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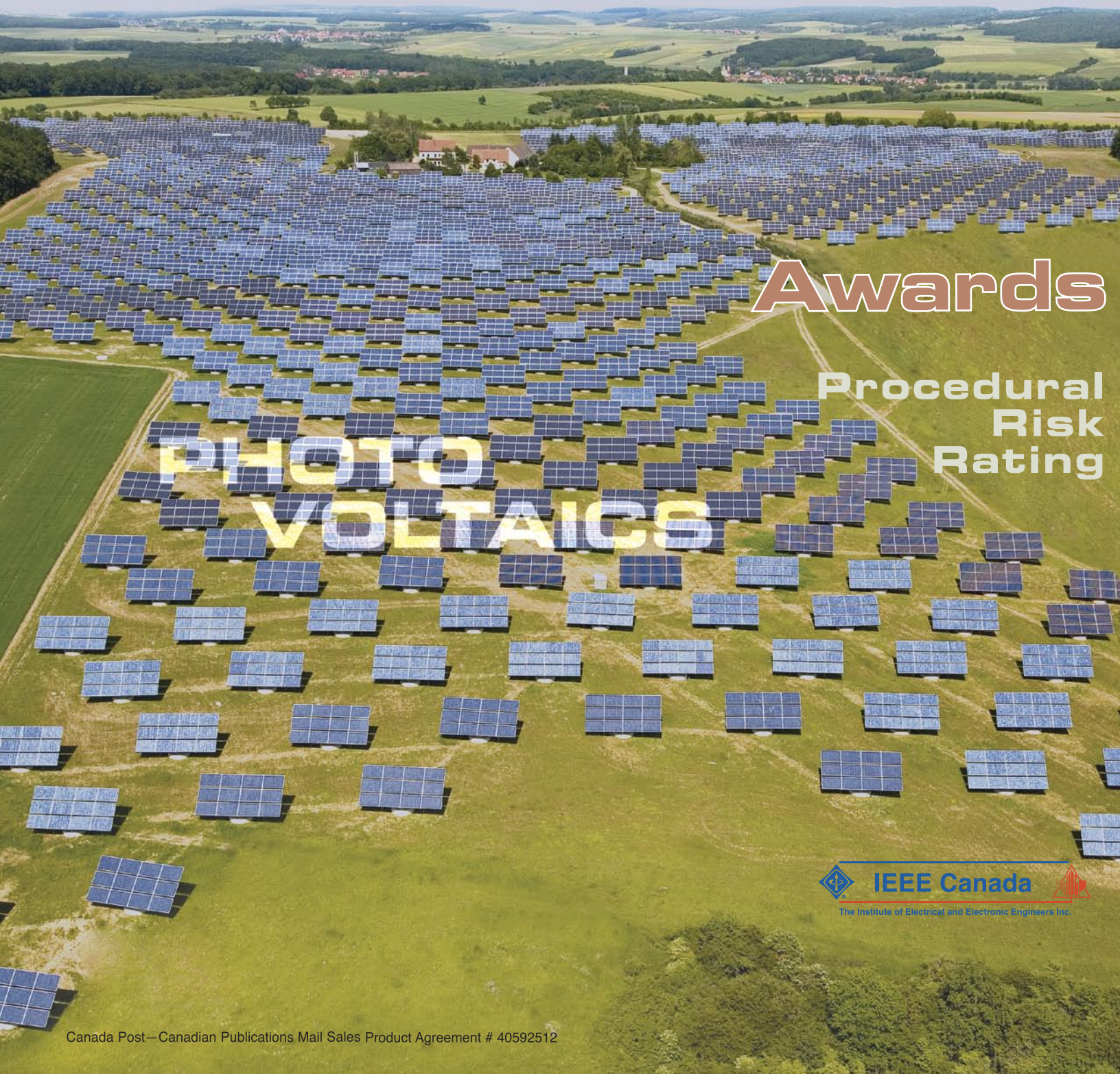

Awards

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IEEE Canadian Review General Information

The ***IEEE Canadian Review*** is published 3 times/year as follows: Spring (to appear in April-May), Summer (to appear in August-September), and Fall (to appear in December). Its principal objective is to project an image of the Canadian electrical, electronics, communications and computer engineering professions and their associated academic and business communities to:

(i) Canadian members of IEEE;
(ii) Canadian members of the profession and community who are non-members of IEEE;
(iii) The associated Canadian academic (i.e. universities, colleges, secondary schools), government and business communities.

To ensure that the ***IEEE Canadian Review*** has the desired breadth and depth, editors are responsible for screening articles submitted according to the following general themes:

1- National Affairs	4- Education	7- Computers
2- International Affairs	5- Power	8 - Electronics
3- Industry	6- Communications	

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Authors are invited to contribute submissions in electronic form to the ***IEEE Canadian Review***. Please contact one of the editors. Responsibility for the content rests upon the authors and not the IEEE, or its members.

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Editorial / *Éditorial*

Eric Holdrinet SMIEEE, Rédacteur en chef / Editor-in-Chief

Ne vous fiez pas à la page couverture, ce numéro est un spécial Prix et Distinctions. Oui, nous avons une photo à la une et un article sur les photovoltaïques-: Un bon survol du domaine, pour non-experts, 1ere partie, avec un angle canadien. Cette photo de couverture montre une technologie canadienne de Arise Technology Corp. (Waterloo, ON) installée dans un champ en Bavière (All.); ce n'est pas le seul exemple de technologie canadienne ayant une portée globale, peu s'en faut. Jetez un œil sur le site de l'Association des industries solaires canadiennes (http://www.cansia.ca/).

Nous aurions pu avoir un numéro complet sur les photovoltaïques-si les membres nous avaient inondés de propositions d'articles sur le sujet. Disons que le prochain numéro sera sur l'électronique de puissance. J'attends vos soumissions.

Donc, un spécial Prix et Distinctions. Nous vous apportons 1. Le livret complet des Prix du IEEE Canada, comme l'an dernier, 2. Un article sur la cérémonie des prix de l'ICI, 3. Une coupure de presse à propos de Dr Paresh Sen, récipiendaire du Prix d'excellence 2008 de l'IEEE Industry Applications Society, 4. Un sommaire des prix décernés par l'APEGGA à quatre membres de l'IEEE à un récent gala, and 5. Une description des gagnants de la compétition nationale sur les FPGA organisée l'an dernier par des membres de la Section d'Ottawa. Nous célébrons les réalisations de nos pairs. Vous connaissez un(e) collègue méritant(e) ? Contactez votre Section locale et discutez du cas-: http://www.ieee.ca/sections et http://www.ieee.ca/awards et suivez les miettes de pain.

Pour aider à produire l'excellent magazine que vous parcourez, nous avons ajouté à l'équipe de nouveaux bénévoles : Dr Amir Aghdam de l'Université Concordia (Montréal) est maintenant directeur de rédaction, supervisant diverses opérations de production. Dr Shaahin Filizadeh de l'Université du Manitoba a organisé la fonction de revue par les pairs depuis l'an dernier. Nous révisons sérieusement les articles. M. Kexing Liu de la Section d'Ottawa s'est occupé de la publicité, aussi depuis 2008, prenant le relais de John Grefford (qui a encore trouvé le temps de nous recruter un client majeur). Ils complètent bien notre équipe entièrement bénévole de chroniqueurs et rédacteurs adjoints, et notre partenaire Communication Matters pour la mise en page/graphisme/production (merci à Bruce et son équipe pour les heures sup. la fin de semaine).

Merci à tous pour leur merveilleux travail. Profitez du résultat.

Don't trust the cover page, this issue is an Awards Special. Yes, we have a cover photo and an article on photovoltaics: A nice overview of the field, for non-experts, part 1, with a Canadian angle. That cover photo is about some Canadian technology by Arise Technology Corp. (Waterloo, ON) installed in a field in Bavaria (Ger.); it is not the only example of Canadian solar technology going global. Check out the Canadian Solar Industries Association website (http://www.cansia.ca/).

We could have had a full issue on photovoltaics *if* members had showered us with article proposals on the subject. Let's say the next issue is a special on power electronics. I am awaiting your submissions.

So, an Awards Special. We bring you: 1. The whole IEEE Canada Awards booklet like last year, 2. An article on the EIC Awards Ceremony, 3. A clipping about Dr. Paresh Sen, recipient of the 2008 IEEE Industry Applications Society Outstanding Achievement Award, 4. A description of winning entries in the nationwide FPGA Competition organized last year by Ottawa Section members, and 5. A summary of honours bestowed by APEGGA on four IEEE Canada members at a recent gala. We celebrate the achievements of our peers. You know of a deserving colleague? Contact your local Section and discuss the case: http://www.ieee.ca/sections and http://www.ieee.ca/awards and follow the breadcrumbs.

To help produce this fine magazine you are perusing, we added to the team some new volunteers: Dr. Amir Aghdam from Concordia University (Montreal) is now Managing Editor, supervising various production operations. Dr. Shaahin Filizadeh from the University of Manitoba has organized the peer-review function since last year. We do seriously review articles. Mr. Kexing Liu from Ottawa Section has handled Advertisement also since 2008, taking the relay from John Grefford (who still found the time to bring us one major client). They nicely round up our team of all-volunteers columnists and associate editors, and our layout/graphics/production partner Communication Matters (thanks to Bruce and his team for crunch-time week-end hours).

Thanks to all for their wonderful work. Enjoy the result.

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Cover photo features PV cells manufactured by Waterloo, Ontario-based Arise Technologies installed at a 12MW solar farm in Gut Erlasee, Bavaria, Germany. Photo credit: Langrock/Zenit/laif.

Much has happened since Last January. In global IEEE news: Early in March IEEE kicked off its 125th Anniversary Celebration with a very successful media event at its birth place, the New Yorker Hotel in New York City: http://www.ieee125.org/engineering-the-future/media-roundtable.html. As well, after an extensive "head hunting" search that involved the IEEE Board of Directors, the IEEE hired a new Executive Director: Jim Prendergast, who assumed his position on April 6th, 2009.

The IEEE Foundation has established a new fund which will provide unique opportunities to make a real difference to developing areas. Through the awarding of grants, the Humanitarian Technology Fund supports projects that provide technological solutions to problems in various parts of the world. The Humanitarian Technology Fund is accepting donations online. You may direct your questions to donate@ieee.org.

If you would rather contribute locally - The IEEE's Teacher In-Service Program (TISP) Training Workshop with IEEE- EAB will be presented in Montreal on May 15-16, 2009 under the leadership of both Montreal and Ottawa IEEE Sections. This is a unique opportunity for engineers to learn how they can bring their expertise to their local community by raising the level of technical literacy of teachers and their students. Look at Events in May at http://www.ieee.org/montreal.

In local news, the IEEE-Canada ExCom approved a proposal submitted by the Chair of the Publication Committee Xavier Maldague to modify the Canadian Review management structure by recruiting a Managing Editor, Dr. Amir Aghdam, Associate Professor at Concordia University (Montreal, QC) and distinguished IEEE volunteer, who will work with Editor-in-Chief Eric Holdrinet. I would like to take this opportunity to express my sincere thanks to Eric who devoted much of his time over the years to make the CR most successful. Also many thanks go to the Publication Committee chair and his team for their excellent work on the Canadian Journal.

Our National Conferences CCECE'09 and EPEC'09 are both going along well – the former to happen very soon in early May, the latter to be held in October in Montreal. If you can, please join us at the CCECE'09 Awards night on May 4th in St John's (NL) and share the Celebration with many IEEE Awards recipients. Seven members will receive Achievement Awards and four will receive Service Awards. This is in addition to eleven who have already been elevated to the grade of Fellow of the Engineering Institute of Canada (EIC); they were recognized at the EIC Gala Dinner, March 7th, 2009 in Ottawa. Many thanks go to the chair of the Awards Committee Bob Alden and his team who made this happen with great success. Well done.

Member Benefits have a high priority for IEEE Canada. "The Personal" Insurance Company is offering special rates on Home and Car insurance for our members; see the ad in this issue. Special thanks to the team of IEEE Member Benefits Services.

It is now official that the Montreal and Boston IEEE Sections have become Sister Sections, thanks to the efforts of the Sections Chairs and IEEE Region 1 Director Howard E. Michel.

I would like to take this opportunity to wish All the Best - to you and your family.

Beaucoup de choses se sont produites depuis janvier dernier. Pour ce qui est des nouvelles de l'IEEE en général : Au début mars l'IEEE a donné le coup d'envoi de la célébration de son 125ième anniversaire avec un événement médiatique très réussi à son « lieu de naissance », le New Yorker Hotel à New York : http://www.ieee125.org/engineering-the-future/media-roundtable.html. Après une recherche exhaustive qui a mis à contribution le conseil d'administration de l'IEEE, on a procédé à l'embauche d'un nouveau Directeur exécutif : Jim Prendergast, qui est entré en poste le 6 avril 2009.

La Fondation de l'IEEE a établi de nouveaux fonds qui permettront de créer des opportunités uniques pouvant faire une différence appréciable dans les pays en voie de développement. Par l'attribution de subventions, le Fonds de technologique humanitaire supporte les projets apportant des solutions technologiques aux problèmes dans diverses parties du monde. Ce fonds accepte les dons en ligne. Vous pouvez acheminer vos questions à donate@ieee.org

Si vous préférez plutôt contribuer localement : L'atelier de formation de l'IEEE ''Teacher In-Service Program (TISP)'' de IEEE-EAB sera présenté à Montréal les 15-16 mai 2009 sous la gouverne des sections de Montréal et d'Ottawa. C'est une occasion unique pour les ingénieurs d'apprendre comment ils peuvent faire profiter leur communauté locale de leur expertise en améliorant le niveau de connaissance technique des professeurs et de leurs étudiants. Consultez la section des événements se produisant en mai à http://www.ieee.org/montreal.

Dans les nouvelles locales, le Comité exécutif de l'IEEE Canada a approuvé une proposition soumise par le Président du Comité des publications, Xavier Maldague, afin de modifier la structure organisationnelle de la Revue canadienne en recrutant un Directeur de rédaction, Dr. Amir Aghdam, professeur agrégé à l'Université Concordia (Montréal, QC) et volontaire distingué de l'IEEE, qui travaillera en collaboration avec le Rédacteur en chef M. Eric Holdrinet. Je voudrais profiter de cette occasion afin d'exprimer mes sincères remerciements à Eric qui a consacré au cours des dernières années beaucoup de son temps afin de faire de la Revue un succès. Mes remerciements vont également au Président du Comité des publications et à son équipe pour leur excellent travail sur le Journal canadien.

Nos conférences nationales CCGEI'09 et EPEC'09 se portent bien – la première se produira très bientôt en mai, et la seconde se tiendra en octobre à Montréal. Si pouvez venir, nous vous invitons à vous joindre à la soirée de remise des prix du CCGEI'09 le 4 mai à St-John's (TN), et célébrer avec les nombreux récipiendaires de prix de l'IEEE. Sept membres recevront des prix d'accomplissement et quatre recevront des prix de service. Ceci en plus d'onze autres qui ont été déjà été élevés au grade de Fellow de l'Institut canadien des ingénieurs (ICI) ; ils ont été honorés lors du dîner de gala de l'ICI le 7 mars 2009 à Ottawa. Nombreux remerciements au Président du Comité des prix Bob Alden et à son équipe qui ont permis que la réalisation de cette activité soit un grand succès. Excellent travail.

Les avantages aux membres constituent une haute priorité pour l'IEEE Canada. La compagnie d'assurance «La Personnelle» offre à nos membres des tarifs spéciaux pour l'assurance auto et habitation; voir l'annonce présentée dans ce numéro. Des remerciements spéciaux vont à l'équipe Services et avantages aux membres de l'IEEE.

C'est maintenant officiel : Les sections de l'IEEE de Montréal et de Boston sont des sections soeur, grâce aux efforts des Présidents des sections et du Directeur de la région 1 de l'IEEE, Howard E. Michel.

Je voudrais saisir cette occasion offrir mes meilleurs souhaits à vous et votre famille.

Dr. Ferial El-Hawary, P.Eng., F.IEEE, F.EIC, F.MTS

2008-2009 IEEE Canada President and Region 7 Director

http://www.ferial.ca

Be a part of…

Training The Next Generation of Engineers

IEEE's Teacher In-Service Program (TISP) Training Workshop

May 15–16, 2009—Montreal Marriott Chateau Champlain

Are you interested in improving the exposure of young people in Canada to Engineering and Technology?

Are you interested in helping teachers of primary, middle and high schools so they can be better prepared to introduce Engineering and Technology to their students?

Did you know that IEEE provides materials and tools that can help these goals?

The purpose of this workshop is to help IEEE members improve the teaching of engineering and engineering design in pre-university schools (primary schools, middle schools and high schools). In this workshop, IEEE members will learn how to work with teachers of pre-university schools, and how to conduct hands-on sessions for these teachers on engineering topics. The teachers will then use these sessions on a regular basis with their own students.

The expectation is that IEEE members who complete the workshop will contact local schools in the months and years to come, and will work with their teachers on lesson plans that demonstrate engineering and engineering design. Examples of such lesson plans are available at http://www.tryengineering.org/lesson.php

The workshop takes one and a half days, and provides attendees with sample lesson plans, suggestions on how best to contact and work with the pre-university school system, and descriptions of successful management of a TISP program in a Section.

The event is free of charge for all IEEE members and invited educators. IEEE will reimburse all reasonable travel-related expenses for this workshop. Travel-related expenses include one night hotel stay and transportation to and from the location of the workshop.

This activity is organized jointly by the IEEE Educational Activities Board, Region 7 and the Montreal Section. The event will begin on Friday, 15 May at 4:30 pm with two hours of presentations followed by a dinner at 7:00 pm.

On Saturday, 16 May, the event will run from 9:00 am to approximately 4:00 pm. It will include hands-on presentations, a question and answer period as well as discussion on numerous topics such as: program background and scope, getting started, potential costs to sections and educators, suggestions on making contact with your local pre-university community, and the alignment of an activity with educational standards. Breakfast and lunch will be provided.

To register, contact:

Yvonne Pelham, Manager of Educational Outreach, +1 732.562.5321, y.pelham@ieee.org or
Mirelle White, Promotions Manager +1 732.562.5323, m.s.white@ieee.org

IEEE
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Newslog Editor

Rédacteur des Coupures de presse

Alexandre Abecassis is a patent agent and Partner at Fasken Martineau DuMoulin LLP, Lawyers and Patent and Trade-mark Agents.

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Send any news clippings you would like to contribute via e-mail to alexandre.abecassis@ieee.org

Veuillez faire parvenir les coupures de presse proposées par e-mail à alexandre.abecassis@ieee.org

VANCOUVER, BC. Mar. 17, 2009. Telus has announced that $500 million will be invested on advanced wireless and wireline broadband infrastructure in the province of British Columbia. In particular, part of the investment will be used to build an Internet data centre according to the Leadership in Energy and Environmental Design (LEED) criteria. The centre will end up having one of the lowest carbon footprints in North America.

CALGARY, AB. Jan. 22, 2009. Acceleware, a developer of high performance computing applications, and Synopsys, a leader in software and IP for semiconductor design and manufacturing, have announced an hardware solution that enables up to 20-times faster electromagnetic simulation of optoelectronic devices such as CMOS image sensors. The performance increase enables engineers to advantageously leverage the rigor and accuracy of the finite-difference time-domain (FDTD) method in designing and optimizing optoelectronic devices while shortening the product development cycle.

