IEEE
VEHICULAR TECHNOLOGY SOCIETY
NEWSLETTER

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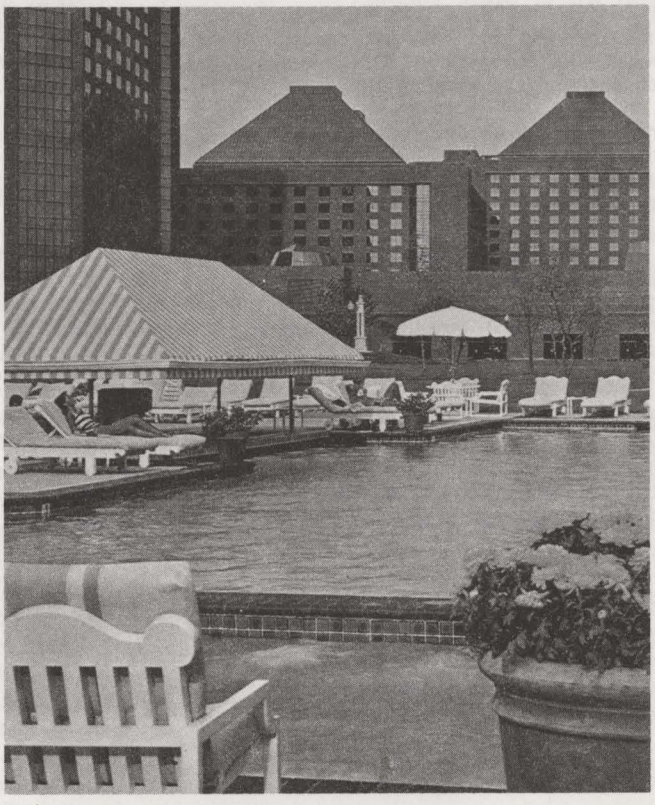
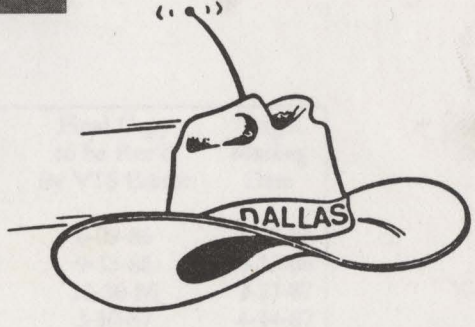
Dallas—Site of 1986 Annual VTS Conference



Be there May 20-22!



TECHNOLOGY ON THE MOVE

President's Message

Robert Fenton
President
IEEE Vehicular Technology Society

By now, I hope you have completed your plans to attend our 36th Annual Conference, VTC '86 in Dallas. If you haven't, you should especially note that VTC '86 is highlighted in this Newsletter with a copy of the technical program included. Examine the latter and note that our Dallas Conference Committee has compiled an excellent technical program with sessions in areas of high current interest and some outstanding panel discussions. Hopefully, this will convince you to join us for an outstanding technical event and an opportunity to enjoy Texas hospitality.

Elsewhere in this Newsletter, you will find an open letter from Sam McConoughey, our Immediate Past President, in which he stresses the need to nominate good candidates for our Board of Directors. Please read his letter and, if you know someone you believe to be qualified, send his name to Sam.

I would also like to enlist your aid for our awards program. We need you to nominate your colleagues for recognitions such as IEEE Fellow, IEEE Field Awards, or for our VTS awards. In particular, our Avante Garde award is intended to recognize those members who played a pioneering role in the development of VTS--don't you know one or more individuals who are deserving of such recognition? If so, please contact our Awards Chairman, Stu Meyer.

These and other matters will be considered at our next Board of Directors' meeting which will be held in Dallas the day before VTC '86. Since the entire Board will be present both then and during the Conference, this is a good opportunity for you to discuss matters of concern with Board Members and suggest issues that should be considered.

Hope to see you in Dallas!

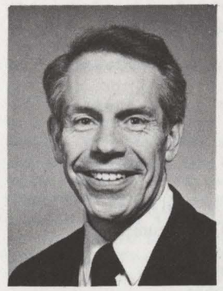
Respectfully submitted,

Bob

Robert E. Fenton

Newsletter Staff

Editor's Notes



A. Kent Johnson
Newsletter Editor

This edition of the newsletter features the upcoming Annual VTS Conference to be held May 20-22 in Dallas, Texas. Elsewhere in the newsletter you will find a complete listing of the papers to be presented at the conference and as you will see, the committee has arranged for an outstanding technical program. We hope you will all be able to make it to Dallas and we look forward to seeing you there.

Special mention should also be made of the results of the recent election for members of the board of directors. These results are mentioned in the report of the recent board meeting and include the election of the following to 3 year terms ending December 1988:

Robert E. Fenton
Charles N. Lynk, Jr.
George F. McClure
Stuart F. Meyer
Eric J. Schimmel

We extend congratulations to these individuals and thank them for past work in behalf of the society.

I would like to call your attention to one other item found elsewhere in this newsletter. Society Vice President Roger Madden has been working with a committee on the revision of the constitution of the IEEE Vehicular Technology Society and a copy of the revised constitution is printed here for your consideration. This document was approved by the Board of Directors at the March 13, 1986 meeting. Please take advantage of this opportunity to study the new constitution.

Month of Issue	Final Copy to be Rec'd By VTS Editor	Target Mailing Date
August	6-09-86	7-13-86
November	9-13-86	10-15-86
February	12-30-86	1-27-87
May	3-10-87	4-14-87

Society Officers and Board of Directors

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BOARD OF DIRECTORS

NAME(Term thru)	RESPONSIBILITY
Robert E. Fenton(88)	President
Arthur Goldsmith(87)	Treasurer
Al Goldstein(86)	Conference Coordinator
A. Kent Johnson(86)	Newsletter Editor
Samuel A. Leslie(86)	Society Secretary
Fred M. Link(86)	Chairman, National Site Selection
Charles Lynk(88)	Chairman, Paper of Year Comm.
Roger Madden(87)	Vice President
Robert A. Mazzola(87)	Chairman, Membership Comm.
George F. McClure(88)	Chairman of Publications Comm. and Transactions Editor
Samuel R. McConoughey(86)	Immediate Past President
Stuart Meyer(88)	Senior Past President
William Misskey(87)	Canadian Editor, Newsletter
Evan B. Richards(87)	National Conference Coordinator
Eric Schimmel(88)	Chairman, Personal Radio Comm.

Board of Directors Report

Samuel A. Leslie
VTS Secretary

TO: IEEE VTS Board of Directors
VTS Chapter Chairmen

A VTS Board of Directors meeting was held at the IEEE Office in Washington, D.C. on March 13, 1986. The meeting was called to order at 9:30 AM, with the following in attendance:

#Bob Fenton	President
#Roger Madden	Vice President
#Art Goldsmith	Treasurer
#Stuart Meyer	Senior Past President
#Sam McConoughey	Junior Past President
#Eric Schimmel	Personal Radio Chairman
Bob McKnight	VTS Publicity Chairman
#Sam Leslie	Secretary
#Bill Misskey	Vehicular Electronics Editor
Gaspar Messina	Chapter Activities Chairman
#Evan Richards	National Conference Coord.
#Fred Link	National Conf. Site Sel.
#Kent Johnson	VTS Newsletter Editor
#Al Goldstein	Noble Candidate Committee
Leo Himmel	Transportation Systems
Tony Eastham	Chairman, Trans. Systems
Richard Uher	Assoc. Trans. Editor

Twelve of the 15 elected Board members were present for this meeting. A quorum was thus present for voting on matters before the Board, and a two-thirds majority was present for voting on the revision of the VTS Constitution.

Sam McConoughey moved, Kent Johnson seconded that the minutes of the last Board meeting (December 11) be approved as published.

CHAPTER ACTIVITIES REPORT

Gaspar Messina reported that the winner of the Chapter of the Year Award goes to the New Jersey Coast (EMC/VT/AP), with the Cleveland Chapter (VTS/ComSoc) being runner-up.

Gaspar reported that more information is being received from the Chapter Chairmen, but that the L31 forms that are sent to IEEE Section Headquarters are still not being forwarded to him.

McConoughey moved, Johnson seconded that Messina's report be accepted as presented. The vote was unanimous in favor.

TAB REPORT

Roger Madden attended the last TAB meeting, and reported that the cost to VTS for the publishing of the Transactions will be going up, due primarily to a restructuring of the methods of investment return from IEEE Headquarters for the various Societies.

He also reported on a discussion regarding mutual interests between ComSoc and VTS in the mobile communications area. ComSoc had recently published a magazine issue devoted primarily to Cellular Mobile Communications, and has recently issued a call for papers for portable and mobile communications. Considerable concern was expressed by all those in attendance that 1) these are subjects that fall squarely into one of the three primary interest areas of VTS, and 2) this activity will significantly siphon off possible papers for presentation at the VTS conferences and publication in the VTS transactions. The VTS President is to get with the VTS Transactions Editor, George McClure, to explore alternatives to resolving this issue.

Also, McConoughey moved, Misskey seconded that the VTS President take the issue of trespass on the Society's scope up at the next TAB meeting, to resolve this issue in a constructive manner with the ComSoc Board, and to make clear that VTS expects such issues to be jointly sponsored where ComSoc feels that special issues on mobile or portable communications are of interest to their membership. The vote was unanimous in favor.

On another issue, Roger Madden moved, Stu Meyer seconded that the VTS support the WISE student program with a fee of $125. Vote was unanimous in favor.

TREASURER'S REPORT

Art Goldsmith reported that VTS had finished 1985 with a surplus of $89.5K, which is a one-in-four-year occurrence due to the '84 Convergence Conference. He noted that expenses for publication of the Transactions will be taking a significant jump in 1986, due in part to the projected special issue on 800 MHz Propagation and due to the restructuring of the return on investments from IEEE Headquarters.

Sam McConoughey moved, Al Goldstein seconded that the Treasurer's report be accepted. The vote was unanimous in favor.

TRANSACTIONS EDITOR'S REPORT

A written report from George McClure indicates that we are getting back on track toward getting the Transactions published on schedule. He also reported that Dr. Sang B. Rhee (Bell Labs, Whippany) will be joining Bill Lee as an assistant Transactions Editor for Communications. Reports from Dick Uher and Bill Misskey regarding the status of Transportation Systems and Vehicular Electronics pending papers were also made.

Roger Madden moved, Bill Misskey seconded that the Transaction Editor's and the Associate Editor's reports be accepted as submitted. The vote was unanimous in favor.

NOBLE COMMITTEE REPORT

Al Goldstein noted that problems continue in getting the scholarship funds to the awardees in a timely manner. The Noble Committee was assigned the task of recommending changes to the procedure to see if some of the required approval steps can be shortened.

On the issue of the amount of the scholarship (discussed fully at the last meeting), Al Goldstein moved, Bill Misskey seconded that VTS and Motorola jointly increase the amount of the Foundation fund from $50K to $80K, with $15K to be provided by VTS and $15K to be provided by Motorola, and with the amount of the stipend to be increased from $5000 to an amount to be determined by the next full Board meeting. The vote was unanimous in favor. Art Goldsmith is to work with the Nobel Committee to determine the amount of stipend which can be expected at today's current dividend rates.

