

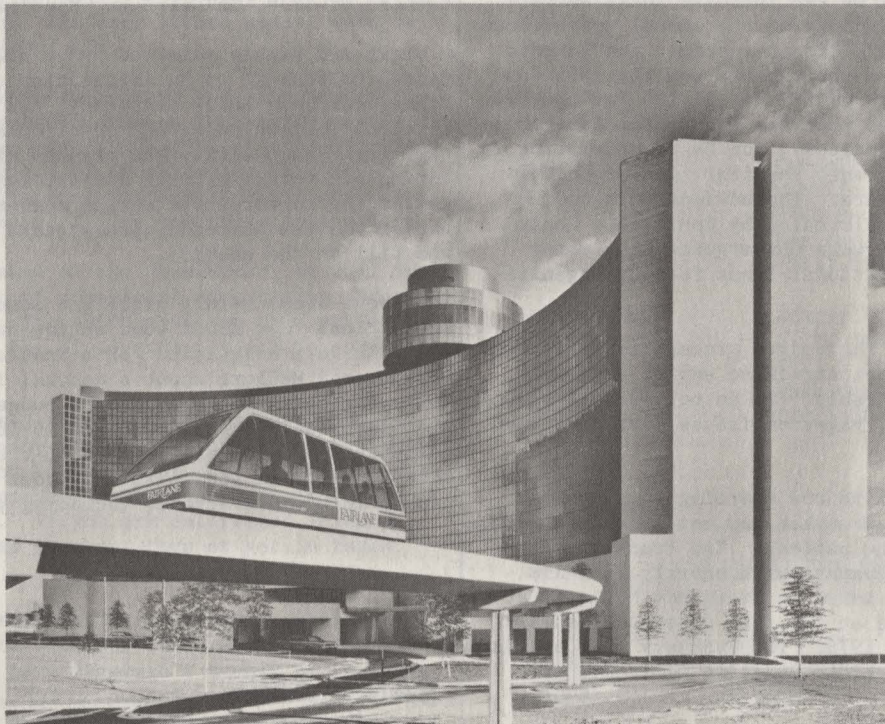
NEWSLETTER

VEHICULAR TECHNOLOGY GROUP

AUGUST 1976

Convergence '76 . . . Latest in Automotive Electronics

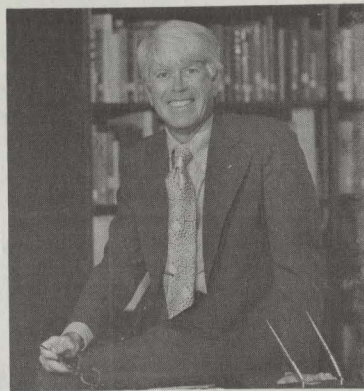
. . . . Hayatt Regency
. . . . Dearborn, Michigan
. . . . September 20-22, 1976



0731265 M
ERIC J SCHIMMEL
6216 HOLLINS DR
BETHESDA

S18 ***
JUL29
MD 20034

THE PRESIDENT'S MESSAGE



Your Administrative Committee (ADCOM) met in Philadelphia on June 16, 1976. The meeting marked the mid-year point of the current ADCOM, and it is time for a progress report.

Our ambitious program has created a problem with the budget. IEEE Headquarters has forecasted a deficit for our 1976 operations and indicated a \$7,500 deficit for 1977. Treasurer Roger Madden and ADCOM Financial Adviser Dave Talley have analyzed the problem and have made suggestions for improvement. The ADCOM acted upon these suggestions and hopefully, we will remain in the black as we have done for many years. Increased income will result from an author's voluntary page charge procedure, advertising in the Newsletter, bulk sales of the VTG special Transaction issues, and the previously approved raise of VTG membership dues from \$5 to \$7 a year. Additional income will result if we can increase total membership. Increased attendance at the annual conferences will also result in additional income. The Toronto Chapter finally closed their books for the 1975 Conference and created an additional \$1,200 for the VTG. Stu Meyer has reported that the Washington Conference was in the black (unaudited), and he is attempting to at least match the Toronto results. Convergence '74 was a profitable venture. The advance work and effective organization created by Conference Chairman Trevor Jones will make Convergence '76 a money maker and provide additional funds for our organization.

Our entire effort in the budget process is to improve our income base and not sacrifice any of our basic services to the membership. We do not wish to reduce the number of papers, pages or issues that have been planned.

The publications area is now starting to show some improvement. You as a member may not note this for some time; however, be patient. The Transaction issues of only three papers will shortly be a dim memory. The special issue on Emergency Medical Services (EMS) will have at least 14 papers and should come out in November 1976. The February 1977 special issue on Automatic Vehicle Location will have at least 15 papers.

We have made a significant appointment to help our busy Transaction Editor George McClure. Bill Chriss has accepted the position of Associate Editor for Communications. He will be working out of the Bell Labs and has already targeted many fine prospective papers.

National Conference Chairman Fred Link has provided the leadership to improving our annual conferences. He and Stu Meyer are personally going to be arm-twisting exhibitors at various industry conferences this summer. The number of exhibitors at Orlando in March 1977 should be improved by at least 25%, based upon the efforts of Fred and Stu. The 1978 conference has been set for the Denver-Boulder area with Fred Link advising on the many advanced details needed for a successful conference. The Denver-Boulder group will get additional training by their sponsorship of the 1976 Symposium on Microwave Mobile Communications scheduled to start either September 29 or October 6, 1976 at Boulder.

Convergence '76, as reported earlier, will be a well-attended event. Trevor Jones will be distributing 15,000 copies of the impressive program starting September 20, 1976, in Dearborn, Michigan.

A small and highly selected group will shortly be contacted to respond to an information questionnaire. Tom McKee, our able ADCOM Secretary, has done considerable research in developing the questionnaire and making it easy for respondents. The results will aid us in tailoring our future efforts and are most important in continuing to serve the entire membership. If you are one of the few selected, please take the few minutes and fill in the answers.

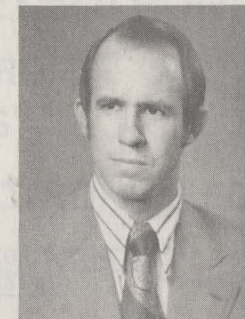
The above items merely highlight some of the VTG-ADCOM activities. How about your active participation? Send Bill Chriss a suggestion for a Transaction paper. Advise George McClure about a special issue that is needed. Tell your boss that you must be budgeted for the Orlando, Florida Annual Conference March 16-18, 1977. Ask your colleagues if they are members of the IEEE-VTG. I am sure you get the idea. This is your organization, participate more and everyone, including you, will benefit.

SAM LANE

Department of Communications
Hall of Administration
500 W. Temple Street
Los Angeles, California 90012

Bus: 213-974-2259
Home: 805-682-3375

EDITOR'S NOTES



A few days ago, as I was reflecting on how quickly time flies between issues of this Newsletter, it suddenly struck me that this issue initiates my third year as your Editor. Checking my file, I noted that my first venture into this arena was with the August, 1974 Newsletter. This has been a very interesting experience for me. Perhaps the most rewarding aspect of the job has been the opportunity to work with the fantastic crew of staff editors. These fellows have really given me the support I needed to produce this Newsletter.

As you may have noted in the past, most issues of this Newsletter have one story related to the start or completion of a conference. In this issue, we cover CONVERGENCE '76 at the Hyatt House in Dearborn, Michigan, September 20-22. Automotive Electronics Editor, Bill Fleming, has a complete story including a listing of the program. The last CONVERGENCE conference, which was held in 1974, was a huge success. There is certainly no doubt about it, electronics will play a major role in automotive design. The very latest update will be presented at CONVERGENCE '76.

CB radio is in the news everywhere and this Newsletter is no longer an exception. Though I normally associate Bill Fleming's column with automotive electronics, Bill has taken on the subject of CB radios in this issue. He traces the CB radio from its origin until now. I believe that everyone will find the story interesting.

With the November issue of the Newsletter, we will inaugurate the placement of commercial advertising and professional listings. The ADCOM voted on this matter at the June meeting as one of several actions to cope with rising costs.

Stu Meyer has accepted the job as the Advertising Director. Stu has many contacts in the industry, and I'm sure he will soon be out vigorously soliciting ads. He is now in the process of establishing rates and a statement of policy. If you are interested, please fill out the enclosed tear-out form or get in touch with him.

In closing, let me say that we are keenly interested in receiving feedback from our readers. Over the last couple of years, we have received a number of requests to reprint articles, and we occasionally receive letters of support. We are also interested in any critical feedback that you may have. Differences of opinion on technical concerns are always prevalent. We will be happy to print a letter that establishes a dialogue on a given subject.

That's it for now; please note the deadline for any inputs to the November issue.

OLIN GILES

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Washington, D. C. 20005
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VTG NEWSLETTER DEADLINE

Month Of Issue	Final Copy To Be Rec'd. By Editor*	Target Mailing Date
November	10-4-76	11-16-76
February	1-10-77	2-10-77
May	4-4-77	5-6-77
August	6-27-77	7-29-77

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

ADVERTISING WANTED FOR THIS NEWSLETTER

- COMMERCIAL DISPLAY ADS
- PRODUCT ADS
- PROFESSIONAL LISTINGS

I AM INTERESTED IN PLACING AN AD, PLEASE CONTACT ME

PLEASE SEND ME A STATEMENT OF POLICY AND A RATE SCHEDULE

NAME: _____

COMPANY: _____

ADDRESS: _____

PHONE NO.: _____

FOLD ALONG THIS LINE

RETURN ADDRESS:

AFFIX
STAMP

STUART F. MEYER
E. F. JOHNSON COMPANY
1523 "O" STREET, N. W.
WASHINGTON, D. C. 20005

AUTOMOTIVE ELECTRONICS

DATELINE: DETROIT

By BILL FLEMING

AUTOMOTIVE ELECTRONICS EDITOR

CONVERGENCE '76 CONFERENCE GAINING MOMENTUM

The upcoming Convergence '76 Conference promises to be most successful. There are 50 participants in the Conference, representing worldwide interests in automotive electronics. (The entire program for the Conference is highlighted elsewhere in this issue of our Newsletter.)

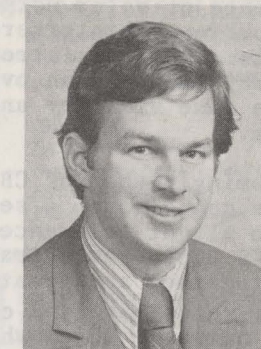
The new Hyatt-Regency Hotel in Dearborn, Michigan, will accommodate Convergence '76 for three days, September 20-22, 1976. If you wish to receive a copy of the Conference program plus a registration card, send your name and mailing address to:
Convergence '76 Registration
C/O Allen-Bradley Co.
32660 Stephenson Highway
Madison Heights, Mich. 48071

The CB Radio Craze

Citizens band radio has achieved unprecedented growth rates. I've been hearing so much about CB radio that I finally decided to do some background reading on the subject. In my reading, I gave special consideration to the effects of CB radio on automotive electronics. I thought it worthwhile to summarize what I found out. All the following information is taken from published articles and appropriate references are cited.

Origins of CB Radio. Citizens' band radio was established in 1958 when the FCC reallocated part of the 11-meter amateur band for personal and business communications. It took 16 years for CB radio to accumulate the first million licenses, eight more months for the next million, and only three months for the third million. As of April 1976, there were 10 million CB users, with new users joining CB ranks at the phenomenal rate of 500,000 per month.¹ At an average price of \$150 per CB set, the 1976 market will exceed \$500 million.

Impact on Automotive Electronics. In 1971 Chevrolet Division of General Motors Corporation was the first carmaker to make the CB radio a dealer accessory item. By 1975 all GM divisions had followed suit.² GM now



offers two units, manufactured by E.F. Johnson Co. of Waseca, Minnesota. An annual CB demand of 50,000 radios has been estimated by GM.²

Ford Motor Company as yet offers no CB units as accessory items for cars but apparently plans to do so in the near future.² Ford Division, however, was the first truckmaker to offer CB radios as original equipment on some heavy trucks.