MIRABEL, QC. Feb. 6, 2009. Kangaroo Media has announced the signature of a term sheet with Front Row Technologies in order to end a complaint alleging patent infringements of US patents 7,149,549 and 7,376,388 by Kangaroo Media. The complaint was filed in September 2008 in the famous Eastern District of Texas.

FAIRFAX, VA. Oct. 28, 2008. CGI Federal has announced the signing of one-year contract renewals estimated at US$30.6 million for business process outsourcing services. Those outsourcing services are for administering multi-family housing programs in Florida, New York, and Northern California for the U.S. Department of Housing and Urban Development (HUD). CGI is responsible for more than 25 percent of the housing portfolio across the U.S. In addition to its contracts to serve Florida, New York and Northern California, CGI administers contracts in the state of Ohio, and in Washington D.C. Housing assistance payments processed total more than US$1.98 billion annually, making CGI the largest HUD processor of its kind in the U.S.

MONTRÉAL, QC. 16 avril 2009. L'APECQ (Association patronale des enterprises en construction du Québec), la plus importante association québécoise d'employeurs multisecteurs dont les membres desservent l'industrie de la construction, a décerné à Siemens le Prix du Fabricant de l'année pour 2009.

REDMOND, WA. 30 mars 2009. Microsoft et TomTom ont annoncé le règlement de leurs litiges respectifs pour contrefaçons de brevets, et ont signé une entente de brevets.

MISSISSAUGA, ON. March 23, 2009. Certicom has announced closing of acquisition by Research In Motion. The security offerings of Certicom are licensed to hundreds of multinational technology companies, including IBM, General Dynamics, Motorola, and Oracle.

OTTAWA, ON. 19 mars 2009. Gennum a signé une entente finale pour acquérir Tundra Semiconductor. Cette transaction est estimée à environ $86 millions.

CALGARY, AB. Mar. 12, 2009. Pure Technologies has announced that it has settled all outstanding patent disputes with the Pressure Pipe Inspection Company in Canada and the U.S. in relation to electromagnetic inspection of prestressed concrete pressure pipes. Under the terms of the settlement both parties are allowed to continue to offer services covered by their respective patents.

OTTAWA, ON. Mar. 9 2009. General Dynamics Canada has announced that it has been awarded a $341 million support contract. The support contract is for the Land Command Support System of the Canadian Army and will ensure that troops will continue to have access to advanced communications services critical to the flow of vital information in rapidly changing combat environments. The contract may be extended for up to five years.

MONTREAL, QC. Feb. 24 2009. McGill University has non-exclusively licensed a tool for hardware-assisted verification to the industry leader in the Simulation Acceleration market. The software tool has been developed by Marc Boulé and Zeljko Zilic from McGill University's Department of Electrical and Computer Engineering, to assist designers and verification engineers to accelerate verification using either of the two leading assertion languages, PSL and SVA. It includes the support for emulation, debug, simulation acceleration, formal verification, and several more applications of design for quality.

MONTRÉAL, QC. 26 fév. 2009. Le ministère de la justice du Québec a octroyé à CGI un contrat estimé à $16,5 millions. Les termes comprennent l'exploitation, le développement, l'évolution, la relève et le support à la gestion des systèmes et infrastructures technologiques de la Direction des registres et de la certification (DRC).

Dr. Paresh Sen honoured by IEEE Industrial Applications Society

Paresh Sen receiving his trophy at the 2008 IAS Annual Meeting as winner of the Society's Outstanding Achievement Award

Queen's University emeritus professor Paresh Sen (Electrical and Computer Engineering) has been chosen as the 2008 recipient of the IEEE Industry Applications Society (IAS) Outstanding Achievement Award. The award was presented to Dr. Sen during the IAS Annual Meeting in October.

The purpose of the award is to honour an individual who has made an outstanding contribution in the application of electricity to industry in accordance with the scope of the IAS. Winners receive a trophy and a $5,000 honorarium.

The author of two internationally acclaimed textbooks, Dr. Sen is globally recognized as an authority in the field of electric motor drives and power electronics. Throughout his career, he has received numerous prestigious awards for his achievements, including the IEEE Canada Outstanding Engineering Educator Award in 2006. He has consistently been rated as a top professor at the University.

A View from the West

On: Innovation Competition and Business Rankings, Small Business Stories, CEO Insights, Leader Profiles, Provincial Tax Credits, One Green Building, Offshore Wind, and Generation Y.

By Terrance Malkinson
School of Health and Public Safety
SAIT Polytechnic. Calgary, Alberta

- An overview of the Canadian Business and NYTRIC Third Annual Great Canadian Innovation Competition was provided by Andy Holloway in: "Are You the Next Great Canadian Innovator?" (Canadian Business, March 16, 2009). See www.greatcanadianinnovation.ca. The winning entry will receive up to 50k$ in prototype engineering services, 20k$ for a feasibility study, 10k$ in intellectual property legal services, and 10k$ in business and financial advisory services.
- Rankings of Alberta companies by growth in revenues, assets, profits, and other criteria over the past three years is provided by Scott Messenger in: "The Fast Growth 50" (Alberta Venture, January 2009; www.albertaventure.com). Many of these companies demonstrate the continued diversification of industry in Alberta. Michael McCoullough, Scott Messenger, and Lindsey Norris discuss the ten top Alberta business stories of 2008 in "Best and Worst of 2008" (Alberta Venture, December 2008).
- The annual ranking of Saskatchewan's Top 100 Companies of 2008 is provided by Paul Martin in: Saskatchewan Business Magazine, September 2008; www.saskatchewanbusinessmagazine.com. Leading the ranking is Federated Co-operatives Ltd, followed by PotashCorp and Viterra Inc. As with Alberta businesses, the companies listed demonstrate economic elasticity and diversity to meet the needs of the changing local and global business environments. PotashCorp, a leader in crop nutrients, is profiled by Paul Martin in "Business of the Year" in the December issue.
- Results from the 7th annual Best Companies to Work for in BC Survey is provided by Jessica Werb and Dorothy Bartoszewski in BCBusiness, December 2008; www.bcbusinessonline.ca. Top companies with more than 100 employees included Next Level Games Inc., Cactus Restaurants Ltd, and Microsoft Canada Development Centre. Top three companies with fewer than 100 employees included web-services company Strangeloop Networks Inc., Chemistry Consulting Group Inc. and The Personnel Department. Common themes include flexible hours, casual workplace, employee empowerment, and job mobility.
- Eight years ago, two 60'ish entrepreneurs –a co-founder of a BC high-technology company and one of Russia's former top physicists – sat down in a Moscow café to discuss a possible venture together. The result was Day4 Energy Inc., a manufacturer of photovoltaic modules. Their story is told by Brenda Bouw in "Here Comes the Sun" (BCBusiness, December 2008; www.bcbusinessonline.ca). Day4 Energy was named 2008 Emerging Company of the Year by the BC Technology Industry Association. The California Energy Commission ranked its technology among the top five percent of most efficient crystalline silicon products that qualify under the state's rebate program. Independent testing in Germany resulted in it being called "one of the best modules we have observed, offering high quality and precise manufacturing".
- Small company entrepreneurial success stories are described by Peter Severinson in: "Against the Current." (BCBusiness, February 2009; www.bcbusinessonline.ca). They describe the challenges of starting your own business and overcoming obstacles - demonstrating the resilience of the human spirit and creating opportunities that not only make money but also change lives.
- Six British Columbia CEO's share their insights on leadership in "Leading Indicators" (BCBusiness, November 2008; www.bcbusinessonline.ca). In the introduction, Vickie O'Brien discusses the leadership shortage facing businesses because of the aging workforce and thus the large number of retirements expected over the next ten years.
- Brett Wilson, 2008 Business Person of the Year is profiled by Tom Keyser in "Rebel with a Cause" (Alberta Venture, December 2008. www.albertaventure.com). He is seen as a leader who has broken the mould of the blue-suited business leader. Energetic and individualistic, he is the co-founder and chairman of FirstEnergy Capital. Jim Veenbaas profiles five entrepreneurs who saw big opportunities within small markets in: "Show me Your Niche" (Alberta Venture, October 2008).
- Effective January 2009 the Alberta Government introduced a refundable 10% tax credit program to encourage scientific research and experimental development (Alberta Scientific Research and Experimental Development Tax Credit Program.) Similar programs exist in other provinces.
- The Saskatchewan company PrintWest invested $5M into a state-of-the-art printing press to help position them as a leader in the printed communications industry ("First Impressions", Saskatchewan Business Magazine, Jan./Feb. 2009; www.saskatchewanbusinessmagazine.com). David White discusses how the company survived tough times, developing a strategy over many months of detailed analysis and interactive discussions, restructured, took bold steps and achieved success.
- Manitoba Hydro's new $278 million, 22 storey headquarters in downtown Winnipeg is described by Bernard Kruchak in "Towering Success" (Commerce & Industry Magazine, 59(3), 2008). The building is seen as a world-class model of sustainable energy efficiency and effective human work environment design.
- The story of the development of power from wind at the Naikum Offshore Wind Energy project is provided by Christopher Pollon in "Blowing in the Wind" (BCBusiness, December 2008; www.bcbusinessonline.ca). In planning since 2001 it is envisioned to have up to 110 tall towers anchored into the seabed off the eastern shores of Graham Island in British Columbia.
- The population born in the early 1980s and known in marketing-speak as "Generation Y" are now moving into the labor market quickly as they finish their formal education. This tech-savvy and multi-tasking cohort is believed to be different from previous cohorts in its attitudes towards careers and behaviors in the workplace. Malwina Gudowska in "What Does Y Want?" (Alberta Venture, November 2008; www.albertaventure.com) discusses the characteristics of this generation who place considerable importance on work-life balance.

About the Author

Terrance Malkinson is a communications specialist, business analyst and futurist. He is Vice-Chair of the IEEE-USA Communications Committee, an international correspondent for IEEE-USA Today's Engineer Online, editor-in-chief of IEEE-USA Today's Engineer Digest, and associate editor for IEEE Canadian Review. He was an elected Senator of the University of Calgary and an elected Governor of the IEEE Engineering Management Society as well as an elected Administrative Commitee member of the IEEE Professional Communication Society. He has been the member of several IEEE conference proceedings, and past editor of IEEE Engineering Management. Currently, he is with the School of Health and Public Safety/Applied Research and Innovation Services at SAIT Polytechnic in Calgary. malkinst@telus.net

Photovoltaic Energy Systems—An Overview

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1.0 Introduction

The Sun is the sole energy source to our planet; its energy is used by all living creatures for growth and warmth. In 1865 the first solar motor was invented [1] to convert the solar energy to mechanical energy. Approximately a decade later (in 1954), the first crystalline silicon photovoltaic cell was developed in Bell laboratories, which converted the solar energy to electricity with an efficiency of 6% [2]. Driven initially by aerospace applications, solar energy technology has constantly improved and gained a lot of attention. With global warming and environmental issues, sustainable energy sources are becoming vital. PV technology features free solar source, little maintenance, no audible noise, and is greenhouse gas emission free; all this makes it one of the best sustainable energy sources. It has motivated governments to build programs in promoting the use of solar energy.

Photovoltaic energy applications can generally be divided in two groups: off-grid systems and grid connected systems.

1.1 Off-Grid Systems

Off-Grid systems can be further divided in two sub-categories:

1.1.1 Off-grid domestic applications

The photovoltaic system is used to provide electricity for small communities where connection to the power grid is not feasible [3]. Usually small PV systems (<1kW) are used for household applications together with an energy storage unit and a backup system.

1.1.2 Off-grid non-domestic applications

The photovoltaic system is used to energize a single industrial or agricultural load that is not connected to the grid, such as a water pump, traffic light, or telecommunication equipments. A battery unit is used to store energy [3, 4].

Off-grid PV systems can be integrated with other energy sources, like a wind energy system or diesel generator to form a hybrid system with larger capacity and higher reliability [5].

1.2 Grid Connected PV Systems

Grid connected PV systems can also be categorized in two different groups:

Distributed grid connected applications

The photovoltaic system is mounted at the premises of a customer (who has connection to the grid), and connected to the load side of the electricity meter. Energy generated is used by the customer load; any excess is loaded on the grid, any deficiency is taken from the grid [3, 4].

Centralized grid connected applications

Known as solar farms, these large photovoltaic systems act as power stations and are connected directly to the grid [3, 4].

The grid connected PV system is usually composed of two components: a PV array and a power conditioner DC/AC inverter that converts low DC voltages produced by the PV arrays to a single or three-phase AC voltage [4].

2.0 Global Utilization of Photovoltaic Energy

The need for more renewable energy sources resulted in the installation of 2146MW PV power in 2007, boosting the cumulative installed PV power to 7841MW. As of the end of 2007, 6% of the total capacity installed was for off-grid applications [3]. Figure 1 shows the cumulative growth trend in the last eleven years. In 2007, growth was 38%; this is the result of the increase in oil prices, increase in demand for sustainable energy sources and government incentives to reduce carbon dioxide emissions.

Germany is a leading country in PV energy utilization with 46.8W/capita. It installed 1135MW in 2007, 99.6% of which was grid connected [3]. This represents a 42% growth in its capacity. Japan, the second in utilization with 15W/Capita, had a 12% increase in 2007. Other countries also continued to increase their PV capacities. Figure 2 shows the percentage of PV energy installed as of the end of 2007 for the 12 leading countries [3].

2.1 PV Energy Utilization in Canada

Canada installed 5.3MW of PV energy in 2007, raising the total capacity by 25.8% to reach 25.7MW as of the end of 2007 [6]. Figure 3 shows the cumulative PV power installed in Canada for the last eleven years.

Abstract

Solar energy has always been vital for mankind. With the increase in anxiety regarding conventional energy sources, renewable energy sources such as solar energy is gaining enormous significance. One kind of solar energies is the photovoltaic (PV) technology that converts solar energy to electrical energy through solar cells.

The photovoltaic energy is implemented as a standalone energy source or connected to the grid as distributed electric generation. This paper provides an overview of the current technology used in PV systems, including PV arrays, inverters especially grid connected ones.

Sommaire

L'énergie solaire a toujours été vitale pour l'humanité. Avec l'accroissement de l'anxiété concernant les sources d'énergies conventionnelles, les sources renouvelables tels le solaire prennent une importance énorme. Un forme populaire de conversion d'énergie solaire est le photovoltaïque (PV) qui fournit de l'électricité en employant des cellules solaires. La génération photovoltaïque est implantée comme source autonome ou reliée au réseau en tant que source électrique distribuée. Cet article fournit un aperçu des technologies courantes utilisées dans les systèmes PV, incluant les générateurs PV, onduleurs (en particulier ceux reliés au réseau) et décrit des éléments technologiques clés tels les algorithmes de conversion optimale d'énergie et les schéma d'anti-îlotage.

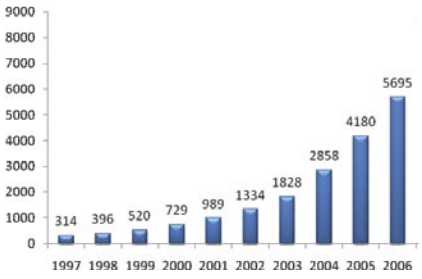

Figure 1: Cumulative installed PV power in IEA.

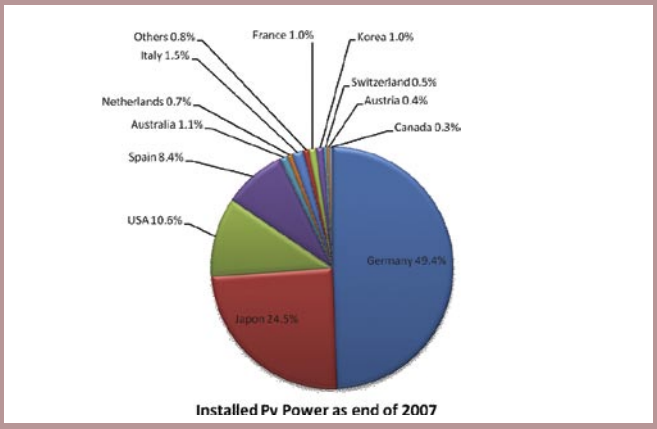

Figure 2: Length and period of FBG and LPFG.

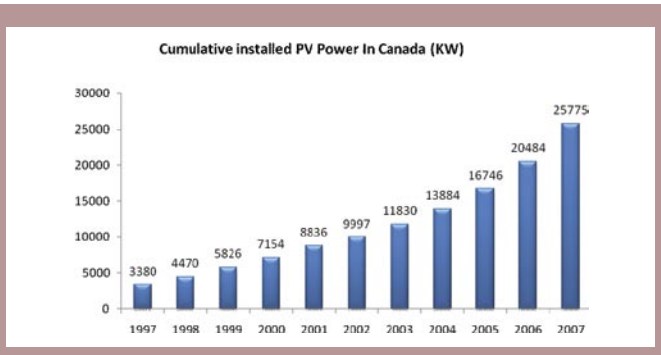

Figure 3: Cumulative PV power in Canada.

The average increase had been 26% for the last 15 years and 38% since 2000. A major portion of the installed PV power in 2007 (73%) was for off-grid applications, and the rest was mainly installed in distributed grid connected applications as shown in Figure 4. An increase in the grid connected applications is expected to take place due to government support programs.

The province of Ontario introduced its Renewable Energy Standard Offer Program (SOP) in November 2006. The SOP guarantees payment of 0.42 CAD/KWh for energy produced from photovoltaic systems and sold to the utility grid for 20-year contracts [7]. This is in return of the applicant investment in connection to the distribution network, metering, operation and maintenance costs [6].

Another incentive is Net Metering or Net Billing, which allows the use of energy from the grid when the PV system is not generating enough energy and gives credit for any surplus power generated. This eliminates the need for storage units and uses the grid as backup, which reduces the overall cost of the system. This incentive may not be available in every province. Electrical power is of provincial jurisdiction [6].

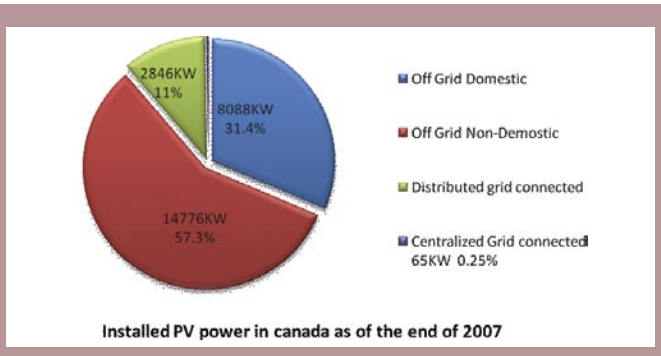

Figure 4: Split of installed PV energy in Canada.

One example for distributed grid connected PV systems can be found at the Toronto Exhibition Place where a 100KW grid connected PV system was installed in August 2006 (Figure 5) [8]. Real-time monitoring of this PV system is available online at the following URL: http://view2.fatspaniel.net/FST/Portal/TorontoHorsePalace/.

In 2007, OptiSolar Farms Canada announced three large solar farm projects: 50 MW at Sarnia (North America's largest), 20 MW at Petrolia and 20 MW at Tilbury, all in the eastern part of Ontario. Completion is expected for 2010 [9].

Figure 5: Exhibition Place 100KW PV system *(Photo courtesy of Exhibition place)*.

Figure 6: PV arrays (a) Crystalline PV array (BP Solar) (b) Thin film PV array *(First Solar)*

3.0 PV Arrays

PV arrays are the main part and also the most expensive element of the PV system. They are manufactured in different sizes and from different materials. Crystalline type of PV arrays in Figure 6a are made from silicon wafers, whereas thin film PV arrays in Figure 6b are made from thin film of semiconductor material deployed on panels (such as glass, plastic metal sheet, etc.) and can be flexible.