TRANSPORTATION SYSTEMS REPORT

Tony Eastham noted that VTS needs to continue its efforts toward recruiting those members of IAS which belong to the Land Transportation Committee. He also noted that the LTC board is holding a meeting at the upcoming joint IEEE/ASME meeting in Norfolk. Bob McKnight and Art Goldsmith are planning on attending that meeting, and they will report the results at the next Board meeting.

Goldstein moved, Johnson seconded that the Transportation Systems report be accepted as presented. The vote was unanimous in favor.

NEWSLETTER EDITOR'S REPORT

Kent Johnson reported that he has one "Professional Listing" ad in hand, one promised by publication deadline, and the possibility of a third listing.

A copy of the IEEE Student Potentials magazine containing the VTS ad was also shown. Tony Eastham noted that an error exists in the ad in that the word "Electronics" in the Transportation Systems heading makes the scope too restrictive. Bob McKnight is to have this corrected for the next issue in which the ad is to be run.

McConoughey moved, Madden seconded that the Newsletter Editor's report be accepted as given. The vote was unanimous in favor.

ELECTION AND AWARDS COMMITTEE REPORTS

Stu Meyer reported that the following VTS members have been elected to the Board for the January 1986 to December 1988 term:

Robert E. Fenton
Charles N. Lynk, Jr.
George F. McClure
Stuart F. Meyer
Eric J. Schimmel

An exceptionally high percentage response to the balloting for the above was noted. The response to the mailed ballots was nearly 25 percent, where the average response to IEEE elections is 18 percent.

Stu noted that he has had inputs from only one individual for awards for the upcoming Dallas Conference. He made a request for more recommendations from those present.

Also, a written report submitted by Jack Neubauer indicates that we have only one candidate currently in process for the Fellow Grade award. Bob Fenton expressed a concern that he thought that there were two others, and that he will contact Al Isberg to determine the Fellow award status.

McConoughey moved, Johnson seconded that the above reports be accepted as presented. The Vote was unanimous in favor.

NOMINATIONS COMMITTEE REPORT

Sam McConoughey noted that he has only one firm commitment to run for election for the January 1987 to December 1989 term. He hopes to get a slate of 10 to run for the 5 positions by June 1. An open letter is to be published in the Newsletter soliciting nominations for the Board.

Richards moved, Johnson seconded that the nominations committee report be accepted as presented. The vote was unanimous in favor.

CONFERENCE COMMITTEE REPORT

Evan Richards reported on the status of the following conferences:

VTC/Dallas: The response to the call for papers was much better than anticipated, with several having to be turned down due to lack of time on the presentation schedule. The advance program mailing is running behind schedule; a conference telephone call is being planned to assist the Dallas committee in achieving a timely mailing of the advance program and registration.

VTC/Boulder: John Murrey submitted an excellent written report on what to watch out for in conducting future conferences. This report has been forwarded to the Dallas committee as well as the files of the members of the Conference committee for future reference.

VTC/Tampa: Allen Gondeck reported that the steering committee is meeting March 19, and that the submitted budget will be amended as requested.

VTC/Philadelphia: Dates for the 1988 Conference in Philadelphia tentatively have been selected to June 14 through June 17, with June 14 being registration. The location of the conference is planned to be at the Center City Holiday Inn, 1818 Market Street, in Philadelphia.

MAGLEV Conference: VTS is co-sponsoring this conference, which will be held at the Ming Court Hotel in Vancouver, Canada on May 14-16, 1986. The Conference Chairman is Dr. Tony Eastham.

Joint VTS/Railroad '87 Conference: Fenton, Eastham, and Richards are to resolve financial questions with the committee that is planning this conference.

Kent Johnson moved, Roger Madden seconded that the Conference Committee Chairman's written and verbal reports be accepted as submitted. The vote was unanimous in favor.

STANDARDS COMMITTEE REPORT

A written report by Jack Neubauer pointed out that two IEEE Standards are in jeopardy of becoming obsolete if timely action is not taken by the Board. The two standards in question are:

> STANDARD 263, "Measurement of Impulsive Radio Noise Radiated by Motor Vehicles and Affecting Mobile Communications Receivers in the Frequency Range 25 to 1000 MHz".
>
> STANDARD 184, "IEEE Test Procedures for Frequency Modulated Mobile Communications Receivers".

Eric Schimmel reported that EIA is faced with a similar situation with some of its mobile radio standards, and that they are currently in the process of reviewing their standards for updating. Eric further suggested that VTS and EIA should coordinate their standards activities. Meyer then moved, Misskey seconded that a committee consisting of Madden, Schimmel, and Meyer be appointed to represent VTS in a cooperative effort with EIA in regard to radio standards activity. The vote was unanimous in favor.

CONFERENCE SITE SELECTION REPORT

Fred Link reported that Arizona is the choice at this time for the 1989 Conference, with Chicago and Orlando remaining as backups. After some discussion, the Board decided that Fred should pursue having the 1990 Conference held in Detroit. The 1990 Conference would thus be the 40th anniversary of the first VTS conference, which was held in Detroit.

VEHICULAR ELECTRONICS REPORT

Roger Madden reported on his February 11 attendance at the Convergence Committee meeting in Detroit. He reports that James McDonald, CEO of General Motors, has been selected as the kickoff speaker for the conference, and that Donald Peterson (Ford Motor Co.) will be the banquet speaker. Trevor Jones (TRW-Automotive) will be heading a Blue-Ribbon panel discussion. The conference appears headed toward and even better year, with all of the available exhibit space (8800 square feet) being sold.

Bob Fenton reported on a January visit to the Convergence Planning Committee, where he indicated that VTS wanted to sponsor a Transportation Electronics scholarship. This is in response to the financial success of the '84 Convergence Conference which resulted in some $60K in funds being provided to VTS. Fenton further reported the the Convergence Committee that VTS's experience with the Nobel Scholarship fund indicated that a minimum of $80K would be necessary to achieve a reasonable stipend from interest or dividends from such a fund. Fenton reported that the Convergence Committee was definitely interested in proceeding with such a plan.

Madden then moved, Johnson seconded that VTS sponsor such a scholarship provided that the Convergence Conference Committee or perhaps a Corporate sponsor provide at least an additional $20K to match the $60K already in VTS's accounts (from the '84 Conference), with said scholarship to be renewable on a 5-year cycle at the Board's discretion. The Board vote was unanimous in favor.

On another matter, Bob Fenton indicated that the Convergence Conference Committee has carried sums forward from the '84 Conference (of which a portion is allocated to VTS) to provide financing for the upcoming '86 Conference. Since this is in variance with IEEE rules on accounting for conference funds, Bob is to request that the Convergence Treasurer provide a letter to the VTS Treasurer indicating the amount of funds involved. Fenton is to take this matter up with the Convergence Committee at their next meeting.

CONSTITUTION & BYLAWS REPORT

Roger Madden submitted a corrected version of the VTS Constitution to the Board. After a brief review, Madden moved, Richards seconded that the March 12, 1986 version of the VTS Constitution be adopted for incorporation. Changes to the Constitution require that two-thirds of the elected Board members be present for voting. Twelve of the elected 15 Board members were present, thereby providing the necessary quantity. The vote to adopt the new VTS Constitution was unanimous in favor.

Kent Johnson is to publish the new Constitution in the Newsletter, and Roger Madden is to proceed with getting IEEE Headquarters to send the Constitution to the VTS membership for approval.

MEMBERSHIP COMMITTEE

Bob Fenton noted that a new membership committee chairmen needs to be appointed. Also, Sam McConoughey indicated that the recently published VTS membership brochure is in need of correcting in light of the recent IEEE changes in new member initiation fees.

INFORMATION & TELECOMMUNICATION POLICY

Eric Schimmel moved, Kent Johnson seconded that the VTS President send a letter to the TAB/USAB/CCIP committee indicating that VTS has reviewed its position on FCC Docket 85-171 (alternate type acceptance procedure for land-mobile transmitters), with the consensus that the issues have already been adequately aired by the comments and reply comments which have been filed in response to the proceedings, and that additional late submissions would not add anything substantive to the record. The motion carried with Board Members S. McConoughey and R. Madden abstaining.

Eric Schimmel is to continue following the security issue being raised by the CCIP committee, and is to report at the next Board meeting.

McConoughey moved, Madden seconded that Schimmel's verbal report be accepted as presented. The vote was unanimous in favor.

PUBLICITY CHAIRMAN'S REPORT

Bob McKnight reported that he has sent press releases to some 60 magazines. These press releases were for the Dallas VTC '86 Conference and for the ASME/IEEE Joint Railroad Conference. Richards moved, Madden seconded that the publicity chairman's report be accepted. The vote was unanimous in favor.

PROPAGATION COMMITTEE REPORT

Sam McConoughey indicated that the committee is still proceeding toward a November Transactions publication date, although the schedule is getting tight for getting the drafts reviewed. Madden moved, Johnson seconded that the Board accept the propagation committee report. The vote was unanimous in favor.

MILESTONES COMMITTEE REPORT

Sam McConoughey reported that the site nominations for the three milestones locations are proceeding well, with Detroit being further along at this point. Mr. Ron Kline of IEEE Headquarters would like to have all three site nominations combined into a single package to present to the IEEE History and Executive Committees. Mr. Kline also asked about the Society sharing a portion of the costs involved in providing the plaques.

After discussion, Richards moved, Misskey seconded that "VTS appropriate a fund, for its equal share in the costs of establishment of the three Milestone sites, and that this fund not exceed $1500.00. Payments from this fund to the IEEE Milestone program may be made by the Treasurer upon the sole approval of the Society President". The vote was unanimous in favor.

Fred Link moved, Roger Madden seconded that the Milestones Committee Report be accepted as presented. The vote was unanimous in favor.

PACE CHAIRMAN REPORT

Kent Johnson relayed a report from Frank Lord, where he indicates that he has been appointed to the editorial boards of the Professional Perspective (an insert that appears in the Institute) and to IMPACT. He also is participating in the USAB manpower committee. Madden moved, McConoughey seconded that the report from Frank Lord be accepted. The vote was unanimous in favor.

APPOINTMENTS

Bob Fenton reported that Ron Kline of IEEE HQ would like the Board to designate a Historian for VTS. By unanimous agreement, the Board designated Fred Link as the VTS Historian.

NEW BUSINESS

Fred Link requested that the Board seriously consider means of compensation for the expenses of those Board members who attend the Board meetings and who do not have corporate sponsors to underwrite those expenses. After discussion, Fenton appointed the chairman of the Constitution & Bylaws Committee and the treasurer to investigate the feasibility of including a generalized policy for inclusion in the VTS Bylaws. They are to present a recommendation to the Board at the Dallas meeting.

ELECTION OF OFFICERS

Sam McConoughey moved, Fred Link seconded that the present slate of officers be nominated for re-election for the term ending December 1986. After discussion, Fred Link moved, Kent Johnson seconded that nominations be closed. The vote on both motions was unanimous in favor. Thus, Bob Fenton continues as VTS President, Roger Madden as VTS Vice President, and Art Goldsmith as VTS Treasurer. Bob Fenton then reaffirmed all appointments, with the exception of the membership chairman position, to continue through the end of the year.

