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NEWSLETTER

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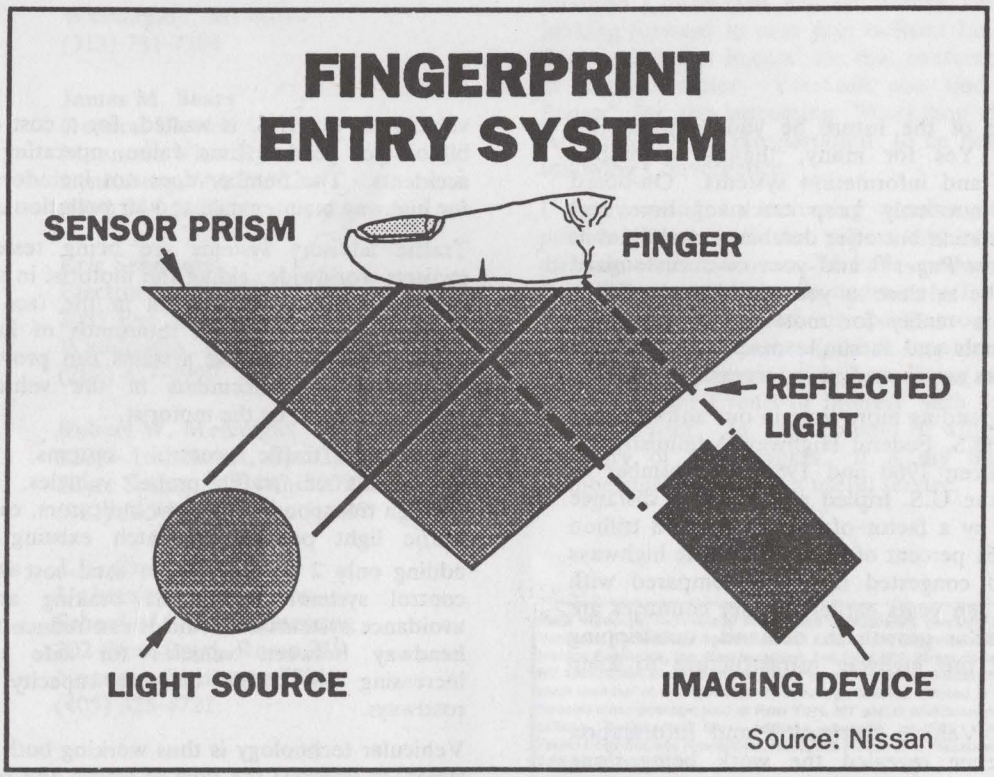
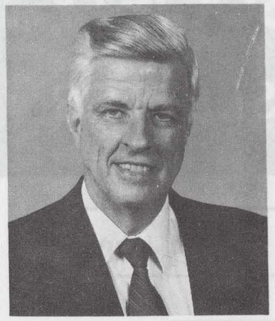


NISSAN FINGERPRINT ENTRY SYSTEM

See "Vehicular Electronics," page 10

President's Message

George McClure
President
IEEE Vehicular Technology Society



Will your office of the future be your automobile? The answer is Yes for many, thanks to mobile communications and information systems. On-board computers can not only keep track of time and distance to destination but offer database capabilities as well. The Yellow *Pages*[tm] and your own customized phone list may be as close as your dashboard. While this is not yet a reality for most of us, in-vehicle computer terminals and facsimile machines linked to mobile telephones are appearing in increasing numbers.

We clearly are spending more time in our automobiles. Data from the U.S. Federal Highway Administration show that, between 1960 and 1986, the number of automobiles in the U.S. tripled and the total distance driven went up by a factor of 2.6 to over 1.8 trillion miles in 1986. 61 percent of urban interstate highways were considered congested in 1985, compared with only 40 percent ten years earlier. Other countries are experiencing similar growth in demand, outstripping the capacity of the highway infrastructure to keep pace.

The first IEEE Vehicle Navigation and Information Systems conference revealed the work being done around the world to combine computers and communications with navigation and traffic control systems to increase travel efficiency and reduce time lost in traffic jams. 12 percent of the time and 6.4 percent of the distance traveled by noncommercial vehicles in the U.S. is wasted, for a cost of over $45 billion per year in time value, operating costs, and accidents. The number does not include added costs for highway maintenance and air pollution control.

Traffic advisory systems are being tested in pilot projects worldwide, aiding the motorist in selecting the best route to his destination in the face of existing traffic congestion. With thousands of informational messages defined, these systems can provide displays and voice announcements in the vehicle, in the language chosen by the motorist.

Interactive traffic control systems, using the movements of "traffic probe" vehicles, interrogated through transponders, as flow indicators, can adjust the traffic light pattern to match existing conditions, adding only 2 percent to the total cost of the traffic control system. Automatic braking and collision avoidance systems on vehicles can reduce the required headway between vehicles for safe travel, thus increasing the traffic carrying capacity of existing roadways.

Vehicular technology is thus working both sides of the street--to improve the flow of traffic and reduce driver frustration on the one side, and offering the conveniences of the office on the other side to offset travel disappointment when the highway becomes a long skinny parking lot.

