

IEEE/SEM Fall '97 Section Meeting

Date: Thursday, October 16, 1997

Location: GM Management Center,
30901 Van Dyke Ave, Warren, MI
Map and directions on page 8

Contact: K. C. Liu, 248-265-6964

Program:
5:45 p.m. Concurrent technical sessions
6:30 p.m. Social period with cash bar
6:30-7:15 p.m. Registration and check in
7:20 p.m. Dinner
8:00-9:00 p.m. Featured Presentation

Dinner Menu:

Choice of chicken parmesan or vegetable lasagne, salad, Italian green beans, garlic bread sticks, and cannoli.

How to Register:

Mail registration form on page 7 by Oct. 6.
Late registration accepted by phone Oct. 6-10.

Students must register through their student branch. Students without a student branch, contact Mohamed Zohdy, 248-370-2234.

There is no fee for attending technical sessions only.

**Section Meeting Featured Presentation:
Automotive Information Integrated Engineering**

*by Dr. William F. Powers
Vice President - Research,
Ford Motor Company*

Global automotive companies are relying increasingly upon integrated computer and communications technology to deal with a rapidly changing global marketplace. The major business drivers are product development speed and efficiency, emerging markets, and technology. Utilizing the typical automotive business timeline, examples will be presented to illustrate the application and integration of emerging information technologies to the total automotive business. In particular, examples of virtual co-located teams, engineering data management, CAD/CAM/CAE, and the roles of the Internet and Intranet will be covered.



William F. Powers has been with Ford Motor Company since 1979. On February 1, 1996, he was elected Vice President-Research. Prior positions at Ford include: Program Manager for the Lincoln Mark VIII and Executive Director of Information Technology. Before joining Ford, he was a Professor of Aerospace Engineering and Computer, Information and Control Engineering at the University of Michigan from 1968-90, and a consultant on the Space Shuttle Program from 1970-79. He is an IEEE fellow, and serves on numerous government, university, and professional society committees.

Professional Activities at Fall Section Meeting

by Don Silversmith, Director of Professional Activities

In addition to the Professional Activities technical session, there will be three additional programs related to professional development.

Student Table Sponsorship:

We continue our successful program of helping firms who hire entry-level EE's to meet interested and enthusiastic student branch members over dinner. We provide a table for an industrial representative, and invite them to meet with students interested in the firm's recruitment activities. This program also helps to subsidize student branch member attendance.

University Showcase:

IEEE/SEM is home to over ten institutions with electrical engineering programs. We invite these institutions to set up an exhibit addressing their choice of EE students, research, educational programs, and graduate study opportunities. The exhibits are often staffed by student members, alumni section members, or institution staff. This is a chance for attendees to learn about local universities.

Vendor Exhibits:

A variety of vendors will have tables offering their products and services at the meeting. These vendors sell discounted insurance, offer Internet connection service, provide consulting services, or offer new employment opportunities to attendees. Come see these displays during the social period.

Participation:

Contact Don Silversmith, 313-577-3861, to learn more about sponsoring a student table or participating in the university showcase or vendor exhibits.

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- II Vehicular Technology:** Vehicular Technology (VT-06)
- III Comm. & Aero. Electronics:** Aerospace & Electronics Systems (AES-10) and Communications (COM-19)
- IV Trident:** Electron Devices (ED-15), Microwave Theory & Techniques (MTT-17) and Antennas & Propagation (AP-03)
- V Computer:** Computer (C-16)
- VI Geoscience & Remote Sensing:** Geoscience & Remote Sensing (GRS-29)
- VII Power Eng. & Ind. Apps.:** Power Engineering (PE-31) and Industrial Applications (IA-34)
- VIII EMC:** Electromagnetic Compatibility (EMC-27)
- IX Power & Ind. Electronics:** Power Electronics (PEL-35) and Industrial Electronics (IE-13)
- X Engineering Management:** Eng. Management (EM-14)

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Calendar of Events

Monday Meeting: **Executive Committee**
October 6 Time: Dinner at 6 p.m., meeting at 6:30 p.m.
 Location: Eaton Corp., 26201 Northwestern Highway, Southfield
 Sponsor: IEEE/SEM
 Contact: Kimball Williams, 248-354-2845

Thursday Meeting: **11th Hammerle Memorial Lecture**
October 9 Speaker: Dick Rutan, aircraft company exec. & former USAF pilot
 Title: Around the World in 9 Days (One World, One Flight)
 Time: 3:30 p.m.
 Location: Room 201, Dodge Hall, Oakland University, Rochester
 Sponsor: Oakland University
 Contact: For further information, call 248-370-2212.

