

EXECUTIVE COMMITTEE'S DESK

The Chairman's Message

- P. Suresh Chander Pal

-Edited by Aparna Murali (aparnamurali@ieee.org)

It is with pleasure that I have been sharing my experience, with all our members, through our "LINK". As you may be aware, we have 83 Student Branches and 2732 H.G.Members, including 1 Fellow and 60 Senior Members, in our Madras Section.

Though there are 38 Societies, affiliated to IEEE, we have only Power Engineering Society, Engineering Management & Industrial Applications Societies and the GOLD Affinity group, reporting on their activities to our Section. The untapped potential available is vast and the IEEE offers various opportunities for members' networking worldwide & peer recognition.

I am glad to inform you, that our IEEE Regional Activities Board, has given meritorious recognition to the Madras Institute of Technology, at Chromepet, as the recipient of **2003 RAB Student Branch Membership Growth Award**, for being the outstanding leader in Membership Development activities in the IEEE Madras Section. We are planning for the Award presentation, in a fitting manner, at one of our future Meetings.

GOLD, young professional (GOLD Affinity Group), stresses the value of retaining membership, upon graduation. There is value in volunteering in IEEE's technical, professional & societal activities, in the fields of electricity, electronics and communication, in support of humanity and our profession. For greater awareness of GOLD, we shall arrange for a short visual presentation on the Screen, at one of our regular meetings.

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FROM THE EDITOR'S DESK

-Rajeev Ganesh

(Rajeev_Ganesh@ieee.org)

"The Journey of a Thousand miles begins with a single step" -A Chinese Proverb.

Just as this proverb says our aim to make this Newsletter not only reachable but also readable by all IEEE members within the Madras Section; has now taken a giant leap on its Thousand Mile journey. **I am really happy to announce that for the 1st time this Newsletter has an article not just from one of the Editorial Team members but also from a Reader on NanoScience.** This was the level of interaction we were really waiting for. I suggest more people to get involved in this way. U can always write to IEEE_news@yahoo.com or directly to me.

The team has put in quite an effort announce Various IEEE activities, Lectures & Conferences and we are working to increase our output on this point. Creating awareness of the Ocean of Knowledge & Opportunities is emphasized in the "Power of IEEE" article.

As for article of the month I chose write about high potential technology produced by an Alliance- Zigbee; a giant created by the IEEE. Since Zigbee is still in a pivotal stage; Bluetooth is still running hot. So, we put it in Tech Buzz along with one of the most malicious topics in IT- "Pirates on the Net". Last but not least, don't forget trying out the brainteasers.

The seed we sowed through at the 1st edition has slowly grown into a plant. I can only wish that it grows exponentially.

Making it a reality is in Your Hands!!

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POWER OF IEEE UNLEASHED

-Amit Mohan Easow (amiteasow@ieee.org)

Having an IEEE membership does a world of good to the person possessing it, provided he/she is interested in an engineering career. This column is usually dedicated to the awards that are presented to IEEE members who have gained recognition for themselves, through their papers sent to international contests. A good example is the Lance Stafford Larson Student Scholarship which was awarded to Kalyana Sundaram from the Thiagarajar College of Engineering in Tamil Nadu, which was already printed in the May issue. But let's face it, not all of us are capable of presenting material worthy of those standards. So, what does the IEEE membership hold for the rest of us? This was the same question that I asked myself before I renewed my IEEE student membership for the second year. All my batch mates had ditched the idea of renewing long ago. But I renewed anyhow in the second year of my engineering. To tell you the truth, it is the IEEE membership that has brought me to where I am today. I have just completed my BE in Computer Science Engineering from St. Joseph's College of Engineering. I have got an admission into one of the most prestigious and oldest universities in the US. I am sure that the Ivy League university, University of Pennsylvania, considered my application only when it had seen the mention of IEEE paper, IEEE Secretary and IEEE editor on my resume. In my second year and subsequent years, I was the sole IEEE student member of my college from my batch. And I took up the initiative with some of my friends to present seminars at college to my batch mates in the name of IEEE. The college IEEE Secretary-ship automatically became mine. Then in the third year I sent an original paper, "SNTP" for presentation to the IEEE-India contest to be held at Varanasi. Though my paper was not selected for the final 15 of that year, it was enough to be mentioned on my resume. Then in the final year of B.E., I volunteered as an editor of "The Link" when the opportunity presented itself through an email sent to all the current members. So I urge you to become an IEEE member today and enjoy the many benefits available to you. The Spectrum magazines which are mailed to the members on a monthly basis also helped me realize my area of interest namely Telecommunications and Wireless Networking which I am going to study in the US. So I wish you all the very best and hope you also come to understand the power of IEEE as I did, and enjoy every bit of it!

