सी–डॉट
**C-DOT**

# Architecting
# DIGITAL INDIA
## 2016-17 ANNUAL REPORT

# Centre for Development of Telematics
(CMMI Level 5 Organization)

## Vision:

Is 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, Telecom Commission & Secretary (T)

Member (Technology), Telecom commission.

Member (Finance), Telecom Commission.

Secretary, Department of Electronics and Information Technology

Chairman & Managing Director, BSNL

Executive Director, C-DOT

Directors, C-DOT

## Steering Committee

**Chairman**
Chairman, Telecom Commission & Secretary (T)

**Vice Chairman**
Member (Technology, Telecom 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 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's BBWT (Broad Band Wireless Terminal) is specially 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 has been recently honoured 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

## 1.1 Accomplishments and activities during the last financial year

FY 2016-2017 witnessed significant progress in the development of state-of-the-art cutting edge technologies, technology trials, efforts in technology commercialisation, which include signing of MoUs with manufacturers, technology promotions, showcasing to prospective vendors, building requisite IPR assets, etc.

Progress made in the major technology programs are summarised below.

- **Communication and security research and monitoring:** Centralised Monitoring system (CMS) infrastructure roll-out, which includes installation of Central Monitoring Centre (CMC) data centre build and its IT infrastructure, Regional Monitoring Centre (RMC) data centre built in 21 LSAs (Licensed Service Area), ILDs, etc, for lawful interception of voice and data by LEAs (Law Enforcement Agency)..

- **Broadband technologies:** Carrying out software adaptations of multi-terabit router for IMS (IP Multimedia System) and 4G technology.

- **Next generation mobile technologies:** Developments for LTE Femto eNodeB system.

- **Carrier networks transport technologies for transport and access networks:** Technology development for the next generation PON (Passive Optical Network) system for applications requiring more bandwidth in the access and DWDM-based (Dense Wavelength Division Multiplexing) transport network system for long-haul applications.

- **Secure wireless and wireline networks:** Design and development of Wireless Phone Secure (WiPS) tablet and hand-held devices.

- **Next generation security for telecom and data networks:** Development of an Advanced Intelligent Monitoring System (AIMS) to scale up the architecture framework of the present CMS, development of interception solutions for new technologies like LTE/LTE-A, IMS-compliant Fixed and Mobile Converged Platform (FMCP), integration with other security agency solutions, and Advanced Intelligence (AI) manager techniques.

- **Satellite-based technologies:** Design and development of a satellite hub baseband system.

- **Power efficient green telecom technologies:** Design and development of an alternate power supply system based on green technologies specifically for CPEs (Customer Premises Equipment), mobile towers (BTS), and also to supply power to current and future products developed in C-DOT.

- **Enabling technologies and telecom networks:** Undertaking of feasibility studies and prototyping on emerging telecom technologies.

- **Technology field implementations and trials:** Undertaking of some of the developed technologies for field implementation.

Through these indigenous developments and the support of indigenous manufacturers, C-DOT offers complete solutions for urban, rural, the north-east, and strategic sectors like Defence and Security. Besides, C-DOT also provides life-time support to its technology in the TSPs' (Telecom Service Provider) network with continuous technology upgradation, value addition, bug fixing and providing alternate designs to address component obsolescence.

Achievements and progress made in the various technology programs are discussed in the following sections.

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### 1.1.1  Security related projects

- **Centralised Monitoring System (CMS) for lawful interception and monitoring:** A national roll-out project, is being commissioned in various LSAs. Installation of RMCs completed in 20 LSAs. In the current FY, pilot RMCs in all 21 LSAs have been migrated to field RMCs and technically 20 LSAs have been commissioned. Cumulatively, 20 RMCs are ready in the field for start of service. Some of the LEAs, namely, UP police, MP police and Meghalaya police are on-board to CMS. Some more LEAs, like CBI (Central Bureau of Investigation), NCB (Narcotics Control Bureau), DoE (Directorate of Enforcement) and J&K police, have placed purchase orders for LEMF for all their sites.

- **Secure and Dedicated Communication Network (SDCN):** Is ready for commissioning in MTNL Delhi network.

- **Internet Service Provider (ISP):** Is undergoing field deployment. In the current FY, ISP gateway hardware equipment was received and installation was completed at all 15 sites planned for the year, and handed over to the LEAs. Cumulatively, ISP monitoring solution has been deployed and is in operation at more than 100 locations across the country.

- **Advanced Intelligent Monitoring System (AIMS):** The R&D project is under development to address enhanced security and interception requirements of LEAs. Pilot/ field trial for enhanced CMS architecture framework has been completed.

- **Centre of Excellence (CoE) for Lawful Interception:** Ministry of Home Affairs (MHA) had approved setting up of a CoE at C-DOT Delhi to undertake R&D programs to address new interception requirements of LEAs through development of advanced technologies, namely, OSINT (Open Source Intelligence), image processing, crypto analysis, etc. Development under OSINT has been completed.

- Hadoop-based basic search engine for big data analysis for LEAs, software prototype for data collection from major social networking sites, such as Twitter, Facebook, LinkedIn, etc, and algorithm for sentimental analysis for social networking sites Twitter and Facebook, have been developed. Moreover, efforts are made for joint working with IIT Delhi in image processing for face recognition and behavior analysis, proposals are being finalised. A WhatsApp type mobile app – SAMVAD – has been developed for secure communication, and is undergoing pilot trial by the Air Force.

### 1.1.2  Optical technologies

- **Next Generation PON:** The PON technology technology development for DWDM-based 32G PON (WDM-PON – Wavelength Division Multiplexing based PON) and TDM-based 10G PON (XG-PON – 10Gbps PON) have been

completed. The pilot trial for these technologies are in progress the BSNL network.

- **Optical Core Network (OCN):** For this R&D project for DWDM-based 100G OTN (Optical Trunk Network) system for long-haul applications to support data rate of 100Gbps per channel at line/WDM side, development has been completed as per C-DOT specifications and validation has started. Enhancements and developments to conform to recently released TEC GR for the system is in progress.

### 1.1.3 Broadband technologies

- **Multi Terabit Router:** For this R&D project for development of a 6 Terabit capacity routing platform, scalable and with built-in security features to carry huge volumes of growing IP traffic, integration testing is in progress at present.

- **Customised router for DRDO - ANURAG (Advance Numerical Research and Analysis Group):** For this R&D project for development of Defence applications, hardware design implementation and software architecture design are in progress at present.

### 1.1.4 Satellite-based technologies

- **Development of customised satellite hub baseband system for DEAL (Defence Electronics Application Laboratory)** Development of carrier grade hub baseband system has been undertaken as phase 2 after delivering hub baseband sub-system to the client under phase 1 of the project. Architecture design for the carrier grade hub baseband system is in progress at present.

### 1.1.5 Wireless technologies

- **Broadband Wireless Terminal (BBWT):** WiFi technology with capabilities like VoIP, cognitive radio for efficient radio spectrum usage, is undergoing field deployment in grampanchayats,

CSC (Common Service Centre), NOFN (National Optical Fibre Network) and Defence networks, and is being explored for export promotion. A MoU has been signed with CSC SPV (Special Purpose Vehicle) for extending broadband services beyond grampanchayat using C-DOT WiFi technology.

- **Shared GSM Radio Access Network (SG-RAN):** 2G GSM technology allows active infrastructure sharing by multiple operators thereby reducing CAPEX and OPEX. C-DOT licensees participated in the tender for deployment of small BTSs (Base Station Subsystem) in the NER (North-East Region). C-DOT has installed its technology in NER for evaluation.

- **Long Term Evolution - Advanced (LTE-A):** For the R&D project for developing LTE-A system comprising of several network nodes, required for building LTE-A infrastructure to provide 4G broadband services, C-DOT EPC (Evolved Packet Core) has been offered and eNodeB (femto) solution is being planned to be offered to TEC for validation. Moreover, for LTE macro, C-DOT RRH (Remote Radio Head) for large coverage areas, is undergoing integration and testing for TDD band and RRH for FDD band is undergoing individual card testing.

### 1.1.6 Power-efficient and green telecom technologies

- **High capacity solar power supply system:** For this R&D project for development of 2KW and 5KW solar power supply systems to address power requirements of telecom equipment (like, mobile towers (BTS)), design has been completed for both 2KW and 5KW systems and implementation is in progress at present

### 1.1.7 Telecom services and applications

- **Machine-to-Machine (M2M) Communication:** For this R&D project to develop next generation communication network platform for future

intelligent pervasive applications (like, energy and utilities management, facility management, etc) required for building smart cities, the progress made are:

- Software design and development are in progress for CSE (Common Service Entity) and AE (Application Entity) platforms, and hardware development is in progress for ADNs (Application Dedicated Node),
- C-DOT M2M common service platform for IN (Infrastructure Node) successfully tested in 2nd oneM2M Interop event held in South Korea, during 10th to 13th May 2016 with 30 participating organisations and 3rd oneM2M Interop event held in Japan, during 29th Nov 2016 to 2nd Dec 2016;
- C-DOT's 34 contributions were accepted by oneM2M standard body in the oneM2M Technical Plenary TP25 held in ETSI in Sohpia Antipolis, France, during 17th to 21 Oct 2016,
- In oneM2M Showcase at ETSI IoT Workshop, C-DOT showcased various M2M applications (like smart living, smart street light, carbon footprint monitoring) on oneM2M based IN-CCSP (Infrastructure Node - C-DOT Common Service Platform) using standards based M2M communication. WPAN technologies like LoRA, and Zigbee were demonstrated

- **C-DOT interoperable Set-Top Box (CiSTB):** For this R&D project to meet TRAI's requirement for providing interoperable STB to give impetus to TV broadcast digitisation, by STB manufacturing in the country, hardware implementation has been completed and software implementation is in progress.