Thursday Meeting: **Fall Section Meeting**
October 16 Time: 5:45-9:00 p.m.
 Details: Announcement on page 1, more stories on pages 4-8.

Wednesday Meeting: **G.O.L.D. Social Meeting**
October 29 Time: 6 p.m. through 9 p.m.
 Location: Woody's in Royal Oak
 Sponsor: IEEE/SEM Graduates of the Last Decade
 Comment: Sign up by October 16. See story page 3.
 Contact: Mark Hunter, 248-588-0355, m.hunter@ieee.org

Monday Meeting: **Executive Committee**
November 3 Time: Dinner at 6 p.m., meeting at 6:30 p.m.
 Location: TBD in Windsor, Ontario
 Sponsor: IEEE/SEM
 Comment: IEEE members in Ontario are invited to the meeting.
 Contact: George Peters, 519-966-1656 x4447#, GPeters@stclairc.on.ca

Thursday Meeting: **Plan Your Financial Future Before It's Too Late**
November 13 Time: 6:30 p.m.
 Location: I-275 & 6 Mile area. Directions provided with registration.
 Sponsor: IEEE/SEM Graduates of the Last Decade
 Comment: Dinner fee. Register by November 8. See story page 3.
 Contact: Mark Hunter, 248-588-0355, m.hunter@ieee.org

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Graduates Of the Last Decade

We have several GOLD activities planned for this fall. These activities are primarily for our GOLD members but general and student members are welcome to attend. Priority will be given to GOLD members if space is limited.

On **Wednesday, October 29**, from 6 p.m. through 9 p.m., we are having a **social outing at Woody's** in Royal Oak. This gathering is for members to meet with other members while enjoying some food, beverages and pool. It is also an opportunity for members to exchange ideas on what other activities they would like to attend throughout the rest of the year.

On **Thursday, November 13**, American Express is presenting a **seminar for planning your financial future before it's too late**. This isn't a sales pitch, but it will show you the benefits of planning now for the future. There will be a set fee of about \$10 to \$15 to cover dinner which will be served along with the presentation. The meeting will be held in the area of I-275 and 6 Mile Road. The exact location and directions can be obtained when you register.

Registration is required for both of these events. Contact: Mark Hunter at m.hunter@ieee.org or 248-588-0355, for additional information and to register. Please provide a return e-mail address or phone number when registering.

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Professional Activities

Career Issues for Engineers to Monitor in a Global Economy

by Marlin Ristenbatt, University of Michigan

The change from US dominance in technical products to global competition, in both products and engineering jobs, has changed the environment for most engineers. This presentation, created by IEEE-USA's Career Maintenance and Development Committee, describes those trends and highlights behaviors that are best suited to succeed in the new environment. The major topics include: the prevalence of flatter, leaner organizations; increased opportunity for engineer's initiative, either as an employee or as a consultant; moving from "how can I get promoted" to "how can I improve my contribution"; and the match between your job and your abilities. A personal assessment questionnaire, to be seen only by yourself, will be filled out after the presentation.

Attend this session and learn more about how you fit into the global marketplace. By the end of this session you will have: (1) improved your confidence that what you are currently doing is about right; or (2) if you are satisfied with what you are doing, gotten some ideas for sustaining that satisfaction over time, or (3) gotten some ideas of how you might improve your contribution and career satisfaction.

You will see the IEEE Career Asset Manager, a tool to maintain your career vitality. Also, the first 20 people will receive a free copy of the new "IEEE-USA Guidelines to Professional Employment."

Marlin Ristenbatt, Ph.D., has, since 1961, been a Research Engineer and Lecturer in the EECS Department of the University of Michigan, conducting advanced communication projects. His specialties are digital and spread spectrum communications, with emphasis on applications.