George F. McClure

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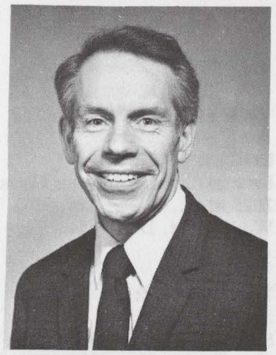
Editor's Notes



A. Kent Johnson
Newsletter Editor

By the time this newsletter reaches your hands, our Orlando Conference will be history and we will be looking forward to next year in Saint Louis. You will find a "Call For Papers" for that conference elsewhere in this newsletter. You will also find a "Call For Papers" for the upcoming "Workshop on Electronic Applications in Transportation" to be held in October following Convergence.

I am receiving an increasing number of requests to publish various calls for papers and conference and meeting announcements. I have made it a policy in the past to publish such items only for conferences which were sponsored or co-sponsored by VTS. Because many of these other conferences are of interest to our membership, I am going to start a new column "Other Events of Interest" with this edition of the newsletter. In this column I will give a brief summary of such events. It is my hope that our membership will find it a useful service.

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February	12-28-90	1-31-91
May	3-10-91	4-14-91

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OTHER EVENTS OF INTEREST

Event: Second Rutgers Workshop on Third Generation Wireless Information Networks
Date: October 18-19 1990
Location: Ramada Renaissance
East Brunswick, New Jersey, USA
Contact: Sanjiv Nanda
WIN Workshop
Department of Electrical and Computer Engineering
Box 909, Piscataway, NJ 08855-0909, USA
Phone: (201) 932-5954
Fax: (201) 932-3693

Event: Operation, Maintenance and Economics of Freight Train Air Brake Systems-Into The 21st Century
Date: May 23-24, 1990
Location: University of Illinois at Urbana-Champaign
Beckman Institute for Advanced Science and Technology
Contact: University of Illinois at Urbana-Champaign
Accounting Business Office
Room 162, Administration Building
506 South Wright Street
Urbana, Illinois 61801
Telephone: (217) 244-7659
Fax: (217) 333-9561

Event: Second International Mobile Satellite Conference
Date: June 17-20, 1990
Location: Ottawa Congress Centre--Ottawa, Canada
Contact: Patti Mordasewicz
174 Hickory Street
Ottawa, ON
Canada, K1Y3T6
Telephone: (613) 724-9900
Fax: (613) 724-4851

Transportation Systems *(continued from page 7)*

the private sector, it just might well see operation. Certainly, it appears that the present Bush Administration will fund some research in the high speed rail area. Not only did the Skinner transportation study so indicate, but Federal Railroad Administrator Gilbert E. Carmichael recently told a Transportation Research Board forum that FRA will take a leadership role in stimulating the development of high speed rail and maglev transportation systems in the U.S.

Chapter News

Gaspar Messina
Chapter News Editor

Meetings

Cleveland Vehicular Technology Society

Subject: Tour of MCI's North Royalton, Ohio Computer and Telecommunication Switching Center
By: Mr. Mike Vent, MCI
12300 Ridge Road
North Royalton, Ohio 44133
Held: February 7, 1990
Attendance: 22 (10 guests)

Subject: A New Generation of High Power Cellular Bootstraps
By: Mr. Ronald Jakubowski, Antenna Specialists
30500 Bruce Industrial Parkway
Cleveland, Ohio 44139-3996
Held: March 6, 1990
Attendance: 20 (7 guests)

Washington, D.C. (Joint VTS/Land Transportation Committee)

Subject: IC-3 Self Propelled Diesel Rail Car
By: Mr. Jan Skopol, Scandia/Randers
Denmark
Held: January 9, 1990
Attendance: 26 (16 guests)

Philadelphia (Joint VTS/Land Transportation Division)

Subject: SEPTA's Fraser Maintenance Facility
By: Mr. David L. Borger, P.E., STV/SSVR
225 Park Avenue, South
New York, New York 10003
Held: January 11, 1990
Attendance: 22 (10 guests)

Subject: New Jersey Transit's Newark Waterfront Connection
By: Mr. Sal Matina, Parson Brickerhoff Quade, Inc.
26 Journal Square
Jersey City, New Jersey 07306
Held: February 8, 1990
Attendance: 30 (12 guests)

Subject: SEPTA: Getting There, An Action Plan For The 90's
By: Mr. John Tucker, III, Chief Corporate Relations Officer, SEPTA
714 Market Street
Philadelphia, Pennsylvania
Held: March 8, 1990
Attendance: 23 (9 guests)

San Francisco Bay Area VTS

Subject: Radio Access Technology, CDMA/Spread Spectrum
By: Dr. W.C.Y. Lee, Pactel Cellular
Van Carman, Irvine, California
Held: March 1, 1990
Attendance: 120 (36 guests)

Gaspar Messina, Physicist/E.E.
Editor and Chapter Activities Chairman
9800 Marquette Drive
Bethesda, Maryland 20817

Transportation Systems

Bob McKnight
Transportation Systems Editor

Land Transportation Chapter wins Award by Philadelphia Section IEEE

The Land Transportation Division unit in the Vehicular Technology Society won the Chapter of the Year Award from the Philadelphia section of the Institute of Electrical & Electronics Engineers.