Chrysler Corporation now offers three different CB units as accessory items from Chrysler-Plymouth and Dodge dealers. The radios are marketed under the Mopar label.² They offer a basic radio, a radio with a signal strength meter and fine tuning, and a deluxe radio with gain control and noise blanking features.

American Motors Corporation began offering CB radios in 1973. It now offers three models, all manufactured by E.F. Johnson Company.² AMC estimates it will sell at least 6,000 CB radios this year.

Limits to CB Radio Growth. There are now 10 million CB users fighting to squeeze into a 0.25 MHz slice of the radio spectrum.¹ Recent FCC studies found complete congestion on all 23 channels in metropolitan areas such as Chicago, Los Angeles and New York during peak-use periods. It was anticipated that the FCC would this past spring expand the CB allocation to 50 channels, but an unanticipated problem of radio interference caused by generation of intermodulation product frequencies has postponed this action.¹

Another problem is caused by solar storm activity which degrades signal-to-noise properties of reception. Indeed, during the last high point of solar activity in 1969, there was a decline in the popularity of CB radio.³

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Even in the absence of solar noise, there often occurs troublesome interference from adjacent channels. An extra-strong CB signal on a nearby channel can overload receivers in the same vicinity and severely desensitize them.³

With the mushrooming number of CB users, on-channel noise can also be a serious problem. Due to slight tolerances of CB frequencies of $\pm 0.005\%$, radio transmissions can heterodyne together and create numerous beat frequencies which have the characteristics of white noise.³ Since white noise is a random phenomenon, it can't be filtered out or blanked out and will therefore set the actual useful level of receiver performance.

It is reported that some CB users have already resorted to using illegally high-power transmitters to, in effect, blast their way through the interference clutter.⁴ (Legal CB transmitters are limited to 4 watts output using AM transmission, and 12 watts peak-envelop-power using single-sideband). Moreover, it is estimated there is currently one unlicensed CB user for every licensed one.³ Ironically, the FCC really can't do anything to unlicensed offenders should its small enforcement staff happen to catch one, but it can move against licensed offenders. Thus, there is little inducement to apply for a license.³ One possible scenario for the future is that unbearable channel congestion and interference problems might well spell the demise of CB radio usage.

Forecast for Future CB Development. In low-density rural areas with little channel crowding or interference, low-cost 23-channel sets will probably be adequate. On the other hand, for dense urban areas, higher-performance 50-channel sets are considered a must.³

CB manufacturers predict that sets are going toward in-dash installations, as they move into the largely untapped automobile market.³ Two Japanese companies--Japan Industry Ltd. and Panasonic--now have in-dash units which include a cassette stereo player, an am/fm multiplex radio, and a 23-channel citizens' band transceiver. Although in-dash mounting can reduce theft rates (currently a serious problem), there may be installation problems in the already limited space behind the dashboard.³

To solve the space limitation, the main part of the radio might be put in the trunk, with a control head including channel selector and microphone up front. The advent of the microprocessor makes it possible to do all this inexpensively.

In the control head, keyboard entry to a microprocessor would organize all channel information and other data, which could then be sent serially over a single wire to a

shift register in the trunk module.³ The trunk module would provide a parallel format to control all desired radio functions such as:

- Monitoring preset channels on a periodic basis
- Reading out signal-to-noise ratios.
- Reading out received signal strength.
- Reading out transmitted power output strength.
- Reading out channel number
- Channel memory.
- Automatic channel stepping.

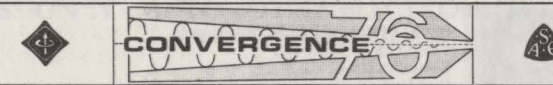
A digital readout would be used to display this information to the CB operator.

The promise of a volume market should provide the impetus for semiconductor manufacturers to produce custom LSI chips for CB radios. These circuits have the capacity of including special circuitry for processing of received signals to reduce radio noise. Examples of such circuits, currently under development, are:³

- Automatic noise limiting to block out low-level noise from high-level signal transmission.
- Squelch control which cuts out the audio output if no carrier is present, thereby eliminating annoying hiss of background noise.
- Adaptive processing, already proved in military equipment, can automatically adjust noise thresholds while enhancing the received signal to boost signal-to-noise ratio.
- Phase-locked-loop frequency synthesizers can generate upwards of 70 channel frequencies with 100-Hz stability to reduce on-channel noise interference. Furthermore, these synthesizers only use one quartz-crystal oscillator circuit instead of the presently required 14 crystals. This design will alleviate the demand for quartz crystals which are currently in short supply.⁴

References

1. Richard Gundlach, "FCC Delays CB Expansion," *Electronics*, April 15, 1976, p. 37.
2. Ruth Zaleski, "Carmakers Cash in on Growing CB Craze," *Ward's Auto World*, March 1976, p. 75.
3. Richard Gundlach, "Citizens' Band Clamor Gives Headaches to FCC, Designers," *Electronics*, March 4, 1976, pp. 91-99.
4. Don Mennie, "The Explosion at 27 MHz," *IEEE Spectrum*, May 1976, pp. 36-41.



INTERNATIONAL CONFERENCE ON AUTOMOTIVE ELECTRONICS AND ELECTRIC VEHICLES

SEPTEMBER 20-22, 1976

Hyatt Regency Dearborn
and
Ford Motor Company Proving Ground
Dearborn, Michigan

SUMMARY PROGRAM

MONDAY, SEPTEMBER 20, 1976

Registration Desk Opens Hotel Main Lobby	9:00 a.m.
Session I - AUTOMOTIVE ELECTRONICS TUTORIAL Regency Room	10:00 a.m.
Session II - AUTOMOTIVE ELECTRONICS Regency Room	2:00 p.m.
Reception Hubbard Ball Room	6:00 p.m.
Banquet Hubbard Ball Room	7:30 p.m.

TUESDAY, SEPTEMBER 21, 1976

Session III - ELECTRIC VEHICLES Regency Room	8:30 a.m.
Reception Hubbard Ball Room	12:00 noon
Luncheon Hubbard Ball Room	12:30 p.m.
Session IV - AUTOMOTIVE ELECTRONICS Regency Room	2:00 p.m.
Session V - AUTOMOTIVE ELECTRONICS - A NEW HORIZON? Regency Room	4:30 p.m.
No scheduled evening activities	

WEDNESDAY, SEPTEMBER 22, 1976

Session VI - EMERGING TECHNOLOGY Regency Room	8:30 a.m.
Session VII - ELECTRIC VEHICLE DEMONSTRATION Ford Proving Grounds, Dearborn	1:00 p.m.
Conference adjourns	5:00 p.m.

SESSION I - AUTOMOTIVE ELECTRONICS TUTORIAL

MONDAY, SEPTEMBER 20, 1976

Sponsored by Vehicular Electronics Laboratory
The University of Michigan

CHAIRMAN
Dr. Dale M. Grimes
Professor & Director - Vehicular
Electronics Laboratory
The University of Michigan



10:00 a.m. REGENCY ROOM



LSI, MICROPROCESSORS, AND ELECTRONIC AUTOMOTIVE CONTROL
Dr. Kensall D. Wise
Assistant Professor of Electrical
and Computer Engineering
The University of Michigan

EMI IN AUTOMOTIVE ELECTRONIC SYSTEMS
Dr. William B. Ribbens
Associate Professor, Electrical Engineering
The University of Michigan



SENSORS FOR NEW AUTOMOTIVE SYSTEMS
William G. Wolber
Program Manager, Sensor and
Actuator Development
The Bendix Corporation

MICROWAVE SOLID-STATE DEVICES FOR SELF-MIXING DOPPLER RADARS
Dr. George I. Haddad
Professor of Electrical Engineering and
Chairman, Electrical and Computer
Engineering Department
The University of Michigan



CONTROLS FOR ELECTRIC VEHICLES
Dr. Gene E. Smith
Associate Professor, Mechanical Engineering
The University of Michigan

12:30 p.m. ADJOURN

SESSION II - AUTOMOTIVE ELECTRONICS

MONDAY, SEPTEMBER 20, 1976

(Selected Papers from IEE Automotive Electronics Conference -
London, July 1976)

CHAIRMAN
William L. Miron
President - Automotive Group
The Bendix Corporation



2:00 p.m. REGENCY ROOM



THE STATUS OF AUTOMOTIVE ELECTRONICS IN THE U.S.A.
Trevor O. Jones
Director
General Motors Proving Grounds

CURRENT STATUS OF AUTOMOTIVE ELECTRONICS IN JAPAN
Takio Kitano
Executive Vice President
Shingo Ito
Executive Managing Director
Nippondenso Company, Limited



CURRENT STATUS OF AUTOMOBILE ELECTRONICS IN EUROPE
William H. Fryer
Engineering Manager
Electronics and Systems Division
Lucas Electrical Limited

THE PLESSEY ELECTRONIC FUEL AND ENGINE CONTROL AND DIAGNOSTIC SYSTEM
Barrie J. Martin
*Technical Manager
 Plessey Power Systems
 The Plessey Company Limited*

PHOTOGRAPH NOT AVAILABLE



AUTOMOBILE ELECTRONIC SYSTEMS: CENTRALISED OR DECENTRALISED?
Dr. Karsten Ehlers
Volkswagenwerk AG

4:30 p.m. ADJOURN

BANQUET - HUBBARD BALL ROOM
 MONDAY, SEPTEMBER 20, 1976

6:00 p.m. RECEPTION

MASTER OF CEREMONIES



Donald E. Petersen
*Executive Vice President
 Ford Motor Company*

PRESENTATION OF SAE VINCENT BENDIX AUTOMOTIVE ELECTRONICS ENGINEERING AWARD



Rodger F. Ringham
*President
 Society of Automotive Engineers*

KEYNOTE SPEAKER



Honorable William T. Coleman
*Secretary of Transportation
 United States Department of Transportation*

SESSION III - ELECTRIC VEHICLES

TUESDAY, SEPTEMBER 21, 1976
 (Selected Papers from EVC-Düsseldorf Conference, August 1976)

CHAIRMAN
George W. Scharbach
*Vice President - Engineering
 AM General*



8:30 a.m. REGENCY ROOM



DEVELOPMENT OF ELECTRIC VEHICLES AT TOYOTA
Kunihiko Imai
*Staff Engineer
 Toyota Motor Company, Limited*



ELECTRIC DELIVERY VANS ABOVE THE 45th PARALLEL IN NORTH AMERICA
Jaques H. Beaudet
*Project Manager, Electric Transportation
 Customer Service, Hydro Quebec*



DEVELOPMENT OF A HIGH PERFORMANCE AND LIGHT WEIGHT HYBRID FLYWHEEL/BATTERY POWERED ELECTRIC VEHICLE
Edward L. Lustenader
*Manager, Advanced Systems and Programs
 Power Generation and Propulsion Laboratory
 General Electric Company*



THE COMPUTER SIMULATION OF AUTOMOBILE USE PATTERNS FOR DEFINING BATTERY REQUIREMENTS FOR ELECTRIC CARS
Harvey J. Schwartz
*Manager, Electric Vehicle Project Office
 NASA Lewis Research Center*



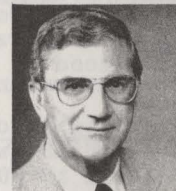
COMPARISON OF ELECTRICAL DRIVES FOR ROAD VEHICLES
Dr. Christian Bader
*Head, Electrical Engineering
 Deutsche Automobilgesellschaft mbH*