The efficiency of the PV arrays differs according to its type [10]. Table 1 shows the efficiencies and some other characteristics [11-13]. The prices of PV arrays are defined as the cost per peak Watt, which varies by the technology used in manufacturing.

Type of Solar PV	Thin Film	Poly-crystalline	Mono-crystalline
Cell Efficiency	8 - 12%	14 - 15%	16 - 17%
Module Efficiency	5 - 7%	12 - 14%	13 - 15%
Area needed per kWp	15.5m^2	8m^2	7m^2
Annual energy per kWp *	800 kWh/kW$_p$	810 kWh/kW$_p$	830 kWh/kW$_p$
Annual energy per m^2 *	50 - 52 kWh/m^2	100 kWh/m^2	107 kWh/m^2
Annual CO_2 savings per kWp *	454 kg/kW$_p$	460 kg/kW$_p$	471 kg/kW$_p$
Price \$/W$_p$	~3.57\$/W$_p$	~3.99\$/W$_p$	~3.89\$/W$_p$
* For south-facing system with 30° tilt.			

Table 1: PV array efficiencies

The electrical characteristics of the PV cell are non-linear, and change with the environmental conditions as shown in Figure 7 . The PV cell output current can be described by equation 1 [14].

$$I_{pv} = I_L - I_o \left[e^{\frac{q\left(V_{pv}+I_{pv}R_s\right)}{nKT}} - 1 \right] - \frac{V_{pv}+I_{pv}R_s}{R_{sh}} \quad (1)$$

Where I_{PV} is output current generated by the PV cell, which is a function of a number of variables defined in Table 2.

I_{PV}	Cell output current
V_{PV}	Cell output voltage
R_S	Cell series parasitic resistance
R_{sh}	Cell shunt parasitic resistance
q	Electronic charge
K	Boltzmann's constant
T	Absolute temperature
n	Diode ideality factor
I_0	Cell reverse saturation current
I_L	Cell photocurrent (irradiance dependent)

Table 2: Length and period of FBG and LPFG.

The output current of the PV array depends mainly on the irradiance while its output voltage depends on the temperature of the PV array [15]. Maximum efficiency can be obtained when the PV array operates at its maximum power point as shown in Figure 7. PV systems use dedicated Maximum Power Point Tracking (MPPT) algorithms.

Building Integrated Photovoltaic (BIPV), which integrates the PV array with the building material, is a new concept. Figure 8 shows an application that integrates the PV arrays onto the roof as solar shingles [16, 17].

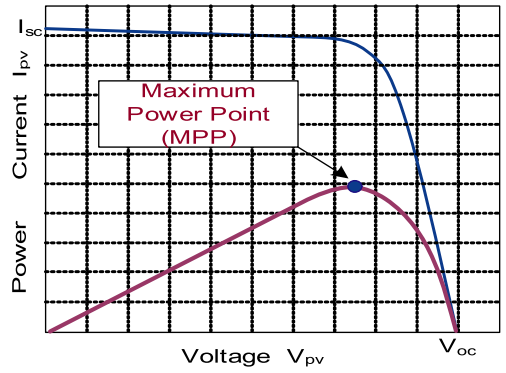

Figure 7: Solar array characteristics.

Figure 8: Solar shingles (courtesy of Solarity Industries, BC Canada), www.solarity.ca

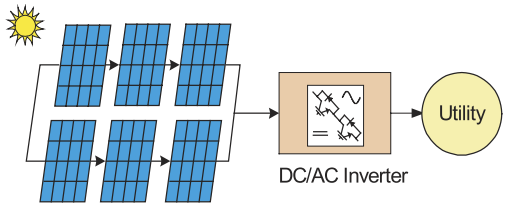

Figure 9: Grid connected central inverter.

4.0 Inverters

The DC/AC inverter is the central part of grid connected PV system. The main task of the inverter is to convert the DC output of the PV array to AC current.

The DC/AC inverter have improved in the recent years with respect to the technology used, which lead to a decrease in price and an increase in performance and reliability. There are four main types of inverters: central inverters, string inverters, module integrated or module oriented inverters, and multi-string inverters [18].

4.1 Central Inverters

Figure 9 shows a typical configuration of grid connected central inverter. PV modules are connected in series to form strings which are connected in parallel to a central inverter [18-20]. The first versions were line-commutated inverters with a power factor of 0.7. The newer systems are equipped with self-commutated IGBT technology, controlled by DSP with space vector modulation (SVM). The large inverters can implement grid quality improvement such as reactive power compensation [21, 22]. Figure 10 illustrates a simplified circuit diagram of a central inverter.

Although these inverters are robust, highly efficient and cheap, their energy yield decreases due to module mismatch, partial shading and centralized MPPT.

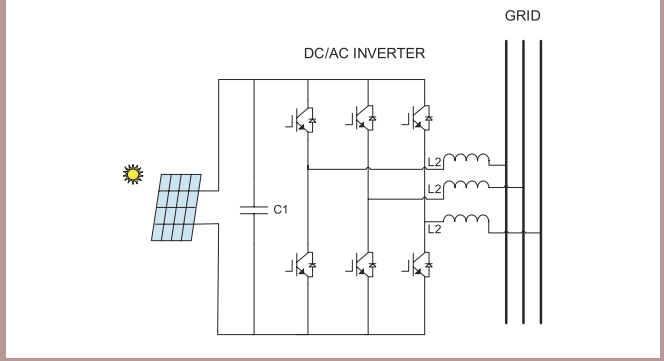

Figure 10: Central inverter topology.

4.2 String Inverters

String inverters are reduced versions of the central inverter. In string inverters, the PV plant is divided into several parallel strings and each of them is connected to a dedicated inverter which implements MPPT independently as shown in Figure 11 [18, 20-25].

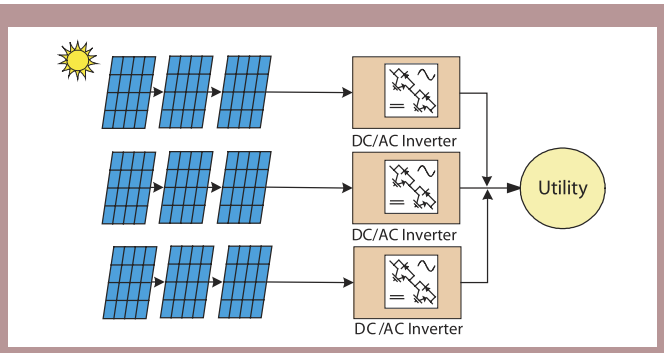

Figure 11: Grid connected string inverters

This technology results in 1% to 3% increase in energy yield compared to central inverter due to reduction in mismatch and partial shading losses. Eventually it aroused as a standard in PV system technology for grid connected applications [18, 19, 22, 23].

Figure 12 shows an example of string inverter with two stage conversion. In the first stage the DC voltage is boosted and converted to a semi-sinusoidal waveform, which is unfolded in the next converter at line frequency.

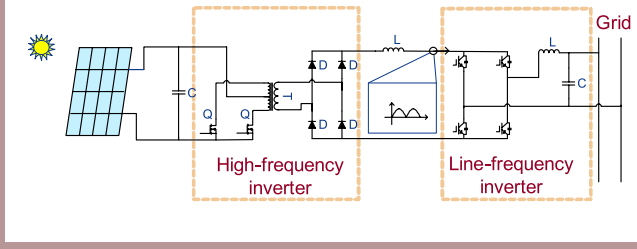

Figure 12: String inverter.

4.3 Multi-String Inverters

In multi-string inverters, each PV string is connected to a separate DC/DC converter that implements its own MPPT, and the output is fed to a DC bus that feeds a central DC/AC inverter [18-20, 22]. Figure 13 shows an example of such a configuration.

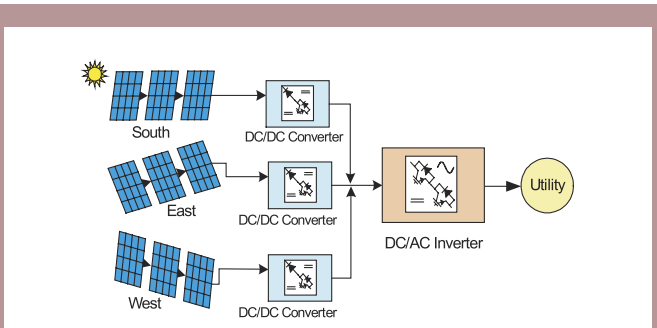

Figure 13: Grid connected multi-string inverter.

This configuration enables the use of different PV modules with different technologies (e.g., crystalline or thin film) and orientations (e.g., south, east & west) in the same PV plant [24]. This inverter combines the advantages of string inverter (high energy yield) and central inverter (low cost) [21, 23, 26-28].

The modular nature of this inverter makes it more flexible and more robust since the failure of one string does not affect the entire PV plant [26].

An example of multi-string inverter is shown in Figure 14, where full-bridge DC/DC converters are interfaced to a single three-phase inverter through a DC bus.

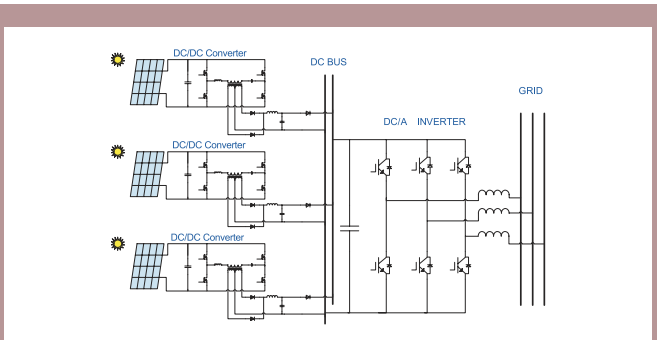

Figure 14: Multi-string inverters.

Inverter Type	Input voltage	Power range	Cost/W	Advantages	Disadvantages
Central Inverter	150-750V	20KW-400KW	Low	Low cost, high efficiency	Mismatch losses, low energy yield
String Inverter	150-450V	1KW-2KW	Med	Separate MPPT	NA
Multi String Inverter	125-750V	1KW-10KW	Med	Separate MPPT, high efficiency	NA
AC Module	30-150V	<500W	High	No dc wiring, high energy yield	Low efficiency, high cost/Watt

Table 3: Summary of inverter characteristics

4.4 Module Integrated Inverters

Module integrated inverters or AC modules consist of a PV module connected to an inverter to form a single electrical device [18, 19, 24]. They are usually rated below 500W and paralleled together to form a PV plant as shown in Figure 15 [21, 22].

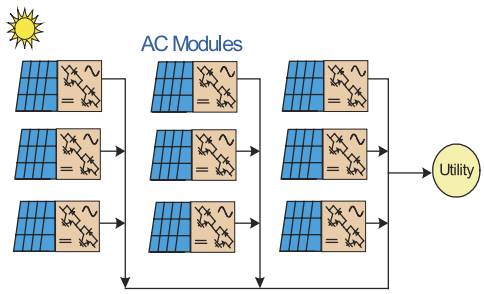

Figure 15: Grid connected module integrated inverter.

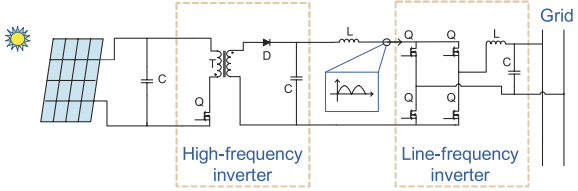

Figure 16: AC module in a module integrated inverter.

This results in highest system flexibility and highest energy yield since each PV module has its own MPPT and the mismatch losses are eliminated [18, 19, 23]. Although this type of inverters has some advantages such as no DC wiring and offering complete PV system at low investment cost, it has some significant drawbacks such as low efficiency due to voltage amplification and high cost per Watt [18-22, 24]. Nevertheless, it is seen as the future trend in PV systems [29]. An example of module integrated inverter is shown in Figure 16. In this system, a flyback converter generates a rectified sine wave which is unfolded in the second converter.

Table 3 gives a summary of the characteristics, main advantages and disadvantages of the above-mentioned inverter types [18, 20, 22].

5 Conclusion

This paper offers a comprehensive overview of the photovoltaic systems and their utilization around the world and in Canada. Different types of the PV systems and applications have been discussed with an emphasis on the grid-connected PV systems, which are widely installed in the world. This paper also provides a state-of-the-art review of power converter technologies

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Wolfgang J. R. Hoefer (LFIEEE) is Professor Emeritus of Electrical & Computer Engineering at the University of Victoria. He holds a Dipl-Ing. diploma from the RWTH Aachen (1965), and a D.Ing. degree from the University of Grenoble (1968). He joined the University of Ottawa in 1969 and was Chair of Electrical Engineering from 1978 to 1981. In 1992 he joined the University of Victoria as a Professor and NSERC Industrial Research Chair in RF Engineering, heading the Computational Electromagnetic Research Laboratory (CERL) until his retirement in 2006. He also held visiting appointments at the Universities of Grenoble, Rome, Nice, Perugia, Munich and Duisburg, the Ferdinand Braun Institute Berlin, the ETH Zürich, AEG-Telefunken, CRC Ottawa, the Institute of High Performance Computing in Singapore, and Georgia Tech. He is the Founder and President of Faustus Scientific Corporation since 1996.

Dr. Hoefer's research in microwave engineering and computational electromagnetics has shaped the technologies and design tools for analog microwave and high-speed digital communication systems. He advanced the CAD of planar and E-Plane circuits, pioneered the application of Finite Difference Time Domain (FDTD), Transmission Line Matrix (TLM) and Multi-resolution Time Domain (MRTD) methods in microwave circuit design, and spearheaded the development of modern time-domain TLM electromagnetic field simulators. His modeling technology forms the basis of the EM Simulator MEFiSTo, commercialized by Faustus Scientific Corporation.

Dr. Hoefer is an IEEE Life Fellow (F'91, LF'06), and a Fellow of the BC Advanced System Institute (1992), the Royal Society of Canada (2003), and the German Academy of Science and Engineering (ACATECH, 2007). He was Associate Editor of the IEEE MTT Transactions (1998-2000), Chair and Co-chair of the MTT-15 Technical Committee on Field Theory (1989 to 2004), and an IEEE MTT Distinguished Microwave Lecturer (2005-2007). Among other distinctions he received the Peter B. Johns Prize (1990), the ACES Mainstay Award (2004), the IEEE MTT Distinguished Educator Award (2006), and an honorary doctorate (2007) from the TU München, Germany.

Wolfgang J.R. Hoefer (LFIEEE) est professeur émérite de génie électrique et informatique à l'Université de Victoria. Il est ingénieur diplômé de la RWTH d'Aix-la-Chapelle (1965), et docteur en génie de l'université de Grenoble (1968). Il a fait ses débuts à l'université d'Ottawa en 1969 et il était directeur du département de génie électrique entre 1978 et 1981. En 1992, il devint professeur et directeur de recherche industrielle CRSNG à l'Université de Victoria, et fonda le laboratoire de recherche en modélisation électromagnétique qu'il dirigea jusqu'à sa retraite en 2006. Il fut professeur invité aux universités de Grenoble, Rome, Nice, Pérouse, Munich, Duisbourg et Zurich (ETHZ), et chercheur invité aux institutions suivantes: AEG -Telefunken, CRC Ottawa, Ferdinand Braun Institut à Berlin, Institute of High Performance Computing à Singapour, et Georgia Tech. Il est fondateur et président de la compagnie Faustus Scientific Corporation depuis 1996.

Professeur Hoefer a fait des contributions substantielles à la technologie des micro-ondes et à la modélisation électromagnétique. Ses travaux sur la conception des circuits hyperfréquences et numériques ont marqué l'évolution des méthodes de design informatisés des structures planaires et quasi-planaires. Il est un pionnier des méthodes numériques temporelles en électromagnétisme, notamment des différences finies dans le domaine du temps (FDTD), des méthodes multi-échelles (MRTD), et surtout de la méthode TLM. Cette dernière méthode est à la base du logiciel MEFiSTo, commercialisé par Faustus Scientific Corporation.

Professeur Hoefer est Life Fellow de l'IEEE (F'91, LF'06), Fellow du BC Advanced System Institute (1992), membre de la Société Royale du Canada (2003) et membre de l'Académie Allemande des Sciences et de la Technologie (ACATECH, 2007). Il fut éditeur adjoint des IEEE MTT Transactions (1998 -2000), président du comité technique MTT -15 (1989 -2004), et conférencier distingué de la société MTT de l'IEEE (2005 -2007). Entre autres distinctions, il a reçu le prix Peter B. Johns (1990), le certificat de mérite exceptionnel de l'ACES (2004), le prix d'éducateur distingué de la société MTT de l'IEEE (2006), et un doctorat honorifique (2007) de l'univeristé de technologie de Munich.

2009 IEEE Canada R.A. Fessenden Medal

for outstanding technical contributions to the area of data transmission in both wireline and wireless environments

sponsored by/commandité par Telus

Médaille R.A. Fessenden de l'IEEE Canada 2009

pour contribution technique exceptionnelle dans le domaine de la transmission de données dans les environnements avec et sans fil

David Falconer (LFIEEE) is Professor Emeritus and Distinguished Research Professor in the Department of Systems and Computer Engineering at Carleton University, which he joined in 1980. He received the BSc degree in Engineering Physics from the University of Toronto in 1962 and the S.M. and Ph.D. degrees in Electrical Engineering from M.I.T. in 1963 and 1967 respectively. After a postdoctoral fellowship at the Royal Institute of Technology, Stockholm, he was with Bell Laboratories, Holmdel, New Jersey from 1967 to 1980. During 1976-77 he was a visiting professor at Linköping University in Sweden. He was Founding Director of Carleton's Broadband Communications and Wireless Systems (BCWS) Centre from 2000 to 2004.

His research career has mainly focused on adaptive signal processing for wired and wireless modems, and currently, next-generation broadband wireless communications systems. He and his over 70 Carleton masters and doctoral graduates have made significant contributions to advanced wireless systems though participation in TRIO and CITR, the IEEE 802.16 wireless MAN standards group and in the European Union WINNER Project. He was the elected Chair of Working Group 4 of the Wireless World Research Forum (WWRF) in 2004 and 2005.

Dr. Falconer received awards for papers published in IEEE Communications Transactions and IEEE Vehicular Technology Transactions in 1983, 1986 and 1992. From 1981 to 1987 he was Editor for Digital Communications of the IEEE Transactions on Communications. He was Vice Technical Chair of the IEEE VTC Conference in 1998, Honorary Conference Chair of the CNSR Conference in 2007, and Executive Chair of the IEEE WCNC Conference in 2008. He received the 2008 Canadian Award for Telecommunications Research and a 2008 Recognition Award from the IEEE Technical Committee on Wireless Communications.

David Falconer (LFIEEE) est professeur chercheur émerite au département de génie des systèmes et informatique à l'Université Carleton, auquel il s'est joint en 1980. Il obtenait un B.A.Sc. en génie physique à l'Université de Toronto en 1962, une maîtrise (1963) et un doctorat (1967) en génie électrique au MIT. Après un stage postdoctoral à l'Institut Royal de Technologie de Stockholm, il a travaillé pour Bell Laboratories de 1967 à 1980. En 1976 -77, il a été professeur invité à l'Université Linköping en Suède. Il a été directeur fondateur du centre Broadband Communications and Wireless Systems (BCWS) de l'Université Carleton, de 2000 à 2004.