NEXT MEETING

The next Board meeting will be held on May 19 at the Dallas VTC Conference site. The meeting will begin promptly at 1:00PM. A Board dinner with the VTC conference committee and spouses is planned for the evening of the 19th, and an awards luncheon tentatively is planned for the noon luncheon on Tuesday.

ADJOURNMENT

Sam McConoughey moved that the meeting be adjourned at 3:25PM.

Respectfully submitted,

Samuel A. Leslie
IEEE VTS Secretary

Chapter News

Gaspar Messina
Chapter News Editor

Meetings

Cleveland VTS

Introduction To Fiber Optics in Communications
by Mr. Harvey Flanders
Held March 13, 1985, with 13 attending, including 5 guests.

Introduction To Cellular Mobile Telephone
by Mr. John Leeder of Cellular One of Cleveland
Held June 11, 1985, with 23 attending, including 13 guests.

Tour of Oberlin Air Traffic Control Center
by Mr. George Lasko of The Federal Aviation Administration
Held October 15, 1985, with 14 attending, including 10 guests.

Land Mobile Radio From the 20's To The 80's
by Mr. Stu Meyer of E.F. Johnson Company
Held November 12, 1985, with 23 attending, including 13 guests.

Space Shuttle and Satellite Communications Update
by Mr. Ron Schertler of NASA-Lewis Research Center, Cleveland
Held December 10, 1985, with 21 attending, including 9 guests.

Tour and Demonstration of Cellular Phone Systems
by Mr. Bob Patterson of GTE Mobilnet of Cleveland, Ohio
Held January 16, 1986, with 43 attending, including 17 guests.

Gaspar Messina
Editor and Chapter Activities Chairman
9800 Marquette Drive
Bethesda, Maryland 20817

Summary of Papers for Dallas Conference

Vehicular Technology Conference offers much for radio, communications, automotive and transportation engineers.

VTC-86 to be held May 20-22 at Loews Anatole Hotel in Dallas, Texas, will feature 84 technical papers delivered by practicing electrical engineers specializing in various aspects of communications and transportation. Authors, in most cases, will enhance their presentations with visual aids.

Subjects covered are in 13 major technical areas. Following is a list of the papers that will be presented in each area:

ANTENNAS

-- Radio Suppression: Science or Black Art? by Clem W. Rowan, Carlos A. Altgelt of Ford Motor Co.

-- A Comparison of Horizontal Patterns of Antenna on Skeletal and Complete Support Structures by Kevin J. Connolly, Peter D. Blevins of Celwave RF.

-- Lens Antenna Concepts for Land Mobile Satellite Communications by Dr. Donald G. Bodnar, Georgia Tech Research Institute; and Dr. Yahya Rahmat-Samil of Jet Propulsion Laboratory.

-- An AM-FM Cellular Vehicular Antenna System by L. J. Bogdon, J. N. Hines and H. Oswald of AT&T Bell Laboratories.

-- The Near Field of Circular Loop Antennas by Q. Balzano and K. Siwiak of Motorola, Inc.

-- Evolution of RF Safety Standards and Their Impact on Mobile and Portable Transmitters by Q. Balzano of Motorola, Inc.

-- RF Safety Evaluation of Window-Mounted Antennas by Q. Balzano, O. Garay and T. Manning of Motorola, Inc.

PROPAGATION

-- UHF-Field Strength Measurements for the Determination of the Influence of Buildings and Vegetation in Land Mobile Radio by K. Loew of Research Institute of the Deutsche Bundespost.

-- Statistical Modeling of a Mobile Radio Channel by M. Lecours, J. Y. Chouinard, G. Y. Delisle and J. Roy of Laval University.

-- Digital Transmission Over Mobile Channels- Measurements and Evaluation by Asrar U. Sheikh and Roshady M. Hafez of Carleton University.

-- The Standard Deviations of the Local Means of Mobile Radio Signals in Flat, Suburban Terrain by Tom Rubinstein of Motorola, Inc.

-- Measurement and Modeling of Land-Mobile Satellite Signal Statistics by Chun Loo, E. E. Matt, J. S. Butterworth and M. Dufour of Government of Canada.

-- Transmission Bandwidth Improvement by Directive Antenna in Urban Mobile Radio Communication by Tsutomu Takeuchi, Fumio Ikegami and Susumu Yoshida of Kyoto University.

-- Relative Performance of Omni and Directional Antennas in an Urban Environment by S. B. Rhee of AT&T Bell Laboratories.

-- Propagation of Radio Signals Inside Buildings at 150, 450 and 800 MHz by Stellios J. Patsiokas, Brian K. Johnson and Jim L. Dailing of MOtorola, Inc.

CELLULAR AND MOBILE TELEPHONE FEATURES

-- The Portable Cell Site by James D. Proffitt of PacTel.

-- Background Acoustic Noise Reduction in Mobile Telephones by R. A. Goubran and H. M. Hafaz of Carleton University.

-- The Cell Enhancer by Edwin W. Quinn of Bell Atlantic Mobile Systems.

-- Development of an On-Board Voice Activation Dial Equipment by Atushi Fudasawa, Takuro Sato, Yumi Takizawa and Shinichi Sato of OKI Electric Industries Co, Ltd.

-- Echo Cancelers Enable Full-Duplex Operation for Hands-Free Mobile Telephone by Stephen Wilkowski and Reed Fisher of AT&T Bell Laboratories.

-- Digital Control of Transmitter Power in a Cellular Mobile Telephone by Roland J. Turner of AT&T Bell Laboratories.

-- Cellular Received Signal Strength Indicator Circuit by A. K. Johnson of AT&T Bell Laboratories.

DATA TRANSMISSION AND DETECTION

-- Analysis of GMSK with Discriminator Detection in Mobile Radio Channels by Said M. Elnoubi of the University of Illinois.

--Analysis of GMSK with Differential Detection in Land Mobile Radio by Said M. Elnoubi of the University of Chicago.

-- Performance of an OFDM-FM Scheme for Data Transmission over Rayleigh Fading Channels by E. Casas, C. Leung of the University of British Columbia.

-- Simulation of ARQ/FEC Data Transmission Using Stored Land Mobile Satellite Channels by Erich Lutz of German Aerospace Research Establishment.

-- 4800 bps High Speed Data Transmission over Cellular System by Atsushi Fukasawa, Takuro Satoo and Kiyohito Tokuda of OKI Electric Industries Co., Ltd.

-- An Open Loop Technique for the Detection of Minimum Shift Keyed Signals by Steven H. Goode of Motorola, Inc.

-- Data Transmission Performance of 18 Kpbs Non-Coherent GMSK in the Land Mobile Environment by Scott N. Carney of Motorola, Inc.

MODULATION AND CODING TECHNIQUES

-- Adjacent Channel Interference in Partial Response Continuous Phase Modulation Systems with MSK-Type Receivers by Vijay Varma and S. C. Gupta of Southern Methodist University.

-- Fractional-Bit Differential Detection of MSK- A New Scheme for Performance Improvement in Land Mobile

Radio by Sirikiat Arlyavisitakul, Susumu Yoshida, Fumio Ikegami and Tautomu Takeuchi of Kyoto University.

-- Performance Evaluation of Codes for Radiopaging by E. Damosso, A. Del Pistola, R. Failli and M. Sentinelli of Centro Studi E Laboratoy " Telecommunications, SPA, Italy.

-- Performance of 12PM3 Modulation Methods for Land Mobile Radio with Noncoherent Receiver by Flavio Muratore, Valerio Palestini of Centro E Laboratory Telecommunications SPA, Italy.

--Narrowband Modulation Methods for Land and Mobile Radio by G. D'Aria, F. Muratore, V. Palestini, P. Porzio Giusto, M. Quacchia and V. Zingarelli of Centro Studi E. Laboratori Tellecommunicazioni SPA, Italy.

-- Advantages of Using Repetition Code in Mobile Radio Communication by Willaim Lee, PacTel.

-- Design and Performance of Digital Voice Privacy for Land Mobile by G. D. Rose and S. Kappagantula of General Electric Mobile Communications.

COMMUNICATIONS SYSTEMS

-- Optimum Frequency Assignment: An Application to Mobile Radio by Ibrahim A. Al-Kadi of King Saud University.

-- A Microcomputer-Based Frequency Assignment MOdel for Mobile Radio Planning by Ibrahim A. Al-Kadi of King Saud University.

-- A Simulation Study of In-Building Personal Communication System by Asrar U. H. Sheikh and Faruk Hadziomerovic of Carleton University.

-- A Duplex Infra-Red System for In-Building Communications by Michael D. Kotzin and Anthony P. van den Heuvel of Motorola, Inc.

-- The Prospect of a Multi-Beam Mobile Satellite Communications System by Eiji Hagiwara, Haraku Mishima, Kohei Sotoh and Noriski Yoshikawa of NTT Electrical Communications Laboratory.

-- Technical Considerations for the Design of Trunked Radio Systems by Ken Zdunek of Motorola, Inc.

-- Time Slotted Cellular System by James K. Cavers of Simon Fraser University and Mike Walker of Mobile Data International.

-- Cordless Telecommunications in the UK by David Holmes of British Telecom Research Laboratory.

FIELD LABORATORY AND COMPUTER SIMULATION OF A FADING CHANNEL

-- A Real Time Mobile Radio Channel Simulator by Rafik Goubran, Asrar U. Sheikh, Roshady M. Hafez of Carleton University.

-- Laboratory Evaluation of a Mobile Radio Data System by Mario Bruneau, Bernard Caron, Gilles Gagnon and Andre Vincent of Communications Research Centre, Canada.

-- Burst Error Characteristics of Narrowband Digital Systems in Land Mobile Radio by Valerio Zingarelli of Centro Studi E Laboratori Telecommunicazioni, Italy.

-- Statistics of Phase Derivatives in Mobile Communications by J. Bach Andersen, S. L. Lauritzen and C. Thommesen of Aalborg University, Denmark.

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-- Cellular Telecommunications Handoff Between Cellular Systems in AUTOPLEX Systems by W. P. Chapman, J. J. McCarthy and L. K. Sakayama of AT&T Bell Laboratories.

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-- Access Strategies for D-Tasi over Mobile Channel by Nam Nguyen, Asrar U. Sheikh and Roshady| M. Hafez of University of Ottawa.

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-- Mobile Communication Control Scheme Using Multi-Transmitter Simul/Sequential Casting (MSSC) by Kenji Imasura and Atsushi Murase of NTT Electrical Communication Laboratories.

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-- Historical Aspects of Automobile Navigation Technology by Robert L. French, Consultant.

-- GPS and Other RF-Based Navigation Technologies by Keith D. McDonald of Federal Aviation Administration Satellite Program.

-- Map-Matching Augmented Dead Reckoning by Walter B. Zavoll and Stanley K. Honey of Etak, Inc.

-- Map Data Base Scenarios for Automobile Navigation by Gary M. Andrew of Rand-McNally and Company.

-- International Review of Automobile Navigation Technology by E. Ryerson Case of Ministry of Transportation and Communications, Ontario, Canada.

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-- Vehicle Detection Sensitivity Formulas for Multi-Turn Rectangular Loops by Milton K. Mills, Federal Highway Administration.

-- A Method for Data Transmission for Automatic Control of Road Vehicles by William M. Brobeck of Brobeck Corp.