11:30 a.m. ADJOURN

LUNCHEON - HUBBARD BALL ROOM

TUESDAY, SEPTEMBER 21, 1976
 12:00 noon RECEPTION 12:30 p.m. LUNCHEON

MASTER OF CEREMONIES



Martin J. Caserio
*Group Vice President
 General Motors Corporation*

PRESENTATION OF VTG-IEEE ACHIEVEMENT AWARDS



Dr. William J. Fleming
*Chairman of IEEE
 Vehicular Technology Group, South East Michigan Section*

KEYNOTE SPEAKER



Lee A. Iacocca
*President
 Ford Motor Company*

SESSION IV - AUTOMOTIVE ELECTRONICS

TUESDAY, SEPTEMBER 21, 1976

CHAIRMAN
Martin J. Caserio
*Group Vice President - Electrical
 Components Group
 General Motors Corporation*



2:00 p.m. REGENCY ROOM



ELECTRONIC ENGINE CONTROL BY ON-BOARD COMPUTER
David F. Moyer
*Director - Powertrain and
 Systems Research Office
 Ford Motor Company*

INTEGRATED AUTOMOTIVE ELECTRONIC SYSTEMS
John T. Auman
*Executive Engineer - Electronic
 Control Systems
 General Motors Corporation*



DIGITAL ENGINE MANAGEMENT
Dr. John W. Weil
*Vice President & Chief Technical Officer
 The Bendix Corporation*

THE ELECTRONIC LEAN BURN SYSTEM
Earl W. Meyer, Jr.
*Assistant Chief Engineer - Engine Electrical
 Chrysler Corporation*



4:00 p.m. ADJOURN

SESSION V - PANEL DISCUSSION

TUESDAY, SEPTEMBER 21, 1976
 4:30 p.m. REGENCY ROOM

MODERATOR
Trevor O. Jones
*Director
 General Motors Proving Grounds*



Donn L. Williams
*President - Electronics Operations
 Rockwell International*

Alan G. Loofbourrow
*Vice President - Engineering
 Chrysler Corporation*



Robert J. Templin
*Chief Engineer
 Cadillac Motor Car Division
 General Motors Corporation*

J. Sidney Webb
*Executive Vice President
 TRW, Incorporated*



Dr. Robert N. Noyce
*Chairman of the Board
 Intel Corporation*

Frederick Z. Herr
*Chief Engineer-Electrical and
 Electronics Division
 Ford Motor Company*



John R. Welty
*Vice President and
 Semiconductor Group Executive
 Motorola, Incorporated*



6:30 p.m. ADJOURN

SESSION VI - EMERGING TECHNOLOGY

WEDNESDAY, SEPTEMBER 22, 1976

CHAIRMAN
Dr. David V. Ragone
*Dean of Engineering
 The University of Michigan*



8:30 a.m. REGENCY ROOM



ADVANCES IN INTEGRATED CIRCUIT TECHNOLOGY
Dr. Thomas A. Longo
*Executive Vice President
 Fairchild Camera and Instrument Corporation*

ADVANCE BATTERY DEVELOPMENT
Dr. Neal A. Richardson
*Manager, Energy Processes
 Energy Systems Group
 Development and Applications Division
 TRW, Incorporated*



ADVANCE ELECTRIC VEHICLE CONTROL SYSTEMS
Dr. Frank T. Thompson
*Division Manager, Electrical Sciences
 Westinghouse Research Laboratories*

ADVANCE MOTOR DEVELOPMENT
Arthur M. Bueche
*Vice President
 Research and Development
 General Electric Company*



ALTERNATE PROPULSION SYSTEMS
John J. Brogan
*Acting Director - Division of Transportation
 Energy Research and
 Development Administration*

12:00 p.m. ADJOURN

SESSION VII - ELECTRIC VEHICLE DEMONSTRATION

WEDNESDAY, SEPTEMBER 22, 1976

CHAIRMAN
George M. Thur
Acting Assistant Director for Highway Vehicle Systems Division of Transportation Energy Conservation Energy Research and Development Administration



COCHAIRMAN
Joseph F. Ziomek
Manager - Electrical and Climate Control Activity Ford Motor Company

ELECTRIC VEHICLE DATA

EDITOR
Dr. Ming-Chih Yew
Project Manager, Electric Vehicles General Motors Corporation



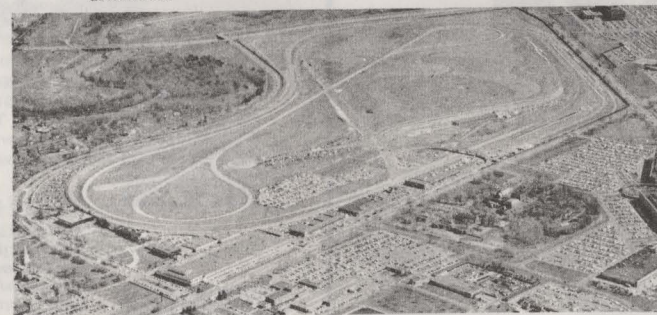
COEDITOR
Dr. Tsih C. Wang
Assistant Head Electrical Engineering Department General Motors Research Laboratories General Motors Corporation

1:00 p.m. FORD PROVING GROUND

This session will be sponsored and organized by the Energy Research and Development Administration.

ERDA will invite electric vehicle manufacturers to display and demonstrate their vehicles at the Ford Proving Grounds which is adjacent to the convention site.

Buses will leave front entrance of hotel for 5 minute ride to Ford Proving Ground at 1 p.m. and return throughout the afternoon.



5:00 p.m. ADJOURN



CONVERGENCE '76 REGISTRATION

Return to:
 CONVERGENCE '76
 Kenneth A. Niemi
 Allen-Bradley Company
 32660 Stephenson Highway
 Madison Heights, Michigan 48071
 Please register me for CONVERGENCE '76, International Conference on Automotive Electronics and Electric Vehicles, Hyatt Regency Dearborn, Dearborn, Michigan, September 20-22, 1976

M _____
 First Name Initial Last Name

Title _____

Affiliation _____

Address _____

Staying at Hyatt Regency Dearborn? YES Reservations-Toll Free (800)228-9000

If no, name of hotel. _____

CODE NO. _____

Please check items for which you are registering:

- TECHNICAL SESSIONS**
 (Registrant will receive one copy of CONVERGENCE '76 Proceedings.)
- Member IEEE/SAE/IEE/EVC . . . \$ 40.00
 - Non-member . . . \$ 50.00
 - One day registrant . . . \$ 15.00
 - Student . . . \$ 15.00
- BANQUET AND LUNCHEON TICKETS**
- Banquet . . . \$ 20.00
 - Luncheon . . . \$ 8.00
- ADDITIONAL PROCEEDINGS**
 Proceedings available at \$20.00 per copy.
 Number requested: _____ x \$20.00 . . . \$ _____
- PAYMENT**
 Enter total amount of checked items and enclose check made payable to Institute of Electrical and Electronic Engineers - Convergence '76 . . . \$ _____

ADCOM HIGHLIGHTS

By TOM McKEE
 ADCOM NEWS EDITOR

JUNE MEETING

The summer meeting of the VTG Adcom was held on June 16 at the Marriott Hotel in Philadelphia, Pa.

* * *

The following persons were present:

- Nick Alimpich
- Arnold Brenner
- Carl Brooks
- Bill Chriss
- Martin Cooper
- John Dettra
- Dick Emberson
- Olin Giles
- Dave Howarth
- Sam Lane
- Fred Link
- Chuck Lynk
- Roger Madden
- Stuart Meyer
- George McClure
- Tom McKee
- Jack Neubauer
- Neal Shepherd
- Dave Talley

* * *

The following elected Adcom members were unable to attend the meeting:

- John Cassidy
- Dale Grimes
- Sam McConoughey

* * *

President Sam Lane indicated that because of the Adcom's emphasis on improving the Transactions, he wanted to have all Adcom members present at the Publications Committee meetings, which are normally held just before the Adcom meeting. George McClure, the Transactions Editor, supported this action.

* * *

Planning was undertaken to assure that VTG sponsors sessions at the ICC-77 and NTC-77.

* * *

Even with the VTG dues increase slated to take effect with the fall IEEE billing, the 1977 financial projection was reported to be somewhat bleak. Roger Madden, VTG Treasurer, and Dave Talley, Financial Advisor, indicated that if we do not make some budget changes we will be \$6300 in the red by the end of 1977. Since publications represent our largest expense, the Publications Committee was requested to investigate ways of reducing expenses or increasing income in the publications area.

* * *



Each Adcom member reported on his efforts to secure a prospective paper for the Transactions. Of the 12 elected Adcom members present, 9 reported actions which should assure at least 9 new papers being submitted for review. The members not reporting actions will be requested to report again at the next Adcom meeting.

* * *

George McClure reported that planning is well along for the 1977 VTG annual conference to be held at Orlando, Florida. In order to secure better hotel arrangements the conference date has been moved up one week to March 16-18, 1977 at the Orlando Hyatt House. It's not too early to begin thinking about a paper for the conference, and the Orlando trip should make the work of writing it quite worthwhile.

* * *

The Adcom approved the slate of candidates proposed by the Nominations Committee. Details appear elsewhere in this Newsletter.

* * *

The Adcom took action to establish a committee on Citizens Band Radio. Carl Brooks was appointed to head this committee. The objectives will be to serve the CB portion of the communications field and hence attract new VTG members and increase the number of papers submitted for presentation and publication. If you are involved in CB radio and wish to participate on this committee please contact Carl at Turner Division, Conrac Corp. 716 Oakland Road, N.E., Cedar Rapids, Iowa 52402, Phone 319-366-8311.

* * *

Tom McKee reported that the VTG Membership Survey should be in the hands of a random sample of VTG members by mid-July. Responses are requested by mid-August.

* * *

In the publications area plans for a number of special issues of the VTG Transactions were discussed. Three special issues are in process for 1977 and more are in the planning stage for 1978.

* * *

THE WASHINGTON SCENE

By ERIC SCHIMMEL
WASHINGTON NEWS EDITOR

WASHINGTON CONFETTI

As I recall, one of the traditional axioms of higher learning is not to expect to commit to mind all available knowledge, but to know where to acquire specific information when needed. In our business, one such hydrant of knowledge is the FCC's Office of Public Information.

Twice each day, that office issues a variety of news bulletins, public notices, and rulemaking documents. These items may be picked up at no charge, or arrangements can be made with local messenger services which, for a monthly fee, will pick up and deliver or mail a copy of all releases to your office. A brief description of each type of document is given below.

Weekly and Monthly Calendars

Schedule of major Commission meetings, and participation of FCC officials in industry conferences, etc. Copies of speeches given by the Commissioners are usually also made available.

Notices of Commission Actions

Abbreviated texts of dockets and rulemaking proceedings. Full texts of each proceeding are also issued, but may not be available until several days later.

Action Alert

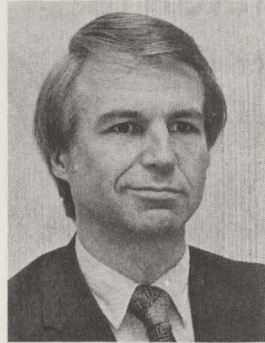
This is a relatively new weekly bulletin which summarizes all dockets and rulemakings which are approaching comment deadlines. Each proceeding is identified with a brief description, and the date by which comments must be submitted is specified.

Notices of Petitions

A listing of formal petitions filed, giving the name of the petitioner, the FCC rule part affected, the nature of the petition, date of filing, and an FCC RM (rulemaking) number. Commission actions on pending petitions are also noted. Interested parties may file comments in support or opposition to petitions within 30 days of the public notice.

License Applications

Separate weekly notices from the various licensing bureaus (Common Carrier, Safety and Special Radio, Broadcast) list applications which have been accepted for filing in certain specific services. These include aviation, marine, microwave and mobile telephone. Each listing identifies the applicant and his location, frequency requested, and call letter or file number. The purpose of the notices is to provide a 30 day period in the event a third party wishes to contest the application.