Chairman Harvey Glickenstein, who accepted the award on behalf of the chapter, founded the LTD chapter in October 1988. Attendance at the meetings has averaged 32 since its founding.

"The Chapter is being cited for being the most active in planning and conducting their technical meetings," so reported the citation of the Philadelphia Section presented at its award banquet on March 3, 1990.

Mr. Glickenstein, a graduate of City College of New York with a Bachelor of Electrical Engineering degree began his railway signaling career with the New York Transit Authority. Later he joined the signal department of New York Central, later becoming Penn Central and then ConRail. At present, he is District Manager, Transportation System Engineering, Thomas K. Dyer, Inc., a consulting engineering firm.

Topics presented at the meetings of this Land Transportation Division chapter of VTS included the following:

- 25 Hz frequency converter used by Southeastern Pennsylvania Transportation Authority to produce 25 Hz electric traction power from 60 Hz commercial power.
- Vital microprocessors for use in railway signaling installations.
- Amtrak's centralized electronic traffic and power control center for its Northeast Corridor routes.
- SEPTA upgrade of its Norristown high speed line and its new multiple unit car maintenance facility. Also, at a meeting in March 1990, SEPTA's plans for the 1990s were presented.
- Terminal facilities of rapid transit lines were topics discussed at two meetings, namely New Jersey Transit's Newark Waterfront facility and SEPTA's Frankford Elevated line Bridge-Pratt Terminal.

High Speed Rail Gains in Interest in the United States

High-speed rail has captured the imagination of many people, especially in Europe and Asia, particularly in Japan. Some wonder why the United States, which has always been thought of a highly technically oriented country has not been, if not in the forefront, at least has some high speed rail in service. High speed rail is often considered to be above 200 mph. Our closest thing is Amtrak's Northeast Corridor operation.

But now there is renewed interest in high speed rail in the US, especially in Florida. According to PROGRESSIVE RAILROADING, in its January 1990 issue, Paul Reistrup, chairman, High Speed Rail Association, said:

"On December 2, the California Nevada Super Speed Ground Transportation Commission voted to proceed with the Las Vegas-Southern California route by issuing requests for proposals for planning and construction.

"Two days later, Florida Governor Bob Martinez accepted a check for $600,657 from the Florida High Speed Rail Corp., which gives that firm the right to proceed with its application to build the Miami-Orlando-Tampa high speed rail system.

"And on December 15, the Ohio High Speed Rail Authority closed its final chapter in the bidding process for the right to build the Cleveland-Columbus-Cincinnati system."

Also showing interest are Texas with a system linking Austin, Fort Worth-Dallas, Houston and San Antonio. Pennsylvania is looking at Philadelphia and Pittsburgh as a high speed rail Other talked about corridors are Chicago and Milwaukee, Chicago-St. Louis and Chicago linked to Detroit. The Milwaukee end of the Chicago link might be extended to Minneapolis.

One thing to point out is that all the systems built overseas, such as Japan's well know "bullet trains" and the French TGV are all financed by the government. In this country, that is not the federal

policy. In Secretary of Transportation Samuel Skinner's report, just released, called MOVING AMERICA- New Directions, New Opportunities, there is a section on A New Generation of Transportation for High-Density Intercity Travel. In this report, the distances are in the 100 to 500 mile range. "The journey may be too long to drive comfortably in a car but not great enough to be accommodated efficiently in today's large commercial aircraft and congested airports."

"High speed rail and magnetically levitated trains are already operating in Europe and Japan. . . The Federal Government will promote research to support those next steps providing seed money for the initial examinations of the feasibility of major new technological proposals and evaluating their cost-effectiveness in comparison with other options.

"While private investment will be the central feature in putting any of these systems into place, the Federal Government can serve as the catalyst and ensure that that regulatory and institutional barriers do not impede implementation of viable systems."

What is operating around the world is summaried below. Thanks are extended to American Railway Engineering Association Committee 17- High Speed Rail,for its report from which this information is taken.

Existing High Speed Rail Systems

Japan- Tokaido South, Tokyo to Shin Osaka, 320 miles, 137 mph.
Sanyo South, Shin Osaka to Hakata, 344 miles, 143 mph.
Tohuku, Omiya to Morioka, 289 miles, 149 mph.
Joetsu, Omiya to Niigata, 167 miles, 149 mph.

France- TGV Southeast, Paris to Lyon, 264 miles, 168 mph.
TGV Atlantique, Paris to Le Mans, 125 miles, 186 mph.

Italy- Direttissima, Rome to Florence, 157 miles, 155 mph.

United States- Northeast Corridor, Washington to New York, 227 miles, 125 mph.

Note: Several countries operate trains at 125 mph on upgraded conventional lines such as in England, Germany, France, Italy, and others.

