



सी-डॉट
C-DOT



Architecting Digital India

Annual Report 2017-18

Centre for Development of Telematics
(CMMI Level 5 organization)



VISION

To become the world class telecom technology development centre.

MISSION

To design and develop state-of-the-art technologies, products and solutions.

To meet the telecom needs of India particularly of national importance in strategic sectors and rural areas.



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C-DOT Management

GOVERNING COUNCIL:

Chairman

Minister of Communications

Vice Chairman

Minister of State for Communications

Members

Scientific Advisor to the Defence Minister
Chairman, Digital Communications Commission
& Secretary (T)
Member (Technology),
Digital Communications Commission
Member (Finance), Digital Communications Commission
Secretary, Department of Electronics
and Information Technology
Chairman & Managing Director, BSNL
Executive Director, C-DOT
Directors, C-DOT

STEERING COMMITTEE:

Chairman

Chairman, Digital Communications Commission
& Secretary (T)

Vice Chairman

Member (Technology, Digital Communications Commission)

Members

Chairman & Managing Director, ITI Ltd.
Director (Planning), BSNL
Sr. DDG, Telecom Engineering Centre
DDG (TPF), Department of Telecommunications
Sr. Director, Department of Electronics
and Information Technology
Executive Director, C-DOT
Directors, C-DOT

PROJECT BOARD:

Chairman

Executive Director, C-DOT

Members

Directors, C-DOT

Overview

Centre for Development of Telematics, C-DOT, established in 1984 as an autonomous R&D centre of the Department of Telecommunications, Ministry of Communications, Govt. of India has been widely known for its monumental role in ushering in the indigenous Telecom revolution in the nation.

With its world class research labs equipped with the state-of-the-art infrastructure and a pool of the brightest engineers from the top institutes of the nation, C-DOT has been strongly committed to fulfilling the overarching objectives of national development through its targeted research initiatives addressing the specific connectivity needs of our diverse country. C-DOT's technologies aim at augmenting the broadband infrastructure of the nation and addressing the typical requirements pertaining to rural, security and strategic applications. C-DOT's diverse product portfolio spanning a wide array of technologies that include Switching & Routing, Optical Communication, Wireless Communication, Network Security, M2M/IoT, 5G, Network Management and a host of other Telecom Software Applications is a manifestation of its unrelenting desire to capture the unexplored dimensions of the vast telecom firmament.

C-DOT's passionate zeal to extend the connectivity to every nook and corner of the nation is well corroborated by its indigenously designed exchanges, popularly called RAX and MAX that are still propelling the rural networks with the persistent upgrades to facilitate the provisioning of the latest IP-based services in an economically viable and effective manner.

C-DOT's GPON (Gigabit Passive Optical Network) solution is fueling the backbone of BharatNet, the prestigious nationwide optical fibre based network connecting 2.5 lakh Panchayats in the nation with high speed broadband, thus realizing our Hon'ble PM's dream of "Digital Empowerment". C-DOT's

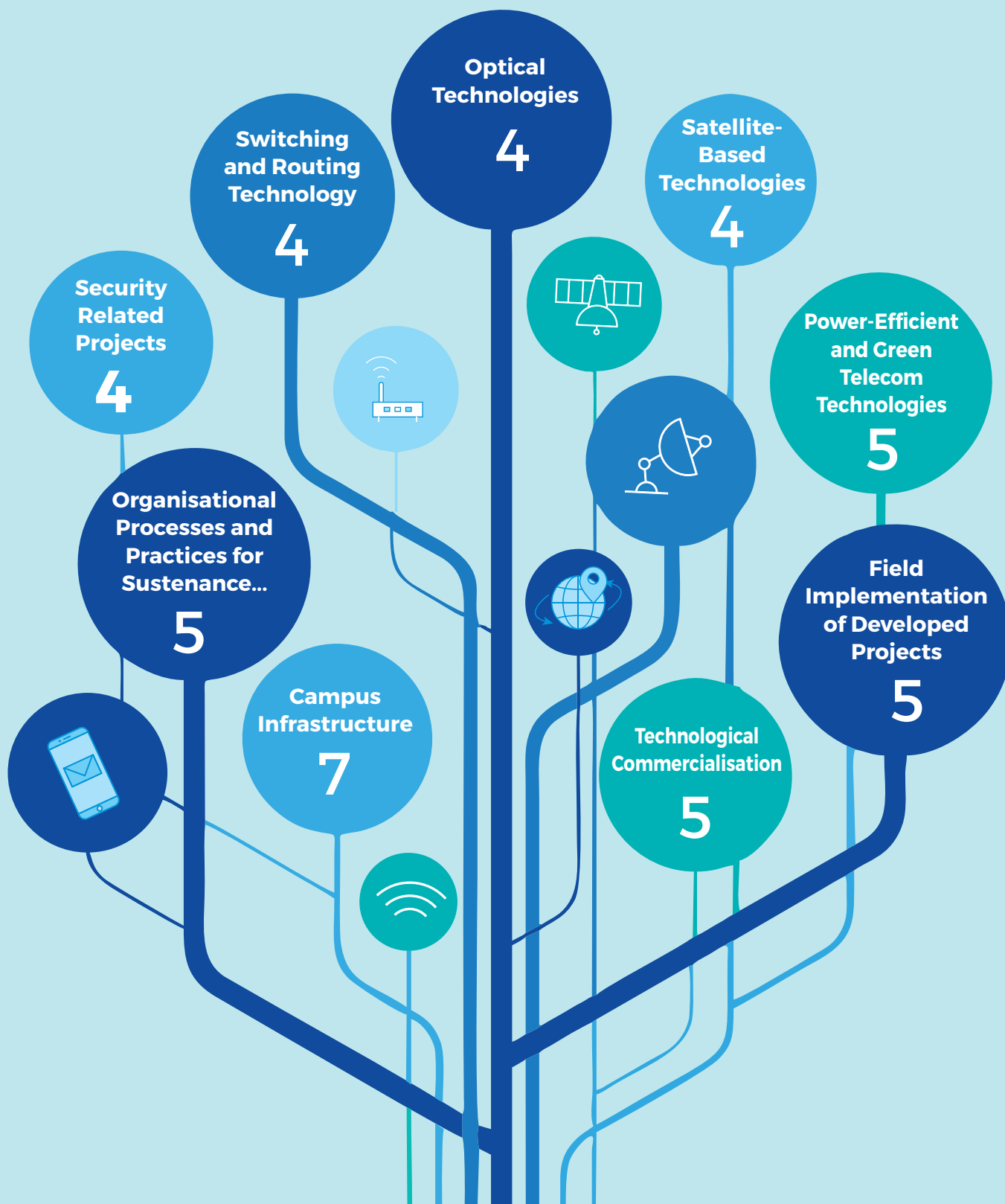
indigenously designed and built Terabit Router is a testimony to our prowess in the field of switching and routing, wherein our switches, gateways and other network entities are slated to play an increasingly pivotal role in the recent initiatives of Govt. of India viz. "Smart Cities" and "Digital India". C-DOT GPON was also awarded with Golden Peacock award 2018 (instituted by the Institute of Directors, New Delhi) under Innovative Product / Service category.

C-DOT's BBWT (Broad Band Wireless Terminal) is especially suited to ensure wireless connectivity to even the most inhospitable and inaccessible terrains of India with a sharp focus on the utilization of the Green sources of energy in the power deficient areas.

C-DOT's unflinching determination towards promotion of "Digital Literacy" is well reflected in its unique innovation, GyanSetu, that is capable of extending the benefits of Internet to the illiterate populace of India including the specially abled in an easy and convenient manner thus spurring the socio-economic growth. This innovative solution was conferred with an award of excellence at ITU Telecom World 2015, Budapest, Hungary.

C-DOT is also a proud member of the oneM2M initiative whereby its M2M and IoT applications have successfully proved its interoperability across a global platform. C-DOT was also conferred with the National Intellectual Property Award 2016 in the category of "Top Organisation / Institution for Patents".

C-DOT, today has emerged as one stop destination for the latest indigenous telecom technologies and innovative solutions, thus propelling the engines of indigenous manufacturing based on its ToT (Transfer of Technology) Model. C-DOT is also poised to play a vital role in catalyzing the evolution of indigenous manufacturing ecosystem as envisioned under the landmark mission, "Make in India".



**Accomplishments & Activities
during F.Y. 2017-2018**

Accomplishments & Activities during F.Y. 2017-2018

Achievements and progress made during FY 2017-2018 in various technology programs are presented in the following sections.

SECURITY RELATED PROJECTS

- **CMS for lawful interception and monitoring:** The CMS project is practically complete with equipment being rolled out in 21 LSAs and operations being commenced with 12 LEAs with onboard CMS and 36 LEAs in the process of onboarding CMS.
- **AIMS:** Development has been completed for cluster-aware LEM application, VoIP call presentation in near real-time, unified media player and IM providing IRI analysis, CDR analytics for LEAs, etc. IRI is in operation at 3 LEA locations. The AIMS solution is ready and available for field deployment.
- **SDCN:** The solution is ready for commissioning in MTNL Delhi network. The required number of CPEs - 1393 of them - have been delivered to MTNL. CPE installations at the designated sites by MTNL are in progress. Gateway installations are in progress at the PMO, PMH and Rashtrapati Bhawan for interfacing with the existing systems at these locations. The SDCN network is targeted to be ready for starting operation by June, 2018.
- **ISP monitoring:** This solution is under field deployment. ISP gateway HW equipment installation is complete in 14 locations and has been handed over to LEAs. Cumulatively, ISP monitoring solution has been deployed and is in operation in 120 locations across the country. Process has been initiated to handover IMS infrastructure to PCI for operations and support, and training has been conducted for DoT officials. IMS training program has also been conducted for LEAs.
- **CoE for lawful interception:** The CoE program addresses new interception requirements of LEAs through development of advanced technologies, namely, OSINT, image processing, etc. Hadoop-based search engine, analysis tool for social websites - Twitter, Facebook, etc, are undergoing validation. For an Android-based WhatsApp-type mobile app, Samvad, pilot trial has been completed for Madhya Pradesh police, Intelligence Bureau and

Indian Air Force, for voice call and chat applications. Pilot trial of Samvad is also going on for DoT, NDMA, NIC, MHA and CMS users. Developments under image and video analytics are also in progress, with completion of developments of face detection and face recognition algorithms in controlled environment, and ongoing validation.

OPTICAL TECHNOLOGIES

- **OCN:** Pilot trial commenced in BSNL network at Chennai for DWDM-based 100 Gbps OTN system for long-haul applications to support data rate of 100 Gbps per channel at line / WDM side. It is in the plan to offer the system to TEC for validation. Development has also progressed for OTN switch with cross-connect capacity of 1.6 Tbps.

SWITCHING AND ROUTING TECHNOLOGY

- **High speed routing system:** Proposal submitted to MTNL for trial starting with 40 Gbps interface and progressively upgrading it to 100 Gbps.
- **LAN, MAN enterprise and data centre segment:** L3 switch implementation for 24-port has been completed. Architecture design has been completed for integrated L2 / L3 switch for 48-port. Development is in progress for medium capacity ToR switch.
- **Customised router for DRDO-ANURAG:** Router development based on off-the-shelf multicore processor has progressed significantly with PCB fabrication and assembly being in progress. Router SW has also been customised, ported and completely integrated on the standard multicore processor reference platform.

SATELLITE-BASED TECHNOLOGIES

- **Satellite hub baseband system for DEAL:** Carrier-grade hub baseband system (phase-2) development has progressed with assembly of multiple cards, and standalone testing of cards being in progress. Satellite hub baseband subsystem (without redundancy), delivered to the client under phase-1, has also been integrated with the satellite and DEAL terminals.

POWER-EFFICIENT AND GREEN TELECOM TECHNOLOGIES

- **High capacity solar power supply system:** Field trial and ToT have been completed for 75W and 125W systems. Development has been completed for modular 5000W system and testing is in progress.

TELECOM SERVICES AND APPLICATIONS

- **M2M communication:** Validation of M2M system nodes (comprising of ADN, ASN, IN and MN) with CSFs is in progress. Extended lab trial for M2M network with applications has also commenced.
- **CiSTB:** Field trial of CiSTB for cable segment is in progress at Mumbai in IMCL cable network, and DTH hybrid STB is undergoing validation. Interoperable STB framework has been demonstrated to TRAI and a panel of experts. Based on this, TRAI has initiated a pilot project for cable segment based on C-DOT solution architecture along with C-DOT CAS, involving industry stakeholders.

