



Dr. Irving Engelson,
President, IEEE EMS

President's Corner

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This is my last president's message of 2004. Therefore, I want to give you – our members – a short account on the state of your Engineering Management Society (EMS). I am pleased to report that EMS is doing well, and that we continue to make progress for the benefit of our members and profession.

A number of significant accomplishments have taken place this year. We have successfully implemented a reduction in the size of our Board of Governors (BoG), from 24 Governors-at-Large to 18. As a result, this year the membership will elect six rather than eight Governors-at-Large for a three-year-term. This will make the board more manageable and less costly to operate. Reduction in our operating expenses was one of my goals and your BoG agreed with my proposal.

We were also successful in bringing in new leaders as board members. While we value experience and long service, I do not favor excessive recycling of the same people. We do have a term limit for the president who may serve no more than two consecutive one-year terms. It may be appropriate to consider similar term limits for other officers. But to accomplish such a concept, we need greater numbers of new volunteers to serve on our BoG. So I urge you that as a member of EMS you try to become involved by running for a position as governor-at-large. Should you be interested please let me know.

We completed our Operations Manual that codifies all our society governance documents. Some further fine-tuning will be considered for implementation in 2005. I have

also implemented an empowerment philosophy, by fully delegating to our various portfolio holders the responsibility for their areas. But with the authority comes full responsibility for the outcomes of their actions. Therefore the activities of the various vice-presidents and committee chairs must be carefully monitored to assure that their obligations to the members are fulfilled. As a result, I can report many successes by our society management team.

Our publications are being managed by a group of three new editors. Professor George Farris is the new Editor-in-Chief of our Transactions. He and his knowledgeable department editors are delivering their periodical in a timely and effective manner. In the beginning of the year Professor Wade H. Shaw took over the editorship of the Engineering Management Review and he continues to produce and deliver for our members and the profession a value added product that continues to receive high praise. And last, but not least, Terrance Malkinson our Editor of Engineering Management our EMS Newsletter is bringing both a new look and new content for the benefit of all our members. The three editors serve as members of the EMS Publications Committee, under the capable Chairmanship of Gus Gaynor, our Vice-President for Publications.

Mr. Gaynor also serves as Chair of the EMS Finance Committee. With the able help of our two co-Treasurers – Ms. Vivian A. Carr and Mr. Louis A. Luceri – your society is in relatively sound financial health and as a result the society dues will remain unchanged for 2005. We continue to be frugal in our expenditures and are taking our fiduciary responsibilities seriously. Our IEMC-04 conference will be held this

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October in Singapore. We expect a very successful conference based on the number of submitted papers. Our Vice-President for Conferences, Dr. Joseph H. Bellefeuille and our Executive Vice-President Professor Tariq S. Durrani are actively involved with the conference logistics. We are fortunate in having an excellent local team in Singapore headed by Prof. H.K. Tang and Prof. M. Xie whose efforts will assure the success of the conference. IEMC-05 will take place in St Johns, Newfoundland, Canada from September 11-13. We continue expanding our conference and tutorial offerings.

Prof. Durrani has also taken the initiative to develop EMS Special Interest Groups (SIGs) and chairing the Strategic Planning Committee. Both were enthusiastically approved by your society's BoG. The BoG has also endorsed an updated Society Field of Interest (FOI) that should be approved by IEEE in November and will be published in the first 2005 issue of this Newsletter.

I also want to acknowledge the support of our proactive Vice-President of Recognition and External Relations, Mr. Joel Snyder, whose experience as a past IEEE President is to our benefit.

Dr. Charles P. Rubenstein, our outgoing Vice-President: Member Relations has contributed to EMS in numerous ways over the years. His promotion and work with IEEE-USA's PACE program and the EMS Chapters has been recognized around the world. Dr. Rubenstein is a candidate for 2005 President-Elect of IEEE-USA and we hope that he will continue contributing to EMS in the future.

Thanks are also due to our immediate Past-President Dr. Dennis Bodson, whose assistance and guidance as a senior EMS statesman has been of immeasurable help. Mr. Bodson is a candidate for Division VI Director in this year's IEEE election. I also want to recognize Prof. Peter A. Eckstein, our society Secretary, for his invaluable support and assistance. We need to develop and expand our

portfolio of educational programs. Our 2004 Vice-President for Education for the first part of the year was John Barrett. Mr. Barrett labored diligently on behalf of the Society, and initiated many programs. However, he resigned his position as an elected member of the BoG and Vice-President for Education in the middle of the year. Because of the vacancy that developed in this position, I appointed - with BoG concurrence - Dr. Mark Werwath to the vice-presidency effective August 1, 2004. During his first month in office he has already launched some possible initiatives for consideration.

Finally, I want to thank our Board of Governors for their confidence in having re-elected me for my second and final term as your 2005 EMS President. I pledge to continue my full commitment to our society and its membership, and look forward to a rewarding New Year. All of the members of your Board of Governors and myself wish you the best of Seasons Greetings and a Happy New Year.

From Your Newsletter Editor

As we approach the end of 2004 I would like to thank everyone who has contributed to your EMS newsletter. The keywords are "your EMS newsletter." I have enjoyed serving you and working with many of the members of the society. The newsletter exists to serve your needs and to promote the profession. I invite you to consider writing an article and/or encouraging others to submit an article for publication in 2005. Your EMS newsletter is not an academic journal. It exists to allow you the member to share timely and relevant information with your colleagues, globally - information that you would not normally receive in the more academic journals. We all have information that others could benefit from. The editorial staff is here to help you with developing your idea and preparing your submission. E-mail your submissions or

questions to malkinst@telus.net.

As part of our efforts of continuous improvement of the newsletter to add value to your membership in the EMS and to meet the changing needs of our membership; two of the issues for 2005 will be theme issues. We will still include all of the features that you have seen in the past with the addition to 2-3 articles focusing on a particular topic important to Engineering Managers. The first theme issue will focus on the Engineering Managers role in promoting Health and Wellness in the workplace.

Did you know?

- People with healthy lifestyles live six to nine years longer than people with unhealthy lifestyles.
- Fewer than one-third of adults engaged in the recommended

amounts of physical activity. Child and adult obesity is at epidemic levels in many countries.

- Epidemiological research has proven that physical inactivity is an independent risk factor for coronary heart disease and degeneration of all body tissues.
- Skyrocketing insurance premiums, absenteeism and decreased productivity due to injury, illness and stress are problems faced by most organizations. It has been reported that headaches, back pain, arthritis, and other muscle and joint pain results in an annual loss of more than \$60 Billion to US business.
- Chronic diseases related to lifestyle accounts for over 50% of a nation's health care costs in many countries.
- The most innovative leaders are those who engage in regular exercise and therefore have the stamina,

and energy to advance to senior positions. They understand the fitness-performance connection.

