



IEEE NEWSLETTER

KITCHENER - WATERLOO SECTION



October 1995

Mark this date on your calendar:

November 9, 1995, 5:30 p.m., University of Waterloo, Davis Centre Room 1304: Dr. Chandra M. Kudsia, COM DEV Ltd. on **MANAGING INNOVATION AND TECHNOLOGY - a Road Map for the R&D Function.**

November 29, 1995, 2:00 p.m., AT&T Global Information Solutions (formerly NCR), 580 Weber St. North, Waterloo: J. Melsa on **Quality, Productivity, High Velocity Performance and Global Competitiveness.**

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The Kitchener-Waterloo Section of the Institute of Electrical and Electronics Engineers serves all members whose mailing address is in Bruce, Grey, Perth, Waterloo or Wellington Counties.

MANAGING INNOVATION AND TECHNOLOGY - A Road Map for the R&D Function

Presented by the K-W Section.

Date: Thursday, November 9th, 1995, 5:30 p.m.

Place: University of Waterloo, Davis Centre Room 1304.

Speaker: Dr. Chandra M. Kudsia, COM DEV Ltd.

Dinner: Meet the speaker for dinner after the seminar.
Please contact Tom East for details (519-746-7809).

Refreshments will be served at 5:15 p.m.

Speaker: Dr. Chandra Kudsia is the Chief Scientist of COM DEV, which is one of the leading innovative companies in space research and development with a large professional staff in Cambridge, Ontario. As Chief Scientist, Dr. Kudsia oversees company wide research and development activities and participates in the planning of long-term business development. He serves on numerous national and international advisory committees and holds an appointment of Associate Professor at McMaster University.

Subject: Linking technology to business strategy has become the norm for the 1990s. A firm's technology strategy is the road map for its R&D function, and is a critical factor in the growth and sustenance of high technology companies. This talk will address some of these strategies from the perspective of space programs. It will also discuss the topic of innovation - specifically the role industries, universities, and the government can play in the process of innovation.

QUALITY, PRODUCTIVITY, HIGH VELOCITY PERFORMANCE AND GLOBAL COMPETITIVENESS

Presented by the K-W Section in conjunction with AT&T GIS Canada.

Date: Wednesday, November 29th, 1995, 2:00 p.m.

Place: AT-T Global Information Solutions (formerly NCR), 580 Weber St. North, Waterloo (Tel. 884-1710)

Speaker: Dr. J. Melsa, Distinguished Lecturer, IEEE Control Systems Society

Speaker: Dr. Melsa has degrees in Electrical Engineering from Iowa State University and the University of Arizona. He was Professor at Southern Methodist University and in 1973 he became Professor and Chair of Electrical Engineering at the University of Notre Dame. His research on speech encoding and digital signal processing was funded by the National Science Foundation, NASA, the Air Force, the Defense Communications Agency, and others.

In 1984, he began a second career in industry as Vice President at Tellabs in Lisle, Illinois. He built Tellabs' first research organization and conducted research that developed proprietary low-bit-rate speech encoding and adaptive echo canceler algorithms. Several successful products implement his innovations.

In 1989, as Vice President of Strategic Planning and Advanced Technology, Melsa led Tellabs' first strategic planning process, evaluated acquisition and merger opportunities, and mastered the art of competitive positioning in global industries. Then as Vice President and General Manager of the Data Communications Division, he led the division to more than 25 percent growth in revenues and even more in profits. In 1993 he assumed a newly created position as Vice President of Strategic

Quality and Process Management. Through his leadership in this position, Tellabs has begun to shape a quality program based on customer input and empowered teamwork. Dr. Melsa was appointed to the 1995 Board of Examiners of the Malcolm Baldrige National Quality Award.

He was appointed Dean of the College of Engineering of Iowa State University of July 1, 1995.

