



THE INSTITUTION OF ELECTRONICS AND TELECOMMUNICATION ENGINEERS

Newsletter

Vol. 1, No 4

November-December 1992

FROM PRESIDENT'S DESK

Some of our senior members may recall that our Institution was established on 1st October, 1953 by a small group of pioneering practitioners of electronics and telecommunication engineering. Looking at those times, the level of electronics and telecommunication developments in those days in India and on the world scene and the present status of our Institution, our hearts are full of admiration and respect for the fine work done by the founders of IETE and the path they charted for us. The history of IETE is indeed synonymous with the history of electronics and telecommunication engineering in modern India. Recognizing this, our Council has now decided to commemorate, 1st October every year, from now onwards as the IETE Foundation Day. What better day can we have to launch this than 1st October 1993, which happens to be the 40th anniversary of our Institution. We are keen to celebrate this event in a fitting manner. For this purpose, I invite suggestions/views from our members at an early date. We have plans to link this programme with our 39th Annual General Meeting and the 36th Annual Technical Convention which are proposed to take place at the historic city of Hyderabad during 30th September-2nd October 1993. Many other technical programmes are also proposed for 1993 in connection with the 40th anniversary of IETE. I look forward to your support and active participation to make this year a memorable year for the IETE.

Bangalore

B S Sonde
President

NEWS FROM HEADQUARTERS

Technical presentation

A technical presentation on "INMARSAT PROJECT 21 - An Evolutionary Approach to Personal Mobile Satellite Communications" was made by Mr Olof Lundberg, Honorary Fellow of the IETE and Director General of INMARSAT on 27 Oct 92 at the Delton Hall. Prof B S Sonde, President of the IETE presided. Mr Lundberg informed that the world's first personal, portable, mobile satellite phone, compact enough to fit into a briefcase and potentially capable of making terrestrial

phone lines redundant will be commercially launched by the end of this year. He said that INMARSAT had launched a programme called 'PROJECT 21' that will involve introducing a series of personal satellite services leading to even smaller hand held satellite phones by the end of 1990's.

Elections

The re-election at Ahmedabad and Madras have been completed and Prof P S Patel and Shri S A Soundara Rajan have been elected Chairman respectively.

NOTICE

- The 24th Mid term Symposium on "Space Electronics and Communications" and its other associated events which were scheduled to be held at Ahmedabad during 16-17 Jan 93 have been postponed to 10-11 Apr 93, due to reasons beyond our control. The inconvenience caused to the Members is very much regretted.
- A workshop on 'ISO 9000' will be held on Saturday the 6th Feb '93 afternoon at Delton Hall, IETE HQrs, Lodi Road New Delhi.

(SECRETARY)

NEWS FROM LOCAL CENTRES

Bangalore

- Contact Programme for AMIETE students was arranged on 06 June 92.
- Final test for Summer school in Electronics (SUSIE-92), Students was held on 07 June 92.
- Inauguration of Coaching Classes for Maths, Network and Electromagnetic fields & Waves held on 12 Jul 92.
- The Saturday evening Video Shows was inaugurated by Shri P Kailasnath, Hony Secy IETE. Video Show on: OP Amplifier, Power Suppliers and Satellite Communication was held on 18 Jul 92.
- Saturday evening Video Show on Practical Transistors was held on 25 Jul 92.

- Sunday morning lectures were inaugurated on 26 Jul 92 by Shri G Narendra Nath, Addl Director, ETDC, Bangalore. The lectures were related on 'Transmission Lines' by Prof A Kumar and on 'Microwave Communications' by Dr T S Vedavathy.
- Saturday evening Video Show on Digital Signal Processing and colour computer was held on 01 Aug 92.
- A Technical Lecture on 'Data Communication' by Shri N Chandrasekhara, Divl Engr, EDX/Tlex was delivered on 02 Aug 92.
- Saturday evening Video Show on 'Super Computers & The VLSI Micro Chip' was held on 08 Aug 92.
- A Technical Lecture on 'Photo Electric Devices' was delivered by Shri Srikanta, Deptt of Elect Engg, IISc, Bangalore on 09 Aug 92.
- Saturday evening Video Show on 'Computer Programme' was held on 15 Aug 92.
- Inauguration of ETE 92 was done by Shri Gautam Soni, Sr Director, DOE, New Delhi. Shri A K Srivastav presided over the function. The exhibition of electronic projects was held during 14-16 Aug 92.
- Shri M G Chandrasekar, Director, EOS & Scientific Secretary ISRO Bangalore was the Chief Guest at the Valedictory