High Speed Rail Systems Under Construction

Germany- Hannover to Wurzburg, 201 miles, 155 mph.
Mannheim to Stuttgart, 62 miles, 155 mph.

France- TGV Atlantique, Paris to Tours, 65 miles, (plus 77 miles now in service), 186 mph.
TGV North, Paris to Lille, Belgium, Channel Tunnel, 207 miles, 200 mph.
Interconnection of TGV lines, Paris, by pass with stop at Eurodisney and Roissy International Airport, 65 miles, 186 mph.
Extension of TGV Southeast, Lyon to Valence, 75miles, 186 mph.

Italy- Direttisima (extended), Milan, Bologna, Florence, Rome, Naples, 482 miles, 171 mph.

Japan- Hokuriku, Takasaki to Karuizawa, 25 miles.

Spain- Madrid to Seville, 292 miles, 171 mph.

High Speed Rail Systems Planned

France- TGV East, Paris to Strasbourg, 261 miles, 186 mph.
TGV Mediterranean, extension to Spain and French Riviera, 186 mph.

Australia- Melbourne to Sydney, 539 miles, 220 mph.

Brazil- Sao Paolo to Rio de Janeiro, 280 miles, 186 mph.

Canada- Quebec, Montreal, Ottawa, Toronto, Windsor, 580 miles, 186 mph.

Korea- Seoul to Pusan, 235 miles, 186 mph.

Taiwan- Taipei to Kaohsiung, 210 miles, 171 mph.

U.S.S.R.- Leningrad to Moscow to Crimea, 1,300 miles, 150-186 mph.

United States- California-Nevada, Anaheim to Las Vegas, 270 miles, 185-250 mph.
Florida- Miami, Orlando,Tampa, 314 miles, 150-186 mph.
Florida- Orlando to Epcot Center, Maglev demonstration, 17.5 miles, 300 mph.
Ohio- Cleveland, Columbus, Cincinnati, 257 miles, 125-170 mph.
Pennsylvania- Philadelphia to Pittsburgh, 308 miles, 180-250 mph.
Texas- Fort Worth to Dallas to Houston to San Antonio to Austin, 618 miles, 185 mph.

Thus, one can see much planning in the US while in France and Japan with Italy and some others, high speed rail is alive and well. The big difference is that overseas it is government policy to move people in trains and public transportation. A factor over there is with gasoline hovering in the $2.50 or $3 a gallon rate, there is an incendive to use public transportation.

On a positive note, one can say that in the United States there is renewed interest in high speed rail, and with funding provided in the Florida case by

Continued on page 4

Communications

J. R. Cruz
Communications Editor

ABSTRACTS

"Characterization of UHF Multipath Radio Channels in Factory Buildings," Theodore S. Rappaport, IEEE Transactions on Antennas and Propagation, Vol. 37, No. 8, August 1989.

Wide–band multipath measurements at 1300 MHz have been made in five factory buildings in Indiana. Root mean square (rms) delay spread (σ) values were found to range between 30 and 300 ns. Median σ values were 96 ns for line–of–sight (LOS) paths along aisleways and 105 ns for obstructed paths across aisles. Worst case σ of 300 ns was measured in a modern open plan metal–working factory. Delay spreads were not correlated with transmitter–receiver (T–R) separation or factory topography, but were affected by factory inventory, building construction materials, and wall locations. Wide band path loss measurements consistently agreed with continuous wave (CW) measurements made at identical locations. It is shown here that such empirical data suggest independent and identical uniform distributions on the phases of resolvable multipath signal components. Average factory path loss was found to be a function of distance to the 2.2 power. Wide–band factory propagation measurements have not been previously reported in the literature.

"Integrated Voice/Data Multiplexer with Adaptive Flow Control of Data Access," K. C. Chua and D. T. Nguyen, IEE Proceedings, Vol. 136, Pt. I, No. 6, December 1989.

The paper proposes the use of an adaptive window flow control technique to control data access, with the aim of improving voice performance in an integrated voice/data multiplexer. By means of both mathematical analysis and computer simulation, the proposed control technique is shown to yield improvements in the average packet delay of both voice and data at the expense of data throughput. Additionally, the proposed control technique can be made to perform better than the two frame management strategies which have been demonstrated by previous work to be efficient for the integration of voice data packets.

"Joint Source–Channel Coding for Raster Document Transmission Over Mobile Radio," R. R. Wyrwas and P. G. Farrell, IEE Proceedings, Vol. 136, Pt. I, No. 6, December 1989.

Coding schemes for binary raster document transmission in the mobile radio environment are explored. For many applications, standard facsimile is too costly in terms of capital investment and transmission time. In this paper we present joint source–channel coding as an alternative, cost–effective solution for low resolution graphics transmission. We present SEA–RL coding as a novel and useful example of joint source–channel coding.

"Threshold Detection of Continuous Phase–Modulated Signals," K. R. Raveendra and R. Srinivasan, IEE Proceedings, Vol. 136, Pt. I, No. 6, December 1989.