Dr. Melsa is a member of numerous honor societies, serves on many boards and advisory councils and has held offices in professional organizations, including president of the Institute of Electrical and Electronic Engineers Control Systems Society. He is the author of 11 books, including Linear Control Systems, and 111 papers. He is a fellow of IEEE

Subject: The issues of quality, productivity, and high-velocity performance are critical to America's ability to compete in the global community in the 21st century. The changes that are occurring in the American business environment to meet this challenge are reflected in the following typical paradigm shifts:

- * process technology has become more important than product technology,
- * natural resources no longer create a competitive advantage,
- * economics of scale are being replaced by economics of competence,
- * high-quality comes with fewer inspectors and yields lower costs,
- * accelerating the success rate comes only from accelerating the failure rate,
- * success will come to those who love chaos - not those who attempt to eliminate it.

When product technology was the key, one only needed to educate the top people to invent products. Now that process technology is the key, it is imperative to educate the entire work force because they run the processes. Continuous process improvement, systematic elimination of waste in all forms, and empowerment of employees are the essentials of a successful competitor in the 21st century. These paradigm shifts need to be reflected in both the process and substance of industry and education. This presentation reflects on the changes that are occurring in American business and some possible responses by higher-education institutions.

REGION 7 MEETING - REPORT FROM THE CHAIR

by Rafaat Mansour, Chair, Kitchener-Waterloo Section.

Each year the IEEE Region 7 Executive Committee and representatives from the twenty Sections across Canada come together for Executive and Regional Meetings. This year the meetings were held in Montreal over the September 9-10 weekend. I represented our Section in these meetings. Some of the important issues discussed are:

* Membership

As of June 1995, IEEE Canada has 162 Fellows, 934 Senior Members, 9,617 Members, 1,538 Associate Members, 3,248 Student Members for a total of 15,499, excluding affiliates of societies. This represents 4.9% of the overall IEEE membership totalling 313,775.

The Kitchener-Waterloo Section has 1 Life Fellow, 7 Fellows, 12 Life Seniors, 25 Senior Members, 10 Life Members, 363 Members, 5 Life Associates, 82 Associates, and 314 Student Members, for a total of 819. This represents 5.2% of the overall IEEE Canada membership

* The IEEE Advantage Program

The IEEE Advantage Program makes available a number of quality products with special cost savings and other value-added benefits exclusively to IEEE members. However, at the present time, some of these services are only available to US members. The Manager of the Advantage Program office was invited to the Region 7 meeting to discuss the program and to outline the services which have been made available to Canadian Members. Below is a list of the current services available to members of IEEE Canada.

- i) A 10% discount on Kinko's products and copying services.
- ii) Life Insurance (Term and Universal). A \$20,000 of term life coverage for one year to all NEW Members at no cost. (For more information Call 1-800-493-IEEE).
- iii) A 40% discount on moving costs with North American Van Lines.
- iv) Car rental discount (Avis, Hertz and Alamo).
- v) IEEE travel services.
- vi) Realty Program (Cash back for buying or selling a home through IEEE Realty program).
- vi) A 40% discount on services by Airborne Express.

* CCECE Planning

The Canadian Conference on Electrical and Computer Engineering (CCECE) was held this year in Montreal during September 4-5. The next CCECE conference will be held in Calgary in May 1996. The Conference Advisory Committee of IEEE Canada is currently evaluating bids to host the annual CCECE conference for the years 1996 through 2000. The deadline for receiving bids from IEEE Sections in Canada is November 3, 1995. A decision on these bids will be made by November 20, 1995.

The members of the Executive Committee of the Kitchener-Waterloo Section are discussing the possibility of hosting the 1998 CCECE conference in Waterloo. The event will be an opportunity for the members of our Section to have technical exchanges with colleagues in their fields of expertise either through formal paper sessions or through more informal personal exchanges. The event also provides opportunities for students and young engineers to meet their experienced peers and to be stimulated to join IEEE activities.

A number of issues related to local arrangements and identification of volunteers for the conference organization committee are currently being addressed. The decision to submit, or not to submit, a proposal to IEEE Canada for hosting this conference will be made in the next Section Executive Meeting on October 12, 1995.