of ETE 92 on 16 Aug 92. He distributed the prizes and certificates and Prof B S Sonde, President Elect. IETE presided over the function.

- A Technical lecture on 'Optical Fibres in Telecommunication' was delivered by Prof A Selvarajan (ICE Dept, IISc) on 16 Aug 92.
- Saturday evening Video Show on 'Digital Applications' on 22 Aug 92.
- Inauguration of Short Term 'Printed Circuit Boards' course was done by Shri P Kailasnath, Hony Secy, Bangalore centre on 22 Aug 92. The key note address was given by Prof B S Sonde.
- A Technical lecture on 'Instrument Landing Systems' by Prof N Balakrishna of IISc, Bangalore was delivered on 23 Aug 92.
- Inauguration of Talk Back TV Programme was held on 24 Aug 92.
- A talk was given on 25 Aug 92 by Shri P Ramachandran of ISRO, Bangalore on INSAT 2A.
- A Technical Lecture 'Introduction to Microprocessors' was delivered by Dr D K Anvekar of IISc, Bangalore on 30 Aug 92.
- One day Seminar on 'Vapour Phase Technology in Manufacturing and Testing' was arranged by Dr D

Felodmann, Novatec GmbH, Germany on 04 Sep 92.

- A technical lecture was delivered on 06 Sep 92 by Dr S R Bhat of IISc on 'Solar Photo voltaic Energy Conversion'. Shri G Narendra Nath presided.
- Video Shows on 03 Sep, 05 Sep and 12 Sep 92 were held.
- A technical lecture on 'Fundamentals of Satcom' was delivered by Dr T S Vedavathy of IISc, Bangalore on 13 Sep 92.
- A technical lecture on 'Basic TV Systems and Colour Televisions' was delivered by Shri M V Srinath of IISc Bangalore on 20 Sep 92.
- A technical lecture on 'Digital Communication and Computer Networking (LANs and WANs)' was delivered by AVMP Govindarajan (R) Technical Consultant, Digital Eqpt (I) Ltd on 08 Oct 92. Brig A K Borwanker, Vice Chairman IETE presided.
- A technical talk in the memory of Prof K Sreenivasan - on 'Telecom Equipments Quality Assurance' was delivered on 14 Nov 92 by Shri G S S Murthy, CGM - Telecom Quality Assurance Circle, Bangalore. He has also distributed the prizes to the winners of All India technical Talk & Essay Contests (for BEL & ITI awards). Prof B S Sonde, President IETE unveiled the photograph of Prof K Sreenivasan at this occasion.

Dehradun

- A training course on 'Design Reliability' was held during 23-25 Sep 92.

Patna

- A lecture on 'Telecommunications Development in Bihar & Non-Conventional energy' was delivered on 19 Oct 92 by Shri Rustam Ali, Chief GM Telecom, Bihar Circle. The Chairman IETE Patna Centre was the Chief Guest.

Nagpur

A technical lecture on 'Development of Communication in Indian Railways



was delivered by Shri Deepak Bhalla, Sr Divnl Manager, SE Rly on 25 Aug 92.