Nanoscience and Nanotechnology

- Pradeep (pradeepsaran@yahoo.com)

Nanoscience and nanotechnology (N&N) are buzzwords that pop up all over the place. But what is this new scientific frontier, and where will it lead? Nanotechnology as a collective term refers to technological developments on the nanometer. A nanometer (American spelling: nanometer) is 10^{-9} metre. Its symbol is nm. It is an SI measure of length, commonly used in measuring the wavelengths of visible light, ultraviolet radiation and gamma rays.

1 nm = 1000 picometre.

1000 nm = 1 micrometre aka 1 micron.



The molecule on the stamp is a "fullerene" molecule called C₆₀, created from sixty carbon atoms arranged in the same structure as a football. This was first discovered by a group of scientists from the US and Sussex University in the 80s, and in 1996 Professor Sir Harry Kroto from Sussex received the Nobel Prize for the discovery. After balls came tubes of carbon, and the nanotech revolution began. Now macromolecular assembly of nanotubes and biomolecules are paving the way towards state-of-the-art nanoscopic devices.

Take it to the limit. That's the philosophy behind N&N. The limit for the size of any structure or machine is the atom, which has dimensions of 0.1 to 0.3 nanometres. It's an important limit. In the semiconductor chip industry, computer memory and disk size doubles approximately every 18 months (with a similar reduction in cost). Manufacturers have been packing more and more logic elements into a single chip by making each element smaller and smaller. Progress has been steady over the last two or three decades and the rate of improvement (noted by Gordon Moore and coined 'Moore's Law') will mean that the size of each element must approach atomic dimensions in a decade or so. Of course, chemists have been juggling with atoms for centuries. However last century, when Physics provided the new theory of small things (Quantum Mechanics), chemists were converted from atomic jugglers to molecular designers. Their work has been aided by computers following the equations of motion of all the electrons and nuclei in the molecule. Thus biochemists tamed fantastically complex molecules such as DNA and, by the turn of this century, had unravelled the blueprint for a human being: the human genome. This information enables pharmaceutical companies to engineer molecules of the right shape and activity to cure diseases, guided by quantum chemistry and the detailed maps of target areas in the complex molecules of life. Nanoscale thinking To get an idea of the scale on which the nano-world operates... imagine a fullerene molecule was the size of a football, then on the same scale a football would be the size of the earth!

The stage is set for a next generation of nanoscience and nanotechnology. We are developing new materials, which for the first time are being constructed from the atomic level upwards. They have the potential to revolutionise a range of industries from construction, aeronautics and vehicle design, to computing, biomedical and fields we have not even imagined yet. At the moment we are in the process of writing the atomic scale construction manuals that will be needed, and then the building can begin! Building blocks for the future, Carbon nanotubes are roughly one hundred times stronger than steel, yet only one sixth the weight! These tubes may one day form the building blocks for devices ranging from nanoprocessors to vehicle frameworks and beyond, the limit may only be that of the human imagination!

ANSWERS FOR MAY ISSUE OF BRAIN TEASERS

- 1) b.
- 2) e
- 3) c.
- 4) a.

Article of The Month: Move Over, Bluetooth; ZigBee is here

-Rajeev Ganesh
(Rajeev_Ganesh@ieee.org).

Bluetooth® wireless technology has received a lot of attention for wireless connectivity. Now it's ZigBee's turn. ZigBee™ is the name of an alliance of companies formed around IEEE's recently approved (May 2003) 802.15.4 specification for low data rates in the Industrial, Scientific and Medical (ISM) radio bands. The ZigBee protocol promises to provide longer battery life (months or even years on a single battery charge) and to be a lower-cost alternative to Bluetooth for wireless sensing and control applications.

The ZigBee alliance which includes such companies as InvenSense, Honeywell, Mitsubishi Electric, Motorola, and Philips takes its name from the zig-zag path of bees that form mesh networks between flowers. ZigBee proponents believe mesh networking is the key to unattended wireless systems in the home, business, or industry. Mesh networking, they say, provides redundancy required for unattended system operation and is essential for the reliability of the ZigBee network.

The IEEE 802.15.4 wireless standard was developed specifically for remote monitoring and control. "802.15.4 is the first standard I am aware of that expressly focuses on low cost and low power and fairly modest bit rates," says Robert Poor, a technical editor for the 802.15.4 standards specification, and chief technology officer and co-founder of Ember Corporation. Ember was established to provide embedded wireless networking solutions and is one of the participants in the ZigBee Alliance. The standard defines transmission and reception on the physical radio channel (PHY), and the channel access, PAN (personal area network) maintenance, and reliable data transport (MAC). ZigBee defines the topology management, MAC management, routing, discovery protocol, and security management, and includes the 802.15.4 portions.