FIELD IMPLEMENTATION OF DEVELOPED PROJECTS:

- **NGN:** VoIP-based packet switching technology is undergoing field deployment in BSNL network to migrate existing C-DOT MAX switches from circuit-switching to packet-switching technology. Migration has been completed at 14 sites out of total 48 sites (C-DOT to carry out migration in 2 exchanges in each of the 24 circles). The equipment installation for NOC (Main and DR) and the AT have also been completed.
- **GPON technology:** Pilot trial for next generation PON, namely, WDAN (WDM-based) and XG-PON (TDMA-based) have been completed. Pilot trial also completed for other GPON variants, namely, Titli ONT with 'dying gasp' feature which is a small-sized low-power ONT to facilitate in extending FTTH services beyond grampanchayat to connect Government institutions, serve individual houses through NOFN, etc, and a new ONT with RF support in addition to existing features in the current ONTs. Validation is in progress for 4-port office OLT to cater to the segment of small user base (of the order of 500 or less in number) with low power requirement.
- **NMS:** Customised NOFN NMS has been deployed in the field deployment for end-to-end monitoring

and management of the NOFN, and the system is in operation.

- **C-DOT Wi-Fi technology:** Field roll-out of Wi-Fi technology has been given significant impetus during the year. The technology has been enhanced and new variants have been added. Wi-Fi roll-outs are in progress for solar Wi-Fi for 5000 villages of CSC, and Wi-Fi systems for Navy and Army. PoC and trials have been completed for solar Wi-Fi at high altitudes at Leh (in Ladakh), PDO (v2), high speed access point (v2), etc.
- **LTE enhancements, customisation and trial:** Development has been completed for C-DOT LTE system comprising of eNodeB and EPC.

ORGANISATIONAL PROCESSES AND PRACTICES FOR SUSTENANCE AND RE-APPRAISAL FOR CMMI MATURITY LEVEL 5

The organisation had already been successfully appraised for CMMI Maturity Level 5 in 2014, for its processes and practices related to development projects.

During FY 2017-2018, through continuous improvement of organisational processes and practices, and regular internal audits, the level of maturity was sustained, and preparations towards a re-appraisal at same level of maturity continued, that included formal spot checks and pre-appraisals by external certified assessor. This culminated in another successful SCAMPI-A appraisal at CMMI Maturity Level 5 (in Nov-2017), for its processes and practices related to development projects of all types (i.e., only HW-oriented, only SW-oriented and HW-and-SW-oriented), and executed across the organisation (i.e., both the locations - Delhi and Bengaluru).

Sustenance and further improvement of high maturity level practices are continuing and are being assessed through regular internal audits.

TECHNOLOGY COMMERCIALISATION

During FY 2017-2018, 14 MoUs, project agreements and agreements were signed with prospective PSUs and manufacturers for technology implementations, manufacturing and customised developments. Details are given below.

Agreements

S.No	Strategic partner	Purpose
A	MoUs and project agreements	
1	Genesys Corporation, Japan	To explore to work together on joint ICT projects
2	IIT Hyderabad	Collaborative research projects in the areas of 4G, 5G, Wi-Fi, wireless PHY, SDN and NFV
3	IIT Delhi	Collaborative project on multilingual and multimodal keyword search in a mixlingual speech corpus
4	Intelligent Communication systems India Limited (ICSIL)	To deploy BBWT in near vicinity of NCR and urban India for building smarter networks
		To monitor, configure and manage telecom network elements for optimal performance
		To use GPON product variants for extending connectivity to urban and rural NCR and Delhi
5	BSNL	To provide technical field support in BSNL network
6	M-Tech Nigeria Limited, Nigeria	To deploy BBWT variants, high speed access point, WiDHWAN
		To deploy GyanSetu
		To use GPON product variants, network management SW and network planning solutions in M-Tech's network
7	Telesuprecon FZE, UAE	To deploy BBWT variants, high speed access points, WiDHWAN and LTE-A
		To use GPON product variants, network management SW and network planning solutions in Telesuprecon network and projects
8	Space Applications Centre, ISRO, Ahmedabad	To use ISRO's high resolution satellite data with C-DOT GIS to monitor and intercept cellular mobile communications.
9	MTNL and ITI Limited	To develop, deliver and deploy IoT and smart city vertical solutions, Wi-Fi hotspot, FTTH, VAS to cater to the requirements of various smart cities
10	TCIL and ITI Limited	To synergise R&D, manufacturing and delivery of innovative and advanced telecommunication products and services to customers and service providers around the world with special focus towards developing countries

S.No	Strategic partner	Purpose
11	MTNL	To deliver converged voice, video, data and multimedia services to MTNL's landline and mobile broadband subscribers
		To upgrade IP and MPLS core network in MTNL Delhi and Mumbai
12	Centre of Excellence in Wireless Technology (CEWiT), IIT Madras	Joint collaborative research projects in the areas of 4G/4G-Advanced, 5G, Wi-Fi, wireless PHY, wireless solutions in various domains
13	MTNL	To roll-out SDCN in Delhi region
14	Foundation of Innovation and Technology Transfer (FITT), IIT Delhi	To develop a SW tool for performing image analytics such as detection and recognition of faces in images and videos
B	ToT agreements with manufacturers	
1	ITI Bengaluru	Extension of AN-RAX agreement
2	RCV Innovations Pvt Ltd	PDO
3	ITI Ltd, Naini	GPSU (75W, 125W)
4	ITI Ltd, Naini	GPSU (250W)
5	Tata Power SED	Power amplifier
6	ITI Bengaluru	STBR

CAMPUS INFRASTRUCTURE

After years of effort, C-DOT campus Infrastructure group had succeeded in achieving self-sufficiency in meeting water requirements and water audit recommendations as well. Two bore-wells were dug out for the purpose after getting permission from the Delhi Jal Board. Delhi Jal Board water-connection was also availed as additional infrastructure to keep a balancing check on depletion of water level in the campus. Maintaining rain harvesting system is another activity towards enriching ground water level.

All statutory approvals for Housing and Hostel project including environmental clearances were achieved during financial year 2017-18 and proposal for the

construction is under consideration of C-DOT Board. The architecture and design of housing and hostel is done in accordance with guidelines laid down for eco-friendly environment.

Also, towards achieving eco-friendly campus, a project to install 1.157 MWp Roof Top Solar (solar RTS) system started in partnership with M/s Central Electronic Limited India. The project is to install 600 KWp and 557KWp at Delhi and Bengaluru campuses respectively. The project got completed and started generating solar power at both the location in the financial year 2017-18.

Organisational Processes and Practices

ORGANISATIONAL PROCESSES AND PRACTICES to sustain CMMI Maturity Level5

The organisation is placed at Maturity Level 5 (ML5) – the highest level in the CMMI model, and through continuous practice and improvement of organisational processes, and regular internal audits, the level of maturity is being maintained.

In May-2014, the entire organisation, comprising of the R&D setups at Delhi and Bengaluru, successfully underwent SCAMPI-A appraisal for CMMI ML5 in the very first attempt. Since the appraisal, all the process practices of levels 2 to 5 were being continued in all development projects, continuous process improvements were taking place, and periodic internal process audits were being carried out to ensure sustenance of the process maturity level.

The next SCAMPI-A appraisal for CMMI ML5 was scheduled in FY 2017-2018 after expiry of the validity period. The initial steps, viz, Spot Checks by an external assessor had been undertaken in Oct-2016 and Dec-2016. Addressing the reported gaps and preparation for the subsequent steps towards the appraisal continued into the first quarter of FY 2017-2018. Pre-Appraisal was conducted in two stages in early Jul-2017 and late Aug-2017. Fine-tuning of the practices, readiness reviews, training the Appraisal Team and detailed planning for the SCAMPI-A appraisal were completed by Oct-2017.

The SCAMPI-A appraisal was conducted during 6th Nov. 2017 to 17th Nov. 2017 across both the locations – Delhi and Bengaluru – and once again, the organization was successfully appraised at CMMI Maturity Level 5 in the first attempt. Since then, all the organizational processes continue to be practiced and improved upon, alongwith regular internal audits, to maintain this level of process maturity.

Intellectual Property Rights

IPR Assets and Publications

Details of Patents Filed

S.N.	Title	Application No. / Date of Filing
1.	Dynamic Channel Selection in IEEE 802.11 Networks	201741028737/11-08-2017 (India)
2.	Method, System and Apparatus for Multilingual and Multimodal Keyword Search in a Mixlingual Speech Corpus	201711032030 /11-09-2017 (India)
3.	A Method and a Mirrored Serial Interface (MSI) for Transferring Data	PCT/IN2017/050179/15-05-2017 (PCT)
4.	System and Method for Network Traffic Slicing	PCT/IB2017/052404/26-04-2017(PCT)
5.	Trouble Ticket Generation and Management System	201741030750/30-08-2017(India)
6.	Wi-Fi Based Early Emergency Alert and Disaster Site Management in India	201841007663/01-03-2018(India)
7.	An Off Ground System in Mid-air to cover inaccessible areas with Wi-Fi	201841008616/08-03-2018(India)
8.	An Eco-Friendly System to Provide Wi-Fi	201841008617/08-03-2018 (India)
9.	Resonance Mitigation in RF High Power Amplifier Enclosure	15/597, 448/17-05-2017(USA)
10.	GIS based Centralized Fiber Fault Localization System	15/524, 973/05-05-2017 (USA) 2964072/26-04-2017(Canada) 201680003582.6/ 06-05-2017(China)
11.	Automatic Volume Control	201741029753/22-08-2017(India)
12.	System and Method for Facilitating Optimization and Analytics of a Managed Network	15/788,578/19-10-2017 (USA) 1717198.4/19-10-2017 (UK) 2,982,199/ 06-10-2017 (Canada) 201710999902.4/ 24-10-2017 (China)
13.	A Method and an Information Appliance Device for Preventing Security Breach in Information Appliance Device	15/685,928/24-08-2017 (USA) 1713627.6/24-08-2017 (UK) 2,977,247/ 26-08-2017 (Canada) 201710750222.9/ 28-08-2017 (China)

Details of Designs Registered

S.N.	Title	Application No. / Date of Filing	Design No. / Date of Grant
1.	SABAL	291762/15-03-2017	291762/18-12-2017 (India)

Details of Trademarks Filed

S.N.	Trademark Name / Logo	Application No. / Date of Filing
1.	C-DOT	3647233/29-09-2017 (India)
2.	CGRAN	3647234/29-09-2017 (India)
3.	PDO (Class 16)	3559916/30-05-2017 (India)
4.	Balloon Wi-Fi (Class 9)	3770847/06-03-2018 (India)
5.	Balloon Wi-Fi (Class 16)	3770848/06-03-2018 (India)
6.	Bamboo Wi-Fi (Class 9)	3770849/06-03-2018 (India)
7.	Bamboo Wi-Fi (Class 16)	3770850/06-03-2018 (India)
8.	C-GEMS	3791960/29-03-2018 (India)

Details of Trademarks Registered

S.N.	Trademark Name / Logo	Application No. / Date of Filing	Trademark No. / Date of Grant
1.	PDO (Class 9)	3559915/30-05-2017	3559915/15-12-2017 (India)
2.	SARVEKSHAN	3552652/19-05-2017	3552652/25-12-2017 (India)
3.	WIDHWAN	3316644/21-07-2016	3316644/27-04-2017 (India)
4.	SUTEEVRA	2926755/20-03-2015	2926755/04-10-2017 (India)
5.	Chatur Damini	2926743/20-03-2015	2926743/02-11-2017 (India)
6.	Mudrika Damak	2926745/20-03-2015	2926745/03-11-2017 (India)
7.	Lok Damak	2926746/20-03-2015	2926746/03-11-2017 (India)
8.	Sampark Damak	2926749/20-03-2015	2926749/26-10-2017 (India)
9.	Damini NET	2926750/20-03-2015	2926750/26-10-2017 (India)
10.	Fiber Damak	2926753/20-03-2015	2926753/25-10-2017 (India)
11.	Divya Damini	2926754/20-03-2015	2926754/26-10-2017 (India)

Details of Copyright Filed

S.N.	Title	Application No. / Date of Filing
1.	DWDM EMS	424/2018-CO/SW/09-01-2018 (India)
2.	G-PON EMS	425/2018-CO/SW/09-01-2018 (India)
3.	C-DOT GPON EMS Simulator	4634/2018-CO/L/31-03-2018 (India)