- A technical lecture on 'VHF Radio for Rural Communication' was delivered by Shri A N Deshmukh, Manager, R&D Meltron, Nagpur on 29 Aug 92.
- A technical lecture on 'Mining Electronics and Communication in India' was delivered by Prof PK Rangole on 23 Oct 92.
- A lecture meet on 'Industrial Computational Fluid Dynamic Software' was organised by Dr Rajiv Behodkar, Chief Engr, Computational Dynamics Ltd, London, UK on 05 Nov 92.

PERSONALIA



Prof U R Rao born in 1932, received his MSc in 1953 from Banaras Hindu University and PhD in 1960 from Gujarat University. He worked on 'Cosmic Rays' as a Post-Doctoral Fellow at the Massachusetts Institute of Technology. He joined PRL Ahmedabad in 1961 and initiated new programmes of research in the field of X-ray and Gamma ray astronomy using balloon-borne, rocket-borne and satellite payloads.

Prof Rao has been responsible for the establishment of satellite technology in the country. Under his guidance the first India Satellite "ARYABHATA" was designed, fabricated and launched from USSR Cosmodrome in 1975. Later two experimental remote sensing satellite - "BHASKARA-I" in 1979 and "BHASKARA-II" in 1981, the first experimental Geostationary Communication Satellite "APPLE" in June, 1981 and two "ROHINI SATELLITE" using "SLV-3" were successfully launched under his guidance.

Prof Rao as a Chairman of INSAT-I board provided overall guidance for INSAT Project, the first multipurpose operational system for providing Communication, TV/ Radio and Meteorological services. The

second generation INSAT-II system has also been designed under his guidance.

The Remote Sensing Satellites for Monitoring and Management of our natural resources IRS-1A and IRS-1B have been designed and launched under his guidance.

Prof Rao is a fellow of Indian National Academy of Sciences, a fellow of Aeronautical Society, and a fellow of Indian National Academy of Engineers. He has been and is a member of number of national and international scientific bodies. He has received many awards notable amongst them are:

Group achievement award by NASA in 1973; Medal of honour by the USSR Academy of Sciences in 1975 for his work on Aryabhata; Karnataka State Award in 1975 and 1983; Hari Om Ashram Perit Vikram Sarabhai Research Award, 1975 for his work in the field of Space Research; Shanti Swarup Bhatnagar memorial award, 1975 for his contribution to Engineering Sciences; National Design Award in 1980 by Institute of Engineers (India); VASVIK research award for 1980 in the field of Electronics Sciences and Technology; PC Mahalanobis Medal 1987 of INSA; Yuri Gagarin Medal by Bureau of Federation of Cosmonautics in 1991; Padmabhushan by Govt of India in 1976.

He is also a recipient of Honorary Doctorates from Mysore, Calcutta and Mangalore Universities besides the Agricultural University, Rahuri.

DISTINCTIONS



Dr J H Agarwal, Fellow and Council Member (92-95) of the Institution of Electronics and Telecommunication Engineers and the Director Instrumentation & Project Coordinator UNDP-DoE-MAEP (IEPP), Jawaharlal Nehru Agricultural University, Jabalpur has been invited to deliver the prestigious PLATINUM JUBILEE LECTURE (Engineering Science Section) at the 80th Session of the Indian Science Congress to be held at Goa during 3-8 January 1993.

TECHNICAL NEWS

First Digital Computer

It is generally believed that the First Digital Computer was built in 1946 by John Mauchly, a physicist at Ursinus College, Collegeville, Pennsylvania, USA. However, it was recently revealed by an Iowa Journalist that during a judgement in 1971, the credit of building the first digital computer went to John Atanasoff, a retired professor from Iowa State University, Ames, USA, who built a prototype of the digital computer in the year 1940 itself. What Mauchly did was to unveil his Electronic Numerical Integrator and Calculator (ENIAC) in 1946 and the device went down in the record books as the first digital computer.

The US president George Bush recently presented the 87 year old John Atanasoff with the National Medal of Technology for his role in building the world's first electronic digital computer more than 50 years after the achievement.

