bill Fleming

President's Message



Stuart F. Meyer
President
IEEE Vehicular Technology Society

At the last meeting of your Board of Directors (September 27, 1981 in Washington DC), it was decided that our awards program would be expanded, upgraded and made more visible with increased recognition. An AD HOC awards committee meeting will have been held by the time this newsletter reaches you in order that we can present the final details to the Board at the next Meeting in December. Jack Neubauer continues as Chairman of our awards program and he has agreed to "hit the road" as part of the "Speaker of the Year" activity for the next two seasons, in order that the much needed interest and action can be generated by the local chapters.

Obviously, Jack cannot be everywhere at one time and we do not have unlimited resources but if you will contact him, he will do his best to accommodate your request. An expanded and highly recognized awards program can play an extremely important role in generating Chapter interest and more important maintaining it. I call upon all of you to send your ideas to Jack and to give some serious thought to having him appear at one of your future local meetings.

Shortly you will be receiving ballots for the election of a number of Directors. Please vote! Your active interest in selecting the Board Members is important to our Vehicular Technology Society.

STUART MEYER
President

Newsletter Staff

EDITOR — A. Kent Johnson, Room 4E-324B, Bell Laboratories, Whippany, New Jersey 07981, (201) 386-6686

STAFF:

- Chapter News Editor — Sam McConoughey, Federal Communications Commission, 1919 "M" Street, N.W., Washington, D. C. 20554, (202) 632-7695
- Automotive Electronics Editor — Dr. William J. Fleming, Electronics Department, General Motors Research Labs, Warren, Michigan 48090, (313) 575-2849
- ADCOM News Editor — Samuel A. Leslie, General Electric Company, U. S. Mobile Radio Department, Mountain View Road, Room 2687, Lynchburg, Virginia 24502, (804) 528-7115
- Washington News Editor — Eric Schimmel, MASCO Communications, P. O. Box 19232, Washington, D. C. 20036
- Transportation Systems Editor — David B. Turner, WED Enterprises, 1048 Grand Central, Glendale, California 91201, (213) 956-7464
- Communications Editor — Tom Rubinstein, Motorola, 9980 Carroll Canyon Road, San Diego, California 92131

Month of Issue	Final Copy To be Rec'd By IEEE Editor*	Target Mailing Date
February	12-14-81	1-18-82
May 3-09-82	4-13-82	
August	6-09-82	7-13-82
November	9-15-82	10-20-82

* Inputs for newsletter staff editors should be received by newsletter editor 1 to 2 weeks before these dates.

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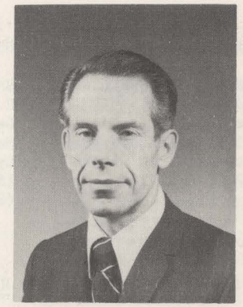
Editor's Notes



A. Kent Johnson
Newsletter Editor

A new feature is introduced in this copy of the newsletter. Jack Newbauer who is chairman of the VTS awards and standards committees becomes a contributing editor to the newsletters. This will allow Jack the opportunity to bring before the society membership some of the important work that he is doing in these areas. We look forward to working with Jack in this capacity and look forward to his regular contributions. Jack has also accepted the appointment as speaker of the year for the incoming year and will concentrate on the awards portion of his responsibility in his talks. Local chapter chairmen should consider taking advantage of his services in the year ahead.

Society Officers and Board of Directors

SOCIETY OFFICERS

Society President	Society Vice President	Society Secetary	Society Treasurer
STUART F. MEYER E. F. Johnson Company Suite 907 1601 N. Kent Street Arlington, VA 22209 (703) 525-6286 (703) 281-3806 (Home)	GEORGE J. MITCHELL Motorola, Inc. Room 2327 1301 E. Algonquin Road Schaumburg, IL 60196 (312) 576-6172	SAMUEL A. LESLIE U.S. Mobile Radio Department General Electric Co. Mountain View Road Lynchburg, VA 24502 (804) 528-7115 (804) 525-7589 (Home)	ROBERT E. FENTON Ohio State University 2015 Neil Avenue Columbus, OH 43210 (614) 422-4310 (614) 457-0479 (Home)

BOARD OF DIRECTORS

NAME	RESPONSIBILITY	TERM
Carl N. Brooks	Div. II Rep. to TAB Finance Committee	Jan78-Dec80
William H. Chriss	Past Treasurer	Jan79-Dec81
Robert E. Fenton	Treasurer	Jan80-Dec82
Trevor O. Jones	Chairman, Automotive Electronics Committee	Jan78-Dec80
Fred M. Link	Chairman, National Meetings Committee	Jan78-Dec80
Charles Lynk	Chairman, Paper of Year Comm.	Jan80-Dec82
Roger Madden	Junior Past President	Jan79-Dec81
George F. McClure	Chairman of Publications Comm. and Transactions Editor	Jan80-Dec82
Samuel R. McConoughey	Chairman, Chapter Activities	Jan78-Dec80
Stuart Meyer	President	Jan80-Dec82
James J. Mikulski	VTS Rep. IEEE Comm. on Social Implications of Technology	Jan80-Dec82
George J. Mitchell	Vice President	Jan79-Dec81
Ronald G. Rule	Education Committee	Jan79-Dec81
(VACANT)		Jan78-Dec80
Robert A. Mazzola	Chairman, Membership Committee	Jan79-Dec81

Board of Directors Report

Samuel A. Leslie

VTS Secretary

ROLL CALL

Attendance totaled eleven, of which six were elected board members with voting status. Since a quorum of eight elected members is required before board business can be voted upon, all board business which require a vote will be taken care of by mail ballot within the next few weeks. In accordance with the bylaws, a majority of the elected Board members (i.e., eight out of the fifteen) must vote in favor of a motion when voting via telephone or mail before it can be passed. The meeting was called to order at 1:25 PM.

ITEMS FOR MAIL BALLOT

The following motions which require approval by the majority of the board were made at this meeting. Final acceptance of these motions will depend on the results of the mail ballot.

1. Minutes of Last Meeting: McConoughey moved, Mitchell seconded, that the minutes of the June meeting be accepted as published.

2. Transcribing Equipment: Meyer moved, Fenton seconded, that VTS purchase cassette transcribing equipment compatible with Stu Meyer's office transcribing equipment, amount not to exceed $200. This transcribing recorder is to be used by the Awards Chairman, Jack Neubauer, for documentation in conjunction with the upcoming enhanced awards program.

3. Investment: Madden moved, Fenton seconded, that the treasurer place all surplus funds not needed for the general operation of the society into the highest available short-term interest bearing accounts available through IEEE, keeping in mind the requirements for the $25,000 to be invested in the Noble award. The reason for this motion is that VTS currently has nominally $45,000 in passbook savings at 5.3%, while the Option 2 (money market) plan available through IEEE is currently paying 16.8%.

4. San Diego Seed Money: Meyer moved, Madden seconded that an additional $1500 be provided to the San Diego Conference, to be expedited by the end of October. This brings the total amount of seed money for the San Diego Conference to $3000.

5. Toronto Conference Seed Money: Link moved, Madden seconded that $1000 seed money be provided for the VTS Toronto conference.

6. 1984/85 VTS Conferences: Meyer moved, Mitchell seconded, that the 1984 conference be held in Washington, and that a joint APCO/VTS conference be considered for 1985.

AWARDS PROGRAM

To achieve greater recognition of the various awards available through the VTS, an upgraded and accelerated program chaired by Jack Neubauer is to be undertaken. Meyer subsequently appointed an ad hoc committee consisting of Neubauer, McConoughey, Madden, Meyer, and Leslie to formulate firm recommendations for board vote at the next meeting in December. In addition, Meyer has appointed Neubauer for a two-year period to the speaker of the year position, with the main emphasis being on publicizing the awards program. Some initial thoughts for this program include:

1. Chapter Awards: Two awards are being considered, one to stay with the chapter for use or display at chapter meetings, and the other for the chapter chairman responsible for obtaining the award. To this end, better methods of getting chapter activity information to the awards committee must be explored.

2. Advant Garde: Expansion of the Advant Garde function to include pioneers in automotive and transportation as well as communications is to be considered.

3. Awards Structure: A hiearchy of awards (i.e., various levels of importance) is to be established. This does not imply that one must work one's way up through the awards; it is merely to establish the relative importance of various awards in comparison to awards offered by the other societies.

4. Splitting of Awards: Prohibiting the splitting of awards (i.e., between two papers, etc.) is to be considered, although the giving of awards to multiple authors of a selected paper is to be acceptable.

5. Paper of the Year Awards: Consideration is to be given to the selection of the best paper from each VTS catagory (i.e., automotive, transportation, and communications) for appropiate catagory awards. The VTS paper of the year is to be selected from one of these three selected papers.

6. Awards Manual: An awards manual to explain the various awards available is to be generated for use by the chapters.

7. Recognition Awards: Recognition awards should say explicitly what the award is for; no "form letter" awards are to be issued.

8. Special Awards: Awards to board members who have made significant contributions to the VTS but who have been unable to progress through the various positions available on the board due to changes to unrelated employment domains is being considered.

This accelerated and enhanced awards program, once implemented, will be on a permanent basis. Many of these suggested procedures will require changes to the VTS bylaws; consequently the committee is to formulate the recommended bylaw changes for review by the board at the next meeting.

BOARD OF DIRECTORS CANDIDATES

Madden reported that he had obtained biographies from the following for election to the board:

Fred Link	(Up for Re-election)
Sam McConoughey	(Up for Re-election)
John H. Auer, Jr.	
V. Edgerton	
Art Goldsmith	
Al Goldstein	
Kent Johnson	
Sam Leslie	

Five of this slate of eight candidates will be elected to the board, and that their terms will run for two years instead of the customary three due to the lateness in getting the slate of candidates together.

Madden also presented a tentative list of names for the next election, which is to immediately follow this election to get back on schedule with the normal three-year term.

1982 VTS CONFERENCE IN SAN DIEGO

Meyer and Link are to meet with the San Diego conference committee on October 22 to determine the planning status of this conference.

CONVERGENCE '82 CONFERENCE

Meyer reported that the Convergence '82 conference does not require seed money for operation this year, since it is SAE's turn to provide the up-front money. Subsequently, the provisional board approval for seed money at the last meeting is rescinded. The question of VTS sponsoring an automative electronics session at the conference was raised; Meyer is to contact Jerome Rivard to determine the feasibility of a VTS-sponsored session.