Sa carrière de chercheur s'est principalement concentrée sur le traitement adaptif des signaux dans les modems avec ou sans-fil, et actuellement, sur les systèmes de communication sans fil de nouvelle génération à bande large. Professeur Falconer et les 70 (et plus) étudiants gradués qu'il a dirigé ont significativement contribué à l'avancement des systèmes de communication sans fil par leur participation à TRIO, CITR, au groupe de standards IEEE 802.16, et au Projet WINNER de l'Union Européenne. Il a été élu président du Groupe de Travail 4 du Wireless World Research Forum (WWRF) en 2004 et 2005.

Dr. Falconer a reçu des prix pour des articles techniques publiés dans IEEE Transactions (Communications et Vehicular Technology) en 1983, 1986 et 1992. De 1981 à 1987 il a été éditeur des communications digitales de l'IEEE Transactions on Communications. Il a été vice-directeur technique de la conférence IEEE VTC en 1998, président honorifique de la conférence CNSR en 2007, et directeur exécutif de la conférence IEEE WCNC en 2008. Il a reçu le Prix Canadien en recherche sur les télécommunications en 2008 et le prix de reconnaissance 2008 du comité technique de l'IEEE sur le communications sans fil.

2009 IEEE Canada Power Medal

for outstanding contributions to the development of rotating machine insulation testing

Médaille d'électricité de l'IEEE Canada 2009

pour contribution exceptionnelle au développement d'essais d'isolation de machine rotative

William McDermid (LFIEEE) is currently Director at Manitoba Hydro of the High Voltage Test Facility for 550 kVac and 500 kVdc equipment which has entered the construction phase. He received his BSc in Electrical Engineering from the University of Manitoba in 1961. Following a year with Ontario Hydro, he joined Manitoba Hydro in 1962 where he soon became involved in diagnostic testing of electrical insulation involving most types of electrical apparatus, including HVDC, during a period of rapid expansion.

Beginning in the mid 1970's and continuing for 15 years Bill served as a monitor of a series of CEA research projects to develop on-line partial discharge (PD) measurements for large rotating machines. An early contribution was the demonstration that PD signals experience considerable attenuation as they travel through machine windings where the bandwidth of the measuring system exceeds 10 MHz. His work in the 1990's with PD measurements in this frequency range on individual stator coils and bars showed that there is sometimes a relationship between the measured PD and the subsequent time to failure during voltage endurance tests, thus providing an opportunity for quality control. Bill has also made contributions to the development hot sticks for live line work at 500 kV which are less vulnerable to flashover than those in common use.

Bill is also a member of APEGM, CSA and ASTM. He was chair of the PES Winnipeg Chapter in 1978/79, chaired the working group that developed IEEE Std 1434-2000 on PD measurements, and chaired revisions of CSA C50 on insulating oil in 1997 and 2008. He was president of the IEEE Dielectrics and Electrical Insulation Society in 2007/08 and has been chair of two of the Society's conferences. He received the APEM (now APEGM) Merit Award in 1992, the IEEE Third Millennium Medal and was elected IEEE Fellow in 2005.

William McDermid (LFIEEE) est actuellement directeur A 0 Manitoba Hydro du centre d'essai d'équipement à haute tension de 550 kVac et 500 kVdc qui est maintenant en phase de construction.

Il a obtenu son BSc en génie électrique de l'Université du Manitoba en 1961. Après une année au service d'Ontario Hydro, il a rejoint Manitoba Hydro en 1962 où il est devenu très tôt impliqué dans les tests diagnostiques d'isolation électrique impliquant la plupart des types d'appareils électriques, y compris le CCHT, au cours d'une période d'expansion rapide.

Pendant 15 ans à partir du milieu des années 70, Bill a été en charge de la supervision d'une série de projets de recherche du CEA visant à développer des mesures de décharges partielles en ligne (DP) pour grandes machines rotatives. Une des premières contributions fut la démonstration que les signaux de DP subissent une atténuation considérable lorsqu'ils voyagent par les enroulements de machine où la largeur de bande du système de mesure dépasse 10 MHz. Son travail dans les années 90 sur les mesures de DP dans cette gamme de fréquence sur différents bobines et barres de stateurs a démontré qu'il y avait parfois un rapport entre la DP mesurée et le moment suivant le bris pendant les tests d'endurance à la tension, ceci présentant un moyen de faire du contrôle de qualité. Bill a également apporté des contributions au développement de perches spéciales pour effectuer du travail sur les lignes sous tension à 500 kV qui sont moins vulnérables contournement électrique que celles d'usage courant.

Bill est également membre de l'APEGM, du ACN et de l'ASTM. Il a été président du chapitre PES de Winnipeg en 1978/79, il a présidé le groupe de travail qui a développé la norme IEEE 1434-2000 sur les mesures de DP, et il a présidé les révisions de la norme ACN C50 sur l'huile isolante en 1997 et 2008. Il fut président de la société de l'IEEE sur les diélectriques et l'isolation électrique en 2007/08 et a été président de deux des conférences de la société. Il a reçu le Prix du mérite d'APEM (maintenant APEGM) en 1992, la médaille du troisième millénium de l'IEEE et a été élevé au grade de IEEE Fellow en 2005.

2009 IEEE Canada Computer Medal

for lasting technical and educational contributions to electronics for computing

Médaille d'informatique de l'IEEE Canada 2009

pour contribution technique et éducative durable à l'électronique pour l'informatique

Kenneth Carless (KC) Smith (LFIEEE) Professor Emeritus University of Toronto, consultant and author, was awarded the BSc in Engineering Physics in 1954, the MSc in EE in 1956, and the PhD in Physics in 1960, all from UofT. He was employed as a transmission engineer for the Canadian National Telegraph in 1954 to 1955, then by the Computer Centre at the University of Toronto in a cooperative project on high-speed computer design at the Digital Computer Laboratory of the University of Illinois, Champaign-Urbana from 1956 to 1959, then as an Assistant Professor of EE at the UofT from 1960 to 1961, then as a Assistant Professor of EE at the University of Illinois from 1961 to 1964, then as an Associate Professor of EE and of CS at the University of Illinois from 1964 to 1965, then Associate Professor of EE and of CS at UofT from 1965 to 1970, then Professor from 1970 to 1997, when he retired as Professor Emeritus. He was Chair of EE at UofT from 1976 to 1981, and was appointed as Professor of Information Science in 1979, Professor of Mechanical Engineering in 1988, all at the UofT. From 1993 to 1998 he was also a Visiting Professor of EEE at the Hong Kong University of Science and Technology, where he was the Founding Director of the Computer Engineering Program from 1994 to 1997.

During his career, he was the Chief Engineer of Illiac II from 1961 to 1965, and the Chief Engineer of Illiac III from 1962 to 1965, and primary consultant to 1969. Upon his return to the UofT, he concentrated on projects of concern to both the EE and CS Departments, including Star Ring (a computer networking scheme), RAP (a relational/rotational associative processor), SSSP (a computer music composition/generation/production/performance system), during which time he was co-founder of the EE Computer Group and the Computer Systems Research Group (later the Computer Systems Research Institute), a cooperation between EE and CS.

In 1978 he was elected Fellow of IEEE for "Contributions to Digital Circuit Design", and Life Fellow in 1996. His professional roles have included: Director and President of the Canadian Society for Professional Engineers; IEEE ISCAS General Chair 1973; IEEE ISMVL Technical Committee Chair 1993 to 1995; IEEE ISSCC Awards Chair 1975 to present; IEEE ISSCC Press-Relations Chair 1993 to present.

Kenneth Carless (KC) Smith (LFIEEE) est professeur émérite à l'Université de Toronto, consultant et auteur. Il a fait ses études à l'Université de Toronto (UdeT), où il a reçu un BScA en génie physique en 1954, une MScA en génie électrique en 1956 et un PhD en physique en 1960. De 1954 à 1955, il a été ingénieur en transmission pour le Canadian National Telegraph. Entre 1956 et 1959 il a été employé du centre informatique de l'UdeT où il a participé à un projet collaboratif sur les circuits à haute vitesse avec l'Université de l'Illinois à Urbana-Champaign (UIUC). Il a été professeur adjoint en génie électrique à l'UdeT de 1960 à 1961 et à UIUC de 1961 à 1964. Ensuite, il a été professeur agrégé à UIUC de 1964 à 1965 et à Toronto en génie électrique et en informatique de 1965 à 1970. Il a été promu professeur titulaire en génie informatique en 1970. Suite à sa retraite en 1997, il a été nommé professeur émérite. De 1976 à 1981, il a dirigé le département de génie de l'UdeT. À Toronto il a été nommé professeur aux départements des sciences de l'information en 1979 et de génie mécanique en 1988. De 1993 à 1998, il a été professeur invité au département de génie électrique et électronique de l'Université des sciences et technologies de Hong Kong , où il a été directeur fondateur du programme en génie informatique (1994 à 1997).

En Illinois, Dr. Carless a participé en tant qu'ingénieur en chef aux programmes Illiac II (1961 à 1965) et Illiac III (1963 à 1965), et comme consultant jusqu'en 1969. Après son retour à Toronto, il a participé à plusieurs projets de recherche aux départements de génie électrique et d'informatique, notamment au réseau informatique Star Ring, au processeur associatif relationnel/rotationnel RAP et au logiciel de composition et performance de musique SSSP. Il a fondé les groupes de recherche en génie électrique et informatique, et en systèmes informatiques (ensuite devenu le Computer Systems Research Institute, une collaboration entre les départements d'informatique et de génie électrique).

Nommé IEEE Fellow en 1978 pour sa contribution à la conception de circuits numériques, il est devenu Life-Fellow 1996. Durant sa carrière il a été nommé directeur et président de la Canadian Society for Professional Engineers, président de conférence pour ISCAS (1973), président du comité technique d'ISMVL (1993 à 1995), directeur des prix d'ISSCC (1973 jusqu'à présent) et directeur des relations de presse d'ISSCC (1993 jusqu'à présent).

2009 IEEE Canada Outstanding Engineer Award

for outstanding contributions to the field of robotically enhanced surgery

Prix d'excellence en génie de l'IEEE Canada 2009

pour contribution exceptionnelle dans le domaine de la chirurgie assistée par la robotique

Rajnikant Patel (FIEEE) received the B.Eng. (Hons.) degree in Electronics from the University of Liverpool in 1969, and the Ph.D. degree in Electrical Engineering from the University of Cambridge in 1973. From 1973 to 1998 he held postdoctoral and faculty positions at various universities and research centres in Canada, U.K., U.S.A., Sweden, and Holland. At present, he holds the position of Distinguished University Professor and Tier-1 Canada Research Chair in Advanced Robotics and Control in the Department of Electrical & Computer Engineering with a cross appointment in the Department of Surgery at the University of Western Ontario. He was a founding member of Canadian Surgical Technologies & Advanced Robotics (CSTAR), a multidisciplinary research centre for medical robotics, and is currently serving as its Director of Engineering.

Dr. Patel has made outstanding contributions to the design, prototyping and control of advanced robotic and other mechatronic systems. He has collaborated with the Canadian Space Agency and Bombardier Inc. on the development of novel robotic technologies for space applications and is currently focusing on robotic applications in minimally invasive surgery. He has published over 300 papers in refereed journals and conferences and has co-authored a textbook and 6 research monographs on robotics and control, and co-edited an IEEE Press "Selected Reprints" book.

Dr. Patel is a Fellow of the Canadian Academy of Engineering, IEEE, ASME (USA), IET (UK), and EIC (Canada). He has served or is serving on editorial or advisory boards of several journals including the IEEE Transactions on Robotics, the IEEE/ASME Transactions on Mechatronics, the IEEE Transactions on Automatic Control, and the International Journal of Medical Robotics and Computer Assisted Surgery. In 2005, he served as the Chair of the IEEE Conference on Control Applications held in Toronto. He is a registered Professional Engineer in the Province of Ontario.

Rajnikant Patel (FIEEE) a obtenu un B.Eng. (Hons) en électronique de l'Université de Liverpool en 1969, et un PhD en génie électrique de l'Université de Cambridge en 1973. De 1973 à 1998, il a occupé des positions post-doctorales et d'enseignement à diverses universités et centres de recherches au Canada, au R-U, aux Etats -Unis, en Suède, et en Hollande. Actuellement, il occupe le poste de professeur universitaire distingué et de responsable de la recherche chez Tier -1 Canada dans le domaine de la robotique et du contrôle avancés au département de génie électrique et informatique. Il collabore aussi avec le département de chirurgie de l'Université Western Ontario. Il fut un membre fondateur du ''Canadian Surgical Technologies & Advanced Robotics'' (CSTAR), un centre de recherches multidisciplinaire en robotique médicale, où il est actuellement directeur de l'ingénierie.

Dr. Patel a fait des contributions exceptionnelles à la conception, au prototypage et au contrôle de systèmes robotiques avancés et autres systèmes mécatroniques. Il a collaboré avec l'agence spatiale canadienne et Bombardier Inc. au développement de technologies robotiques originales en vue d'applications dans l'espace, et il se concentre actuellement sur des applications robotiques dans la chirurgie mini-invasive. Il a publié plus de 300 articles dans des revues avec comité de lecture et des conférences, et il est co-auteur d'un manuel et de 6 monographies de recherches sur la robotique et le contrôle, et il a co-édité un livre de la série "Selected Reprints" de l'IEEE Press.

Dr. Patel est membre de l'Académie canadienne de génie, Fellow de l'IEEE, de l'ASME (Etats-Unis), de l'IET (R-U), et de l'ICI (Canada). Il a siégé ou siège encore sur les comités éditoriaux ou consultatifs de plusieurs revues comprenant les Transactions de l'IEEE sur la robotique, les Transactions de l'IEEE/ASME sur la mécatronique, les Transactions de l'IEEE sur le contrôle automatique, et la Revue inter nationale de robotique médicale et de chirurgie assistée par ordinateur. En 2005, il a agit comme président de la conférence de l'IEEE sur les applications en contrôle tenue à Toronto. Il est ingénieur professionnel enregistré dans la province d'Ontario.

2009 IEEE Canada Outstanding Engineering Educator Award

for outstanding contributions in inspiring postgraduates in fiber optics research

sponsored by Canadian Heads of ECE
commandité par les directeurs canadiens de GEI

Prix d'excellence en enseignement du génie de l'IEEE Canada 2009

pour contribution exceptionnelle à l'inspiration des étudiants de 2e et 3e cycle dans la recherche en fibres optiques

John C. Cartledge (FIEEE) is Professor and Queen's Research Chair in the Department of Electrical and Computer Engineering, Queen's University, Kingston, Ontario, Canada. He received the BSc. (mathematics and engineering, 1974), M.Sc. (mathematics, 1976) and Ph.D. (mathematics, 1979) degrees from Queen's University. From 1979 to 1982, he was a Member of the Scientific Staff at Bell-Northern Research, Ottawa, Ontario, Canada. He has been with the Queen's University since 1982 and has spent sabbatical leaves with the Lightwave Systems Technology Research Division of Bellcore, Red Bank, NJ, in 1988-89, and the Optical Communications Department of Tele Danmark Research, Hørsholm, Denmark in 1995-96.

Dr. Cartledge has made significant contributions to the field of fiber-optic communications by advancing the fundamental understanding of the impact that device and component properties have on transmission system performance. Key differentiators of his work include the breadth and practical significance of his contributions. His results have contributed to the development of fiber-optic communications, thereby advancing global telecommunication networks that have benefited society.

Dr. Cartledge is a member of IEEE LEOS and IEEE ComSoc, an IEEE Distinguished Lecturer (2008-09), a Fellow of the Optical Society of America, and Professional Engineer in Ontario. His service on Technical Program Committees includes the Conference on Optical Fiber Communication, the European Conference on Optical Communications, and the IEEE LEOS Annual Meeting. He is Chair of the Optical Networks and Systems Technical Committee of IEEE LEOS (2007-09). Dr. Cartledge participated in the research network Agile All-Photonic Networks which received the Synergy Award for Innovation from the Natural Sciences and Engineering Research Council (2006). With BTI Photonic Systems he received the Mind To Market Award from the Ontario Centres of Excellence (2007).

John C. Cartledge (FIEEE) est professeur et titulaire de la chaire de recherche Queen's au département de génie électrique et informatique de l'Université Queen's à Kingston, Ontario, Canada. Il a obtenu son BSc (mathématiques et génie, 1974), MSc (mathématiques, 1976) et PhD (mathématiques, 1979) de l'université Queen's. De 1979 à 1982, il fut membre du personnel scientifique chez Recherches Bell-Northern à Ottawa. Il membre depuis 1982 du personnel de l'université Queen's. Il a profité de congés sabbatique pour travailler dans la division de recherche de la compagnie Lightwave Systems Technology, une division de Bellcore, à Redbank, NJ, en 1988 -89 et aussi pour travailler dans le département de communications optiques chez Tele Danmark Research, à Hørsholm, Danemark, en 1995-96.

Dr.Cartledge a fait maintes contributions au domaine des communications par fibre optique en améliorant la compréhension fondamentale de l'impact des propriétés de dispositifs et composantes sur la performance des systèmes de transmission. Son travail se distingue par l'envergure et l'impact de ses contributions. Ses résultats ont contribué au développement des communications par fibre optique, faisant ainsi progresser les réseaux globaux de télécommunications qui ont profité à la société.

Dr.Cartledge est membre de IEEE LEOS et IEEE ComSoc, conférencier distingué IEEE (2008-09), Fellow de la Optical Society of America et ingénieur professionnel en Ontario. Il a fournit ses services à plusieurs comités de programme technique tel la Conférence sur la communication par fibre optique, la Conférence européenne sur la communication optique, et la Réunion annuelle IEEE LEOS. Il est president du comité sur les réseaux optiques et systèmes technique d'IEEE LEOS (2007 -09). Dr. Cartledge à participé au réseau de recherche Réseaux agiles tout -photoniques qui a reçu un Prix Synergie pour l'innovation du Conseil de recherches en sciences naturelles et en génie du Canada (2006). Lors de son séjour chez BTI Photonic Systems, il a reçu le prix Mind to Market des centres ontariens d'excellence (2007)

2009 IEEE Canada Industry Leadership Award

for pioneering leadership in restructuring the electric utility industry in Alberta as the first CEO of the Alberta Power Pool

Prix d'excellence en leadership industriel de l'IEEE Canada 2009

pour leadership pionnier dans la restructuration de l'industrie électrique en Alberta en tant que premier PDG du «Alberta Power Pool»

Lorry Wilson (MIEEE) is a director on the Management Board of Grasslands Renewable Energy LLC, a US corporation that is developing the Wind Spirit Project. He is also a Managing Director of Rocky Mountain Power (2006) Inc., President & Chief Executive Officer of Lorry Wilson & Associates Ltd. Lorry received his degree in Electrical Engineering from the University of Saskatchewan, Saskatoon, graduating with distinction in 1974.

Lorry joined SaskPower in 1974 assuming management roles of increasing responsibility in various aspects of long-range system planning for generation and transmission. In 1996 Lorry joined the Power Pool of Alberta to lead the development of Alberta's first competitive market for electricity. Mr. Wilson was the CEO of the Power Pool of Alberta before the merger with the Transmission Administrator function into the AESO (Alberta Electric System Operator). In 2002 Lorry left the Power Pool to create Rocky Mountain Power which along with Lectrix created the Montana Alberta Tie Lie (MATL), North America's first merchant power line. The MATL project was subsequently acquired by Tonbridge Power (TBZ.v). In 2007, Lorry and his colleagues next created Rocky Mountain Power (2006) Inc. Lorry's current activities centre around the Wind Spirit Project being developed by Grasslands Renewable Energy.