Details of Copyright Granted

S.N.	Title	Application No. / Date of Filing	Copyright No. / Date of Grant
1.	SARVEKSHAN	7587/2017-CO/SW/12-05-2017	SW-9339/2017/28-08-2017 (India)

Details of Paper Publications

S.No	Product	Title	Conference / Journal details
1.	Satellite Hub	Multichannel Variable Fractional Rate Digital Down Converter for Satellite Communications	IEEE Latin-American Conference on Communications, 2017 (IEEE Latincom, 2017), Guatemala, Latin America, 8th -10th November, 2017
2.	Satellite Hub	FPGA Based Implementation of low latency Multichannel Satellite Modulator with packet loss detection	IEEE International conference on Engineering Technologies and Applied Sciences (ICETAS 2017), Bahrain, 29th Nov - 1st Dec 2017
3.	MAX-NG NOC	Remote Software Maintenance System for Telecom Network	International Conference on Advances in Computing, Communications and Informatics (ICACCI'17), Manipal University, Karnataka, 13th - 16th Sep 2017
4.	Emergency Call Session Control Function of IMS	Determination of Public Safety Answering Point (PSAP) and Routing of Emergency Calls in IP Multimedia Subsystem	IEEE Conference on Advanced Networks and Telecommunication Systems, Bhubaneswar, Odisha, 17th - 20th Dec 2017
5.	GyanSetu	A Novel Approach to Power Optimization for Projection Systems	Indian Journal of Science and Technology, Vol 10 (24), June 2017
6.	Satellite Hub	Multi-core DSP-based Implementation of Variable Data Rate OQPSK / TDMA Satellite Receiver	17th International Conference on Electronics Information and Communication (ICEIC) 2018, Honolulu, Hawaii, USA, 24th - 27th Jan 2018
7.	Satellite Hub	Crosstalk and Field analysis of Arc shape Coaxial Via for high speed digital signals	IEEE 21st Workshop on Signal and Power Integrity (SPI), Baveno, Italy on 10th May 2017
8.	Generic-5G	Beam Division Multiple Access (BDMA) and Modulation Formats for 5G: Heir of OFDM?	International Conference on Information Networking (ICOIN 2018), Chiang Mai, Thailand, 10th Jan - 12th Jan 2018

IPR Day Celebrations at Delhi and Bengaluru

Intellectual Property Right (IPR) plays an important role in protection of knowledge derived from R&D efforts. IPR day was celebrated at Delhi and Bengaluru campuses to felicitate and honour the intellect of our fellow C-DOTians that have been the foundation of our unique innovations.

The Innovators in Delhi were felicitated by Hon'ble chief guest, Prof. V Ramgopal Rao, Director, IIT, Delhi and Shri B P Singh, Deputy Controller of Patents and Designs, The Patent Office, Govt. of India on 24th May 2017.

The Innovators in Bengaluru were felicitated by Hon'ble chief guest, Shri V Mahesh, Chief Scientist CRL, BEL, Bengaluru on 6th June 2017.



Knowledge Management



Training

Constant efforts are made to enhance the skill sets of C-DOT employees. For this employees are encouraged to participate in various seminars and conferences. Various internal and external trainings on both technical and soft-skill areas are arranged for the employees. Various technical topics on which training during the year were arranged are Cryptography, ExtremeDB, Embedded Systems, C-DOT Routers, 5G, M2M, LTE and various wireless technologies, CMMI Processes, Design Engineering, EMI, ESD, Signal Integrity, Innovation, IoT, Software Safety and Security, Block Chaining, NLP & ML, Quantum-safe Cryptography Algorithms etc. Apart from technical trainings employees are encouraged to attend general and soft skill trainings also. During the year various workshops attended were on topics like Goods and Service Tax, Custom Practice, Public Procurement, Marketing Management, Anger Management, Work Life Balance, Communication Skills, Gender Sensitizing, Motivation, Ethics, Self-management, Time Management etc.

Institutional Memberships

To participate in relevant and international networks for exchange of information and for sharing of information resources C-DOT has taken memberships of 26 leading professional associations. These memberships enable C-DOT employees to promote their professional development, increase knowledge in their field and expand networking possibilities. This also helps them to remain updated with the latest industry innovations, research and trends.

S.No.	Membership name	Type of Membership
1.	All India Management Association (AIMA) www.aima-ind.org	Institutional Membership Since 1994
2.	Asia Pacific Telecommunity (APT) www.aptsec.org	Affiliate Membership Since 2002
3.	Asia Pacific Network Information Centre (APNIC) www.apnic.net	Associate Membership Since 2005
4.	Current Science Association www.currentscience.ac.in	Institutional Membership Since 2016
5.	Delhi Management Association (DMA) www.dmadelhi.org	Patron Membership Since 1996
6.	Electronic Industries Association of India (ELCINA) www.elcina.com	Associate Membership Since 2010
7.	Electronics & Computer Software Export Promotion Council (ESC) www.escindia.in	Association Since 2009
8.	European Telecommunication Standards Institute (ETSI) http://www.etsi.org	Associate Membership Since 1999
9.	Fiber To The Home (FTTH) Council http://www.ftthcouncilap.org	Silver Membership Since 2010
10.	3GPP http://www.3gpp.org/	Individual Membership
11.	India Electronics & Semiconductor Association (IESA) http://www.iesaonline.org	Since 2013
12.	Institute of Directors (IOD) http://www.iodonline.com	Institutional Membership Since 2015
13.	Institution of Electronics and Telecommunication Engineers (IETE) http://www.iete.org	Organizational Membership Since 2010
14.	Internet Protocol Television Society (IPTV) Broad Band India Forum http://www.iptvforum.org.in	Corporate Membership Since 2015
15.	National Association of Software and Service (NASSCOM) www.nasscom.in	Associate Membership Since 1996
16.	OneM2M http://www.onem2m.org/	Individual Membership
17.	Pacific Telecommunication Council (PTC) India Foundation www.ptcif.org	Corporate Membership Since 1997
18.	PICMG http://www.picmg.org	Associate Membership Since 2015
19.	Telecom Equipment & Services Export Promotion Centre (TEPC) http://www.telecomepc.in	Since 2015
20.	Telecommunications Standards Development Society, India (TSDSI) http://www.tsdsi.org/	Institutional Membership Since 2014
21.	TM Forum http://www.tmforum.org/	Corporate Membership Since 2017
22.	WiFi Alliance http://www.wi-fi.org	Regular Membership since 2016
23.	Wireless Broadband Alliance http://www.wballiance.com/	General Member since 2016
	Library Memberships	
24.	American Centre http://amlibindia.state.gov .	Organizational Membership
25.	British Council www.britishcouncil.in/	Access 10 Membership
26.	Delnet http://delnet.nic.in	Institutional Membership

Knowledge Management Centre

Knowledge Management Centre has been established to provide latest scientific and technical information to support C-DOT research and development activities at both Delhi & Bengaluru centers. It includes a rich collection of more than 31,300 technical books, 4000 Hindi books and over 70 periodicals and magazines besides country’s 13 leading Newspapers and Newsletters. For the year 2017-2018 a total of 60 new technical books and 69 Hindi books were added to the library collections.

C-DOT has also subscribed to IEEE and ACM digital library through MCIT consortia. The IEEE Xplore digital library is a powerful resource for discovery of and access to scientific and technical content published by the Institute of Electrical and Electronics Engineers (IEEE) and its publishing partners. The ACM Digital Library (DL) is the most comprehensive collection of full-text articles and bibliographic records in existence today covering the fields of computing and information technology. The full-text database includes the complete collection of ACM’s publications, including journals, conference proceedings, magazines, newsletters, and multimedia titles.



- Apprentice Training**

The Scheme of Apprenticeship Training provides opportunities for practical training to graduate engineers, diploma holders (Technicians) and 10+2 Vocational pass outs from about 10,000 industrial establishments/ organizations as per the policies and guidelines laid down by the Central Apprenticeship Council (CAC), which is an apex Statutory Body constituted under the Apprentices Act, 1961. As per these guidelines C-DOT also takes apprentices (graduate, diploma and ITI) on yearly basis.

Category	On roll as on 31-03-17	Period from 1st Apr 2017 to 31st March 2018			Present strength as on 31-03-18
		Inducted	Resigned / Absconding	Completed	
Graduate	54	89	35	40	34
Diploma- Technical	4	0	0	4	0
ITI	0	3	0	0	3
Total	58	92	35	44	37

Business Promotion

- Supply Order received from DRDO for the supply of Network Elements i.e. Routers at Core Layer and Switches at Access Layer.
- Purchase Order received from TRAI for Design, Development and Technical support of Quality of Service Portal.
- Field support of MAX continued for BSNL on PAN-India basis as per signed MoU.
- Supply Order received from BSNL for supply of Titli Damaks.
- Supply Order received from CSC eGov Services India Ltd for supply of Titli Damaks, BBWT to CSC.
- Purchase Order received for Design, Development and Technical Support of Mandatory Testing and Certification of Telecom equipment (MTCTE) Portal from Telecommunication Engineering Centre (TEC).
- Acceptance of proposal for Supply, Implementation of C-DOT LEMF application software and its integration with CMS received from various LEAs.

Awards received

- C-DOT's GPON was awarded under Innovative Product / Service category with Golden Peacock award 2018 (instituted by the Institute of Directors, New Delhi)
- C-DOT's Gyansetu was awarded with Change Award 2017 instituted by Cyber Media Initiative
- C-DOT's WiDHWAN and PDO were awarded SKOCH Certificate for Merit by SKOCH group
- Frost and Sullivan's Project Evaluation and Recognition Program (PERP) 2017 awarded C-DOT for Cost Leadership for WiDHWAN, and for Process Innovation for MAX-NG
- ELCINA - Electronics For You 2016-2017 - awarded C-DOT Certificate of Merit for Excellence in R&D.



Transfer of Technology

Technology Development and efficient Transfer of Technology results in building enabling base for manufacturing ecosystem for India . The Transfer of Technology (ToT) philosophy of C-DOT aims at a high rate of success in the technology dissemination process and functions in line with the 'Make in India' initiative of Government of India. It aims at educating the recipients of various technologies not only on the infrastructural requirements and requisite know-how for production, but also at providing the licensed manufactures with vital details about sources and specifications for the capital equipment and components.

During the FY 2017-2018, C-DOT has signed a total of 5 ToTs, covering 5 new Technologies / Products. of these 5 ToTs, 2 were signed with private sector manufacturers and 3 with CPSUs. As on 31st March 2018, a total of 82 ToTs were signed for 26 Technologies, with 23 different Licensees. C-DOT, through its ToT, has supported bulk manufacturing for mass deployment of its GPON, MAX-NG, ANRAX and BBWT technologies, through working very closely with the central public sector undertakings like M/s BEL, M/s ECIL and M/s ITI Ltd. C-DOT MAX-NG technology deployment extends the life of its indigenously developed switches in the BSNL network. For PAN India deployment of GPON in BharatNet, C-DOT is closely working with various units of ITI and with private manufacturing partners like M/s UTL and M/s Tejas Networks Ltd. and considerable amount of equipment has been deployed in network while efforts are made to complete the deployment. These deployments give a positive boost to building BharatNet which provides enabling infrastructure to the Government of India's 'Digital India' initiatives.

C-DOT technology Manufacturing Partners including CPSUs, and more notably the Licensees from private sector like M/s Systems Controls Technology Solutions Pvt. Ltd, M/s Cyient Ltd, M/s HFCL are working closely with C-DOT in reaching out to non-Government segment of business for Wi-Fi based products such as Solar / High Speed Access Broadband Wireless Terminals. C-DOT PDO was also promoted during this period.

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**Events
2017-2018**

Report on Events from April 2017 to March 2018

Workshop on ‘Future Proof Smart Cities with a Common Service Layer’ on 21st April 2017. The event was co-organized by ETSI, TSDSI, and C-DOT



The India-EU Cooperation on ICT-Related Standardization, Policy and Legislation project, a collaboration of European Telecommunications Standards Institute (ETSI) and Telecommunications Standards Development Society, India (TSDSI) in association with Centre for Development of Telematics (C-DOT) organized a one day workshop on “Future Proof Smart Cities with a Common Service Layer: a Standards Driven Approach” on 21st April 2017 at C-DOT Campus in New Delhi.