- It has been proven that well designed work-site wellness programs enhance employee productivity, keep health insurance costs down, and therefore have a positive impact on profitability.

Stay tuned for your next issue of IEEE Engineering Management for a discussion of this important topic and tips on how you as an Engineering Manager or as an Engineer can improve your own fitness and promote health and wellness in the workplace. Should you be interested in submitting an article

on this topic please let me know.

I welcome your suggestions for the second theme issue of 2005, which will be published in the third quarter of 2005. I always welcome feedback on how we can improve the newsletter to best meet your needs as a valued member of the Engineering Management Society.

For many of us this is the season of the year when we think of those who are less fortunate. As Engineering Managers we might think on how each of us in our daily activities can use our skills to contribute to make the world a better place for all humanity.

Best Wishes from IEEE Engineering Management and your EMS Board of Governors for the festival season and for 2005

Terrance Malkinson
 Editor: IEEE Engineering Management
 Senator: The University of Calgary
 Governor: IEEE Engineering Management Society
 Editor-in-Chief: IEEE-USA News and Views
 Associate Editor: IEEE Canadian Review
 Member: Communications Committee, IEEE-USA
 Member: Editorial Board, IEEE-USA

EMS Awards

A gentle reminder that peer recognition is the greatest "pat on the back" that anyone can receive. Well now is the time to look around and consider who among your friends and colleagues should be recognized for their professional accomplishments. I have the pleasure of serving as the Vice-President for Awards for your IEEE Engineering Management Society and it is in that capacity that I am sending this message.

The Engineering Management Society sponsors three major awards for practicing members. They are the Engineering Manager of the Year, the Engineering Management Educator of the Year, and the Engineering Management Innovation awards. Below are short descriptions of these awards. Look them over and decide who is eligible and worthy of recognition, then send me an email describing that person and the reasons for your nomination and I will help you process the proper paperwork to get them before the evaluation committee.

Engineering Manager of the Year Award

- Recognition: \$1,000.00 plus Cer-

tificate or Plaque.

- Eligibility: Senior Member or IEEE Fellow, Member of EMS for at least 3 years, and an Engineering Manager for at least 10 years.
- Basis for Judging: Outstanding Executive or Managerial contributions to the field of Electrical and Electronics Engineering.

Engineering Management Educator of the Year Award

- Recognition: \$1,000.00 plus Plaque and a One-year EMS Membership.
- Eligibility: Active or Retired Educator or Education Administrator in the Field of Engineering Management or a closely related discipline.
- Basis for Judging: Outstanding Education or Education Administration contributions to the field of Engineering Management or a closely related discipline.

Engineering Management Innovation Award

- Recognition: \$1,000.00 plus Plaque and a One-year EMS Membership. If the awardee is not a member of IEEE, that individual shall be supported as a one-year EMS affiliate. In the case of a

multiple person team, the \$1,000 award shall be split evenly among the team members and a single EMS membership or affiliate status shall be awarded to whomever the team designates but each individual shall receive a plaque.

- Eligibility: No restrictions. The award may be given to one individual or a small, focused, team of individuals in the engineering management community whose work meets the "basis for judging" below.
- Basis for Judging: For outstanding management of an engineering project, or series of related projects, where the success of the project(s) is tied clearly to the use of innovative engineering management techniques. The work for which the nomination is being made shall have been completed within the last 10 years.

Recognition is sweet! And it brings almost as much joy to the nominator as to the award recipient. So send me your ideas and nominations. I will help.

Joel Snyder
 Vice-President for Recognition and External Relations
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IEEE Transactions on Engineering Management 50th Anniversary Issue

by George Farris

IEEE Transactions on Engineering Management is 50 years old! Volume 1 was published in 1954 under the editorship of a committee, and Al Rubenstein became editor-in-chief in 1958. He was succeeded by Dunder Kocaoglu in 1986, and George Farris became the third editor in 2003. Each issue of the journal is read by about 10,000 scholars and managers, and the journal consistently ranks at or near the top in measures of scholarly quality and impact in its field.

The November 2004 issue of the Transactions is its 50th anniversary issue. To celebrate this achievement, the department editors and editor-in-chief chose a small number of major contributors to the field to comment upon it. They were asked to write short essays that comment on the past 50 years of research and practice in engineering management and speculate on the next 50 years. What have

been some of the most important developments in the field as they see it, and what do they expect will be the most important developments in the future? What role has IEEE-TEM played in past developments, and what role should it have in the future? They were asked to feel free to be as opinionated as they wished and to comment from your own perspectives on the field.

This issue begins with the invited essays. Thomas J. Allen and M. Lourdes Sosa identify trends in author affiliations and article topics through five decades of the Transactions. David I. Cleland reviews the evolution of project management, pointing out that the field is far older than our journal. Edward B. Roberts reviews four central themes in the literature: quantitative tools and techniques for technical managing, behavioral insights into technical groups and organizations,

process/organizational innovations and technology strategy, and technology-based entrepreneurship in new and existing organizations. Richard S. Rosenbloom suggests that the most important development in the field has been broadening of bodies of knowledge and increased attention by social and systems scientists to technology management. Albert H. Rubenstein describes a dozen trends within firms and cites four indicators of how the field has flourished over the years. Michael Tushman views the field as having evolved from engineering management/R&D management to the management of innovation to exploiting and exploring over “value nets.” Arthur W. Winston sees a shifting emphasis from management to leadership.

These essays were quite provocative, and they are highly recommended reading for all members of EMS.

IEMC 2004

A Focus on Innovation and Entrepreneurship

Delegates from all over the world gathered on October 19 to 21 as Guest of Honor Dr. Vivian Balakrishnan, Singapore Minister of Community Development and Youth Sports, and Senior Minister of State for Trade and Industry; Dr. Arthur Winston, IEEE President; and Dr. John O'Reilly, IEE President opened the 2004 edition of IEEE International Engineering Management Conference on “and Entrepreneurship for Sustainable Development.” The IEEE International Engineering Management Conference enjoyed its largest turnout yet to hear opening addresses, keynote speakers, tutorials, and delivered papers.

Conference Management and Overview



Dr. H. K. Tang

Two years of planning and hard work paid off for EMS, IEE Management Network, IEEE Singapore Section, and the Singapore Chapter of EMS – sponsors of the conference. We owe the great success of IEMC 2004 to General Conference Chair Professor H. K. Tang and his organizing committee as well as the tutorial leaders, keynote speakers, technical paper presenters, and, of course, the 320 registered participants. This year's conference was held at the Pan Pacific Hotel in Singapore. The conference offered a platform for sharing experiences,

presenting new ideas and results, and networking with leading experts. IEMC-2004 hosted six keynote speakers, six tutorial sessions, and 42 paper sessions with 278 papers published in the IEMC '04 Proceedings. Over 300 academics and professionals attended the conference from five continents. Approximately forty percent of the attendees represented industry.