Mr. Wilson is a professional engineer with over 30 years of expertise in the power industry. He is a member of the Association of Professional Engineers, Geologists and Geophysicists of Alberta and a member of the Institute of Electrical and Electronic Engineers. Mr. Wilson was past Chairman of the South Saskatchewan branch of the IEEE. He resides in Calgary, Alberta with his wife Pamela. His two grown children, Nicola and Mike also live in Calgary. He is currently focused on enabling greater utilization of renewable energy sources in the bulk power grids.

Lorry Wilson (MIEEE) est un des directeurs siégeant sur le conseil d'administration de la Grasslands Renewable Energy LLC, une société américaine qui développe le projet Wind Spirit. Il est également Directeur général de Rocky Mountain Power (2006) inc., PDG de Lorry Wilson & associés Lté. Lorry a obtenu son diplôme de génie électrique de l'Université de la Saskatchewan, Saskatoon, graduant avec distinction en 1974.

Lorry s'est joint à SaskPower en 1974, assumant des rôles de gestion de responsabilité croissante dans divers domaines de la planification de système à longue portée pour la production et la transmission. En 1996, Lorry s'est joint au ''Power Pool of Alberta'' afin de mener au développement du premier marché de l'électricité compétitif de l'Alberta. M. Wilson fut PDG du ''Power Pool of Alberta'' avant sa fusion avec la fonction d'administrateur de réseau de transmission pour former l'AESO (Alberta Electric System Operator). En 2002, Lorry quitta le ''Power Pool'' pour créer la Rocky Mountain Power, qui avec Lectrix créa la Montana Alberta Tie Line (MATL), la première ligne électrique de transmission commerciale de l'Amérique du Nord. Le projet de MATL a été acquis plus tard par Tonbridge Power (TBZ.v). En 2007, Lorry et ses collègues ont créé ensuite Rocky Mountain Power (2006) inc. Les activités actuelles de Lorry se concentrent sur le projet Wind Spirit développé par Grasslands Renewable Energy.

M. Wilson est un ingénieur professionnel possédant plus de 30 années d'expertise dans l'industrie énergétique. Il est membre de l'association des ingénieurs professionnels, géologues et géophysiciens de l'Alberta et membre de l'IEEE. M. Wilson fut Président de la branche du sud de la Saskatchewan de l'IEEE. Il réside à Calgary, Alberta, avec son épouse Pamela. Ses deux enfants, Nicola et Mike demeurent aussi à Calgary. Il se concentre présentement à faciliter une utilisation accru e des sources d'énergie renouvelables dans les réseaux électriques.

2009 IEEE Canada W.S. Read Outstanding Service Award

in recognition of 45 years of dedicated leadership and service to IEEE at the local, national, and international levels

Prix d'excellence de service W.S. Read de l'IEEE Canada 2009

en reconnaissance de 45 années dédiées au leadership et au service rendu à l'IEEE, au niveau local, national et international

David J. Kemp (SMIEEE) holds a diploma in electronics engineering technology from the Manitoba Institute of Technology and certificate in Industrial Management and Administration. He retired from Manitoba Telecom Services following 35 years of telecom experience in systems design, training, project management, customer service, planning, and information technology. In 2001 Dave commenced consulting activities in Europe and several clients in Canada. Dave served as Board member, Electronics Industry Association of Manitoba, and The Canadian Institute of Management. He is a Fellow of The Engineering Institute of Canada. Dave is licensed to conduct industrial hearing conservation tests.

An active volunteer since 1964 Dave held senior positions at all levels of IEEE including student branch, Winnipeg Section, Area, IEEE Canada, and IEEE worldwide. He served as President-IEEE Canada, Region 7 Director, and IEEE Secretary. He initiated the IEEE Graduates of the Last Decade (GOLD) program as well as associated Affinity Groups. He was founding Chair of IEEE Canada's Conference Advisory Committee (CONAC) and the IEEE Canada Standards Committee. He has been active in establishing IEEE's online communities. Dave led the major rebranding of IEEE in 2000. In 2008 he led the publication of A 25-Year History of IEEE Canada. He has been a board and executive officer of the IEEE Engineering Management and IEEE Professional Communication Societies. Dave continues to be a member of several IEEE Societies and groups including Computer, Professional Communication, Women in Engineering, Communications, Technology Management, Standards, and is an Associate Editor – IEEE Canadian Review.

Dave has received awards for his leadership and volunteer activities. In 1965 he was awarded the Outstanding Leadership and Service award (Student Branch); 1984 IEEE Centennial Medal; 1980 the Western Canada Silver Merit Award, 1995 IEEE Professional Communication Society Emily K Schlesinger Award; 1998 RAB Leadership Award and 2000 IEEE Millennium Medal.

David J. Kemp (SMIEEE) détient un diplôme en technologie du génie électronique de l'Institut de Technologie du Manitoba et un certificat en gestion industrielle et administration. Il a quitté pour la retraite Manitoba Telecom Services après avoir accumulé 35 années d'expérience dans le domaine des télécommunications en conception de systèmes, formation, gestion de projet, service à la clientèle, planification, et technologie de l'information. En 2001, Dave a entrepris des activités de consultation en Europe et chez plusieurs clients au Canada. Dave a été membre du conseil d'administration de l'Association de l'industrie de l'électronique du Manitoba, et de l'Institut canadien de gestion. Il est Fellow de l'Institut canadien des ingénieurs. Dave possède une licence permettant d'effectuer des tests de conservation de l'audition en milieu industriel.

Volontaire actif depuis 1964, Dave a occupé des postes seniors à tous les niveaux de l'IEEE incluant une branche étudiante, la section de Winnipeg, le conseil de l'ouest du Canada, IEEE Canada, et IEEE mondial. Il a servi comme président de l'IEEE Canada, directeur de la région 7, et secrétaire de l'IEEE. Il est à l'origine du programme des Diplômés de la dernière décennie (DDD) et aussi des groupes d'affinité associés. Il fut le président fondateur du Comité consultatif des conférences de IEEE Canada (CCC) et du Comité de normalisation de IEEE Canada. Il a été actif en établissant des communautés de l'IEEE en ligne. Dave a mené une campagne de renouveau au niveau de la stratégie de marque de l'IEEE en 2000. En 2008, il a dirigé la publication de la brochure sur les 25 ans d'histoire d'IEEE Canada. Il a été membre du conseil et cadre supérieur des sociétés IEEE Engineering Management et IEEE Professional Communication. Dave continue d'être membre de plusieurs sociétés et groupes de l'IEEE, comprenant celle sur les ordinateurs, la communication professionnelle, les femmes en génie, les communications, la gestion de la technologie, les normes, et est rédacteur associé pour la Revue canadienne de l'IEEE.

Dave a reçu des prix pour son leadership et ses activités de bénévolat. En 1965, il s'est merité le prix pour leadership et service exceptionnels (branche étudiante) ; la Médaille centennale de l'IEEE en 1984; le Prix d'excellence de l'ouest du Canada en 1980; le Prix Emily K. Schlesinger de la Société de communication professionnelle de l'IEEE en 1995; le Prix de leadership RAB en 1998 et la Médaille du millénaire de l'IEEE en 2000.

2009 IEEE Canada J.J. Archambault Eastern Canada Merit Award

for dedicated and outstanding service to the IEEE Ottawa Section, IEEE Canada and EIC

Prix d'excellence J.J. Archambault de l'est du Canada de l'IEEE Canada

pour service exceptionnel consacré à la section d'Ottawa de l'IEEE, IEEE Canada et l'ICI

John Grefford (SMIEEE) has been program support officer at Defence Construction Canada since 2007. Prior employment includes: 10 years as principal engineer for CRO Engineering Ltd. providing engineering services to both public and private organizations, 10 years as a project manager managing large-scale projects with National Defence, 3 years managing Research projects at a Defence Research Establishment Valcartier, 5 years Assistant Professor at Royal Military College, 2 years as a Technology Manager at National Bank of Canada and 2 years as Investment Advisor at National Bank Financial. John has a B.Eng. in Chemical Engineering from RMC in Kingston, Ontario, a B.Sc. and M.Sc. Electrical Engineering from the U.S. Naval Post Graduate School Monterey, Californie and an MBA from Laval University.

John was IEEE EMS Ottawa Chapter Chair from 2001 to 2004 and was involved actively within the IEEE Ottawa Section as Chair in 202 and 2003 where he developed a number of projects to support IEEE Ottawa Section to fulfil IEEE's educational and scientific goals. He served on the IEEE EMS Board of Governor from 2004 to 2007. He was also active in the Government Liaison Program of Professional Engineers of Ontario (PEO) and has organised joint IEEE-PEO seminars.

John is a Senior member of IEEE, a registered Professional Engineer in Ontario, a Project Management Professional and a Fellow of the Engineering Institute of Canada. In 2008 John was Region 7 representative to IEEE IB & SC committee. In that capacity he identified and planned for individual benefit for value add of membership. John developed goals and selection criteria for supplier's selection to meet specific insurance needs and coordinated the acceptance and introduction of an encompassing Home and Auto Insurance program with The Personal insurance company to benefit IEEE Canada members.

John Grefford (SMIEEE) a été agent de programme de soutien à Construction de Défense Canada depuis 2007. Avant cette emploi John a passé 10 ans comme ingénieur principal pour CRO Engineering Ltd ou il a fourni des services d'ingénierie à la fois aux organismes publics et privés, 10 ans comme gestionnaire de projet de grande envergure avec la Défense nationale, 3 ans en gestion de projets de recherche au Centre de Recherche pour la Defense de Valcartier, 5 ans comme professeur adjoint au Collège militaire royal du Canada (CMRC), 2 ans en tant que gestionnaire de technologie à la Banque Nationale du Canada et 2 ans en tant que conseiller en placement à la Financière Banque Nationale. John possède un baccalauréat en génie chimique de CMRC Kingston, un baccalauréat et une maitrise en génie électrique de l'US Naval Post Graduate School de Monterey, Californie et un MBA de l'Université Laval.

John a été président du chapitre IEEE EMS d'Ottawa de 2001 à 2004 et président de section en 2002 et 2003. Il a élaboré de nombreux projets pour aider la section d'Ottawa à atteindre ses buts éducationnels et scientifiques. John a servi sur le Conseil des gouverneurs de l'IEEE EMS de 2004 à 2007. Il a également été actif dans le programme de liaison avec le gouvernement de Professional Engineers Ontario (PEO) et a organisé des séminaires conjoints IEEE et PEO.

John est membre senior de l'IEEE, ingénieur professionnel en Ontario, Project Management Professional et Fellow de l'Institut canadien des ingénieurs. En 2008, John a été représentant de la région 7 au comité IB&SC de l'IEEE. À ce titre, il a identifié et planifié des bénéfices individuels dans le but d'ajouter de la valeur à l'adhésion des membres. John a développé des objectifs et des critères de sélection pour la sélection pour le choix des fournisseurs afin de répondre à des besoins d'assurance. Il a coordonné l'acceptation et l'instauration d'un programme d'assurance habitation et auto avec la compagnie d'assurance La Personnelle qui profite aux membres de l'IEEE Canada.

IEEE Canada M.B. Broughton Central Canada Merit Award

for outstanding contributions to the IEEE Toronto Section and the IEEE Canadian Foundation over the past 25 years

Prix au mérite M.B. Broughton du centre du Canada de l'IEEE Canada 2009

pour contribution exceptionnelle à la Section de Toronto de l'IEEE et la Fondation Canadienne de l'IEEE lors des 25 dernières années

David Whyte (SMIEEE) P. Eng. is Managing Principal of DAMAR Consulting, a Toronto based telecommunications consultancy. David holds a Bachelor of Applied Science from the University of Toronto, followed by business studies also at the University of Toronto. Before entering the independent consulting field, David was Senior Manager Internet Technology and Services AT&T Canada (Allstream). Prior to that, he progressed through management and technical positions related to architecture development, technology selection and network planning for voice and data networks and services.

His IEEE involvement began as a Student Member while at the University of Toronto. Later he became involved with the Toronto Section, holding various positions, including Communications Society Chapter Chair, and Section Chair. David then became involved with the IEEE Canadian Foundation, where he has managed the awards activities, as Grants Chair and Vice-President, as well as supporting the overall growth and maturing of the Foundation.

Over the years, David has been involved in the organization of IEEE and other industry conferences, workshops and seminars. He has been recognized by the CTRC for his contribution to Interconnection issues in Canada. Internationally, David has participated in IEEE 802 Local and Wide Area Network standards development, and other telecommunications standards organizations. David also serves as 2008-9 President of the Canadian Telecommunications Consultants Association.

David Whyte (SMIEEE) est directeur principal de DAMAR Consulting, une firme de consultation en télécommunications basée à Toronto. David détient un BScA de l'Université de Toronto, suivi par des études en affaires également de l'Université de Toronto. Avant d'entrer dans le domaine de la consultation indépendante, David était cadre supérieur Technologie Internet et services chez AT&T Canada (Allstream). Avant cela, il avait progressé en occupant différentes positions techniques et de gestion se rapportant au développement d'architecture, au choix de technologies et à la planification de réseaux pour les services et réseaux voix et données.

Son implication pour l'IEEE a commencé en tant que membre étudiant lorsqu'il était à l'Université de Toronto. Plus tard, il s'est impliqué dans la section de Toronto en occupant diverses positions, incluant la présidence du chapitre de la société de communications et la présidence de la section. David a alors été impliqué dans la Fondation canadienne de l'IEEE où il a dirigé les activités de remise de prix, a été président et vice-président du comité des subventions, et a participé à la croissance soutenue et à la maturation de la Fondation dans son ensemble.

Au cours des années, David a été impliqué dans l'organisation de conférences de l'IEEE et dans d'autres conférences, ateliers et séminaires de l'industrie. Il a été honoré par le CTRC pour sa contribution à la résolution des problèmes d'interconnexion au Canada. Internationalement, David a participé au développement des normes IEEE 802 pour réseau local et à grande surface, et à d'autres organismes en charge de normes en matière de télécommunications. David est également président 2008-2009 de l'Association canadienne des consultants en télécommunications.

2009 IEEE Canada E.F. Glass Western Canada Merit Award

for outstanding contributions to the IEEE Vancouver Section and the IEEE Communications Society

Prix d'excellence E.F. Glass de l'ouest du Canada de l'IEEE Canada 2009

pour contribution exceptionnelle à la section Vancouver de l'IEEE et la Société de Communications de l'IEEE

David G. Michelson (SMIEEE) is a professor in the Department of Electrical and Computer Engineering at the University of British Columbia in Vancouver, BC. He received the BASc, MASc and PhD, all in Electrical Engineering, from UBC. From 1996-2001, he was a member of a joint AT&T Wireless Services (Redmond, WA) – AT&T Labs–Research (Red Bank, NJ) team that developed advanced channel models applicable to broadband fixed wireless systems. From 2001-2002, he was an adjunct professor at UBC while serving as a consultant to UBC IT Services as they deployed one of Canada's largest campus wireless LANs. Since 2003, he has led the UBC Radio Science Lab where his research interests focus on radiowave propagation and channel modeling.

During his eight-year term as chair of Vancouver Section's Joint Communications Chapter, Professor Michelson greatly expanded the chapter's role in British Columbia's wireless community. He hosted well over one hundred monthly meetings, mini-symposia and other technical events that helped wireless engineers stay current in their field, helped promising startup companies recruit talent and helped engineering students begin productive careers. He also supported WINBC, BC's wireless industry association, as they set up and established their own programs. He also established the IEEE Communications Society student chapter at UBC, which he continues to serve as faculty advisor.

Professor Michelson is a registered professional engineer. He currently serves as an appointed member of the Board of Governors of the IEEE Vehicular Technology Society, as Chair of the IEEE VT-S Technical Committee on Propagation and Channel Modeling, and as an Associate Editor for Mobile Channels for IEEE Vehicular Technology Magazine. He has received numerous awards for his service to British Columbia's wireless community through his leadership roles in IEEE Vancouver Section and the IEEE Joint Communications Chapter.

David G. Michelson (SMIEEE) est professeur au département de génie électrique et informatique de l'Université de la Colombie-Britannique (UBC) à Vancouver. Il a obtenu son BScA, sa MScA et son PhD, tous dans le domaine du génie électrique à UBC. Durant la période 1996 -2001 il a été membre d'une équipe conjointe AT&T Wireless Services (Redmond, WA) - AT&T Labs–Research (Redbank, NJ) qui a développé des modèles de canaux avancés applicables aux systèmes sans fil fixes à larges bandes. Durant la période 2001 -2002, il fut professeur adjoint à UBC tout en servant de conseiller aux services TI de l'UBC lorsqu'ils ont déployé un des plus grand réseaux locaux de campus au Canada. Depuis 2003, il est en charge du laboratoire de sciences radio de UBC où ses intérêts de recherche portent sur la propagation d'onde hertzienne et la modélisation de canal.

Pendant son mandat de huit ans comme président du chapitre conjoint Communications de la section de Vancouver, professeur Michelson a considérablement accru son rôle au sein de la communauté sans fil de la Colombie-Britannique. Il a été l'hôte de plus de cent réunions mensuelles, mini-colloques et autres événements techniques qui ont aidé les ingénieurs du domaine du sans fil à se maintenir à jour, aidant aussi les compagnies en démarrage prometteuses à recruter des personnes de talent et aidant des étudiants à entreprendre des carrières productives. Il a également soutenu WINBC, l'association de l'industrie sans fil de la province, lorsqu'ils ont mis en place et établi leurs propres programmes. Il a également fondé le chapitre étudiant de la société Communications de l'IEEE à UBC, qu'il continue à servir en tant que conseiller du corps enseignant.

Professeur Michelson est ingénieur professionnel enregistré. Il agit actuellement en tant que membre désigné du conseil supérieur de la société de technologie véhiculaire de l'IEEE, comme président du comité technique VT-S de l'IEEE sur la propagation et la modélisation de canal, et comme rédacteur associé pour le magasine ''Mobile Channels for IEEE Vehicular Technology''. Il a reçu de nombreux prix pour son service à la communauté du sans fil en Colombie-Britannique grâce à son leadership à la section de Vancouver de l'IEEE et son chapitre conjoint Communications.