The aim of the workshop was to provide a platform where foreign and Indian experts from IoT and M2M forums, academia, R&D, industry and senior

officials from Ministries of Communications, Urban Development and Electronics and Information Technology and cities named in Indian Smart Cities Project could interact to share their knowledge and experiences. It was also planned to enrich the interaction by inviting City administration officials from Europe and South Korea who have actually implemented smart city projects in their respective cities.

Interop4 at Taiwan from 16th – 19th May 2017

Interop4 was co-organised by ETSI (European Telecommunications Standards Institute), TTA (Telecommunications Technology Association of Korea) and Institute of Information Industry (III) from Taiwan during 16th - 19th May 2017 at Bellezza Hotel, Zhongshan District, Taipei City, Taiwan. C-DOT participated in this event to verify the primitives interoperability as defined in oneM2M standards and to check end-to-end functionality on oneM2M interfaces.

IPR Day Celebrations 2017

IPR Day was celebrated at Delhi and Bengaluru campuses to encourage and honour the intellectual might of our fellow C-DOTians whose innovative ideas have brought accolades to C-DOT.

On 24th May 2017, inventors and authors working in Delhi campus were felicitated by Hon’ble chief





guest Shri Ramgopal Rao V Director, Indian Institute of Technology, Delhi. The event was presided over by Shri Vipin Tyagi, Executive Director, C-DOT. The chief guest also delivered a speech on Internet of Things. Shri B. P. Singh, Deputy Controller of Patents & Designs, Indian Patent Office, Guest of Honour of the event appreciated the inventors and authors and congratulated C-DOT for the achievements.

On 6th June 2017, inventors and authors working in Bengaluru campus were felicitated by Hon'ble Chief guest Shri Mahesh V Chief scientist, Central Research Lab, BEL, Bengaluru. The event was presided over by Shri Vipin Tyagi, Executive Director, C-DOT. The chief guest also delivered a speech on basics and importance of IPR.

oneM2M Developers Event at C-DOT Campus on 8th and 9th June 2017

oneM2M Developers Event was organized at C-DOT Campus on 8th and 9th June 2017 in New Delhi, India and video streamed live to Bengaluru. This event was co-organized by C-DOT, TSDSI and ETSI under the aegis of the India-EU Partnership Project on Collaboration for ICT Standardization.

This developer-focused event provided an overview of oneM2M standards and tools that enable interoperability and market growth in the Internet of Things. National and International speakers shared valuable insights for developers, active in IoT. The spirit of this new initiative was to create an interactive and stimulating exchange platform for developers, allowing many opportunities of hands on exercises. The first day of the event provided an overview of oneM2M standards and a tutorial on how to develop IoT applications quickly. The second day was dedicated to hands on exercises on developing

oneM2M applications on the sensors / actuator sides as well as on the end user side. The event witnessed the participation of delegates from industries, academia and student fraternity.

Strategic Electronics Summit 2017

The 8th edition of Strategic Electronics Summit 2017 (SES 2017) – Defence & Aerospace, was held on 6th & 7th July 2017 at Bengaluru International Exhibition Centre (BIEC), Bengaluru. Shri Vipin Tyagi, Executive Director, C-DOT gave an insightful account of the Opportunities for Electronics Manufacturers in Defence Projects. A Special Technology Session was also conducted by C-DOT on Trends in Strategic Communication Technologies & Potential for Indigenization. C-DOT took this opportunity to showcase its indigenous products and solutions which were appreciated by the visiting officials.



Visit of Chairman, TRAI at C-DOT, Bengaluru

Telecom Regulatory Authority of India (TRAI) had formed an expert panel to look into the technological challenges involved in allowing



subscribers to use the same STB for different service providers, for which the Centre for Development of Telematics (C-DOT) has been regulator's nodal partner. Chairman, TRAI and other dignitaries of Telecom Regulatory Authority of India (TRAI) visited C-DOT, Bengaluru on 24th July 2017 to discuss about the interoperable STB framework and see its demonstration.

C-DOT Foundation Day Exhibition and Launch of WiDHWAN on 30th and 31st August, 2017

C-DOT celebrated its 33rd Foundation Day during 30th - 31st August 2017 at C-DOT Campus in

Delhi as well as Bengaluru. On this occasion, the Minister of Communications Shri Manoj Sinha in his message said that the premier Telecom R&D Centre of the Government of India, can develop products having far reaching impact in the areas of Agriculture, Education and Health care and it has to play an important role in developing state-of-the-art telecom infrastructure at affordable rate for the common man. Chief Guest of the event, Ms. Aruna Sundarajan, Secretary DoT & Chairman Telecom Commission, GoI launched the latest innovation in C-DOT's portfolio WiDHWAN, an intelligent CPE solution, which has been exclusively designed to cater to the recurring call drop issues in no-signal and low-signal network scenarios in places such as offices and homes. The Executive Director, C-DOT, Shri Vipin Tyagi said that in the coming years there will be a new paradigm of communications and his organization has to rise to the new challenges. The other highlights of this event were product exhibits and G B Meemamsi Lecture Series.

This edition was full of informative sessions as part of G B Meemamsi Lecture Series. Prof V Ramgopal Rao, Director IIT Delhi conducted a workshop on 'Bridging Academic R&D with Product Innovation'.





Dr. Samir Mittal, Expert in AI, Cognitive Solutions & Machine (Deep) Learning, USA enlightened the attendees about 'Cognitive Computing Architectures for Machine (Deep) Learning at Scale with Applications in M2M/IoT analytics'. Dr. David Garrett, Distinguished Engineer, Expert in DSP & VLSI Design, USA gave his insights on 'Emergence of Smart Antennas in WLAN technology (802.11ac) and implications of the upcoming 802.11ax standard'. The event witnessed active participation from various sectors private, government, small and medium industries, academic institutions, appreciating the innovations and impact of C-DOT.

Indo-African ICT Expo 2017 at Lagos, Nigeria during 6th - 7th September 2017

Government of India hosted the 3rd edition of Indo-Africa ICT Expo 2017 in conjunction with IT and Telecom Summit to emphasise the relationship and commitment between India and African countries, on 6th - 7th September 2017 at the Eko Hotels and Convention Centre in Lagos, Nigeria.

Indo-Africa ICT Expo 2017 was a platform to build synergy among India & African Countries to showcase innovative & diversified Products & Services



and to bring together thought-leaders across the entire ICT value chain to discuss solutions to regulatory and business issues.

Indo-Africa ICT Expo 2017 presented the latest technologies that helped companies in Africa to evolve and maintain a competitive edge in the Communications and digital world. Shri M Soundarakumar, Director, C-DOT was one of the keynote speakers in the event.

IMS 2017

C-DOT participated in the Indian Manufacturing Show 2017 (IMS 2017) that acted as a catalyst to the manufacturing sector by bringing together the best talent, the best technologies and the best minds from across the globe while providing excellent marketing opportunities for all its participants.

India Manufacturing Show 2017 was the country's premier trade fair for engineering sector and related companies. IMS 2017 offered participating companies a unique, never before platform to exhibit their products & services. IMS is held biennially and the fourth edition was held from



30th October – 1st November 2017 at the Bengaluru International Exhibition Centre (BIEC), Bengaluru, India.

Visit of Taiwanese Delegation to C-DOT on 14th November 2017

The Taiwanese delegation comprising officials from Taiwan Association for Information and Communication Standards (TAICS), Industrial Technology Research Institute (ITRI), Institution for Information Industry (III) and other Taiwanese academic institutions and consortia visited C-DOT, Delhi on 14th Nov 2017. The visitors were briefed about C-DOT's Telecom solutions and indigenous developments. The detailed deliberations were held with Taiwanese officials about several standardization initiatives and upcoming trends in the area of 5G and IoT.



C-DOT participated in ITE.Biz 2017, which was jointly organised by the Dept. of IT & BT, Govt. of Karnataka and Software Technology Parks of India (STPI) Bengaluru. ITE.Biz was held during 16th - 18th November 2017 at the Palace grounds, Bengaluru.

ITE.Biz 2017

Department of IT & BT, Govt. of Karnataka has taken many initiatives to support the innovation ecosystem and Bengaluru ITE.biz 2017 focussed on 'Define the Next'.



ITU Secretary General visit on 22nd November 2017

Mr. Houlin Zhao, Secretary-General ITU visited C-DOT, Delhi on 22nd November 2017. Along with him, senior officials from DoT also graced the





occasion with their presence. They visited some of the R&D labs and were demonstrated C-DOT's indigenous solutions. They appreciated C-DOT's contribution to the Indian Telecom Sector.

Participation in FIGI 2017

First edition of Financial Inclusion of Global Initiative (FIGI) Symposium was held in Bengaluru, India from 29th November to 1st December 2017. The Symposium was organized jointly by the Telecommunication Standardization Bureau (TSB) of the International Telecommunication Union (ITU) with the Bill & Melinda Gates Foundation, the World Bank and the Committee on Payments and Market Infrastructure



(CPMI) and the kind support of the Government of India. The event was hosted by DoT with C-DOT being one of the co-hosts. The theme of this edition of the event was "Innovative Approaches to Digital Financial Inclusion Challenges." The Minister of Communications Shri Manoj Sinha was the Chief Guest of the event. Shri R. S. Sharma, Chairman TRAI, Ms. Aruna Sundararajan, Secretary DoT & Chairman Telecom Commission, Shri Ajay Prakash Sawhney, Secretary, MeitY and other senior officials from DoT were also present. C-DOT took this opportunity to exhibit its indigenous products and solutions which can play a key role in augmenting the network infrastructure in both rural and urban areas, as required to support digital financial inclusion.

IEEE iAIM 2017

IEEE Bengaluru Section announced an International Conference on Antenna Innovations and Modern Technologies (iAIM-2017). This conference took place during 24th - 26th Nov 2017 at Sterlings Mac Hotel, Bengaluru India.

C-DOT participated in iAIM-2017 that aimed to bring synergy between the industry and academia. iAIM-2017 included invited talks, tutorials from international experts, industrial and academic exhibits and contributory paper presentations on antenna design and measurements.

ETSI 2017

ETSI, the European Telecommunications Standards Institute, produces globally-applicable standards for Information and Communications Technologies (ICT), including Fixed, Mobile, Radio, Broadcast and Internet Technologies.





ETSI had requested C-DOT and TEC to host a One day symposium at C-DOT Bengaluru campus on 6th Dec 2017. It was helpful for developers in C-DOT to know about current standards. It gave C-DOT the platform for interacting with people and companies who are veterans in making and defining the standards.

IEEE ANTS 2017

C-DOT participated in IEEE ANTS 2017 which was held during 17th - 20th Dec 2017 at Bhubneshwar, Odisha. ANTS is a premier IEEE forum on networking and telecommunications topics. The distinguishing characteristic of IEEE ANTS 2017 was the promotion of an intense dialogue between academia and industry to bridge the gap between academic research, industry initiatives and governmental policies. This was fostered through panel discussions, keynotes, invited talks and industry



exhibits where academia was exposed to state-of-the-art practices and results from trials and interoperability experiments. The industry, in turn, benefitted from exposure to leading-edge research in networking as well as the opportunity to communicate with academic researchers regarding practical problems that require further research. This year the theme was "Communications for Smart City".

5th India M2M + IoT Forum 2018

Fifth edition of M2M + IoT Forum was held during 30th January – 31st January 2018 at Indian Habitat Centre New Delhi. C-DOT exhibited its Common Service Platform (CCSP) and end applications like smart light, geo intelligence etc. India's policy makers, regulators and the industry leaders were present at the event to chart out the vision ahead in the area of Machine-to-Machine (M2M) and Internet of Things (IoT). C-DOT demonstrated its capabilities in M2M and Shri Vipin Tyagi, Executive Director, C-DOT gave a talk on 'Capitalizing Connected World' during the event.

IOTSHOW.IN 2018

C-DOT participated in IOTSHOW.IN 2018 which witnessed a grand success in last two editions in



Bengaluru. In the third edition, EFY organised the IOTSHOW.IN 2018 during 7th - 9th February 2018 at KTPO Trade Center, Bengaluru to celebrate the achievements of India's Tech Industry.

India Telecom 2018

India Telecom 2018- An Exclusive International Business Expo, was organized by TEPC (Trade and Export Promotion Centre) at Shangri - La's Eros Hotel, New Delhi, India during 22nd - 23rd Feb 2018 under Market Access Initiative Scheme (MAI) of Department of Commerce, Government of India. The main objective of the event was to provide opportunities to Indian telecom exporters to meet qualified overseas buyers. This event provided one to one meeting opportunities between buyers from different countries and Indian exporters who can enlighten them about their products and technology solutions. C-DOT showcased its products and solutions that included Wireless, GPON, Geo Intelligence and Router.



