

# Annual Report 2021-22



**Disaster  
Management**

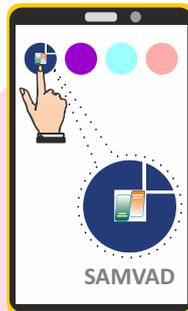
**CAP**



**4G LTE**



**CDOT Meet**



**SAMVAD**



**Terabit  
Router**



**XGS Mini  
OLT**

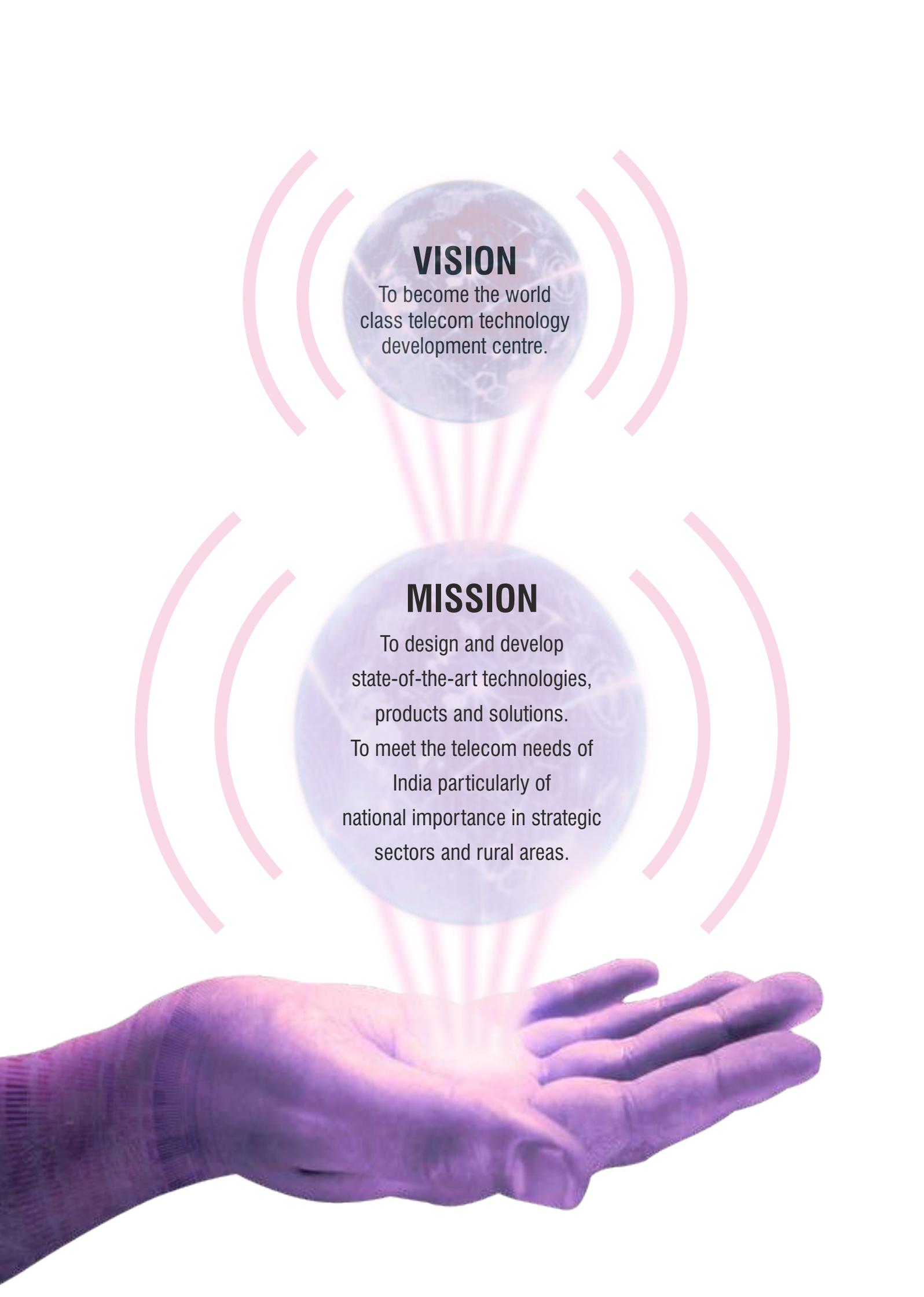


**DWDM**



**Wi-Fi 6**

**5G**



The image features a hand at the bottom holding a glowing globe. Inside the globe, there are two sections: 'VISION' at the top and 'MISSION' below it. The globe is surrounded by concentric circles, and light rays emanate from the globe. The overall color scheme is purple and blue.