2009 EIC Fellows (IEEE Canada) (elected by the EIC Board of Directors)

Savvas Chamberlain (FIEEE)—Waterloo, Ontario
for significant contributions to the field of microelectronics and the founding of DALSA Corporation

Tongwen Chen (FIEEE)—Edmonton, Alberta
for international leadership in sampled-data control, multirate control design, and multirate digital signal processing

Mark S Fox (SMIEEE)—Toronto, Ontario
for groundbreaking work in both the theory and application of artificial intelligence in industrial systems

Fadhel M Ghannouchi (FIEEE)—Calgary, Alberta
for numerous contributions related to the areas of RF and microwave engineering including theory and techniques for devices, circuits, signals and systems

Ling Guan (FIEEE)—Toronto, Ontario
for seminal contributions to many areas of multimedia and signal processing, especially in the use of artificial intelligence techniques in solving important problems, such as resource allocation and image and video retrieval

Victor C M Leung (FIEEE)—Vancouver, British Columbia
for outstanding research and leadership in the development of protocols and management techniques for mobile communication systems

Maike Luiken (SMIEEE)—London, Ontario
for using strong interpersonal skills to bring disparate groups from government, academia and industry together into coherent networks to achieve significant accomplishments at both the local and national level

Xavier Maldague (SMIEEE)—Québec, Québec
for world leadership in techniques for applying infrared vision to nondestructive testing

David Plant (FIEEE)—Montréal, Québec
for exceptional contributions to optoelectronic devices, including pioneering work on the application of optical interconnects to computing and switching systems

Lotfollah Shafai (FIEEE)—Winnipeg, Manitoba
for outstanding contributions to the advancement and practical applications of electromagnetics, in particular antennas

Wilsun Xu (FIEEE)—Edmonton, Alberta
for pioneering work on using intentionally generated power disturbances for anti-islanding protection of distributed generators and transferring this technology to industry for commercialization

Fellow 2009 de l'ICI (IEEE Canada) (élus par le Conseil d'administration de lCI)

Savvas Chamberlain (SMIEEE)—Waterloo, Ontario
pour sa contribution significative au domaine de la microélectronique et à la fondation de DALSA Corporation

Tongwen Chen (FIEEE)—Edmonton, Alberta
pour le leadership international dans le contrôle des données échantillonnées, la conception de contrôle multidébits, et le traitement de signal numérique multidébits

Mark S Fox (SMIEEE)—Toronto, Ontario
pour le travail inaugural effectué dans la théorie et l'application de l'intelligence artificielle dans les systèmes industriels

Fadhel M Ghannouchi (FIEEE)—Calgary, Alberta
pour plusieurs contributions reliées aux domaines de l'ingénierie RF et micro-ondes incluant la théorie et les techniques pour les dispositifs, signaux et systèmes

Ling Guan (FIEEE)—Toronto, Ontario
pour contributions déterminantes dans plusieurs domaines du multimédia et du traitement de signal, spécialement dans l'utilisation des techniques d'intelligence artificielle dans la résolution de problèmes importants, telles que l'allocation de ressources et l'extraction d'image et de vidéo

Victor C M Leung (FIEEE)—Vancouver, Colombie Britannique
pour la recherche et le leadership exceptionnels dans le développement de protocoles et de techniques de gestion pour les systèmes de communication mobiles

Maike Luiken (SMIEEE)—London, Ontario
pour avoir utilisé sa grande sociabilité afin d'amener des groupes disparates du gouvernement, du milieu universitaire et de l'industrie ensemble à former des réseaux cohérents pour atteindre des résultats significatifs au niveau local et national

Xavier Maldague (SMIEEE)—Québec, Québec
pour leadership mondial dans les techniques visant l'application de la vision infrarouge aux essais non destructifs

David Plant (FIEEE)—Montréal, Québec
pour contributions exceptionnelles aux dispositifs optoélectroniques, incluant du travail pionnier dans application des interconnexions optiques aux ordinateurs et systèmes de commutation

Lotfollah Shafai (FIEEE)—Winnipeg, Manitoba
pour contributions exceptionnelles à l'avancement et aux applications pratiques de l'électromagnétisme, et en particulier les antennes

Wilsun Xu (FIEEE)—Edmonton, Alberta
pour avoir agit en tant que pionnier dans les travaux sur l'utilisation de perturbations de puissance générées intentionnellement pour la protection anti-ilôtage d'alternateurs distribués et le transfert de cette technologie à l'industrie pour commercialisation

IEEE Canada members elected as 2009 IEEE Fellows by the IEEE Board of Directors.

Kazimierz Adamiak, (FIEEE)—London, Ontario
for contributions to the numerical analysis of applied electrostatic and electrohydrodynamic processes

John Cartledge, (FIEEE)—Kingston, Ontario
for contributions to modulation dynamics of optical devices

Ian Cumming, (FIEEE)—Vancouver, British Columbia
for achievements in synthetic aperture radar signal processing

Francis Dawson, (FIEEE)—Toronto, Ontario
for contributions to modeling of excitation and detection of electrical arcs

Louis Durand, (FIEEE)—Montreal, Quebec
for contributions to instrumentation and methods for assessing cardiovascular and respiratory diseases

Abdulmotaleb El Saddik, (FIEEE)—Ottawa, Ontario
for contributions to interactive haptic audio visual systems

Brendon Frey, (FIEEE)—Toronto, Ontario
for contributions to information processing and machine learning

John Lodge, (FIEEE)—Ottawa, Ontario
for contributions to the application of signal processing and communications theory

Michal Okoniewski, (FIEEE)—Calgary, Alberta
for contributions to computational electromagnetic

David Parnas, (FIEEE)—Ottawa, Ontario
for contributions to software engineering

Terence Peters, (FIEEE)—London, Ontario
for contributions to medical imaging and image-guided surgery

Nicholas Hamilton Piercy, (FIEEE)—Innisfil, Ontario
for leadership in development, design and implementation of modern network architecture and topologies in the cable industry

Omar Ramahi, (FIEEE)—Waterloo, Ontario
for contributions to computational electromagnetics in electromagnetic compatibility

Jonathon Rose, (FIEEE)—Toronto, Ontario
for contributions to field-programmable gate arrays

Xuemin Shen, (FIEEE)—Waterloo, Ontario
for contributions to resource management of wireless networks

Adam Skorek, (FIEEE)—Trois Rivieres, Quebec
for contributions to electro-thermal analysis of industrial processes

Ming Yu, (FIEEE)—Cambridge, Ontario
for contributions to the design and tuning of microwave filters and multiplexers

Membres de l'IEEE Canada élus Fellows de l'IEEE 2009 par le conseil d'administration de l'IEEE

Kazimierz Adamiak (FIEEE)—London, Ontario
pour contribution à l'analyse numérique de procédés électrostatiques et électrohydrodynamiques appliqués

John Cartledge (FIEEE)—Kingston, Ontario
pour contribution à la dynamique de modulation des dispositifs optiques

Ian Cumming (FIEEE)—Vancouver, Colombie Britannique
pour accomplissements dans le traitement de signal de radars à synthèse d'ouverture

Francis Dawson (FIEEE)—Toronto, Ontario
pour contribution à la modélisation de l'excitation et de la détection d'arcs électriques

Louis Durand (FIEEE)—Montréal, Québec
pour contribution à l'instrumentation et aux méthodes d'évaluation des maladies cardiovasculaires et respiratoires

Abdulmotaleb El Saddik (FIEEE)—Ottawa, Ontario
pour contribution dans les systèmes audio-visuels haptiques interactifs

Brendon Frey (FIEEE)—Toronto, Ontario
pour contribution au traitement de l'information et l'apprentissage-machine

John Lodge (FIEEE)—Ottawa, Ontario
pour contribution à l'application du traitement de signal et à la théorie des communications

Michal Okoniewski (FIEEE)—Calgary, Alberta
pour contribution à la simulation en électromagnétisme

David Parnas (FIEEE)—Ottawa, Ontario
pour contribution au génie logiciel

Terence Peters (FIEEE)—London, Ontario
pour contribution à l'imagerie médicale et à la chirurgie guidée par l'image

Nicholas Hamilton Piercy (FIEEE)—Innisfil, Ontario
pour le leadership exercé dans le développement, la conception et la mise en service d'architectures et de topologies modernes de réseau dans l'industrie du câble

Omar Ramahi (FIEEE)—Waterloo, Ontario
pour contribution à la simulation en électromagnétisme en compatibilité électromagnétique

Jonathon Rose (FIEEE)—Toronto, Ontario
pour contributions dans le domaine des réseaux logiques programmables

Xuemin Shen (FIEEE)—Waterloo, Ontario
pour contribution à la gestion des ressources des réseaux sans fil

Adam Skorek (FIEEE)—Trois-Rivières, Québec
pour contribution à l'analyse électro-thermique de procédés industriels

Ming Yu (FIEEE)—Cambridge, Ontario
pour contributions à la conception et au réglage de filtres et multiplexeurs micro-ondes

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IEEE Canada

CCECE 2010

23rd Annual Canadian Conference on Electrical and Computer Engineering

May 9-12, 2010, Calgary, Alberta, Canada

http://www.ccece2010.org

"Evolution of Theory: Bringing Theory and Technology into Application"

Preliminary Call for Papers and Proposals

The 2010 IEEE Canadian Conference on Electrical and Computer Engineering (CCECE 2010) will be held in Calgary, Alberta, Canada from May 9-12. CCECE 2010 provides a forum for the presentation of electrical and computer engineering research and development from Canada and around the world. Papers are invited, in French or English, for the following symposia:

- Circuits, Devices and Systems
  Chair: Terrance Malkinson
- Control and Robotics
  Chair: T.B.A
- Communications and Networking
  Chair: T.B.A.
- Computers, Software and Applications
  Chair: Vincent Chiew
- Power Electronics and Energy Systems
  Chair: Dr. Hamid Zareipour
- Signal and Multimedia Processing
  Chair: T.B.A.

Authors wishing to submit papers that do not fit within any of the above topics are encouraged to do so to the 'general interest' symposium.

Regular Paper Submission

Please submit original full-length paper(s) (maximum 6 pages) to the Technical Program Committee using the on-line submission process on our web site at http://www.ccece2010.org before December 4, 2010. Click on "Call For Papers" and follow the instructions provided.

Tutorial and Workshop Proposals Submission

Proposals for half-day tutorials and workshops should be submitted before December 5, 2010 to the Tutorials Chair at tutorials@ccece2010.org.

Important Dates

Full length paper must be received by:	Friday, December 4, 2009
Tutorial or workshop proposals must be received by:	Friday, December 4, 2009
Notification of acceptance will be sent out by:	Friday, February 5, 2010
Author's Registration ends by:	Friday, March 5, 2010
Advance Registration ends by:	Friday, April 2, 2010

Industrial Exhibits and Sponsorships

For industrial exhibits please contact the Industrial Exhibits Chair at exhibits@ccece2010.org. For sponsorships please contact the Sponsorship Chair at sponsorship@ccece2010.org.

Questions or Comments

For any questions or comments, please contact the Conference Chair: Rob Anderson. Phone: 509 939-5641 Fax: 509 241-6153 Email: rlanderson@ieee.org

pour la version en français, s'il vous plaît voir http://www.ccece2010.org

Engineering Institute of Canada
Cream of the Crop, 2009


Tongwen Chen


Wilson Xu


Fadhel Ghannouchi


David Plant


Mark S. Fox


Lotfollah Shafai


Maike Luiken


Victor C. M. Leung


Ling Guan


Xavier P. V. Maldague

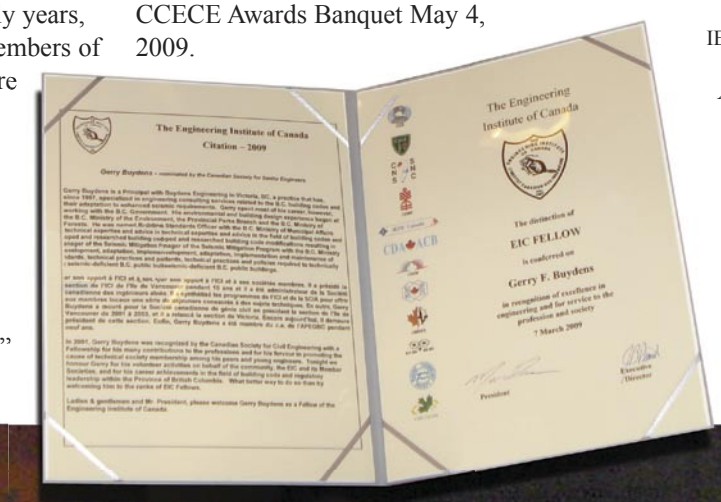
The Engineering Institute of Canada (EIC, http://www.eic-ici.ca, L'Institut canadien des ingénieurs) is a federation of engineering societies in Canada—including of course IEEE Canada for the electrical and computing engineers. Its Annual Award Ceremony took place March 7th in Ottawa, at the Westin downtown hotel. It was the occasion for the organization to elevate a cohort of engineers to the grade of "Fellow of the EIC".

This grade is described as follows: "The Council of the Institute has, since 1963, elected annually to the grade of Fellow a number of engineers in recognition of their excellence in engineering and their services to the profession and to society. In the early years, the new Fellows were members of the Institute. Now they are members of the Member Societies of the Institute. Over the years, the numbers of elected Fellows have varied from a few to fifty or more. Current practice is to elect up to twenty Fellows annually."

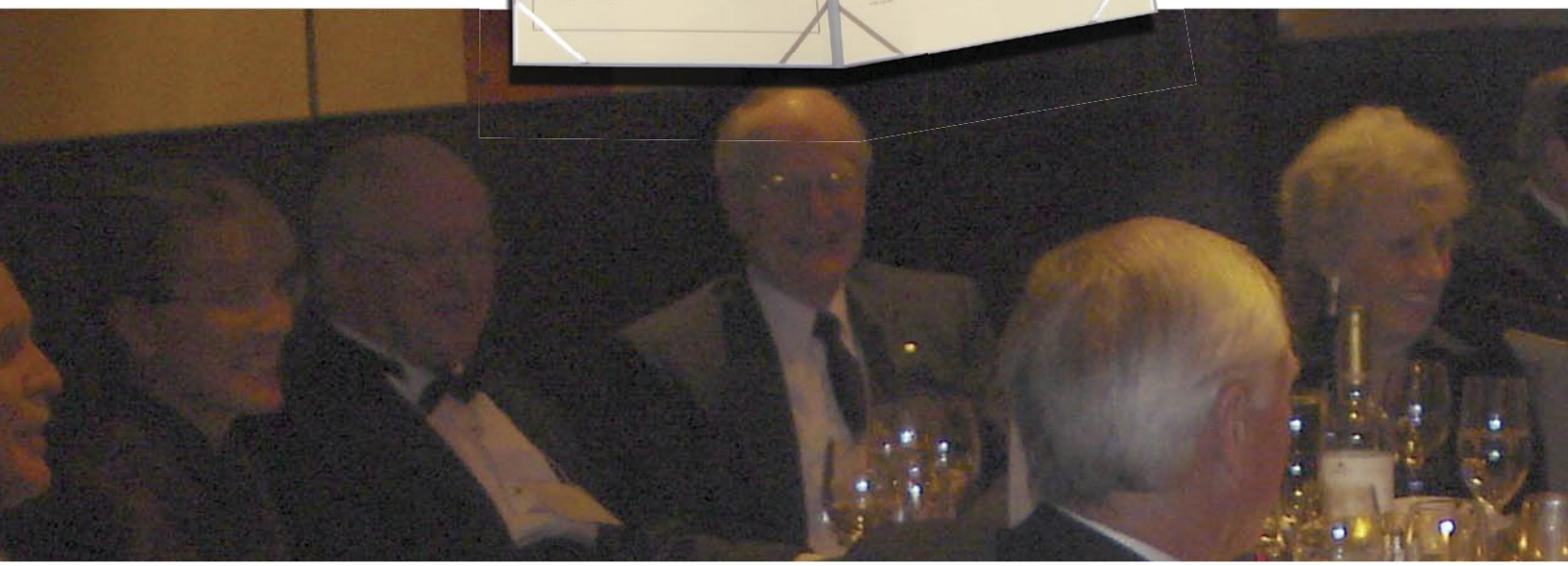
As usual, IEEE Canada saw several of its members elevated as EIC Fellow: Tongwen Chen, Mark S. Fox, Fadhel Ghannouchi, Ling Guan, Victor C. M. Leung, Maike Luiken, Xavier P. V. Maldague, David Plant, Lotfollah Shafai and Wilson Xu. A complete list of all 2009 EIC Fellows including bios and citations is posted on the EIC website.

Several prestigious medals are also awarded at the event: "Sir John Kennedy", "Julian C. Smith", "K.Y. Lo", "John B. Stirling", and "Canadian Pacific Railway" Medals for various accomplishments in the engineering profession. IEEE Canada also has its own set of medals and awards to be presented at the CCECE Awards Banquet May 4, 2009.

To further entice recipients to come in person for their award, a tasty coast-to-coast menu was served: Creamy Yukon gold potato and leek soup with camembert, Westin style Caesar salad, Sage-rubbed prairie chicken stuffed with spinach and Oka cheese from Quebec, Dark chocolate truffle cake with bourbon and vanilla, teas and coffee. I expect the latter two came through the ports of Vancouver and Halifax respectively.



IEEE Canadian Review
Reporter at the event: Xavier P.V. Maldague, Chair, IEEE Canada Publications and Communications.



Procedural Risk Rating ofTechnology–based Initiatives

By Louis A. Poulin, Chief Technology Officer
GRafP Technologies Inc.

Abstract

In previously published papers, analysis of the expected quality of products and services developed by Information Technology (IT) organizations showed that likelihood of experiencing problems provided a more accurate picture of an organization's capability to develop and maintain software applications than solely measuring the degree to which best practices were implemented. Data collected with respect to the Capability Maturity Model Integration (CMMI®) and other models suggest that practices are not all equal, given the context in which an organization operates, the types of products it develops, its resources, and its culture.

This paper explores the concept of procedural risk rating in order to determine the capability of an organization to deliver its technology-based products and services, using existing models adapted to the organization or new models specifically developed for it.

Keywords: Procedural risk; process improvement; risk rating.

Sommaire

Dans des articles publiés précédemment, l'analyse de la qualité attendue des produits et services développés par des organisations en technologies de l'information (TI) a montré que la probabilité de rencontrer des problèmes fournit une image plus exacte de la capacité de ces organisations à développer et maintenir des applications logicielles, plutôt que seulement mesurer le degré auquel ces meilleures pratiques étaient implantées. Les données colligées en rapport au "Capability Maturity Model Integration" (CMMI®) et autres modèles suggèrent que les pratiques ne sont pas toutes égales, étant donné le context dans lequel une organisation opère, le type de produits qu'elle développe, ses ressources et sa culture. Cet article explore le concept d'évaluation de risque procédural pour déterminer la capacité d'une organisation à livrer les produits et services technologiques, utilisant des modèles adaptés à l'organisation ou de nouveux modèles spécifiquement developpés pour celle-ci.

1.0 Introduction

In two previously published papers, correlation between process maturity and quality [1] and between process maturity and performance [2] was analyzed. This led us to conduct additional research to better understand how failure of an initiative calling on engineering and technical development could be predicted with a reasonable amount of confidence, using an instrumented approach supporting repeatable outcomes while reducing the amount of subjectivity that affected such predictions.

Failure prediction, as opposed to success prediction, was the subject of the approach to be investigated. The rationale for such a choice was derived from the argument that if one does not fail, one does not necessarily succeed, whereas if one fails, one surely does not succeed. In that sense, failure prediction was deemed easier to establish and less subjective than success prediction [6].

Procedural risk management and risk rating were to be the main focus of the instrumented approach. Procedural risks are defined as potential losses resulting from operational problems, fraud, disasters, terrorism, project failures, and contractual complications due to lack of or inadequacies in the means through which people, procedures, methods, equipment and tools are integrated to produce a desired end result [4], [8].

2.0 Overview of the instrumented approach

Rating is essentially an exercise in intelligence gathering and analysis performed in a time frame short enough to allow efficient and effective decision making [5]. On the other hand, it is unrealistic to expect outsiders to come in and learn enough about an initiative, which is likely to involve complex issues, to be able to come up with a meaningful rating over a relatively short period of time. A more realistic approach consists of collecting information from a large number of stakeholders who are familiar with the initiative and the domain under consideration, and remove inherent biases displayed by these stakeholders to derive the rating.

Therefore, the first step in the devised approach consists of developing a means of modeling risks [7]. By and large, existing models and standards are used when available. On the other hand, in many cases, it is necessary to model the initiative to be rated, based on the desirable situations to be exploited and undesirable ones to be prevented. This consists in making an inventory of situations liable to translate into desirable or undesirable outcomes, making an inventory of practices that should be implemented or avoided in order to achieve the initiative's business objectives, and establishing the relationships between them.