On 23rd Feb 2018, TEPC (Telecom Equipment and Services Export Promotion Council) organized "International Buyer- Seller meet TEPC India Telecom 2017". The event attracted more than 100 foreign high-profile delegates from the Information and communication technology (ICT) industry from over 30 countries, including Ministerial / Official delegations from Bhutan, Bangladesh, Cambodia, Indonesia, Lao PDR and Malawi. The main objective was to provide opportunities to Indian telecom exporters, including SMEs and startups, to explore export potential and demonstrate their capabilities to meet the needs of the overseas buyers. The TEPC's flagship event is held every year and is a unique platform where potential buyers from across the globe are invited to meet Indian suppliers of telecom equipment and services as well as key stakeholders in the Indian Government.

Mobile World Congress 2018

C-DOT participated in the GSMA Mobile World Congress 2018 which was held from 26th Feb - 1st March 2018 in Barcelona, Spain.





IEEE CONNECT 2018

IEEE CONNECT 2018 was organized by IEEE Bengaluru Section during 16th - 17th March 2018 in Bengaluru. The conference featured plenary talks and invited papers by distinguish researchers and technologists. The conference focussed on recent advances in the field of Electronics, Computing and Communications.



Convergence India 2018

C-DOT participated in Convergence India 2018 held at New Delhi during 7th - 9th March 2018. Various C-DOT technologies were demonstrated at the event and live demonstration of the products were appreciated by visitors.



HR Initiatives

During the year 2017-18, C-DOT recruited 74 Fresh Engineers, from Computer Science and Electronics & Communication streams & 4 MBAs through Campus recruitment at IITs, NITs and other reputed Engineering colleges.

Women Empowerment:

C-DOT's Management has always been sensitive to gender issues and has consistently worked towards creating organizational culture reflecting gender equality. Presently, about 33% of staff members in C-DOT are women.

Existing Policies:

All eligible female staff members are allowed to avail up to 180 days maternity leaves and up to 90 days leaves subsequent to that (270 days inclusive of 180 days maternity leave). For miscarriage / abortion, leave of a total of 45 days in the entire service span is permissible.

C-DOT has introduced the policy on child care leave. This leave has been granted to eligible female staff on their applying for the same.

C-DOT offers accommodation and transport benefits to all its women employees with different options that may be availed as per individual needs. This ensures the safety and security of all women employees in the company.

Reimbursement for residential telephone expenses is admissible to about 100% of the women staff.

Multifunctional allowance is admissible to 36% of the women employees.

Career growth opportunities are available to women employees in C-DOT. In the last financial year, of the total employees promoted to higher grades 28% of them were women.

In management cadres (Team Leaders, Group Leaders, Technical Experts and Sr. Technical Experts) about 28% are women.

In order to address issues relating to Sexual Harassment of women staff at work place, a Committee has been constituted by C-DOT Board to take a fair and justified view of the cases and recommend suitable action on the same.

Employees' Welfare:

For the purpose of coverage for hospitalization expenses, C-DOT has taken a Tailor-made group medi-claim insurance from National Insurance Company Ltd. Staff members (and their families) in executive cadres have coverage of Rs. 5 Lakhs with the facility of opting for Rs. 7.5 or 10 Lakhs and staff in non-executive cadres have been covered for Rs. 3.5 Lakhs with the facility of opting for Rs. 5.0 Lakhs.

Grievance procedure has been introduced for C-DOT staff to provide the employees with easy & readily accessible machinery for prompt disposal of their day-to-day grievances.

Recruitment of SC / ST and persons with disabilities:

For recruitment of persons with disabilities and candidates belonging to SC / ST category,

C-DOT follows government rules providing for reservation in jobs in C-DOT.

C-DOT has a system in place to look after the welfare of persons belonging to these categories and address any problems / complaints that may come up.

Benefits for persons with disabilities:

C-DOT follows guidelines issued by Government of India with respect to reservations in jobs for persons with disabilities.

The C-DOT Campus at Delhi has been constructed in such a manner so as to ensure barrier free environment for the persons with disabilities. The main entrance/exit can be approached through a ramp together with stepped entry. Even elevators connecting the various working areas have been installed in way to facilitate persons with disabilities to move around freely from one wing to another.



Swachh Bharat Abhiyan

Being prime telecom R&D center of Govt. of India, C-DOT has contributed to Swachh Bharat initiative with many activities in the C-DOT campus. The focus has been providing cleanliness of surrounding and environment. With budgetary support from DoT for the initiative under “Swachhta hi seva”, C-DOT has undertaken many activities to promote, maintain and sustain the cleanliness of the surrounding and environment.

- Revamped cleaning in the campus to maintain its greenery at Delhi and Bengaluru campuses have further equipped with dustbins for recyclable and non-recyclable dustbins laid down within every 50 meters in C-DOT.
- Community service for the Swachh Bharat is the focus in the present year with emphasis on cleaning of the maintaining cleaning of the access road, sufficient dustbins at the entrance for keep which are accessible for communities in neighborhood.
- Construction of toilet for male at entrance of the campus is another and most significant aspect of the cleanliness as mission with commitment to the community service for Swachhta Action Plan (SAP) under “Swachhta hi seva”. The accessibility of these community is provided by the proper signage at the entrance.
- Construction of two other common toilets in the canteen areas for contract employees, like gardeners, security staff, housekeeping staff on duty for road and open area cleaning, towards community service.
- Installation of two water RO based water coolers, one at entrance and other at contract employees’ canteen for community service.

एक कदम स्वच्छता की ओर

Promotion of Hindi in C-DOT

C-DOT and Official Language: a Glimpse of Activities

C-DOT is making serious efforts to ensure compliance to the Official Language Policy of Government of India. To create awareness among the employees, C-DOT organizes different programmes throughout the year. Many innovative programmes have been initiated at both Delhi and Bengaluru centres of C-DOT in this regard. The meetings of Official Language Implementation Committee are conducted regularly under the chairmanship of the Head of Organisation. Hindi workshops are held regularly on topics of relevance.

• Hindi Utsav

C-DOT celebrates Hindi Utsav with festivities and zealous participation from one and all. It is not confined to just a fortnight but the enthusiasm is sustained throughout the year.

During 2017-18 Hindi Utsav was celebrated throughout the month of September in both Delhi and Bengaluru offices.

During this period a new & unique program "Mushaira Theatre" was organised in Bengaluru office, which was liked by all staff members. Apart from this program various competitions viz., Articulation, Poetry Recitation, Dumb Charades, Oral Quiz, Extempore Speech, Calligraphy, Dictation and the Picture Speaks were conducted and one technical talk was also organised. All the winners of the competitions were awarded certificates and cash awards. All other participants were also awarded certificates and participation prizes as motivation.

Likewise, in Delhi office also, various competitions with innovative ways to attract maximum participation, were organised. The storytelling competition-Katha Kahani, Kaho Apni Zubani, the poetry recitation competition- Kavyanjali and competition to measure the knowledge of Hindi language, grammar and idioms-Varg Paheli, Bhasha Gyan evam Muhavare gathered huge participation.

• Samvaad

Hindi Utsav was started with a workshop Samvaad, in which well-known tech-guru and linguist Shri Balendu Sharma Dadheech was invited. Shri Dadheech gave a comprehensive presentation on the Hindi computing scenario worldwide with brief notes about all the available Hindi software and linguistic solutions. The workshop proved to be highly informative and interesting.

• Kavi-Sammelan

In order to create an environment conducive to Hindi and other regional languages in C-DOT, a grand Kavi Sammelan / Mushaira is organized every year. Hindi / Urdu poets like Dr. Wasim Barelvi, Dr. Ashok Chakradhar, Shri Laxmi Shankar Vajpayee and Budding poet Shri Chirag Jain were invited.

• Kabir

A musical presentation based on the life of the saint, philosopher and poet, Kabir was staged in C-DOT. Kabir's messages of brotherhood, love and harmonious co-existence are equally relevant in today's world full of communal tension and hostility.

• Inse Miliye...

The series - INSE MILIYE...has been started with an endeavor to create an environment where all members of the C-DOT family inculcate a feeling of pride towards Indian culture and the Indian languages. In this programme eminent personalities from distinct fields are invited to share their success stories with us. This gives C-DOTians an opportunity to meet the successful and talented people.

This year the theatre, television and film actor Adil Hussain, who works in the mainstream Bollywood as well as art house cinema, was invited to share his success story. Coming from a small town Goalpara of Assam, he has made his mark in international films also. He received the Special



Jury Award at the 2017 National Film Awards. He has acted in English, Hindi, Assamese, Bengali, Tamil, Marathi, Malayalam, Norwegian and French films. Rendezvous with the artist was very inspiring and motivating.

• C-DOT in TOLIC

C-DOT, Delhi organized Story Telling contest on 28 July 2017 for all the member offices under the aegis of the Town Official Language Implementation Committee (South Delhi). The aim of this competition is to connect everyone with language, literature and books. As participants go to the libraries or Hindi websites to find a good story and thus our purpose of connecting them once again to Hindi language, literature and books is fulfilled.

The program was organized in two sessions. In the inaugural session, the famous story writer

Dr. Mamta Kalia, Central Provident Fund Commissioner, Dr. P. V. Joy and Shri Ramji Bali, from National School of Drama were special guests and speakers.

C-DOT, Bengaluru has been sponsoring one amongst the various inter office competitions held as part of the Hindi Month under the auspices of Town Official Language Implementation Committee, Bengaluru every year. During the year 2017 "Memory Test" competition was sponsored & conducted by C-DOT.

C-DOT participates in all the meetings organized by Town Official Language Implementation Committee.

Department of Telecommunications conducted OL related inspection at C-DOT Bengaluru during the year 2017 and a commendable report on the same was received.



Vigilance Awareness Initiatives

A separate vigilance unit has been set up in the Organisation in September, 2017 with the posting of a full-time CVO. During the year 2017-18, a number of steps were undertaken to carry out vigilance activities, primarily preventive Vigilance, as per the directives of CVC. Practices and procedures mainly related to Operation and Maintenance contracts and Disciplinary proceedings were reviewed and corrective measures were taken. Annual Property Returns were filed for the first time by the staff of C-DOT for the calendar year 2017. In addition, for the first time, sensitive posts were identified in C-DOT. Moreover, action for e-publishing of all tenders on CPPP portal has been initiated in C-DOT.

CTE type examination of few contracts were carried out by the Vigilance Unit and systemic improvements were suggested. Half-day workshop on disciplinary proceedings was conducted for the Admin Staff and Group Leaders of C-DOT. Further, awareness about Office procedures was generated amongst the target groups. Regarding complaints, all the complaints received were dealt in time, as per the complaint handling policy of the CVC.

'Vigilance Awareness Week' 2017 was observed successfully in C-DOT (both at Delhi and Bengaluru campus) from 30th Oct - 4th Nov 2017, wherein outreach activities were also undertaken for the first time. The keynote address was delivered by Dr. S. K. Sarkar, IAS (Retd.), ex-Secretary, DOPT. Most of the employees have taken integrity e-pledge.





Financial Statements

INDEPENDENT AUDITOR'S REPORT

**To the Members of
CENTRE FOR DEVELOPMENT OF TELEMATICS (C-DOT)**

Report on the Financial Statements

We have audited the accompanying financial statements of Centre for Development of Telematics (hereinafter referred to as "C-DOT" or Centre), which comprise the Balance Sheet as at March 31, 2018, the Statement of Income & Expenditure Account for the year then ended, annexed thereto, in which are incorporated the accounts of the units of the Centre audited by us and a summary of significant accounting policies and other explanatory information.

Management's Responsibility for the Financial Statements

Management is responsible for the preparation of these financial statements that give a true and fair view of the financial position and the financial performance of the Centre in accordance with the Societies Registration Act, 1860 and Generally Accepted Accounting Principles in India. This responsibility includes design, implementation and maintenance of adequate internal control, relevant to the preparation and presentation of the financial statements that give a true and fair view and are free from material misstatement, whether due to fraud or error.

Auditor's Responsibility

Our responsibility is to express an opinion on these financial statements based on our audit.