-- Wide Area Vehicle Monitoring System Project for Ontario's Trucking Industry by Joe Tsai of Ministry of Transportation and Communications, Ontario, Canada.

-- Fleet Management with Automatic Vehicle Location by Mark D. Hamlen of Motorola, Inc.

-- Loran-C in the Land Mobile Environment by Ralph E. Menick of Motorola, Inc.

-- A Loran-C Based Receiver for Automatic Vehicle Location by Richard C. Sagers of Motorola, Inc.

TRANSPORTATION COMMUNICATION SYSTEMS

-- A Combined Carrier Squelch and Dual Tone Multi-Frequency (DTMF) Mobile PBX Access Terminal by Frank Cooper, Jr., of Southern Pacific Transportation Co.

-- Train Management: A Satellite Approach by Carl Williams of Railstar Corp.

-- Photovoltaic Power Systems: A User's Guide to Reliability in Sizing and Design by Thomas J. Ulrich of Arthur N. Ulrich Co.

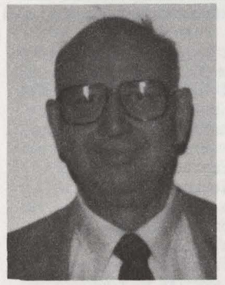
TRANSPORTATION SIGNAL & OPERATING SYSTEMS

-- Freight Train of the Future: The Integral Train by Thomas H. Engle of New York Air Brake Co.

-- Southern Railway's Modernization of Wayside Signaling by Forrest H. McIntyre of Southern Railway System.

-- Yards 2000 by Tony LaPolla of General Railway Signal Co.

Transportation Systems



Bob McKnight

Transportation Systems Editor

Advanced Train Control Project gains momentum and exposure to suppliers

The Advanced Train Control Systems project gained a wider audience following a public meeting in Atlanta, Georgia on February 5.

Estimates are that about 250 railway men, manufacturers, suppliers, consultants and service companies interested in command and control of North American railways heard of progress in the project plus where ATCS is going. Following the meeting in the morning, free and open discussion followed in the afternoon as people broke up into small discussion groups.

The ATCS project is a joint venture of the Railway Association of Canada and the Association of American Railroads.

"ATCS is a tool which will enable the railroad industry to modernize the methods we use to manage and plan our day-to-day operations," Walter W. Simpson, Vice President & Chief Enigneer, Norfolk Southern Corp., told the ATCS audience. Among the assets are 1.5 million freight cars and 20,000 locomotives.

Simpson cited seven areas where ATCS should lead to savings or reduced operating costs:

1- Personnel directing and managing train operation will become more efficient.

2- Major mainline, man-failure accidents will be reduced through implementation of supervisory over-ride features of ATCS.

3- Through implementation of an automated system to handle the complex movement-specific calculations required to "page" trains to avoid conflict, a significant favorable impact will be on railroads' diesel fuel bill.

4- Reduction in train delays will improve railroads' car hire costs, personnel costs of crews which are time sensitive and unnecessary train stopping costs.

5- Maintenance of way personnel will be able to obtain maximum on-track production time.

6- On-board diagnostics will give maintenance personnel data on what specifically they should do when a locomotive arrives at a service facility, hence provide faster turn-around time for motive power.

7- ATCS properly used will give railroads improved reliability of service, which in turn means increasing their competitive position. Hence more business.

Some component and concept testing has begun on a few railroads, and Mr. Simpson welcomed this forward looking approach. He said that two such tests are scheduled for this year on Norfolk Southern.

"As the different concepts reach the testing stage, we will need to maximize the productivity of these tests by avoiding duplication of efforts on different roads. Speaking for Norfolk Southern, we will welcome component testing on our property that will yield additional knowledge which we can use in our efforts to perfect the ATCS concept and similar systems," he said.

FORM, FIT, FUNCTION IS KEY

"By setting industry standard specifications via the Form, Fit and Function specification concept, we will be able to use any manufacturer's component within the system without detrimental effect on adjacent components of custom interfaces.

"Another fall-out of this type of specification is that, as technology develops and changes, we can take advantage of newer, safer, faster, or long life-span components."

So stated J. M. Cooper, President, Cybernetics & Systems, Inc., and Vice President Management Information Services, CSX Corp.

Cooper touched on the economics of ATCS by citing that one railroad had studied a territory about to be signaled with a present day system and estimated that ATCS would be about one-quarter the capital cost.

He pointed out that the railroads' benefits would be the supply industry's benefits. With lower capital costs of ATCS, railroads could afford to make more or larger installations.

Speaking of efficiencies, Cooper said: "As we begin to grasp the volume of data that will be available to us through ATCS, we begin to understand that many of the functions that are manual tasks, such as data-entry, can and will be automatically integrated with other business software systems, producing efficiencies that reach far beyond the dispatch office and track."

FOUR LEVELS OF ATCS

A family of Advanced Train Control Systems shows four distinct levels, each of which can be built upon to reach a more sophisticated type of control. The ATCS system has 39 functional modules which can be used in different configurations depending upon what a railroad desires to have for a control system.

What comprises the four levels was described by John A. Reoch, Assistant Vice President Operations, CN Rail.

Level 10 is the foundation level and would feature a microprocessor at the train dispatcher's work station. Communication between the dispatcher and train, or track forces working along the wayside, would be by voice radio. Basically Level 10 is a computer-aided manual block system.

Level 20 would add a vital data communications link coupled with micro-processor equipment on locomotives and selected maintenance-of-way equipment. Now there is two-way data communications between the dispatcher and trains and other mobile equipment. The vital data link will be the major means of sending movement authority to trains. Voice radio would still be available.

This Level 20 with its vital data link and mobile display terminals, offers options that can be added with relatively minor hardware or software. Such options could include:

-- Data communications between the central dispatching computer and track forces to provide for automatic receipt of train line-ups, automatic application of temporary slow orders, and - subject to over-ride by the central computer, automatic receipt of track occupancy permits and application of unplanned work blocks.

--On-board sensors for monitoring and diagnosing locomotive condition, status monitoring of wayside equipment, on-board display of defective equipment detector reports and a form of switch control short of a full field interlocking.

-- Some level of track structure integrity protection, but some research is needed.

Level 30 introduces an automatic location and identification system. This would allow the train to report clear of authority limits automatically because the train knows where it is.

Other options for Level 30 are:

-- On-board display of current allowable speed, next allowable speed and distance to speed change.

-- Automatic braking to enforce speed or authority limits.

-- On-board route characteristics display to assist in train handling.

-- A locomotive security system so only an authorized person could operate the locomotive.

-- Timely display of slow order and work block information.

-- Automatic conflict resolution and projection of train paths by the central computer.

-- Automatic alert sent to the dispatcher and other trains when an unexpected emergency stop occurs.

-- Calculate the most efficient fuel usage for all trains.

-- Continuous monitoring of train and locomotive performance characteristics.

-- Train prediction information for field forces.

-- Remote swtich point monitoring and/or control to allow the locomotive engineer to operate the switch. Would be beneficial for trains without cabooses, but would require a vital data link and presence detction around switches.

-- Train handling assist which would analyze route characteristics and train performance parameters to provide train handling advice to locomotive engineers.

Level 40 would require full field interlocking with associated wayside communications. Level 40 would allow dispatchers to control switches and would have the route integrity of conventional centralized traffic control. It is this level of ATCS that would be superimposed over existing ctc installations.

At Level 40, all the previous features or options would be available.

An option at Level 40 would be to allow the locomotive engineer to temporarily gain remote control of selected switches for switching operations.

SYSTEM ENGINEERING RESULTS

System architecture developed by a consortium of system engineers led by ARINC Research Corp., presented system architecture to the ATCS task forces consisting of 60 officers from 16 railroads at a meeting in November 1984 in Kansas City.

Key architectural proposals were accepted by this ATCS group. They were:

-- Fundamental is that all movement authorities and operating instructions to the train be displayed in the locomotive cab.

-- A data radio communication link will be required along with some on-board computing capability. The vital data link because of safety must be separate from the voice radio. Cost and technical difficulty will require intermittent radio coverage.

-- There will be a combination of centralized decision making (train movement authorities) but decentralized information processing (some on-board the locomotive). The "intelligent train" with its on-board microprocessor can process its own authorities and permissible speeds, and is aware of any number of plant and operation conditions.

-- Thus the train must know where it is, and after much discussion at Kansas City, the location system selected as a preferred industry standard would include an interrogator on the locomotive and transponders at fixed control points. However, the design will accommodate an alternate location system, such as one of the satellite-based systems.

PROGRESS IN THE ATCS PROJECT

Progress to date and the future of the ATCS project was outlined by Peter J. Detmold, General Manager ATCS. He said that the first two phases of the project are complete:

-- The statement of the operating requirements.

-- The system engineering operation.

The next two phases are the writing of component specifications; and research and testing.

It might be mentioned that Mr. Detmold made a key remark about ATCS, namely that it is a private enterprise project. "We have neither requested nor accepted funding from any public source in either country.

"When complete, the systems and their components will be marketed directly by suppliers to individual railroads through customary commercial processes. But they will be engineered to a common overall plan," Me. Detmold said.

The system engineers consortium that developed the system architecture for ATCS is headed by ARINC Research Corp. assisted by Transportation & Distribution Associates and Lapp-Hancock Associates.

It is proposed that Component Specification Drafting Committees be set up to draft component specifications and for research and testing. The only entry qualification for suppliers will be the bona fide intention to perform a service that is relevant to the railroads' needs, "yet this organization will be of a wholly competitive character."

The purpose of these committees will be to develop performance specifications for each component, stating its function, reliability requirement, size limiation, range of environmental conditions to be tolerated and testing procedure. The ARINC consortium will prepare the initial drafts for each component specification and also for message protocols, control logic, data bases and test procedures.

Meetings will probably be held near a major US or Canadian city and at least a 30 days notice given. Dates and places will also be published in the Journal of Commerce in the US and the Toronto Globe and Mail in Canada.

It is estimated the principal component specifications will be written in 1986 with design of some components under way later this year so that prototypes might be available in 1987.

Although it is expected that research and testing will be done by suppliers, some consideration is being given to having independent testing laboratories in both countries designated as approved testing laboratories. Consideration along these lines is being given to the testing of software by independent specialists because of safety concerns.

Cost sharing in development, research and testing will be worked out by RAC, AAR and the suppliers. This subject is under study by the railroads in the project and final decisions have been reached.

AAR and RAC will bear some of the research and testing costs. For example, the writing of component specifications will be paid for by AAR and RAC who will contract ARINC and their associates for this purpose. Also the two sponsoring railway organizations will arrange and bear the cost of any research and testing that is, in their view, necessary to validate that completed component specifications are in fact satisfactory under a variety of environmental conditions.

In general, the testing of total systems will be a matter for negotiation between the railroad wishing to use that combination of components and the suppliers principally concerned. However, AAR and RAC may, at their discretion, test a number of typical combinations of components in the early stages, to demonstrate the safety, reliability and general efficiency of advanced train control systems as a whole.

"Nothing is carved in stone. As the work proceeds, we shall be open for discussion of any aspect of it at any time, and it will be reviewed periodically at public meetings," Mr. Detmold concluded.