In order to identify situations liable to translate into desirable or undesirwable outcomes with respect to a given domain, a series of interviews are held with subject matter experts to discuss the topic of what they would like to happen or not to happen with respect to the domain under consideration. In a first attempt, only events or conditions are listed, without trying to classify them. The classification comes later after these events or conditions have been inventoried.

In order to identify practices that should be implemented or avoided with respect to the domain being modeled, a second series of interviews are held with other subject matter experts. We discuss the topic of what they should do or avoid to obtain conclusive results with respect to the domain under consideration.

It was found to be desirable that risk and process models be developed by two different parties to ensure that they are not inherently biased. Otherwise, the individual(s) developing the risk model will have the natural inclination to simply address identified risks when developing the process model, and vice-versa. The consequence is that some practices will likely be left out only because some risks have not been thought of. It is better to use an independent approach and filter out unrealistic risks, and practices that exhibit low risk mitigation potential.

When identifying a risk its consequence is described, whether it materializes (and assuming it is associated with an undesirable event or situation) or not (assuming it is associated with a desirable event or situation). If no consequences can readily be identified, it may not constitute a risk at all. Likewise, when identifying practices, the benefit of implementing desirable ones or of avoiding undesirable ones is also described.

Seven customizable parameters are then defined to characterize each risk and practice. In the domain of engineering and technical development, the following parameters were selected: 1) Customers/Users; 2) Organization's goals; 3) Product/Service; 4) Technical process, methods and tools; 5) Management process, methods and tools; 6) Work environment; and 7) Material and human resources.

These seven parameters are 'fairly' independent, in the sense that the value of a parameter cannot be derived from a combination of the other six. Other models can reuse these seven parameters, or new parameters can be defined that are a better fit for the domain under consideration.

Each added risk or practice is characterized with the help of these seven parameters. The process of defining the value of these parameters for each risk or practice consists in qualifying the relationship that exists between the added risk or practice and the parameter under consideration. A relationship can be non-existent, weak, moderate or strong. The process of qualifying parameters is as follows: after having entered a risk or practice, assign 'weak relationship', 'moderate relationship' or

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'strong relationship' qualifiers to exactly 4 out of 7 parameters in order to characterize the added risk or practice; the remaining 3 parameters are assigned the 'no relationship' qualifier.

In a first step, it is recommended for a given risk or practice to assign a qualifier to each parameter without regard to the number of parameters that have been assigned a 'no relationship' qualifier. Then, in a second step, the number of parameters that have been assigned the qualifier 'no relationship' are examined and adjusted to reach an exact count of 3:.If this number is less than 3 only the four that have the most significant qualifier or the four that are the most relevant to the added risk or added practice (i.e. set the remaining parameters to 'no relationship') are kept. If, on the other hand, more than 3 parameters have been assigned the qualifier 'no relationship', then a 'weak relationship' or 'moderate relationship' qualifier is assigned to the parameters that are most relevant to the added risk or the added practice.

For example, in relation to the parameter 'Customers/Users', the process of qualifying parameters consists of answering the following questions:

• To what degree (none, low, moderate or high) is the added risk related to customers or users (e.g. differences with customers/users, customers/users needs, customers/users satisfaction)?

• Does this added risk represent a desirable or a non-desirable situation?

• To what degree (none, low, moderate or high) taking (if it is desirable) or avoiding (if it is undesirable) the added practice help mitigate an issue affecting customers or users (e.g. ensuring that customers/users are aware of progress, controlling changes made by customers/users, being able to respond to queries from customers/users)?

• Is this added practice desirable or non-desirable?

Parameterized risks and practices are then correlated to establish a relationship between each risk and each practice, and integrated into a prototype application specifically developed to generate a rating and characterize initiatives calling on engineering and technical development. This method is based on the one initially devised to analyze data from a set of 40 assessments that had been conducted over a period of 10 years in Europe, North America and South America [1]. A model editor was also developed to facilitate the generation of inventories of risks and practices, parameterize them, regroup these risks and practices into key risk and key process areas, and create surveys that can subsequently be integrated into models specific to given application domains. Models created in this manner are then built, compiled and published on the server so that they can be used in the course of audits and assessments. When these models are used in a risk assessment, experience and knowledge gained during the assessment can be used to refine the models, such that subsequent assessments build upon past ones.

Part of the development work consisted in calibrating the algorithms devised to automate the data analysis and verifying that the results matched those obtained with the initial method. Additional development was undertaken to identify the individual risks that contribute the most to the overall rating and the practices that offer the most potential to improve the rating.

A significant amount of effort was invested in factoring the likelihood of experiencing problems into risk likelihood and vulnerability, in order to estimate the risk exposure in terms of financial losses resulting from individual risks contributing to a particular rating.

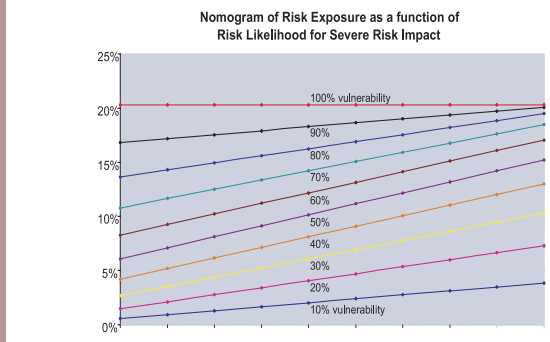

Figure 1: Nomogram of risk exposure as a function of risk likelihood and vulnerability to risk for a risk impact categorized as severe

The nomogram shown in Figure 1 provides an example for risks having a severe impact. Six categories are used in the prototype application: Catastrophic, Critical, Severe, Serious, Moderate and Minor. For instance, if the loss associated with a catastrophic risk is valued at $100,000 and if the likelihood of a risk for which the impact as been assessed as severe is 60%, and the vulnerability of the initiative to this risk is 40%, the resulting normalized risk exposure, from the nomogram, is equal to 9%. Multiplying this value by $100,000 results in an estimated financial loss equal to $9,000.

Note also that from the nomogram it can be seen that a low vulnerability and a high risk likelihood are preferable to a low risk likelihood and a high vulnerability. With the aforementioned example, if the likelihood of a risk for which the impact as been assessed as severe is 40% and the vulnerability of the initiative to this risk is 60%, the resulting normalized risk exposure is equal to 11% – resulting in an estimated financial loss of $11,000.

This is simply Murphy's Law, which says that if something can go wrong, it will. Intuitively, it can be understood this way: If a risk has a high likelihood of occurrence but vulnerability is low, then there is a good chance that a given occurrence will not have any impact or that it will somehow be mitigated. On the other hand, if a risk has a low likelihood of occurrence but vulnerability is high, then there is a good chance that every time a risk occurs, even if infrequently, it will translate into the worst forms of the problem it suggests.

A risk profile generated by the prototype application, similar to the one shown above using an adapted version of the CMMI [3], provides the equivalent of a "DNA signature" uniquely characterizing an initiative.

Finally, a rating scale provides an easily identifiable symbol to indicate the level of risk that a particular initiative represents for an organization or for investors. The rating can also apply to an organization if it is performed for a representative set of initiatives within that organization.

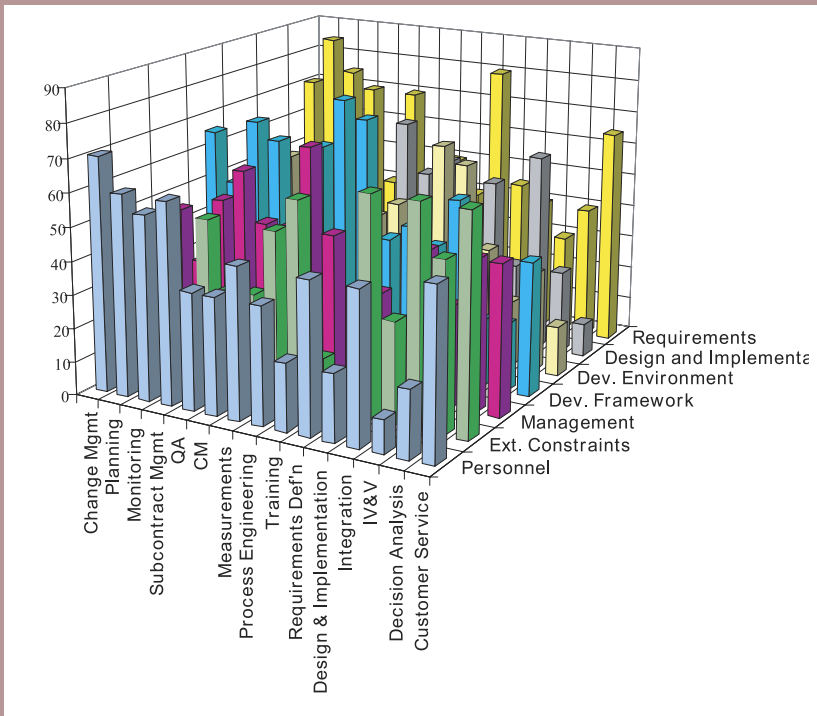

Figure 2: Likelihood of experiencing problems as a function of key risk areas and key process areas

$AAA^{E\&T}$ – Excellent (lowest risk). Initiatives or organizations rated $AAA^{E\&T}$ are considered to represent an excellent investment from a technology point of view. They offer the least amount of risk to an organization or investors. Organizations with this rating are typically recognized as being leaders in product development or service offerings, and have demonstrated in the past their ability to meet their budget, schedule, and functionality requirements.

$AA^{E\&T}$ – Very Good (very low risk). Initiatives or organizations rated $AA^{E\&T}$ are similar in characteristics to those rated $AAA^{E\&T}$ and can also be considered technologically superior. The organization has demonstrated a history of success in initiatives it has undertaken, but the nature and the number of risks are such that the rated initiatives may still experience difficulties.

$A^{E\&T}$ – Good (low risk). Initiatives or organizations rated $A^{E\&T}$ are considered to offer good quality products and services and have many favorable characteristics. The main feature that distinguishes them from initiatives or organizations assigned a higher rating is that they are more vulnerable to adverse conditions (say, key individuals leaving the organization). In all cases, initiatives or organizations rated $A^{E\&T}$ have maintained a history of adequate safeguards. However, certain elements exist that may impair this protection.

$BBB^{E\&T}$ – Average (moderate risk). Initiatives or organizations rated $BBB^{E\&T}$ are classified as average and are also considered to be a good investment risk, especially if a risk management plan has been prepared. However, initiatives or organizations with a $BBB^{E\&T}$ rating are generally more vulnerable than any of the more highly rated ones to swings in budget, schedule and delivered functionality. There may be factors either internal or external to the organization that may contribute to these swings.

$BB^{E\&T}$ – Mediocre (high risk). Initiatives or organizations rated $BB^{E\&T}$ are considered to be of a lower medium grade. Their overall engineering practices may be modest or unstable. As such, significant overrun in schedule and budget, and inadequate delivered functionality may be anticipated. During periods of favorable conditions, schedule, budget and delivered functionality can be expected to be at acceptable levels.

$B^{E\&T}$ – Poor (very high risk). Initiatives or organizations rated $B^{E\&T}$ lack most attributes necessary for the successful delivery of quality products or services. Organizations with this rating already have a history of volatile operating conditions and it is unlikely that significant cost overruns and schedule slippage can be avoided. Current engineering practices are typically below current averages in a similar industry and there is little assurance that this situation will improve significantly in the short term.

$C^{E\&T}$ – Not Recommendable (highest risk). Initiatives or organizations rated $C^{E\&T}$ are clearly speculative. Organizations with this rating are relatively junior in the application of risk management concepts and process engineering. They may have had a better rating in the past but have since suffered significant deterioration in their product development or service offering capability, or have had major problems in the past. There is little assurance that the development of their products and services will proceed as planned.

3.0 Case studies

Three risk ratings were performed with the prototype application to test its failure prediction features.

The first rating was performed in connection with a large initiative (over 100M$) to integrate financial and resource planning in a very large organization. Many of the envisioned development and management processes had neither been integrated nor applied in practice. They were essentially in the process of being developed by the Project Management Office. The rating provided at the onset of the initiative was $BB+^{E\&T}$, which indicated a moderate to high risk of failure. 'What-Ifs' were performed to assess the impact of unsuccessful rollouts of the most critical management and development processes once they had been completely defined, which made the rating drop from $BB+^{E\&T}$ to $B^{E\&T}$, indicating a very high risk of failure and a foreboding of things to come. Indeed, 18 months later, deployed methods and tools proved inadequate, and management issues deteriorated to the point where the project had to be cancelled.

[E&T] The superscript "E&T" indicates these ratings are Engineering and Technology ratings, and therefore should not be used to draw comparison between other ratings such as investment fund ratings.

The graphs shown below constitute a sample of the analyses performed to assess risks facing the initiative.

The second rating involved a large initiative undertaken by a consortium of two firms to automate patients file management and distribution across health-care establishments. This was an example of management and development processes that were poorly matched to the risks facing the initiative, and it obtained a $BB^{E\&T}$ rating – indicating a high risk of failure. Problems of having hospital administrators, surgeons, nurses, doctors, engineers, computer scientists, business analysts, etc. working together was underestimated, not to mention the tensions between the two main partners who kept trying to trip each other up in order to get a bigger part of the pie. The initiative ultimately failed and resulted in the bankruptcy of one of the two consortium partners.

The third rating was carried out in connection with a medium size government initiative undertaken to manage reforestation activities. It was with the voluntary participation of the wood products, and pulp and paper industry. The initiative did not display any level of over reliance on the capacity of individuals to anticipate problems; instead, it established a network of early warning mechanisms that alerted managers when they needed to take appropriate action. It obtained an $A^{E\&T}$ rating indicating a low risk of failure. It was a low visibility but nevertheless successful initiative.

4.0 Conclusion

Procedural risk rating provides the benefits of demonstrating that due diligence has been applied before the decision to fund or outsource an initiative is made, avoiding investments totaling millions of dollars without some guarantee that the recipient has the capability to deliver. It prevents embarrassing failures and cost overruns that needlessly tarnish the reputation of both investing organizations and those that benefit from investments and outsourcing contracts.

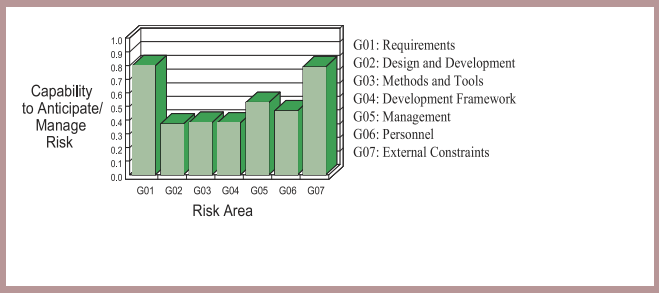

Figure 3: Capability to anticipate/manage risk as a function of key risk areas characterizing the initiative

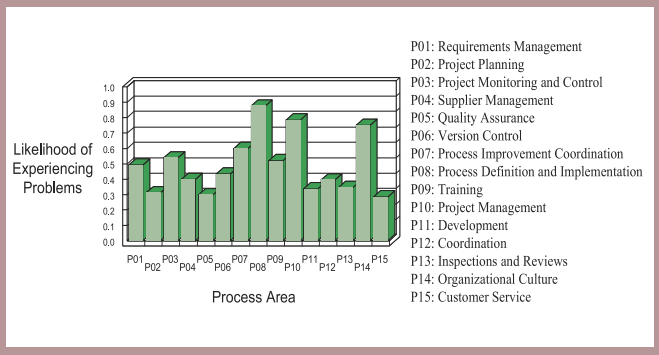

Figure 4 - Likelihood of experiencing problems as a result of key process area deficiencies characterizing the initiative

However, in order to be useful and contribute to a successful initiative, the rating also has to provide the following: 1) A description of the challenges the organization benefiting from the investment or the outsourcing contract is likely to face, 2) Remedial actions to implement in order to reduce the chances of failure, and 3) The cost associated with procedural risks if they materialize, which offers insight into the real cost of the initiative and how much funding must be set aside to manage these risks.

Tests were performed to explore the concept of procedural risk-rating, and new ones are planned in the near future to extend the scope of pro-

cedural risk-rating to the Social Sciences [9], [10]. They underscored a need to support dynamic modeling in order to monitor risks as situations evolve over time.

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About the Author

Mr. Poulin is involved in assessing the capability of software development organizations, and in developing risk assessment methodologies and risk management applications. He holds a Bachelor degree in Engineering Physics, a certificate in Naval Engineering and a Master's degree in Electrical Engineering. Prior to his active involvement in software engineering, Mr. Poulin served in the Canadian Navy as a Combat Systems Engineering Officer. He is a member of the Institute of Electrical and Electronics Engineers and a Fellow of the Engineering Institute of Canada.

41 Boxes, 100 years of Engineering History

41 bankers-size boxes are sitting in the basement of Andrew Wilson, past president of the Engineering Institute of Canada (EIC) and long-time Chair of the EIC History & Archives Committee. They contain the surviving archival material belonging to the Institute and are in need of safe, permanent storage that would also be accessible to those researching the history of engineering in Canada. Much of our profession's history is recorded in there.

EIC began life in 1887 as the Canadian Society of Civil Engineers (CSCE) by means of an Act of the Dominion Parliament. Its membership was based on individual engineers. Although its title used the word 'civil,' the intent was that it should include all disciplines of engineering and, while civil was dominant, the other main ones at the time were mechanical and mining, with electrical and chemical in their emergent stages. CSCE continued to be the name of the organization until 1918 when, in order to broaden its appeal to the growing number of 'non-civil' engineers, the Act was amended and it became the Engineering Institute of Canada. Much later, in the early 1970s, a second significant change came about when EIC formed several semi-autonomous, discipline-based 'constituent' societies which eventually became its "members". Nowadays, it assembles a dozen member societies including its largest by far in individual membership, IEEE Canada.

Over the years, some archival material belonging to the original CSCE and to EIC has been held in the National Archives of Canada (now Library and Archives Canada—LAC), EIC headquarters, constituent societies and a few other places. LAC archives did not fully represent the activities or the publications of the Institute, and recently it has restricted the kinds of material it will accept. The individual member societies, by the way, are responsible for the disposition of their own archival material; CSEE/CSECE/IEEE Canada material is currently being held at Queen's University.

During the course of its history, EIC volunteers kept copies of organizational records and publication—the latter being composed mainly of *Transactions* of CSCE, *Transactions* of EIC, and the *Engineering Journal* which was published until the mid-1980s. A collection effort which involved EIC Headquarters and various units had concentrated on the period since the end of World War II. Some photographs and memorabilia have also been included. The material in the collection, therefore, provided archival coverage of CSCE/EIC from around 1887 until around the end of the 20th century, but its effective use for historical research was made difficult by a lack of systematic organization and the dispersal of various collections.

This 1891 photo depicting early construction of an electrical machinery manufacturing plant in Peterborough Ontario was taken only four years after the founding of the CSCE. Like the EIC that grew out of the CSCE, it represents the inter connections between the disciplines' histories. Photo courtesy of Canadian General Electric Company Limited.

So, a methodical archival project led by Andrew Wilson began in the early 1990s. The rationale behind it was spelled out by Dr. Norman Ball in 1979 when he was engineering archivist at the National Archives of Canada: *it is up to the profession itself to preserve the raw material of Canadian engineering achievements and make it available for public use.*

Here we are now after a multi-year project involving the collection, sorting, filing and cataloguing of the material. Coverage is sometimes incomplete, but it is possible to do both longitudinal and vertical studies, the latter since some of the preserved material was collected by individuals for specific periods of time. Incidentally, the collected files that cover successful nominations for awards and fellowships provide a significant catalogue of achievements by Canadian engineers. All engineers in Canada should be grateful to Andrew for the immense amount of time he donated to preserve the memory of the profession.