To meet global regulatory requirements, ZigBee is designed to work in either the 868-through-928 MHz band to cope with regional differences, or 2.4 GHz ISM band typically available worldwide. "Where we see the market really taking off is in the home," says Kirsten West, founder of West Technology Research Solutions, a market research and consulting company focused on emerging technologies. The motivation for wireless connectivity in Asia/Far East is conservation. Mesh networking aids such unattended system operation. The star topology used in cell phones and wireless LANs has a central control point that requires physical movement to improve connectivity. Mesh networking allows alternative paths to routing data to the target device and this process is transparent to the user. To provide low cost, the system requirements for ZigBee are much less than Bluetooth and other wireless protocols. Also, ZigBee's bandwidth is lower than Bluetooth, but the range is greater and the number of nodes is much greater. Bluetooth is limited to eight nodes per network. Many of the potential ZigBee applications, such as networked lighting in office buildings, would require dozens and even several dozens of nodes.

BRAIN TEASERS

-Amit Mohan Easow (amiteasow@ieee.org)

1. What is a networked computer that is shared by multiple users?
 - a. WAN (Wide Area Network)
 - b. Modem
 - c. World Wide Web
 - d. Network
 - e. Server
2. What do we call anything created with a software program that is stored in a computer?
 - a. Document
 - b. Record
 - c. Field
 - d. Report
 - e. Text
3. What word means to copy or send a file from a local computer to another computer on the Internet?
 - a. URL (Universal Resource Locator)
 - b. Login
 - c. Upload
 - d. Download
 - e. Server

TECH BUZZ

PIRACY ON THE NET

Rajamohan N (nraj_15@rediffmail.com)

Internet piracy is a term used for the general use of the Internet to illegally copy or distribute counterfeit or other unauthorised software. This crime occurs when the Internet is used to advertise, offer, acquire or distribute pirated software.

Over the past few years, sale of counterfeit software through the Internet to unsuspecting consumers has multiplied. An estimated 2 million Web pages offer, link to, or otherwise reference "warez" software - the Internet code word for pirated software.

Shielded by anonymity and boosted by the reach of the Internet, these cyber-pirates are able to attract innocent cyber-shoppers with attractively priced software. Unbeknownst to the consumer, he or she buys counterfeit software from an illegitimate and unauthorised source.

Here are some tips to help you shop smart and safe on-line:

- Get full company address and phone numbers up front.
- Avoid doing business with companies or individuals that are unwilling to verify their identity.
- Ask for full details on return, service or warranty policies. If you aren't satisfied with the response, there's something wrong with the source.
- Check product prices. Beware of on-line distributors that offer unusual explanations, for example, liquidated inventories or acquisition through bankruptcy sales. Counterfeiters often use these phrases to dupe consumers into believing they are legitimate businesses that sell legal products.
- If in doubt, contact the software publisher
- Piracy's economic impact

In the United States alone piracy has resulted in 107,000 job loss.

BLUETOOTH TECHNOLOGY

Sreekar (scorpion_reddy@ieee.org)

Whilst Nordic states were warring, he managed to unite Denmark and part of Norway into a single kingdom. The Bluetooth brand is now recognised worldwide on products with short range wireless communication capabilities. The brand is applied to devices implementing the Bluetooth technology, even if it says little about the way the technology works.

Fundamentally Bluetooth operates within the Industrial, Scientific and Medical (ISM) band at 2.4 GHz. It is a short-range wireless communication standard defined as cable replacement for a Personal Area Network (PAN).

In unrestricted countries the radios hop in pseudo random sequences around all available channels, this equates to 79 RF channels with a channel spacing of 1 MHz. Starting at a base frequency of 2402 MHz then the frequency of the channels, f , can be expressed as:

$$f = 2402 + n \text{ MHz}$$

Where, n , is the channel number with an integer value in the range of 0 to 78.

In restricted countries a limited frequency hopping schemes with just 23 channels is used and is catered for in the Bluetooth specification. Both hopping schemes have a 1 MHz channel spacing making it possible to design a simple radio interface whereby the base band only has to specify a channel number and the radio multiplies this up to the appropriate frequency offset.

In this FHSS scheme there are 1600 hops per second, which is a hop every 625 μ s. Part of this hop timing is taken up by the guard time of 220 μ s allowing the synthesizer time to settle. The frequency hopping implements time division multiplexing. As the radios are constantly hopping to different radio channels, this ensures that packets affected by interference on one channel can be retransmitted on a different frequency channel.