## 1.1.8 Field implementation of developed projects

- **Next Generation Network (NGN):** VoIP-based (Voice over IP) packet switching technology is undergoing field deployment in BSNL network through conversion of existing circuit switching based C-DOT MAX switches to packet switching based MAX-NG switches. Physical installation has been completed for all 6 core sites and purchase orders have been placed for all access equipments. Validation testing is in progress for NMS/NOC (main). Physical installation of NMS/NOC (DR) at south zone has been completed.

- **NGN** technology is also undergoing field deployment in MTNL network through conversion of circuit switching based switches to VoIP-based packet switching based ones. Validation testing for C-DOT LMG (Line Media Gateway) for migration of existing 40K landline connections of MTNL to C-DOT NGN platform has been completed

- **Network Management System (NMS):** NMS customised for NOFN is undergoing field deployment for end-to-end monitoring and management of the NOFN.

- **C-DOT WiFi technology** deployment is in progress in a phased manner across 7000 grampanchayats. Field surveys for WiFi planning have been done in Ghazipur and Meerut, UP, alongwith equipment and configuration planning for the sites mentioned

- Pilot trial for **low-cost ONT** (Optical Network Termination) - Titli Damak - is in progress in the BSNL network at Mysore, Karnataka, to address the requirements of the rural segment for broadband connectivity across the country.

## 1.1.9 Technology commercialisation

During FY 2016-2017, 24 agreements comprising of MoUs, project agreements and ToTs - were signed with prospective PSUs and manufacturers for technology implementations, manufacturing, customised developments, etc. Details are given below.

## MoUs and Agreements

| S.NO. | STRATEGIC PARTNER | PURPOSE |
|---|---|---|
| **MoUs signed with prospective organisations** | |
| 1 | Dept. of IT & eGovernance, Govt. of Jharkhand | Establishing a framework for cooperation in joint research/ development/ manufacturing/ creation and delivery of innovative telecommunication services and support activities relating to the telecommunication equipment and services |
| 2 | CSC e-Governance Services India Ltd. | Joint execution of development and commercial deployment of projects of mutual interest |
| 3 | Telkom Kenya | Cooperation in delivery and implementation of C-DOT's telecom solutions and services in Kenya |
| 4 | Global IEEE Institute for Engineers | To work jointly in the areas of common interest |
| 5 | Bharat Sanchar Nigam Limited | Technical field support in BSNL network |
| **Project Agreements with prospective organisations** | |
| 1 | Advanced Numerical Research & Analysis Group (ANURAG), DRDO | Development of Router Hardware Platform |
| 2 | Advanced Numerical Research & Analysis Group (ANURAG), DRDO | Router stack porting, customization and validation |
| 3 | Central Electronics Limited | Supply, installation, testing and commissioning of roof-top on-grid solar power plant system at C-DOT Delhi and Bangalore Centre buildings |
| **ToT agreements with manufacturers** | |
| 1 | Himachal Futuristic Communications Ltd. | Terabit Router |
| 2 | Himachal Futuristic Communications Ltd. | L2 Switch |
| 3 | ITI Ltd., Mankapur | BBWT (Long Range & Solar Versions) |
| 4 | ITI Ltd., Mankapur | CGRAN |
| 5 | ITI Ltd., Rae Bareli | GPON (Economic Ver.) |
| 6 | ITI Ltd., Rae Bareli | Titli Damak |
| 7 | ITI Ltd. | GyanSetu |
| 8 | ITI Ltd. | BBWT (Solar and High Speed Access Point) |
| 9 | System Controls Technology Solutions Private Ltd. | GPON |
| 10 | Tejas Networks Ltd. | ONT11 |
| 11 | Tejas Networks Ltd. | Titli Damak |
| 12 | TARANGG NETWORKS(MSME) | BBWT (Basic, Long Range and Solar Versions) |
| 13 | Comint Systems & Solutions Private Ltd. | BBWT |
| 14 | Cyient Ltd. | GPON, Titli Damak |
| 15 | Cyient Ltd. | BBWT (Solar and High Speed Access Point) |
| 16 | ELCOMM | BBWT (Solar and High Speed Access Point) |

Total Purchase Orders worth Rs. 132 crores were received during FY 2016-17.

## 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.

Relevant clearances required for Housing and Hostel project ware also achieved during the financial year 2016-17. 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 Bangalore campuses respectively.

# Organisational Process & Practices to sustain CMMI Maturity Level 5

The organisation has been successfully appraised for CMMI Maturity Level 5 (ML5), and through continuous practice and improvement of organisational processes, and regular internal audits, the level of maturity is being sustained.

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 are being continued in all development projects, continuous process improvements are taking place, and periodic internal process audits are being carried out to ensure sustenance of the process maturity level.

For the next SCAMPI-A appraisal for CMMI ML5 scheduled in FY2017-2018 after expiry of the current validity period, the initial steps, viz, Spot Checks by an external assessor have been undertaken in Oct-2016 and Dec-2016. The reported gaps have by now been addressed and preparation is on for the subsequent steps towards the appraisal.

# Intellectual Property Rights
## IPR Assets and Publications

### Details of Patents Filed

| S.NO. | INVENTION | APPLICATION NO. / DATE OF FILING |
|---|---|---|
| 1. | System and method for network traffic slicing | 201611014694/27-04-2016 (India) |
| 2. | Visible light communication for system debugging and monitoring | 201611019469/06-06-2016 (India) |
| 3. | GIS based centralized carbon footprint monitoring system and method thereof | PCT/IB2016/055950/05-10-2016 (PCT) |
| 4. | Resonance mitigation in RF high power amplifier enclosure | 201611026390/02-08-2016  (India)<br>EP17161641.0/  17-03-2017 (UK) |
| 5. | System and method for facilitating optimization and analytics of a managed network | 201641036389/24-10-2016 (India) |
| 6. | Method and system for minimizing cloning attacks in set-top box interoperability | 201641029069/26-08-2016 (India) |
| 7. | Gesture based human machine interface using marker | 15/313,604/23-11-2016 (USA)<br>1620733.0 /07-12-2016 (UK)<br>2950048 /23-11-2016 (Canada)<br>201580035304.4/28-12-2016 (China) |
| 8. | A real-time distributed engine framework of Ethernet virtual connections | PCT/IN2016/000091/08-04-2016 (PCT) |
| 9. | A method and a Mirrored Serial Interface (MSI) for transferring data | 201611043737/21-12-2016 (India) |
| 10 | An indic key pad | 201711007955/07-03-2017 (India) |
| 11. | Secure interoperable set-top box through reverse OTP | 201711003385/30-01-2017 (India) |
| 12. | GIS based centralized fiber fault localization system | 1705008.9/29-03-2017 (UK) |

### Details of Designs Filed

| S.NO. | INVENTION | APPLICATION NO. / DATE OF FILING |
|---|---|---|
| 1. | SABAL | 291762/15-03-2017 |

## Details of Designs Registered

| S.NO. | INVENTION | APPLICATION NO. / DATE OF FILING | DESIGN NO./ DATE OF GRANT |
|---|---|---|---|
| 1. | VOIP CPE-2 for LG network | 277084/30-10-2015 | 277084/04-10-2016 |
| 2. | Optical Network Terminal device (DAMAK 11) | 277995 /30-11-2015 | 277995 /02-12-2016 |

## Details of Trademarks Filed

| S.NO. | INVENTION | APPLICATION NO. / DATE OF FILING |
|---|---|---|
| 1. | WiDHWAN | 3316644/21-07-2016 |
| 2. | Massive WiFi | 3392663/20-10-2016 |
| 3. | WiFi Access Controller | 3392662/20-10-2016 |

## Details of Trademarks Registered

| S.NO. | INVENTION | APPLICATION NO. / DATE OF FILING | TRADEMARK NO./ DATE OF GRANT |
|---|---|---|---|
| 1. | VAJRA DAMAK | 2433118 / 26-11-2012 | 2433118 / 04-10-2016 |
| 2. | SANGEET DAMAK | 2433115 / 26-11-2012 | 2433115 / 04-10-2016 |
| 3. | OFFICE DAMINI | 2433114 / 26-11-2012 | 2433114 / 05-10-2016 |
| 4. | LAGHU DAMINI | 2433113 / 26-11-2012 | 2433113 / 04-10-2016 |
| 5. | DAMAK | 2433109 / 26-11-2012 | 2433109 / 05-10-2016 |
| 6. | BACKHAUL DAMAK | 2433097 / 26-11-2012 | 2433097 / 05-10-2016 |
| 7. | DAKSH DAMINI | 2433105 / 26-11-2012 | 2433105 / 04-10-2016 |
| 8. | BHAWAN DAMINI | 2433100 /26-11-2012 | 2433100 / 04-10-2016 |

## Details of Copyright Filed

| S.NO. | INVENTION | APPLICATION NO. / DATE OF FILING |
|---|---|---|
| 1. | Node configuration tool | 6838/2016CO/L/10-06-2016 |
| 2. | Element Management System For Evolved NodeB | 6835/2016CO/L/10-06-2016 |