Next steps: The (now much better organized) archives of the Engineering Institute of Canada need a home. The institution accepting this mandate will carry the prestige of being the guardian for a significant portion of Canadian Engineering memory. Discussions are taking place; we will let you know.

Then there will be the question of digitization and web-accessibility. Is there an engineer in the room?

***

The material for this article was provided by Mr. Andrew H. (Drew) Wilson. Andrew is a graduate in mechanical engineering and the liberal arts. He is a past president of CSME and EIC and a past chair of CSME and EIC History Committees.

Montreal and Boston Adopt Each Other

Maybe it's the cold weather; IEEE Sections in Canada are really going after the warm feeling of having a larger family. After Toronto signing an agreement with Pittsburgh Section for 'sibling' status and Ottawa with Twin Cities (Minnesota), Montreal has now signed up with Boston. Yes, hockey archrival Boston. This is only the 7th sibling sections set in the whole IEEE!

This concept of Sister/Sibling Sections has existed for some time as IEEE leaders promoted closer cooperation between Sections, sharing tricks and techniques for unit management, exchanging distinguished lecturers and promoting each other's conferences. Although formalities are minimal for establishing this link, ongoing implementation had been sluggish due to communications costs and haphazard contact as volunteers come and go.

Now it's back with a vengeance, spurred on by Canadians. The latest such initiative started when Montreal Section chair Anader Benyamin-Seeyar was presented the concept at the IEEE Canada Board Meeting last Fall in Quebec City, just before Sections Congress. Dr. Bob Hanna, Past President of IEEE Canada, suggested Boston Section would be a good match with Montreal due to proximity, relative size and technological dynamism.

Anader didn't wait for formal introduction. The next day at Sections Congress he was roaming the hall looking for a Bostonian and found one in John Conrad, at the time Section Vice-Chair and now Chair. John mentioned that Boston had a Sister Section in Japan until 2008, and was more than ready to retry with a closer sibling. He obtained enthusiastic support from Region 1 director Howard Michel and advice from IEEE Past President Art Winston. IEEE Canada President Ferial El-Hawary was certainly upbeat about the prospect (no one who knows her would be surprised…)

Anader wanted this agreement drafted on the spot in Quebec City, but the Boston Section Chair was not present. Oh well, this is not the Big Dig; a simple plan was set up and followed: Agreement drafted, voted on, sent, and signed – as of January 8th, 2009. Welcome to the family!

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Material for the article provided by Anader Benyamin-Seeyar, IEEE Montreal Section Chair 2007-2008. Warm thanks extended to all volunteers involved, who unanimously supported this effort. Members' suggestions about Boston-Montreal cooperation are welcome.

IEEE Ottawa Arrayed at the Gates: A National FPGA Programming Competition and Workshop

by: Alfredo Herrera, SMIEEE; Chair, Innovate Canada FPGA Programming Competition

Two years ago, a team of IEEE Ottawa members set out to organize an event that would showcase current and upcoming applications of Field Programmable Gate Array (FPGA) technology. With the support of the Section, its Technology Management Council and the Educational Activities committee, they organized the event in two parts: First, a workshop about "Accelerating Computationally Intensive Applications" using FPGAs, a topic relevant to researchers, developers and consumers of the technology. Second, a FPGA programming competition for Canadian university students, to encourage learning by doing.

The FPGA Workshop 2007 aimed to increase understanding and knowledge of FPGAs and to encourage growth and development in the field. FPGAs are used in most digital designs, from consumer devices to aerospace systems. It is a fascinating design platform that has commoditized digital design and verification.

The workshop theme was "Accelerating Computationally Intensive Applications" (http://ottawa.ieee.ca/tmpcsit/fpgaworkshop/). It was held in Ottawa on October 16-17, 2007, in conjunction with CMC Microsystems' Canadian Workshop on System-On-Chip. The workshop program provided an insight into new uses of FPGA technology to those familiar with traditional uses of FPGAs; and to those not yet familiar with FPGAs it provided a tangible showcase.

The FPGA programming competition ran from January 25 to May 30, 2008 under the banner "Innovate Canada" (http://www.innovatecanada.ca/). Thanks to the generous sponsorship of Altera and Impulse Accelerated Technologies, it was possible to make this a Canada-wide FPGA programming competition open to undergraduate and graduate engineering students. Qualifying teams drew from over CAD $100,000 in donated tools to develop their own image processing, signal processing, computational finance, mathematical or high-performance computing algorithm or sub-system.

Innovate Canada is just the latest in a series of academic competitions sponsored by Altera, and the first in which Impulse has participated as a sponsor. These Altera sponsored student competitions have been successfully held in other parts of the world; Innovate Canada was the first to be held in the Americas.

First prize went to a team mentored by Dr. Gregory Steffan at the University of Toronto. Team members Martin Labrecque, Muttee Sheikh, Jill San Luis, Benzakhar Manashirov and Mohammed Elsayed created an FPGA-based object recognition project that included a number of complex hardware filters as well as software running on an embedded NIOS 2 processor. Second prize went to an Ottawa University team Mentored by Dr. Miodrag Bolic. Daniel Shapiro, Vishal Thareja, Saurabh Ratti, Srivatsan Vijayakumar and Muran Yang created an automatic fuzzy logic generator, including compiler extensions, that enhances the instruction set of the open-source LEON embedded processor.

Tied for third place: University of Toronto team composed of Trevor Burton and Geoffrey Green – again mentored by Dr. Miodrag Bolic! – who created a hardware implementation of a wavelet-based image compression algorithm, and the University of Saskatchewan team mentored by Dr. Eric Salt. Team members Geoff Baker, Shea Pederson, Adrien Rudulier, Nathan Windels and Brett Baerg created a hardware system for Ethernet transmission of MPEG stream from standard composite (yellow RCA) NTSC. A honorable mention was awarded to the Carleton University team; Daanish Khan and Dragan Trifkovic, mentored by Dr. Adrian Chan and Dr. Sreeraman Rajan, created a heart rate estimator using phonocardiogram (PCG) signals to automate unattended unobtrusive heart rate estimation.

The IEEE Ottawa Section team is now planning its second programming competition. Due to strong demand, they plan to accommodate more students and open it to North-American universities; promotion is planned for US and Mexico colleges. As well, there will be now be Fall and Winter competitions: The former will be a design competition similar to the one held during Winter'08. The latter, to be held during the Winter''10 semester, will be about design verification. This will culminate with a workshop and awards ceremony in Ottawa at the end of the Winter'10 semester.You are invited to join the team in celebrating winners, and support their effort to bring to our aspiring design engineers a platform to showcase their talent, determination and innovation.

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Denzil Doyle addressing workshop audience

Daniel Shapiro, member of ISE for LEON 3 team, accepting presence prize during workshop

IEEE Members amongst 2009 APEGGA Summit Awards Recipients

The path to the podium was traced by four IEEE Canada members at a recent gala organized annually by the Association of Professional Engineers, Geologists, and Geophysicists of Alberta (APEGGA). The Association's major recognition program, this year's Summit Awards® was held April 23 at the Calgary TELUS Convention Centre.

Dr. Fadhel M. Ghannouchi, P.Eng., FIEEE
The Alberta Ingenuity Fund Research Excellence Award
For innovative research used to improve economic and social well-being

Dr. Ghannouchi is internationally known for his involvement in the creation of the iRadio Lab which has been instrumental in raising Alberta's profile as a leading place for research and technology development. The lab has made a remarkable impact on the field of information and communications technology research. He is an iCORE professor and Canada research chair in intelligent radio frequency technology at the University of Calgary's Schulich School of Engineering.

Dr. James W. Haslett, P.Eng, FIEEE
The Frank Spragins Technical Service Award
For recognized integrity, expertise and outstanding accomplishments

Dr. Haslett has conducted leading-edge research for the past 37 years and has been an active consultant to industry since 1970. He recently held the TRLabs / iCORE / NSERC senior industrial research chair in radio frequency integrated circuit (RFIC) design and in 2008 was appointed as the principal investigator of the iCORE Advance Technology Information Processing Systems Research Initiative. Currently, his research interests include ultra-low-power radio chip and sensor systems, ultra-low-noise amplifiers and analog-to-digital converters.

Dr. Mark G. Petovello, P.Eng, MIEEE
The Early Accomplishment Award
For exceptional achievement in the early years of a professional career

After graduating with a B.Sc. in geomatics engineering, Dr. Petovello made significant contributions as a graduate student to navigation research. He was appointed as a Senior Research Engineer in the Department of Geomatics Engineering at the University of Calgary after receiving his PhD. Becoming Assistant Professor in January 2008, he has developed several novel algorithms and methods to improve the accuracy, reliability and efficiency of navigation systems.

Dr. Peter C. Flynn, P.Eng. SMIEEE
The Community Service Award
For outstanding contributions to society

During his 25-year career in the energy industry Dr. Flynn served as director of various organizations including the Canadian Society of Chemical Engineering and the Chemical Institute of Canada. In the academic world, the Engineering Management program at the University of Alberta was revitalized under his supervision. He has also given to the broader community through appointments to the board of the Informatics Circle of Research Excellence and the Balancing Pool of Alberta, and volunteer work with the Capital Region Housing Corporation, Fort Edmonton Foundation and other organizations.

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by Terrance Malkinson
School of Health and Public Safety
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- Predictions of the future are useful to everyone, for managing a business or managing their career. In July 2008, over one thousand futurists met in Washington, D.C. and discussed their views on the world and where it might be heading. Cynthia Wagner, Aaron Cohen and Rick Docksai review this meeting of the World Future Society "Seeing the Future Through New Eyes" in The Futurist, Nov.-Dec. 2008; www.wfs.org. Insights are provided into society and culture, business and careers, health and wellness, learning and education, technology and science, resources and the environment, governance and communities. A 9-page inset "Outlook 2009" collates thought-provoking insights about the future. — Marvin Cetron provides a "Timeline for the Future: Potential Developments and Likely Impacts" in The Futurist, March-April 2009. This timeline suggests when we might see the evolving technologies that will radically reshape human life. — "Where's the future we were promised?" is asked in "Science Fiction vs. Reality" [The Futurist, Sept.-Oct. 2008]. Visionaries discuss how predictions made in the 1960's turned out. Visions of the future included expectations of flying cars, undersea habitation, teleportation, and human-level artificial intelligence.

- Engineers often work in other countries or with people who have been trained in other countries. In "Competencies Beyond Countries: The Re-Organization of Engineering Education in the United States, Europe and Latin America" [Journal of Engineering Education, October 2008; www.asee.org/publications/jee/index.cfm], Juan Lucena et al. discuss the importance of extending competencies that engineers learn beyond that of their nation of origin. — In 2006 General Electric launched its new management development program "Leadership, Innovation and Growth." It is designed to support corporate priorities of achieving growth by expanding businesses and creating new ones ["How GE Teaches Teams to Lead Change," Harvard Business Review, January 2009; www.hbr.org]. Steven Prokesch discusses the effectiveness of this program that trains all senior members of a GE business management team as a group. — Reed Stevens provides an analytical framework that focuses on changes occurring over time as students traverse their undergraduate engineering education in: "Becoming an Engineer: Toward a Three Dimensional View of Engineering Learning," in the July 2008 Journal of Engineering Education [www.asee.org/publications/jee/]. The authors believe that three interrelated dimensions (disciplinary knowledge, identification and navigation) will help us understand how students become, or do not become, engineers. Implications for education and proposed further lines of research are discussed.
- Each generation has its own unique style, so it is with learning. In an article by Sara Rimer [The New York Times, 13 January 2009], entitled "At M.I.T. Large Lectures are Going the Way of the Blackboard," Rimer describes how in the past introductory physics at the Massachusetts Institute of Technology was taught in a vast amphitheatre where more than 300 freshmen took notes while the professor used numerous blackboards to deliver knowledge. It was the student's job to figure it out and, as shown by failure and attendance rates, many students experienced difficulty. M.I.T. has made a striking change replacing the amphitheatre with smaller classes that emphasize hands-on, interactive, collaborative learning. The walls are covered with white boards and huge electronic display screens where teachers and students learn concepts in small groups conducting experiments together. The new approach is known as "Technology Enhanced Active Learning" (TEAL).
- Public speaking is never easy. It is important to communicate to the audience that you are sincere. In "How to Become an Authentic Speaker" [Harvard Business Review, November 2008], Nick Morgan, a communications coach for more than two decades, offers you a four step process that will help you create a true emotional connection with your audience. — Cristian Linte, in "The Art of Dissemination: What Makes an Effective Scientific Presentation?" [IEEE Engineering in Medicine and Biology Magazine, July/August 2008; www.ieeexplore.ieee.org/Xplore], provides you with information that will assist you in preparing a successful presentation; this is an excellent reader-friendly article that covers all of the essentials. — Patrick Tucker in his article "The 21st Century Writer" [The Futurist, July-August 2008] discusses how technology and market trends are affecting writing and publishing. The Internet is causing traditional print publishers to innovate or perish. This may result in significant changes in reading, writing and publishing practices.
- Employee turnover is a fact of life. Traditionally, organizations focus on employee-retention programs in order to reduce turnover. In "Rethinking the 'War for Talent'" [MIT Sloan Management Review, Summer 2008; www.sloanreview.mit.edu], Deepak Somaya and Ian Williamson discuss how the departure of talented employees might benefit business. This benefit is realized by exploiting potential opportunities created by allowing knowledge to flow between organizations. This may serve as the basis for future business. An interesting inset provides information on the traditional approach and a new approach of thinking about employee turnover. — In a troubled economy, cutbacks and hiring freezes are routine. This is an unfortunate but unavoidable result of the business cycle. In: "How to Protect Your Job in a Recession" [Harvard Business Review, September 2008], Janet Banks and Diane Coutu discuss actions that you can take to make sure that you retain your job as the economy softens. Congeniality, versatility and looking to the future by focusing on customers are key factors. Strategies discussed include "acting like a survivor"; "giving your leaders hope"; and "being a good corporate citizen."
- When change is necessary many organizations do not understand the importance of involving the people who will be affected by the change. Helping them understand the importance of the change, and giving them time to make the transition is essential. In "Controlling the Perils of Change" [Training and Development, September 2008; www.astd.org/TD], Merry Lee Olson discusses the views of change experts, who suggest that issues influencing acceptance of change are not only predictable but manageable. This is an excellent, reader-friendly, concise article that provides you with valuable strategies for implementing change. — Peter Mayer and Robert Vambery believe that strategic planning tools need to be re-engineered in order to continue to be effective instruments for achieving sustainable competitive advantage. Concepts for the alignment of two established strategic management tools, product life cycle analysis and SWOT analysis are explored in "Aligning Global Business Strategy Planning Models with Accelerating Change" [Journal of Global Business and Technology, Spring 2008; www.gbata.com/jgbat.html].

About the Author

Terrance Malkinson is a communications specialist, business analyst and futurist. He is Vice-Chair of the IEEE-USA Communications Committee, an international correspondent for IEEE-USA Today's Engineer Online, editor-in-chief of IEEE-USA Today's Engineer Digest, and associate editor for IEEE Canadian Review. He was an elected Senator of the University of Calgary and an elected Governor of the IEEE Engineering Management Society as well as an elected Administrative Commitee member of the IEEE Professional Communication Society. He has been the member of several IEEE conference proceedings, and past editor of IEEE Engineering Management. Currently, he is with the School of Health and Public Safety/Applied Research and Innovation Services at SAIT Polytechnic in Calgary.
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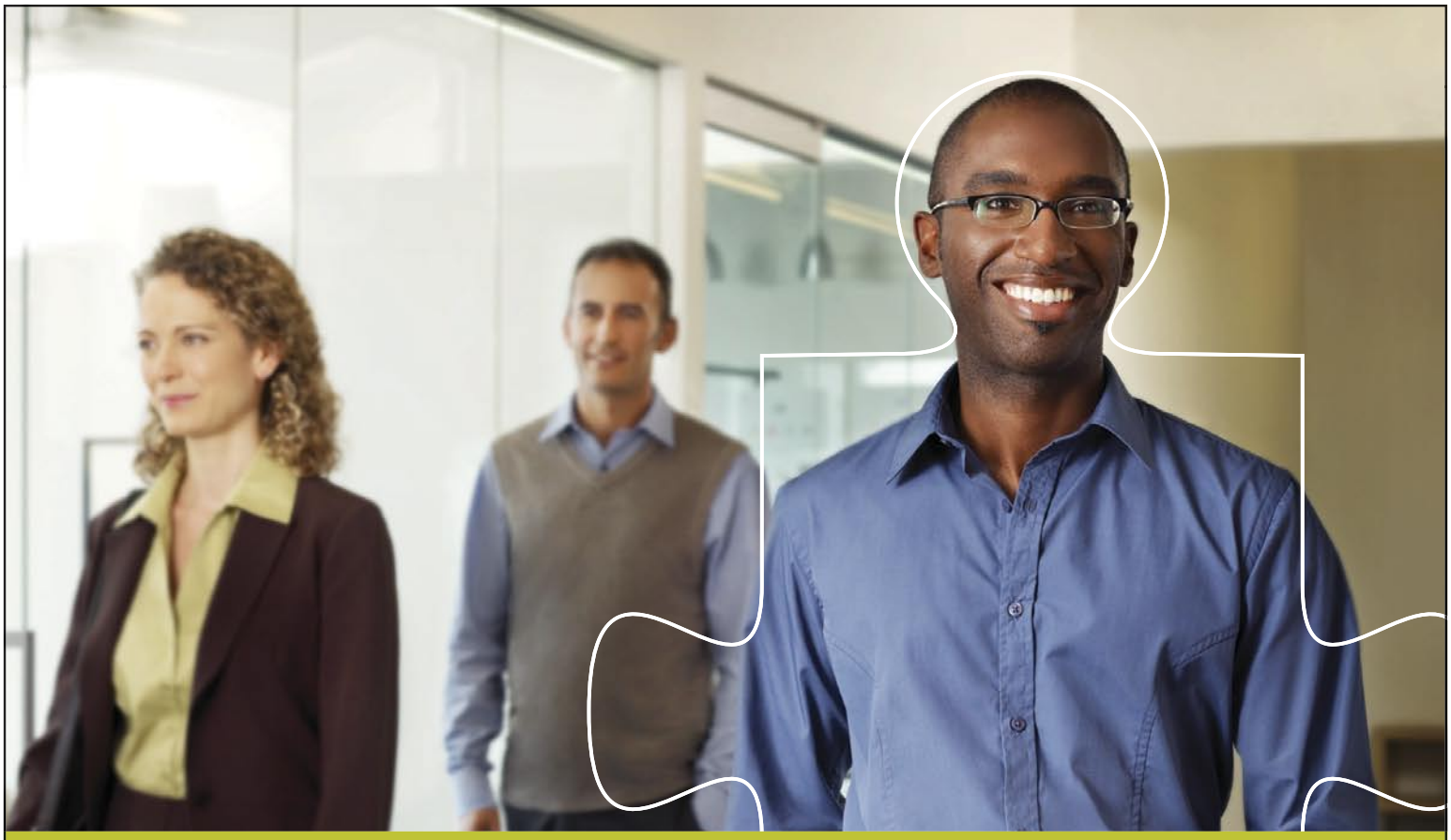

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