NATIONAL AND INTERNATIONAL CONFERENCES COMING UP THIS MONTH

-Parthan (parth_srp@ieee.org)

Here is a list of upcoming conferences :

1. **Conference Name** 2004 26th International Conference Information Technology Interface(ITI)
Date 07 Jun - 10 Jun 2004 **Location** Croatia Hotel, Cavtat, Croatia.
Conference Web Site URL <http://iti.srce.hr>
2. **Conference Name** 2004 International Networking and Communications Conference (INCC)
Date 11 Jun - 14 Jun 2004 **Location** Lahore University of Mgmt Sci. Lahore, Pakistan.
Conference Web Site URL <http://ravi.lums.edu.pk/ieee/incc2004/index.htm>
3. **Conference Name** 2004 IEEE Intelligent Vehicles Symposium (IV)
Date 14 Jun - 17 Jun 2004 **Location** Universita degli Studi di Parma Parco Area Delle Sci. Parma, Italy.
Conference Web Site URL <http://www.ieeeiv.org/>
4. **Conference Name** 2004 IEEE Symposium on VLSI Technology
Date 15 Jun - 17 Jun 2004 **Location** Hilton Hawaiian Village Honolulu, HI.
Conference Web Site URL <http://www.vlssymposium.org>
5. **Conference Name** 2004 2nd International IEEE Conference "Intelligent Systems"
Date 22 Jun - 24 Jun 2004 **Location** Bulgarian Council of Ministers Holiday Complex Varna, Bulgaria.
Conference Web Site URL <http://www.fnts-bg.org/is/>
6. **Conference Name** 2004 IEEE International Conference on Solid Dielectrics (ICSD)
Date 05 Jul - 09 Jul 2004 **Location** Centre de Congres Pierre Baudis Toulouse, France.
Conference Web Site URL <http://www.icsd2004.org>

Chairman's message (cont'd)

It is said that the future belongs to the Science & Technology and those who make friends with the Science & Technology. Let us build our **image of IEEE**, by enlarging our activities, starting more number of Student Branches & increasing membership. We invite eligible Members to apply for elevation to the grade of the **Senior Members**, citing Mr. P. Suresh Chander Pal(SM00207274) Chair, Mr. C. R. Sasi (SM07117492) Mr. G. V. Rao (SM40280459) or Dr. Ponnavaikko and two other Senior Members, or others known to them, as referees, under intimation to the referees, along with their bio-data & experience, for making the recommendation. This can be done online also. Our Senior & qualified Members should apply for Fellowship. IEEE is for technical people, with a culture of mutual care & commitment. IEEE is for continuous learning opportunities, for promoting global prosperity, world-class standards for efficiency and professionalism.

IEEE is for volunteers, who value the satisfaction, derived from serving the World Community. I invite your views and suggestions and request you to share your experiences, through **"LINK"**.

WORLD TELECOMMUNICATION DAY-2004

The Celebration of World Telecommunication Day , on 17th May2004,at Hotel President at Mylapore, was a delightful meeting of local heads of apex bodies viz., VSNL,BSNL, Bharat Infotel ,IETE,IEEE,IE(I), IEE and Broadcasting Engineering Society(India).The theme for this Year's celebration, organized by IETE ,Chennai Centre and co-sponsored by other Societies, was **"ICTs : leading the way to sustainable development"**.

M/s K. B. Brahmadathan, CGM, BSNL, Chennai Telephones, P. R. Krishnan, Vice-President (Telecom), TCS, A. S. Menon, Regional Manager (SR) VSNL, M. S. Ravichandran, CTO, BhartiInfotel, P. Mohandoss, Chief Engineer, AIR & Doordarshan, K. S. Lakshminarayanan, G.M. (IT)&CTA, Elcot, V. AppaKutty, Director (Engg) Prasar Bharati &Chair, IETE, P. Suresh Chander Pal, Chair, IEEE Madras Section, A. Sivasnkaran, Chair, Institution of Engineers (India), TN State Centre, Captain N. R. Ravi, Chair, IEE, Chennai center , spoke on the occasion.

ICTs can involve more people, hitherto unreached and under-served and accomplish a deeper geographic penetration, especially to rural areas, (with See, Speak & Touch features), than in the case with the traditional means and modalities. From the present Electronic Voting, we can look forward to the Tele-voting, in the future. ICTs allows faster delivery and a more adapted content of technical assistance, in a variety of sectors ranging from **Long Distance Education, Tele-medicine, Environmental Management, to strengthening of participatory approaches and creation of livelihoods.**

ICTs are not only a significant factor in the performance and growth of economiesbut they also represent a novel and effective tool to help sustainable human development, reducing poverty and creating opportunity for long term development

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