1983 TORONTO VTS CONFERENCE

Tony Bonney (Toronto conference publicity chairman) attended the board meeting, and provided a report of the conference status. He reconfirmed that the conference is to be held at the Prinze hotel in Toronto on May 25 through 27, 1983.

DAN NOBLE MEMORIAL FELLOWSHIP

Jerry Underwood (substituting for Al Goldstein) reported that approval had been achieved for Motorola to provide $25,000 for the Noble award. Details for the award program are being submitted to the IEEE TAB awards board for consideration at their October 20th meeting. It is anticipated that the transfer of funds from Motorola and the matching funds from VTS will occur in the December-January time frame.

MISCELLANEOUS

Vehicular Technology R&D - Madden continues in his assignment in representing VTS on this issue.

1981 NTC Conference - Kent Johnson reported that the VTS-sponsored session at this conference will have five papers, of which four are submitted and one is invited. The VTS session is to take place the afternoon November 30 (Monday).

1982 Global Communication Conference - Meyer reported that the Global Communication conference committee is not interested in having VTS sponsor a VTS-related session at this conference. This conference, however, is being co-sponsored by the VTS Miami Chapter.

VTS Standards - Neubauer reported that the recently released IEEE VTS standard on spurious measurments needs to be publicized. Meyer instucted Neubauer to send copies of the standard to the EIA Transmitter Committee, and that Johnson is to publicize the standard in the VTS newsletter.

Transaction Editors - The problem of obtaining permanent transaction editors for both automotive electronics and transportation was brought forward. Fenton currently is serving in a temporary status as the transportation editor.

Next Board Meeting - The next VTS Board meeting will be held sometime during December at a date and location that is convenient for most of the board members. Mitchell is to poll the board members via phone to determine when and where the meeting is to be held.

ADJOURNMENT

The meeting was adjourned at 4:30 PM.

Respectfully submitted,

Samuel A. Leslie
VTS Secretary

BOARD OF DIRECTORS 1981 MEETING ATTENDANCE

\# - Executive Committee

* - Elected Board Members

NAME\	FUNCTION	APR 08	JUN 09	SEP 08	DEC
*#Stuart Meyer	President	X	X	X	
*#George Mitchell	Vice President			X	
*#Robert E. Fenton	Treasurer	X	X	X	
#Samuel A. Leslie	Secretary		X	X	
*#Roger Madden	Immediate Past President	X		X	
#John Cassidy	Senior Past President				
*#Trevor O. Jones	Chairman, Automotive Electronics Committee				
**Carl N. Brooks	Div. II Rep. to TAB Finance				
**William H. Chriss	Past Treasurer Committee				
**Fred M. Link	Chairman, National Meetings Committee	X	X	X	
**Charles Lynk	Chairman, Paper of Year Comm.		X		
**Robert A. Mazzola	Chairman, Membership Comm.				
**George F. McClure	Chairman of Publications Comm. and Transactions Editor	X			
**Samuel R. McConoughey	Chairman, Chapter Activities	X		X	
**James J. Mikulski	VTS Rep. IEEE Comm. on Social Implications of Technology	X			
**Ronald G. Rule	Education Committee	X	X		
James G. Bender	Assoc. Trans. Editor, Communications	X			
Charles D. Bodson	Standards Committee				
CDR. R. H. Cassis	Council on Oceanic Eng.				
Martin Cooper	Member-at-Large				
Al Goldstein	Conference Coordinator	X			
Kent Johnson	Newsletter Editor	X	X	X	
Jay Kitchen	Chairman, Newsletter Adv. _Exhibits Committee				
William C. Y. Lee	Assoc. Trans. Editor, Communications	X			
Jack R. Neubauer	Chairman, Awards and Standards Committees	X		X	
Eddie Simon	1982 Conference Chairman		X		
David Tally	Financial Advisor	X			
David Claes	Chapter Chairman, Cleveland	X			
George DeWire	1981 Conference Committee	X			
Art Goldsmith	1981 Conference Committee	X			
Gaspar Messina	1981 Conference Committee	X			
Neal Pike	Chapter Chairman, Washington	X			
Dave Reid	Toronto VT Chapter	X			
C. Vinodrai	Toronto Conference Chairman	X			
Tony Bonney	Toronto Conference Publicity			X	
Jerry Underwood	(1)Representing Al Goldstein			X	
	TOTAL ATTENDANCE	21	8	11	

THE INSTITUTE OF ELECTRICAL AND ELECTRONICS ENGINEERS, INC.

32nd VEHICULAR TECHNOLOGY CONFERENCE

SAN DIEGO, CALIFORNIA MAY 23-26 1982

Please address reply to:
P.O. Box 600
Solana Beach, Ca. 92075

FELLOW I.E.E.E. MEMBER - - -

As Chairman of the 32nd VTS Conference, I extend a cordial invitation to you to visit San Diego and the Southern California area.

STOP Whatever else you were doing and mark the dates on your calendar - - you'll be able to

LOOK At the very latest in vehicular communications, transportation and automotive electronics equipment in the spacious exhibit hall - - you'll

LISTEN To national authorities examine future trends and new techniques in the technical sessions. You'll also hear a keynote address by Ms. Adriana Gianturco, Director of Transportation for the State of California. Ms. Gianturco, always innovative, always lively, always at the leading edge of California Transportation, will take an overall view of the conference theme: MEETING THE CHALLENGE OF LIMITED RESOURCES.

This conference, to be held at the Town and Country Hotel in fabulous Mission Valley, will be THE BEST ! Call your friendly travel agent for arrangements to the San Diego Airport, the hotel will be operating shuttle service from there.

See you at the Registration Booth !

Eddie Simon

Eddie Simon
Conference Chairman

IEEE INDUSTRIAL ELECTRONICS SOCIETY

CALL FOR PAPERS

THE INSTITUTE OF ELECTRICAL AND ELECTRONICS ENGINEERS, INC.

WORKSHOP ON AUTOMOTIVE APPLICATIONS OF MICROPROCESSORS

October 7-8, 1982 • Hyatt Regency Hotel • Dearborn, MI

Sponsored by the Industrial Electronics Society of IEEE and Endorsed by Convergence 82 Conference Committee. Workshop Follows Convergence 82.

This workshop is a forum on applications of microprocessors to automobiles, trucks, vans, allied automotive products, plants, and processors. It focuses principally on the applications of the microprocessor to these products. Through informal exchange of information, this Workshop encourages the open discussion of applications of microprocessors, problems encountered, and specific or novel hardware and software solutions.

Papers are being solicited for presentation at this Workshop. Emphasis will be on technical value, readability, and informational content.

Topics of interest include, but are not limited to, the following areas:

- Engine Controls
- Drivetrain Controls
- Engine and Vehicle Diagnostics
- Instrumentation and Display
- Safety Systems
- Entertainment Systems
- Test Equipment
- Plant Process and Quality Control

Those interested in presenting a paper at the Workshop should submit a 300-500 word summary (double spaced) in two copies to the address below. The summary should define the purpose of the work and what results have been obtained. The paper should be suitable for a 20 minute presentation. A proceedings containing the accepted papers will be distributed to the Workshop attendess. Accepted papers may be expanded and submitted for publication consideration in the Industrial Electronics Transactions.

The summary deadline is February 15, 1982. Authors of accepted papers will be notified March 15, 1982. Final papers are due June 1, 1981.

Mr. John G. Neuman, Technical Program Chairman, General Motors Research Labs, Electrical Engineering Department, GM Technical Center, Warren, MI 48090.

Candidates—Board of Directors

JOHN H. AUER, JR. (A'52 - M'57)

MEMBERSHIP NO _____

PRESENT EMPLOYER

General Railway Signal Company
Rochester, NY

IEEE HISTORY

Was secretary of Local Power/IA Chapter; Chairman of Local Communications Society Chapter, 1977-78; Member of Land Transportation Committee; Member of Advanced Transportation Systems Committee; Chairman of IEEE Safe Headway Standards Working Group, 1977-80.

PROFESSIONAL BACKGROUND

Manager of Advanced Engineering at General Railway Signal Company with broad involvement of Transportation Control Systems for Railroads, Rapid Transit, People Movers and Highways.

OTHER PROFESSIONAL SOCIETIES

American Public Transit Association, Systems Safety Committee; Association of American Railroads, Communication and Signal Division; National Society of Professional Engineers; Rochester Engineering Society; Sigma Xi, Transportation Research Board.

EDUCATION

B.S.E.E. Union College
Graduate work at Rochester Institue of Technology

Mr. Auer has been associated with the Transportation Controls Industry for more than 30 years. In 1980, he received the Inventor's Award from the Rochester Patent Law Association. He holds 87 U.S. patents and has authored a number of technical papers in the transportation field. His experience includes development of systems for vehicle detection, communication, speed control and route control.

50 WORD NARRATIVE

V. EDGERTON (SM '80)

MEMBERSHIP NO 7366040

PRESENT EMPLOYER

Intelligence Technology Resouces, Inc.
10 Park Avenue, New York, NY 10016
(212) 689-0137

IEEE HISTORY

Vice Chairman, Registration Committee, ELECTRO/81; VTS/PAC Chairman, 1979/80; Chairman, Tristate (Region I) Communications Network Feasibility Study - under FCC RS R&R Part 95 Sub A, 1979, 80; Member, Licensure and Registration Task Force, USAB, 1979, 80; New York Section VTS chapter Chairman, 1978, 79; Chairman, T/P Workshop Subcommittee 4: Responsible Fostering of R&D, 1978 Technology Policy Conference; IEEE Rep. on Calif, Eng. Conf. on Proffessional Registration (9/15/79); State of Orgeon: Licensure/Public Safety Study, Member '80.

PROFESSIONAL BACKGROUND

Since 1964, worked on various areas of on-line teleprocessing computer systems. Since 1977, with ITR, Inc. worked on interactive communications systems, microprocessor applications, and microprocessor/rabotics; developed courses; and published two papers on microproccessor languages.

OTHER PROFESSIONAL SOCIETIES

NSPE

EDUCATION

MBA, Fairleigh Dickinson University, 1976
(BS-equiv. in mathematics)

50 WORD NARRATIVE

Edgerton has worked long and hard towards strengthening the profession; for a rational approach to protection of the public; and for a stronger VTS.