Professional Activities

Frank E. Lord
Professional Activities Editor

CAREER MAINTENANCE AND DEVELOPMENT

The title of this column is taken from the name of one of the more than forty committees and task forces under the aegis of the United States Activities Board (USAB) that address matters that are not entirely technical that, nevertheless, have an effect on our professional lives.

In 1977, Marlin Ristenbatt, working with the Region 4 Director, Paul Carroll, established the Career Maintenance and Development (CMD) Task Force and served three years as its chairman. When task forces become permanent parts of USAB they are designated "committees" and CMD has since made this transition. In little more than a year CMD sponsored a major event, a Careers Conference, and since then they have held three more such conferences. Harry Cronson and Wally Decker subsequently chaired this committee, contributing a great deal to the conferences. The present chairman in Charles Kost.

The Committee addresses many subjects and issues contributing to the improvement of our profession. Many of these activities go unpublicized. One output of this committee, however, is available for the asking, the pamphlet Professional Practices for Engineers, Scientists and Their Employers. You will admire the thought that has gone into this succinct document. These guidelines are designed to benefit both engineers and employers. The employers' section describes practices that are already embraced by the country's best-run companies. It is an interesting exercise to compare your own professional behavior with the suggestions presented for individuals. You can obtain a copy of this pamphlet by contacting:

Bill Anderson
IEEE Washington Office
1111 - 19th Street, N.W. - Suite 609
Washington, DC 20036
Phone: (202) 785-0017

Points emphasized in the pamphlet often surface in a variety of forms at the Careers Conferences. Other observations emerge as well, including the fact that engineers do not pay as much attention to these matters as they ought to.

Harry Cronson wrote a report on the fourth conference, which was held last October 2-4 in Cambridge, Massachusetts. Before launching into the report he made the independent observations that follow:

"Why are most engineers so apathetic about their careers? Maybe they judge they have little power in their organizations. If unsatisfied, they'll change jobs hoping for more challenging assignments elsewhere. I believe that engineers have more power and discretion than they realize and could improve themselves and their organizations by using more initiative. While engineers are primarily responsible for their careers, organizational nurturing is also essential. The Careers Conference is the only IEEE forum, perhaps the only engineers' forum, where a mix of engineers, managers, academics and human resource people discuss developing and nurturing engineering careers. It's too important to be apathetic about. An engineer's effectiveness on the job is not only personally satisfying, but also impacts the productivity and competitiveness of the United States, and possibly the ultimate survival of the free world."

The following extracts from Harry's report will perhaps serve to convey to you the flavor of the Conference:

The 2-day conference was divided into seven sessions. The first two sessions dealt with the recently completed "Study of Engineering Utilization" conducted by the American Association of Engineering Societies (AAES) and funded by NSF and DOD. Titles of the other sessions were: Dual Ladder: Viable Career Options?, Current Issues in Engineering Careers, Current Research in Career Development, Career Management in a Changing Environment, and Company Programs That Promote Career Development.

Recurring themes at the Conference were:

1. Challenging work assignments are of prime importance for career development.

2. Career development means continuing personal and professional growth and not necessarily upward movement in the organizational hierarchy.

3. The caliber of communication between engineers and managers needs considerable improvement in most organizations.

4. Engineers must take prime responsibility for their careers.

5. Underutiization (light intellectual and light time demands) is more widespread than misutilization (light intellectual and HEAVY time demands).

Some comments from Session 2, a panel discussion on Better Utilization of Engineers, were:

Gene Dalton (Brigham Young University)
- o A major problem is that engineers don't understand their careers and organizations. Engineers must understand what their organizations value and learn how to manage their managers.

Charles Kost (Texas Instruments)
- o Career maintenance and development is a three-legged stool made up of challenging work assignments, support systems and reward systems.

Fred Landis (University of Wisconsin-Milwaukee)
- o Underutilization is more of a problem than misutilization.
- o Age changes a people's expectations. As they grow older, they become more interested in people, but are not necessarily able to deal with people any better.
- o Career studies have been going on for well over 20 years. American management has not learned much about engineers' careers over these 20 years.
- o People should only take continuing education if this allows them to do their present job better.

William Shearer (AT&T Bell Laboratories)
- o Career guidance should be a company responsibility.
- o There should be more interaction between industry and academia. Industry people should teach at universities and university people should work in industry.
- o Engineers should participate in the decision-making process. Project management workshops should involve engineers, as well as managers.

Session 6 on Career Management in a Changing Environment had some particularly interesting observations.

John Sloan, ALCOA, spoke on the economic and technical environment for engineering in the 1980's and 1990's. He concluded that: "The environment for engineering careers in the next 15 years is likely to be characterized by change and challenge. Engineers will have to become more business wise, worldly wise and more skilled in human interaction. Engineering careers will be more available and more rewarding than they have been in the last 15 years and the strategic role of the engineer is likely to be better recognized and rewarded by both business leaders and society as a whole."

"Taking Charge of Your Own Career" was discussed by Ray Svenson. His premises were: "1) Engineers can't depend on anyone else for their careers. 2) They should treat themselves as individual professionals selling a service. 3) Lifelong learning is a must." One point he emphasized was that engineers must recognize the need to sell the service. The most professional and effective sales strategy involves no compromise of ethics, only a compromise of a little modesty.

For those interested in more detail, the complete report runs 8 pages and will be available from the Washington Office.

OPEN LETTER TO MEMBERS OF THE SOCIETY

President Kennedy once said, "Ask not what your country can do for you, but what you can do for your country."

I am posing a similar proposition to you!

Each year, the Society elects five persons to its 15 member Board of Directors. Each year, the search is made to find five of our Members who are willing to stand for election, and who have the support of their employers to serve for the three year term. And who will be Directors, de facto, not de jure. The search is not an easy one, and that is why I call upon you.

Our Society has three main areas of interest; Mobile communications, Automotive Electronics, and Land Transportation systems. The ideal Board would have a mix of representation from each of these areas. This we strive to do, albeit not always successfully. Our membership is predominantly communications oriented, thus it is only natural that our Board is thus oriented. But this year we welcome the new members of the former Land Transportation Committee of IAS. It is time for you to put forward Board Candidates. We are also anxious for those with Automotive Electronics interests to put forward their candidates.

You can do something for your Society. If you know someone, whom you believe would make a good candidate for the Society Board of Directors, please write to me at the address below, or give me a call. All I need is the persons name, address and telephone number. I will contact them to see if they will serve, if elected. If so, I will see that they appear on next fall's ballot. The rest will be up to the membership. But don't stop there, if your man gets on the ballot, campaign for him!

Experience has shown that our Membership rarely elects an unknown. So if your man has not been active in the Society, and yet you believe he would make a good candidate, then encourage him to volunteer for a Committee assignment. Many of our present Directors have followed this path to successful election.

Every effort will be made to have at least two candidates for each Board seat. If we are successful, then there will be five who fail to be elected. But if you have picked a person who is of Board caliber, then he should be willing to serve in an appointed committee capacity and then run again for election.

Ask not only what your Society can do for you, but what can you do for your Society.

Sam McConoughey, Chairman
Nominations Committee
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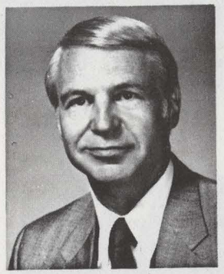
News From Washington



Eric Schimmel
Washington News Editor

A MODERN DAY LOAVES AND FISHES

The concept of a better two-way radio service for the general public is not dead. Via the docket reproduced below, the FCC intends to explore the feasibility of creating a new Consumer Radio Service in a segment of the 460 MHz range currently occupied by the General Mobile Radio Service (GMRS), formerly known as the Class A Citizen's Band. Since this is a Notice of Inquiry, specific proposals are not made, but responses to general concepts are solicited. The trick will be to develop a rulemaking proposal which can deliver a technically and economically viable service with only 200 KHz of spectrum. A major consideration will have to be the co-existence or displacement of existing licensees in that band. Get your bright ideas and recommendations into the FCC by May 30.

Before the
FEDERAL COMMUNICATIONS COMMISSION
Washington, D.C. 20554

PR
FCC 86-65
36409

In the Matter of	)	
	)	
Creation of a new Consumer Radio Service.	)	PR DOCKET NO. *86-38* RM-5058

NOTICE OF INQUIRY

Adopted: *January 30, 1986* ; Released: *February 5, 1986*

By the Commission:

Introduction

1. We are considering significant changes in the Part 95, Subpart A General Mobile Radio Service (GMRS). Our purpose in issuing this Inquiry is to seek public comment on the best approach to accommodate unmet personal communications needs within the two 200 kHz frequency segments now assigned to the GMRS. [1] This document sets forth an alternative Consumer Radio Service which would emphasize transceivers carried on the person in order to respond to the communications needs of the contemporary citizen living and traveling in our mobile society.

Background

2. The present GMRS has roots extending back to May, 1945, when we allocated the 460-470 MHz frequency band to a new "Citizens Radio Service" in Docket 6651. We formulated rules to govern this service from 1947 through 1949 in Dockets 8449 and 9119. These rules provided for licensing two types of stations -- Class A and Class B.

The Personal Radio Steering Group (PRSG) filed a petition for rule making (RM-5058) on June 11, 1985 which sought to restructure the GMRS to address additional personal communications needs. PRSG and Dow Chemical Telecommunications Corporation submitted comments. M.C. Trahos filed reply comments. We will include PRSG's petition and the comments and reply comments filed thereon as comments in this proceeding.

3. In 1958 in Docket 11994 much of the 460-470 MHz band previously available for Class A and Class B use was reallocated to other services. Class B stations were abolished. Class A operation was redefined and confined to sixteen specific channels, eight frequencies in each of two 200 kHz frequency segments. In Docket 20120, Class A operation was renamed the General Mobile Radio Service (GMRS). The rules governing the GMRS were updated and codified in PR Docket No. 82-84 in July, 1983.

4. Notwithstanding the evolution of three distinct Part 95 Personal Radio Services in Docket No. 20120 certain personal user communications needs remain unfulfilled. The GMRS provides relatively high quality two-way communications, but at considerable cost in terms of both price and spectrum consumption. The Radio Control (R/C) Radio Service, a one-way non-voice service for the remote operation of devices, attracts mostly model aircraft, model boat and model car enthusiasts. The Citizens Band (CB) Radio Service provides for short-range two-way personal and business communications, but requires continuous monitoring to hear a directed message. Both R/C and CB are in frequency bands subject to adverse propagation phenomena.

The Inquiry

5. We believe there is a need to restructure the GMRS into an affordable Consumer Radio Service. It would allow one person to contact another specific person over a short distance and conduct a brief voice conversation. It would allow, for example, two or more persons attending a large outdoor event together to keep in touch when they are out of sight of each other. Each person would thereby have greater mobility without losing contact with the other. Persons attending picnics, sporting events and parades should find such a device very useful. Campers, hikers, cyclists, commuters, shoppers, travelers, and participants in rallies, political campaigns and public service organizations such as REACT and neighborhood watch groups have similar needs. In each case, the need is for personal directed communications as the only possible means of contact between people.