He founded IEEE-USA's Career Maintenance and Development Committee in 1977. He recently led the creation of "IEEE-USA Guidelines For Professional Employment" and "Career Issues for Engineers to Monitor in a Global Economy." In 1997, He received the IEEE United States Activities Board's highest award, the Citation of Honor.

Student Track

Application of Quantitative Feedback Theory Using the Matlab QFT Toolbox

by James M. Slicker, Eaton Corporation

Quantitative Feedback Theory (QFT) is an engineering method devoted to practical design of feedback systems. The basic QFT premise is that physical systems are inherently uncertain and/or have uncertain disturbances acting on them. In these cases QFT provides a design method for achieving specified performance while minimizing the "cost of feedback."



The QFT exposes design trade-offs between stability, performance, plant uncertainty, disturbance rejection, controller complexity and controller bandwidth. QFT uses the simplest mathematics for the problem, accomplishing complex, robust designs in optimal fashion without resorting to abstract theorems or higher mathematics.

The basics of robust control design using QFT and a demonstration of using the Matlab QFT toolbox will be presented. An application of QFT to a suitable automotive control problem will be solved using the toolbox.

James M. Slicker received the B.E.E. degree from the University of Detroit in 1968, the M.S.E.E. degree from New York University in 1971, and the Ph.D. degree in Systems Engineering from Oakland University. He is currently a Senior Principal Engineer at the Eaton Corporation's Corporate Research and Development Center in Southfield, Michigan, where he has worked since 1978. At Eaton, he has developed control systems for vehicle related products and induction motor drive systems. He holds 15 U.S. patents.

Chapter I: Circuits & Signal Processing

Intelligent Mobility & Control for Unmanned Vehicles

by Paul Lescoe, US Army TACOM

The Army's vision is to provide 21st century land forces with a family of highly mobile unmanned ground vehicles for various military operations. A lack of robust vehicle control when operating in outdoor, unstructured, and dynamic conditions currently limits the usefulness of many of these unmanned ground vehicles. An overview of Army goals and programs in robotic control will be presented as well as opportunities to coordinate and leverage commercial and academic research interests with these Army activities. Land transportation operations can be significantly enhanced to increase performance, reduce costs, and improve personnel safety through a comprehensive effort to incrementally overcome remaining technology barriers to intelligent vehicle control.

Paul Lescoe of the US Army Tank Automotive & Armaments Command (TACOM), is the Chief of the Robotics Office, responsible for directing research in areas of intelligent mobility and control for Army vehicles. Key to this goal is the machine intelligence necessary to perform the perception, planning, and control tasks associated with navigating a vehicle through an outdoor unstructured environment. Mr. Lescoe received his bachelor's degree in Electrical Engineering in 1982 from Wayne State University and a master's degree in Electrical Engineering from the University of Detroit in 1987. He is a member of the Society of Automotive Engineers (SAE), a state Director of the Michigan Chapter of Intelligent Transportation Systems, and a national trustee of the Association of Unmanned Vehicle Systems International. He is also the Technical Chair of an annual International Ground Robotic Vehicle Competition for college students, now in its sixth year.

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Chapter II: Vehicular Technology

Magnetostrictive Sensors

by Mehmet H. Uras, Lawrence Tech. University

This session will review recent developments in the area of magnetostrictive sensors. The speaker will summarize experimental studies and modeling efforts on a non-bonded magnetostrictive strain sensor and a force sensor. A prototype force sensor will be demonstrated.

Mehmet H. Uras currently is an Associate Professor of Mechanical Engineering at Lawrence Technological University. His interests include the design and development of electro-mechanical systems, various sensors and actuators, instrumentation and measurements, data acquisition systems and software, friction/vibration interaction, magnetostrictive sensors, and internal combustion engines. He has bachelor's, master's and doctorate degrees in Mechanical Engineering, all from the University of Michigan, Ann Arbor. He has carried out numerous research and development projects funded by industry and government, and served as consultant to industry. He is a member of ASME, ASEE and SAE.

Chapter III: Comm. & Aero. Electronics and Chapter V: Computer

From Arpanet to Internet and Beyond (with Diversions Along the Way)

by Tom Blackadar, Personal Electronic Devices Inc.