ARTHUR GOLDSMITH

MEMBERSHIP NO. 0305086

PRESENT EMPLOYER

Consultant
4303 Wynnwood Dr., Annadale, VA 22003
(703) 941-1323

IEEE HISTORY

M 38, SM 45; VTS 68, Treas. 1981 VTS Conference, Treas. 80 and 81 Washington Mini-Conferences; EMS 60, AdCom 622-70, Pres. 68-69, Treas. 80-81, AES 62; Comp. Soc. 79; TAB Membership Svcs. Comm. 69-70; TAB Transportation Comm. 71-75, Chm. 71-73; Joint Engr. Mgmt. Conf. IEEE Rep. 65-78; Intersociety Comm. on Transportation, IEEE Rep. 71-76, Chmn 74-75.

PROFESSIONAL BACKGROUND

Consultant. Prior to retirement from Federal Government in 1979 was principal advisor to the Secretary of Transportation on radionavigation, editor of the National Plan for Navigation, and responsible for overseeing telecommunications R & D including radionavigation, highway electronics, and vehicle monitoring.

OTHER PROFESSIONAL SOCIETIES

Fellow, Radio Club of America; Institute of Navigation; U. S. Naval Institute; American Society of Engineering Education.

EDUCATION

Ph.d. in EE, Illinois Inst. of Tech.; MBA, Stanford Univ.

50 WORD NARRATIVE

Registered Professional Engineer; Listed in American Men of Science and Who's Who in Government.

ALVIN M. GOLDSTEIN

MEMBERSHIP NO. 5174412

PRESENT EMPLOYER

Motorola Inc.
1301 E. Algoniquin Road
(312) 576-4903

IEEE HISTORY

Was 1979 VTS Conference Chairman,Chicago VTS Chapter Chairman, Los Angeles VTS Chapter Chairman, Los Angeles VTS Chapter Activity Chairman, San Francisco VTS Chapter Activity Chairman

PROFESSIONAL BACKGROUND

Member of the Vehicular Technology Society of the IEEE.

OTHER PROFESSIONAL SOCIETIES

Tau Beta Pi - Engineering Honorary Society,
Eta Kappa Nu - Engineering Honoray Society

EDUCATION

BSEE - Illinois Institute of Technology

50 WORD NARRATIVE

I decided to be considered for the Board of Directors because of my 25 years of work in the industry, and my long term professional association with the IEEE and the Vehicular Technology Society. My recent role as Conference Chairman for the 1979 Vehicular Technology Society's conference gave me insight into responsibilities of being on the Board.

A. KENT JOHNSON

MEMBERSHIP NO.1313147

PRESENT EMPLOYER

Bell Laboratories
Whippany, New Jersey
(201) 386-6686

IEEE HISTORY

Editor, Vehicular Technology Society Newletter from 1978 to present. Appointed member, VTS Board of Directors from 1978 to present. Chairman of the 1978 Sysmposions on Microwave Mobile Communications.

PROFESSIONAL BACKGROUND

Eleven years as a member of the Mobile Communications Laboratory at BTL. Working on the design and development of the Cellular Advanced Mobile Communications System.

OTHER PROFESSIONAL SOCIETIES

EDUCATION

BSEE Brigham Young University 1960
MSEE New York University 1962
PH.D Stevens Institute of Technology 1965

50 WORD NARRATIVE

As an appointed member of the Board of Directors since 1978 I have been in attendance at every board meeting and have a strong feeling for the goals and operations of the society. I feel I could make a worthwhile contribution as a voting member of the board.

SAMUEL A. LESLIE

MEMBERSHIP No. 1459759 SM

PRESENT EMPLOYER

General Electric Company, Mobile Comm. Div.
Mountain View Road, Lynchburg, Virginia
(804) 528-7115

IEEE HISTORY

Secretary, IEEE Vehicular Technology Society Registration Chairman, 27th Annual Vehicular Technology Society Conference.

PROFESSIONAL BACKGROUND

Currently responsible for design of microprocessor-based communication products; prior experience includes both system and hardware design of radio paging, mobile telephone, and military communication equipment.

OTHER PROFFESSIONAL SOCIETIES

EDUCATION

BEE, University of Florida, 1962
ME, University of Florida, 1966

50 WORD NARRATIVE

Sam Leslie has 18 years communication engineering experience, of which the past 10 has been in the land mobile radio field. He has authored several papers, and holds several patents, and is a registered professional enginner. Non-professional interests include personal computing, amateur radio (W4PK), photography, woodworking gardening, and bicycling.

FRED M. LINK

MEMBERSHIP NO. LIFE FELLOW 99127

PRESENT EMPLOYER

Independent Semi-Retired Consultant
Robin Hill, Pittstown, NJ 08867
(201) 735-8310

IEEE HISTORY

Member VTS Board, (Elected for past three terms) Chairman, VTS National Conferences Life Fellow IEEE, Honorary Member VTS, Second member so elected - 1970, Member VTS Avant Garde, signifing early support and participation in VTG and now VTS activity since 1950.

PROFESSIONAL BACKGROUND

Communications Consultant - Land Mobile Radio, Independent Consultant to industry - Founder and Ownwr Link Radio Corporation

OTHER PROFESSIONAL SOCIETIES

President and Fellow, Radio Club of America, Mayor's Association (Former Mayor Westwood, NJ)

EDUCATION

Graduate Penn State University - BS-EE, Member: Tau Beta Pi, Eta Kappa Nu

50 WORD NARRATIVE

Have been active in Radio Communications industry since 1927 commercially, and prior to that as a radio amateur as 30V / 3BVA / W2ALU since 1920. Prior to founding Link Radio was associated with Dr. Lee DeForest at DeForest Radio, and Allen DuMont at DuMont Laboratories. After selling Link Radio to retire in 1950 became associated with industry groups such as RCA as a consultant, and as of 1966 to date as an independent consultant to the industry - Land Mobile Radio.

SAM MCCONOUGHEY

MEMBERSHIP NO.0420505

PRESENT EMPLOYER

FCC
1919 M. St. N.W.
Washington, D. C. 20554
(201)632-7695

IEEE HISTORY

1976 VTS Conference - Papers Chariman, VTS Board of Directors, Chairman, Chapter Activites, VTS Chairman, 1st Mini-Con, VTS Various other IRE, IEEE activties since 1946.

PROFESSIONAL BACKGROUND

Presently on electronics Engineer, Network Analysis Branch; formerly chief, Mobile Services Division, Supervisory Engineer Safety & Special Radio Services Bureau at the FCC. Prior to the FCC served in various engineering and marketing positions at Northrop, LTV, G. E. Co., Prodelin, Michigan Wisconsin Pipe Line and AT&T. Thirty years of experience in Land Mobile and Microwave Communications.

OTHER

Fellow, Radio Club of America, Member, IEEE Com. Soc.

EDUCATION

BSEE Iowa State College

50 WORD NARRATIVE

The Board of Directors has had considerable turnover. I believe that it is adviseable to retain one or two members to preserve continuity in VTS policies. There is only one other Board member with the continuity of service and high attendance record comparable to mine. I hope you will vote for both of us.

Chapter News

Sam McConoughey
Chapter News Editor

CHAPTER NEWS
by
Sam McConoughey

MESSAGE FOR CHAPTER OFFICERS

Congratulations on your election!

The 1981-82 Season has begun and I wish to remind you that our Speakers-Of-The-Year are available to assist you in filling out your program for the Season. For details, see below.

Regarding the 1980-81 Season just past, be sure that your Chapter has seen all its meetings reported on these pages. The Newsletter reports are used to determine the winner of the Chapter-of-the-Year award. Likewise, instruct your Chapter Secretary to send a copy of the IEEE's "Meeting Report" form L-31 to this Editor following each meeting.

Best wishes for the best season ever.

MEETINGS

Miami

Tour-National Hurricane Center
Held on July 1, 1980 with 20 attending.

Tour-Television Station WPLG-TV
Held on Sept. 25, 1980 with 15 attending.

"Lightwave Transmission via Fiberguide"
by Mr. Manuel R. Santana, Technical Supervisor Lightguide Cable
Bell Laboratories, Norcross, GA.
Held on January 27, 1981 with 50 attending.

Tour-Dade County Communications Center
Held on March 31, 1981 with 7 attending.

"Satellite Communications-a SBS Systems Description"
by Mr. William Curry, Mgr. Systems Definition and Control
Satellite Business Systems, Inc. McLean, VA.
Held on May 26, 1981 with 35 attending.

ELECTION RESULTS

Miami

Dr. Malcom Gotterer, Chairman 81-82
Prof. of Math. Sciences
Florida International University
DM414B Tamiami Campus
Miami, FL. 33199
Tel. No. 93050 552-2743

Mr. Frank Krupansky, Vice-Chairman 81-82
Coulter Electronics

Mr. Christopher Joyce, Sec'y./Treas. 81-82
Criterion Studies

Dallas/Fort Worth
Mr. Paul Hartman, Chairman 81-82
812 Thoreau
Allen, TX. 75002

Mr. Richard Luthans, Vice-Chairman 81-82
P.O. Box 313
Richardson, TX. 75080
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GLOBECOM '82 (ex-NTC)

Our thanks to C.C. Whitney, Vice-Chairman and to Dave Talley for reminding us that the Miami Chapter will be co-hosting the first GLOBECOM meeting to be held Nov.29-Dec.3, 1982 at the Sheraton Beach in Bal Harbour, FL. Ple nty of time to submit papers and to budget the travel!

SPEAKERS BUREAU

The following persons have agreed to serve as speakers for local VTS Chapters. The Society picks up the tab for travel to your city. The local Chapter is expected to pick up the tab for hotel, meals, and local travel.

The Chapter is to make arrangements directly with the speakers listed below. We hope that by the next issue of the NEWSLETTER to add speakers for the areas of Automotive Electronics and Transportation.

Mr. Charles Higginbotham, Consultant
7757 Conservatory Drive
Sarasota, FL. 33580
813 355 1813

Subject matter: The changing regulatory enviroment. As former Chief of the F.C.C.'s Safety and Special Radio Services Bureau, Charlie is well qualified to discuss the significance of the changing regulatory climate at the F.C.C..

Mr. Fred Link, Consultant
Cook's Cross Road, Robin Hill Farm
Pittstown, N.J. 08867
201 735 8310
Subject matter: The anecdotal history of land mobile radio and its personalities. Brought back by popular demand! Fred's talks recite the history and development of land mobile radio and of the personalities that made it happen. Former President and founder of Link Radio Corp.

Mr. Jerry S. Stover, Consultant
4025 Druid Lane
Dallas, TX. 75205
214 522 0227
Subject matter: Land Mobile, Its Successes and Failures
Jerry is the retired Chairman of the Board of Communications Industries (Decibel Products Co., Secode, General Communications, etc.) and has spent his entire professional career in the field of land mobile. He and his associates built a 2-way sales and service organization following WW-2 into a multi-million dollar conglomerate. Thus Jerry is highly qualified to discuss the land mobile industry's successes and failures and to comment on what the future may hold.