## **VISION**

To become the world class telecom technology development centre.

## **MISSION**

To design and develop state-of-the-art technologies, products and solutions.  
To meet the telecom needs of India particularly of national importance in strategic sectors and rural areas.

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## C-DOT MANAGEMENT

### Governing Council

#### Chairman

Hon'ble Minister of Communications

#### Vice Chairman

Hon'ble Minister of State for Communications

#### Members

Chairman, Digital Communications Commission &  
Secretary (T), DoT

Chairman, DRDO & Secretary,  
Department of Defence (R&D)

Secretary, MeitY

Member (In charge - C-DOT), DCC

Member (Finance), DCC

CMD, BSNL

Executive Director, C-DOT

Directors, C-DOT

### Steering Committee

#### Chairman

Chairman, Digital Communications Commission &  
Secretary (T), DoT

#### Vice Chairman

Member (In charge C-DOT), DCC

#### Members

Chairman & Managing Director, ITI Ltd.

Director (Planning), BSNL

Sr. DDG, Telecom Engineering Centre

DDG (B&PF), Department of Telecommunications

Sr. Director, MeitY

Executive Director, C-DOT

Directors, C-DOT

### Project Board

#### Chairman

**Dr. Rajkumar Upadhyay**  
Executive Director, C-DOT

#### Members

**Dr. Pankaj Kumar Dalela**  
Director-I, C-DOT

**Shikha Srivastava**  
Director-II, C-DOT

**Daniel Jebaraj**  
Director-III, 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, Government 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, 4G LTE, 5G, network security, advanced encryption techniques and Post-Quantum Cryptography based solutions, network management, M2M/IOT, AI, 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 has developed an early warning platform based on ITU's Common Alerting Protocol (CAP) for effective disaster management. The platform has been widely used by National and State Disaster Management authorities for dissemination of alerts and other useful information to the masses on all available media during emergencies like floods, cyclones and Covid pandemic.

C-DOT's indigenous innovations have been instrumental in architecting Digital India. C-DOT's GPON solution is fueling the backbone of BharatNet, the prestigious nationwide

optical fibre based network connecting 2.5 lakh Gram Panchayats in the nation with high-speed broadband. C-DOT's XGS-PON is ideally suited to fulfilling the ever increasing demand of bandwidth emanating from the new dimensions of user applications like Work from Home, IPTV, HD Video Streaming, Online Gaming and host of other cloud-based services. C-DOT's high-capacity DWDM system has been designed to drive the core of Telecom networks in an optimally effective manner.

C-DOT's indigenously designed and developed network elements like Routers, Switches, etc. are a testimony to our prowess in building Next Generation Networks for "Smart Cities" and "Digital India". C-DOT's Wireless Terminals are especially suited to ensure seamless connectivity to the inhospitable and inaccessible terrains of India with a sharp focus on the utilization of green energy in power deficient areas. C-DOT has a wide suite of indigenous Wi-Fi solutions that are slated to play an increasingly pivotal role in the creation of PM-WANI Wi-Fi hotspots across the country.

C-DOT has also been developing indigenous solutions for strengthening communication networks for defence & strategic establishments. C-DOT has been actively involved in various projects of national importance that aim to augment the security of our national networks against cyber threats. C-DOT has developed Samvad, a mobile based unified secure chat & call platform and a Video-conferencing solution that are being used by the officers of various Government departments.

C-DOT is a proud member of the global oneM2M initiative and successfully demonstrated the interoperability of its M2M/IoT solutions on the platform. C-DOT has been focused on creating an inter-operable indigenous M2M/IoT ecosystem comprising of start-ups, industry, academia and R&D to boost innovation and growth in this new dimension.

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 Transfer of Technology (ToT) Model. C-DOT reiterates its commitment towards catalyzing the indigenous manufacturing for the creation of "Atmanirbhar Bharat".