Tom Blackadar worked at Bolt, Beranek and Newman (BBN) when the earliest Internet hardware and software was being developed. This presentation will share some of the stories about the challenges, successes and interesting problems when the Internet was just getting started.

Mr. Blackadar considers himself a well-rounded systems engineer with a strong electrical engineering background as well as formidable UNIX experience. He started at BBN developing test equipment for communications systems, and migrated into VLSI design and test working on the Butterfly Parallel Processor. After finishing the last version of the Butterfly Switch chip, he moved into combining this chip with the rest of the Butterfly components to build the world's largest and fastest MIMD Parallel Processor in 1984. He became lead systems engineer for the Butterfly Voice Funnel, Internet Gateway, and the first UNIX based Butterfly Parallel Processor.

Later he moved through the management ranks of BBN, and took over the hardware engineering group at BBN in 1991. Here programs he helped initiate and worked on were the Multi-Gigabit router, the Advanced Communications Technology Satellite (ACTS) earth station, several classified programs, and the BodyLAN program. The BodyLAN program is the last frontier of personal wireless networking.

In December 1996, Mr. Blackadar left BBN to pursue personal interests in low power wireless sensors. His new company, Personal Electronic Devices Inc., is helping to define the uses of electronic devices in the next millennium.

Chapter VI: Geoscience & Remote Sensing

Present and Future Direction of National Remote Sensing Initiatives

by Robert G. Onstott, ERIM International

This session will review national remote sensing initiatives. Highlights will include interferometrics, wideband radar, and satellite SAR activities.

Robert G. Onstott, Ph.D., is a Senior Research Engineer and Scientist with the Environmental Research Institute of Michigan International in Ann Arbor. He received a bachelor's degree in electrical engineering with high honor from Wichita State University in 1974, and a master's degree in electrical engineering in 1976. He was awarded the doctorate degree in electrical engineering from the University of Kansas in 1980, while conducting electromagnetic research and the study of the microwave science of ice in polar regions at the Center for Research, Remote Sensing Laboratory. He then accepted a staff position of Research Associate at the Laboratory, where he worked until 1985. He also had an Adjunct Professor appointment in the Department of Electrical Engineering.



Since 1985, Dr. Onstott has been with the Environmental Research Institute of Michigan (ERIM). He has conducted and lead research activities in the areas of microwave remote sensing; radar cross section measurement; instrument and sensor design and development. He is also a pioneer in the microwave science of Arctic sea ice. This research has been described in numerous presentations at various IEEE technical conferences, journal papers, and in two books. He also has an appointment as Adjunct Professor at the University of Michigan in the Department of Atmospheric, Oceanic and Space Sciences.

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Chapter VII: Power Eng. & Ind. Apps.

Electrical Testing

by Lyle Detterman, Northern Electrical Testing

Mr. Lyle Detterman of Northern Electrical Testing will present an overview of acceptance testing of electrical equipment and discuss the testing required for co-generation equipment and primary switchgear.

Mr. Detterman has extensive experience in testing electrical power systems for the past 29 years. He is a director and past president of the International Electrical Testing Association (NETA), and his company has been a member of the organization since 1979. Following graduation from the University of Toledo, Lyle started his career with Detroit Edison in electrical power distribution and switching equipment. Additional industrial and hospital experience was gained with Harlan Electric Company. In 1979, he founded Northern Electrical Testing, Inc. His company provides testing services to electrical engineering firms, industrial, institutional, governmental, and private clients.

Northern Electrical Testing provides: assistance in site specific specifications, short circuit analysis, overcurrent device coordination, thermographic and ultra sonic surveys, relay testing and calibration, primary and secondary cable testing, switching equipment, power transformers, uninterruptable power supply systems, load testing of UPS batteries, emergency generation systems and other support functions. The company offers technical services, such as custom modification of switchgear, control systems and distribution equipment.

Chapter VIII: EMC

Truckers, Fat Ladies, & EMI at the Gas Pump

by Bill Ritenour, EMC Compliance, L.L.C.