Dr. Robert E. Fenton
The Ohio State University
Department of Electrical Engineering
2015 Neil Avenue
Columbus, OH. 43210
614 422 2572

Subject matter: Future Ground Transportation Systems

The need for major improvements in our Nation's ground transportation network is plainly evident from an evaluation of both our current and projected future transportation needs. One attractive approach toward meeting at least some of these needs is the automation of various facets of ground transportation. This would include central-business-district circulation systems, urban roadway networks, and intercity highways.

The status of research and development for the first two of these facets will be overviewed with an emphasis on the required command and control systems. Then the third, the intercity automated highway, will be examined in detail with an emphasis on both some possible command and control configurations and an overview of ongoing research activities which have been focused on the design, implementation, and field evaluation of both automatic (hands off) steering systems and those for automatic longitudinal (velocity and position) control of individual automobiles. The talk will be concluded with an assessment of future directions in these areas.

Plan now to use one, or all of these speakers at one of your upcoming programs. Consider a joint meeting with other Chapters, Societies, your Section and Student Chapters. Use the meeting to bolster your membership and attendance.

-30-

by Sam McConoughey, Editor & Chapter Chairman
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Communications

Tom Rubinstein
Communications Editor

THE DIGITAL COMPUTER AS A TOOL IN LAND MOBILE RADIO SYSTEM DESIGN

With the continuing escalation of engineering salaries and the increased availability of data processing equipment, the digital computer is becoming more and more attractive as a tool for increasing engineering efficiency. Since a digital computer excels at repetitive tasks, it has the potential for both increasing engineering efficiency and improving morale among engineers. Among the most repetitive of facets of the RF Communication Systems Engineer's job are radiowave propagation prediction and radio site design.

RADIOWAVE PROPAGATION PREDICTION

The most commonly used algorithms for radiowave propagation prediction are those of Bullington[1], Longley and Rice[2], and Okumura[3]. The Longley-Rice Method is documented as a set of Fortran routines. The Bullington and Okumura methods are not as readily adaptable to computer methods.

The Longley-Rice method may be used to predict propagation loss on point-to-point paths as well as mobile "area" predictions. The program is not in ANS Fortran and, therefore, includes a certain amount of machine-peculiar notation which must be rewritten for use on any except a CDC computer. The software does not include a cover program to call the various routines. This must be supplied by the user. This has the advantage of permitting the output to be tailored to the user's specific needs.

By implementing the Longley-Rice program, the user gets automated propagation prediction data along user-determined radials. The data collection process, however, is <u>not</u> automated. The user must collect the distance versus height data for each radial from topographic maps and input the data into the computer. CSPM[4] is a <u>fully</u> automated program based upon the Longley-Rice algorithm. Automated data collection (from an existing topographic data base) and coverage contour plotting are included as part of the package. CSPM was discussed in more detail in a recent issue of the Newsletter[5].

Bullington's methods were developed long before digital computers were available to the average engineer for routine tasks. To ease the hand calculation process, Bullington presented his results in the form of nomographs. Some, but by no means all, formulas were also presented. There is no reason why, with a certain amount of tedious work, the remaining formulas could not be derived. With the formulas in hand, it is a relatively simple process for an engineer familiar with an engineering-oriented language to write a program to suit his needs.

Okumura's algorithm, too, was presented in a format suitable for manual, rather than for automated, application. Some of his tables were reduced to formulas applicable to certain conditions by Hata[6]. Since the stated conditions are somewhat limiting, a more general approach is both desirable and possible[7]. Figures 15, 18, 20, 22, 24, 27, 28, 29, 31, 32, 34, 35, and 40 can be converted to algebraic formulas. In a number of cases, multiple formulas are required to properly characterize a parameter over its full range. Having these formulas, it is possible to write a program which analyzes each radial. Programming is required to determine the values of the following "intermediate parameters" which are required before applying the formulas: Effective antenna height, terrain undulation height, isolated ridge height and distance, slope of terrain, and land/sea ratio. Once the above has been accomplished, it is a relatively simple matter to write a cover program to provide the required data input/output capabilities.

Unfortunately, most propagation prediction algorithms are intended to answer the question "How much signal do I have here?", rather than the more typical question for land mobile coverage "How far can I talk?". The latter question can be handled by using iterative methods. However, any iterative routine which involves multiple calculations is likely to be costly to run.

We have, thus far, discussed two levels of automation: Full automation (CSPM) does the entire job from profile "pulling" to contour plotting. Longley-Rice and the suggested other methods can be made to analyze profile data which is manually inputted and manually converted to a contour plot. Computers can also be used as a tool for making manual propagation prediction easier. One possibility is to automate the plotting of path profiles. A number of microprocessor systems have X-Y plotters optionally available. Another possibility is the use of a plotting terminal, such as those made by Diablo. Successful profile plot programs have incorporated the actual plot on rectangular coordinate paper as well as earth curvature and Fresnel clearance corrections. It is obvious that proper scaling is an essential part of any plotting program.

Another easily computerized "propagation" issue is coverage reliability. The most widely used models for coverage reliability[8-13] can be easily programmed. This can be used as an adjunct to both the coverage prediction process and the frequency coordination process. In frequency coordination, we seek to keep signal reliability <u>below</u> some specified value (usually 1, 2, 5, or 10%).

ANTENNA SITE DESIGN

When placing multiple transmitters and receivers on a single site, system degradation is almost certain to occur unless the following factors are considered:

- o Transmitter Noise
- o Receiver Desensitization
- o Intermodulation
- o Degradation to Noise Figure

Fortunately, it is not difficult to computerize calculation of these factors. Transmitter noise and receiver desensitization curves of base stations are available from their manufacturers. These can be manually digitized and placed in a file. This information, combined with curves for cavity filters and antenna separation (available from cavity and antenna manufacturers), can be used in a comprehensive antenna site design program, incorporating all of the factors mentioned above, except for potential intermodulation frequencies. The intercept point method could, however, be easily incorporated into the program to provide an indication of potential intermodulation level.

Calculation of potential intermodulation frequencies is very straightforward. Because of the repetitive nature of the calculations, computerization provides an exceptional saving of time. These calculations are, however, time consuming and could be expensive to run. To minimize computer time utilization, trade-offs must be made regarding the orders of mixes considered and the number of transmitters considered. Those trade-offs were discussed in a recent issue of the Newsletter[14].

A typical intermodulation program calculates all mixes of the orders and numbers of transmitters selected and compares them with a list of receiver frequencies. Any time a combination falls within a predetermined bandwidth of a receiver frequency, all of the component frequencies are printed. The program can include a feature for adding stations to an existing site where only those "hits" which involve either a new transmitter or a new receiver are printed.

Another application for intermodulation calculation is "unknown transmitter" calculation. This type of program finds the potential transmitter frequencies involved in a mix when the receiver frequency and one transmitter frequency are known. It is useful in finding an offending transmitter.

CONCLUSION

We have seen that there are many applications in which digital computers can be used to increase the efficiency of the Systems Engineer. With a little additional thought, I am sure that more applications will come to the mind of many creative engineers.

REFERENCES

1. Bullington, K., "Radio Propagation for Vehicular Communications", IEEE Trans Veh Tech, Vol VT-26, No. 4, Nov., 1977, pp. 295-308

2. Longley, A. and P.L. Rice, Prediction of Tropospheric Radio Transmission Loss Over Irregular Terrain - A Computer Method - 1968, (NTIS Access No. 676-874).

3. Okumura, Y. et al, "Field Strength and Its Variability in VHF and UHF Land-Mobile Radio Service", Review of the Electical Communication Laboratory, Vol.16, No. 9-10, Sept-Oct, 1968.

4. Jennings, R.D. and S.J. Paulson, Communications System Performance Model for VHF and Higher Frequencies, (NTIS Access No. PB 274458).

5. Rubinstein, T., "CSPM - A step in the Right Direction", IEEE Vehicular Technology Society Newsletter, Vol. 27, No. 4, Nov, 1980, pp. 22-24

6. Hata, M., "Empirical Formula for Propagation Loss in Land Mobile Radio Services", IEEE Trans Veh Tech, Vol VT-29, No. 3, August, 1980, pp. 317-325

7. Rubinstein, T., "Okumura", unpublished program and report, 1976.

8. Bullington, op cit, pp. 299-300.

9. Okumura, op cit, pp. 860-863.

10. Egli, J., "Radio Propagation Above 40 Mc Over Irregular Terrain", Proc. IRE, Oct. 1957, pp. 1388-9.

11. Longley, A., op cit, pp. 1-1 thru 1-27.

12. Reudink, D., 'Properties of Mobile Radio Propagation Above 400 MHz", IEEE Trans Veh Tech, Vol. VT-23, No. 4, Nov., 1974, pp. 143-147.

13. Hansen, F. and F. Meno, "Mobile Fading-Rayleigh and Lognormal Superimposed", IEEE Trans Veh Tech, Vol. VT-23, No. 4, Nov., 1974, pp. 332-335.

14. Rubinstein, T., "Intercepting Receiver IM" IEEE Veh Tech Soc Newsletter, Vol. 27, No. 2, May, 1980, p. 25.

A NOTE OF GRATITUDE FROM ONE PAC CHAIRMAN FOR SOME EXAMPLES OF CONSTRUCTIVE LEADERSHIP IN 1980.

It wasn't all good in 1980, but since IEEE leadership expresses gratitude towards grass-roots efforts they consider positive, it is only fair that grass-root PACs express gratitude also, for leadership considered positive.

First of all, my thanks to Dr. Leo Young, 1980 President of IEEE, for having repeatedly proved, stated, and published that the country needs "a national commitment to strengthen engineering...," and that it is "self evident, the world benefits when engineers realize their maximum potential." And again, my thanks to Dr. Young, and also to Dr. Weinschel, for their public challenge to Congress at the 1980 Technological Policy Conference on founding engineering technology. President Young stated, "Technology means security," and with typical, polite thoroughness he identified all the ways in which the statement holds true. Dr. Weinschel bluntly suggested

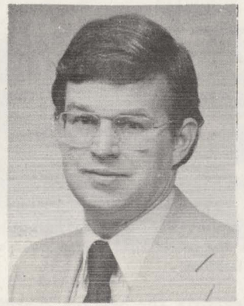
that we consider telling Congress, "Put your money where your mouth is." From the increase in funding reported by the press, it looks like Congress got the message. My thanks to Mr. Roger Madden, 1980 President of VTS, for having spearheaded a campaign against unprofessional standards in recruitment of engineers; for having stated and published that if people wish to be nothing more than engineers, they are asserting they will be nothing less:"...the engineering community has something very positive to offer humanity...the more nonengineering tasks engineers are assigned, the less engineering they will do, and innovation will continue to fall, since it is only the engineering profession that can provide technological innovation."