Threshold detection techniques are employed to obtain canonical multiple–bit–observation receivers for detection of weak coherent and incoherent continuous phase–modulated signals buried in non–Gaussian noise. The limiting performance estimates of these receivers are derived, and then used to determine optimum coherent and incoherent threshold signaling schemes that belong to a subclass of CPM signals and find applications over certain bandlimited channels.

"Empirical Prediction of BER in FSK Data Communication Systems Subjected to Impulsive Noise," A. M. D. Turkmani and J. D. Parsons, IEEE Transactions on Communications, Vol. 37, No. 12, December 1989.

A new method is proposed for predicting the degradation in performance of FSK data communication systems subjected to impulsive noise. It involves overlaying a representation of the incoming noise, expressed in terms of the noise amplitude distribution (NAD), on a family of isodegradation curves drawn with BER as the parameter. A direct prediction of the BER to be expected in the presence of the noise can be obtained by reading off the value of BER corresponding to the point of tangency between the two sets of curves (termed the tangential BER), and multiplying this by a factor F, characteristic of the radio location. The value of F can be found either experimentally or analytically. The usefulness of the method has been demonstrated, using vehicle–borne equipment, by a series of experiments designed to be representative of typical mobile radio reception conditions. The proposed method is a very powerful experimental assessment technique. It is simple in concept, easy to apply and has the advantage of being readily generalized for applications with different modulation techniques.

"Performance Evaluation of Slotted ALOHA With Generalized Retransmission Backoff," D. Raychaudhuri and K. Joseph, IEEE Transactions on Communications, Vol. 38, No. 1, January 1990.

This paper presents an analytical investigation of generalized retransmission backoff policies for slotted ALOHA random access channels. Backoff techniques, of which the well–known "exponential backoff" is a special case, are based on adaptation of average retransmission delay as a function of the number of collisions experienced by each message accessing the contention channel. An analytical model applicable to slotted ALOHA channels employing general backoff functions has been developed and used to assess the performance advantages offered by either exponential backoff or alternative policies motivated by heuristic considerations. Numerical results for an example satellite channel scenario are presented, demonstrating that the use of appropriate backoff policies can result in significant improvements in stable throughput–delay characteristics relative to nonadaptive systems.

"Error Probability of Fast Frequency Hopping Spread Spectrum with BFSK Modulation in Selective Rayleigh and Selective Rician Fading Channels," Bassel Solaiman, Alain Glavieux, and Alain Hillion, IEEE Transactions on Communications, Vol. 38, No. 2, February 1990.

The performance of noncoherent reception in fast frequency hopped spread–spectrum (FFH–SS) communication systems operating through noisy, fading multipath channels in investigated. Systems operating with binary frequency–shift keying modulation (BFSK) and noncoherent demodulation are examined under the assumption of very slow fading. These analyses demonstrate the frequency hopping benefits in selective channels. Expressions are derived for the bit error rate in the context of selective Rayleigh and selective Rician fading channels, as a function of channel and system parameters.

"Dynamic Performance of ALOHA–Type VSAT Channels: A Simulation Study," Dipankar Raychaudhuri and James Harman, IEEE Transactions on Communications, Vol. 38, No. 2, February 1990.

This paper presents a simulation study of the dynamic behavior of ALOHA–type protocols used in interactive–data very small aperture terminal (VSAT) networks. A simulation model for quantitative evaluation of random access channel stability in terms of the transient response to a traffic overload pulse is described, and the usefulness of a single performance measure defined as "backlog fall time" is established. The variation of backlog fall time with selectable protocol parameters (such as average retransmission delay for nonadaptive systems or retransmission backoff policy parameters for adaptive systems) is investigated, for example, ALOHA and selective reject (SREJ) ALOHA channels. A methodology for joint optimization of steady state and dynamic performance based on obtaining contours of average delay versus backlog fall time over the variation range of selectable protocol parameters is outlined and demonstrated. It is shown that, generally speaking, a suitable operating point is easily identified from these contours because they exhibit a characteristic "knee" region in which both delay and fall time are close to the minimum values that can be independently obtained.

"Novel Acquisition–Aid Design for the Split–Loop Phase–Lock Receiver," P. B. Kenington, J. P. McGeehan, and D. J. Edwards, IEE Proceedings, Vol. 137, Pt. I, No. 1, February 1990.

The paper describes a number of acquisition–aid schemes applicable to a tracking receiver, and discusses the relative merits of each, when applied to the proposed new split–loop tracking receiver. It is demonstrated that the more conventional designs of acquisition aid, currently in use on long–loop receivers, are less than optimum when applied to a split–loop receiver. A novel form of sweep acquisition aid, incorporating a feedback correction system, is described for application to a split–loop receiver. The operation of the system is described mathematically, along with its practical implementation and operation in an actual tracking receiver. This scheme is also shown to be applicable to conventional long–loop receivers.

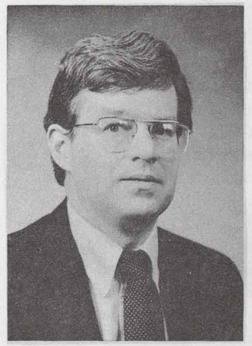
"M–ary Frequency Shift Keying With Differential Phase Detector in Satellite Mobile Channel With Narrowband Receiver Filter," I. Korn and M. Namet, IEE Proceedings, Vol. 137, Pt. I, No. 1, February 1990.