Type Acceptance Grants

Alphabetical list by applicant, of all equipment type accepted since publication of last notice, usually 2 to 4 weeks. Listing includes: frequency range, R.F. power, emission designator, radio service (s) for which equipment is authorized, frequency tolerance, and type number. A cumulative list is issued several times a year, but must be purchased from the FCC's duplication contractor.

Type Approval Grants

Essentially the same kind of public notices as are issued for Type Acceptances, but categorized by type of equipment; e. g. radars, microwave ovens, TV games.

License Grants

Complementary to the notices of applications accepted for filing, notices are also issued by the licensing bureaus regarding actions taken on those applications.

Experimental Licenses

Periodic bulletin gives call letters of new experimental grants, licensee's name, frequencies, and general statement of purpose for which the application was granted.

Notices of Violation

Listings of licensees who have recently been cited for violating an FCC regulation. The listings identify the licensee's call letters, city and state, radio service, and the nature of the violation. Subsequent notices state the disposition of the citation, including the penalty if one is levied.

Notice of Filings

A listing by docket number, of comments received from interested parties. The parties are identified, as is the subject matter of the proceeding.

Ignition Noise Report

In an earlier issue, we reported that the FCC had initiated Docket 20654 as an inquiry into interference from automotive spark ignition systems. The Research and Standards Division of the Office of Chief Engineer has now issued a report on this subject, based on measurements made by its staff. If you wish to request a copy from that office, refer to report FCC/OCE RS 76-03.

To give you some idea of the substance of the report, its summary and conclusions are reproduced below.

SUMMARY

The purpose of this project was to determine on an individual basis the percentage of vehicles in a large sample size that exceeded the SAE J551(c) standard, and which vehicles caused degradation to land mobile reception.

Ten thousand vehicles were measured at each test frequency, 50 MHz and 153 MHz, as each vehicle passed the measurement site located on a single-lane ramp connecting two interstate highways. Data was obtained to answer the following questions about each vehicle.

1. Was the vehicle's radiation above the industry's voluntary limit?
2. Was the signal quality degraded by the vehicle's radiation?
3. How long was the degradation present?
4. What was the make and type of the vehicle?

The results of the measurements are shown in Figure 1. The percentage of vehicles exceeding the SAE radiation limit was 3.6% at 50 MHz and 2.6% at 153 MHz. All of these vehicles caused degradation of at least one quality grade to land mobile reception based on our subjective grading scale. Additionally, 16.3% of the vehicles at 50 MHz and 8.0% of the vehicles at 153 MHz, caused degradation of one quality grade or more even though their radiation was below the SAE limit.

An analysis by manufacturer and type of the vehicles exceeding the SAE limit and/or causing degradation is shown in Figures 2 through 5.

In accordance with the measurement procedure the dipole antenna was placed 10 meters from the road. We also examined a more typical traffic situation by mounting whip antennas on a van parked 3 meters from the road. The percentage of vehicles causing degradation increased by 50% for the 3 meter distance. The results of the measurements at 3 meters are shown in Figure 6.

The purpose of the project reported in Appendix A was to determine if there was any degradation to land mobile reception due to the ignition systems of 1976 factory-fresh American-made automobiles and to compare this new data with the data previously found in Report R-7302, "Degradation of Mobile Radio Reception at UHF and VHF." The measurements were made at 153 MHz at a Grade 4 signal quality. It was found that from a group of twelve of these vehicles (reference Figure 21) there was 22.3 dB degradation at 153 MHz. This result compares with the 21.5 dB degradation reported in R-7302 where older, on-the-road vehicles were measured. The traffic configuration used in the recent test method (Reference Figure 20) was almost identical to that reported in R-7302.

Conclusions

1. A considerable percentage of vehicles (16.3% at 50 MHz and 8.0% at 153 MHz) with ignition radiation below the SAE J551(c) limits caused degradation to land mobile reception.
2. The percentage of vehicles causing degradation was 50% higher with the antenna located 3 meters from the road (typical distance between adjacent vehicles in traffic) than with the antenna located 10 meters from the road (SAE J551(c) measurement distance).

3. A large percentage (78.6%) of all motorcycles caused degradation and 53.6% of all motorcycles were above the SAE radiation limit.

4. It was not possible to measure each vehicle's ignition radiation from 20 MHz to 1000 MHz with the four antenna-vehicle configurations as prescribed in the SAE standard at the ramp site. The restriction of using one land mobile narrow band (20 kHz bandwidth) receiver at a single frequency (50 MHz or 153 MHz) and having only one antenna-vehicle configuration (vertical polarization-right side of vehicle) may have caused the percentage of vehicles found to have exceeded the SAE limit to be less than was actually present.

5. It was not feasible to determine why vehicles were above the radiation limit. It is not known whether these vehicles had been modified with non-resistor plugs, non-resistive cables, etc.

6. Of the ten thousand vehicles tested at each frequency, a greater percentage of vehicles caused degradation at 50 MHz (19.9%) than at 153 MHz (10.6%).

7. Almost all the White Corporation trucks had diesel engines and this is reflected in the measurements taken at the ramp site where 355 White trucks were measured at 50 MHz and 368 at 153 MHz and none caused degradation.

8. The Appendix A study shows that at a Grade 4 signal quality a group of twelve 1976 factory-fresh American-made automobiles caused 22.3 dB degradation at 153 MHz. This result affirms the 21.5 dB degradation previously reported in Report R-7302, and supports the conclusion that degradation resulting from the cumulative effect of a group of vehicles is not peculiar to on-the-road vehicles.

New FCC Forms

For those of you who prepare equipment type acceptance and certification filings, a new combined application form became effective May 17. Form 731 now replaces forms 722, 723 and 729.

A new application form for private operational fixed microwave systems has also been adopted. Presently two forms, 402 and 402-S are required. A revised form 402 will become available later this year and will eliminate the need to file a 402-S. The use of this form will become mandatory on January 1, 1977.

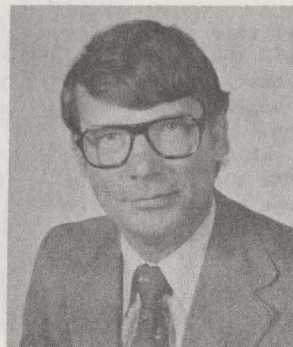
Effective November 1, 1976, another new form, (740), will be required for all radio frequency equipment and devices imported into the United States. The form will require the following information: port of entry; the import vessel or carrier; date of entry; description of equipment and quantity; trade name; model or type number; FCC identifier; and manufacturer's name and address; plus a declaration that an equipment authorization, has been issued by the FCC or does not require an equipment authorization, but complies with FCC technical requirements, and the condition under which the device is being brought into the U. S.; the importer's name, address and signature; or name, address, and signature of the consignee.

The importer of a RF device must attach an appropriately completed FCC Form 740 in duplicate to the entry papers of each shipment of each separately identified RF device or subassembly subject to FCC technical or equipment authorization requirements.

Forms will be available about October, from both the FCC and the U. S. Customer Service.

CHAPTER NEWS

By JOHN DETTRA
CHAPTER NEWS EDITOR



MEETINGS

CLEVELAND: LECTURER OF THE YEAR
A.K. (KENNY) GUTHRIE, GENERAL ELECTRIC COMPANY
ON APRIL 12, 45 ATTENDING.

TOUR OF FAA AIR ROUTE TRAFFIC CONTROL CENTER
IN OBERLIN, OHIO
ON MARCH 8, 46 ATTENDING.

PRACTICAL APPLICATIONS OF BASE ANTENNAS IN
LAND MOBILE COMMUNICATIONS
BY RICK PRINDLE, THE ANTENNA SPECIALISTS CO.
ON MAY 11, 34 ATTENDING.

COLUMBUS: PUBLIC SAFETY RADIO...AS IT WAS
BY AL SHIRK, COMMUNICATIONS CONSULTANT
ON APRIL 14, 14 ATTENDING.

SACRAMENTO: LOW-BAND REPEATER SYSTEMS
BY HENRY L. CRUTCHER, DEPT. COM OFF., CALIF. DEPT OF PARKS
ON MAY 17. THE SYSTEM IS A COMPREHENSIVE
STATEWIDE SYSTEM COVERING SOME 250 PARKS
AND RECREATIONAL AREAS. IT IS THE FIRST
LOW-BAND REPEATER SYSTEM LICENSED BY THE FCC.

WASHINGTON: METRO COMMUNICATIONS SYSTEMS
BY JOSEPH P. GREENWAY, COM. ENG., METRO AREA TRANSIT AUTH.
ON MAY 14, 27 ATTENDING.

NEW CHAPTER OFFICERS:

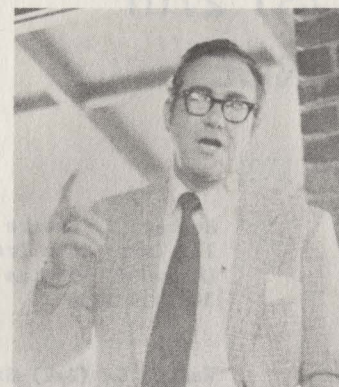
CLEVELAND: DONALD R. NELSCH, CH.
KARL F. BECKMAN, VICE CH.
DAVID J. DOMER, SEC.

SACRAMENTO: MAYNARD A. WRIGHT, CH.

WASHINGTON: ERIC J. SCHIMMEL, CH.
NILL J. MCKAY, VICE CH.
EMMIGRATION AND NATURALIZATION SERVICE
WILLIAM M. BORMAN, SEC.
MOTOROLA, INC.

MEETING ANNOUNCEMENTS:

SACRAMENTO: SEPTEMBER 20; OCTOBER 18; & NOVEMBER 15, 1976.
RAY VINCENT DEVELCO WILL DEMONSTRATE A
3-AXIS SPECTRUM ANALYZER AND AL ISBERG
WILL REPORT ON RAPID TRANSIT RADIO COMMUNICATIONS.



JOSEPH P. GREENWAY OF
THE METRO AREA TRANSIT
AUTH. ADDRESSING THE
WASHINGTON CHAPTER

BOOK REVIEW

By CARROLL LINDHOLM

About a year ago I reviewed a new volume
entitled QUEUEING SYSTEMS - Vol. 1 : THEORY
by Prof. Leonard Kleinrock.

I have now received the recently published
companion volume for review:

QUEUEING SYSTEMS - VOL.2 : Computer Appli-
cations. by L. Kleinrock, John Wiley &
Sons (New York) 1976

This volume begins with a "primer" on queue-
ing theory, results derived in Vol. 1.
Special emphasis is placed on those situa-
tions which will be frequently applied in
the following chapters. There follows a
chapter on "Bounds, Inequalities and
Approximations" which presents the methods
available for coping with many of the com-
plex formulas encountered in the first
chapter. Here, special cases are examined
while frequently encountered parameters
and functions such as "average wait", bounds
on the tail of waiting time distribution,
etc. are addressed.

Beginning with Chapter 3 the author addresses
the promised applications. First comes
"Priority Queueing" wherein members of a
queue are tagged with priorities on the basis
of which they are selected for service.

Chapter 4 is entitled "Computer Time - Shar-
ing and Multiaccess Systems". Here we look
in considerable detail at the very real
situations formed in the now-ubiquitous time
sharing computer systems. Here indeed users
are queued awaiting service from the server
(the big Processor) while its supervisor
(software) works hard to measure and tag the
users so that some "optimal" situation may
be realized. A great many algorithms have
involved in actual practice and the commoner
of these are examined from a queueing view-
point.

Thus "round - robin" and "foreground - back-
ground" systems are modelled. Then a more
generalized system with more parameters and
capable of representing many different
algorithms is discussed with some interesting
results in spite of its generality. This
chapter alone has 114 pages and is by itself
a complete discussion of its subject matter.