## Details of Paper Publications

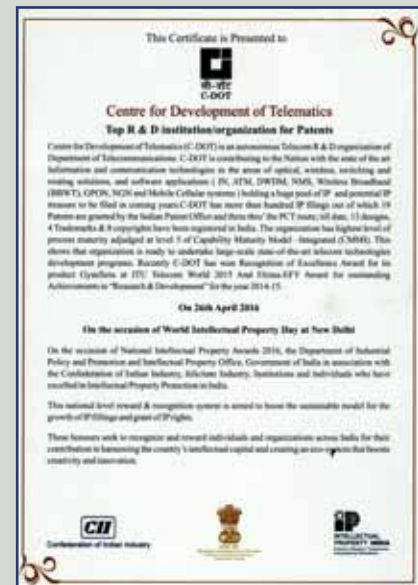| S.NO | PRODUCT | TITLE | Conference / Journal details |
|------|---------|-------|------------------------------|
| 1. | Generic-Embedded Concepts | Zen and Tao of Embedded System Design: A Pragmatic Perspective | International Conference on Computing, Communication and Control Technology (IC4T-2016). Lucknow, India, November 10-12, 2016 |
| 2. | Satellite Technologies | FPGA implementation of Multichannel Satellite Modulator: Novel Data Buffering Technique | 13th IEEE International Conference on Signal Processing. Chengadu, China, November 6-10, 2016 |
| 3. | SGRAN | Bit Synchronization and Delayed Decision Feedback Equalization for EDGE BTS-Hardware Implementation on TMS320C6424 TI DSP | 8th EAI International Conference on Wireless & Satellite System. Cardiff, Great Britain, September 19-20, 2016 |
| 4. | Geo-Intelligence | Modification Of Existing Routing Algorithms For Geo-intelligence Based OFC Network Route Planning | 30th IRF International Conference. Bengaluru, India, 21st August, 2016 |
| 5. | Generic -IoT Concept | Smart ICU using IoT | ADWITYA International Conference Engendering Health. Bengaluru, India, November 18-19, 2016 |
| 6. | M2M | Real Time Monitoring of Power Resources with Surveillance based on M2M Communication | 2016 IEEE International Conference on Advanced Networks and Telecommunications Systems (ANTS). Bengaluru, India, November 6-9, 2016 |
| 7. | M2M | Security Enhancement in Tower Monitoring System of oneM2M Network | 2016 IEEE International Conference on Advanced Networks and Telecommunications Systems (ANTS). Bengaluru, India, November 6-9, 2016 |
| 8. | Geo-Intelligence | Geo-Intelligence based Automatic Verification and Optimization of Manual Field Survey for OFC Network Planning | 2016 IEEE International Conference on Advanced Networks and Telecommunications Systems (ANTS). Bengaluru, India, November 6-9, 2016 |
| 9. | Generic – Wireless Concepts | A novel architecture for last mile connectivity for rural India using NOFN | 2016 IEEE International Conference on Advanced Networks and Telecommunications Systems (ANTS). Bengaluru, India, November 6-9, 2016 |

| 10. | Satellite Technologies | Synchronization of TDMA Bursts with Short Preamble for Satellite Receiver | 2016 IEEE International Conference on Advanced Networks and Telecommunications Systems (ANTS). Bengaluru, India, November 6-9, 2016 |
|---|---|---|---|
| 11. | Satellite Technologies | A Short Preamble-Based Synchronization for QPSK/TDMA Satellite Receiver -Implementation on Multi-core DSP | 16th IEEE International Conference on Electronics, Information, and Communication (ICEIC 2017) Phuket, Thailand, January 11-14, 2017 |
| 12. | GyanSetu | GyanSetu – A boon to the rural Mass | International Conference on Information and Communications Technology Convergence 2016. Jeju Island, Korea, October 19-21,2 016 |
| 13. | Green Power Supply | Managed Hybrid Power Supply System for Telecom Equipment | 5th International Conference on Renewable Energy Research and Applications. Birhingham, UK, November 20-23, 2016 |
| 14. | SGRAN-BSS | Mitigation of Resonance in RF high power Amplifier enclosure | 11th IEEE Radio & Wireless Week (RWW2017). Arizona, USA, January 15-18, 2017. |
| 15. | M2M | Alarm notification to tower monitoring system in oneM2M based IoT networks | 2016 International Conference on Advances in Computing, Communications and Informatics (ICACCI). Jaipur, India, September 21-24,2016 |
| 16. | GyanSetu | GyanSetu – build with a human touch | 2016 IEEE Region 10 Humanitarian Technology Conference (R10-HTC). Agra, India, December 21-23, 2016 |
| 17. | M2M | Surveillance enabled Smart Light with oneM2M based IoT network | 1st International Conference on Computational Intelligence, Communications and Business Analytics (CICBA) Kolkata, India, March 24-25, 2017 |

# National Intellectual Property (IP) Awards

The Indian Intellectual Property Office confers National Intellectual Property (IP) Awards on outstanding innovators, organizations and companies in the fields of patents, designs, trademarks and geographical indications on the occasion of World IP Day every year.

Centre for Development of Telematics (C-DOT) was selected as a Winner for the year 2016 in the category of "R & D institution/ organization for Patents".

The award was presented on 26th April, 2016 by Hon'ble Minister of Commerce and Industry, Govt. of India, Smt. Nirmala Sitharaman at a function jointly organized for the celebration of World IP day by the Indian Intellectual Property Office and Confederation of Indian Industry (CII) at New Delhi. The National IP Award carries an amount of Rs. 1,00,000/-, a citation and a memento.

# IPR Day Celebrations at Delhi and Bengaluru

PR day was celebrated at Delhi and Bengaluru campuses to felicitate and honour the intellectual might of our fellow C-DOTians that have been the bedrock of our unique innovations since its inception.





Inventors being felicitated by Hon'ble chief guest, Mr. R.J.S. Kushwaha, Wireless Adviser to the Government of India





Inventors being felicitated by Hon'ble chief guest, Padmashree Prof. Balakrishnan. N, Honorary Professor, Supercomputer Education and Research centre, Indian Institute of Science (IISc), Bengaluru.

# 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 IP, MPLS, Orbit Tool, MS-Excel, Voice Quality Analyzer, C-DOT Routers, 5G, various wireless technologies, Hadoop/ Big Data, CMMI processes, Signal Integrity, Innovation, IOT etc. Apart from technical trainings employees are encouraged to attend soft skill trainings also. During the year various soft skill workshops attended were on topics like 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 more than 20 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. | NAME OF THE MEMBERSHIPS | TYPE OF MEMBERSHIPS |
|---|---|---|
| 1. | All India Management Association (AIMA) http://www.aima-ind.org | Institutional Membership since 1994 |
| 2. | Asia Pacific Telecommunity (APT) http://www.aptsec.org | Affiliate Membership since 2002 |
| 3. | Asia Pacific Network Information Centre (APNIC) http://www.apnic.net | Associate Membership since 2005 |
| 4. | Delhi Management Association (DMA) http://www.dmadelhi.org | Patron Membership Since 1996 |
| 5. | Electronic Industries Association of India (ELCINA) http://www.elcina.com | Associate Membership since 2010 |
| 6. | Electronics & Computer Software Export Promotion Council(ESC) http://www.escindia.in | Association since 2009 |
| 7. | European Telecommunication Standards Institute (ETSI) http://www.etsi.org | Associate Membership since 1999 |

| 8. | Fiber To The Home (FTTH) Council http://www.ftthcouncilap.org | Silver Membership since 2010 |
|---|---|---|
| 9. | India Electronics & Semiconductor association (IESA) http://www.iesaonline.org | Since 2013 |
| 10 | Institute of Directors (IOD) http://www.iodonline.com | Institutional Membership since 2015 |
| 11. | Institution of Electronics and Telecommunication Engineers (IETE) http://www.iete.org | Organizational Membership since 2010 |
| 12. | Internet Protocol Television Society (IPTV) Broad Band India Forum http://www.iptvforum.org.in | Corporate Membership since 2015 |
| 13. | National Association of Software and Service (NASSCOM) http://www.nasscom.in | Associate Membership since 1996 |
| 14. | Pacific Telecommunication Council (PTC) India Foundation http://www.ptcindia.com | Corporate Membership since 1997 |
| 15. | PICMG  http://www.picmg.org | Associate Membership since 2015 |
| 16. | Telecom Equipment & Services Export Promotion Centre (TEPC) http://www.telecomepc.in | Since 2015 |
| 17. | Telecommunications Standards Development Society, India (TSDSI) http://www.tsdsi.org | Institutional Membership since 2014 |
| 18. | WiFi Alliance http://www.wi-fi.org | Regular Membership since 2016 |
| 19. | Wireless BroadbandAlliance http://www.wballiance.com | General Member since 2016 |
| 20. | Current  Science Association http://www.currentscience.ac.in | Institutional Membership since 2016 |
| 21. | OneM2M http://www.onem2m.org | Individual Member |

# 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 14,000 technical books, 2000 hindi books and over 70 periodicals and magazines besides country's 13 leading Newspapers and Newsletters. For the year 2015-16 a total of 60 new technical books and 120 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 | ONROLL AS ON 31-03-16 | PERIOD FROM 01-APR-2016 TO 31-MAR-2017 | | | Strength as on 31-03-17 |
|---|---|---|---|---|---|
| | | Recruited | Resigned | Completed | |
| Graduate | 17 | 20 | 4 | 14 | 19 |
| Diploma Technical | 5 | 4 | 1 | 4 | 4 |
| ITI | 2 | 1 | - | 2 | 1 |
| Total | 24 | 25 | 5 | 20 | 24 |

# Business Promotion

- Purchase Order received from BSNL for Supply, migration, and up-gradation of C-DOT MAX technology exchanges to VOIP based C-DOT MAX NGN with all-IP NGN technology for NGN core equipment for 6 core sites at North, east, West & South Zones under phase-II of the C-DOT MAX NGN Project.