## Accomplishments and Activities

### 1. Key Project Achievements at a glance

C-DOT is a telecom organization engaged in the research and development of state-of-the-art Telecom R&D solutions as well as in the field implementation of its developed technologies. C-DOT is appraised at CMMI (Capability Maturity Model Integration) Maturity Level 5 for its process practices for the 'Development Projects', and has been sustaining this status since 2014.

The progress on major technologies under development, field deployment, etc. is briefly summarized in the section given below:

- 4G Solution comprising of C-DOT's 4G Core and Tejas RAN (Radio Access Network) was successfully demonstrated to Secretary Telecom and senior DOT and BSNL officials on October 9, 2021. The Proof-of Concept (PoC) trials for BSNL (Bharat Sanchar Nigam Limited) EoI (Expression of Interest) for 4G successfully completed in the BSNL network at Ambala and Chandigarh
- C-DOT Radio Access Network (RAN) consisting of eNodeB, EMS and NMS started testing in Airtel Labs at Gurgaon during Mar 2022. Connectivity and VoLTE call established between C-DOT eNodeB and Airtel Core serving commercial traffic for Delhi NCR region.
- The services of "COVID-19 Savdhan" system based on ITU-CAP (Common Alerting Protocol) was used by 12 States & Union Territory authorities to send 23.11 crore COVID-19 pandemic SMSs to the citizens of India in English and 7 regional languages.
- During Cyclones Tauktae, Yaas, and Gulab in Tamil Nadu floods, concerned state disaster authorities sent 7.77 Crores SMSs in vernacular languages using C-DOT CAP platform. Also, 60 lakh voice messages were disseminated to the targeted population of West Bengal and Odisha during cyclone Yaas.
- C-DOTs Covid-19 Quarantine Alert System (CQAS) has been designed for detecting the quarantine Geo-fence breaches. More than 33,72,000 subscribers have been tracked for quarantine breaches till now and the system has generated 20,53,86,763 Geo-fencing breach alerts from the beginning. CQAS is also being used as Oxygen Digital Tracking System (ODTS) to track oxygen carrying vehicles since May 2021. It works based on driver's mobile no. or M2M (Machine to Machine) SIM used in the vehicle. More than 36,000 oxygen carrying vehicles have been tracked through CQAS-ODTS.
- Trusted Telecom Portal (TTP): C-DOT's software solution for implementation of National Security Directive on Telecom Sector (NSDTS) was successfully launched and made operational on 15th June 2021.
- TSOC (Telecom Security Operation Centre) - Additional 24 Internet Gateways completed this year using in-house developed 200 Gbps IPFIX (IP Flow Information Export) probe. C-DOT has successfully developed and deployed 400G IPFIX probe at one ISP site. Dashboard for organizational level monitoring was also made available.
- In CEIR (Central Equipment Identity Register), Stolen Device Reporting System (SDRS) launched in Maharashtra/Goa, Mumbai and Delhi circles. Indian Counterfeited Device Restriction (ICDR) system was launched on Pan India basis for checking validity of imported mobile devices.
- C-DOT's Quantum Key Distribution (QKD) system along with C-DOT's PQC (Post Quantum Cryptography) Encryptor and Router was successfully tested and demonstrated in the Army Network (approximate fiber length of 50 Km) in December 2021
- Wi-Fi Access points were deployed in Indian Navy & CSCs. Pan-Navy deployment activity started to cover all naval ships under various Naval Commands
- Digital Connectivity in some village clusters of Akola in Maharashtra was extended using C-DOT's Wi-Fi Technology in "Point-to-Point (P2P) link" and distributed

through Public Wi-Fi Networks for proliferation of broadband.