The last two chapters (5 & 6) review "Comput-
er Communication Networks" with heavy empha-
sis on a very large active system now in use
throughout the land (ARPANET). In these 246
pages (nearly half the book) the author leads
the reader through much of the design history
and problems of this very large network.
The subject is important because it is
increasingly common today to seek to improve
computation by load splitting, by distributed
computers, by sophisticated concentrators,
etc. The limited capacity of processors and
communications lines places bottlenecks into
the system. Thus queues for service form due
to both sources, as well as at network node
points where temporary storage may be neces-
sary, as well as limited. Queueing problems
in such complex systems are difficult to
model and simulations are frequently utilized
to learn about the impending problems of a
real world proposal. Measurement and para-
meter estimation are important here, and the
author treats the subject in much detail.

So far the subject is a new one. The author
admits that the subject is young, that the
data is dying rapidly from obsolescence, new
algorithms are being proposed regularly and
that the book only gives the reader a glimpse
of the subject today. But we also enjoy the
advantage of watching a skilled teacher
approach a new complex subject and extract
valuable data and useful design parameters
from it. Much later all this would be past
history and we would miss the chance to learn
the valuable lessons.

I recommend this book to anyone interested
in any of the subjects mentioned.

ORLANDO CHAPTER TO HOST 27th ANNUAL VTG CONFERENCE

... March 16-18, 1977

The Twenty-Seventh Annual Conference of the IEEE Vehicular Technology Group will be held at the Orlando Hyatt House near Orlando, Florida. The dates for the conference are March 16-18, 1977. Area attractions nearby include Walt Disney World, Sea World, Circus World, and Cypress Gardens. Package tours are available to Busch Gardens in Tampa and to Cape Kennedy, where special bicentennial exhibits have been added to the regular bus tour.

The theme for the conference is "Personal Communications and Vehicular Technology--Linking Man to Society". Papers presented will cover new developments and applications of mobile communications, automotive technology, and transportation systems enabling man to function more effectively as a part of society. Exhibits at the conference will provide attendees with first-hand knowledge of the new products and services now available.

Known as "The City Beautiful," Orlando is noted for its friendly hospitality. Its weather in March is usually mild and sunny. Mark the dates -- March 16-18, 1977 -- on your calendar and plan to attend our next national Vehicular Technology Conference.

Papers for the conference are being sought. Details are contained in the Call for Papers. A Conference Record containing all papers presented at the conference will be prepared and distributed to attendees. Reservations for exhibit space are being accepted now.

Local committee chairmen for the conference are:

Conference Chairman-

George F. McClure
Martin Marietta Aerospace
Box 5837, MP-71
Orlando, Florida 32805
305/352-3782

Vice-Chairman-

Mel C. Kelch
Repco, Inc.
1940 Lockwood Way,
P. O. Box 7065
Orlando, Florida 32804
305/843-8484

Technical Program & Papers-

Martin L. Barton
Martin Marietta Aerospace
Box 5837, MP-437
Orlando, Florida 32805
305/352-2160

Registration-

Samuel A. Leslie
Martin Marietta Aerospace
Box 5837, MP-437
Orlando, Florida 32805
305/352-3961

Exhibits-

Herbert J. Zwarra
119 Tarry Town Trail
Longwood, Florida 32750
305/339-1894

Arrangements-

Walter C. (Bud) Simciak
Repco, Inc.
1940 Lockwood Way
P. O. Box 7065
Orlando, Florida 32804
305/295-9490

Finance-

J. Richard Endicott
Martin Marietta Aerospace
Box 5837, MP-140
Orlando, Florida 32805
305/352-4346

LAKE EOLA IN DOWNTOWN ORLANDO



CALL FOR PAPERS

1977 IEEE VEHICULAR TECHNOLOGY CONFERENCE

MARCH 16-18, 1977

ORLANDO HYATT HOUSE
ORLANDO, FLORIDA

SPONSOR: Institute of Electrical & Electronics Engineers (Vehicular Technology Group)

THEME: "Personal Communications and Vehicular Technology - Linking Man to Society"

TOPICS:

- Personal Communications Services, Systems, and Hardware
- Microwave Mobile Communications Systems
- Air-Ground Public Radiotelephone Systems
- Digital Communications in the Mobile Services
- All Phases of Automotive Electronics
- Automatic Transmitter Identification
- Satellite Systems for Extended Coverage: Aeronautical, Maritime, Land Mobile, and Rural Radiotelephone Units
- Automatic Vehicle Location, Monitoring, and Identification of Mobile Units
- Transportation Systems Control or Simulation
- Spectrum Efficiency Improvements in Mobile Services, including Trunking, Multiple Access, and Spread Spectrum Methods
- Public Safety and Emergency Medical Systems
- Industrial and Transportation Uses of Mobile Communications
- Spectrum Requirements in the Mobile Services
- Propagation at 900 MHz and Above in Mobile Services

- Mobile Service Issues in the World Administrative Radio Conference
- Traffic Control Systems
- Motorist Aid Systems
- Marine and VHF Communications and Control Systems
- EMC and RFI in the Vehicular Environment
- Roles and Effects of Regulation on Vehicular Technology
- International Developments in the Mobile Services
- Radio Fault Alarm and Performance Monitoring Systems
- New Hardware and Systems Developments

DEADLINE: Six copies of a 500-word outline should be submitted by October 15, 1976 to:

Mr. Martin L. Barton
Martin Marietta Aerospace
P.O. Box 5837, MP-437
Orlando, Florida 32805

Outlines or summaries should be typed single-spaced with a two-inch left margin, in a 4-3/4 inch column with a 1-1/2 inch top and bottom margin. The title, name(s), and affiliations should be included, with complete address and telephone number.

Authors will be notified of acceptance by November 15, 1976. The complete text of accepted papers will be published in the Conference Record, which will be distributed at the conference.

ELECTION OF VTG ADCOM MEMBERS

The VTG bylaws provide that five new members shall be elected annually to the administrative committee. The dossiers for the eleven candidates selected by your nominating committee appear below. The terms of the elected candidates will run concurrently from January 1, 1977 to December 31, 1979. This advance information will permit you to review the qualifications of each candidate prior to the receipt of your ballot. Ballots will be mailed from IEEE headquarters to reach you sometime in August or early September.

ARNOLD BRENNER



PRESENT EMPLOYER:
Motorola, Inc.
Schaumburg, Illinois

IEEE HISTORY (M '59)

- 1974 Elected to VTG Adcom. Participated in IEEE standards committees with particular emphasis on 27.7 - land mobile receivers. Served in the Chicago Section as arrangements chairman and technical program chairman.
- 1966 Chairman subcommittee Electro-Magnetic Compatibility

PROFESSIONAL BACKGROUND

Sixteen years with Motorola, Inc. Started as design engineer in 1959 and rose through the management ranks as engineering group leader, engineering section manager, manager of engineering, product manager, group product manager and currently operations manager, Mobile products. Assignments include mobile, portable, fixed, station, car telephone, and data communications systems.

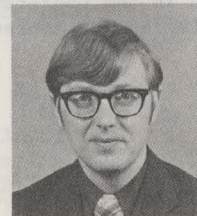
OTHER PROFESSIONAL SOCIETIES

Served on several EIA technical committees, and as chairman of TR8.10 - Engine Noise Interference, and chairman of the Ad Hoc committee for technical standards at 800 MHz.

EDUCATION

- 1958 Illinois Institute of Technology, BSEE
- 1959 University of Illinois, MSEE
- 1959-1962 Northwestern University, Further Post-Graduate EE

JOHN F. CASSIDY, JR.



PRESENT EMPLOYER:
General Motors Research, Electronics Dept.
G. M. Technical Center
Warren, Michigan 48090

IEEE HISTORY (M '66)

- 1976 Vice-President VTG Adcom
- 1975 Treasurer - VTG Adcom
- 1974 Elected to VTG Adcom
- 1973 S.E. Mich. Chapter VTG Chairman (Chapter of the year award)
- 1973 S.E. Mich. Sec. Div. IV Director
- 1970 Member VTG
- 1966 Control Systems Grp. Editor Electronics II (Special IEEE-VTG & SAE Publication on Automotive Electronics). Asst. Chairman Technical Program Convergence '74 (SAE-IEEE Regional Automotive Electronics Conference). Asst. Session Chairman Convergence '76 (IEEE-SAE Automotive Electronics Committee).

PROFESSIONAL BACKGROUND

- 1969-1976 Senior Research Engineer; General Motors Research Electronics Dept.

OTHER PROFESSIONAL SOCIETIES

Society of Automotive Engineers; Electrical & Electronic Systems Committee; Automotive Electronics Committee

EDUCATION

Rensselaar Polytechnic Institute
BEE-1965; MEE-1967; Phd 1969

If re-elected, I plan to vigorously pursue the primary Adcom goals of improving and expanding our Transactions and National Conference. I feel that our communications interests should be broadened and strengthened while developing our activities related to the exploding technology of Automotive Electronics.

JOHN E. DETTRA, JR.



PRESENT EMPLOYER:
Dettra Communications, Inc.
2029 K Street, N.W.
Washington, D. C. 20006

IEEE HISTORY (S'55 - A'57 - M'61)

- 1973-Present Chairman, Chapter Act. VT-6
- 1974-Present Chapter Editor for VT-6 Newsletter
- 1970 Vice Chairman, 21st Annual Conference, VT-6
- 1969 Chairman, Washington Chapt. VT-6
- 1968 Vice Chairman, Washington Chapter VT-6
- 1967 Secretary, Washington Chapt. VT-6

PROFESSIONAL BACKGROUND

Dettra Communications, Inc. President.
Steel, Andrus & Adair, Consulting Engineers
George P. Adair Eng. Company
WB7NBF, First Class Radio-telephone Permit

OTHER PROFESSIONAL SOCIETIES

Association of Federal Communications Consulting Engineers
NARS, NABER, ICET, ARRL

EDUCATION

- 1968 B.S.E.T., Capitol Institute of Technology
- 1956 A.A.S., Capitol Radio Eng. Inst. Matriculated: USDA Graduate School, Un. of Virginia

Since 1956, he has been engaged in many phases of the consulting radio engineering work in the mobile, broadcast, marine, MDS, and paging fields. His practice includes feasibility, channel allocation, and interference studies; directional antenna design; preparation of applications; and has given expert radio engineering testimony before the FCC and many state public utility commissions.

EDWARD G. FROST



PRESENT EMPLOYER:
Frost Communications Inc.
12000 Old Georgetown Road
Rockville, Maryland 20852

IEEE HISTORY (M '66)

Active in the Washington, D. C. VTG for past three years. Presented paper entitled "A Comprehensive Automatic Radio Telephone System" during 26th Annual VTG Conference 1976

PROFESSIONAL BACKGROUND

- 1969-Present President of Frost Comm., Inc.
- Previously: 4 years senior executive ITT, member of the board of directors of ITT Standard Electric Surinam NV. 8 years with Philips Telecommunicatie Industrie NV setting up and operating telecom. business in W. Africa, Mid East and Asia.

EDUCATION

BSC Telecommunications London University, England 1951
C&G of London Institute (Telecommunications) 1951
Grad. I.P.R.E. London 1954

Hold U.S. Patent No. 3,849, 194 July 8, 1975 Automatic Mobile Radio Telephone System. Designed the UHF telemetry equipment for the first pilotless aircraft on behalf of the Royal Aircraft Establishment UK. Have been responsible for numerous complete communications system designs and engineering both for ITT and Philips also for systems designed and installed by Frost Communications, Inc. Many of these systems exclusively provided mobile radio or included mobile radio as an adjunct to the main system.