We derive an expression for the error probability of M–ary frequency shift keying with differential phase detector and narrowband receiver filter in the satellite mobile (Rician) channel which includes as special cases the Gaussian and land mobile (Rayleigh) channels. We compute the error probability as a function of various system parameters for M = 2, 4, and 8 symbols and the third order Butterworth receiver filter. The error probability increases with Doppler frequency and with the shift of the channel from Gaussian through Rician to Rayleigh. The optimum normalized bandwidth per bit is in the vicinity of one and the optimum modulation index for binary symbols is about 0.6. The threshold for quaternary symbols can be optimized to about 0.9 of the modulation index. For Rician and Rayleigh channels with non zero Doppler frequency there is an error floor, therefore may require diversity or coding in order to achieve a desired error probability.

"New Detection Algorithm with Reduced Complexity," G. Benelli and R. Fantacci, IEE Proceedings, Vol. 137, Pt. I, No. 1, February 1990.

A new algorithm for detecting and/or decoding of signals in communication system is presented. The advantage of the proposed sub–optimum algorithm with respect to the classical maximum likelihood detection (MLSE) method lies in the significant reduction in computation complexity attainable by associating a reliable information to each received signal. At the same time, the error probability is maintained close to MLSE levels through the proper selection of the reliability information. We describe the application of the proposed algorithm to some interesting cases, such as the detection of continuous phase modulations with and without combined channel coding, detection of Ungerboeck codes, use in conjunction with the Viterbi algorithm. In all cases, a net reduction in computation complexity with respect to the classical MLSE algorithm is achieved.

Vehicular Electronics



Bill Fleming
Vehicular Electronics Editor

Auto Directional Antenna -- Blaupunkt has developed a concealed radio antenna system that uses "phased array" technology to electronically steer the antenna in the direction of best reception [1]. This antenna is especially useful in minimizing effects of multipath interference which are pronounced in localized areas near broadcast transmitters. An OEM version of this system is expected to debut in the 1991 model year.

The antenna system differs from traditional diversity antennas that simply focus on the strongest incoming signal. The new Blaupunkt antenna adjusts the phases of signals received by four bumper-mounted antennas such that the phased array antenna is electronically aimed in the direction of best signal reception. At the same time, unwanted multipath signals coming from other directions are rejected.

(This should sell well to anyone who drives around Southfield, MI; where at least 3 or 4 high-power transmitters create severe multipath interference problems. I usually switch to am-radio when I'm driving in this part of the greater Detroit area).

The antennas used in this system are made of foil and can either be bumper mounted or embedded in any quarter section the vehicle which is plastic. The microprocessor that electronically controls the phased array antenna is proprietary and was developed by Robert Bosch [1].

Integrated Cellular Phone/Windshield Visor -- Buyers of five high-end Chrysler vehicles will be able to order cellular phones that are integrated into the windshield visor [2]. The phones were developed jointly by Chrysler and Oki Telecom.

To place a call, the driver flips down the visor, presses a button to turn the phone on, and then enters the number. The telephone automatically mutes the radio when making or receiving a call. It also has capacity for up to 100 programed telephone numbers for faster dialing.

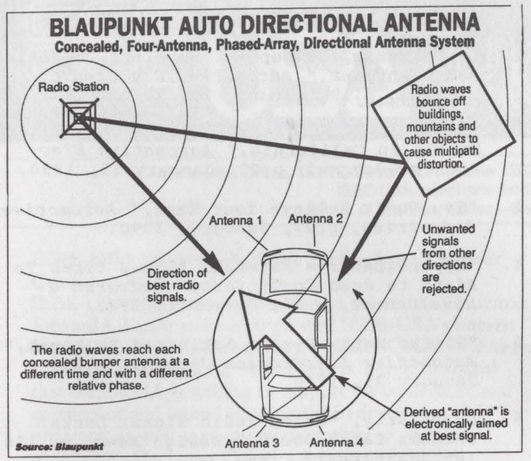
Electronic Muffler -- Noise Cancellation Technologies, Inc., and Walker Manufacturing (Tennco Automotive) have formed a joint venture to develop an electronic muffler [3]. Equal but opposite-phase sound waves are electronically generated to cancel sound waves in the exhaust that are generated by the engine.

Not only is noise muffled, but so is engine exhaust backpressure. It is claimed that this results in a 5-percent improvement in both fuel economy and horsepower, as well as a 25-percent savings in muffler weight.

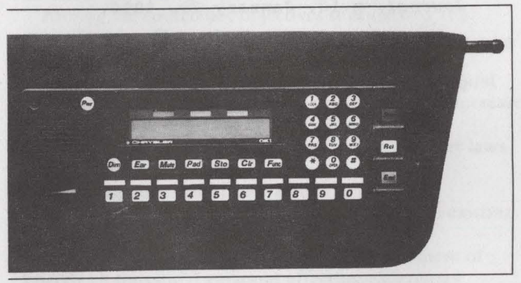
"Intelligent Tires" -- I think we're all becoming weary of hearing about "smart" and/or "intelligent" this or that. Well how about "intelligent" tires? Two professors from the Milan, Italy, Polytechnic Institute claim to have such a thing [4].