- Field support of MAX continued for BSNL on PAN-India basis as per signed MoU.

- Purchase Order received from ANURAG, DRDO for ANUROUTER Stack Porting Customization and validation.

- Purchase Orders received from Indian Navy, ITI and CSC eGov Services India Limited for Supply of BBWTs.

- Purchase Order received from CAIR (DRDO) for Supply of SCS Platform based PRT Cards.

- Acceptance of proposal for Supply, Implementation of C-DOT LEMF application software and its integration with CMS received from various LEAs including Punjab Police, CBI, NIA, Narcotics Bureau, Enforcement Directorate. Proposal for Intelligence Manager has been submitted to various LEAs.

- Project Proposal for Implementation Study and Pilot Deployment of Gigabit Passive Optical Network (GPON) Technology in CLMV Countries and Indonesia was approved by ASEAN secretariat.

## Awards Received

- IPR award on the occasion of 'World IP day' for 'Top R&D institution for patents'.



- Best enterprise award in the field of telecommunication for the year 2016 (Socrates award).

- Recognised as the winner under 'Process innovation leadership category in the service sector - telecom domain' for 'Customisable Service Management Platform' by 'Frost and Sullivan Project Evaluation and Recognition Program 2016'



- Special jury award for 'Outstanding contribution to innovation and development of domestic supply chain' from ELCINA to Vipin Tyagi, Executive Director, C-Dot.



- AEGIS Graham Bell award in three categories:
  - Innovative telecom product category: C-DOT Long Range WiFi
  - Innovative managed services category: GIS-based Fibre Fault Localisation System
  - Green telecom category: C-DOT Green Power Supply Unit

# 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 2016-2017, C-DOT has signed a total of 18 ToTs, covering 10 Technologies/Products. Of these 18 ToTs, 10 were signed with private sector manufacturers and 8 with CPSUs. As on 31st March 2017, a total of 76 ToTs were signed for 23 Technologies, with 20 different Licensees. C-DOT, through its ToT, has supported bulk manufacturing for mass deployment of its GPON, MAX-NG and ANRAX 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 RHPL, M/s Cyient Ltd, M/s Comint Systems and Solution Pvt. Ltd., M/s HFCL and M/s VMC are working closely with C-DOT in reaching out to non-Government segment of business for WiFi based products such as Solar/High Speed Access Broadband Wireless Terminals. Another major initiative of C-DOT during the FY 2016-17 is to work closely with MSMEs and assisting them to partner amongst themselves as a consortium so as to harness their individual strengths and minimising their financial risks. The "TARANGG" from Bengaluru, a consortium of 9 diverse MSMEs is the case in point, and they are actively working on WiFi Products. C-DOT has also signed an MOU with Department of IT & e-Governance, Govternment of Jharkhand for broad band Wi-FI and GPON Technologies, for supporting the state's IT initiatives.

C-DOT reaffirms its steadfast commitment towards realizing the objectives of Government of India's 'Make In India' initiative.

## Events 2016-17

**July 2016**

**Strategic Electronics Summit** | 07th and 08th

**August 2016**

**KSCST Seminar in Bijapur** | 19th and 20th
**Foundation Day Celebrations** | 30th and 31st

**September 2016**

**2nd Indo-Africa ICT Expo** | 1st to 3rd

**October 2016**

**"Skill Development in Telecom Sector and Telecom Sector skill Plan"** | 25th

**OneM2M Technical Plenary TP25 – France** | 17th to 21st

**November 2016**

**IEEE ANTS Exhibition** | 7th to 9th
**BRICS Exhibition** | 10th and 11th
**VLE Conference** | 8th
**ETSI IOT/M2M Workshop - France** | 15th to 17th
**AfricaCom, Cape Town, South Africa** | 15th to 17th
**Bangalore ITE.Biz** | 28th to 30th
**oneM2M Interop Event 3 - Japan** | 29th
**System Integrators Meet** | 30th

**December 2016**

**System Integrators Meet** | 16th
**Communicast Myanmar Exhibition** | 6th to 8th

**January 2017**

**Indian Science Congress , Tirupati** | 3rd to 7th

**February 2017**

**Convergence India** | 8th to 10th

**March 2017**

**India M2M plus IOT Forum** | 6th and 7th
**DEFCOM India** | 23rd and 24th

# Events 2016-17

## Strategic Electronics Summit 2016

Strategic Electronics Summit 2016 (SES2016) for the Defense & Aerospace segment was held on the 07th & 08th July 2016 in the Bangalore International Exhibition Centre, Bengaluru.

C-DOT stall had seen many visitors from Government and private industries. We have received positive response on the products displayed and manufacturers showed interest in partnering with C-DOT.



## Visit of Minister of Posts and Telecommunications, Bangladesh at C-DOT

Honourable Minister of Posts and Telecommunications, Bangladesh , Shmt. H.E. Tarana Halim visited C-DOT Delhi with the Bangladesh delegation. Executive Director, C-DOT,

Shri Vipin Tyagi gave brief presentation about C-DOT Telecom Technologies and its Transfer-of-Technology process. Honourable Minister visited labs and showed keen interest in C-DOT products like GPON, GyanSetu, NGN. C-DOT Executive Director offered to share C-DOT's technology and to impart skill training in Bangaladesh.



## Foundation Day Celebrations 2016

C-DOT celebrated its 32nd foundation day, "G B Meemamsi lecture series 2016" from 30th to 31st August 2016 at C-DOT Campus. Honourable MoC, GoI, Sh. Manoj Sinha launched new innovative telecom products of C-DOT – Sabal (High Speed Access Point), WDM-PON, Samvad App for Secure Communication.Sh. J.S. Deepak, Secretary DoT and Chairman Telecom Commission was the Guest of Honour at the event. Sh. Goutam Chattopadhyay, Senior Research Scientist, NASA-JPL and Sh. Narendra Karmarkar, World Renowned Indian Mathematician were invited speakers. They delivered effective lectures during workshop on "Wireless Devices and Smart Computing for Analytics".

Many visitors from private, government, small and medium industries, and academia came and admired the strengths and impact of C-DOT.





### KSCST Seminar in Bijapur 2016

Student project programme is an important programme for Karnataka State Council for Science and Technology (KSCST). As a part of these programme the 39th State Level seminar and exhibition to be held at BLDE Association's Vachna Pitamaha Dr. P G Hallikatti College of Engineering and Technology, Vijaypura (Bijapur) on 19th and 20th August 2016.

### 2nd Indo-Africa ICT EXPO 2016

C-DOT participated in INDO-AFRICA ICT EXPO 2016 between 1st to 3rd September 2016 in Nairobi, Kenya, East Africa and live demonstration were given on all the C-DOT products viz.,BBWT, Gyansetu, Green Power supply, GPON, NMS, Terabit Router.





### "Skill development in Telecom sector and telecom sector skill plan"

C-DOT participated in the conference organized by DoT & BSNL "Skill development in Telecom sector and telecom sector skill plan" in Lucknow on 25th October 2016 where a presentation on smart cities using the technology of C-DOT was also given.

## OneM2M Technical Plenary TP25 – OCT 2016 – France

C-DOT is contributing in the M2M standardization process by actively participating in oneM2M discussions. C-DOT participated in the oneM2M Technical Plenary TP25 held in ETSI in Sohpia Antipolis, France from 17th to 21st October 2016, where 34 contributions from C-DOT were accepted by oneM2M.



## IEEE ANTS 2016

IEEE ANTS Exhibition    by C-DOT from was conducted from 7th to 9th November 2016 at J N TATA Auditorium, IISC, Bengaluru.The outcome of the event was successful with presence of eminent personalities.C-DOT stall had seen a lot of visitors from Govt. and Private Industries, Academia and Startups

One of the paper presented by C-DOT was given the Honorable mention award.



## BRICS Exhibition 2016

BRICS Exhibition was held on 10th & 11th November 2016 at Hotel JW Marriott, Bengaluru

BRICS 2016 is one of the prestigious events for C-DOT to participate. This event gives the brand visibility of C-DOT and its products.C-DOT stall had seen many visitors from foreign delegates, Govt. and Private Industries and Startups.





## Village Level Entrepreneur (VLE) Conference 2016

C-DOT exhibited in the VLE conference at Meerut on 8th November 2016 organized by CSC, Meity.

An MoU already signed between C-DOT & CSC was exchanged in the graceful presence of Hon'ble MoEITY, Sh. Ravi Shankar Prasad .

Both organizations will now work jointly to provide digital connectivity through CSC. C-DOT will assist CSC SPV's Wi-Fi Choupal project to create advance Wi-Fi set up in villages.

## AfricaCom 2016, Cape Town, South Africa

C-DOT, Centre for Development of Telematics, participated in AfricaCom 2016 from 15th – 17th November 2016 at Cape Town, South Africa and demonstrated its indigenous Telecom technologies and innovative solutions with a view to demonstrate it to African visitors and explore business opportunities in the African market through collaborative partnerships with key manufacturers and service providers of Africa. The theme for AfricaCom 2016 was "Economic Development and Social Empowerment through Digital Connectivity".