We conducted our audit in accordance with the Standards on Auditing issued by the Institute of Chartered Accountants of India. Those Standards require that we comply with ethical requirements and plan and perform the audit to obtain reasonable assurance about whether the financial statements are free from material misstatement

An audit involves performing procedures to obtain audit evidence about the amounts and the disclosures in the financial statements. The procedures selected depend on the auditor's judgment, including the assessment of the risks of material misstatement of the financial statements, whether due to fraud or error. In making those risk assessments, the auditor considers internal control relevant to the Centre's preparation & fair presentation of the financial statements in order to design audit procedures that are appropriate in the circumstances. An audit also includes evaluating the appropriateness of the accounting policies used and the reasonableness of the accounting estimates made by the Management, as well as evaluating the overall presentation of the financial statements.

We believe that the audit evidence we have obtained is sufficient and appropriate to provide a basis for our audit opinion on the financial statements.

Opinion

In our opinion and to the best of our information and according to the explanations given to us, the aforesaid financial statements give the information required by the Societies Registration Act, 1860 in the manner so required and give a true and fair view in conformity with the accounting principles generally accepted in India.

- a) In the case of the Balance Sheet, of the state of affairs of the Centre as at March 31, 2018; and
- b) In the case of the Income & Expenditure Account of the excess of expenditure over income for the year ended on that date.

For J. C. Bhalla & Co.
Chartered Accountants
Firm Regn. No.001111N

Sd/-
(Akhil Bhalla)
Partner
Membership number: 505002

Place: New Delhi
Date: August 25, 2018

BALANCE SHEET AS AT 31st MARCH, 2018

(in Rupees)

Particulars	Schedule No.	2018	2017
CORPUS / CAPITAL FUND AND LIABILITIES			
Corpus / Capital fund	1	4,05,49,01,722.88	3,27,65,56,565.50
Current liabilities and provisions	2	1,39,88,38,154.39	1,18,95,81,656.64
TOTAL		5,45,37,39,877.27	4,46,61,38,222.14
ASSETS			
Fixed assets	3		
Gross block		6,22,35,94,676.10	5,90,39,47,190.71
Less :- Depreciation		5,18,20,80,285.28	4,93,95,23,016.56
Net block		1,04,15,14,390.82	96,44,24,174.15
Asset in transit	3	16,11,200.90	1,97,923.50
Capital work-in-progress	4	62,52,840.00	62,52,840.00
Investments - long term	5	-	-
Current assets, loans, advances and deposits	6	4,40,43,61,445.55	3,49,52,63,284.49
TOTAL		5,45,37,39,877.27	4,46,61,38,222.14
Significant accounting policies	14		
Contingent liabilities and Notes on accounts	15		

Schedules 1 -15 form an integral part of the Financial Statements.

As per our report of even date.
For J.C. Bhalla & Co.
Chartered Accountants
Firm Regn. No. 001111N

For and on behalf of
Centre for Development of Telematics

Sd/-
(Akhil Bhalla)
Partner
Membership No. 505002

Sd/-
(G. Mukundan)
Chief Finance Officer

Sd/-
(Vipin Tyagi)
Executive Director

Place: New Delhi
Date: August 25, 2018

INCOME AND EXPENDITURE ACCOUNT FOR THE YEAR ENDED 31st MARCH, 2018

(in Rupees)

Particulars	Schedule No.	2018	2017
INCOME			
Income from TOT, Royalty, TSR / FSR & Publications	7	1,08,65,29,588.50	73,78,58,404.75
Interest earned	8	5,20,17,569.23	4,71,83,617.57
Other income	9	8,24,15,215.95	6,46,92,725.39
TOTAL (A)		1,22,09,62,373.68	84,97,34,747.71
EXPENDITURE			
Establishment expenses	10	2,09,94,14,048.61	1,83,21,14,291.76
Operational expenses	11	63,91,52,228.91	76,19,64,960.55
Other administrative expenses	12	34,04,56,696.37	55,63,67,116.33
Depreciation	3	24,25,57,877.72	30,50,34,666.74
TOTAL (B)		3,32,15,80,851.61	3,45,54,81,035.38
Excess of expenditure over income for the year [(B)-(A)]		2,10,06,18,477.93	2,60,57,46,287.67
Add / (Less) :-			
Adjustments pertaining to prior period items (Net)	13	(89,63,635.31)	(67,15,977.61)
Extraordinary Expenses		-	35,22,89,250.00
Balance being excess of expenditure over income		2,09,16,54,842.62	2,95,13,19,560.06
Add :- Excess of expenditure over income of previous years		25,07,83,96,596.62	22,12,70,77,036.56
Balance being deficit carried to Corpus / Capital fund		27,17,00,51,439.24	25,07,83,96,596.62
Significant Accounting Policies	14		
Contingent Liabilities and Notes on Accounts	15		

Schedules 1 -15 form an integral part of the Financial Statements.

As per our report of even date.
For J.C. Bhalla & Co.
Chartered Accountants
Firm Regn. No. 001111N

For and on behalf of
Centre for Development of Telematics

Sd/-
(Akhil Bhalla)
Partner
Membership No.505002

Sd/-
(G. Mukundan)
Chief Finance Officer

Sd/-
(Vipin Tyagi)
Executive Director

Place: New Delhi
Date: August 25, 2018

SCHEDULE 1- CORPUS/CAPITAL FUND
(Forming part of the Balance Sheet as at 31st March 2018)

(in Rupees)

Particulars	2018	2017
Grants from Department of Electronics & Information Technology (Formerly known as Department of Electronics)		
Accumulated balance	33,52,00,000.00	33,52,00,000.00
Subtotal (A)	33,52,00,000.00	33,52,00,000.00
Grants from Department of Telecommunication		
Balance at the beginning of the year	28,01,97,53,162.12	24,86,97,53,162.12
Add:- Contributions towards corpus / capital fund during the year	2,87,00,00,000.00	3,15,00,00,000.00
Subtotal (B)	30,88,97,53,162.12	28,01,97,53,162.12
Total [(A)+(B)]	31,22,49,53,162.12	28,35,49,53,162.12
Less :- Balance of net expenditure transferred from the Income and Expenditure account	27,17,00,51,439.24	25,07,83,96,596.62
TOTAL	4,05,49,01,722.88	3,27,65,56,565.50

SCHEDULE 2- CURRENT LIABILITIES AND PROVISIONS(Forming part of the Balance Sheet as at 31st March 2018)

(in Rupees)

Particulars	2018	2017
A. CURRENT LIABILITIES		
1. Sundry Creditors		
a) For Goods	18,01,11,135.56	20,23,96,307.24
b) Others	9,38,05,674.45	8,74,30,627.90
2. Advances received		
- For Funded Projects	31,92,35,495.60	8,59,10,329.60
3. Statutory Liabilities	15,76,35,570.00	3,31,02,661.00
4. Other Current Liabilities	15,47,19,835.78	29,56,48,974.90
Subtotal (A)	90,55,07,711.39	70,44,88,900.64
B. PROVISIONS		
1. Gratuity	97,75,001.00	3,61,01,469.00
2. Earned leave	48,35,55,442.00	44,89,91,287.00
Subtotal (B)	49,33,30,443.00	48,50,92,756.00
TOTAL (A+B)	1,39,88,38,154.39	1,18,95,81,656.64

SCHEDULE 3- FIXED ASSETS

 (Forming part of the Balance Sheet as at 31st March 2018)

(in Rupees)

Particulars	Gross Block				Depreciation				Net Block	
	As at 01.04.2017	Additions	Adj./ Write-off	As at 31.03.2018	As at 01.04.2017	For the year	Adj./ Write-off	As at 31.03.2018	As at 31.03.2018	As at 31.03.2017
A) Fixed Assets										
Land -Free Hold	12,00,00,000.00	-	-	12,00,00,000.00	-	-	-	-	12,00,00,000.00	12,00,00,000.00
Building-Office	57,01,80,967.65	-	-	57,01,80,967.65	40,82,02,324.17	1,61,97,864.35	-	42,44,00,188.52	14,57,80,779.13	16,19,78,643.48
Building-Residential	2,36,27,434.00	-	-	2,36,27,434.00	1,54,92,432.48	4,06,750.08	-	1,58,99,182.56	77,28,251.44	81,35,001.52
R & D Equipment	1,97,76,59,801.29	10,20,18,718.29	-	2,07,96,78,519.58	1,60,06,00,935.53	7,18,61,635.50	-	1,67,24,62,571.03	40,72,15,948.55	37,70,58,865.76
R & D Computers	2,45,84,99,493.50	19,31,98,013.20	-	2,65,16,97,506.70	2,32,76,29,124.99	12,96,89,456.49	-	2,45,73,18,581.48	19,43,78,925.22	13,08,70,368.51
Office Equipments & Appliances	37,20,40,789.56	1,47,06,612.00	-	38,67,47,401.56	30,70,86,113.32	1,19,84,621.63	-	31,90,70,734.95	6,76,76,666.61	6,49,54,676.24
Furniture & Fixtures	32,38,63,584.23	86,81,317.00	-	33,25,44,901.23	22,24,36,965.59	1,13,74,115.77	-	23,38,11,081.36	9,87,33,819.87	10,14,26,618.64
Library Books	5,80,75,120.48	10,43,433.90	(609.00)	5,91,17,945.38	5,80,75,120.48	10,43,433.90	(609.00)	5,91,17,945.38	-	-
Total	5,90,39,47,190.71	31,96,48,094.39	(609.00)	6,22,35,94,676.10	4,93,95,23,016.56	24,25,57,877.72	(609.00)	5,18,20,80,285.28	1,04,15,14,390.82	96,44,24,174.15
Previous year's total	5,46,70,05,671.75	43,69,48,768.96	(7,250.00)	5,90,39,47,190.71	4,63,44,92,699.82	30,50,34,666.74	(4,350.00)	4,93,95,23,016.56	96,44,24,174.15	83,25,12,971.93
BI Assets in transit									16,11,200.90	1,97,923.50

SCHEDULE 4- CAPITAL WORK IN PROGRESS(Forming part of the Balance Sheet as at 31st March 2018)

(in Rupees)

Particulars	As at 01.04.2017	Additions	Trf. to fixed assets	As at 31.03.2018
Campus - Delhi				
Campus - Residential Complex	62,52,840.00	-	-	62,52,840.00
TOTAL	62,52,840.00	-	-	62,52,840.00
Previous Year Balance	48,58,512.00	13,94,328.00	-	62,52,840.00

SCHEDULE 5- INVESTMENTS-LONG TERM(Forming part of the Balance Sheet as at 31st March 2018)

(in Rupees)

Particulars	Number of fully paid equity shares	Face value per share	2018	2017
UNQUOTED (AT COST)				
JOINT VENTURE COMPANY				
CDOT ALCATEL LUCENT RESEARCH CENTRE PVT LTD (CARC)	5,20,00,000	10	52,00,00,000.00	52,00,00,000.00
Less:- Provision for bad & doubtful investments			52,00,00,000.00	52,00,00,000.00
TOTAL			-	-

SCHEDULE 6- CURRENT ASSETS, LOANS, ADVANCES AND DEPOSITS

(Forming part of the Balance Sheet as at 31st March 2018)

(in Rupees)