"Intelligent" tires change shape to suit different road conditions. Instead of filling the tires with air, the tires are filled with a "composite substance called Compound X." Peltier belts inside the tire rapidly change its temperature, whereupon Compound X expands by heretofore unheard of amounts. Compound X-filled tires would be especially useful for off-road agricultural or military vehicles. Compound X can also be used in safety applications such as in crash helmets to provide occupant-conformal energy-absorbing padding and bolstering.

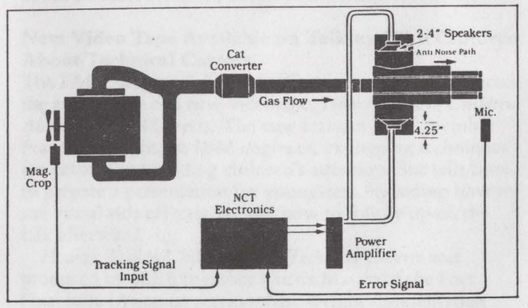
Now there's a hitch. The Italian professors won't disclose the makeup of Compound X. However, they said that it is not a metal, a polymer, or a traditional compound. (Big help they are). Make up your own mind, but they sure don't have many answers for the questions that were asked. More information is warranted, particularly with respect to the dramatic claims they're making. Personally, I've already met too many people like them.



BLAUPUNKT AUTO DIRECTIONAL ANTENNA

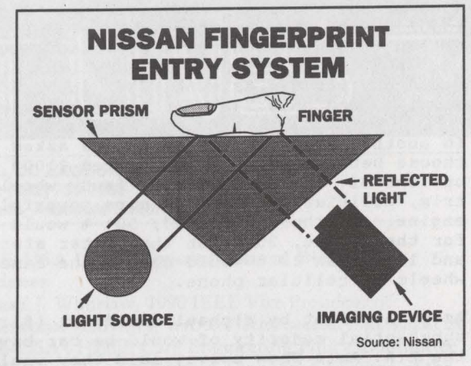


INTEGRATED CELLULAR PHONE/WINDSHIELD VISOR

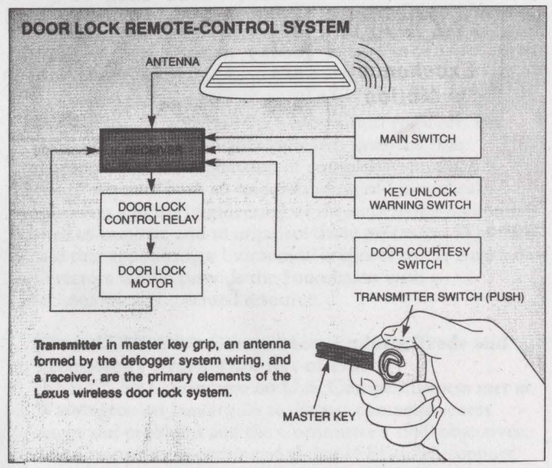


ELECTRONIC MUFFLER SYSTEM

Nissan Keyless Entry System -- Nissan has developed a keyless entry system which is activated by the fingerprints of people who regularly use the car [5]. The system permits entry to the vehicle by reading pre-programed fingerprints. After keying in a 3-digit entry code on door-mounted push-buttons, the driver places his or her finger on a sensor prism.



NISSAN FINGERPRINT ENTRY SYSTEM



LEXUS WIRELESS DOOR LOCKING SYSTEM

The system can match authorized fingerprint patterns within 2.5 s, or reject unauthorized fingerprints within 5 s, and will register new authorized fingerprints within 45 s.

Lexus Wireless Door Locking System -- A low-power 41-MHz radio signal, transmitted from the grip of the ignition key is received by the vehicle rear window defogger wire grid (acting as an antenna). If the transmitted frequency-modulated code matches the stored code, a motor-drive circuit either locks or unlocks the vehicle doors [6]. The remote-control door locking system is only operative within three feet of the rear window antenna.

What Does The Customer Want -- According to a survey of visitors at the 1990 Greater Los Angeles Auto Show, the customer is surprisingly uninterested in high-tech aids to driving [7]. In one part of the survey, customers were asked to choose between: a route guidance system, a traffic communications warning system, a collision avoidance system, and a robotic driving (auto pilot) system.

None of the systems received even a 50-percent endorsement. For hypothetically identical prices of $1000 each; 43 % of those surveyed said they would buy collision avoidance, 34 % would buy robotic driving, 33 % for traffic warning, and only 24 % for route guidance.

In another survey, customers were asked to choose between identically priced $1000 options of: upgraded stereo, fancy wheels and trim, cellular phone, or a more powerful engine. Of those surveyed; 50+ % would opt for the engine, 25 % for the better stereo, and less than 10 % would choose the fancy wheels or cellular phone.