This is a definitely non-politically correct but mildly humorous discourse on electromagnetic interference (EMI) effects. The talk details three EMI problems that Herman, a greatly put-upon gas pump, encounters during a typical workday. The problems range from electrostatic discharge due to a generously proportioned human sliding out of a car on a cold day, to RF interference from a 500 watt illegal CB mounted on a large commercial conveyance, and finally to an electrically “abrupt” large induction motor operating in an adjacent car wash. The presentation reviews the basic electromagnetic concepts associated with the various events; explains how each electromagnetic effect causes electronic upsets (halts) within poor Herman; and finally outlines the mitigation techniques used to eliminate each effect. At the conclusion of the talk, an extraordinary but non-lethal – and true – electromagnetic event is described that provides Herman a humorous revenge on the humans who had plagued him during the day.

Bill Ritenour received his Bachelor of Science in Electrical Engineering at the University of Texas (Austin) in 1963 and worked in the aerospace industry until 1980, principally in electronic counter-measures and radio navigation. Since 1980, Mr. Ritenour has specialized in electromagnetic compatibility, first in small computer peripherals (1980-84), followed by industrial process control (1984-88), then consulting and teaching (1988-1990), and finally in information storage and retrieval systems (1990-1996). In early 1996, Mr. Ritenour established his own consulting company, EMC Compliance, L.L.C.

Mr. Ritenour has taught EMC courses in the US, Europe, Canada, and Australia. He has served or is serving on several ANSI committees. He serves on the IEEE EMC Society’s Board of Directors. He is an EMC Society Distinguished Lecturer (1997-1999). He has written articles on EMC topics in IEEE EMC, EMC EXPO, and EMC/ESD International symposia as well as EMC Test and Design and other periodicals.



Chapter IX: Power & Ind. Electronics

High Temperature Electronics for Control Apps

by Dr. George Foyt, President of Foyt & Associates

The development of high temperature electronics will enable the deployment of distributed control systems into applications where elements of the control system are located in high temperature environments. These systems will then have all the usual features of a conventional temperature distributed system; i.e., substantial reductions in wire harness size and weight, reductions in connector requirements, enhanced possibilities of self-test and fault isolation, and the ability to reconfigure and modify the system easily, at lower cost.

This presentation’s topics range from the fundamentals of operation at both high and low temperatures, to the current state-of-the-art at high temperatures, and some projections for the future.

The presentation will conclude with a discussion of the program “High Temperature Distributed Control Systems (HiTeC).” This program is a DARPA funded, AF managed, consortium devoted to the development of SOI electronics and the demonstration of smart actuator and smart motor applications of electronics in high-temperature environments.

Dr. Foyt has enjoyed an extensive career in the development of semiconductor devices and device fabrication processes. Following his doctoral thesis work on the Gunn Effect in Polar Semiconductors at the MIT Lincoln Laboratory, he developed ion implantation processes in compound semiconductors, infra-red detectors, and high-speed optoelectronic switches. At Lincoln Laboratory, he supervised work in long-lifetime diode lasers, CCD imaging devices, IMPATT diode amplifiers, and microelectronic packaging. More recently, at the United Technologies Research Center, he has supervised work in high-precision pressure sensors, high-speed analog signal processing, low-noise oscillators, silicon-based accelerometers, and high-temperature electronics. Presently, he is technical leader for “High-Temperature Distributed Control Systems (HiTeC),” a consortium of nine companies devoted to the development and commercialization of high-temperature electronics.



Chapter X: Engineering Management

Toyota’s Set-based Product Development Process

by Jeffrey Liker, U of M, Ann Arbor

Toyota’s Product Development System is in many ways as much of a breakthrough as their now famous Toyota Production System. This presentation will review some of the central features of this product development system and consider them in light of a theoretical formulation called set-based design, originally developed by Professor Allen Ward of the Univ. of Michigan.

Jeffrey Liker is Associate Professor of Industrial and Operations Engineering at the University of Michigan, Ann Arbor, where he has been on the faculty since 1982. He has been studying Japanese design and manufacturing methods since 1982, particularly focusing on concurrent engineering. In 1991 he co-founded the Japan Technology Management Program at University of Michigan.

Dr. Liker has authored or co-authored 50 articles and book chapters and four books. In 1995 an article on supplier involvement in product development by Professor Liker and Rajan Kamath won a Shingo Prize for Excellence in Manufacturing Research (“A Second Look at Japanese Product Development,” Harvard Business Review, Nov.-Dec, 1994).