IEMC 2004 helped Singapore celebrate its thirty-ninth birthday – it gained independence from Malaysia in 1965. Singapore and the Asia region have witnessed spectacular success for the past several decades. Success often is accompanied by its own unique problems so it was fitting to bring IEMC here to discuss “sustainable innovation and entrepreneurship.”

IEEE Engineering Management Society and its cosponsors owe H. K. Tang and his organizing committee a debt of gratitude for the outstanding effort and superb performance put forth on behalf of the 2004 edition of the International Engineering Management Conference.

Technical Program



*Professor
Min Xie*



*Professor
Durrani*

Several times throughout the conference we heard complimentary comments about the program. Credit and bragging rights for the program belong to Professors Min Xie and Tariq Durrani and their program committee. The program attracted technical professionals, managers, and academic researchers, and provided a foundation upon which to build an interesting keynote speakers' program.

The keynote speakers, representing industry and academia from the Singapore, United Kingdom, United States, India, and other parts of Asia, addressed the importance of collaboration and research in sustaining innovation in a changing world. After the opening comments the delegates enjoyed keynote speakers followed by technical paper sessions.

Keynote Speakers



*Lord
Bhattacharyya*

Professor Lord Kumar Bhattacharyya's, Director, Warwick Manufacturing Group, University of Warwick, UK, presentation titled: "The Opening up of the Two Asian Giants: China, India and the New Agenda for Manufacturing Globalization" drew parallels between the growth and development of the so called 'Asian Tigers', of the smaller Asia countries, like South Korea, Singapore and Malaysia and the

growth rates that are being achieved by China and India are just as spectacular as those achieved by the Tigers in their heyday. However, these are not small tiger economies, between them they have a population of two and a half billion. To get economies of this size moving at this rate is an astonishing achievement. The developments in these two countries are happening at a pace that has taken the world by surprise. The demand they are creating for raw materials and technology, is driving world markets, while the output they are creating is having a massive effect on the location and investment decisions in manufacturing all around the world.



*Professor
Mizuno*

Professor Hiroyuki Mizuno, Director, Research Institute of Kochi University of Technology, Kochi University of Technology, Japan, and IEEE Honorary Member talked about "Sustainable Development" as a cure for some of Japan's recent woes. Professor Mizuno drew upon the writing of Joseph Schumpeter an Austrian born economist. Mr. Schumpeter introduced the concept of "INNOVATION" which gives power to societies by creating new combinations of existing resources. The professor explained that based on Schumpeter, we can say that Japanese success of economies after Second World War depended on the policy of "Combinations of Western Intellectual Property (IP) with Japanese labor". He went on to explain that whereas past successes for developing countries combined hardware related intellectual property with low cost labor, developed societies are focused on software IP.



Professor Farris

Professor George F. Farris, Rutgers Business School, USA, Editor of IEEE Transactions on Engineering Management addressed the concept of "The

Effective Engineer." When does an engineer do his or her best work? Studies of industrial scientists and engineers have identified characteristics of a "creative climate" associated with greater innovative performance and issues which are especially important to engineers in early, mid, and late career. The professor described the characteristics of a creative climate and the dynamics of its relationship to performance. He then addressed the implications for engineers at different career stages and suggested steps which engineers and their managers can take to increase engineers' innovative performance throughout their careers.



Mr. Ramadorai

Mr. S. Ramadorai, CEO, Tata Consultancy Services, India IEEE Fellow was scheduled to deliver a keynote address, but he was called to his headquarters in India to attend to some initial public offering duties. Ravi Sundaram, Head ASEAN Tata Consultancy Services, Singapore, stood in for Mr. Ramadorai and presented a talk titled: "Country Focus: India as a Hot Spot for BPO." Mr. Sundaram posited that it takes drivers and enablers to accelerate an industry in a developing economy. Some key drivers of BPO (Business Process Outsourcing) cited were an increasing proportion of labor costs in services, shifting demographics leading to decline in an active workforce, and increased globalization creating margin pressures. Key among the enabling forces Sundaram indicated labor cost differentials, mature BPO providers, and technical innovation and declining interaction costs. He further referenced proven economics of early adopters like General Electric, American Express, and Citi Group. In 2004, India alone will see \$3.6 billion (US) in BPO revenue accelerating to \$21 - 24 billion by 2008. Currently forty percent of the \$3.6 is from banking and financial

services. By 2008 the lions share will constitute customer care followed by human resources services and payment services.



Mr. McCourt

Mr. Martin McCourt, CEO Dyson, UK, presented an energizing keynote titled: "The Offshore Journey: The role that South East Asia can play in driving UK led

design and technology." The Dyson story is an exciting one, and you may want to visit the company website at www.dyson.co.uk to get the full scope of a remarkable innovative company. Mr. McCourt's presentation focused on the outsourcing journey after he gave a short history of the company. His was both an entertaining and informative talk. He included the successes and failures as well as lessons learned by a small start-up firm's attempts to first expand in the UK and eventually outsourcing by developing a partnership with a Malaysian supplier.

Technical Paper Tracks

In addition to five keynote sessions and six tutorial sessions, IEMC-2004 hosted forty-two technical paper sessions with 278 papers published in the proceedings. Academics and professionals presented the conference papers. The paper sessions covered topics on business strategy, technology management, knowledge management, entrepreneurship, design for environment, product innovation, manufacturing systems, supply chain management, and quality management. Participants were impressed by the quality of these presentations and the opportunity to engage in questioning and discussion with the authors.

Conference Tutorials

On Monday prior to the opening of the conference, the organizing committee offered six one-half day workshops. Workshop leaders came from Singapore, and United Kingdom as

well as the United States.

TN Goh, CEO of Design Technology Institute, and Professor at National University of Singapore offered a tutorial titled: "Six Sigma for Engineering Managers." This tutorial emphasized that Six Sigma, a framework for quality excellence, has taken industry by storm in the past two decades. Many books have been written on this subject, and discussions abound as to its contents, actual effectiveness, and suitability for specific organization or situations. While many have vouched for the power of Six Sigma, there are also others who see it as another management fad that relies on packaging rather than substance. One thing is clear: trainers and consultants of Six Sigma have been demanding a high price for Six Sigma programs. Many managers would like to know more about Six Sigma before committing substantial company resources and manpower into it. This tutorial was designed against this backdrop and helped those seeking an objective view of Six Sigma.