GEORGE F. McCLURE



PRESENT EMPLOYER:
Martin Marietta Aerospace
Sand Lake Road, MP-437
Orlando, Florida 32805

IEEE HISTORY

- Present Editor, IEEE Transactions on Vehicular Technology
Chairman, 27th Nat'l VTG Conf.
- 1975 Named Engineer-of-the-Year by Orlando Chapters, VTG and Comm. Soc.
- 1975 Organizer & Chmn., ICC-75 Session, Paging and Reporting Systems
- 1974 Organizer and first chairman, Orlando Chapter, VTG
- 1973-74 Chairman, Orlando Chapter, Communications Society

PROFESSIONAL BACKGROUND

- Present Senior Group Engineer; Section Head - Comm. Systems Design
- 1964-73 Staff Engineer, Systems Design Mobile Comm. Systems
- 1961-64 Engineer, Systems Design, Comm. & Display Systems
- 1957-59 Instructor, Dept. of Elec. Engr., U.S. Naval Academy
- 1955-57 Communications Officer, USNR, Amphibious Communications

OTHER PROFESSIONAL ACTIVITIES

Member, Audio Engineering Soc. Member, Orange County Emergency Medical Services Council (Fla.)
Chairman, New Technology Seminar, "Expanded Services and Opportunities in Mobile Comm.", National Electronics Conference, 1974

EDUCATION

- 1961 Master of Science in Engineering, University of Florida
- 1954 Bachelor of Electrical Eng., University of Florida
- 1952 Assoc. Arts, Jacksonville Junior College (Florida)

George McClure is engaged in the design of computer-controlled radio and wire communications systems, including mobile telephone, dispatch, and emergency medical systems. He directs design work for both commercial and military applications, has authored FCC filings, published papers on EMS, vehicular, and amphibious communications, and organized technical sessions at national and international conferences.

STUART F. MEYER



PRESENT EMPLOYER:
E. F. Johnson Company
1523 "O" Street, NW
Washington, D. C. 20005

IEEE HISTORY

Present Chairman 26th Annual VT Conf.
Chairman Washington Chapter VTG
Member Adcom

PROFESSIONAL BACKGROUND

Present Manager of Government & Industry
Relations, the E. F. Johnson Co.
Chairman, Engineering Panel,
Communications Division, EIA
Industry Observer of the World
Administrative Radio Conference-
79 FCC Working Group.

OTHER PROFESSIONAL SOCIETIES

Fellow & Director in the Radio
Club of America
Director of Nat'l Assn. of Business &
Educational Radio (NABER)
Chairman of 1975 ARRL National
Convention.

EDUCATION

Graduated in courses at the Naval Air
Technical Training Command in Annapolis,
Md. & Corpus Christi, Texas.
Graduated DeForests Institute.

Have been associated with land-mobile radio most of
my adult life, previously Manager of Gov't. Relations,
RCA Mobile Communications Systems, Executive Vice
President of Aerotron, Inc., President of
Hammarlund Mfg. Co. Mobile Eng. Manager of Allen B.
DuMont Laboratories and Chief Engineer of the Link
Radio Corporation. Active in numerous Land-Mobile
committees for 30 years.

A. M. MISSEDA



PRESENT EMPLOYER:
RCA
Meadow Lands, Pa. 15347

IEEE HISTORY (M '60)

1972-Present Program Chairman Pittsburgh
Chapter VTG/CS
1972-1975 VTG Adcom, Membership Chairman
1969-1972 VTG Adcom, Chapter Activities
Chairman
1967-1969 Chairman, Pittsburgh Chapter VTG/CS

EDUCATION

1960 BSEE, Univ. of Pittsburgh
1966 MSEE, Univ. of Pittsburgh
1975 Executive Management Program -
Penn State University

Mr. Missenda is 40 years old, married and the father
of three children. He has been active in EIA and/or
FCC Committees on Land Mobile Channel Splitting at
450 MHz, Land Mobile/TV Sharing and 900 MHz Technical
Standards. He has held a First Class Radiotelephone
License since 1955. He was a member of a team which
received the 1975 David Sarnoff Award for Outstanding
Technical Achievement. He was awarded U.S. Patent
#3,810,023 in June 1974.

PROFESSIONAL BACKGROUND

1964-Present RCA Mobile Comm. Systems:
1975 Manager, Portable Products
1974 Program Manager - TACTEC
1973 Manager - Advanced Development
1972 Leader - Advanced Development
1968 Senior Member of Tech. Staff -
Base Sta. Syst. Grp.
1964 Member of Tech. Staff - Receiver
Design Group
1962-1964 Design Engr. - Mine Safety
Appliances Co.
1960-1962 Research Engr. - U.S. Sig. Corps
Research Labs

J. R. NEUBAUER, P.E.



PRESENT EMPLOYER:
Urban Sciences, Inc.
5434 King Avenue
Pennsauken, N. J.

IEEE HISTORY

Member VTG/ADCOM Awards Chm.
Chairman Standards Committee
27.7 FM Mobileradio Trans. Int.
Chairman Standards Comm. 16.2
FM Mobile Receivers
Member ANSI/IEEE C.63 Sub-Committee
EMC susceptibility

PROFESSIONAL BACKGROUND

Vice President, Engineering
Urban Sciences, Inc.
Communications Consultants &
Systems Engineers

OTHER PROFESSIONAL SOCIETIES

Member, National Society of
Professional Engineers
Member, American Institute of
Aeronautics & Astronautics
Member, American Assn. for the
Advancement of Science
Fellow, Radio Club of America

EDUCATION

Colorado Univ., Mathematics
Colorado A & M College, Teaching
Temple Univ., Management

Hold 1st class FCC Radiotelephone
license; granted 2 patents in
Vehicular system control.

Mr. Neubauer has 35 years of experience in
communications systems planning and design. His
most recent studies have included computer-aided
UHF radio dispatching of major transit authorities
sponsored by the urban mass transit administration
in Philadelphia and New York City. He spent 23
years of his professional life with the RCA Corpo-
ration in capacities ranging from communication
systems engineering manager in mobile and microwave
radio through program manager on the minuteman
missile sensitive command network. He was also
associated with the lunar/Apollo extra vehicular
radio system.

NEAL PIKE



PRESENT EMPLOYER:
Federal Communications
Commission
2025 M St., N.W.,
Washington, D.C. 20554

IEEE HISTORY

1950-Present Member

PROFESSIONAL BACKGROUND

Present FCC, Supervisory Engineer, Ind.
and Public Rules Div.
1974-75 Arthur D. Hall, Inc., Vice President
1972-74 MCI Telecommunications, Div.
Director
1971-72 Merrimac Industries, Inc.,
Dir. R&D
1964-71 Computer Sciences Corp.,
Dept. Mgr.
1961-64 Prodelin, Inc. Dir. R&D
1957-60 Bell Telephone Labs. Tech. Staff
1955-57 M.I.T. Lincoln Labs., Tech. Staff

OTHER PROFESSIONAL SOCIETIES

Rutgers Engineering Society

EDUCATION

MSEE, Cornell Univ. 1956;
BSEE, Rutgers Univ. 1954;
Doctoral Studies, N.Y.U. and
Princeton Univ. 1957-60

I have a broad, diversified background in tele-
communications encompassing experience in R&D
laboratories, manufacturing companies, telephone
operating companies, engineering consulting and
regulatory work. Initial experience was in R&D
in microwave, antennas and propagation and land
mobile. Then ten years in communications and
information system consulting activities i.e.,
N.Y.C. Off-Track Betting, TWA Passenger Reserva-
tion System and others. More recently particip-
ated in the Engineering and Planning activities
of MCI's initial operations. Then followed a year
of consulting activities in regulatory proceedings
which have been extended to my work at the FCC in
the Safety and Special Radio Services Bureau.

NEAL H. SHEPHERD



PRESENT EMPLOYER:
General Electric Company
Mountain View Road
Lynchburg, Virginia 24502

IEEE HISTORY

1967-Present VTG Adcom
1964-Present Chairman of Tech. Comm. 16
1956-Present Member of Tech. Sub-Committee 27.7
1967-Present IEEE Representative on ANSI C63 & C95

PROFESSIONAL BACKGROUND

1968-Present Consulting Engineer Spectrum Usage
1947-68 Design Engineer - General Electric
1946-47 Test Engineer - G.E.
1942-46 Air Force

OTHER PROFESSIONAL SOCIETIES

RESA, U.S. Delegate to CCIR meetings
Member of EIA and IEC Comm.
Member of SAE Committee

EDUCATION

BSEE - Texas A&M University

Neal Shepherd is engaged in planning and development
of advanced mobile communication systems, propa-
gation studies, and noise studies. He has published
several papers on interference evaluation and methods
on interference reduction. He authored Chapter 17,
Mobile Radio Services of the "Communications System
Engineering Handbook".

WILLIAM TRANAVITCH



PRESENT EMPLOYER:
Federal Communications
Commission
Park Ridge, Illinois

IEEE HISTORY

Past Chapter Chairman - Chicago
1975 Chapter Chairman, Chicago
1974 Vice Chairman - Chicago

PROFESSIONAL BACKGROUND

Chief, Spectrum Utilization
Section at the FCC's Chicago
Regional Office.

EDUCATION

BSEE 1963 Newark College of
Engineering
MSEE 1973 New York University

William Tranavitch was born in Norwood,
Massachusetts, on September 18, 1941. Presently
employed by Federal Communications Commission as
Chief, Spectrum Utilization Section at the Chicago
Regional Office. Previously Chief, Liaison Section

same office. The Chicago Regional Office is an experiment by the Commission to decentralize its licensing and provide more spectrum management via engineering analysis and a computerized data base. His present duties include conducting studies concerning systems programs, including the effects of site selection on monitoring statistics, propagation anomalies, veracity of sampling techniques, and spurious data generation. Prior to joining the Commission in 1972, Mr. Tranavitch was employed at the U.S. Army R & D Laboratory, Fort Monmouth, N. J. as a project engineer concerned with development and deployment of narrow and wide band communications systems including both voice and data transmission.

SPECIAL ISSUES PLANNED FOR TRANSACTIONS

The November issue of the Transactions on Vehicular Technology will be a Special Issue devoted to Emergency Medical Services. Messrs. Dennis Bodson and Jack Renner are serving as Guest Editors for this issue, which will include at least fourteen full papers. Bulk orders for this issue, in lots of 100, will be entitled to a reduced price, if received before publication. Information on such orders may be obtained from Dennis Bodson at 202/692-2124.

The February 1977 issue will be a Special Issue on the subject of Automatic Vehicle Monitoring and Position Location Systems. Walter C. Scales is the Guest Editor and is planning a comprehensive treatment of the subject, with over 15 papers.

Following up on this, a special issue on Automotive Electronics is in the works, with Trevor Jones as Guest Editor. This issue will include some papers presented at CONVERGENCE-76, plus additional papers updating and enlarging on the work reported at that conference.

In November 1977, a Special Issue on Propagation in Mobile Communications is planned. Guest Editors are Neal Shepherd and John McCormick. Papers are now being invited for that issue.

Future plans for special issues include one devoted to the subject of Maritime Communications and another covering mobile data communications. Suggestions for still other special issues are welcomed, with nominations for topics and guest editors. Drop a line to George McClure, Transactions Editor, or call him at 305/352-3782.

TRANSACTIONS SPECIAL ISSUE ON EMERGENCY MEDICAL SERVICES

A Special Issue of the IEEE Transactions on Vehicle Technology will be published in November 1976. This issue will be devoted to Emergency Medical Services Communications. The guest editor for this issue will be Dennis Bodson, Office of Technology and Standards, National Communications System.

The major focus of this issue will be to address the creation of a new EMS communications service as a result of Federal Communications Commission docket 19880 and its impact upon all segments of the EMS community. A sample listing of papers and authors is as follows:

- EMS Communications Development: History and Commentary
..... B. A. Smith
- Emergency Medical Services Systems Development: A National Initiative
..... D. R. Boyd
- Regional Emergency Medical Communications Systems
..... Robert Wood Johnson Foundation
- The Organizational Impact of Docket 19880
..... J. O. Page
- Arizona's Rural Emergency Medical Services Communications System
..... R. H. Flood & L. K. Russell
- Problems in EMS Planning and Communications
..... F. B. Vogt
- An Evaluation Methodology for Multi-Elements Emergency Medical Services Systems
..... S. J. Stephany, Jr.
- EMS Biomedical Telemetry Systems
..... R. G. Gage & A. Shulze
- Emergency Medical Services Communication System Design
..... S. J. Adler
- The Role of Communication Systems in Emergency Medical Services
..... A. J. J. Sluyter, Jr.