(R&D Magazine, Jan 5, 1991)

The Digital Future

We are going to see a merger of the computer, consumer electronics, entertainment and information industries in the future. The catalyst will be digitisation, everything from the analog waves of telephone calls, radio and TV to images of movies, photos and painting in going to be digital. Once all these informations have been converted to bits, it can be manipulated just like data in computer.

The vision for future is information any where, any time with COMP-TV at home and a digital assistant in your pocket. The same computer will read your hand writing, interpret your voice and manage reams of data on multimedia while the video phone will handle clear video images and microchips will give your phone computing power to take messages and handle faxes. All this through improved compression technology and personal digital assistant - a handy electronic diary/databook will help you communicate with the computers and fax machines from wherever you are.

So, while this digital future looks so rosy, there are some hurdles. There are major technical and marketing barriers to be overcome, there is no standard format for digitising and manipulating all this information, for instance; the compression technology to squeeze all these bits into digital highways is still being evolved; and then there is a question of having the high speed digital pathway. Cable Companies have an edge in this field. Cable has the bandwidth to move one billion bds (bits of data a second) but they lack the kind of computerised network monitoring and billing system, experience to two way communication and the finances to realise the entire pathway. Phone Companies have an advantage in this respect crippled only by the low capacity of their twisted pair copper wiring. Perhaps an alliance between phone & cable company is the answer.

Meanwhile the computer and consumer electronics companies are all going ahead with mutual dealings to manage this digital flow. No single industry or national is likely to dominate the digital world. The risks are high and while the deal making is on the way, the first products of digital evolution are coming out. Everybody is just making guesses about the digital future & shaping of new products. As said earlier, the vision is "information anywhere, anytime"

INTERNATIONAL NEWS

Wide range of ITU documents now available on-line: ITU standards to become electronically accessible in early 1993.

An electronic document distribution service providing remote access to ITU documents - TELEDOT became operational last week.

Aimed at providing fast and timely access to ITU information to the world telecommunication and networking Community, TELEDOT is a database containing at present:

- > CCITT and CCIR administrative documents
- > list of contributions (substantive input/proposals) CCITT and CCIR study groups

- > lists of CCITT reports and recommendations (ie standards)
- > summaries of CCITT new or revised Recommendations
- > CCITT and CCIR meeting schedules and other information concerning Study Groups structures and activities.

On TELEDOT's first day of operation, ITU Secretary-General Pekka Tarjanne stated: "The impact of the changing telecommunications environment makes it imperative that the ITU develop now approaches to the standardization process and find new ways to improve the efficiency of our work, new ways to disseminate the output of our work throughout the world. The implementation of TELEDOT", he said, "is undoubtedly a right step in this direction. Our ultimate goal is to make available on-line an entire library of ITU documents for a broad and transparent information exchange with all categories of interested users".

TELEDOT is based on a X.400 document server which processes requests sent in by electronic mail. The TELEDOT Auto-Answering Mailbox accepts messages from the two most widely used E-mail systems: X.400 and Internet. Users without direct access to X.400 or Internet mail can use gateway services provided by major service providers (eg MCI or Compuserve). The electronic mail address of TELEDOT Auto-Answering Mailbox (TAM) is:

X.400 S=teledot
P=itu
A=arcom
C=ch

Internet teledot@itu.arcom.ch

Document formats which are planned to be made available include ASCII, Microsoft RTF, Word for Windows, Postscript and CCITT ODA/ODIF.

TELEDOT will be available on request, on a trial period of one year, at no access cost.

Agreement on Compatibility between the Broadcasting (band 87-108 MHz) and Aeronautical Services (band 108-137 MHz)

For some time, experts have considered the problem of interface between FM sound

broadcasting stations and aeronautical radio systems. At a meeting of Task Group 12-1 of ITU's International Radio Consultative Committee (CCIR) held at ICAO Headquarters (Montreal, Canada), 36 international experts drafted a recommendation that will allow countries to assure compatibility between the broadcasting and aeronautical services which both utilize the radio frequency spectrum in the vicinity of 108 MHz.