As pointed out by Michael Sheldrick [8]: "a substantial majority of would-be car buyers in the L.A. Auto Show survey said they wouldn't pay $1000 for many features that automotive engineers are even now readying for late '90s production." Nonetheless, "more than 40 percent would be willing to pay $1000 for a collision avoidance system. That's pretty high considering a goodly number had to be buyers of low-cost cars. It confirms the high interest in safety."

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IEEE USA HOT LINES

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IEEE-USA Supports Federal Technology Transfer Conference

IEEE-USA's U.S. Competitiveness Committee Chairman Edward J. Doyle recently expressed IEEE-USA's interest in participating in a Technology Transfer Conference to be held in June in Santa Fe, New Mexico. Doyle indicated that IEEE-USA is willing to support the conference as a co-sponsor and would like to assist in developing the program, as well as send representatives to attend the conference. Dr. James Gover, a former IEEE-USA Congressional Fellow who is a member of the U.S. Competitiveness Committee, will represent IEEE-USA at the conference along with Mr. Doyle.

Among the conference objectives summarized at a recent Steering Committee meeting are:

- Promoting cooperation among industry, Federal laboratories, agencies, educational institutions, state and local governments and non-profit organizations to increase the utilization of federally developed technology;
- Seeking industry feedback on technology transfer laws and regulatory policies;
- Informing interested firms about the *National Competitiveness Technology Transfer Act of 1989* and existing opportunities and methodologies;
- Stimulating industry guidance to the Department of Energy on the new regulations affecting technology transfer; and,
- Promoting the mission of technology transfer and preparing for future efforts to change industrial attitudes about external research, developments, and technology.

New Video Tape Available on Talking With Children About Technical Careers

The PACE Regional Activities Committee has announced the availability of a new videotape, *How to Talk to Children About Technical Careers*. The tape features IEEE member Francine Wright, an IBM engineer, explaining techniques for getting and holding children's attention. She tells how to prepare a presentation for youngsters, including how to use visual aids effectively, and how to follow up on the talk afterward.

How to Talk to Children about Technical Careers was produced by IEEE member Curtis Massie of the Fort Huachuca (Arizona) section. Ms. Wright's presentation provides a useful tool for those who have established and maintain contact with their local schools, teachers and students. The tape may be obtained on loan from your Regional PACE Coordinator, or from the IEEE-USA Office in Washington, D.C. Sections or individuals wishing to purchase a copy of the tape should contact Ann Hartfiel at the IEEE-USA Washington Office.

IEEE-USA Urges Appointment of Biomedical Engineer

Michael J. Whitelaw, 1990 IEEE Vice President of Professional Activities, wrote a letter recently on behalf of IEEE-USA's Health Care Engineering Policy Committee (HCEPC) to Senator Edward Kennedy, Chairman of the Senate Labor and Human Resources Committee, regarding S.1391, the *Foundation for Biomedical Research Act of 1989.* One purpose of the bill is to amend the *Public Health Service Act* to establish a Foundation for Biomedical Research.

In his letter, Whitelaw recommended that a minimum of one appointed member of the Biomedical Research Board of Directors be reserved for a biomedical engineer. He pointed out that biomedical research involves "the development and application of complex technology," which requires both an understanding of biomedical processes and the engineering of the underlying equipment used to measure and manipulate those processes. Whitelaw said that appointing a biomedical engineer to the Board of Directors would provide the Foundation with a technologically oriented resource.

Three IEEE-USA Committees Endorse Trade and Technology Promotion Act of 1989

IEEE-USA's Committee on U.S. Competitiveness met in Washington on January 26 to discuss competitiveness issues and problems and the Committee's 1990 objectives. The Committee recommended that IEEE-USA support new legislation introduced by Senator John Glenn (D.-Ohio). His bill, S.1978, reorganizes the Department of Commerce into a Department of Industry and Technology. In a February 7 meeting, Harry Broadman, Chief Economist of the Senate Governmental Affairs Committee, explained to an IEEE-USA delegation how Glenn's bill differs from prior legislation. He also offered suggestions for enacting the legislation.

IEEE-USA's National Government Activities Committee (NGAC) convened in Washington on February 8, also proposing to support the new bill. 1990 NGAC Chairman Edward Bertnolli pointed out that the new legislation would not only establish a new executive department of the government, but also add an Advanced Civilian Technology Agency within the department.

Additionally, IEEE-USA's Engineering R&D Policy Committee has also expressed its support for S.1978. Michael Whitelaw, 1990 USAB Chairman and Vice President of Professional Activities, recently sent a letter to John Glenn, Chairman of the Senate Committee on Governmental Affairs, requesting an opportunity to give testimony on the bill.

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Vol. 7, No. 4 ■ April 1990

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Prospective authors should submit four copies of a 300-500 word summary of their papers by April 18, 1990 to:

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Contributors will be notified by May 15th of acceptance of their paper and author kits will be supplied at that time. Papers will be published for the workshop and selected papers considered for publication in the Transactions of the Society most closely allied with the nature of the individual paper.

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