6. The use best suited to personal communications needs is a critical component to design of a restructured GMRS. It appears that most of the personal communications needs we have discussed would be most suitably addressed by a service providing two-way voice communications between persons with transceivers carried on the person. We seek comment on whether this is indeed the optimum configuration. The type of equipment designed for the service could obviate the need to rely upon user familiarity with detailed operating regulations for rule compliance, particularly with regard to the prevention of interference. We could require that the equipment be user transparent. That is, rather than relying upon operator discipline and significant levels of Commission enforcement to prevent interference and achieve rule compliance, we could require equipment designed to control users actions automatically.

7. We envision units carried on the person for short-distance low-power communications that would, if they were readily and inexpensively available, assist people in the conduct of everyday living. While we do not contemplate that this service would be intended to duplicate those services which provide for vehicular mobile radios, there would be nothing to prevent a person from carrying the unit into a vehicle. This type of a unit could provide off-the-shelf technology which would allow people to have flexibility in the use of the equipment.

8. We believe the needs we have identified require directed communications and affordable portable equipment. The communications must include a reasonable degree of privacy and offer security from interference. The characteristics of the service should be designed to give it maximum utility for a variety of everyday applications. Thus, the equipment should be easy to use, and should have most operating functions built in to make it user transparent.

9. System Technology. We seek comment on the different methods available to maximize the number of uses in the two 200 kHz bands. We ask respondents to consider what range is needed to accommodate the envisioned personal communications requirements and what degree of service reliability is necessary within that range. The answers to these questions will help us determine whether to provide selective calling and whether to have single or paired frequency channels. We seek comment on the most appropriate trade-off between range and channel reuse in this service.

10. We encourage commenters to express their best judgments about suitable methods to maximize user transparency. We believe an essential aspect of this service would be automatic frequency selection in lieu of frequency assignment or "party" channels.

11. We ask for comments whether one-way services should be permitted if they can be accommodated without being detrimental to two-way services. We request commenters to address how the choice of one configuration over another would affect other choices to be made in a new Consumer Radio Service. If one or more digital channels are the best choice for automatic frequency selection, should excess capacity on these channels be available for paging or other appropriate uses and if so how should such functions be structured?

12. We request comment on the suitability of various emission modes for this service, particularly with regard to accomplishing minimum channel spacing and maximizing frequency reuse. We encourage comments on spectrum efficiency and on spectrum-saving technology. The relative merits of AM, FM, sideband technologies, and analog and digital technologies capable of providing voice transmission should be discussed. This technical analysis should address the usual parameters for each mode of operation: transmitter and receiver requirements, frequency tolerance, harmonic and spurious attenuation, frequency reuse considerations and the cost (both to the manufacturer and to the consumer) to obtain each specification. We request comment from equipment manufacturers on the type of market and likely demand for any such personal use-oriented equipment at 460-470 MHz. We wish to know the interrelationships of market size and equipment cost.

13. Equipment Technology. We wish input on the extent to which current technology would support narrower channels and the effect reducing the channel spacing would have upon equipment costs. Should we set the initial channel spacing at its practical minimum now, or should we consider a wider channel spacing and then redivide channels when technology has sufficiently advanced? We seek comment on whether choosing the latter course would minimize the impact of equipment frequency stability on initial equipment cost or result in premature obsolescence of equipment. We also seek comment on the advantages and disadvantages of equipment designed to facilitate the required upgrading in the event of such channel redivision.

14. Are certain techniques and innovations likely to improve the GMRS so much that they would attract so many users that there would be unacceptable levels of congestion? If so, should such techniques and innovations be rejected, or should we instead consider new technologies to increase the number of channels available to accommodate these techniques and innovations? Should we consider rules to limit use in congested metropolitan areas? Can we include certain techniques and innovations on the premise that any congestion would be self-limiting, with those desirous of, eligible for and able to pay for higher quality service choosing other alternatives?

15. Interconnection. In 1978 we decided to bar interconnection to the public switched telephone network in the GMRS because we saw no "practical way to accommodate a potentially large demand for such service with merely 8 pairs of frequencies." First Report and Order, Docket No. 20846, 69 FCC2d 1831,1840 (1978). It is our preliminary view that the same practical considerations militate against consideration of an interconnected service in only 400 kHz of available spectrum. While we do not discourage comment on whether there is any unmet need for interconnected personal communications which can be practically accommodated in a new Consumer Radio Service, we do not view the restructured GMRS as a new cordless telephone service.

16. Equipment compatibility. A restructured GMRS designed to accommodate large numbers of personal users in a relatively small portion of spectrum might require standardized protocols or algorithms for intersystem compatibility to permit use of the equipment in locations other than the user's normal service area. This would also assure that one user could communicate with any other user. We request respondents to address the questions of equipment compatibility and associated costs.

17. Emergency channels. The Citizens Band Radio Service dedicates one channel (Channel 9) for emergency or travelers' advisory purposes. The GMRS has no current similar dedicated channel, but there are some emergency and safety-of-life or property communications in GMRS spectrum. We request comment on whether a restructured GMRS should include one or more selectable or priority channels for emergency or travelers' advisory purposes, or for coordination and intercommunication among emergency teams. We also seek comments on methods for assuring that non-emergency communications would not occur on these channels.

18. Licensing and Regulation. In the GMRS we license systems consisting of one or more transmitting units used by station operators to communicate messages. We do not wish to issue individual user licenses in a new Consumer Radio Service.[2]

19. Not issuing individual user licenses would probably require type acceptance of transmitters for a new Consumer Radio Service with specifications on output power, frequency stability, frequency coverage (channels), automatic channel selection, output bandwidth and modulation technique. However, this would eliminate the need for users to have the technical knowledge required to recognize any interference potential of their equipment or to remedy interference problems. We invite discussion.

20. While we anticipate that most of the equipment for the service we are considering would be carried on the person, we do not rule out the possibility that we might authorize certain land stations that would have greater authorized power, higher permissible antenna height, or possibly even the capability to act as a repeater. We seek comment on whether such a unit could be as user transparent as the basic unit, and, if not, whether this type of equipment would require licensing even if we did not generally license users in a restructured GMRS.

21. We also seek comment on personal and commercial use sharing in this spectrum. We wish to know whether the two uses have been compatible in the GMRS and whether they would be compatible under the concept advanced in this proceeding.

22. Transition. Any significant change in the nature of the GMRS or the permissible equipment in a restructured GMRS would of necessity have a large impact upon current GMRS licensees. We seek comment on how we should accommodate current GMRS licensees if we decide to restructure the GMRS. We could grandfather their operations on a permanent or temporary basis. Any grandfathering clause could be tied to a date certain, or could be tied to the license term. We think that current operations should be permitted until such time as the industry has had an adequate opportunity to develop and market new equipment for a restructured GMRS. Current GMRS licensees should be given opportunity to conform to the new rules or to find a suitable communications alternative. We seek comment on all of these considerations.

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2 Authority for operation of radio stations in a Consumer Radio Service without individual licenses is derived from 47 U.S.C.§307(e), which authorizes such operation in the citizens band radio service. Subsection (3) provides that in this context "citizens band radio service" shall have the meaning given to it by rule. A Consumer Radio Service created for the use of the general public would also be a citizens band radio service. See 47 CFR §95.401.

23. Economic Issues. We also want information on costs associated with a restructured GMRS. Will the market size be sufficient to provide incentive for equipment development? What is the projected cost demand relationship? Is the required technology available and manufacturable in volume at reasonable cost? Can anticipated demand be balanced against the available spectrum?

Conclusion

24. We seek information on the different types of usage desired, the maximum number of channels that can be obtained from the various technologies, the number of channels (if any) that should be reserved for particular usage, desirable channel bandwidths and spacings, and any band planning or coordinating necessary to accommodate the various uses in a restructured GMRS. This list, and the entire discussion above, is not all-inclusive. We encourage comments on any matter relevant to this proceeding.

25. Authority for issuance of this Notice is contained in Sections 4(i), 303(r) and 403 of the Communications Act of 1934, as amended (47 U.S.C. §§154(i), 303(r) and 403). Pursuant to applicable procedures set forth in Sections 1.415, 1.419 and 1.430 of the Commission's Rules (47 CFR §§1.415, 1.419 and 1.430), interested parties may file comments on or before May 30, 1986 and reply comments on or before June 30, 1986.

26. All relevant and timely comments will be considered by the Commission before final action is taken in this proceeding. To file formally in this proceeding, participants must file an original and five copies of all comments, reply comments and supporting comments. If participants want each Commissioner to receive a personal copy of their comments, an original and nine copies must be filed. Comments and reply comments should be sent to Office of the Secretary, Federal Communications Commission, Washington, D.C. 20554. Comments and reply comments will be available for public inspection during regular business hours in the Dockets Reference Room (Room 239) of the Federal Communications Commission, 1919 M Street, N.W., Washington, D.C. 20554.

27. For information concerning this proceeding contact John J. Borkowski, Federal Communications Commission, Washington, D.C. 20554 (202) 632-4964.

INTERNATIONAL STANDARDS

Last year we published a list of domestic (EIA) telecommunications technical standards. Many of these, particularly the mobile radio standards, are undergoing review and revision. If you would be interested in participating in that effort, please let me know.

As this industry becomes more global, the relevance of international performance and measurement standards also becomes more significant. As such, you may find the following list of IEC publications useful. Our thanks to Charlie Willyard of Motorola for supplying this information.

IEC Publication 489
METHODS OF MEASUREMENT FOR RADIO EQUIPMENT
IN THE MOBILE SERVICES

Number	Subject	USNC Price*
489-1 Part 1 (1983)	General Definitions and Standard Conditions of Measurement	$47.00
489-2 Part 2 (1978)	Transmitters Employing A3 and F3 emissions	34.20
489-2 Part 2 (1981)	First supplement - Inter-transmitter Intermodulation and Audio-frequency Intermodulation Distortion	11.00
489-3 Part 3 (1979)	Receivers for A3 and F3 Emissions	49.00
489-3 Part 3A(1981)	First supplement - Conducted Spurious Emission	11.00
489-4 Part 4 (1980)	Transmitters Employing Single Sideband Techniques	46.00
489-5 Part 5 (1979)	Receivers Employing Single Sideband Techniques	46.00
489-5 Part 5 (1981)	Conducted Spurious Emission	11.00
489-6A (1974)	First supplement - Audio Frequencies Commonly Used in Tone-Signalling Systems	13.00
489-6B (1977)	Selective Calling Audio-frequency Band Measurements	21.00

* Price does not include shipping and handling charges. These charges are based on the following:

If price of publication is $ 5.00 - $ 9.99	the shipping charge is $2.00
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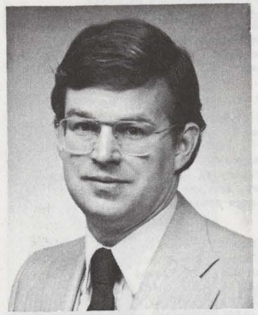


Vehicular Electronics

Bill Fleming
Vehicular Electronics Editor

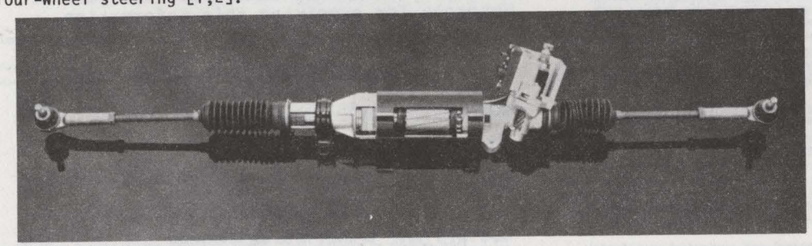
TRW Inc. has found a new automotive target for electronics: the pump, hoses, and fluids used in hydraulic power steering systems. It will replace these with an electronically controlled motor that provides a lower cost, more responsive, and safer power steering system. Although other U.S. makers of power steering systems are working on similar units, they are not as close to production as TRW is.