The meeting, which took place from 07-16 September 1992, was chaired by Dr J Finnie of the United Kingdom and assisted by Mr E Augstman (Canada) and Mr K Hunt of the European Broadcasting Union as Vice-Chairmen. Participants included representatives from 10 countries, 4 international organizations and 3 operating agencies.

ASIA TELECOM 93

The ASIA TELECOM 93 EXHIBITION and FORUM will be held in Singapore from 17 to 22 May 1993 under the theme "Telecommunity: the next era of growth". It would be hosted by Singapore Telecom and the Telecommunication Authority of Singapore, and is organized by the International Telecommunication Union - a world body with the unique leverage to attract top-level participants, with a record of bringing benefits both to business and governments, and with the vision to create the next era of growth - a global telecommunity. ASIA TELECOM 93 is where the key players in telecommunications will shape the future of the telecommunications and information technology industry.

ASIA TELECOM 93 will take place in Singapore's World Trade Centre, ideally located and offering advanced exhibition and forum facilities.

The ASIA TELECOM 93 exhibition will occupy 22,000 square meters of air-conditioned space. More than 150 exhibitors will present the latest telecommunications equipment and systems, information technology - ranging from office networks to artificial intelligence - and the futuristic ideas and techniques from their research and development laboratories.

The four symposia of the ASIA TELECOM 93 FORUM will focus on policy, technical, regulatory and economic matters. During the forum, legislators, ministers and corporate leaders will pave the way for the region's future direction in telecommunications development and opportunities. Traditionally, the TELECOMFORUM is unique in attracting the key players in national and international telecommunications. There, the people who matter most make pre-announcements of their investment plans, liberalization policies and long-and short-term objectives.

New Members of ITU

The Republic of Moldova (formerly a USSR Republic) became the 173rd Member and the Republic of Bosnia & Herzegovina (formerly part of Yugoslavia) the 174th Member of the International Telecommunication Union (ITU).

CONTINUING EDUCATION NEWS

Centre for Distance Education, IETE has been identified by DoE for preparing the 'B' (graduation) and 'C' (postgraduation) level Computer Courseware as per the syllabii provided by DoE.

The 'Telematics' lectures through Satellite under the continuing education programme will tentatively be held on dates to be announced later. The details of lectures and speakers are:

SPEAKER	TOPICS
1. Prof M B Faruqui, AMU, Aligarh	Image Coding
2. Prof Surendra Prasad, IIT, Delhi	Low bitrate Coding Speech
3. Prof A Jhunjhunwala, IIT, Madras	Rural Communication System
4. Prof S C Sahasrabudhe, IIT, Bombay	Advances in Digital Modulation Techniques
5. Prof U Mukherjee, IISc, Bangalore	Computer Communication Protocols.

Corporate and student members of IETE may register themselves with their local IETE centres for attending the programme free of cost. Other interested persons are also welcome.

BIBLIO FILE

Books added in the IETE HQ Library during Sept-Oct 92

Electronics & Telecommunication

01. Engineering Fluid mechanics	K L Kumar
02. Industrial Engg and Management	O P Khanna
03. Art of Electronics	Horowitz
04. Pulse, Digital and Switching Waveforms	Millman and Taub
05. Digital Signal Processing Design	A Bateman
06. Material Science and Processes	S K Hajra Choudhury
07. Advanced Engg Mathematics	Jaggi and Mathur
08. Television Maintenance and Repair	A Singh
09. Industrial Control and Instrumentation	W Balton
10. Digital Systems	S K Bose
11. Electronic Components and Materials	M A Joshi
12. Advanced Engg Mathematics	C R Wyle
13. Communication Systems	A B Carlson
14. Applied Mechanics and Strength of Materials	R S Khurmi
15. Operational Amplifiers and linear Integrated circuits	R F Coughlin
16. 2000 solved problems in Electronics	J J Gothey
17. Principles of Marketing	P Kother
18. Marketing Management	P Kother
19. Network Systems	D Roy Choudhury
20. Basic Electronics	P B Zbar
21. Fluid Dynamics	W E Hughes
22. College Physics	F J Buche
23. Integrated Course in Electronics and Telecommns	N K Jain
24. Advanced Mathematics	M R Spiegel
25. Advanced Engg Mathematics	E Kreysig