- PM-WANI Central Registry integrated with PRAYAAS Portal of Government of India which has details of all PM schemes. PDO (Public Data Office) Portal developed for PDOs to receive enquiries regarding the PM-WANI scheme. Dashboard has been enhanced to provide usage data of the PM-WANI scheme.
- PM-WANI Service Delivery Platform - C-DOT enabled 12 PDOAs (Public Data Office Aggregator) and APP providers on C-DOT developed PDOA stack and PM-WANI APP. Other PDOAs and APP Providers are also in the process to start services using C-DOT Solution.
- SAMVAD, a secured Chat and Call solution, was enhanced with several new security features, hosted and offered to many Government organizations like DoT, Prasar Bharati, DRDO, MHA, NSCS, CSIR, SPG, Income Tax Department on trial basis.
- Integration of SDCN (Secure and Dedicated Communication Network) core with DRDO completed in Oct, 2021 including configuration of networking equipment, development and deployment of Enhanced Element Management System (EMS) and upgradation of Soft switch at DR (Disaster Recovery) site in SDCN Network.
- MTCTE (Mandatory Testing and Certification of Telecom Equipment) Project was successfully rolled out for third and fourth phase for certification of products by OEMs.
- XGS-PON: Technology Approval Certificate of XGS-PON (10-Gbps Symmetrical Passive Optical Network) received from TEC.
- Lab prototype development completed for C-DOT Quantum-Secure Video IP Phone.

**The progress made in major technology areas, is briefly discussed as follows:**

## 1.1. Next Generation Mobile technologies

- ◆ **5G-CORE** - 5G Non-Stand Alone (NSA) Core development is in-progress. Interactions are ongoing with partners to upgrade 4G eNodeB to make it compatible with 5G NSA. Development of 5G NSA Core will be completed by August 2022. For 5G Data Plane, Accelerated data plane functions and Accelerated virtual firewall solution are deployed in BSNL PoC setup. Experimental Standalone Core is setup in the Lab for study and evaluation
- ◆ **5G-RAN** (Radio Access Network) – Study of 3GPP standards for 5G gNodeB development completed. System Requirement Specifications and Software Requirement Specifications finalized. Technical visits/Interactions held with IIT Madras and IIT Bombay regarding use of 5G testbed project components for building commercial grade 5G products. 5G core software, developed under 5G testbed project, received from IITM which is being tested.
- ◆ **4G-RAN** - During the year 2021-22, in 20W RRH Band-3, Band-40, and Band-41: 3-sector integration validation and testing completed. Over-the-Air testing of 20W Band 3 system done in C-DOT Campus and two rounds of testing of both FDD (B3) and TDD (B40) done in TCS Labs. System undergoing testing in Airtel Labs in Gurgaon Delhi with their commercial Core serving the Delhi-NCR region. EPC-eNodeB link establishment & VoLTE call for both TDD and FDD demonstrated. Detailed testing still going on. Load testing with 1,000 User Equipment (UE) Attach/Detach and IP traffic load tested with simulators in C-DOT labs for both FDD and TDD system. For 40W RRH Band-1, Band-3 and Band-41 design and procurement completed, initial RRH prototypes assembled and testing is in progress. In 40W RRH Band-28 Development, design completed, PCB-component assembly in progress and testing to start from Apr 2022. Efforts are in progress to complete testing to release an industrial grade 4G RAN. C-DOT has signed an MOU with a system integrator for integrating C-DOT 4G system with MCX (Mission Critical Applications) solutions for launching LTE for Railways (LTE-R). C-DOT is also in discussions with BEL as a System Integrator for C-DOT RAN solution

## 1.2. Security related projects

◆ **CMS** (Centralized Monitoring System) for lawful interception and monitoring - During the year, LEMF (Law Enforcement Monitoring Function) system has additionally been commissioned and made operational with Maharashtra Police wherein it is supported with 48 Remote sites and 225 Users connected to the system. Kerala Police and CBDT (Central Board of Direct Taxation)-Chennai have been connected with additional Remote locations.

### ◆ **CoE (Centre of Excellence) for Lawful Interception**

- **Samvad** - C-DOT Samvad solution has been deployed in Navy, IB and DoT. SAMVAD solution hosted and offered to many Government organizations like DoT, Prasar Bharati, DRDO, MHA, NSCS, CSIR, SPG, Income Tax Department on trial basis. Features like integration with video conferencing for conducting instant group meetings, user specific notification sound, phone book synchronization, high availability, security enhancements, profile update in organization directory, messaging across multiple organizations provided
- **C-DOT Video Conferencing Solution** - The solution is enhanced with important features like session streaming on YouTube, multiple webcams, repositioning webcams, network connectivity icon, display presenter video in full screen mode, Interactive Connectivity Establishment (ICE) Support, overload protection, screen sharing loop issue resolution, bandwidth saving features, shorter recording processing time. Solution is being used by various Government departments / organizations including IndiaPost, Railways, Prasar Bharati, DoT, NSCS, TSDSI and IITs.
  - **Face recognition** - Pilot of Face Recognition was conducted with one strategic agency. Developed Mask detection solution prototype for detecting protective gear for workers at site. Developed prototype of object detection from tower on request of a strategic agency and detecting & classifying objects from normal height. Algorithm development for sentiment, emotion, hate speech completed and integrated in social media analytics tool.