Arrangements are being made to accommodate bulk orders for this issue at prices substantially below the single-copy price, if orders are placed in advance of publication. For additional information, contact Dennis Bodson.

Dennis Bodson
233 North Columbus Street
Arlington, Virginia 22203
(202) 692-2124 - Office
(703) 524-3743 - Home

BILL CHRISS NAMED ASSOCIATE EDITOR—TRANSACTIONS



William H. Chriss of Bell Laboratories is the new Associate Editor - Communications for the VTG Transactions - it was announced by George McClure, Editor. Bill will be responsible for selecting reviewers for technical papers in the communications area. He is also responsible for assuring the timely and thorough review of these papers. More specifically, Bill Chriss' interests as an Associate Editor are concerned with mobile telephone, cellular systems, Marine, aviation, propagation, private dispatch, command and control, spectrum management, circuit design and applications, and RFI matters.

Bill is currently a Member of the Technical Staff in the Mobile Customer Systems Engineering Department of Bell Laboratories. He performs mobile telephone systems studies for the new Bell System High Capacity Mobile Telephone System (HCMTS). He joined Bell Labs in 1969 as a member of the Mobile Telephone Department. His initial work included investigation of phase lock loops in mobile receiving systems. Since then, Bill has worked in the areas of fading simulation, and ship to shore signaling subsystems.

Bill has just returned from a two-year assignment at Ohio Bell where he was a member of the radio group in Columbus, Ohio. His responsibilities there included the design and maintenance engineering of all mobile telephone systems in southern and western portions of Ohio.

While in Ohio, Bill served as the vice chairman of the Columbus Chapter of VTG. He was appointed Associate Editor - Communications in April.

Bill received his Bachelor of Electrical Engineering degree from Villanova University in 1969. He was awarded his Master of Science in Electrical Engineering from Columbia University in 1971. Bill is a member of Tau Beta Pi and Eta Kappa Nu.

Bill, his wife Carol, his daughter, Cheryl, and son, Stephen live in Holmdel, New Jersey. Bill has been an amateur radio operator since the age of 11, and has collected the call signs K3JTV, W2FRD, and W8LOB, as well as an advanced class license. He also has a First Class Radiotelephone license. Bill enjoys water skiing, bicycling, and jogging. He is also an avid vegetable gardener.

Bill Chriss' address is:

W. H. Chriss
Bell Laboratories
Room 3G638
Crawfords Corner Road
Holmdel, N. J. 07733
Phone # (201) 949-6633

TRANSACTIONS TO APPLY VOLUNTARY PAGE CHARGES

To cope with the rising costs of publication and to continue its policy of increasing the number of papers published in the IEEE Transactions on Vehicular Technology, the VTG AdCom voted at its March meeting to request voluntary payment of page charges by the authors' companies or institutions. Over half of the IEEE professional groups have already adopted a policy of voluntary page charges. Payment of the charge, amounting to \$70 per page, entitles the author to 100 free reprints without covers.

Payment of the page charges is not obligatory nor is their payment a prerequisite for publication. The author is not asked for an indication of whether the voluntary page charges will be honored by his company or institution until after his paper has been accepted for publication.

In recent years a growing number of scientific and engineering societies have adopted a page-charge policy in order to cope with the increasing costs of printing and distribution and their impact on increasing the quantity of important material for publication. Underlying the page-charge philosophy is the belief that the usual research or development project is complete only when the results have been disseminated to the engineering and scientific community, and that it is thus proper that the financing of the project include funds to support, in part, the cost of publication. As an example, most U.S. government agencies recognize the payment of page charges as a legitimate part of the cost of performing research and development work under government contracts.

The voluntary page charges will not be applied to papers which have already been received for review, unless the author indicates a willingness to have his company make this payment.

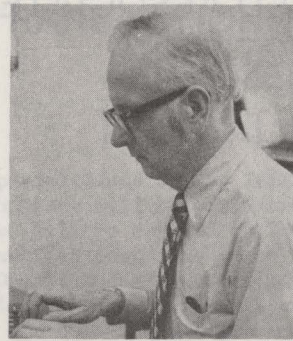
1976 SYMPOSIUM ON MICROWAVE MOBILE COMMUNICATIONS

The utilization of the frequencies ranging upward from 800 MHz in mobile radio communications will be the topic of the Fourth Symposium on Microwave Mobile Communications to be held at the Department of Commerce Laboratories in Boulder, Colorado, on September 29 through October 1, 1976. The symposium provides an atmosphere for an informal and detailed technical discussion of ideas and problems arising in the following areas of interest: Propagation, Instrumentation, Measurements and Analysis Techniques, Antennas, Noise and Interference, Modulation Techniques, Signaling and Data Transmission, Component and Device Design, System Concepts, Traffic and Control. The Symposium is officially endorsed by the IEEE Vehicular Technology Group, Communications Society, and Denver Chapter.

For further information, please contact J. J. Mikulski of Motorola, Schaumburg, Illinois 60172, or S. B. Rhee of Bell Laboratories, Whippany, New Jersey 07981.

ABOUT RECEIVERS

By A. K. "Kenny" GUTHRIE
COMMUNICATIONS EDITOR



Using only a standard signal generator, a resistive load (which substitutes for the speaker), and a harmonic distortion analyzer (DA), you can make a graph along the lines of Figure 1 for any land-mobile FM receiver. This "picture" is worth more than the traditional "thousand words"—it contains a wealth of information. Since we will show SINAD sensitivity, among other things, the receiver volume control is set to deliver full rated audio output with Standard Test Signal... 1000 uV, modulated with 1 KHz tone to $\pm 60\%$ of Maximum System Deviation.

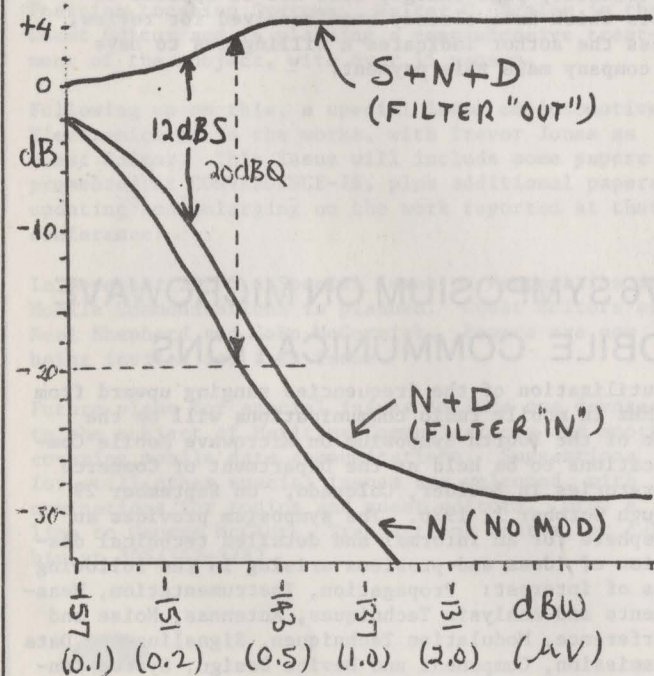


Figure 1. AUDIO OUTPUT FROM A RECEIVER, MEASURED FROM AN ARBITRARY REFERENCE. VOLUME CONTROL IS SET FOR FULL RATED AUDIO OUTPUT WITH STANDARD TEST MODULATION

The plot is in dB from an arbitrary reference. That is, adjust the "SET LEVEL" control, initially, to bring the indication from noise of an unquieted and unquieted receiver to 0 dB on a convenient scale. At each RF level:

- "S+N+D" is taken with Standard Test Modulation, with the DA filter switched "OUT." The DA serves merely as an AC voltmeter. It sums up everything which appears at the receiver output...SIGNAL (the 1000 Hz component)...NOISE...and DISTORTION (primarily from the 1000 Hz signal).

- "N+D" is taken with Standard Test Modulation, with the DA filter "IN." Of course, the DA is properly "nulled" for maximum rejection of the 1000 Hz fundamental component. The indication is "what's left?" after the 1000 Hz signal is removed. This is summed up by the meter, and included NOISE (primarily from the partially quieted receiver), plus DISTORTION (primarily that generated within the receiver).

- "N" is taken with the signal unmodulated, and with the DA filter "OUT." Nothing but noise is present. And, primarily, the source of noise is within the receiver. "N" is the "quieting curve" of the receiver.

The signal levels shown in Figure 1 go with a "typical" high-band receiver, with 20 dBQ sensitivity of -145 dBW. The numbers change from unit-to-unit and from band-to-band, but the shape of the curves stay about the same.

"S+N+D" increases with increasing signal, until the limiters are fully saturated and audio recovery levels off. This occurs about 17 dB above signal generator minimum output.

"N+D" decreases with increasing signal. At the lowest input levels, both NOISE (primarily from the partially quieted receiver) and DISTORTION (created within the receiver) are significant contributors. As the receiver becomes quieted (with increasing signal), the noise becomes less and less significant, while distortion remains constant. The "N+D"

curve is characterized by a rapid downward slope at threshold, leveling out to a value determined by the receiver's distortion characteristics. In the Figure 1 receiver, The ultimate separation between "S+N+D" and "N+D", reached at about -125 dBW input, is about 32 dB. Since $\log^{-1} -32/20 = .025$, we've determined the receiver's distortion to be about 2.5 percent.

"N" also decreases with increasing signal. Since "N" is taken with an unmodulated signal, distortion products are not a factor. The "N" curve, likewise, shows a rapid downward slope from threshold. The slope continues beyond the values plotted on our graph. The curve finally levels out at the voltage established by "hum and noise." If you use a "first-class" signal generator, this "maximum quieting" will be established by the receiver itself. Power supply ripple is usually the culprit which sets the limit. Often-times, the receiver under test is more quiet than the signal generator, and your measurement determines signal generator FM hum and noise, rather than a receiver characteristic. Given a "quiet generator" you can experience maximum quieting at -65 dB (from the original zero reference) or better.

At any input signal level, the difference between Curves "S+N+D" and "N+D" is SINAD. The level at which the curves diverge by 12 dB is the "12 dB SINAD Sensitivity" (12 dB) of the receiver. In the receiver shown in Fig. 1 12 dB occurs at about -149 dBW. SINAD is very useful for checking receiver performance. When a receiver "makes" its SINAD sensitivity specification, you are assured that nothing is grossly wrong with gain, distortion, or selectivity at the "nose."

Despite its value in receiver work, SINAD isn't the best measure for system performance. As we've seen, SINAD is limited by distortion. But, few radio systems are found to be performance-limited by distortion. In the real world, the limitation is NOISE. The preferred "system yardstick" is SIGNAL-TO-NOISE RATIO (S/N). You can obtain S/N from Figure 1. For any input level, the difference between Curve "S+N+D" and Curve "N" is S/N. You can measure S/N with nothing more than a voltmeter across the receiver output. When receiving a signal with Standard Test Modulation, note the output voltage on a dB scale. Then, remove modulation, and note the new indication on the voltmeter. The difference between the two readings is the Signal-To-Noise Ratio. We've redrawn this difference from Figure 1 into Figure 2, which shows S/N with increasing input signals.