Choon Boon Lim, principal lecturer at Ngee Ann Polytechnic in Singapore, offered a tutorial titled: "An Intensive Workshop on the Buzan Mind Mapping: A Swiss Knife for the Innovative and Creative-Minded Person." The objectives of the tutorial were to enable participants to:

- a. Understand and conceptualize the Buzan Mind Mapping technique.
- b. Synergize their ideas and thoughts through the use of Mind Maps
- c. Be able to confidently use Mind Maps in the workplace and at home.

George F. Farris, Professor of Management and Director of the Technology Management Research Center at Rutgers University, facilitated a discussion on: "Publishing in IEEE Transactions on Engineering Management and Other Top Journals." In this tutorial Professor Farris led the discussion using IEEE Transactions on Engineering Management as an example to explore research publishing in

IEEE as well as other refereed journals. First, the overall process of submission and review was described. Next, the perspectives of the various parties involved in the review process: Authors, Editors-in-Chief, Department Editors, Editorial Assistants, Editorial Review Board members, and Ad Hoc Reviewers were discussed. Finally, suggestions were offered to authors as to how to choose journals for particular papers, how to prepare a manuscript for submission, how to prepare a useful transmittal letter to the Editor-in-Chief, how to respond to reviewer comments, how to prepare a revised manuscript, and what to do with a rejected manuscript.

A tutorial titled: "Effective Leadership in R&D and Technology-Based Team Environments" was offered by Bentley College Professor Hans J. Thamhain. This intensive workshop addressed the challenges of managing and leading in technology-oriented project environments: stimulating innovation, dealing with risk, uncertainty, time and resource pressures and sustained development. The seminar provided participants a forum for discussing contemporary management concepts, tools and techniques suitable for managing in these dynamic and often non-linear processes.

The emphasis was on best practices. Working interactively in small groups, participants analyzed complex R&D project scenarios, discussed challenging problems, shared experiences, and worked out potential solutions. Participants also applied the latest techniques for planning, tracking and controlling technical projects, compressing the time-to-market cycles, managing innovation under cost and time constraints, establishing early warning systems, leading self-directed project teams, dealing with interruptions, risks, conflict and commitment, and applying contemporary management concepts, such as critical chain, maturity model and Six Sigma to R&D and project management situations.

Dr. Anthony F. Bainbridge, CEng

FIEEE MIEEE presented a tutorial: "Managing Yourself – A Strategy for Enjoying Self-employment." This seminar was geared to the well qualified and experienced engineers around the world who have either chosen to become self-employed or been "forced by redundancy" (an English phrase meaning surplus) to establish their own businesses. The challenge to the individual and the family arising from this change is often substantial.

The world of work is in transition, and will be very different in the next 20 years. But many forces are on the side of the individual. There are many clients who find it necessary to employ good consultants. The market is a busy and well-populated one. The Internet has a democratizing capability, because it can transfer power away from government and business towards ordinary people. In short, there is plenty of business to be gained. But we need to learn the skills to find it. Those who find themselves in this situation must begin by taking control of their personal and professional development. This seminar explored the issues which, for most consultants, dominate their thinking in the early days. The aim was to help participants face this amazing learning curve with greater confidence. Participants also discussed the prospects for establishing consultants learning networks hosted by IEEE and IEE.

Dr. Loh Han Tong, Design Technolo-

gy Institute Ltd, presented a tutorial titled: "Knowledge Management to Power Your Organization." Knowledge management (KM), in an organizational sense, is the management of all, or some part, of the knowledge process. The key component of knowledge management is the information technology (IT) that moves and transforms data, information, and knowledge. With the recent explosion of information technology, massive amount of data has become readily available in many organizations. Either due to lack of know-how or resources, much of these data is currently used for archival purposes only. However, there is a huge amount of knowledge/information embedded in these databases which when discovered can result in enormous savings in time and cost.

Data/Text Mining is the process of discovering valid, potentially useful and ultimately actionable knowledge and information from huge databases. It involves a confluence of techniques from many disciplines such as computer science, statistics, mathematics and engineering. It has been applied to many different industries, namely; banking, medical, semi-conductor, food, and bioinformatics with great success.

This tutorial focused the application of knowledge management techniques in the product development process. The main highlights of the tutorial included:

- An introduction to the basic ideas of data and text mining within

knowledge management

- Major operations within data mining and text mining
- Real-life case studies
- Current status and future directions in research and applications

Future Conferences

Looking ahead, next year's conference titled: "A Strategic View of Engineering and Technology Management" will be held on September 11 – 13 2005 at the Fairmont Hotel in St. John's, Newfoundland, CA. The IEMC 2005 website is <http://www.iemc2005.org>. If you would like to help or have suggestions, contact General Conference Chair Charles Randell at Charles.Randell@C-Core.CA, Kathleen Chafe at ChafeK@DFO-MPO.GC.CA, or Dennis Peters at dpeters@engr.mun.ca. The abstract submission deadline is March 1, 2005, abstract acceptance by May 15, 2005, and paper submission is June 15, 2005.

Your Engineering Management Society is organizing a management track in the Professional Communications Society IPCC 2005 conference in Limerick, Ireland.

IEMC 2006 and 2007 are in the planning stages and their venues will be announced later. If you would like to comment on this article or explore the possibilities in sponsoring a conference, please contact Joe Bellefeuille, Vice-President of Conferences at j.h.bellefeuille@ieee.org.

NSTA Awards

Dr. Kay Das, a member of the IEEE EMS, and Professor Low Teck Seng is also a Fellow of the IEEE and a past Director of IEEE Region 10, received Awards from the Singapore Government. These were two of eleven individuals who were accorded Singapore's highest honour in Science and Technology from the Agency for Science, Technology and Research. With passion, cre-

ativity and perseverance, these winners of the 2004 National Science and Technology awards (NSTA) have excelled in their field of work, and made significant progress and contribution to science and technology in Singapore.

The NSTA awards were officially presented to the winners on 15 September 2004 by Mr. Tharman Shanmu-

garatnum, Minister for Education, at the NSTA Awards Dinner where more than 500 key players from industry, academia and research institutions gathered.

The two winners of the prestigious National Science and Technology Medal this year have played strategic roles in the development of Singapore through the setup of research and

development centres in industry and public sector as well as promoting research partnership and collaboration.

This year's National Science and Technology Medal (NSTM) 2004 are:

• **Mr Kay Das**

R&D Director, STMicroelectronics Asia Pacific

"For his contributions to the initiation and expansion of high value R&D activities in STMicroelectronics and pro-

motion of partnerships with external R&D organisations"

• **Professor Low Teck Seng**

Principal and CEO, Republic Polytechnic

"For his contributions to the establishment of data storage capabilities in Singapore and promotion of R&D partnerships between universities, research institutes and industry"

The award selection panels com-

prised key representatives from the industry, academia, defence and research institutes, and are chaired by distinguished leaders in science and technology, namely Mr Heng Swee Keat, Permanent Secretary of Ministry of Trade and Industry, Prof Lim Pin, University Professor of NUS, Prof Cham Tao Soon, Distinguished Professor of NTU and Prof. Leo Tan, President of Singapore National Academy of Science.