IEEE/SEM Fall '97 Meeting Registration Form

Complete and mail form with an early registration fee of \$25 per person. The registration fee includes technical session attendance and dinner. Complete this form for each person attending. Please make check payable to IEEE/SEM and forward along with a completed registration form to: **Christin Clayborn, 2206 Judy Lane, Shelby Township, Michigan 48316.**

Fee Type	Amount	Deadline
Early registration	\$25	Postmarked or received by 10/6/97.
Regular registration	\$30	Phone call to K. C. Liu, 248-265-6964, by 10/10/97.
Student registration	\$12	Register & pay through student branch.

There will be express check in for those pre-registering.

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Indicate which technical session you wish to attend:

- _____ Chapter I: Circuits & Signal Processing
"Intelligent Mobility and Control for Unmanned Vehicles"
- _____ Chapter II: Vehicular Technology
"Magnetostrictive Sensors"
- _____ Chapter III: Comm. & Aero. Electronics and
 Chapter V: Computer
"From Arpanet to Internet and Beyond (with Diversions Along the Way)"
- _____ Chapter VI: Geoscience & Remote Sensing
"Present and Future Direction of National Remote Sensing Initiatives"
- _____ Chapter VII: Power Eng. & Ind. Apps.
"Electrical Testing"
- _____ Chapter VIII: EMC
"Truckers, Fat Ladies, and EMI at the Gas Pump"
- _____ Chapter IX: Power & Ind. Electronics
"High Temperature Electronics: Needs and Challenges"
- _____ Chapter X: Engineering Management
"Toyota's Set-based Product Development Process"
- _____ Professional Activities Session
"Career Issues to Monitor in A Global Economy"
- _____ Student Track
"Application of Quantitative Feedback Theory using Matlab Toolbox"

Plasma Kudos by Steven Shannon

Professor Ron Gilgenbach from the University of Michigan received the 1997 Plasma Science Applications Committee (PSAC) award for excellence. He accepted the award at IEEE's International Conference on Plasma Science in San Diego. The award was for exceptional contribution in the field of Laser Ablation.

Donation in Memory of John H. Bryant

At its August meeting, the IEEE/SEM Executive Committee discussed the many contributions of John H. Bryant to the section. He had served IEEE/SEM as chair and advisor, and led the formation of the Geoscience & Remote Sensing Chapter. EXCOM approved a motion to make a donation in John Bryant's name to the Historical Electronics Museum, PO Box 746, Mail Stop 4015, Baltimore, MD. (The September 1997 issue of *Wavelengths* contained an obituary for John Bryant.)

Chapter X: Engineering Management *(continued)*

In 1996 his book on Japanese technology management practices won a second Shingo prize ("Engineered in Japan: Japanese Technology Management," N.Y., Oxford University Press, 1995). In 1997 his article with Allen Ward and Durward Sobek ("The Second Toyota Paradox: How Delaying Decisions Can Make Better Cars Faster," Sloan Management Review, Spring, 1995) won a third Shingo Prize. Other books about to be released by Dr. Liker are "Remade in America: Transplanting and Transforming Japanese Production Systems," Oxford University Press, "Becoming Lean: Inside Stories of U.S. Manufacturers," Productivity Press, and Fleischer, M. and Liker, J.K., "Concurrent Engineering Effectiveness: Integrating Product Development Across Organizations," Hanson-Gardner.

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If you didn't renew your membership for the 1997 year, then this *Wavelengths* will be your last issue. A notice telling you that you are in arrears will appear above your name on the mailing address. This issue was sent to you to let you know about some of the local events taking place this fall. Join us at some of these events and re-join IEEE. We are launching a special program to regain arrears members so you will be hearing more from us soon. Contact Mark Hunter, m.hunter@ieee.org, 248-588-0355, for more information on renewing your membership for 1998.

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Map to Fall Section Meeting, October 16, 1997

Directions to GM Management Center: From I-696 take Van Dyke Avenue North past 12 Mile Road. Stay in the right hand lane and proceed past 13 Mile Road. Take the clover leaf to westbound Chicago Road. Take Chicago Road to the first stoplight and turn left into the GM Tech Center.