My thanks to Mr. Peter Rusche, Director of Region 4 in 1980, for having proved it possible to mobilize the vast resources of IEEE-80 Societies and two Councils, TAB, RAB, USAB-and to mobilize the engineering profession itself, through the AAES; and ultimately, through the Wall Street Journal, to reach industry, government, and the business media. There are laid-off engineers in Detroit who are competent, and have diverse, across-the-board engineering skills; who know the layoffs will probably be permanent; whose plans for the future have been shattered; whose families face a harsh set of realities. The IEEE Region 4 Director was responsible for:

- . bringing job offers to Detroit, and getting some of his engineers hired and moved
- . proving IEEE leadership does care for the members and the IEEE can make a difference
- . perhaps having turned the Regional tide of hopelessness resulting from the misconception that automotive industry engineers' skills were not transferable to other industries.

It wasn't all good in 1980, and since there are negative and obstructionist elements in any large group of people, so there are those elements in the IEEE. But you know, there are really decent hard-working members devoted to improving our profession and the quality of life. I have been fortunate to have worked with some of them. They are usually busy people with little time and many concerns, and such people deserve our help.

V. Edgerton, Chairman
VTS/PAC/1980

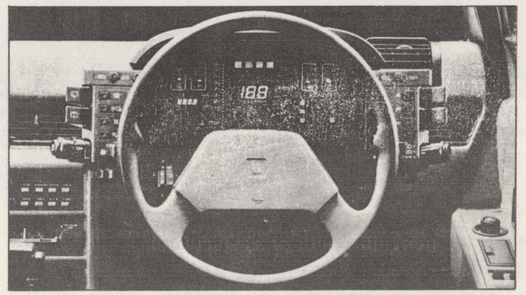


Automotive Electronics

Dateline: Detroit

Bill Fleming

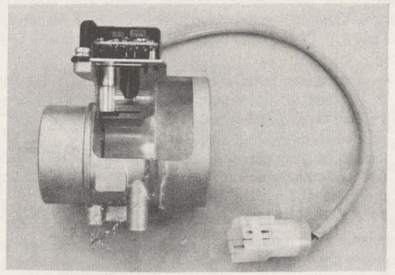
Automotive Electronics Editor



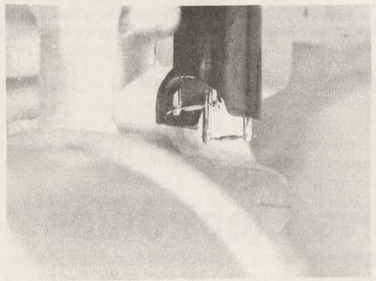
ISUZU PIAZZA DIGITAL DASHBOARD

The new Isuzu Piazza features a digital dashboard which uses a vacuum fluorescent display for digital speed readout and other instrument readouts.[1] Light emitting diodes form an analog strip of dark green dots for the tachometer readout.

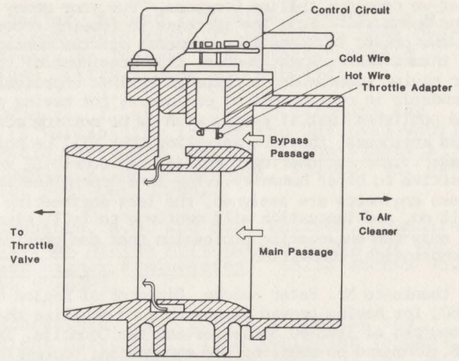
Digital instruments give more information in less space than older pointer-type instruments. Eventually, digital displays will also be lower cost. At present volumes of less than 1000 per month, it is not economical to use integrated circuits to drive the displays.[1] However, the use of electronic digital displays is projected to increase slowly for a year or so, and then accelerate rapidly to reach saturation by 1985. When this is achieved, significantly more information will be available to the driver at lower cost to the automaker.[1]



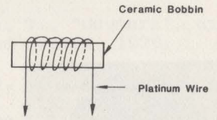
Sectioned View



Coil Mount Arrangement



Schematic Diagram



Coil Construction

ISUZU AIRFLOW SENSOR

The new Isuzu Piazza also features Isuzu Total Electronic Control (I-TEC), a new digital engine management system.[2] The system utilizes a heated wire airflow sensor which consists of twin coils (a hot wire coil and a cold wire coil) in a bypass air stream. Each coil consists of platinum wire wound on a ceramic bobbin.

The two coils are connected in a bridge circuit. The bridge output, which controls the heating current to the hot wire, also provides the desired measurement of air flow. The cold wire coil senses and compensates for air temperature. Dirt build-up is minimized by placing the sensor in a bypass passage in the intake stream. The passage lets in only three percent of the total air inlet, thereby reducing effects of contamination.[2]

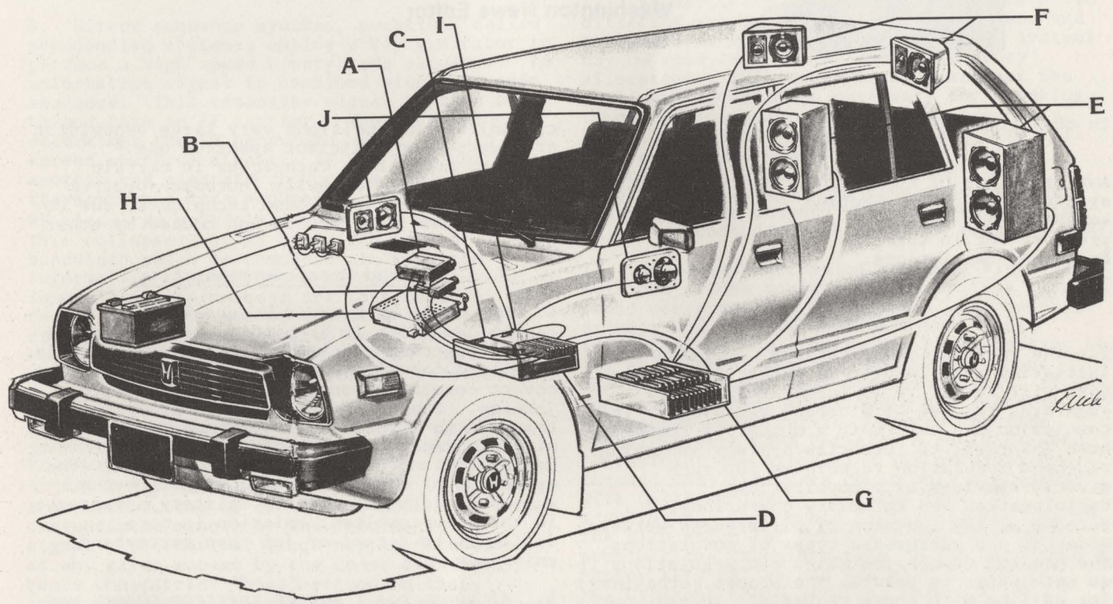
CUSTOM SOUND

Fred Gregory, a staff writer for Motor Trend Magazine, set out to install a state-of-the-art stereo system in his Honda wagon.[3] In the end, the sound system expense was $3000.00. I said to myself, "My goodness, that's about as much money as his car is worth. What could possibly cost that much?" Here's the breakdown:

Item	Description	Cost
A	Preamplifier	$ 200
B	Fader to balance sound between front and rear satellite speakers	25
C	Two Crossover Circuits which balance the amplifier output levels between the tweeters and the mid-range speakers	240
D	Power amplifier to drive front satellite speakers (20 watts per channel)	300
E	Four woofer speakers mounted in two custom enclosures	80 (plus labor)
F	Four rear satellite speakers, two tweeters and two mid-range, mounted in two custom enclosures	80 (plus labor)
G	Two power amplifiers to drive rear woofer speakers and rear satellite speakers (each amplifier: 50 watts per channel).	700
H	AM/FM stereo receiver and cassette tape deck	380

I	Crossover circuit which controls the output levels of the three amplifiers so that the correct amount of power is delivered to each set of speakers	150
J	Four front satellite speakers, two tweeters and two mid-range, mounted in the front door panels	31 (plus labor)
K	Labor, mostly to make and install the custom speaker enclosures, and to hide the wiring	814
	Total Cost	$3,000

There it is -- $3000 worth of in-car stereo, designed for the connoisseur of high-fidelity sound.[3]



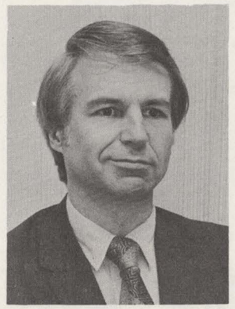
REFERENCES

1. J. R. Hartley, "Inside Japan: VF and LED Are In," Automotive Industries, September 1981, pp. 44-46.

2. J. Yamaguchi, "Isuzu's New Coupe Incorporates Electronic and Electric Features," Automotive Engineering, August 1981, pp. 90-92.

3. F. Gregory, "Custom Sound," Motor Trend, August 1981, pp. 89-94.

News from Washington



Eric Schimmel
Washington News Editor

In the Matter of)
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Authorization of spread) GEN DOCKET
spectrum and other wideband) NO. 81-413
emissions not presently)
provided for in the FCC)
Rules and Regulations.)

Introduction

1. The Federal Communications Commision is initiating this Inquiry to gather information that will assist it in formulating policy regarding the use of wideband emissions. The Commission has before it a number of requests, both informal, to authorize systems employing wideband modulation techniques for such diverse services as communications, radiolocation and telemetry operations. Because of the fundamental differences between wideband and narrowband types of modulations, the present Commission Rules and Regulations do not appear to provide the proper mechanisms for dealing with these requests. Indeed, our present rules implicitly forbid the use of some new technologies in this area.

2. This inquiry is designed to serve two purposes. We hope to gather information to: 1) assist us in identifying specific radio services presently authorized by the Commision, as well as ideas for new services, where the authorization of wideband modulation techniques would serve the public interest; and 2) identify the technical parameters which characterize a wideband emission, including procedures used to measure these parameters, and identify technical standards necessary to insure operation on a minimum interference basis.