◆ **Quantum Safe Cryptography (QSC)** – Development of 80Mbps Compact Encryptor Module (CEM) completed. STQC commercial security grade certification is ongoing with all required security enhancements incorporated. MoU signed with the Institute for Development and Research in Banking Technology (IDRBT), Hyderabad for examining the security use case in banking sector.

◆ **Quantum Key Distribution (QKD)** - Design & development of the point to point QKD system completed. Detailed system testing and optimization is in progress. C-DOT's QKD (along with C-DOT's Compact Encryptor Module and Router) successfully tested and demonstrated in the Army Network (approximate fiber length of 50 Km) during Dec'21. Commercial order for setting up of QKD Prototype has been received from an academic institute. Interactions are ongoing with DRDO Lab and C-DAC for supplying C-DOT's QKD solution.

◆ **Secure and Dedicated Communication Network (SDCN)** – Integration of SDCN core with DRDO completed in October'21 including configuration of networking equipment, development and deployment of Enhanced Element Management System (EMS) and upgradation of Soft switch at DR site in SDCN Network.

◆ **Internet Lawful Interception Monitoring System**– C-DOT's solution for ISP Monitoring has been implemented at 15 new locations and existing 12 locations have been upgraded as on December'21.

◆ **Quantum-Secure Smart Video IP Phone** – Development of Lab Prototype of Quantum-Secure Smart Video IP Phone was successfully completed and demonstrated to National Security Council Secretariat (NSCS) in C-DOT Labs.

## 1.3. Carrier networks transport technologies

◆ **Packet Optical Transport Platform (POTP)**- Architecture Design of ~10T POTP system completed. Development of ~4 Tbps POTP system is in-progress. Architecture Design with a prototyping system development completed for Transport SDN implementations for C-DOT's Optical Network system.

◆ **XGS-PON (10-Gbps Symmetrical Passive Optical Network)** - Multiple variants of XGS-PON equipment

(OLT/ONT) developed for various use-cases (Chassis based OLT, 4 Port Mini-OLT, XGS-ONT, XGS-ONT-R, XGS-ONT with 802.11ac Wi-Fi), Proposal for conducting XGS-PON field trials on commercial basis in BharatNet submitted to BBNL. Approval/PO awaited from BBNL. Technology Approval accorded to C-DOT by TEC for Chassis based XGS-PON OLT. XGS-PON 4 Port Mini-OLT Technology Approval by TEC is in progress (testing completed and report under preparation). C-DOT has received PO from RailTel for 100,000 GPON/EPON ONTs. The same will be supplied by C-DOT ToT partners.

#### 1.4. Next-Generation Switching and routing systems

- ◆ **Next-Generation High Speed Routing System (HSRS)** – C-DOT has completed the development, product integration and testing of High Speed Router/Data Center Switch. SDN (Software Defined Networking)/NFV (Network Function Virtualization) Software development and testing completed apart from the design of compute node and Intelligent NIC. Development of EMS (Element Management System) for HSRS Nodes completed. A prototype of high speed router along with protocol acceleration software on Intelligent NIC was put on trial as main data center router in the 4G Core Network PoC.
- ◆ **LAN, MAN Enterprise and Data Centre Segment-** Validation testing of Medium capacity ToR (Top of Rack) switches completed. Integration testing of High Capacity ToR and High Capacity Spine Switches, design of 48-port Layer 2 switch has been completed. High Capacity ToR Switch Deployed in BSNL 4G Trial.
- ◆ **Switches and Router Support** - C-DOT has completed the development, product integration and testing of Branch Router.