Computer

01. Object Oriented Design	G Booch
02. Computer Network and Distributed Process	G Martin
03. Turbo C++	Wang and Bibb
04. Computer Communications and Networks	J Feer
05. Master C++	R Woodlord
06. Computer Based Information Systems	D W Krocher
07. Computer Organization and Architecture	W Stalliam
08. C++ Programming Language	B Stroustrup
09. Local Area Networks	S V Raghavan
10. Learn Windows in a day	B J Doaley
11. Windows Illustrated 3.1	R E Whitsitt
12. System Simulation	G Gordon
13. Computer Graphics	R A Plastock
14. Advanced Techniques in dBase III Plus	A Simpson
15. Understanding UNIX	J R Groff
16. Advanced Programmer's Guide to UNIX Systems	R Thomes
17. Illustrated dBase IV	R A Stultz
18. UNIX for you	P Koparkar
19. Digital Logic and Computer Design	M M Mano
20. Advanced C	M Schildt
21. Data Networks	S Dertsekar
22. Wordstar Professional	Mathews and Mathews
23. Programming with PASCAL	B Gottfried

ANNOUNCEMENT

24th Mid Term Symposium Ahmedabad 10-11 April 1993

HIGHLIGHTS

1. Theme "Space Electronics and Communications"
2. Chief Guest HE Governor of Gujarat has been requested
3. 20th Vikram Sarabhai Memorial Lecture Dr N Seshagiri
4. 8th Lal C Verman Award Lecture Shri J S Raju, DG, STQC
5. Eminent experts in the field of Space Electronics will chair the Technical Sessions and present papers at the Symposia. The Technical sessions will be as follows: Space Electronics in Rockets, Satellites, Defence Communications and Remote Sensing.
6. Panel Discussions & Validictory function— Chief Guest Industry Minister of State Govt of Gujarat has been requested.
7. Registration

Delegate Fee

1. Sponsored Delegates	Rs. 800/-
2. Sustaining Donor Member	Rs. 600/-
3. Individual Corporate Member	Rs. 200/-
4. Student Member	Rs. 100/-
5. Council Members/Dist Fellow and Corporate Members above 65 years of age.	As Honoured Guest

8. Advertisement in souvenir

Advertisement Rates

(Page size 28cm X 22cm) Demy Quarto Printed area 24cm X 18 cm

1. Back Cover	Rs. 6000/-*
2. 2nd & 3rd Cover	Rs. 4000/-*
3. Full page	Rs. 3000/-*
4. Half page	Rs. 1500/-
5. Quarter page	Rs. 800/-

* For Colour Advertisement Rs 1000/- per colour in addition.

For more details, please write to IETE, HQ and/or to

1. Shri O P N Calla, Convenor
24th Mid Term Symposium, IETE
Dy Director, Satellite Communication Area,
Space Application Centre (ISRO)
Ahmedabad - 380 053
Phone: 0272-44180, Telex: 0121-6321 & 6239
Gram: Space & Antarix
2. Brig K Balasubramaniam
Co-Convenor, 24th Mid Term Symposium
Managing Director, Tata Telecom Ltd,
E1/1 GIDC, Electronics Estate,
Gandhi Nagar - 382 028
Phone(s): (02712) 21773, 21774, 23345
Telex: 01203-231/240 TILG IN;
Fax: (02712)- 24897.
3. Shri Madhukant Patel, Hony Secretary
IETE Ahmedabad Centre
206 Umia Shopping Centre,
Satellite Road
Ahmedabad - 380 053

FORUM

IETE feel proud of presenting the 4th Issue of Newsletter to its honourable members. In the previous three issues, Newsletter has tried to bring write-ups on our Hony Fellows, Distinguished Fellows and Distinguished Guests helping IETE and Newsletter over the years. We had also tried to present latest technology, products and activities of the headquarters and the various centres. We are, therefore, thankful to our members for their valuable suggestions from time to time and the encouragement we have been given to improve the quality and coverage of the other publications and Newsletter as well.