## ETSI IOT/M2M Workshop 2016 featuring the Smart World - France

C-DOT also participated in oneM2M Showcase @ ETSI IoT Workshop held from 15th to 17th November 2016. C-DOT showcased how various M2M applications like Smart Living, Smart Street light, Carbon footprint Monitoring can use the oneM2M based IN-CCSP (Infrastructure Node- C-DOT Common Service Platform) for standards based M2M communication. Various WPAN technologies demonstrated were LoRA, and Zigbee.
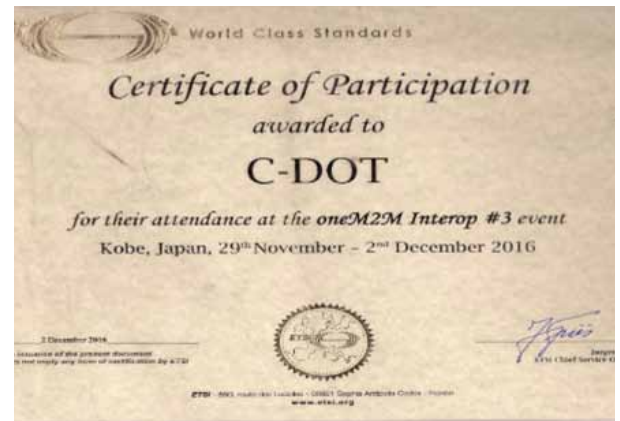
## Bangalore ITE.Biz 2016

Bangalore ITE.Biz is held from 28th to 30th November 2016 at Bengaluru. C-DOT stall attracted many visitors from Govt. and Private Industries. There was positive feedback on the products displayed and many manufacturers were interested in becoming partners along with C-DOT.



World Class Standards

**Certificate of Participation**
awarded to

**C-DOT**

for their attendance at the oneM2M Interop #3 event
Kobe, Japan, 29th November – 2nd December 2016



## System Integrators Meet 2016

C-DOT organized System Integrators Meet on 30thNovember and 16th December 2016 at C-DOT Delhi and Bengaluru office respectively. The outcome of the event was successful with many System integrators both from private and the government participated and showed keen interest to work with C-DOT product and services.

## oneM2M Interop event 3 held in Japan

C-DOT Participated in oneM2M Interop event 3 held in Japan from 29th November to 2nd December 2016 C-DOT performed successful interoperability testing with NTT, HP, KETI, HUAWEI, Interdigital, HERIT, SEJONG University, LAAS-CRNS.

Also Conformance testing was performed with ETSI. C-DOT was awarded the certificate of participation by ETSI.

## Communicast Myanmar Exhibition 2016

The International Myanmar ICT Exhibition 2016 held by the ALL WORLD EXHIBITIONS in Novotel Yangon Max Hotel from 6th to 8th December 2016. In the 3rd Communications Technology Show, many foreign companies introduced about the technologies of communication such us IT Solutions, Network Infrastructure, Wifi Technologies, Broadcasting Technologies and so on.

C-DOT presented various Indian products and discussed the Bi-Lateral relationship, Line of credit with Mr. Soe Thein, Director General, Ministry of Transport & Communications, Posts & Telecommunication Department, Republic of the union of Myanmar and his team at his office in Naypyitaw, Myanmar on 7th December 2016.

## Indian Science Congress 2017, Tirupati

104th Indian Science congress was held in Tirupati, Andhra Pradesh from 3rd to 7th January 2017. C-DOT products like Gyansetu, Solar Wi-Fi, Smart LED & GPON were appreciated by students, academia & public who visited the C-DOT stall. Hundreds of school children were inspired by C-DOT products

## Convergence India 2017

C-DOT participated in Convergence India 2017 held at New Delhi from 8th-10th February 2017. Various C-DOT technologies were demonstrated at the event and live demonstration of the products were appreciated by visitors.





## India M2M plus IOT forum

C-DOT participated in 4th edition of India m2m plus iot forum at India Habitat Centre, New Delhi from 6th to 7th March 2017. 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 Mr. Vipin Tyagi, EDR, C-DOT gave a talk on 'Capitalizing Connected World' during the event.

## DEFCOM India 2017

C-DOT participated in DEFCOM INDIA 2017, organized by Corps of Signals, Indian Army in association with the Confederation of Indian Industry (CII), from 23rd to 24th March 2017 in New Delhi. The theme for the conference, this year, was centered on "DIGITAL ARMY INFRASTRUCTURE AND SKILLED HUMAN RESOURCE". Luminaries from Indian Industry, Academia, R&D Organizations and Defence services attended the event. C-DOT showcased its indigenous technologies and innovative solutions viz. Secure VoIP Network, LTE-A, Terabit Routers, M2M/IoT applications and GPON based optical solutions in the exhibition.

# HR Initiatives

During the year 2016-17 C-DOT recruited 45 Fresh Engineers, from Computer Science and Electronics & Communication streams, 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 maybe 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 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. The Group Medi-claim policy has been made effective from 1st April 2006.

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

The Swachh Bharat Abhiyan is a massive movement that seeks to create a clean India. C-DOT also observed cleanliness drive as part of the Swachh Bharat Abhiyan in its campus. Staff members were asked to maintain the cleanliness of their individual working areas by disposal of all waste papers, unwanted files, junk etc. Competitions were organized for best maintained block & best maintained workstation in which all staff members participated whole-heartedly.

C-DOT launched an event "Plant on your birthday" as part of its 'GO Green' Initiative. Staff members contributed towards the conservation of environment by planting a sapling during the month of their birthday, nurturing it and watching it grow into a full-fledged tree. Special cleanliness drive was also conducted during weekend in which our Executive Director along with staff members took the initiative of cleaning the main roads leading to the Campus. Process of putting up dustbins of colours blue and green on the main Mandi road and installation of water coolers on the Mandi road is in progress.

# Promotion of Hindi in C-DOT

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. Hindi workshops are held regularly on topics of relevance.

The month of September, 2016 was celebrated as Hindi Utsav at C-DOT offices at New Delhi and Bengaluru. Many competitions and events were organized during the fortnight to motivate C-DOTians to do their day-to-day work in Hindi.

An audio-visual Quiz was also organized in Hindi, which was liked by one and all. Competitions like 'Katha-Kahani Kaho Apni Zubani' had been very successful in motivating people to once again connect to the old tradition of story-telling and read literature and books.

A grand Kavi Sammelan was organized during Hindi Utsav. Eminent poets like Shri Lakshmi Shankar Vajpayee, Dr. Dinesh Raghuvanshi, Rajesh 'Chatan", Shri Naresh Shandilya and Dr. Keerti Kale mesmerized the audiences with their heart rending poems.

This year, for a change, the guest for InseMiliye… programme was not any outsider but Shri Vipin Tyagi, Excecutive Director, C-DOT himself. It was received with great enthusiasm by everyone as knowing the other side of your Executive Director was a new concept.

Hon'ble Parliamentary Committee on Official Language visited for an inspection-meeting to review the implementation and progress of OL in C-DOT, Delhi on 28th October, 2016. Senior Member of Parliament (Lok Sabha) Shri Laxmi Narayan Yadav chaired the meeting and MP (Rajya Sabha) Shri Bashistha Narain Singh and MP (Lok Sabha) Dr. Sunil Baliram Gaikwad also guided C-DOT to make the implementation of OL better. Senior officials from C-DOT including the Board members and Registrar were present for the meeting. Shri Vipin Tyagi, ED, C-DOT made a brief presentation on C-DOT. A live demo of C-DOT GyanSetu was appreciated **by all the committee members. The committee found C-DOT's efforts towards implementation of OL up to the mark and satisfactory.**

C-DOT OL Cell organized a technical seminar-Manthan-2017 on the occasion of National Science Day on 28th February, 2017. It was simultaneously held at Delhi and Bengaluru offices. Total 21 C-DOTians participated with their presentations on latest telecom technology. The winners at both the locations were given cash prizes and certificates.

# Statement of Accounts
# 2016 - 2017

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**Significant Accounting Policies**

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# 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 "CDOT" or Centre),whichcomprise the Balance Sheet as at March 31, 2017, 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, 2017 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:14-08-2017

# BALANCE SHEET AS AT 31st MARCH....

(In Rupees)

| | Schedule no | 2017 | 2016 |
|---|---|---|---|
| **CORPUS/CAPITAL FUND AND LIABILITIES** | | | |
| Corpus/Capital Fund | 1 | 3,276,556,565.50 | 3,077,876,125.56 |
| Current Liabilities & Provisions | 2 | 1,189,581,656.64 | 1,023,979,382.65 |
| **TOTAL** | | 4,466,138,222.14 | 4,101,855,508.21 |
| **ASSETS** | | | |
| Fixed Assets | 3 | | |
|     Gross Block | | 5,903,947,190.71 | 5,467,005,671.75 |
|     Less :- Depreciation | | 4,939,523,016.56 | 4,634,492,699.82 |
|     Net block | | 964,424,174.15 | 832,512,971.93 |
| Assets in transit | 3 | 197,923.50 | 12,184,575.52 |
| Capital Work in Progress | 4 | 6,252,840.00 | 4,858,512.00 |
| Investments-Long Term | 5 | 0.00 | 260,000,000.00 |
| Current Assets, Loans & Advances and Deposits | 6 | 3,495,263,284.49 | 2,992,299,448.76 |
| **TOTAL** | | 4,466,138,222.14 | 4,101,855,508.21 |
| Significant Accounting Policies | 14 | | |
| Notes on Accounts | 15 | | |

Schedules 1 to 15 form an integral part of the Financial Statements

For and on behalf of the Centre for Development of Telematics

In terms of our report of even date .
For J.C.BHALLA & CO.
Chartered Accountants
Firm Regn. No. 001111N