Enhancing the Role of Industry in IEEE

by Mr. R.K. Vir
Chairman IEEE Delhi Section

During my return trip to India last year after Region 10 meet I had opportunity to travel with Dr. Jung Seo Region 10 Director. The subject of lack of and declining interest by industry in IEEE activities came up. This was followed by exchange of emails between two of us. Before I proceed with my hypothesis and make suggestions to encourage more people from industry to join and actively participate in IEEE activities, I will like to state the vision and mission of IEEE as published on the IEEE Website.

Vision

"To advance global prosperity by fostering technological innovation enhancing members' careers and promoting community worldwide."

Mission

"The IEEE promotes the engineering process of creating, developing, integrating, sharing and applying knowledge about Electro and Information Technologies and Sciences for the benefit of humanities and profession."

There are two distinct streams when one considers membership in the IEEE. These are from academic institutions and from industry. A third is from research institutions. The purpose of my presentation is to suggest means that can create more coherence

and the complimentary role they can play for each other.

One cannot exist without the other. This very healthy and essential feature has been responsible for technical growth, and sustained industrial and consequently economic development of the world leading to improve standards-of-living. It would be seen that to fulfill the vision and mission of the IEEE the cooperation of both the streams is necessary.

Even if a few of you feel that you are already adequately represented in the Institute, the suggestions which I am going to make may intensify participation and may help entry of new members from this category. I have no intention in creating a cleavage and politicization of the subject. Rather I would make suggestions that how the two distinct streams could compliment each other's role.

Emerging from my research, the ratio of members from Academic Institutions and Industry is 60:40, while the ratio of population of Electrical and Electronic Engineers of the two categories residing in the jurisdiction allotted to Delhi section is likely to be of the order of 1:10, or even lower. This shows indifference and reluctance of engineers from industry to join IEEE. All India figures of IEEE

Fellows are 34. Out of these only 6 are from industry.

This brings me to the election of Honorary Members. IEEE has only two such members in India. During the last two decades India has made rapid strides in many industrial spheres particularly in Space and Information Technologies. The role of practicing engineers has been fantastic not only in helping Indian economy and in raising the standard of living of its people but also in contributing to technology in general for the benefit of entire mankind. IEEE could also have recognized the contribution of leaders in these fields by honoring them as Honorary Members.

Volunteers in any organization look to occupy and hold important office sometime during their membership. Most important office in the Region is that of R10 Director. As far as known to me, during the last two decades, only two have been elected from industry; one of them being the present R 10 Director, Dr. Seo.

I believe that it is clear that IEEE does not attract engineers from industry to enroll themselves as members, but even those who enroll are not adequately represented amongst the important offices elected Fellows and Honorary Members (even much less

than the ratio of their membership).

Industrial managers appear to have a feeling that IEEE is losing its relevance to them. One can only feel their waning interest in IEEE affairs. As I do not have a global view, I have to depend on what I have observed in India. Many of them are not reimbursing IEEE membership to their staff. They do not say openly but intimate talk with them makes one believe that some of them feel ignored by the existing IEEE hierarchy. When a member feels that his voice will not matter and not even heard he quietly withdraws.

I have been a Senior Member of IEEE for over 17 years. During this period, it has been my perception that leaders of industry who were earlier active or rather playing leading role as volunteers in IEEE functioning have abdicated their responsibility. This is indeed a disappointing trend that is happening gradually and probably not getting noticed. It may be the beginning of the erosion of the principles and the very foundation of IEEE. You may ask me the question. "Why I have continued to remain an IEEE member so long?" That is due to my basic personal approach to life. I have been not only a volunteer in IEEE but a few other organizations as well.

A cycle, I will not like to call "vicious" appears to have established.

The academicians are continually influencing IEEE affairs. There is dominance of members from R01 to R06 in IEEE and its various societies. This has resulted in US members in running and managing IEEE. This may mainly be due to the strength of its numbers and much easier access they have to those who are at the helm of IEEE affairs.

My Suggestions

- Equitable representation of the two streams in the election process of IEEE Fellows. In the June 22, 2003 meeting the IEEE Board of Directors approved changes in the Fellow nomination process designed to assure equal opportunity for election to IEEE Fellow grade of members with careers involving the application of technology. IEEE Bylaws were also amended to clarify the eligibility of application engineers and practitioners and to establish the realization of significant value to society standard for evaluating nominations. The revised norms have been made applicable for all future nominations from 2005 onwards. The long over-due change has at last occurred.
- When considering candidates from Regions other than 1 to 6 representatives from these regions should be also be involved in the selection process. Only such a representation

can enable more fair assessment of the candidate and his contribution to technology

- Equitable representation of the two streams in the Excoms of Sections and Regions
- Election Process of Fellows should be made more transparent and democratic. It should be more objective. Only those candidates whose work promotes Vision and Mission of IEEE should be elected. It is likely that members constituting the Selection Board do not know entire background of the candidate. To give a fair chance to such a candidate members of the selection board should freely consult IEEE members from the section and region who are familiar with candidate's work. This particularly applies to practicing engineers. In case of academicians due to their published work of their contribution can be easily assessed. Final discretion to give accreditation to opinions from the consulted, however resting with the Selection Board. Such a procedure needs to be institutionalized.

I hope that IEEE recognize waning interest of leaders from Industry in IEEE, otherwise I am afraid to point out that in the years to come It will become only a Professors' Club.

Chapter Reports

Winnipeg by Anne Parker

In the Winnipeg IEEE section, we have an amalgam of the Education, Management and Professional Communication societies - MANCOM. Each year, MANCOM awards two student memberships in IEEE PCS to two students enrolled in the Red River Technical Communication program and presents the winners with a certificate to acknowledge the award. This year's winners are Car-

olyn Walker, a first-year student, and Ben Davies, a second-year student in the technical communication program at Red River College. MANCOM will be hosting an awards luncheon in honor of the two students.

Germany Chapter by Gerald Anleitner, Gerhard Seiler, and Dirk Weidemann

Visit of EMS Vice-President Member Relations Charles Rubenstein

On his "Region 8 Distinguished Lecturer Tour", EMS Vice-President (Member Relations) Charles Rubenstein joined the September meeting of our Chapter. After visits to Engineering Management representatives of the British IEE and the EMS Chapter in Austria, Charles and his wife Rose came to Munich before continuing their journey to the IEEE 2004 Student Branch & GOLD Congress giving a talk about "Scalability of IEEE Membership" at the University of Passau.