The new system, called Powertronic, can be delivered to the auto assembly plant, pre-tested and ready to be bolted in place. This is a tremendous advantage over hydraulic systems which include extensive hydraulic equipment which can only be tested after final assembly. This "modular" construction is much in demand by automakers because it reduces assembly time, inventory and plant size.

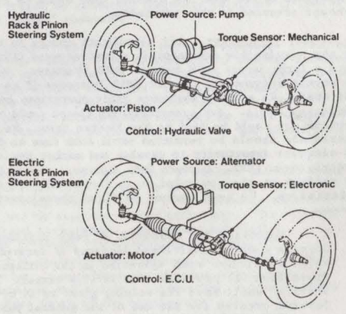
Unlike hydraulic systems, which are mechanically coupled to the engine and consume power continuously, a system driven by the electric motor gets its energy from the battery and uses power only when needed for a steering maneuver. This results in horsepower gains and also gives an estimated extra 0.5 mile per gallon fuel savings. The system also saves space and weight, knocking seven pounds off the heft of today's typical hydraulic system while reducing the number of pieces in the steering system from 18, required for hydraulic systems, to just 3 required for the electronic system. This reduces the automaker's inventory handling of power steering parts by 85%. Maintenance costs will also be reduced because leaky hydraulic oil systems, which account for nearly two-thirds of steering-system warranty claims, will be eliminated.

The Powertronic system can be programmed to different levels of steering effort. For example, the unit can produce a low-effort, "luxury-car" feel or a high-effort "sports-car" feel. The steering effort can be pre-set by the manufacturer or by the customer if the auto manufacturer chooses to provide customer selectable settings. The system also provides steering effort which is proportional to speed. For example, low effort is provided for parking whereas higher effort is used to provide a greater feel of the road during high-speed driving.

By 1990 the company expects to produce 500,000 units. By 1992 TRW estimates a market of 3 million electronically controlled steering units. Electronic steering provides a launching point for a number of advanced suspension projects. TRW is currently looking at integrated packages with electronically controlled suspension and four-wheel steering [1,2].



Cut-Away-View Of TRW Powertronic Electronically Controlled Steering System



TRW Powertronic Steering System Compared To Hydraulic Rack-and-Pinion Steering System

THE CHAMELEON CAR

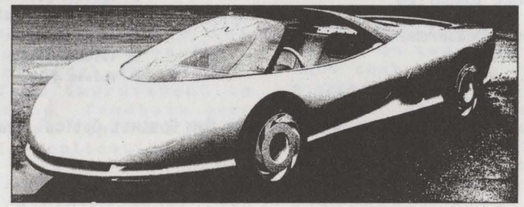
Using advances in microprocessing and other technologies, U.S., Japanese and European car makers and their suppliers are putting together vehicles that automatically and quickly adapt many of their operations to suit the taste of different drivers or one owner's varying requirements. These cars are known as "chameleon cars", "personality cars", or "his and hers" automobiles. This means that automobile suspensions convert at the touch of a switch from a cushy "boulevard" luxury-car ride to a responsive sports-car feel. In addition, steering can be varied between feeling loose with lots of play to feeling very quick with sensitive car feel. And transmissions can be varied from shifting seemlessly or to authoritative gear shift jerk-like action.

Inside the automobiles; seats, mirrors, windows, and other powered devices slide into place to suit the driver at that moment. Radio and climate controls adjust immediately to pre-set preferences. Joe Ziomek, engineering director of the Automotive Product Technology Laboratory for TRW Inc. says that "It's an idea being driven by competition and the customer -- customers have been given a peek of what's possible technologically, and they are hungry" [3,4].

A rudimentary component of the chameleon car is the TRW memory-seat module now available in General Motor's luxury cars. At the present time this module can be used to program (pre-select) and automatically recall two different seating positions of the General Motors six way power seat. TRW expects to extend the system to pre-programmed radio tuning and climate control settings and mirror position settings. Thus, two or more drivers -- or the same driver in different moods -- could change the cabin environment with the touch of a single pre-select button. Eventually this feature could be extended to control operation of the vehicle suspension, steering, gear shifting pattern, and engine calibration.

CHEVROLET CORVETTE INDY

At a recent Detroit Auto Show Chevrolet showed a concept vehicle called the Corvette Indy. This vehicle was a showcase for future Corvette hardware, such as four-wheel drive, four-wheel steering, active suspension, and electronic navigation. Four-wheel drive is required because the 32-valve V-8 engine puts out over 600 hp, and two-wheel drive just can not transfer that much power to the road in an effective manner. The engine is a British-built 2.6L design. The concept vehicle was developed jointly by Lotus and General Motors [5,6].



Chevrolet Corvette Indy, A Concept Car

TEST INSRUMENTATION FOR NON CONTACT VEHICLE GROUND SPEED MEASUREMENT

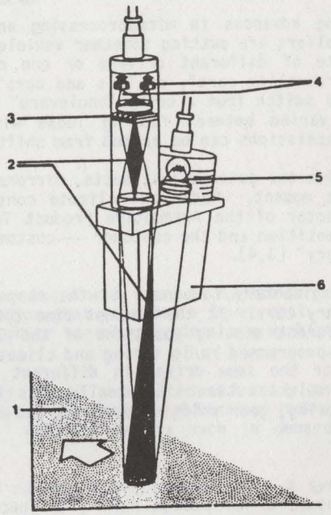
In Germany, a new type of optical sensor for non contact true ground speed measurement of vehicles has been developed by Datron-Messtechnik. The sensor accurately measures both forward and transverse ground velocities of the vehicle in a non contact fashion thereby eliminating problems of wear, damage, slip and bounce inherent to the conventional contact fifth wheel measurement technique. The sensor is said to be accurate over all types of road surfaces including; asphalt, concrete, cobblestone, Belgian block, brick, sand, gravel, dirt, grass, ice, and snow.

Because the measurement is non contact, velocity vectors, both longitudinal and transverse, are reliably measured, even during skid maneuvers. When a height sensor is used in combination with the ground speed sensors, motion of the chassis such as pitch and roll can also be accurately measured during vehicle maneuvers. In order to obtain operation over all types of road surfaces a halogen reflector lamp is built into the instrument to give reflection over surfaces ranging from snow to dirt. In addition, the height measurement is independent of environmental conditions, partly because of its use of an infrared diode illumination of the ground. The instrument is simply installed on one vehicle using an adjustable suction holder and works accurately without need for exact positioning of the instrument with respect to the ground. Accuracy of both the velocity measurements and range measurements are said to be within 0.1%.

Operation of the sensor depends on signal processing of images of the roadway received by the sensor. The image is split into two parts, via a grating or filter. The two images are then compared electronically to establish a time delay between the leading edge and trailing edge of the image thereby determining the velocity of the vehicle. At least I think this is how the sensor operates, very little information is provided as to the exact operating mechanism of the sensor.

Correvit Optical Measuring Head Installed

On Test Vehicle For Speed Measurement



Structural Set-up of the Optical Sensor CORREVIT-L

1 Measuring object (e.g. road surface) and direction of measurement
2 Optical path of rays
3 Measuring grid
4 Photo detector
5 Illumination
6 Splash guard

Operating Parts Used In Non Contact Optical Measurement Of True Ground Speed

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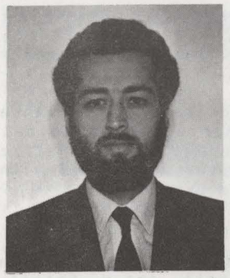

Communications

J. R. Cruz
Communications Editor

ABSTRACTS

"Cross-Polarization Cancellation and Equalization in Digital Transmission Over Dually Polarized Multipath Fading Channels," M. Kavehrad and J.Salz, AT&T Technical Journal, Vol. 64, No. 10, December 1985.

A theory for data-aided equalization and cancellation in digital data transmission over dually polarized fading radio channels is presented. The present theory generalizes and extends previous work by admitting decision feedback structures with finite-tap transversal filter implementations. Subject to the assumption that some past and/or future data symbols are correctly detected, formulas and algorithms for evaluating the least mean-square error for different structures are presented. In a sequency of curves we evaluate and compare the performance of various structures for a particular propagation model and several fading events. We find improvement in performance for decision feedback over linear equalization. More importantly, we discovered that in this application, as in the single-channel transmission case, decision feedback/canceler structures are much less sensitive to timing phase than linear equalizers.

"A Laboratory Simulation Facility for Multipath Fading Microwave Radio Channels," A.J. Rustako, Jr., C.B. Woodworth, R.S. Roman, and H.H. Hoffman, AT&T Technical Journal, Vol. 64, No. 10, December 1985.

This paper describes a laboratory facility capable of simulating time-varying radio multipath channel responses in real time under computer control. Four independent fading channels are available that can be used for single-polarization nondiversity, combined in pairs for single-polarization dual diversity, or cross-coupled to simulate the two outputs of a dual-polarization nondiversity channel. Each channel contains a controllable variable network capable of producing a narrowband intermediate frequency response that resembles the "three-path" function of Rummler. A wide range of models can be accommodated by altering the computer-stored sequences used to control each variable channel network. The only assumption implicit in the choice of model is that the channel response can be fitted to the generic function over bandwidths up to 40 MHz. The channel responses are controlled by either entering fixed parameters from a keyboard, or by reading time-varying parameters stored in disk memory. This description includes the architecture, hardware design, software implementation, and performance of the simulation facility.

"Performance Signatures for Dual-Polarized Transmission of M-QAM Signals Over Fading Multipath Channels," M. Kavehrad and C.A. Filler, Jr., AT&T Technical Journal, Vol. 64, No. 10, December 1985.

Performance signatures for dual-polarized transmission of M-state quadrature amplitude-modulated signals over dispersive multipath digital radio channels are theoretically derived in this work. We report on two major findings. Firstly, we show that for the assumed propagation model, a cross-coupled interferer exhibits noiselike behavior and impacts on digital radio outage time in direct relation to its power level. Secondly, our theoretical finding is based on a new application of performance signature curves for two cross-coupled multipath channels. This treatment permits the prediction of multipath-induced digital radio outage for specified ratios of power in the copolarized and cross-coupled signals. Theoretical findings are qualitatively supported by measured performance signatures obtained from a laboratory simulation of the model.

"Statistical Model for Amplitude and Delay of Selective Fading," D. Balaban, AT&T Technical Journal, Vol. 64, No. 10, December 1985.