3. The environment of advancing technology leading to smaller and smaller bandwidths has established a trend among radio regulatory agencies, including the Commission, of reducing bandwidths to achieve higher spectrum efficiency.[1] Obviously, reducing bandwidth is at least one one way of increaing spectrum efficiency, but it may not always be the best way. In a 1959 paper. J. P. Costas showed the somewhat surprising result that decreasing bandwidth does not always increase spectrum efficiency, but that under certain communication conditions very large bandwidths are needed for efficient spectrum use.[2] Wideband modulation techniques in certain applications may actually increase spectrum efficiency over narrowband techniques, due to both natural interference and caused by other users.

Spread Spectrum Modulation

4. One class of bandwidth expansion techniques which is of particular interest is spread spectrum modulation. It was originally developed for military applications concerning covert communications and/or resistance to jamming. Generally spread spectrum systems transmit an information signal by combining it with a noiselike signal of a much larger bandwidth to generate a wideband signal. The spreading of the information signal over a wide bandwidth has obvious military advantages in that the resultant emission is more difficult to detect or jam than narrowband emissions.

5. Although basic spread spectrum theory was developed in the early 1950's and the military today is developing a number of operational systems, there are few civil applications of this technology. However, much of the earlier government funded research has now been de-classified and is available for the general public.[3] Moreover, new advances in device technology, such as large scale integrated circuits, charged-coupled devices, and surface acoustic wave devices, give promise to lower-cost spread spectrum systems. Current FCC Rules, however, implicity forbid spread spectrum's use in most services.[4] This alohe may be inhibiting research and development in civil applications.

6. The CCIR defines a spread spectrum system as "one in which the average energy of the transmitted signal is spread over a bandwidth which is much wider than the information bandwidth."[5] Actually it appears that this definition could apply to any wideband modulation scheme. R. C. Dixon, in his book entitled Spread Spectrum System, narrows this definition by adding the requirement that "some signal or operation other than the information being sent is used for broadbanding (or spreading) the transmitted signal."[6]

7. There appear to be three basic types of spread spectrum techniques of interest to the Commission: a) direct sequence modulated, b) frequency hopping, and c) pulsed-FM. Hybrid systems may be formed from the combination of two or mor of these basic types. A brief description of each type follows; more detailed information is available in an IEEE press publication entitled Spread Spectrum Techniques and an FCC funded report by the MITRE Corporation.[7]

8. Direct sequence systems, sometimes called pseudonoise systems, employ a key generator to produce a high speed binary code sequence. An information signal is combined with this code sequence. This composite signal is then used to modulate an RF carrier. The code sequence determines the RF bandwidth, resulting in a spread spectrum signal. At the receiver another key generator poduces a replica of the transmitter's code sequence, and the incoming RF signal is multiplied with this sequence. This collapses the RF bandwidth into a bandwidth which is commensurate with the information alone. Conventional narrowband demodulation techniques are then used to recover the information signal from the RF carrier. The critical problem in direct sequence systems is to synchronize the key generators in the transmitter and receiver.

9. Frequency hopping systems also used key generators at the transmitter and receiver. However, here the binary code sequence is used to control a frequency synthesizer. At the transmitter, the RF carrier is modulated in a conventional manner by the information signal. The carrier frequency is determined at any given moment by the codes sequence; hence the carrier "hops" around in the frequency domain. Again the receiver and transmitter key generators are synchronized, and the receiver local oscillator tracks the changing frequency of the carrier. Conventional demodulation techniques are used at the receiver. Frequency hopping systems can be programmed to miss selected frequencies as they hop. They require only moderate accuracy in synchronization, as the speed of the code sequence generator is much less than in direct sequence systems.

10. Pulsed-FM or chirp systems are similar to frequency hopping sytems in that the carrier frequency is varied. Frequency hopping systems shift the carrier among discrete frequencies. The transmitted signal is a swept-frequency pulse, similar to a signal produced by a laboratory sweep generator. This type of signal is relatively easy to generate today using a voltage controlled oscillator. Conventional narrowband modulation of the sweeping carrier is used to convey the information signal. At the receiver a dispersive filter accumulates and sums the transmitted energy received over a certain interval. By releasing this energy in one coherent burst, the filter compresses the signal into a narrow time slot and the signal behaves like a high power, narrow pulse.

Advantages and Applications of Spread Spectrum in the Civilian Environment

11. Spread spectrum modulation offers radio users a number of unique advantages. Only a receiver employing the same code sequence as the transmitter will be capable of decoding the transmitted signal and recovering the information signal. By assigning each receiver in a network a different code, the user may selectively address a particular receiver by employing the corresponding code at the transmitter.

12. By assigning different code sequences to different systems, i.e. the transmitters and receivers of each licensee, many such systems may be able to share a common frequency allocation. This could be done without the explicit coordination necessary for trunking, time division multiple access or frequency division multiple access. Transmitters will only be able to communicate with their intended receivers; in fact, each system should be unaware of the operation of other systems. This uncoordinated channel sharing is called code division multiple access (CDMA).

13. Selective addressing and code division multiple access could prove attractive to both radio users and the Commission. The message privacy and security inherent with coded transmissions would certainly be attractive to law enforcement agenies, mobile telephone users and perhaps some business users. If the Commision chooses to allocate new spectrum for a personal radio service, spread spectrum moduaiton with CDMA techniques could be used to restrict the allocation its originally inteded use; i.e users could only communicate with units employing the same code structures. This would facilitate the use of the allocation for "personal business" and prohibit the transformation of the band into a "hobby service" as has happened in the 27 MH_z Citizens Radio Service. Because each discrete address code is essentially a new channel, spectrum efficiency may be improved over conventional systems. This has been theorized in a number of papers, particularly in regards to cellular land mobile communications.[8]

14. In 1978 the FCC funded a study by the U.S. Department of Commerce, National Telecommunications and Information Administration (NTIA), on the spectrum efficiency of multiple independent spread spectrum land mobile radio sytems. The study concluded that in this application spread spectrum was not as efficient as conventional FM modulation.[9] The report determined that in a band allocated exclusively to spread spectrum systems, base stations and mobile stations would have to operate on separate frequencies to prevent interference. When two mobiles stations are transmitting at the same time, the station that is closest to the receiving station can saturate the front end of the receiver thereby preventing the far station from being received. As with conventional systems, this problem can be reduced by controlling the output power of all mobiles. But in the absence of power control, the "near-far" problem limits the spectrum efficiency of spread spectrum systems.

However, in our opinion the report's conclusions apply only to direct sequence or fast frequency hopping systems, not all spread spectrum systems.

15. Another inherent property of spread spectrum modulation is the low power density of the transmitted signal. Because the transmitter output power is distributed across a wide band of frequencies, the power density (watts/hertz is very small. In fact some spread spectrum systems can operate with the desired signal below the noise level at the receiver. This power density reduction can be used to advantage in applications involving covert communications, prevention of interference to other users, and privacy.

16. In Private Radio Docket 80-9 the Commision has considered the use of spread spectrum modulated trailing devices.[10] These devices would allow law enforcement personnel to track moving vehicles without visual contact and their low power density would make them virtually undetectable to all others. Although the Commission has formally endorsed the concept of spread spectrum trailing devices, their use at this time is not permitted because the Commision has not addressed the issue of technical standards. Considering the low interference potential of these devices, it may be appropriate for the Commission to adop only inband/out-ofband emission limitations. We invite comments indicating what standards will be necessary for the implementation of spread spectrum systems in covert trailing operations.

17. Spread spectrum systems also provide an interference rejection capability not possible with conventional narrowband sytems. The strength of interfering signals at the receiver output is reduced by the system's "processing gain". This gain is approximated by the ratio of the transmitted RF bandwidth to the original information signal's bandwidth. Processing gain may suppress interfering signals by as much as 40 dB.

18. The low power density and interference suppression capability of spread spectrum systems suggests a unique application, that of band overlay. It may be possible in some circumstances to overlay spread spectrum systems on spectrum used by conventional services with little or no mutual interference. Obviusly this would increase the spectrum efficiency of the affected band and could release additional spectrum for allocation to other services. Short range systems, such as cordless telephones, might prove ideal for such an application. Many of these telephones are carrier current devices, operatng on frequencies adjacent to the AM broadcast band. Current demand may already exceed the spectrum available for these telephones. If the United States decides to implement a WARC '79 decision to reallocate 1605 to 1705 KHz to the Broadcasting Service, cordless telephones will lose these frequencies. It may be impossible to find suitable additional spectrum to offset this loss. However, spread spectrum modulated telephones could possibly be overlayed on another frequency band. Not only would this relieve the problem of spectrum scarcity, but the orthogonal codes used in spread spectrum sytems should prevent interference between neighbors' telephones without specific coordination. Surface acoustic wave devices, telephones without specific coordination. Surface acoustic wave devices, already employed in a number of television receivers, might be used to generate and receive spread spectrum signals at an affordable price.

19. Although theoretically band overlay is possible, more consideration must be given to interfeence from spread spectrum systems to conventional communications systems. The CCIR examined interference from direct sequence and frequency hopping systems to conventional AM voice, FM voice and FDM/FM voice signals.[11] The report gives signal to interference protection ratios for the cases considered and concludes that a potential for sharing exists, but further examination is required to determine detailed sharing criteria. The IIT Research Institute examined the performance of voice communications systems in the presence of spread spectrum interference in a report prepared for the Department of Defense.[12] The report concludes that a direct sequence interfering signal affects system performance similar to white Gaussian noise and a frequency hopping signal results in interference similar to that produced by a periodic pulsed signal.

20. NTIA has conducted several studies on the feasibility of overlaying spread spectrum systems on commynications bands. The FCC funded a study to determine the effects of spread spectrum interference on TV. The study concluded that the amount of interference caused by a constant amplitude spread spectrum system should be about the same as that caused by a narrowband FM land mobile signal, as long as the spread spectrum RF bandwidth is less than 2 MH_z.[13] If the spread spectrum RF bandwidth is greater than 6 MH_z, the spread spectrum signal should have some advantage because of the out-of-band rejection capability of a TV receiver. This study suggests the possibility of overlaying very wide bandwidth spread spectrum signals on existing television bands.