The Germany EMS Chapter meeting took place at the Munich offices of McKinsey, which generously provided meeting space and catering for the event. After a brief introduction of the participants, Gerald Anleitner presented a history of the chapter taking into account early objectives of the chapter, its activities during the years and an outlook on planned activities. Christian Borgert then gave an overview on the election results. With a participation rate of 21%, the following candidates were elected into positions with in the EM Chapter Germany Executive Committee: Gerhard Seiler (Chair), Horst Kremers (Vice-Chair), Sebastian Helbeck (Secretary), Johannes Nührenberg (Treasurer).

Together with a note of appreciation, Charles presented certificates and tokens to the members of the former executive committee of the EMS chapter to recognize their efforts in establishing the chapter and organizing a number of events during the years of its existence. He then 'installed' the new EM Chapter Germany officers. Finally, new chapter chair Gerhard Seiler took over for a strategy and planning session discussing future activities and plans of the chapter. For the remainder of 2004, seminars on automotive engineering and on product development are planned. In 2005, a seminar on systemic management is planned as well as further seminars on HR topics and automotive issues.

Apart from visiting the EM Chapter Germany and giving a talk at the Region 8 Student Branch/GOLD Congress in Passau, Germany, Charles also visited the United Kingdom representing EMS at a Joint Programs Meeting with IEE/MPN. The Central Europe Chapter of the Engineering Management Society welcomed Charles and his wife in Vienna, Austria on September 1, 2004. They participated in a tour of the Engineering Management Executive Education Program at the Vienna University of Technology. This was followed by a CEC Chapter meeting where he pre-

sented Chapter officers with certificates and tokens of appreciation to recognize their efforts in organizing a number of events for members in the Joint Section Chapter. While in Vienna, Dr. Rubenstein met informally with Region 8 Director Dr. Anthony Davies and Region 8 Leadership Training Workshop Presenter Dr. Kurt Richter and discussed EMS, training, and professional activities in Region 8. Both the Central Europe and Germany Chapters applied for EMS Chapter Event Grants of \$300 to defray speaker travel expenses.

EMS Automotive Seminar in Leonberg/Stuttgart

On September 25, 2004, the German Chapter of the IEEE EMS presented a seminar about "Automotive Driver Assistance Systems and Chassis Systems" in Leonberg. The seminar was well accepted with 30 participants from car manufacturers, suppliers and engineering companies.

The seminar was organized in two sessions, the first about examples of current driver assistant and chassis systems, the second about challenges in developing these systems.

The first speech, an overview of Bosch's current development of assistant systems, was already the highest appreciated speech from both aspects, content and presentation style. Jan Egelhaaf presented all development efforts of Bosch in detail, covering distance warning, heading control, night vision, and emergency breaking. Central to his discussion was the two-dimensional distinction of passive and active systems, and safety versus comfort systems.

The presentation of Dr. Bernd Clephas (ThyssenKrupp Presta Steertec) focused on their steer-by-wire-system that recently got official approval for use on public roads. Dr. Clephas described the architecture, particularly the redundancy concept, and the approval process. Although the approval was achieved without limitation, and business cases mainly for commercial vehicles are clearly visible, no implementation in the market is

expected in the short term. Probably no vehicle manufacturer wants to take the risk to be first. Additional to the steer-by-wire solution, ThyssenKrupp suggests active steering based on servo steering. This could be used to help driving trucks or buses backward, or even to remote control trucks.

Topic of the speech of Albrecht Irion (Bosch) was the Adaptive Cruise Control (ACC) that is already available in some premium cars. ACCs were classified as active comfort system following the above mentioned topology. Thus current implementations of ACC always allow the driver to take control when required. Liability is one of the main motivations for this decision. In his speech, Albrecht Irion focused on the way of using the ACC. How it detects cars ahead and measures the distance as well as speed to then determine how to handle this driving situation.

The second session, challenges in developing automotive systems, began with a presentation by Anke Schirmer (Porsche Engineering Services) about management of component interfaces. A simple tool supports car manufacturers and suppliers in specification and design control. In principle, parts of these tasks could be managed with design tools based on UML or focused on real-time development, however this would require a homogeneous tool landscape among OEMs and suppliers, which will most probably not happen soon.

Dr. Guido Haak of McKinsey focused on quality management in the development of automotive electronics and software. After observing that OEM's quality problems today are predominantly electronics and software related, he gave an overview of state-of-the-art management techniques applicable to improve the situation. Specifically, he outlined customer-oriented innovation portfolio, mature development processes, comprehensive test and release management and system and knowledge-oriented development organization.

In the final presentation about usage of consumer electronics, Dirk Weidemann (Capgemini Deutschland) wanted to provoke a little bit on how to manage different life cycles of automotive electronics and the consumer industry. Central idea is a 'trusted' interface device belonging to the automotive electronic, that would allow infotainment and passive driver assistance systems to access the rest of the car in a strictly controlled way. The discussion afterwards was then only about, where and how to implement this interface, the necessity of such an interface was not questioned at all.

IEEE EMS appreciates the seminar's success in networking and content, and is already planning the next series of their automotive seminars.

Bombay Chapter by Anthony Lobo

Our Bombay Chapter of EMS, which was inaugurated in October 2002, had a gala event "Electrifying India" which brought together leaders of India's Power Sector and on the occasion of which we had sought to apply Engineering Management best practices to problems of the power sector. A CD of the proceedings is available from Kirit J. Sheth <kirit_sheth@ieee.org upon request.

Power Sector and the Role of Engineering Management was the theme of a prestigious event from the IEEE Engineering Management Society, Bombay Chapter which was hosted at Hotel Hyatt Regency, near Sahar airport on February 12 and 13, 2004.

The inauguration was at the hands of Honorable Minister of State for Power, and Member of Parliament from Mumbai, Smt Jayawantiben Mehta who spoke in chaste Hindi and with the authority of an insider. Mr. H L Bajaj, Director of Central Electricity Authority, Delhi gave the keynote address. He is past Director

IEEE Region 10 and was elevated as FIEEE as of Jan 2004.

The second day's keynote address was again by FIEEE, Dr M Ramamoorthy, Director Energy Research and Development Agency (ERDA), Baroda.

Both days' proceedings were well attended by the cream of decision-makers in the power sector, especially from the CEA, National Thermal Power Corporation, Maharashtra State Electricity Board, and other organizations. In fact the faculty themselves were largely from key public sector undertakings in the field.

This event was a tribute to the organization skills of Mr Kirit Sheth, EMS Bombay Chapter Chair and his team, especially the Program Chair, Mr. A. Velayutham, then Member Secretary Western Region Electricity Board (now Member of Maharashtra Electricity Regulatory Commission) and an active IEEE member.

Above all the program served to establish valuable linkages between the professional community and the power industry.