Particulars	2018	2017
A. CURRENT ASSETS		
1. Inventories (as taken, valued and certified by the Management)		
a) Stores and spares	63,14,45,010.23	65,25,28,195.48
b) Inventory in transit	95,90,755.90	22,85,158.28
	64,10,35,766.13	65,48,13,353.76
2. Sundry debtors		
a) Debts outstanding for a period exceeding six months	61,39,52,660.20	53,23,03,992.73
b) Others	1,08,75,99,474.00	48,44,21,345.00
	1,70,15,52,134.20	1,01,67,25,337.73
Less:- Provision for bad & doubtful debts	1,89,37,915.00	3,59,33,244.00
	1,68,26,14,219.20	98,07,92,093.73
3. Bank Balances		
a) With Scheduled banks		
On Current Accounts	61,13,729.29	5,22,128.29
On Deposit Accounts	1,18,80,00,000.00	20,00,00,000.00
On Savings Accounts	29,59,00,920.26	1,08,90,31,086.60
	1,49,00,14,649.55	1,28,95,53,214.89
TOTAL (A)	3,81,36,64,634.88	2,92,51,58,662.38
B. LOANS & ADVANCES		
1. Loans		
a) Staff	56,15,122.00	62,15,272.00
b) CARC Pvt Ltd	18,45,78,500.00	18,45,78,500.00
	19,01,93,622.00	19,07,93,772.00
Less:- Provision for Bad & doubtful Loans - CARC (P) Ltd	18,45,78,500.00	18,45,78,500.00
	56,15,122.00	62,15,272.00
2. Advances and other Amounts Recoverable in Cash or in Kind or for value to be received		
a) Contractors & Suppliers	17,27,44,864.08	20,07,01,949.56
b) Employees	34,27,405.73	41,89,867.00
c) Prepaid expenses	1,45,54,179.43	1,50,21,395.76
	19,07,26,449.24	21,99,13,212.32
3. Interest Accrued		
a) Staff Loan	8,76,643.46	15,99,393.26
b) On Bank Deposits	84,05,363.22	61,91,146.63
c) CARC Loan	5,98,58,060.00	5,98,58,060.00
	6,91,40,066.68	6,76,48,599.89
4. Claims Receivable	26,35,02,545.31	25,88,37,721.31
Less:- Provision for Bad & doubtful Claims Receivable	19,78,41,104.35	19,78,41,104.35
	6,56,61,440.96	6,09,96,616.96
5. Tax deducted at source	24,19,54,271.06	20,26,40,230.06
6. Input Tax Credit	81,55,707.73	29,81,087.88
TOTAL (B)	58,12,53,057.67	56,03,95,019.11
C. DEPOSITS		
1. Office Building	1,20,500.00	1,20,500.00
2. Others	93,23,253.00	95,89,103.00
TOTAL (C)	94,43,753.00	97,09,603.00
TOTAL (A+B+C)	4,40,43,61,445.55	3,49,52,63,284.49

SCHEDULE 7- INCOME FROM TOT, ROYALTY, TSR / FSR & PUBLICATIONS

 (Forming part of the Income & Expenditure Account for the year ended 31st March 2018)

(in Rupees)

Particulars	2018	2017
1. Income from Royalty	14,43,14,355.00	-
2. Income from Transfer of Technology (TOT)	2,46,00,000.00	1,85,50,000.00
3. Technology / Field support receipts (TSR / FSR)	91,74,79,413.00	71,92,09,241.00
4. Income from Publications	1,35,820.50	99,163.75
TOTAL	1,08,65,29,588.50	73,78,58,404.75

SCHEDULE 8- INTEREST EARNED

 (Forming part of the Income & Expenditure Account for the year ended 31st March 2018)

(in Rupees)

Particulars	2018	2017
1. On term deposits with Scheduled Banks	4,41,09,312.73	3,50,54,761.59
2. On savings accounts with Scheduled Banks	59,26,374.30	49,44,362.02
3. On loans to employees	6,77,344.20	9,10,635.96
4. On loans to others	11,10,504.00	22,14,939.00
5. Others	1,94,034.00	40,58,919.00
TOTAL	5,20,17,569.23	4,71,83,617.57

SCHEDULE 9- OTHER INCOME

 (Forming part of the Income & Expenditure Account for the year ended 31st March 2018)

(in Rupees)

Particulars	2018	2017
1. Income from rent	4,13,75,264.00	4,21,17,208.00
2. Gain due to foreign exchange translation	18,48,748.53	7,77,386.84
3. Bad & doubtful debts recovered	1,69,95,329.00	-
4. Miscellaneous income	2,21,95,265.42	2,17,98,130.55
5. Profit on sale / disposal of assets	609.00	-
TOTAL	8,24,15,215.95	6,46,92,725.39

SCHEDULE 10- ESTABLISHMENT EXPENSES(Forming part of the Income & Expenditure Account for the year ended 31st March 2018)

(in Rupees)

Particulars	2018	2017
a. Salaries and wages	1,55,29,58,902.00	1,40,26,97,675.00
b. Bonus	13,86,205.00	30,72,336.00
c. Contributions to provident fund	15,99,43,069.00	10,85,35,931.00
d. Contributions to other fund	1,44,02,576.00	1,50,29,522.00
e. Gratuity provided for employees	6,97,75,001.00	3,61,01,469.00
f. Staff welfare expenses	28,70,61,768.00	24,45,24,399.00
g. Rent on residentials & maintenance expenses	24,45,136.00	1,66,66,607.00
h. Recruitment and training expenses	1,14,41,391.61	54,86,352.76
TOTAL	2,09,94,14,048.61	1,83,21,14,291.76

SCHEDULE 11- OPERATIONAL EXPENSES(Forming part of the Income & Expenditure Account for the year ended 31st March 2018)

(in Rupees)

Particulars	2018	2017
a. R&D components & consumables	32,95,76,681.46	41,45,15,605.00
b. Freight & forwarding charges	2,04,30,532.24	2,68,12,350.82
c. Repair & maintenance - R&D / office equipments	7,20,13,910.21	7,30,23,703.73
d. Design, development & technology support expenses	14,94,67,058.00	20,13,34,546.00
e. Technical, Apprentice & Consultancy expenses	6,49,09,566.00	4,45,37,049.00
f. Testing charges	27,54,481.00	17,41,706.00
TOTAL	63,91,52,228.91	76,19,64,960.55

SCHEDULE 12- OTHER ADMINISTRATIVE EXPENSES

(Forming part of the Income & Expenditure Account for the year ended 31st March 2018)

(in Rupees)

Particulars	2018	2017
a) Travelling and conveyance expenses	5,61,17,514.32	4,94,37,083.62
b) Vehicle hire charges	35,66,986.50	32,84,394.00
c) Rent, rates & taxes	52,21,661.00	51,29,270.00
d) Interest / penalty paid	1,40,877.00	-
e) Electricity & water charges	10,00,00,524.00	14,21,62,416.73
f) Repair & maintenance - Others	10,12,18,724.00	8,84,85,474.48
g) Newspaper, periodicals & journals	64,27,652.28	37,40,010.50
h) Insurance charges	9,88,540.00	10,33,376.00
i) Printing, stationery, photocopy & admin consumables	1,16,23,309.34	1,04,56,238.63
j) Postage, telephone and communication charges	1,32,83,662.58	1,49,01,717.40
k) Exhibition, advertisement & publicity expenses	2,20,38,368.00	1,93,41,865.00
l) Conference / seminar / membership fees	72,17,247.50	62,51,500.50
m) Legal, professional fees & honorarium	45,35,132.00	83,25,981.04
n) Patent fees	47,60,428.00	23,58,514.00
o) Remuneration to auditors		
Audit fees	3,00,000.00	3,00,000.00
Out of pocket expenses	1,08,490.00	80,551.00
	4,08,490.00	3,80,551.00
p) Hospitality / entertainment expenses	57,075.00	70,662.00
q) Bank charges	19,03,846.80	21,26,189.73
r) Loss due to foreign exchange translation	9,26,958.05	9,96,334.35
s) Miscellaneous expenses.	19,700.00	44,433.00
t) Bad & doubtful debts	-	19,78,41,104.35
TOTAL	34,04,56,696.37	55,63,67,116.33

SCHEDULE 13- ADJUSTMENTS PERTAINING TO PRIOR PERIOD ITEMS (NET)(Forming part of the Income & Expenditure Account for the year ended 31st March 2018)

(in Rupees)

Particulars	2018		2017	
	Debit	Credit	Debit	Credit
INCOME				
Income from TOT, Royalty, TSR / FSR & Publications	-	-	-	-
Interest earned	4,20,226.00	-	-	-
Other Income	-	-	-	1,47,506.00
EXPENDITURE				
Establishment expenses	6,13,422.00	-	1,41,644.00	-
Operational expenses	-	1,01,47,777.64	-	87,11,587.51
Other administrative expenses	1,50,494.33	-	20,05,821.90	-
Depreciation	-	-	-	4,350.00
TOTAL	11,84,142.33	1,01,47,777.64	21,47,465.90	88,63,443.51
NET TOTAL		89,63,635.31		67,15,977.61

SCHEDULE 14:- SIGNIFICANT ACCOUNTING POLICIES

(Forming part of the financial statements for the year ended 31st March, 2018)

1. Accounting Method

- a) The financial statements are prepared on accrual basis of accounting under historical cost convention in accordance with generally accepted accounting principles and standards in India and provisions of the Societies Registration Act, 1860.

2. Use of estimates

- a) Preparation of financial statements require estimates and assumptions to be made that effect the reported amount of assets and liabilities on the date of financial statement and the reported amount of revenues and expenses during the reporting period. Differences between actual results and estimates are recognized in the period in which the results are known / materialized.

3. Fixed Assets

- a) Fixed Assets are stated at cost less accumulated depreciation and any impairment in value. Cost of fixed assets comprises the purchase price and any directly attributable cost of bringing the asset to its working condition for its intended use.
- b) Asset, the individual cost of each of which is Rs. 5000 or less is also capitalized and depreciated in the year of acquisition itself at 100% value reduced by one rupee.
- c) Library books are capitalized irrespective of the individual values thereof.
- d) Subsequent expenditure related to an item of fixed asset is added to its book value only if it increases the future benefits from the existing asset beyond its previously assessed standard of performance.
- e) The Management conducts physical verification of fixed assets at the year end and its reconciliation with financial records. Such exercise is undertaken, taking into account the nature / size of activities of the Centre.

4. Depreciation

- a) The provisions of Appendix I to the Income Tax Rules, 1962 (The Rules), as amended from time to time, are applied with the exceptions indicated below
 - i. Assets put to use anytime during the year are depreciated at the full rate prescribed by the Rules.
 - ii. Library books purchased during the year are depreciated fully in the same year.
 - iii. Assets, which are sold or discarded or lost or disposed off during the year, do not suffer depreciation for that year.

5. Inventory Valuation

- a) Stores and Spares (including machinery spares) are valued at cost. The cost is calculated on weighted average method. Cost comprises expenditure incurred in the normal course of business in bringing such inventories to its location and includes, wherever applicable, appropriate overheads.
- b) Obsolete, slow moving and defective inventories are identified at the time of physical verification of inventories and, wherever necessary, provision is made for such inventories.

6. Investments

- a) Current investments are valued at lower of cost and fair market value.
- b) Long Term Investments, including in Joint Ventures, are carried at cost. Wherever necessary, provision is made to recognize decline, other than temporary, in valuation of Long Term Investments.

7. Accounting for Grants-In-Aid

- a) Grants-in-aid received from the Government are treated as towards "Corpus / Capital Funds".
- b) The Grants-in-aid are treated as accrued when sanction memos are issued by the Administrative Ministry.

8. Revenue Recognition

- a) In respect of projects undertaken by the Centre for Telecom Operators and other agencies, the expenses and income in relation to these, are accounted for as expenditure / income respectively, only upon completion of the milestones related to project. Where the milestones / acceptances are not completed, the balances available in the Project account are shown as advances / recoverable on the balance sheet date.
- b) Revenue is recognized to the extent that it is possible to estimate / ascertain that the economic benefits will accrue to the Centre and the revenue can be realistically measured. When the Centre is unable to assess the ultimate collection with reasonable certainty, revenue recognition is postponed and is recognized as and when the revenue collection is reasonably certain.

9. Foreign Currency Transaction

- a) Foreign currency transactions are accounted at the exchange rate prevailing on the date of transaction and the difference between the date of transaction and payment / receipt / accrual are accounted for as income or expenditure, as the case may be.
- b) Monetary Current Assets and current liabilities denominated in foreign currency are translated at the exchange rate as prevailing at the year end and the resultant gain / loss is adjusted to revenue account. Advances paid to foreign suppliers for materials / services are treated as non-monetary assets and consequently are reported using the exchange rate at the date of transaction.
- c) Contingent liabilities denominated in foreign currency are translated at the exchange rate as prevailing at the year end.

10. Retirement and other employee benefits

- a) The Centre operates defined benefit plan for Gratuity to its employees. The costs of providing benefits under this plan are measured on the basis of actuarial valuation at the end of each year using projected unit credit method. Actuarial gains or losses for the defined benefit plan are recognized in full in the period in which they occur in the statement of profit or loss.
- b) Provisions for compensated absences are accounted for based on actuarial valuation using the projected unit credit method at the year end.

11. Adjustments pertaining to earlier years

Adjustments necessitated during the current year pertaining to one or more previous years are treated as prior period items only when the value in each such case exceeds Rs. 5000/-.