* IEEE Organizational Improvements

Three new organizational models for IEEE are currently being discussed by the IEEE Board of Directors. A description of these models is given in the 1995 June issue of The Institute. An organization improvement survey form was also included in the June issue. The regional committee of IEEE Canada urges Canadian members to respond to this survey. Some of the models, if adopted, will have a strong impact on the level of Canadian representation in the IEEE Board of Directors.

* Free e-mail aliases

Canadian members of the IEEE can now request a free e-mail alias from IEEE Canada. The service provides members with an e-mail address of the form f.lastname@ieee.ca which forwards messages to the member's actual address. The advantage of this service is that members retain a constant e-mail address even if they change schools, jobs, or internet service providers.

To request an alias, use the form on the IEEE Canada WWW server <http://www.ieee.ca/guestrin/e-mail.html>, or send an e-mail message to mail_admin@ieee.ca with the following information: surname and given name(s), IEEE membership number and current e-mail address.

Finally, I had the chance to meet other Section Chairs of IEEE Canada, learning about the activities of their Sections. Overall the Montreal Regional meetings were productive and very well organized.

CONFERENCES IN CANADA

1995

Oct 22-25 1995 IEEE International Conference on Systems, Man and Cybernetics. Vancouver. Venue West Ltd 604-681-5226.

1996

Apr 23-25 Broadband 96 - International IFIP/IEEE Conference on Broadband Communications. Montreal. L.G. Mason 514-765-7836. e-mail: lorne@inrs-telecom.quebec.ca

Apr 27-28 TechNet Canada 96 "Government and Industry Info Exchange on Transition to the Future" presented by AFCEA Canada (Armed Forces Communications and Electronics Association). Ottawa 613-594-8788.

Jun 16-19 1996 IEEE International Symposium on Electrical Insulation. Montreal. R. James 615-574-6213

Jul 9-11 3rd Workshop on Finite Element Methods in Electromagnetic Wave Problems. Halifax. Z.D. Chen fax 902-422-7535 or G. Pelosi e-mail FEW96@ingfil.ing.unifi.it

1997

Jun 8-12 ICC 97 - IEEE International Conference on Communications. Montreal. Celia Desmond 905-615-6507.

Jul 14-18 IEEE AP-S International Symposium and URSI Radio Science Meeting. Montreal. Stanley Kubina 514-848-3492.

1998

May 4-7 1998 IEEE/IAS Industrial and Commercial Power Systems Technical Power Conference (I&CPS). Edmonton. M. Bince 403-468-6673

EDUCATIONAL ACTIVITIES OF IEEE

The Educational Activities Board publishes books and self-study courses to help engineers with lifelong learning. Self-study courses offer graduate-level applied technical education. Career opportunity guides are being planned to help students select a suitable career path. And the "Engineers Guide to Business" series offers inexpensive, easy-to-use information on non-technical subjects. See advertisement on page 6.

For further information, please contact Barbara Coburn, Educational Activities Department, IEEE, 445 Hoes Lane, Piscataway, NJ 08855; phone (908)562-5498.

INDUSTRY NEWS

AT&T-GIS

The former NCR Canada is starting to manufacture Automatic Teller Machines in Waterloo. They expect to be making 6000 ATMs and similar machines per year, and will likely need more workers to do it. The announced restructuring of AT&T world wide will impact AT&T Canada, but is not expected to reduce the number of employees at the Waterloo plant.

COM DEV

Com Dev Atlantic has joined forces with Phase Devices of Luton, England to manufacture antenna diplexers for PCS (personal communications systems) base stations. Much of the work will be sub-contracted to Moncton-area companies. The Atlantic subsidiary of Com Dev has received support from the Province of New Brunswick and from Toronto-Dominion Merchant Banking Group.

Meanwhile, Com Dev has also received a contract from Motorola for Ka band satellite antennas for the Iridium project, which was the subject of a meeting by this section in 1992 (see the November 1992 issue of this newsletter). The constellation of low earth orbit (LEO) satellites in polar orbit will provide telephone and data coverage of the entire world.