Sd/-
G.Mukundan
Chief Finance Officer

Sd/-
Vipin Tyagi
Executive Director

Sd/-
Akhil Bhalla
Partner
Membership No.505002

Place : New Delhi
Date: August 14, 2017

# INCOME AND EXPENDITURE ACCOUNT FOR THE YEAR ENDED 31st MARCH.....

(In Rupees)

| | Schedule no | 2017 | 2016 |
|---|---|---|---|
| **INCOME** | | | |
| TOT, Royalty, FSR and Publications | 7 | 737,858,404.75 | 531,777,199.52 |
| Interest Earned | 8 | 47,183,617.57 | 61,789,250.57 |
| Other Income | 9 | 64,692,725.39 | 76,653,334.41 |
| **TOTAL (A)** | | **849,734,747.71** | **670,219,784.50** |
| **EXPENDITURE** | | | |
| Establishment Expenses | 10 | 1,832,114,291.76 | 1,455,640,961.00 |
| Operational Expenses | 11 | 761,964,960.55 | 1,203,492,142.78 |
| Other Administrative Expenses | 12 | 556,367,116.33 | 263,601,581.88 |
| Depreciation | 3 | 305,034,666.74 | 180,853,341.81 |
| **TOTAL (B)** | | **3,455,481,035.38** | **3,103,588,027.47** |
| Excess of expenditure over income for the year  C =(B-A) | | 2,605,746,287.67 | 2,433,368,242.97 |
| Add/less(-) :-Adjustments pertaining to earlier years | 13 | (6,715,977.61) | (34,511,538.24) |
| Add:- Extraordinary expenses | | 352,289,250.00 | 352,289,250.00 |
| **Balance being excess of expenditure over income** | | 2,951,319,560.06 | 2,751,145,954.73 |
| Add:- Excess  expenditure over income of earlier years | | 22,127,077,036.56 | 19,375,931,081.83 |
| **Balance being deficit  carried to Corpus Fund/ Capital Fund** | | **25,078,396,596.62** | **22,127,077,036.56** |
| Significant Accounting Policies | 14 | | |
| Notes on Accounts. | 15 | | |

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

For and on behalf of the Centre for Development of Telematics

In terms of our report of even date .
For  J.C.BHALLA & CO.
Chartered Accountants
Firm Regn . No. 001111N

Sd/-
G.Mukundan
Chief Finance Officer

Sd/-
Vipin Tyagi
Executive Director

Sd/-
Akhil Bhalla
Partner
Membership No.505002

Place : New Delhi
Date: August 14, 2017

## SCHEDULE 1- CORPUS/CAPITAL FUND

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

(In Rupees)

| | 2017 | | 2016 | |
|---|---|---|---|---|
| **Grants from Dept.of Electronics (Presently Dept of Information Technology)** | | | | |
| Accumulated balance | 335,200,000.00 | | 335,200,000.00 | |
| **Grants from Dept. of Telecommunication** | | | | |
| Balance at the beginning of the year | 24,869,753,162.12 | | 21,869,753,162.12 | |
| **Add:-** Contributions towards Corpus/Capital Fund during the year | 3,150,000,000.00 | 28,354,953,162.12 | 3,000,000,000.00 | 25,204,953,162.12 |
| **Less :-** Balance of net expenditure transferred from the Income and Expenditure Account | | 25,078,396,596.62 | | 22,127,077,036.56 |
| **TOTAL** | | **3,276,556,565.50** | | **3,077,876,125.56** |

# SCHEDULE 2 - CURRENT LIABILITIES & PROVISIONS

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

(In Rupees)

| | 2017 | | 2016 | |
|---|---|---|---|---|
| **CURRENT LIABILITIES** | | | | |
| 1  Sundry Creditors | | | | |
|    a) For Goods | 202,396,307.24 | | 317,605,755.78 | |
|    b) Others | 87,430,627.90 | 289,826,935.14 | 73,263,649.51 | 390,869,405.29 |
| 2  Advances received | | | | |
|    - For Funded Projects | | 85,910,329.60 | | 94,251,349.60 |
| 3. Statutory Liabilities | | 33,102,661.00 | | 26,493,736.51 |
| 4. Other Current Liabilities | | 295,648,974.90 | | 112,098,084.25 |
| **Sub-total (A)** | | **704,488,900.64** | | **623,712,575.65** |
| **PROVISIONS** | | | | |
| 1. Gratuity | 36,101,469.00 | | 2,066,834.00 | |
| 2. Leave Salary | 448,991,287.00 | | 398,199,973.00 | |
| **Sub-total (B)** | | **485,092,756.00** | | **400,266,807.00** |
| **TOTAL (A+B)** | | **1,189,581,656.64** | | **1,023,979,382.65** |

## SCHEDULE 3 - FIXED ASSETS

( Forming part of the Balance Sheet as at 31st March'2017)

(In Rupees)

| | GROSS BLOCK | | | | DEPRECIATION | | | | NET BLOCK | |
|---|---|---|---|---|---|---|---|---|---|---|
| | As on 01.04.2016 | Additions | Adj./Write-off | As on 31.03.2017 | As on 01.04.2016 | For the year | Adj./Write-off | As on 31.03.2017 | As on 31.03.2017 | As on 31.03.2016 |
| Land -Free Hold | 120,000,000.00 | 0.00 | 0.00 | 120,000,000.00 | 0.00 | 0.00 | 0.00 | 0.00 | 120,000,000.00 | 120,000,000.00 |
| Building-Office | 570,180,967.65 | 0.00 | 0.00 | 570,180,967.65 | 390,204,697.12 | 17,997,627.05 | 0.00 | 408,202,324.17 | 161,978,643.48 | 179,976,270.53 |
| Building-Residential | 23,627,434.00 | 0.00 | 0.00 | 23,627,434.00 | 15,064,274.51 | 428,157.97 | 0.00 | 15,492,432.48 | 8,135,001.52 | 8,563,159.49 |
| R & D Equipment | 1,843,914,540.03 | 133,745,261.26 | 0.00 | 1,977,659,801.29 | 1,534,061,138.16 | 66,539,797.37 | 0.00 | 1,600,600,935.53 | 377,058,865.76 | 309,853,401.87 |
| R& D Computers | 2,186,796,711.80 | 271,710,031.70 | (7,250.00) | 2,458,499,493.50 | 2,131,299,796.23 | 196,333,678.76 | (4,350.00) | 2,327,629,124.99 | 130,870,368.51 | 55,496,915.57 |
| Office Equipments & Appliances | 354,075,478.56 | 17,965,311.00 | | 372,040,789.56 | 295,529,913.69 | 11,556,199.63 | 0.00 | 307,086,113.32 | 64,954,676.24 | 58,545,564.87 |
| Furniture & Fixtures | 310,813,879.23 | 13,049,705.00 | 0.00 | 323,863,584.23 | 210,736,219.63 | 11,700,745.96 | 0.00 | 222,436,965.59 | 101,426,618.64 | 100,077,659.60 |
| Library Books | 57,596,660.48 | 478,460.00 | 0.00 | 58,075,120.48 | 57,596,660.48 | 478,460.00 | 0.00 | 58,075,120.48 | 0.00 | 0.00 |
| Total | 5,467,005,671.75 | 436,948,768.96 | (7,250.00) | 5,903,947,190.71 | 4,634,492,699.82 | 305,034,666.74 | (4,350.00) | 4,939,523,016.56 | 964,424,174.15 | 832,512,971.93 |
| Assets in transit | | | | | | | | | 197,923.50 | 12,814,575.52 |
| Previous year's total | 5,393,832,422.04 | 73,097,442.74 | 75,806.97 | 5,467,005,671.75 | 4,453,239,681.64 | 180,853,341.81 | 399,676.37 | 4,634,492,699.82 | 832,512,971.93 | 940,592,740.40 |

# SCHEDULE 4 - CAPITAL WORK IN PROGRESS

( Forming part of the Balance Sheet as at 31st March'2017)

(In Rupees)

| | As at 01-04-2016 | Additions | Transfer to Fixed Assets | As at 31-03-2017 |
|---|---|---|---|---|
| **Campus -Delhi** | | | | |
| 1) Campus-Residential Complex | 4,858,512.00 | 1,394,328.00 | 0.00 | 6,252,840.00 |
| **Total** | **4,858,512.00** | **1,394,328.00** | **0.00** | **6,252,840.00** |
| **Previous Year  Balance** | 4,656,512.00 | 202,000.00 | 0.00 | 4,858,512.00 |

# SCHEDULE 5 - INVESTMENTS-LONG TERM

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

(In Rupees)

| | NO. OF FULLY PAID EQUITY SHARES | FACE VALUE PER SHARE (Rs) | 2017 | | 2016 | |
|---|---|---|---|---|---|---|
| **UNQUOTED (At cost)** | | | | | | |
| **JOINT VENTURE COMPANY** | | | | | | |
| CDOT ALCA-TEL - LUCENT RESEARCH CENTRE PVT LTD(CARC) | 52,000,000 | 10 | 520,000,000.00 | | 520,000,000.00 | |
| **Less:-** Provision for Bad & doubtful Investments | | | 520,000,000.00 | 0.00 | 260,000,000.00 | 260,000,000.00 |
| **TOTAL** | | | | **0.00** | | **260,000,000.00** |