The transmission performance of digital radio systems is controlled by spectral distortion caused by multipath fading. To evaluate this performance for digital systems with high-order modulation schemes, a statistical model for frequency-selective fading is needed. New propagation data obtained in Gainesville, Florida, were used to generalize Rummler's model to include group delay response. The introduction of the delay response data into the model of the fading channel enabled the classification of the fades as minimum phase and nonminimum phase. We found that 24 percent of all fades have significant delay distortion, and can be characterized as being minimum phase or non-minimum phase. In the range of practical

interest, there are as many minimum phase as nonminimum phase. The results of this work will facilitate a better understanding of the fading channel, which will be beneficial in the engineering of radio routes and digital radio design. The results also demonstrate the need for a description of the geographical occurrence of dispersion, which will differ from that for multipath fading at a single frequency. This is based on the observation, presented in this paper, that the relative amount of dispersive fading is significantly greater in Gainesville, Florida, than in Palmetto, Georgia. The availability of a dispersive fading map will facilitate the accurate engineering of digital radio routes.

"Intersymbol and CW Interference in QPSK, OQPSK, and MSK Hard-Limiting Satellite Systems," I. Oka, IEEE Trans. Aerospace Electron. Systems, Vol. AES-22, No. 1, January 1986.

A new equivalent model for deriving the bit error rate (BER) of quadrature phase-shift keying (QPSK), offset QPSK (OQPSK), and minimum shift keying (MSK) signals transmitted over hard-limited channels in the presence of up-link intersymbol interference (ISI) and CW interference (CWI) is introduced. In the equivalent model the up-link and down-link are interchanged in order to avoid the complicated expectation due to the up-link ISI at the hard-limiter output. The analysis is based on the moment technique and the Gram-Charlier expansion. Numerical results of the BER show that the large bandwidth-symbol time product (BT) or the existence of CWI makes MSK preferable compared with QPSK or OQPSK.

"Closed-Loop Autocorrelator and its Application to Frequency Discrimination," H. Messer, and Y. Bar-Ness, IEE Proc., Vol. 133, Pt. F, No. 1, February 1986.

A new closed-loop autocorrelation system is proposed in the paper. It is based on a conventional autocorrelator; however, the fixed delay is replaced by a variable delay line and the autocorrelator output is fed back to control the delay. The variable delay can be realised by a SAW voltage-controlled variable delay line (VCDL). A detailed analysis of the loop is given. It is shown that for some special inputs, the loop performs as a frequency-measuring system, as an instantaneous frequency measurement (IFM) or as a wideband linear FM discriminator. It is further shown that, in the presence of noise, the loop behaves similarly to a frequency modulation feedback (FMFB) loop. Therefore, the output SNR can be improved (in comparison with conventional FM discriminators) by appropriately choosing the loop parameter. Experimental results of a system implemented using an SAW VCDL are presented and are shown to support the analysis.

"Cellular System Design: An Emerging Engineering Discipline," J.F. Whitehead, IEEE Comm. Magazine, Vol. 24, No.2, February 1986.

Brief descriptions of major performance issues, followed by a survey of practical channel reuse, interference control, traffic engineering, and other topics associated with cellular system design are examined.

"Second Generation Mobile Radio Telephone System in Japan," M. Kuramoto, and M. Shinji, IEEE Comm. Magazine, Vol. 24, No. 2, February 1986.

This paper introduces a new high-capacity land mobile telephone system now under research and development at NTT (Nippon Telegraph and Telephone).

"The German Cellular Radiotelephone System C," K. Spindler, IEEE Comm. Magazine, Vol. 24, No. 2, February 1986.

The German cellular radiotelephone system C is a "fully cellular" radiotelephone system in the 450 MHz range in order to meet the mid-term demand. This informative article discusses this system in detail.

"MATS-E, an Advanced 900 MHz Cellular Radio Telephone System: Description, Performance, Evaluation, and Field Measurements," H.G. Preller, and W. Koch, IEEE Comm. Magazine, Vol. 24, No. 2, February 1986.

This article examines MATS-E (an advanced 900 MHz Cellular Radio Telephone System - its development, performance, and description) and gives an idea where CASD (computer aided system design) and field measurements can be included in the design and development of a mobile telephone system.

"DynaT *A*C Cellular Portable Radiotelephone System Experience in the U.S. and the U.K.," J. Mikulski, IEEE Comm. Magazine, Vol. 24, No. 2, February 1986.

Enhancements of the DynaT *A*C Cellular Portable Radiotelephone and its application in U.S. cellular systems is described. Also discussed are the adaptation of U.S. system design to the needs of the UK and projections for future cellular system designs.

"Detachable Unit Service in 800 MHz-Band Cellular Radiotelephone System," S. Seki, N. Kanmuri, and A. Sasaki, IEEE Comm. Magazine, Vol. 24, No. 2, February 1986.

This system consists of a vehicular mounting unit and a detachable transceiver unit (used as a portable telephone). The philosophy and characteristics of this system in Japan is described.

"Discrimination Against Parially Overlapping Interference - Its Effect on Throughput in Frequency - Hopped Multiple Access Channels," J.E. Wieselthier, and A. Ephremides, IEEE Trans. Comm., Vol. COM-34, No. 2, February 1986.

In this paper we derive the probability of correct packet reception and the resulting channel throughput achievable in an asynchronous slow-frequency-hopped multiple user channel. Reed-Solomon coding is used to correct errors caused by other-user interference in an otherwise noiseless channel. We analyze and evaluate an M-ary FSK signaling scheme, which permits the discrimination against interfereng signals that are present for a sufficiently small fraction of the hop duration, and results in substantial increases in channel throughput over previous models.

"Exact and Approximate Construction of Digital Phase Modulations by Superposition of Amplitude Modulated Pulses (AMP)," P.A. Lanrent, IEEE Trans. Comm., Vol. COM-24, No. 2, February 1986.

Minimum shift keying and offset QPSK are two well-known modulations which can be interpreted as a set of time/phase-shifted AM pulses.

We show in this paper that any constant amplitude binary phase modulation can also be expressed as a sum of a finite number of time limited amplitude modulated pulses (AMP decomposition).

New methods for computing autocorrelation and power frequency spectrum are derived, which give very simple results for half-integer index modulations.

We also show that the signal can be built with good accuracy using only one optimized pulse ("main pulse"). This synthesis is particularly satisfactory for modulations that have good spectral characteristics and/or low index.

New IEEE/VTS Constitution

March 12, 1986

CONSTITUTION

FOR

IEEE VEHICULAR TECHNOLOGY SOCIETY

Article 1

Name and objective

Section 1. This organization shall be known as the Vehicular Technology Society of the Institute of Electrical and Electronics Engineers, Inc. (IEEE-VTS).

Section 2. Its objective shall be scientific, literary, educational and professional in character. The Society shall strive to advance the theory and practice of electro-technology engineering and of the allied arts and sciences, with specific application to vehicular systems.

Section 3. The Society shall promote close cooperation and exchange of technical and professional information among its members and shall hold meetings for the presentation of papers and their discussion, and through its committees shall study and provide for the needs of its members.

Section 4. The Society will conduct its affairs according to the Constitution and Bylaws of the IEEE and of this Society.

Article 2

Fields of Interest

Section 1. The fields of interest of the Society are the theoretical, experimental and operational aspects of electrical and electronics engineering in mobile radio, motor vehicles and land transportation.

(a) Mobile radio shall include all terrestrial mobile services.

(b) Motor vehicles shall include the components and systems and motive power for propulsion and auxiliary functions.

(c) Land transportation shall include the components and systems used in both automated and non-automated facets of ground transport technology.

Article 3

Membership

Section 1. Membership in the Society shall be available only to members of the IEEE in any grade, including students, having a professional interest in the fields of interest of the Society.

Section 2. Affiliates may participate in the Society as provided by the IEEE Bylaws and any additional limitations imposed by the Society Bylaws.

Article 4

Financial Support

Section 1. The Society shall collect from its members an annual assessment in accordance with the IEEE Bylaws.

Section 2. The Society may raise revenues by advertising, exhibits, requests for contributions and charges for sending notices to non-Society members provided such means are consistent with IEEE Bylaws. Any revenue means not explicitly covered by IEEE rules must be approved by the General Manager of the IEEE before being adopted by the Society.

Article 5

Administration

Section 1. The Society shall be managed by a Board of Directors of 15 elected members of the Society.

Section 2. Sub-entities of the Society shall be prescribed in the Society Bylaws.

Section 3. The terms of the members of the Board of Directors shall be for 3 years, 5 members to be elected each year.

Section 4. The Board of Directors shall elect from its membership the governing officers as specified in the Society Bylaws.

Section 5. The duties and responsibilities of the officers shall be specified in the Society Bylaws.

Section 6. The Board of Directors shall have control of the affairs and property of the Society and shall fix its policies. It shall have power to hold meetings, and carry out the interests of the Society.

Section 7. The Board of Directors shall utilize the services of Headquarters as bursar for all or part of Society funds, as provided by the IEEE Bylaws. If any part of the Society funds are received and deposited separately, the terms and conditions shall be in accordance with IEEE policies and Society Bylaws and subject to any special conditions of the Board of Directors.

Section 8. Neither the Vehicular Technology Society or any officer or member thereof shall have authority to contract debts for, pledge the credit of, or in any way bind the IEEE or the Vehicular Technology Society, except within the terms of previously approved budgets.

Article 6

Meetings, Conferences, Conventions and related Business

Section 1. The Society may hold meetings, conferences, symposia or conventions either alone or in cooperation with Sectional, Regional or the Convention Committee of the IEEE or other organizations, subject to the IEEE Bylaws. The Society shall sponsor at least one technical conference of major scope each year, which may be held as a separate conference.

Section 2. Meetings, conferences or conventions of the Society shall be open on an equal basis to all members of the IEEE. The Society shall no sponsor or co-sponsor a meeting which is subject to security clearance.

Article 7

Publications

Section 1. Publications undertaken by the Society shall be subject to IEEE policies and to any further guidance or controls prescribed by the Board of Directors or its duly appointed committees. The Society shall be responsible for the financial aspects of its publication program.

Section 2. The President, with the consent of the Board of Directors, shall appoint such editors as may be required to implement the publication program. The duties of an editor shall be as prescribed in the Society Bylaws.

Article 8

Amendments

Section 1. Amendments to this Constitution may be initiated by a petition submitted by at least 50 members of the Society or by the Board of Directors. An affirmative vote of at least 10 members of the Board of Directors is required to initiate an amendment by the Board of Directors. Proposed amendments to the Constitution brought by petition will be presented as if approved by the Board of Directors.

Section 2. Approved or petitioned amendment proposals will be published in the Society Transactions and/or the Newsletter. A copy of the proposed amendments shall be mailed with a ballot to all members of the Society at least 30 days before the date appointed for return of the ballots, and the ballots shall carry a statement of the time limit for their return to the IEEE office. Approval of the amendment by at least two-thirds of the members voting shall be necessary for further action.

Section 3. Amendment proposals approved by the Society membership must be submitted to the IEEE Technical Activities Board and to the IEEE Executive Committee for approval before being adopted.

Section 4. Amendment of the Society Bylaws may be initiated by a petition signed by at least 50 members of the Society or by a Director of the Society.

Section 5. Proposed amendments to the Society Bylaws must be mailed to each Director at least 20 days prior to a scheduled meeting of the Board of Directors.

Section 6. Proposed amendments of the Society Bylaws must receive at least 10 affirmative votes to be adopted.

Section 7. Adopted amendments will not be enacted until at least 30 days subsequent to publication in the Society Newsletter.