OPEN TEXT CORP.

Under a recent agreement, text search technology developed by Waterloo company Open Text will be used by Yahoo!, a popular guide to the Internet. Until now, Yahoo has used key words to access related data, but with Open text software, data can be accessed simply by calling up some words, and any document in the entire data base containing those words will be available.

Open Text had acquired the Internet software division of MKS, another Waterloo company.

SWITCHVIEW

A neighbour of Open Text, Switchview has sales offices in the USA, Australia and New Zealand. It supplies Bell Canada and Northern Telecom with telecommunications software. It has received venture capital from the Bank of Montreal, the TD Bank and Bell Canada Enterprises to allow continued expansion.

RAYTHEON CANADA LTD.

Ratheon Canada has received registration to ISO-9001/Tick IT the internationally recognized quality standard. The Tick IT registration includes recognition to their software capability. The principle of ISO-9001 is "Say what you do" and "Do what you say".

VIRTEK

Virtek Vision International, as it is now known, will be distributing its LeatherCam systems in France, Italy, Spain and the Benelux countries through Investronica, a Spanish company. The systems maximise the yields from hides by placing patterns. Virtek has settled a lawsuit with Laharco of Portland Oregon over a patent for laser projection technology. Sales at the Waterloo company continue to grow.

COMPUTER MUSEUM PROPOSED FOR WATERLOO

Kevin Stumpf has been collecting commercial computer and data processing equipment for several years - you may have seen some of it in the window of Waterloo Computer Books. Now he wants to set up a permanent museum of this hardware, in Waterloo.

The Commpertseum, as he calls it, has the approval of IBM, which would pay the cost of transporting a 360 mainframe from Montreal. He is looking for other companies to provide financial support for renovating a suitable building and opening this tourist attraction next year. He is not looking for government money.

PRACTISING SAFE FAX

by Tom East

Some time ago, Ann Landers warned her readers who leave messages on someone's answering machine, always to add their own name and phone number: if they had called the wrong number, there was a chance that the "wrong number" would phone them and they could get the message to the right place. The same thing can happen with fax. Recently, I received two faxes which had nothing to do with me, from someone who did not leave his/her name or address. One of them apparently authorised someone to order \$17,500 (US) worth of hardware: I wonder if the order ever got placed?

You have three choices: 1. If you do not care whether the message gets through, don't identify yourself (but why send it anyway?) 2. If the message is important but not confidential, include your name or at least your fax or phone number. 3. If you don't want competitors or other stray bodies to read it, use an encryptor. An article in Signal, the AFCEA magazine, describes an incident in which a well-known businessman made public via fax his interest in buying into a corporation that owned a major U.S. airline. This made the price of the stock go up, and he eventually withdrew his bid (by fax). A doctor's office in British Columbia sent confidential records about a patient to the Vancouver Sun recently.

There are several ways a fax can leak. 1. The sending mail room. 2. Pushing the wrong button on an electronic directory (example, dialling a newspaper by mistake). 3. Fax lines are easy to bug, at sending or receiving end. 4. The receiving mail room. The defence appears to be to have the fax machines in secure offices, and to use an encryptor such as JFX SAFE from Savin Canada.

PLENTY OF TOWERS

According to Industry Canada, which regulates radio communications in Canada, there are 191,000 licensed radio "stations", increasing by 9,000 per year: most of their antennas are on towers. Of the stations, 1,700 are for cellular services.

FUSION REACTOR AT THE BRUCE NUCLEAR FACILITY?

The International Thermonuclear Experimental Reactor, described in the February 1992 issue of this newsletter, has reached the stage where a siting council is investigating possible sites for the facility. Two possible sites are the Bruce nuclear complex, and the Darlington plant east of Toronto. A decision is expected in 1996. The reactor will use the fusion of Hydrogen isotopes to form Helium: existing power reactors use fission of Uranium. It is expected that 3500 people would work at the site(s).