# SCHEDULE 6 -CURRENT ASSETS, LOANS & ADVANCES AND DEPOSITS

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

(In Rupees)

| | 2017 | | 2016 | |
|---|---|---|---|---|
| **A. CURRENT ASSETS** | | | | |
| 1. Inventories (As taken, valued and certified by the Management) | | | | |
| a) Inventory | 652,528,195.48 | | 491,590,903.34 | |
| b) Inventory in transit | 2,285,158.28 | 654,813,353.76 | 17,209,230.52 | 508,800,133.86 |
| 2 Sundry Debtors | | | | |
| a) Debts outstanding for a period exceeding six months | 532,303,992.73 | | 498,599,545.35 | |
| b) Others | 484,421,345.00 | | 290,445,299.92 | |
| | 1,016,725,337.73 | | 789,044,845.27 | |
| Less:- Provision for Bad &Doubtful Sundry Debtors | 35,933,244.00 | 980,792,093.73 | 35,933,244.00 | 753,111,601.27 |
| 3. Bank Balances | | | | |
| a) With Scheduled banks | | | | |
| On Current Accounts | 522,128.29 | | 342,653.44 | |
| On Deposit Accounts | 200,000,000.00 | | 767,654,299.28 | |
| On Saving Accounts | 1,089,031,086.60 | 1,289,553,214.89 | 238,502,926.27 | 1,006,499,878.99 |
| **TOTAL (A)** | | **2,925,158,662.38** | | **2,268,411,614.12** |
| **B. LOANS & ADVANCES** | | | | |
| 1. Loans | | | | |
| a) Staff | 6,215,272.00 | | 9,788,790.00 | |
| b) CARC Pvt Ltd | 184,578,500.00 | | 184,578,500.00 | |
| | 190,793,772.00 | | 194,367,290.00 | |
| **Less:-**Provision for Bad & doubtful Loan | 184,578,500.00 | 6,215,272.00 | 92,289,250.00 | 102,078,040.00 |
| 2. Advances and other amounts recoverable in Cash or in kind or for value to be received. | | | | |
| a) Contractors & Suppliers | 200,701,949.56 | | 159,592,635.63 | |
| b) Employees | 4,189,867.00 | | 1,942,512.00 | |
| c) Prepaid expenses | 15,021,395.76 | 219,913,212.32 | 8,581,530.26 | 170,116,677.89 |
| 3. Interest Accrued | | | | |
| a) On Staff Loan | 1,599,393.26 | | 1,660,970.30 | |
| b) On Bank Deposits | 6,191,146.63 | | 8,967,182.64 | |
| c) CARC Loan | 59,858,060.00 | 67,648,599.89 | 59,858,060.00 | 70,486,212.94 |
| 4. Claims Recoverable | 258,837,721.31 | | 203,055,376.91 | |
| **Less:-**Provision for Bad & doubtful Claims recoverable | 197,841,104.35 | 60,996,616.96 | 0.00 | 203,055,376.91 |
| 5. Tax Deducted at Source | | 202,640,230.06 | | 173,607,435.06 |
| 6. Cenvat credit receivable | | 2,981,087.88 | | 1,622,201.84 |
| **TOTAL (B)** | | **560,395,019.11** | | **720,965,944.64** |
| **C. DEPOSITS** | | | | |
| a) Office Building | 120,500.00 | | 40,500.00 | |
| b) Others | 9,589,103.00 | | 2,881,390.00 | |
| **Total (c)** | | **9,709,603.00** | | **2,921,890.00** |
| **Total (A) + (B)+(C)** | | **3,495,263,284.49** | | **2,992,299,448.76** |

## SCHEDULE 7 -INCOME FROM TOT, ROYALTY, FSR AND PUBLICATIONS

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

(In Rupees)

| | 2017 | 2016 |
|---|---|---|
| 1.  Income from Royalty | 0.00 | 1,356,289.00 |
| 2.  Income from Transfer of Technology(TOT) | 18,550,000.00 | 5,400,000.00 |
| 3.  Field /Technology Support Receipts | 719,209,241.00 | 524,924,410.52 |
| 4.  Income from Publications | 99,163.75 | 96,500.00 |
| **Total** | **737,858,404.75** | **531,777,199.52** |

## SCHEDULE 8 -INTEREST EARNED

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

(In Rupees)

| | 2017 | 2016 |
|---|---|---|
| 1. On Term deposits with Scheduled Banks | 35,054,761.59 | 37,140,929.08 |
| 2. On Saving Account with Scheduled Banks | 4,944,362.02 | 6,785,003.00 |
| 3. On Loans to Employees/Staff | 910,635.96 | 1,178,642.09 |
| 4. On loans to Others | 2,214,939.00 | 2,221,008.00 |
| 5. Others | 4,058,919.00 | 14,463,668.40 |
| **Total** | **47,183,617.57** | **61,789,250.57** |


## SCHEDULE 9 - OTHER INCOME

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

(In Rupees)

| | 2017 | 2016 |
|---|---|---|
| 1. Profit on Sale/disposal of Assets | 0.00 | 26,446.00 |
| 2. Miscellaneous Income | 21,798,130.55 | 38,964,487.93 |
| 3. Gain due to foreign exchange translation | 777,386.84 | 16,390.48 |
| 4. Income from rent | 42,117,208.00 | 37,646,010.00 |
| **Total** | **64,692,725.39** | **76,653,334.41** |

## SCHEDULE 10 - ESTABLISHMENT EXPENSES

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

(In Rupees)

|   |   | 2017 | 2016 |
|---|---|---|---|
| a) | Salaries and Wages | 1,402,697,675.00 | 1,100,247,480.00 |
| b) | Bonus | 3,072,336.00 | 797,874.00 |
| c) | Contributions to Provident Fund | 108,535,931.00 | 92,601,266.00 |
| d) | Contributions to other Funds | 15,029,522.00 | 15,063,613.00 |
| e) | Gratuity provided for employees | 36,101,469.00 | 3,566,834.00 |
| f) | Staff Welfare expenses | 244,524,399.00 | 222,739,482.00 |
| g) | Rent on residentials and Maintenance Expenses | 16,666,607.00 | 17,863,772.00 |
| h) | Recruitment and Training Expenses | 5,486,352.76 | 2,760,640.00 |
|   | **Total** | **1,832,114,291.76** | **1,455,640,961.00** |

## SCHEDULE 11 -OPERATIONAL EXPENSES

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

(In Rupees)

|   |   | 2017 | 2016 |
|---|---|---|---|
| a) | R &D  Components & Consumables | 414,515,605.00 | 179,696,144.28 |
| b) | Freight & Forwarding Charges | 26,812,350.82 | 10,800,580.00 |
| c) | Repair &Maintenance-R &D & Office Equipments | 73,023,703.73 | 42,771,727.50 |
| d) | Design, Development & Technology support Expenses | 201,334,546.00 | 929,790,011.00 |
| e) | Consultancy,Apprentice & Technical Service Expenses | 44,537,049.00 | 40,371,699.00 |
| f) | Testing Charges | 1,741,706.00 | 61,981.00 |
|   | **Total** | **761,964,960.55** | **1,203,492,142.78** |

# SCHEDULE 12 - OTHER ADMINISTRATIVE EXPENSES
( Forming part of Income & Expenditure Account for the year ended 31st March....)

(In Rupees)

| | | 2017 | | 2016 | |
|---|---|---|---|---|---|
| a) | Travelling and Conveyance expenses | | 49,437,083.62 | | 26,186,035.65 |
| b) | Vehicle hire charges | | 3,284,394.00 | | 3,127,980.00 |
| c) | Rent, Rates & Taxes | | 5,129,270.00 | | 4,401,355.00 |
| d) | Electricity & Water Charges | | 142,162,416.73 | | 101,386,210.00 |
| e) | Repairs & Maintenance-Others | | 88,485,474.48 | | 69,368,065.00 |
| f) | Newspaper , Periodicals, Journals & CDs | | 3,740,010.50 | | 6,356,083.61 |
| g) | Insurance Charges | | 1,033,376.00 | | 765,046.00 |
| h) | Printing , Stationery, Photocopy & Admin Consumables | | 10,456,238.63 | | 9,862,192.80 |
| i) | Postage, Telephone and Communication Charges. | | 14,901,717.40 | | 14,299,203.48 |
| j) | Exhibition, Advertisement & Publicity Expenses | | 19,341,865.00 | | 18,052,059.73 |
| k) | Expenses on Conference/Seminar/ Membership Fees | | 6,251,500.50 | | 2,143,831.51 |
| l) | Legal, Professional fees & Honorarium | | 8,325,981.04 | | 3,961,256.00 |
| m) | Patent fees | | 2,358,514.00 | | 619,846.00 |
| n) | Remuneration  to Auditors | | | | |
| | Audit Fees | 300,000.00 | | 301,500.00 | |
| | Out of pocket expenses | 80,551.00 | 380,551.00 | 48,223.00 | 349,723.00 |
| o) | Hospitality/Entertainment Expenses | | 70,662.00 | | 6,724.00 |
| p) | Bank Charges | | 2,126,189.73 | | 811,183.18 |
| q) | Loss due to foreign exchange transla-tion | | 996,334.35 | | 1,880,113.26 |
| r) | Miscellaneous Expenses. | | 44,433.00 | | 3,266.29 |
| s) | Loss on sale of Assets | | 0.00 | | 21,407.37 |
| t) | Bad and Doubtful Debts | | 197,841,104.35 | | 0.00 |
| | **TOTAL** | | **556,367,116.33** | | **263,601,581.88** |

# SCHEDULE 13 - ADJUSTMENTS PERTAINING TO EARLIER YEARS (Net)

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

(In Rupees)

| | 2017 | | 2016 | |
|---|---|---|---|---|
| | **Debit** | **Credit** | **Debit** | **Credit** |
| **INCOME** | | | | |
| TOT, Royalty, FSR and Publications | 0.00 | 0.00 | 0.00 | 6,037,127.44 |
| Interest Earned | 0.00 | 0.00 | 0.00 | 0.00 |
| Other Income | 0.00 | 147,506.00 | 0.00 | 113,940.00 |
| **EXPENDITURE** | | | | |
| Establishment Expenses | 141,644.00 | 0.00 | 996,610.60 | 0.00 |
| Operational Expenses | 0.00 | 8,711,587.51 | 0.00 | 12,773,378.23 |
| Other Administrative Expenses | 2,005,821.90 | 0.00 | 0.00 | 17,313,612.00 |
| Depreciation | 0.00 | 4,350.00 | 729,908.83 | 0.00 |
| **TOTAL** | **2,147,465.90** | **8,863,443.51** | **1,726,519.43** | **36,238,057.67** |
| **Net Debit/Credit** | | **6,715,977.61** | | **34,511,538.24** |

# Significant Accounting Policies

(Forming part of the Accounts for the year ended 31st March 2017)

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 5,000 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 their 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

a) 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.