Central Texas Chapter by Leslie Martinich

The Central Texas Chapter embarked on a plan with three major objectives:

1. To build the engineering management capabilities of our members
2. To improve the performance of our members' teams
3. To build the strength of our chapter in order to support our future conference plans.

The first step of this plan is to hold regularly scheduled meetings with speakers.

Catherine Crago of The Semiconductor Group addressed the chapter meeting on October 7, and provided guidance in managing the transition to globally

distributed operations of an engineering organization. Crago cited four questions organizations ask during the planning, execution and evaluation of distributed operations. These fundamental questions are asked at every point in the transition process and by every level team member:

1. Do our values have to change to accommodate our new operation?
2. Does the way we make decisions have to change?
3. Are our words and meanings understood by distributed team members?
4. Do we need to change communication methods and protocols to accommodate culture, time and distance?

She offered case studies and data based on a survey of more than 100 multinational team members. Additionally, she provided each participant with a list of "10 Principles of Distance Management."

Twenty-seven people attended the meeting. Eleven are members of IEEE and 9 members of EMS. The non-member attendees were encouraged to join IEEE and EMS and several indicated they would like to do so.

Approximately 100 people attended the IEEE UT EMC 2004 "Managing the Future," held August 12-13, in Austin. Economist Angelos Angelou (Angelou Economics) gave the keynote address on "Economic Trends: Austin, Texas and the U.S." It included a stark contrast in the Austin job growth data since 2002, contrasting the non-technology sector, which has grown slightly, and the technology sector, which has shown consistent and significant job losses since 2002.

LaVerne Council (VP I/T Global Technology Development and Services at Dell) gave the keynote address on August 13 on Globalization.

The conference included four workshops and 13 papers.

The conference concluded with a panel on outsourcing moderated by Pat Wyman (ADEA Solutions) and including Judith Ambler (Perot Systems), Stacey Berlow (Project Balance), David Chao (SC Global Strate-

gies), Glen Edgerly (Emerson Process Management), and Brenda Hall (Austin Test, Inc.).

The Chapter is actively involved in the planning of the 6th Annual IEEE-

UT Engineering Management Conference, EMC 2005 "Managing in Uncertain Times" to be held August 25-26th, 2005 in Austin, Texas and have issued the following Call for Papers.

Call for Papers

The Program Committee welcomes all papers related to the broad theme of "Managing in Uncertain Times." Suggested topics include:

- Retraining
- Mergers and acquisitions
- Security
- Layoffs
- Diversification
- Risks

- Trusted intermediaries
- International standards

Schedule for proposals:

Submit abstracts to Steve Prough: sprough@austin.rr.com
 May 1, 2005 Deadline for submission of abstract
 June 1, 2005 Notification of acceptance
 July 1, 2005 Deadline for final version

Conference website: www.ieeeUTemc.org

Global Water Policy

by Terrance Malkinson

Water is the basis of life. Our body, which is approximately 60% water, needs to consume about four liters a day to maintain metabolism. While 70% of the world's surface is covered by water, 97.5% of this is saltwater; and of the remaining 2.5% that is freshwater, 75% is frozen as ice. Every citizen of the world lives within one global ecosystem and as engineering managers we have a professional responsibility to ensure that no harm is done to the natural processes necessary to sustain life on this planet.

The Importance of the Issue
 Freshwater is being increasingly used faster than the ecosystem's natural water recycling systems can supply. Countries around the world are facing growing water deficits as the supply of freshwater diminishes. The largest water user is agriculture (69%), followed by industry (23%). More than 2.2 billion people, mostly in developing countries die each year from diseases associated with poor water and sanitation. Over 6,000 children die every day from diseases that can be

prevented by improved water and sanitation. About 1 billion people (1 out of 5) in the world drink unhealthy water. In the developing world 90% of all wastewater goes untreated into local rivers and streams. Water is not distributed or utilized evenly globally. The average United States citizen uses 500 liters/day, British citizen 200 liters/day and Somalia citizen 8.9 liters/day. Conflicts over water have resulted in combat and bloodshed. Incentives to promote water management increasingly face political challenges.

Continued complacency over the water situation is likely to lead to a water crisis that will have serious consequences for us all. The recent (2000) trained water tragedy in Walkerton, Canada where contaminated tap water caused seven deaths and acute illness in over 2,300 citizens proves that even in the developed world, if the water supply is not managed responsibly our health is at risk.

Nature has been the template for most of the medicines we use today however habitat loss and overexploita-

tion are imperiling this source of natural medicines. Oil spills continue to contaminate large areas of the oceans. The oceans' wildlife continues to be over-fished. The 2003 world grain harvest fell short of consumption by 93 million tons, dropping world grain stocks to the lowest level in 30 years, and is thought to be the result of rising temperatures and falling water tables http://www.earth-policy.org/Updates/Update28_printable.htm

The report "World Water and Food to 2025: Dealing with Scarcity" <http://www.ifpri.org/pubs/books/water2025/water2025.pdf> by the International Food Policy Research Institute (Washington DC, 2002) describes the relationship between food supply and water availability. By analyzing the various policy and investment scenarios, the authors' show how policy makers and water users managing water resources can make the difference between a food-secure world and one in which water shortages could lead to hunger, poverty, and conflict.

Drought

The impacts of drought are substantial. It is estimated that between \$6 billion and \$8 billion is lost annually in the United States in the agriculture, transportation, recreation and tourism, forestry, and energy sectors. Similar economic losses occur in other countries. In the past decade, drought occurred not only in the drought-prone western states but also throughout the eastern United States. The drought of 1999 in the east extended from the New England states to Florida and into the Ohio Valley. This was the worst drought in 100 years for the mid-Atlantic States. The southeastern states (particularly Georgia and Florida), experienced three consecutive years of drought from 1998 to 2001, and dry conditions plagued Georgia and the Carolinas in 2002. Drought also had substantial impacts in the Pacific Northwest in 2001. In 2002, the western United States experienced severe drought conditions. The impacts of these droughts illustrate increasing vulnerability to extended periods of water shortage. Interest in planning for drought has increased at all levels. In 1980, only 3 states (New York, South Dakota, and Colorado) had drought plans. Now over 38 states have some type of plan or are in the process of developing a plan. The tremendous economic, social, and environmental costs associated with drought are one of the reasons for this interest.

The Clean Water Act (1977)

The Clean Water Act (1977) established the basic structure for regulating the discharge of pollutants into the waters of the United States. www.epa.gov/r5water/cwa.htm
Before this Act 70% of U.S. waters were too polluted for swimming or to support fish and other wildlife. Although progress has been made there is still a long way to go. Population growth is threatening the progress that has been made. Small streams, ponds, and wetlands are under threat. New and dangerous chemical and biological pollutants are still

entering the water ecosystems. Natural aquatic purifiers are being destroyed. Deforestation is threatening the mountain reservoirs.