21. Another study performed by NTIA examined the compatibility of spread spectrum and FM land mobile radio (LMR) systems.[14] It concluded that it would not be possible to overlay a spread spectrum LMR system onto a frequency band already occupied by conventional FM LMR systms without causing interference. The definition of overlay in this study was interpreted to mean the unrestricted operation of both spread spectrum and FM mobiles throughout the same service area. According to this report, the extreme range of propagation conditions encountered in a LMR environment can not be overcome by the reduction in interference obtained with a spread spectrum system. Interference can be reduced by increasing the RF banwidth of the spread spectrum system, but this reduction is not sufficient to compensate for the wide range of signal conditions in the LMR

environment. However, the report did indicate that if a frequency hopping system was programmed to avoid frequency channels already in use, the signal suppression necessary for unrestricted operation might be achieved.

22. In 1978 the IIT Research Institute prepared another report in spread spectrum for the Department of Defense, this time developing procedures for analyzing interference caused be spread spectrum signals.[15] The report presents mathematical procedures for predicting interference conditions when conventional receiving systems are subjected to offending signals from spread spectrum transmitters. The procedures are generally applicable to all types of spread spectrum signals. This report seems to be a good foundation on which Commission procedures to analyze spread spectrum interference could be based. We specifically request comments on the appropriateness of using this report as a basis for rule making.

23. An interesting characteristic of wideband systems is their ability to provide high resolution range measurements. Because the velocity of propagation of a radio signal is known, the distance between a transmitter and a receiver can be determined by measuring the time it takes a signal to propagate between them. A precise measurement of the signal's arrival time at the receiver is necessary. Because the uncertainty in measuring the arrival time is inversely proportional to the signal's bandwidth, wideband signals provide greater resolution than narrowband signals.

24. Del Norte Technology, Inc., a manufacturer of radiolocation equipment, has designed a radiolocation system which uses pulsed-FM technology. The system operates in the 420-450 MH_z band and can determine distances up to 50 kilomters with an accuracy of plus or minus 2 meters. Del Norte has petitioned the Commission to amend its Rules to permit the marketing and use of this system.[16] A radiolecation system such as this could improve the accuracy of both aircraft and ship navigation.

25. A major concern with the use of spread spectrum is the Commission's ability to monitor and locate stations using this modulation technique. Because the emitted signal is both wideband and encoded, specialized receivers are necessary to demodulate it. The number of virtual "channels" realized with spread spectrum modulation mat be very large, further limiting the Commission's ability to detect and monitor all tranmissions. This problem is not necessarily restricted to spead spectrum systems; any system employing digital modulation techniques, whether for privacy or merely to facilitate communcations, will pose a complex monitoring problem for the Commission. However, there are rgulatory aproaches that will mitigate this problem. Monitoring the technical parameters of a spread spectrum signal certainly poses much less of a problem than monitoring the same signal for message content. Thee Commision may choose to restrict the number of authorized user codes, assign them to licensees on a permanent basis or require that user codes be registered with the Commission. Spread spectrum systems could be authorized in services which have had few enforcement problems. Only spread spectrum techniques which can be decoded with a conventional wideband receiver might be authorized. Finally, considering the low interferenc potential of spread spectrum emissions, it should be noted that spread spectrum signals strong enought to cause interference will probably be strong enough to locate.

Matters to be Addressed in this Inquiry

26. In December of 1979, the FCC issued a contract to the MITRE Corporation for the purpose of researching the potential use of spread spectrum techniques in non-government applications. MITRE has completed its study and submitted its report to the Commission.[17] The report presents a view of the potential benefits, costs and risks of spread spectrum communications and examines in detail many of the concepts briefly discussed in this inquiry. Two examples of hipothetical implementations are considered: a slow frequency hopping system with FM voice and an intrusion detector using fast frequency hopping. We wish to direct attention to this report in the hope that it will stimulate further discussion and specifically request comments on it.

27. The Commission would also like to inquire about the measurement techniques used to evaluate spread spectrum systems. The Electromagnetic Compatibility Society (EMCS) of the Institute of Electrical and Electronics Engineers has written the Chief Scientist expressing their concern about broadband RF measurement and analytical techniques that may be required to evaluate the interference potential of broadband emissions to electronic eqipment.[18] They are concerned about establishing a technical standard to promote good engineering practice in this area. The EMCS has suggested some basic steps to represent a model for evaluating the interference potential of broadband emissins. They believe that a model should be developed to, or in consonance with, the development of measurement and analytical techniques. This model would help define the technical characteristics that need to be considered. This inquiry will afford an opportunity for all parties to assist in addressing our concerns regarding the measurement techniques that will be necessary to describe the interference potential and technical characteristics of spread spectrum and other wideband systems.

28. Comments are also invited on all of the issues discussed in this Inquiry. Suggestions of services which might benefit with the allowance of wideband modulation techniques are specifically requested. Comments on analytical procedures which the Commission could employ to evaluate the interference potential of wideband systems would be particularly helpful. In report (reference 15) as a basis for Commission rule making. All parties interested in the development of wideband systems are urged to file comments in this proceeding.

29. The questions listed below are not exhaustive. They merely typify the Commission's areas of concern. Information not directly responsive to these questions but relevant to the general subject matter of the inquiry is welcome andinvited. To facilitate staff review each reponse should clearly state the precise topic or question being addressed.

30. Please provide answers and supporting data to the following questions:

(a) What services can be accommodated by the use of spread spectrum systems? Can they be implemented by band overlay or will they require dedicated frequency allocations?

(b) In the case of band ovelay, should a spread spectrum system be required to operate on a non-interference basis with conventional systems? Should spread spectrum systems accept any interference they receive from other spread spectrum or conventional systems without protection from the Commission?

(c) Should each wideband modulation technique be considered on its own merits as to its spectrum use and efficiency?

(d) How should the power levels of spread spectrum systems be expressed? What power levels are necessary for operation?

(e) What narrowband receiver characteristics should be considered in determining the interference potential of spread spectrum systems to conventional narrowband emmissions? Do these characteristics affect the possibility of having spread spectrum systems and conventional systems co-exist in the same frequency band?

(f) Will special test equipment be necessary to evaluate spreas spectrum emissions? What type of detector, peak, quasipeak, or average, is best suited for measuring the interference potential of spread spectrum emissions?

(g) Can systems which use different wideband modulation methods be evaluated by the same measurement techniques? Will the transmitter duty cycle affect the measurement techniques and the results?

(h) If the Commission chooses to authorize spread spectrum systems, will detailed technical standards be needed? If so, what standards? Would establishing inband/out-of-band emission limitations be sufficient?

(i) Should the Commision consider authorizing spread spectrum modulated cordless telephones? How much more expensive than present cordless telephones would these units be?

(j) From a spectrum utilization standpoint, are there any capabilities or efficiencies which spread spectrum or other wideband systems possess that would allow the transmission of more information for a given frequency band than is now possible using conventional systems?

The following questions generaly refer to ideas developed in the MITRE Corporation's report:

(k) Should the Commission authorizes spread spectrum systems only if they utilize the spectrum more efficiently than conventional techniques or should spectrum efficiency be weighed along with the potential benefits of spread spectrum such as selective addressing, uncoordinated use, and secure communications? In such a case should spectrum efficiency be defined in terms of either instantaneous users/MH_Z, total user/MH_Z, or total users /MH_Z saquare kilometers?

(l) Because the spectrum efficiency of spread spectrum appears to be high when transmitting low-rate data at microwave frequencies, what services could be implemented with this type of system?

(m) Which ISM bands might be suitable for spread spectrum overlay? How detrimental would this be to exisisting users? What sort of services could use ISM ban overlay?

(n) Would the increased cost of spread spectrum equipment prohibit its acceptance by users? How much would equipment cost be expected to increase?

(o) Is it necessary for the Commission to monitor the message content of all types of transmissions? If spread spectrum is authorized, should the Commission require that equipment not have the capability of multiple user codes? Should user codes be assined by the Commission? On a permanet basis? Should spread spectrum stations be required to identify thenselves at some point in their transmissions with conventional modulation techniques, or some other means?

(p) Considering spread spectrum's low power density, would it be possible to design a police radar that could not be readily detected by motorists with monitors? How much more expensive than conventional police radars would such a unit be? What bandwidth would be required?

(q) Should the Commission consider a slow frequency hopping system with FM voice for any new personal radio service allocation? Could such a system be implemented today? At what cost over conventional systems? Would the potential advantages, such as privacy and uncoordinated channel access, outweigh the potential disadvantages, such as increased enforcement problems, if such a service was authorized by the Commission?

(r) In Appendix C of the MITRE Corporation's report, a model simulating the Citizens Band Service is developed. Is this model suitable for analyzing slow frequency hopping in the land mobile services? If not what modifications would be necessary to make it suitable?

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1. Although there is no universally accepted measure of spectrum efficiency, it can be defined in general terms as the ratio of communications accomplished to spectrum used. These terms are usually difficult to quantify, but they may involve parameters such as: information delivered, users satisfied, radio frequency bandwidth occupied, geographical area covered and the time the spectrum is denied to other users. For a detailed discussion of metrics in this area see D. Hatfield, "Measures of Spectral Efficiency in Land Mobile Radio", IEEE Transactions on Electromagnetic Compatibility, Vol. EMC-19, No. 3, Aug. 1977, p. 266 and D. R. Ewing and L. A. Berry, "Metrics for Spectrum-space Usage", Office of Telecommunications, OT Report 73-24, 1973.

2. J. P. Costas, "Poisson, Shannon, and the Radio Amateur", Proc. IRE, Vol 47, pp. 2058-2068, December 1959.

Awards and Standards

Jack Neubauer
Awards Editor

IEEE Vehicular Technology Society Awards Program

The Vehicular Technology Society is embarking on an agressive program of public recognition of it's members, who have made significant contributions to vehicular electronics or service to the Institute and Society. The program will be carried to the Chapters to promote identification of candidates who deserve National recognition. During the next two years each Chapter will be visited by a member of the Board of Directors, who will present the program, answer questions and assist them in selecting candidates.

The Institute sponsors six classes of awards. They include the Medal of Honor, Major Annual Medals Field awards, Service Award, Prize Paper Awards and Scholarships. The Vehicular Technology Society sponsors five awards. Two are for outstanding papers, one for the outstanding chapter and two personal service recognition awards. It is planned to add three or more personal recongnition awards and to establish a Scholarship which provides substantial financial asistance to graduate students.

A detailed listing of the Institute and Society. Awards follows. You will note that there are three Field Awards which are particularly made to communication-oriented engineers: the IEEE Award in International Communication, the Mervin J. Kelly Award, and the Frederik Phillips Award. In addition, a new Major Annual Medal Award has been announced, the Alexander Graham Bell Medal, which is given to engineers making outstanding contributions to the advancement of communications. Both of the IEEE Prize Paper Awards, i.e., WRG Baker and Browder J. Thompson Memorial, are eligible goals for communicatins engineers."