The board of IETE Newsletter is firm to take this publication to the best possible heights and, therefore, continued encouragement advice of the members will be of great help.

There can be no two views that India in the prevailing world economic and political environment, with all its attendant, social problems, looks forward to its technocrats and scientists for overcoming the problems and pave way for leadership in the field of science and technology. Institutions like IETE have the onerous responsibility to give their due in this need of the nation. It is through our members that the institution can serve these requirements. Publications are the medium to the members to contribute and assist the institution in discharging its social and technological obligations to the society. We are, therefore, trying to improve our other three publications viz the Journal of IETE, IETE Technical Review and Students' Journal.

In the past, we had already obtained a number of suggestions from honourable members and accordingly, the concept of Special Issues and bi-monthly periodicity of both the main journals and quality of the Students' Journals was adopted. All this has been taken well and appreciated. We request members to kindly keep advising from time to time and send their contributions as report on important events, activities, special products etc as well as quality articles for Technical Review.

We continue to look forward honourable members and participants advice.

Cdr(Dr) H S Sharma (Retd)
Hony Editor

INDUSTRY PROFILE

TATA TELECOM COMPANY PROFILE

Name	Tata Telecom Limited
Promoters	Tata Industries Limited
Year of Incorporation	August 1986
Commencement of Operations	April 1988

Board of Directors

Dr H N Sethna	<i>Chairman</i>	Mr C P Shah	<i>Director</i>
Brig K Balasubramaniam	<i>Managing Director</i>	Mr B B Dubash	<i>Director</i>
Mr V K Gupta	<i>Executive Director (Operations)</i>	Mr N N Kampani	<i>Director</i>
Mr K M Gherda	<i>Director</i>	Mr D S Pendse	<i>Director</i>
Mr D B Engineer	<i>Director</i>	Mr M V Shah	<i>Director</i>
Mr A Kashyap	<i>Director</i>	Mr M L Rawal	<i>Director</i>

The Company

Tata Telecom Limited, was incorporated in 1986, for the manufacture of Electronic Private Automatic Branch Exchanges (EPABXs/EPAX) and allied equipments. With technical assistance from OKI Electric Industry of Japan and an installed capacity of 50,000 lines. Tata Telecom started its commercial production in 1988. In less than four years, Tata Telecom has about 200,000 lines installed across the length and breadth of the country.

Achievements

From Railways to Steel....From Oil to Coal
From Hotels to Power....From Banking to the all important area of Defence.

In more than 1,400 organisations, in virtually every sector the EPABXs and allied systems from Tata Telecom are meeting diverse and stringent day to day communication requirements. In the Defence Communication Network, besides being highly dependable, every component of the telecom equipment had to withstand hostile environment conditions such as, extreme temperature variations, dust and high humidity. Reliable performance at higher altitudes was another factor. Tata Telecom has successfully met this challenge.

Today, we are proud to say that our equipments, ring the borders of the country

and we have installed the world's highest altitude EPABX.

Tata Telecom has set up the first Integrated Private Network in the country —SBINET which handles the communications of SBI offices in 64 cities across the country.

The systems from Tata Telecom connects 11 pumping stations along a 1,500 km oil pipe lines from Naharkatiya in Assam to Barauni in Bihar.

Tata Telecom has to its credit, the largest and the second largest EPABX installation in the country, so far, at TISCO and Durgapur Steel Plant respectively.

Another link to its Telecommunication Network is the Voice Cum Data Network of Modi Xerox - MX NET which links its offices in Europe and America to its factory and offices in India.