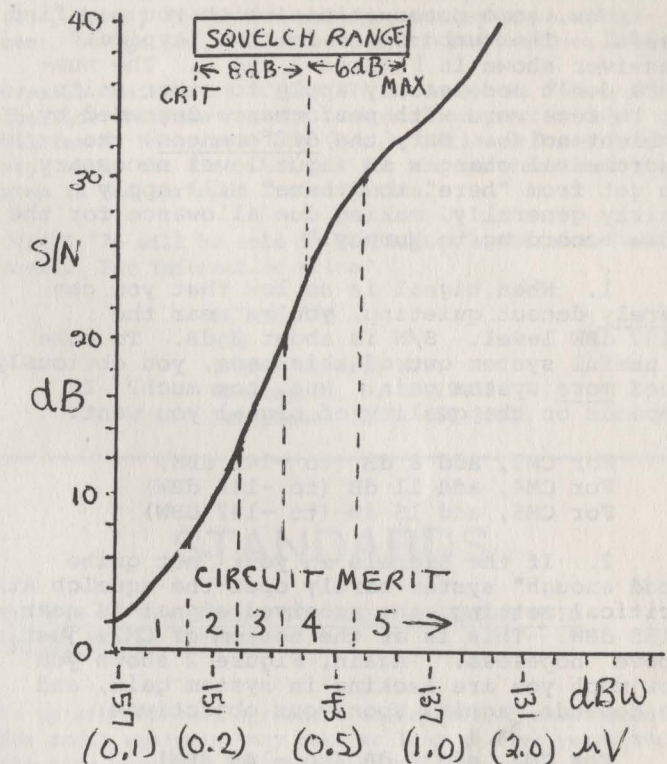


Figure 2. SIGNAL-TO-NOISE RATIO IMPROVES AS SIGNAL INCREASES. CM4 (S/N 20 dB) IS A REASONABLE "MINIMUM" OBJECTIVE FOR SYSTEM OPERATION. RANGE OF SQUELCH CONTROL ADJUSTMENT IS ABOUT 14 dB, ALMOST CENTERED ON THE 20 dBQ SENSITIVITY

We've overlaid the curve of Figure 2 with "Circuit Merit" signal-quality designations. These give an idea of "how good?" is the signal. Here are some commonly used Circuit Merit" definitions:

CIRCUIT MERIT	SIGNAL-TO-NOISE RATIO	DEFINITION
CM1	Less than 8 dB	Hopeless
CM2	8dB - 16dB	Poor
CM3	12dB - 22 dB	Fair
CM4	20dB - 30dB	Good
CM5	More than 30 dB	Excellent

And, we've also overlaid the performance of a "typical" adjustable noise-operated squelch circuit. The squelch control range is about 14 dB. At "critical" setting, the circuit "opens" with signals about 8 dB below 20 dBQ. At "maximum squelch," opening is with signals about 6 dB above 20 dBQ.

Now, some observations which you may find useful. The numbers are for the "typical" receiver shown in Figures 1 and 2. The numbers don't necessarily apply to other units, or to receivers with performance degraded by ambient noise. But, the differences, the incremental changes in input level necessary to get from "here" to "there" will apply fairly generally, making due allowance for the "Law according to Murphy."

1. When signal is so low that you can barely detect quieting, you're near the -157 dBW level. S/N is about 2 dB. To make a useful system out of this mess, you obviously need more system gain. But, how much? It depends on the quality of signal you want:

For CM3, add 8 dB (to -149 dBW)
For CM4, add 11 dB (to -146 dBW)
For CM5, add 15 dB (to -142 dBW)

2. If the signals in your "not quite good enough" system barely open the squelch at critical setting, the received signal is near -153 dBW. This is at the bottom of CM2, just above "hopeless." Again, Figure 2 shows you how much you are lacking in system gain, and it depends, again, upon your objectives:

For CM3, add 4 dB (to -149 dBW)
For CM4, add 7 dB (to -146 dBW)
For CM5, add 11 dB (to -142 dBW)

3. If signals in your system will open the squelch circuit when it's set to MAXIMUM, received signal is better than needed for CM5 performance. Your "margin" is at least 4-5 dB, and maybe more. You can determine "how much?" more by making a S/N measurement.

The performance of the receiver, coupled with the characteristics of the squelch circuit, make a powerful argument for the use of "fixed squelch." Given something which he can "twiddle," the uniformed user will twiddle to his detriment. If he sets too close to "critical" he hears a lot of useless junk from distant co-channel users and interference sources. There's no intelligence--what he hears constitutes an annoyance and he becomes firmly convinced that the radio is "noisy" and, therefore, no good. On the other hand, if he sets the squelch to "maximum" and leaves it there, he's really plugged the "ears" of your radio system. "Max Squelch" is about 7 dB above the signal level required for CM4 performance. He just cut your system gain by 7 dB! 7 dB can be pretty precious. He just cut your range by a third! If you use fixed squelch, a good setting is for operation at 10 dB S/N, which corresponds to about 8 dBQ. The user won't hear much which is completely useless, and you'll have all of the system gain you've provided to give you some "margin" which will be useful when things go wrong.

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MEMBERSHIP SURVEY PROGRESS REPORT

A VTG membership survey is now in the hands of randomly selected VTG members in Regions 1 thru 7. The survey form contains 47 mostly multiple choice questions and space for the participants' comments. The questions are arranged in five major groupings soliciting data on: (1) the participant and his employment (6 questions), (2) the participants' IEEE and VTG membership (7 questions), (3) the participants' views on VTG publications (19 questions), (4) the participants' views on VTG conferences (9 questions), and (5) the participants' views on VTG chapter activities (6 questions).

The results of the survey will help guide the Adcom in making decisions where membership services are in question and will provide VTG leadership with a profile of the membership.

AUGUST 16

is the due date for the randomly selected VTG members to return the membership survey. If you received a copy of the survey and have not yet completed it, please do so now. I hope to be able to complete the tabulation of results by mid-September and to write an article for the November Newsletter covering the survey results.

Tom McKee, Secretary VTG

RESOURCE USES OF THE SEAS TO BE FEATURED IN OCEANS '76

Economic potentials of the oceans including deep sea mining for manganese nodules, fisheries, Law of the Sea and international implications, and remote sensing of the sea by satellites and other sensors are features of the technical sessions scheduled for OCEANS '76 to be held here September 13-15.

This second annual combined conference of the Marine Technology Society and the Council on Oceanic Engineering of the Institute of Electrical and Electronic Engineers will have overtones of the U.S. Bicentennial celebration that are focused on the Nation's capital. A panoply of U.S. oceanographic and naval history is being assembled and will be on exhibit. The displays have been obtained from the Smithsonian Institution, U.S. Navy, National Oceanic and Atmospheric Administration and the U.S. Marine Corps.

The 130 papers to be presented cover a wide spectrum of ocean oriented activities with strong emphasis on the development and utilization of ocean resources, environmental observation, offshore coastal activities and the associated ocean engineering and marine technology. In addition there will be workshops on marine recreation, marine education, deep ocean mining and water quality measurement requirements. Poster sessions will permit attendees to discuss technical subjects directly with the authors.

More than 100 exhibitors will display their goods and services.

The principal focus on the Law of the Sea negotiations will be given by Howard W. Pollock, Deputy Administrator of the National Oceanic and Atmospheric Administration (NOAA), who has been a senior delegate to all of the Law of the Sea Conferences. What is hoped to be the treaty-making session of seven weeks will end September 17. An international flavor will be added by Georgette C. Mariani of the French National Center for Exploitation of the Oceans who will discuss the legal status of of installations in the marine environment.

On the subject of marine mining, one of the stickier questions at the Law of the Sea Conference, an overview will be presented by Amor Lane, head of NOAA's Office of Marine Minerals. An innovative approach to processing the end product of deep sea mining, "Nuclear Techniques for Mining and Processing of Manganese Nodules" will be given by R. Pepelnik, U. Fanger and W. Michaelis of the German Gesellschaft fur Kernenergieverwertung in Schiffbau und Schifffahrt mbH.

The focus on remote sensing will be on the upcoming SEASAT A satellite planned for launch in 1978. Papers will be given on the satellite's imaging radar, radar altimeter, scanning multi-channel microwave radiometer and microwave scatterometer.

The Outer Continental Shelf Study session, chaired by MTS President-Elect Phillip Eisenberg, will cover activities in the Atlantic, southern California, Mississippi-Alabama-Florida and south Texas areas.

Other sessions will feature undersea vehicles, acoustics, buoys, diving and salvage, coastal zone management, navigation, pollution control and undersea cables.

Overall Chairman of OCEANS '76 is Joseph R. Vadus, NOAA. The Vice Chairman for the technical program is Capt. William M. Nicholson, USN (Ret.), National Ocean Survey, while the Vice Chairman for the non-technical program is Bud Burke of Tracor Marine.

OCEANS '76 will be held in Washington's Sheraton-Park Hotel. For information write:

OCEANS '76
MTS
1730 M Street, N.W.
Washington, D. C. 20036
Telephone: (202) 659-3251

STANDARDS

METHODS OF MEASUREMENT FOR RADIO EQUIPMENT USED IN THE MOBILE SERVICES

To obtain national agreement on methods of measurement for radio equipment may take as long as five years and the time required for international agreement is usually longer. The International Electrical Commission (IEC) is the international governing body for standards which are recognized by more than 40 participating National Committees. IEC sub-committee 12F is responsible for preparing standard methods of measurement for mobile equipment.

Recent action by IEC SC12F has resulted in agreement for a single method of measuring receiver sensitivity. Proposed methods had included the following:

1. 20 dB Noise Quieting
2. 12 dB SND/ND (SINAD)
3. 10 dB SND/N (for AM)
4. 20 dB SND/N
5. 20 dB SND/N (PSOPHOMETER weighted)

The SINAD method (12 dB) of measuring receiver sensitivity, after several years of debates has become the only recommended method for FM, AM and SSB type receivers. It is interesting to note that I.R.E. Standard 49IRE16.S1 first introduced this method in 1949.

The following IEC Standards are available from ANSI. Send purchase order - Attention: Sales Department, American National Standards Institute, 1430 Broadway, New York, N. Y. 10018.

Publication 489-6 Methods of Measurement for Standards lists definitions.

Publications 489-6A Methods of measurement for signalling equipment. This Standard is to provide means for making independent measurements of the encoder and decoder of a Selective-Calling System.

BY: NEAL SHEPHERD

MEETINGS

OCEANS '76

Sheraton Park Hotel
Washington, D. C.

September 13-15, 1976

* * *

WESTERN ELECTRONICS SHOW (WESCON)

Los Angeles Convention Center
Los Angeles, California

September 14-17, 1976

* * *

CONVERGENCE '76

Hyatt Regency
Dearborn, Michigan

September 20-22, 1976

* * *

ELECTRONIC AND AEROSPACE SYSTEMS CONVENTION

Stouffer's Inn
Washington, D. C.

September 26-29, 1976

* * *

CANADIAN COMMUNICATIONS AND POWER CONFERENCE

Queen Elizabeth Hotel
Montreal, Quebec, Canada

October 21-22, 1976

* * *

FRONTIERS IN EDUCATION INT'L. CONFERENCE

Ramada Inn
Tuscon, Arizona

October 25-27, 1976

NATIONAL TELECOMMUNICATIONS CONFERENCE

Fairmont Hotel
Dallas, Texas

November 29 - December 1, 1976

* * *

INTERNATIONAL ELECTRON DEVICES MEETING

Washington Hilton Hotel
Washington, D. C.

December 5-8, 1976

SHORT COURSE

FREQUENCY MODULATION

Sarasota, Florida

September 13-17, 1976
January 10-14, 1977

Fundamentals of FM systems, including noise, distortion, spectra, tape recording, radio links, telemetry applications. Contact:

EMR-Telemetry (Sponsor)
Mrs. Jean Mazza
Box 3041
Sarasota, Florida 33578
Phone: (813) 371-0811

K. M. Uglow, Consultant (Instructor)
Box 2260
Sarasota, Florida 33578
Phone: (813) 955-5856

Fee: \$300