IEEE Award Name of Award	Distinctive Features	Presentation
Medal of Honor* IEEE Medal of Honor	The Medal of Honor shall be warded for a particular contribution which forms a clearly Exceptional addition to the science and technology of concern to the Institute. The award shall normally be given within a few years after the recognition of the exceptional nature of such contribution	When warranted, not necessarily to a member of IEEE. Gold Medal, Bronze Replica Certificate and $10,000 Date established 1917

Major Annual Medals*

Alexander Graham Bell Medal	For exceptional contributions to the advancement of telecommunications. Preference shall be given to achievement by a single individual, but may be conferred upon a team of not more than three individuals.	One annually, to a member of IEEE. Gold Medal, Bronze Replica, Certificate and $10,000. Sponsored by American Telephone and Telegraph Co. Date established: 1976
Edison Medal	A career of meritorious achievement in electrical science or electrical engineering or the electrical arts.	One annually, to a member of IEEE. Gold Medal, Small Gold Replica. Certificate and $10,000. Date established: 1904
Founders Medal	For major contributions in the leadership, planning and administration of affairs of great value to the electrical and electronics engineering profession	One annually, to a member of IEEE. Gold Medal, Bronze Replica, and Certificate. Date established: 1952
Lamme Medal	Meritorious achievement in the development of electrical or electronic apparatus or systems	One annually, to a member of IEEE. Gold Medal, Bronze Replica, and Certificate. Supported by the Westinghouse Foundation. Date established: 1928
IEEE Education Medal	Excellence in teaching and ability to inspire students; leadership in electrical engineering education through publication of textbooks and writings on engineering education; innovations in curricula and teaching methodology; contributions to the teaching and engineering profession through research, engineering achievements, technical papers, and participation in the education activities of professional societies.	One annually, to a member of IEEE. Gold Medal, Bronze Replica, and Certificate. Supported by IEEE Life Member Fund Committee. Date established: 1956

IEEE Field Awards

Cledo Brunetti Award	For outstanding contribution in the electronic arts	One annually. Certificate and $1,000 Bequest of the late Cledo Brunetti. Date established: 1975
Control Systems Science and Engineering Award	For meritotious achievement in the field of control systems science and engineering, to an individual	One annually. Certificate and $1000. Sponsored by Systems Control, Inc. Date established: 1980
Harry Diamond Memorial Award	Outstanding technical controibutions in the field of government service in any country, as evidenced by publication in professional society journals	One annually. Certificate and $2,000. Date established: 1949

William M. Habirshaw Award	Outstanding contribution in the field of transmission and distribution of electric power, to an individual or group	One annually, Bronze Medal, Certificate and $1,000. Sponsored by Phelps Dodge Cable & Wire Co. Date established: 1958
IEEE Award in International Communication in honor of Hernand and Sosthenes Behn	Outstanding contribution in the field of international communication. Preference given to achievement by a single individual. May be conferred on a team of not more than three individuals	One annually. Plaque Certificate and $2,000 Sponsored by International Telephone and Telegraph Corporation. Date established: 1966
Morris E. Leeds Award	Outstanding contribution in the field of electrical measurement, to an individual or group. Special consideration given to value of contribution made before candidate reached 36th birthday	One annually illuminated Certificate and $1,000. Sponsored by Leeds & Northrup Foundation. Date established: 1958
Morris N. Liebmann Memorial Award	Important contribution to emerging technologies recognized within recent years	One annually. Certificate and $2,000. Date established: 1919
Jack A. Morton Award	Outstanding contributions in the field of solid-state devices to an individual or group	One annually. Bronze Metal, Certificate and $2,000. Sponsored by 20 semiconductor organizations of the United States, Europe and Japan. Date established: 1974
Frederik Philips Award	Outstanding accomplishments in the management of research and development resulting in effective innovation in the electrical and electronics industry. Preference given for achievement by a single individual. May be conferred on a team of not more than three individuals.	One annually, Gold Medal, Certificate and $2,000. Sponsored by N. V. Phillip's Glocilampenfabriaken. Date established: 1971
Emanuel R. Piore Award	For outstanding achievement in the field of information processing, in relation with computer science. Preference given for achievement by a single individual. May May be conferred on a team of two individuals	One annually. Gold plated Bronze Medal. Certificate $2,000 and $2,500 international travel grant. Sponsored by international Business Machines Corporation. Date established: 1976
David Sarnoff Award	Outstanding contribution in the field of electronics. Preference given to a single individual for achievement recognized during five years preceding year in which award is made. May be conferred on a team of not more than three individuals.	One annually. Gold Medal. Bronze Replica, Certificate and $1,000. Sponsored by RCA Corporation. Date established: 1959

Charles Proteus Steinmetz Award	Major contributions to the development of standards in the field of electrical and electronics engineering, to an individual	One annually. Certificate and $1,000. Sponsored by IEEE Standards Board Date established: 1979
Nikola Tesla Award	Outstanding contributions in the field of generation and utilization of electric power to an individual or group.	One annually. Plaque and $1,000. Sponsored by IEEE Power Engineering Society. Date established: 1975
Vladimir K. Zworykin Prize Award	Outstanding technical contribution in the field of electronic television	ONe annually until 28 awards have been made. Certificate and $1,000. Supported by RCA Corporation. Date established: 1950
IEE Service Award* Haraden Pratt Award	For outstanding service to the Institute	One annually, to an IEEE Senior Member or Fellow. Illuminated Certificate. Date established: 1971
IEEE Prize Paper Awards W.R.G. Baker Prize Award	Outstanding paper reporting original work in any of the IEEE TRANSACTIONS, JOURNALS, MAGAZINES or PROCEEDINGS issued between January 1 and December 31.	One annually. Certificate and $1000. Date established: 1956
Donald G. Fink Prize Award	Outstanding survey, review or tutorial paper in any of the IEEE TRANSACTIONS, JOURNALS, MAGAZINES or PROCEEDINGS issued between January 12 and December 31	One annually. Certificate and $1,000. Supported by IEEE Life Member Fund Committee. Date established: 1979
Browder J. Thompson Memorial Prize Award	Outstanding by author(s) under 30 years of age in any IEEE publication issued between January 1 and December 31	One annually. Certificate and $1000. Date established: 1945
IEEE SCHOLARSHIP AWARDS Charles LeGeyt Fortescue Fellowship	to a student of electrical engineering who has received a degree from a recognized college or or university (Final date for receipt of applications at Headquarters, January 15)	One annually. $7,000 for full time post-graduate work and Certificate. Established by Westinghouse Electric Corporation in 1939
Volta Scholarship	to an Italian citizen with degree in electrical engineering not over 30 years of age	One every other year $6,000 for one year of graduate study in the United States. Established by the Italy-America Society of New York in 1927

VTS AWARDS

1. Annual Paper Award

Prize - Certificate and 1st - $250.00 - 2nd - $100.00.

Eligibility - Papers by IEEE members relating to the VT field of interest and published in IEEE publications.

Basis for Judging - Contribution to field, originality, clarity in written presentation, timelines.

Presentation - Annually - at VT Annual Meeting Banquet.

2. Chapters Paper Award

Prize - Certificate and $100.00

Eligibility Papers related to the VT field of interest presented orally at VT Chapter meetings and submitted typewritten to Awards Committee.

Basis for Judging - Contribution to field, originality, clarify in written presentation.

Presentation - Annually - at VT Annual Meeting Banquet.

3. Chapter-of-the Award

Prize - Certificate and Wall Plaque.

Eligibility - VT Chapters.

Basis for Judging - Best yearly activities.

Presentation - Annually - at Chapter Meeting.

4. Honorary Membership

Prize - Certificate, Pin and a life membership in the VTS

Eligibility - Recognition of signigicant technical contribution and outstandig service to the Vehicular Technology Society

Basis of judging - A member of the Society for at least five years recognized for his service to the profession and the IEEE.

Presentation - Annually on the petition of 50 members of the Society

5. Outstanding Service

Prize - Certificate of recognition

Eligibility - Member of IEEE/VTS

Basis of Judging - Recognized outstandig service to the VTS Board of Directors

Presentation - Annually by vote of the Board of Directors

Many of our members are qualified to receive at least one of these awards. It is up to you, our membership; to identify them. Wont you help us?

Address your recommendations to:

J. R. Neubaner, P. E.
Awards Committee Chairman
P.O. Box 125

P.S. A new Honorary Membership Award has been conferred on Robt. E. Tall. Editor and Publisher of Industrial Communications. Bob joins the ranks of distinguished peers.

Harry Nylund	Bell Labs
Fred Link	Consultant
Austin Bailey	Bell Labs
Dr. Dan Noble	Motorola
David Talley	Consultant
Joe Kelley	Attorney
George Ikleman	FCC/retired
A. D. Buchaman	Detroit Edison/Retired
E. C. Deustaedt	Retired
Robert Bloor	Ohio Bell/retired
James Evans	Michigan State Police/retired

IEEE STANDARD 377-1980

IEEE RECOMMENDED PRACTICE FOR
MEASUREMENT OF SPURIOUS EMISSION FROM
LAND-MOBILE COMMUNICATION TRANSMITTERS

This standard was initiated as Project No. 712-53, by the IEEE Electromagnetic Compatibility Group Committee 27.0. The project was approved by the IEEE Standards Committee on June 3, 1971. Subcommittee 27.7 was assigned the task. This subcommittee had recently completed a standard covering Measurement of Radio Noise Generated by Motor Vehicles. Continuing coordinations with The IEEE Group on Vehicular Technology, the Electronics Industries Association and the International Electrotechnical Commission via common membership, was maintained.

The purpose of the measurement procedures is to enable design and system engineers engaged in a variety of development projects, to achieve uniform results, in recognizing sources and nature of radio frequency spurious emissions emanating from vehicular communications transmitters. The measurement procedure enables quantitative results, which determine the magnitude of undesired by-products of a transmitters RF carrier generation. The specific spurious emissions measured, are not readily recognized, except as they deprecate the performance of receivers associated with the transmitter or which are located in a moderately near field environment. In a modern vehicle employing a computerized fuel management system, the spurious emissions can be quite destructive.

A prime objective of the standard was to develop methods employing basically standard laboratory measuring equipment and produce useful planning or design data from which performance characteristics could be accurately derived.

The present members of the IEEE Elecromagnetic Compatability Society Subcommittee 27.7 are:

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