NUCLEAR WASTE FINDS A HOME

Conventional nuclear generation stations produce moderate amounts of highly radioactive byproducts, which so far, are being stored on site. However, research and processing establishments have larger amounts of waste materials such as clothing, cleaning materials etc. which also have to be disposed of. These low-level radioactive wastes will be stored in Deep River now that the residents have voted to accept them, in exchange for financial compensation from the Feds. Deep River is in Ontario, north west of Ottawa.

FIBER UNDER THE OCEANS

by Tom East

In June this year, the Canadian Association of Physicists held its annual convention in Quebec City, which I was able to attend. One of the talks described the work being done at MPB Technologies, of St. Anne de Bellevue (near Montreal), and progress in fiber optics generally. The company supplied a branching multiplexer for the TAT-9 cable from North America to Europe, which is effectively an under-water switchboard.

The company is becoming a world leader in under sea fiber optic systems. With the introduction of Erbium Doped Fiber Amplifiers (EDFA), repeaters (which convert light signals to electrical, amplify them, and convert them back again) are no longer necessary in many cases. Hops of 100 km between amplifiers are now practical at wide bandwidths. In a three hop under water section, the two amplifiers do not even have to contain pump lasers - the pumps can be on dry land and send their light to the Erbium sections through the fiber, so that it is possible to span 300 km without underwater electronics. If this could be increased to 405 km, it would be possible to run a cable across the Atlantic with no under water pumps or repeaters by island hopping, since a route can be found in which the water sections do not exceed 405 km.

Some interesting numbers are: loss in fiber at 1.3 micron is about 0.4 dB/km with zero dispersion, and at 1.55 micron is 0.25 dB/km; each splice is 0.2 dB; and the cost of a cable-laying ship is about the same as the cost to launch one rocket to put satellites in geostationary orbit (and the ship is re-useable!).

Using EDFA amplifiers spaced 50 km apart at 1.55 microns, it is now possible to send 4 Gigabits per second. A route which now costs \$50 per year per voice channel used to cost \$100,000 per year per channel in 1960.

One project in which MPB is interested would link many ports around Spain and Portugal by a daisy chain, with the repeaters on land but the fiber under the sea. This avoids the tedious task of negotiating rights of way for the cable.

AN EQUATION FOR THE GUINNESS BOOK OF RECORDS?

The January issue of the IEEE Transactions on Aerospace and Electronic Systems is something of a record-breaker in itself, as it contains 511 pages of technical material (all good stuff) and is as thick and heavy as some telephone directories. However, starting on page 353 and ending on page 354 is an equation whose right side consists of 296 terms, each consisting of an integer multiplied by up to four parameters: the left side is 0. The article, by J.J. Sudano, is titled "Maneuver-Driven α - β and α - β - Γ Tracking Filters" and concerns circuits for following radar targets.

ACCESS TO THE INTERNET

I only received one reply to the questionnaire in the April 1995 newsletter: that respondent was satisfied with the system. Though there was some learning to do on our part, the main problem with access to the Internet seems to have been mainly with our server: now that we have changed, things go much better. Comments on anything published here are always welcome.

Tom East 102432.2337@compuserve.com

RECYCLING

The great efforts being made to reduce the amount of material that goes into landfill sites is paying off. But besides newspapers, bottles and tins, attention is being paid to another bulky commodity - computers. Laidlaw Waste is reported to be setting up an operation to disassemble computers in Hamilton. If you are wondering whether they will have enough material to make it worth while, apparently, Synergenics in Guelph, which retails computers, accepted old ones for disposal and was astounded to receive 200,000 in one month: they are becoming more choosy. Maybe our next story has something to do with it.

BEWARE OF BEAN-COUNTERS

The Notes From The Field column in InfoWorld Magazine reported last year that purchases of new PCs were forbidden at General Electric Co. after auditors discovered that there were more computers than employees on the books. Conclusion: make sure that obsolete computers are no longer in inventory.

HOW TRUE

"One man's subsidy is another man's tax" - V.H. Watson, 1953 graduate of Cambridge University, England.

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