The National Drought Policy Act (1998)

Droughts have caused substantial economic and environmental damages. On July 16, 1998, Congress passed the National Drought Policy Act of 1998, Public Law 105-199, which established the National Drought Policy Commission. The Commission is composed of fifteen members representative of all levels of government and other drought impacted groups. It is charged by Congress to provide advice and recommendations on the creation of an integrated, coordinated Federal policy designed to prepare for and respond to serious drought emergencies. The report of the National Drought Policy Commission is the result of thousands of hours of effort by many persons and groups who have a commitment to improving drought policy in our nation. National Drought Policy Commission (NDPC) reports are accessible via the following link: <http://www.fsa.usda.gov/drought/finalreport/accesstoreports.htm>

The Issues

Our struggles with our relationship with water are growing in importance as consumption continues to increase supply. Holistic policies are needed if a crisis is to be avoided. Important questions need answers:

- Private companies are supplying more and more of the world's water. Is water a fundamental human right and one that should not be entrusted to the private sector?
- Should pricing policies that encourage efficient water use distributed and affordable to all regardless of socioeconomic status and yet still ensure water quality protection should be created?
- How should decisions be made on the management of water channels that transcend national boundaries?
- Should nations/regions who have large reservoirs of fresh water be

required to share their water with less advantaged nations/regions?

- Should we be developing and implementing sustainable agricultural practices that consume less water?
- What can the international community do to help less advanced regions locate sources and build distribution systems of purified water? Is there a moral responsibility for them to do so?
- Should pricing structures for municipal and industrial water services reflect the full cost of providing the services?
- What is the effect of climate change on water reservoirs such as glaciers and the polar ice caps?
- What is the future for hydroelectric power generation? More and more dams are being removed (140 removals 1995-2000) due to safety and efficiency, fisheries, and reservoir siltation issues.
- Should scientists be investigating and government implementing programs to influence and modify the weather to alleviate drought and the effects of hazardous storms?
- Should we be examining the possibility of building floating homes and cities in the oceans?
- What opportunities and responsibilities does the global community have in developing (engineering) the oceans?

Further sources of Information:

The World Water Council

The World Water Council <http://www.worldwatercouncil.org/about.shtml> is the international water policy think tank dedicated to strengthening the world water movement for the improved management of the world's water resources. Membership includes more than 300, including public and private sectors, NGO's, and United Nations agencies. The missions of the World Water Council are to promote awareness and build political commitment on critical water issues at all levels, to facilitate the efficient conservation, protection, development, planning, management

and use of water on an environmentally sustainable basis for the benefit of everyone. The Water Policy research journal published by the Council provides reviews and debates on all policy aspects of water resources. This Journal provides a forum for dialogue between diverse private and public communities, policy makers, diplomatic, administrative, judicial, technical and scientific parties. This dialogue includes all water community's -agricultural, rural, environmental, industrial, urban, transport and energy producers and consumers.

International Water Management Institute

The International Water Management Institute <http://www.iwmi.cgiar.org/> is a non-profit scientific research organization specializing in water use in agriculture and integrated management of water and land resources. IWMI works with partners to develop tools and methods to help these countries eradicate poverty and ensure food security through more effective management of their water and land resources. IWMI's research operates at regional, national and local levels, concentrating on work that has the potential for wide application. Research projects are in progress in some 20 countries, across Asia and Africa.

Environmental Expert

Environmental Expert <http://www.environmental-center.com/index.htm> is an independent business publisher maintaining a web-based information center for environmental professionals

and businesses worldwide. Environmental Expert focuses on the business needs of environmental industry professionals, and is a recognized leader in the field. Environmental Expert is designed to help professionals find information and contacts they need to be successful in their careers. Special sections of this publication focus on: News, Publications, Reports, Journals, Magazines, Equipment and Technologies, Software Solutions, Services, Professional Training, Conferences, Trade Shows and Jobs. Over 140,000 environmental professionals from North America (70%), Europe (25%), and the Asia Pacific region (5%) use this site on a monthly basis.

The National Drought Mitigation Center

The National Drought Mitigation Center (NDMC) <http://www.drought.unl.edu/index.htm> helps people and institutions develop and implement measures to reduce our vulnerability to drought. Most of the Centers services are directed to state, federal, regional, and tribal governments that are involved in drought and water supply planning. The NDMC's activities include maintaining an information clearinghouse; drought monitoring, including participation in the preparation of the U.S. Drought Monitor, drought planning and mitigation; drought policy; advising policy makers; collaborative research; K-12 outreach; workshops for federal, state, and foreign governments and international organizations; organizing and conducting seminars, workshops,

and conferences; and providing data to and answering questions for the media and the general public. The NDMC is also participating in numerous international projects, including the establishment of regional drought preparedness networks in collaboration with the United Nations' Secretariat for the International Strategy for Disaster Reduction.

Conclusion

It is clear that we need a paradigm shift in the way that we think about water. Managing water responsibly is in everyone's best interest. It is not a problem that affects only a few countries. Citizens and engineering managers in every country in the world must examine the issue. Water reservoirs exist and we have the technology to build the infrastructures necessary to distribute water equitably to everyone on earth. We simply need the will and generosity to do so. Reaching a solution requires a mixture of public leadership, market know-how, science, technology and partnerships among all of the stakeholders.

Terrance Malkinson is a proposal manager/documentation specialist; an elected Senator of the University of Calgary; an elected Governor of the Engineering Management Society, international correspondent for IEEE-USA Today's Engineer; editor-in-chief of IEEE-USA News and Views, and editor of the IEEE Engineering Management. Opinions expressed are the author's.



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IEEE Engineering Management Society Newsletter (ISSN 1066-212X) is published quarterly by the Engineering Management Society of the IEEE, Inc. Headquarters address: 3 Park Avenue, 17th Floor, New York, NY 10016-5997. The cost is \$1.00 per member per year (included in Society fee) for each member of the Society. IEEE Customer Service: 1-800-678-IEEE (USA and Canada), 732-981-1393 (outside USA and Canada), FAX 732-981-0027.

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Printed in the U.S.A.

Newsletter Deadlines

Issue	Deadlines
First Quarter	15 January
Second Quarter	1 April
Third Quarter	1 July
Fourth Quarter	1 October
Terrance J. Malkinson, Editor <malkinst@telus.net>	
Paul Doto, IEEE Newsletter Coordinator <p.doto@ieee.org>	

Periodicals postage paid at New York, NY and at additional mailing offices.

Postmaster:

Send address changes to IEEE Engineering Management
Society Newsletter, IEEE, 445 Hoes Lane, Piscataway, NJ 08855.



Engineering Management