# Notes on Accounts

(Forming part of the Accounts for the year ended 31st March 2017)

## PART –A: Balance Sheet

**1.0 Fixed Assets**

a. Fixed assets include land at New Delhi measuring 40 acres (Previous Year- 40 acres) which was acquired in 1993 from Government of India. This land has been considered free hold, even though no formal conveyancing has been done in favour of the CENTRE.

**2.0 Capital Work-in-Progress**

a. This represents the cumulative expenditure, incurred since 2008-09, on the proposed Housing facility at the Campus at New Delhi, amounting to Rs. 62.53 lakhs as at 31.03.2017. (Previous Year - Rs. 48.59 lakhs)

b. The expenditure under this head will be capitalized appropriately under "Fixed Assets", upon completion of the Housing Facility.

**3.0 Investments in C-DOT Alcatel Lucent Research Centre (CARC) Private Limited.**

a. The investments in the equity of a Joint Venture Company engaged in Research & Development in the field of Telecommunications was Rs. 5200 lakhs. The said company has accumulated losses and its net worth has fully eroded. Hence, a provision for bad and doubtful Investments amounting to Rs 2600 Lakhs has been made in these accounts, in addition to the provision of Rs 2600 Lakhs made in the previous year. C-DOT being one of the promoters of the Company, is awaiting the directive of the Government on the prospects of that Company.

**4.0 Current Assets, Loans, Advances and Deposits**

a. Inventory of Components includes:

i. An amount of Rs. 277.93 lakhs as at 31.03.2017(Previous year Rs. 277.93 lakhs) represents components which are lying in stock for more than three years on the balance sheet date. 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 the 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. 118.15 Lakhs as at 31.03.2017 (Previous Year - Rs. 219.87 lakhs).

b.  Sundry Debtors amounting to Rs 10167.25 Lakhs as at 31.03.2017 (Previous Year Rs.7890.45 lakhs )includes:

   i.  On account of TOT & Royalty dues of Rs. 2337.18 lakhs as at 31.03.2017 (Previous Year - Rs. 2331.43 lakhs) due from the concerned licensee has been fully met by the value of the land and buildings at Bangalore belonging to that licensee. This was taken over by the Centre since 2005, however, formal transfer of land and Building has not been made so far.

   ii.  On account of Royalty dues of one of the licensees, the same are being received in installments. The balance as at 31.03.2017 was Rs. 68.90 lakhs (Previous Year - Rs. 148.90 lakhs).

   iii.  On account of TOT /Royalty dues from other licensees, the balance as at 31.03.2017 was Rs 190.54 lakhs (Previous year- Rs 104.47 lakhs).

   iv.  The balance amount of TOT/Royalty dues of Rs. 359.33 lakhs as at 31.03.2017 (Previous Year Rs. 359.33 lakhs), provision for bad and doubtful debts has already been made in these Accounts.

   v.  On account of dues for technology/field support services rendered to Telecom companies Rs 7157.57 lakhs as at 31.03.2017. (Previous Year - Rs. 4817.26 lakhs). These are considered good and fully recoverable.

   vi.  On account of rent receivables from Telecom Companies /Research Academy- Rs 53.73 lakhs (Previous Year Rs 129.06 lakhs)

c.  Loan to CARC Private Limited

The aggregate of the Loans given to the Joint Venture Company engaged in Research & Development in the field of Telecommunications, after providing for bad and doubtful loan is Rs. Nil. (Previous Year - Rs. 922.89 lakhs). The said company has accumulated losses and its net worth has fully eroded. Hence, a provision for bad and doubtful Loan amounting to Rs 922.89 Lakhs has been made in these accounts in addition to the provision of Rs 922.89 made in the last year.

d.  Interest Accrued on loan to CARC Private Limited

Interest accrued on loan given to the Joint Venture Company as on 31-03-2017 is Rs 598.58 lakhs (Previous Year Rs 598.58 lakhs). From the Financial Year 2011-12, Joint Venture Company has defaulted in paying the interest. However, the Centre has not made any provision for the interest due on loan, keeping in consideration the liquid funds available with the said company at the balance sheet date.

e.  Claims Recoverable:

The aggregate of the amount realizable by the Centre as at 31.03.2017, on account of projects undertaken by it for the other organizations/expenses incurred by it, on reimbursement of cost basis, was Rs. 2532.54 lakhs (Previous Year - Rs. 2030.55 lakhs).

Due to uncertainties associated with recovery, a provision amounting to Rs 1978.41 lakhs (Previous year Rs nil) has been made in these accounts.

f.  Tax Deducted at Source

Tax deducted at source receivable pertaining to various years, aggregating to Rs 2026.40 lakhs (Previous Year Rs 1736.07 lakhs) is considered good for recovery.

**5.0  Contingent Liability not provided for**

a.  On account of unexpired letters of credit issued by bankers in respect of purchase orders for procurement of components and equipment – Rs. 61.74 lakhs as at 31.03.2017 (Previous Year - Rs. 70.40 lakhs)

b.  On account of pending legal cases, the amount outstanding is Rs. 20.87 lakhs. (Previous year Rs. 20.87 lakhs).

## PART – B: Income & Expenditure Account

### 1.0 Expenditure:-

### A.  Employees' Benefits:-

#### i. Gratuity:-

The value of liability of the Centre, based on existing pay and allowances, on account of Gratuity at the end of the year on actuarial valuation basis was Rs 5015.18 Lakhs (Previous year Rs. 4322.34 lakhs). The net expenditure recognized in the Income & Expenditure account for Gratuity in the current year was Rs 361.01 lakhs (Previous Year Rs 35.67 lakhs). The Gratuity Trust, which is managed by a separate Board of Trustees comprising of employees, is discharging 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 on actuarial  valuation, in respect of Earned Leave of employees as at 31.03.2017, was Rs. 4489.91 lakhs (Previous Year Rs. 3982 lakhs).

### B. Bonus

Ex-gratia payment to eligible employees of the Centre, as per applicable policy from time to time is treated as expenditure of the year on an estimate basis. The estimated expenditure provided on account of bonus for the year is Rs 30.72 lakhs (Previous Year Rs 7.98 lakhs).

### C. Consumption of Components:-

i.  As per the practice followed consistently, the 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 year was Rs. 4145.16 Lakhs (Previous year Rs. 1796.96 Lakhs).

### D. Foreign Exchange Fluctuations:-

i.  The net result of the fluctuations in Foreign Exchange on account of the transactions during the year was a loss of Rs. 2.19 Lakhs (Previous Year- loss of Rs. 18.64 Lakhs).

ii.  The gains and losses on account of such fluctuations are distinctly disclosed in Schedule 9 and 12 respectively.

### E. Adjustments Pertaining to earlier years (Net):-

Income and Expenditure under this head (refer Schedule 13), includes income of Rs. 1.48 lakhs (Previous year Rs. 61.51 lakhs) and expenditure of Rs (-) 65.68 lakhs (Previous year Rs. (-) 283.60 lakhs).

### F. Extraordinary Expenses

In making these accounts, an amount of Rs 3522.89 Lakhs (Previous year Rs 3522.89), being the aggregate value of Provision for Bad and Doubtful – Investments- Rs 2600 Lakhs and Provision for Bad and Doubtful Loans – Rs. 922.89 Lakhs, made/extended to CARC Private Limited, has been shown as Extraordinary expenses.

### PART – C: General

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

|  |  |
|---|---|
| Sd/- | Sd/- |
| G.Mukundan | Vipin Tyagi |
| Chief Finance Officer | Executive Director |

## OUR BANKERS

**Canara bank**
C-DOT Campus, Mehrauli
New Delhi-110 030

**Syndicate Bank**
Corporate Finance Branch
6, Sarojini House, Bhagwan Dass Road
New Delhi-110 001

**Canara Bank**
Electronics City-1, Hosur Road
Bengaluru-560 100

**Central Bank Of India**
Sona Towers, 71/1, Millers Road
Bengaluru-560 052

## OUR STATUTORY AUDITORS

**J.C. Bhalla & Co**
Chartered Accountants
Head office:B-17, Maharani Bagh
New Delhi -110 065

## OUR OFFICES

**C-DOT**
C-DOT Campus
Mehrauli
New Delhi-110 030

**C-DOT**
Electronics City
Phase-I, Hosur Road
Bengaluru-560 100

**C-DOT**
Field Support Centre, P-108 ,
Ground Floor
Lake Town, Block -A
Kolkata-700 089

**Centre for Development of Telematics**

C-DOT Campus, Mehrauli, New Delhi- 110 030

Electronics City, Phase - 1, Hosur Road, Bengaluru - 560 100

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