12. Provisions and Contingent Liabilities

- a) The Centre creates provision when there is a present obligation as a result of an obligating event that probably requires an outflow of resources and a reliable estimate can be made of the amount of outflow.
- b) A disclosure for a contingent liability is made when there is a possible obligation or a present obligation that may, but probably will not, require an outflow of resources. Where there is a possible obligation or a present obligation in respect of which the likelihood of outflow of resources is remote, as per the view of the Management, no provision or disclosure is made.

SCHEDULE 15: NOTES ON ACCOUNTS

(Forming part of financial statements for the year ended 31st March, 2018)

PART -A: Balance Sheet

1. Fixed Assets:-

Fixed assets include land at New Delhi measuring 40 acres (same as previous year) which was acquired in 1993 from Government of India. This land has been considered free hold, however, formal conveyancing has not been done in favour of the Centre.

2. Capital work-in-progress:-

- a. It represents cumulative expenditure, incurred since the financial year 2008-09, on proposed housing facility within the C-DOT Campus at New Delhi, amounting to Rs. 62.53 lakhs as at 31.03.2018 (Previous year - Rs. 62.53 lakhs).
- b. This expenditure under this head will be capitalized appropriately under "Fixed Assets", upon completion of the housing facility.

3. Investments in C-DOT Alcatel Lucent Research Centre (CARC) Private Limited:-

- a. C-DOT Alcatel Lucent Research Centre (CARC) Private Limited is a joint venture company engaged in Research & Development in the field of telecommunications. The Centre's equity participation in the joint venture is Rs. 5200 lakhs.
- b. The net worth of the said company is fully eroded as the company has accumulated losses. Hence, a provision against the said investment was made under the head "Provision for Bad and Doubtful Investments" amounting to Rs. 5200 lakhs in previous years. Centre, being one of the promoters of the company, is awaiting the directive of the Government on the prospects of the company.

4. Current Assets, Loans, Advances and Deposits

- a. Inventory:-
 - i. Components which are lying in stock for more than 3 years amounting to Rs. 521.75 lakhs as at 31.03.2018 (Previous year Rs. 277.93 lakhs). The Management is of the view that these components may be required for use in any of the future R&D and field maintenance activities of the Centre.
 - ii. The value of components, which were purchased in past years, issued to the indentors and treated as consumed in the accounts of the year of issue, but part of which were returned to the stores during the current year by the indenting groups- Rs. 149.94 Lakhs (Previous year- Rs. 118.15 lakhs).
- b. Sundry Debtors amounting to Rs. 17015.52 Lakhs as at 31.03.2018 (Previous year Rs.10167.25 lakhs) includes:-
 - i. TOT, Royalty & Technology support dues amounting to Rs. 2598.95 lakhs as at 31.03.2018 (Previous year - Rs. 2337.18 lakhs) from one of the licensees is met by the value of land and building at Bengaluru belonging to that licensee which was taken over by the Centre in the year 2005. However, formal transfer of land and building has not been made so far.
 - ii. Dues for technology / field support services rendered to Telecom companies amounts to Rs. 10150.06 lakhs as at 31.03.2018 (Previous year - Rs. 7157.57 lakhs). It is considered good and fully recoverable.

- iii. Provision for Bad & doubtful debts amounting to Rs. 189.38 lakhs (Previous year - Rs. 189.38 lakhs) towards TOT & Royalty dues of M/s PCL has been retained due to ongoing arbitration proceedings.
 - iv. Royalty dues from one of the licensees amounting to Rs. 448.39 lakhs comprises of income of Rs. 410.19 lakhs related to previous years, recognised in the current year as the certainty to receive has crystallised during the year.
 - v. Other dues amounting to Rs. 3628.74 lakhs (Previous year Rs. 444.92 lakhs) are considered good and fully recoverable.
- c. Loan to C-DOT Alcatel Lucent Research Centre (CARC) Private Limited:-
- The aggregate of loans given to C-DOT Alcatel Lucent Research Centre (CARC) Private Limited in previous years amounts to Rs. 1845.79 lakhs. The said company has accumulated losses and its net worth has fully eroded. Hence, a provision against the said loan was made under the head "Provision for Bad and Doubtful Loan" amounting to Rs. 1845.79 lakhs in the previous years. Aggregate of loans after providing for bad and doubtful loans as at 31.03.2018 is Nil (Previous year - Nil).
- d. Interest Accrued on loan to CARC Private Limited:-
- Interest accrued on loan given to C-DOT Alcatel Lucent Research Centre (CARC) Private Limited as at 31.03.2018 is Rs. 598.58 lakhs (same as previous year). From the Financial Year 2011-12, the said company defaulted in paying the interest. However, keeping in consideration the liquid funds available with the said company at the balance sheet date, the Centre has not made any provision against the interest due on loan.
- e. Claims Receivable:-
- Amount realizable, on account of projects undertaken for other organizations, on reimbursement of cost basis aggregating Rs. 2576.58 lakhs (Previous year- Rs. 2532.54 lakhs) after providing for "Provision for Bad and Doubtful Claims Receivable" of Rs. 1978.41 lakhs (same as previous year) amounts to Rs. 598.17 lakhs as at 31.03.2018 (Previous year- Rs. 554.13 lakhs) is considered good for recovery. Balance of claims receivable amounting to Rs. 58.44 lakhs (Previous year- Rs. 55.83 lakhs) are considered good for recovery.
- f. Tax Deducted at Source:-
- Tax deducted at source receivable pertaining to various years, amount to Rs. 2419.54 lakhs as at 31.03.2018 (Previous year - Rs. 2026.40 lakhs) is considered good for recovery.

5. Contingent Liability:-

- a. On account of unexpired letters of credit issued by bankers in respect of purchase orders for procurement of components and equipment - Rs. 164.40 lakhs as at 31.03.2018 (Previous year - Rs. 61.74 lakhs).
- b. On account of pending legal cases, the amount outstanding is Rs. 20.87 lakhs as at 31.03.2018 (Previous year - Rs. 20.87 lakhs).

PART-B: Income & Expenditure Account

1.0 Expenditure:-

A. Employees' Benefits:-

- i. Gratuity:-

Liability on account of Gratuity using the Actuarial valuation method, based on existing pay

and allowances is Rs. 5920.26 lakhs (Previous year- Rs. 5015.18 lakhs). The net expenditure recognized in the Income & Expenditure account for Gratuity in the current year is Rs. 697.75 lakhs (Previous year- Rs. 361.01 lakhs). The Gratuity Trust, which is managed by a separate Board of Trustees comprising of employees of the Centre, is responsible to discharge the liability on this account.

ii. Earned Leave (EL):-

As per Rules of the Centre, Earned Leave is encashable by serving employees as well as by those leaving the services, either on superannuation or otherwise. The provision for liability, based on existing pay and allowances, estimated using actuarial valuation method, in respect of Earned Leave of employees as at 31.03.2018, is Rs. 4835.55 lakhs (Previous year- Rs. 4489.91 lakhs).

B. Bonus

The Centre makes ex-gratia payment to eligible employees, as per applicable policy for the time being in force. These ex-gratia payments are accounted for on estimate basis every year. The estimated expenditure provided for the financial year 2017-18 is Rs. 13.86 lakhs (Previous year- Rs. 30.72 lakhs).

C. Consumption of Components:-

- i. As per the practice followed consistently, value of consumption is arrived at by reducing the value of closing stock from the aggregate of the values of opening stock and the purchases made during the year.
- ii. Accordingly, the value of components consumed during the current year was Rs. 3295.77 Lakhs (Previous year - Rs. 4145.16 Lakhs).

D. Repair & maintenance –others

It includes civil works expenditure amounting to Rs. 70.09 lakhs for the current year (Previous year - Rs.160.88 lakhs), incurred on campus at Bengaluru.

E. Foreign Exchange Fluctuations:-

- i. The net result out of gains & losses due to fluctuations in Foreign Exchange on account of various transactions during the current year is a gain of Rs. 9.22 Lakhs (Previous year Loss- Rs. 2.19 Lakhs).
- ii. The gains and losses on account of foreign exchange fluctuations are disclosed in Schedule 9 and 12 respectively.

F. Adjustments Pertaining to earlier years (Net):-

It includes income of Rs. (-) 4.20 lakhs (Previous year Rs. 1.48 lakhs) and expenditure of Rs. (-) 93.84 lakhs (Previous year Rs. (-) 65.68 lakhs).

PART-C: General

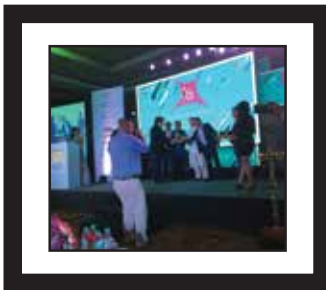
Previous year's figures have been regrouped or rearranged, wherever necessary, to make them comparable.

Sd/-
G. Mukundan
Chief Finance Officer

Sd/-
Vipin Tyagi
Executive Director

Acronyms

4G: 4th Generation (wireless communication technology)	LTE: Long Term Evolution (of universal terrestrial radio access network)
5G: 5th Generation (wireless communication technology)	M2M: Machine-to-Machine
ADN: Application Dedicated Node	MAN: Metropolitan Area Network
ANURAG: Advanced Numerical Research and Analysis Group	MAX-NG: Main Automatic Exchange – Next Generation
ASN: Application Service Node	MAX: Main Automatic Exchange
AT: Acceptance Testing	MHA: Ministry of Home Affairs
BBWT: Broadband Wireless Terminal	MN: Middle Node
BSS: Base Station Subsystem	MPLS: Multi-Protocol Label Switching
C-GEMS: C-DOT GPON EMS Simulator	NCR: National Capital Region
CAS: Conditional Access System	NDMA: National Disaster Management Authority
CDR: Call Detail Record	NFV: Network Function Virtualisation
CGRAN: C-DOT GSM Radio Access Network	NIC: National Informatics Centre
CiSTB: C-DOT interoperable Set-Top Box	NOC: Network Operation Centre
CMML: Capability Maturity Model – Integrated, Shared GSM Radio Access Network	NOFN: National Optical Fibre Network
CPE: Customer Premises Equipment	OCN: Optical Core Network
CSC: Common Service Centre	OSI: Open Source Intelligence
CSF: Common Service Functions	OTN: Optical Trunk Network
DEAL: Defence Electronics Applications Laboratory	PCB: Printed Circuit Board
DoT: Department of Telecommunications	PCI: Prime Custodian of Interception
DR: Disaster Recovery	PCT: Patent Cooperation Treaty
DTH: Direct-To-Home	PDO: Public Data Office
ECSCF: Emergency Call Session Control Function	PMH: Prime Minister's House
EMS: Element Management System	PMO: Prime Minister's Office
eNodeB: Evolved Node B	PSAP: Public Safety Answering Point
EPC: Evolved Packet Core	PSU: Public Sector Undertaking
FPGA: Field Programmable Gate Array	RAX: Rural Automatic Exchange as Access Network
FTTH: Fibre-To-The-Home	RF: Radio Frequency
GIS: Geographic Information System	SDN: Software Defined Networking
GPSU: Green Power Supply Unit	STB: Set-Top Box
ICT: Information and Communication Technology	STBR: Stackable Terabit Router
IEEE: Institute of Electrical and Electronics Engineers	Tbps: Terabits per second
IIT: Indian Institute of Technology	TCIL: Telecommunications Consultants India Limited
IM: Intelligence Manager	TDMA: Time Division Multiple Access
IMCL: IndusInd Media & Communications Ltd	TEC: Telecommunication Engineering Centre
IMS: Internet Protocol (based) Multimedia Subsystem	ToR: Top-of-Rack
IN: Infrastructure Node	TRAI: Telecom Regulatory Authority of India
IRI: Interception-Related Information	VAS: Value-Added Service
ITI: Indian Telephone Industries	VOIP: Voice over Internet Protocol
LAN: Local Area Network	WDAN: Wavelength-based Distribution and Aggregation Network
LEA: Log and Event Manager	WiDHAN: Wireless Data Connectivity at Home using Wireline Access Network
LSA: Licensed Service Area	WiFi: Wireless Fidelity
LTE-A: Long Term Evolution - Advanced	XGPON: 10 Gbps Passive Optical Network (TDM/TDMA-based)



OUR BANKERS

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Canara Bank

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Bengaluru - 560 100

Central Bank of India

Sona Towers, 71/1, Millers Road
Bengaluru - 560 100

OUR STATUTORY AUDITORS

J.C .Bhalla & Co

Chartered Accountants
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New Delhi - 110 065

OUR OFFICES

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