The growing list of achievements of our Company is backed by an automated manufacturing and testing facility. The team work and the orchestrated efforts of about 350 employees has made it possible for Tata Telecom to become the market leader in the Telecom Industry.

We are constantly modifying and adding new equipments to keep in pace with the fast changing technology and increasing requirements of customers.

A. YEARLY PERFORMANCE

(Rs. In Millions)

Year	Sales		Profit
	Lines	Value	
1987-88 (3 months)	3,600	31.72	(7.60)
1988-89 (9 months)	21,866	125.13	1.67
1989-90	42,172	248.19	19.70
1990-91	59,534	309.11	26.11
1991-92	60,212	312.31	12.45

B. MAJOR CUSTOMERS

Defence - Army, Navy, Airforce; Steel Plants; Railways; Oil Companies; Power Plants - Nuclear and Conventional; MTNL/DOT
Commercial Houses
Educational Institutions

C. DISTRIBUTION/SERVICE NETWORK

Regional Sales & Service Offices:

Delhi, Bombay, Calcutta and Madras

Branch Offices

Bangalore, Pune, Hyderabad

Service Centre

Guwahati, Jamshedpur, Nagpur, Jammu, Baroda

Resident Engineers

Jamnagar, Tezpur, Shillong, Tawang, Tenga, Jorhat, Udaipur, Jaiselmer, Bhatinda, Vizag.

CALENDER OF EVENTS

Subjects	Dates	Venue	Contact
PTC 1993, the 15th annual Pacific Telecommunications Conference	17-20 Jan'93	Honolulu, Hawaii, USA	PTC, 2454 S Beretania Street, Suite 302, Honolulu, Hawaii, 96826, USA
Discussion Meeting on recent advances in Signal Processing & Communications (SPCOM-93)	18-20 Jan'93	Bangalore	Dr T V Sreenivas, Convenor, SPCOM-93 Deptt of ECE, IISc, Bangalore-560 012
CMC Technologies Exposition-1993	28-29 Jan'93	Madras	Mr R Vishwanathan, Organising Secretary CMC Technologies Exposition 1993, CSIR Complex, Madras 600 113
AES 94th Convention	16-19 Mar'93	Berlin	Prof Ernest-Jo Voelke, Institut fuer Akustik und Bauphysik, Kiesweg 22, D-6370, Oberursel 6, Germany
Seminar on 'Integrated Electronics'	20-21 Mar'93	Roorkee	Prof R P Agarwal, Convenor, SIE-93 Deptt of Electronics & Comp Engg, Univ of Roorkee, Roorkee 247 667
IETE 24th Mid-Term Symposium on 'Space Electronics & Communications'	10-11 April '93	Ahmedabad	Shri OPN Calla, Dy Director, Satellite Communication Area, SAC, Ahmedabad 380 053
National Seminar on Computer Processing of Hindi Language (COMPHIL-93)	10-11 Apr'93	Allahabad	Dr Gulab Singh, Convenor COMPHIL-93 The Instn of Engineers (India), Allahabad Local Centre, Teliarganj, Allahabad 211 004
Asia Telcom 93	17-22 May'93	Singapore	Ms Suzan Hee-Sook Lee, Project Manager, Asia Telecom 93, ITU, Place des Nations, CH-1211 Geneva 20 Switzerland Tel : 41 22 730 5811 Fax : +41 22 740 1013
18th International onal TV Symposium & Technical Exhlibition	10-15 Jan'93	Montreux	Montreux Int TV Symposium & Technical Exhibition, PO Box 97, Rue du Theatre 5, 1820 Montreux/Switzerland
4th Intl Symp on Recent Advances in Microwave Technology (ISRAMT '93)	15-18 Dec'93	New Delhi & Agra	Prof Banmali Rawat, Dept of EE, University of Nevada, Reno, Nevada 89557-0153, USA; or Prof Bharathi Bhat, CARE, Indian Institute of Technology, New Delhi 110 016