#### 1.5. Satellite based technology

- ◆ **Satellite Hub Baseband System** – Field support continued to the customer for Carrier grade hub baseband system supplied to DEAL (Defense Electronics Applications Laboratory).
- ◆ **DVB-S2 (Digital Video Broadcasting - Satellite - Second Generation) Hub Baseband System** Development of

Algorithms for configurable multiple Modulation schemes and Channel Coders has been completed.

#### 1.6. Power efficient and Green telecom Technologies

- ◆ **Development of 10KW power plant** – System Architecture has been finalized so as to support both Solar as well as AC main inputs. Such green and hybrid products would help control the greenhouse gas emissions from telecom network. Further Design and Assembly of AC based SMPS module is completed and prototype testing is in progress.

#### 1.7. Telecom Service Application

- ◆ **M2M Communication** - Design, development, testing and deployment of Service Capability Exposure Function (SCEF) completed for '4G Core Network Node for IoT' for demonstrating Non IP Data delivery with 5G tester as part of 4G POC at BSNL Chandigarh.
- ◆ **PM-WANI Service Delivery Platform** – C-DOT developed PM-WANI Compliant PDOA and APP software has been commissioned for 12 nos. of PDOAs and App Providers. This has enabled the PDOA and APP Providers to provide services under the PM-WANI scheme.
- ◆ **PM-WANI Central Registry (CR)** – CR has been integrated with PRAYAAS Portal of government which has details of all PM schemes. PDO Portal developed for PDOs to post enquiries with respect to the PM-WANI scheme. Dashboard enhanced to provide usage data of the PM-WANI scheme. Portal is translated into multiple Indian Languages.
- ◆ **Wi-Fi technology (BBWT)** – Design & development completed for Wi-Fi6 indoor and outdoor access points. Wi-Fi5 indoor/outdoor access points has been developed for PM-WANI segment.

#### 1.8. DOT Projects

- ◆ **TSOC (Telecom Security Operation Centre)** - Additional 24 Gateways completed this year using in-house developed 200 Gbps IPFIX (IP Flow Information Export) probe. Development, testing and pilot deployment of 400

Gbps capacity IPFIX probe is completed successfully. Development of global, country level and organization level monitoring solution completed. Development of NMS and EMS for health monitoring of IPFIX probes is completed.

- ◆ **CEIR (Central Equipment Identity Register)** – Stolen Device Reporting System (SDRS) launched in Maharashtra/Goa, Mumbai and Delhi circles, Indian Counterfeited Device Restriction (ICDR) system was launched on Pan India basis for checking validity of imported mobile devices, was enhanced to implement the feedbacks of users. Security audit of Know your Mobile, ICDR, SDRS Apps completed.

### 1.9. Major Field implementations, roll-outs, customization

- ◆ **National Disaster Management Authority (NDMA) CAP EWS** - MoU for implementation of location based alert dissemination system 'SACHET' based on ITU-CAP was signed between C-DOT and NDMA on 23rd August 2021 for implementation on PAN India basis. Secretary (T) and Chairman, Digital Communications Commission inaugurated the CAP EWS lab at C-DOT on 3rd September, 2021.
- ◆ **MTCTE (Mandatory Testing and Certification of Telecom Equipment) Project:** The third and fourth phase of MTCTE portal was successfully rolled out for certification of products by OEMs.
- ◆ **Trusted Telecom Portal (TTP):** C-DOT's software solution for implementation of National Security Directive on Telecom Sector (NSDTS) was successfully launched and made operational on 15th June 2021. This will be a major milestone in ensuring security and integrity of the Indian Telecom backbone by assessment and verification of

sources (company as well as product) of equipment manufacturers/ device manufacturers/ system integrators.

- ◆ **NMS (Network Management System):** Mobile App developed by C-DOT has been successfully deployed in BharatNet. Major enhancements on TT (Trouble Ticket) and SLA (Service Level Agreement) modules for BharatNet NMS have been implemented and made operational. Unified Network Management System (UNMS) for monitoring "State led, Satellite & BharatNet Phase I and II projects" has been deployed. Business Exchange Gateway has been developed for integrating non-C-DOT NMS platforms. This has also been integrated with CSC for village coverage monitoring data access for 24 states.
- ◆ **GPON (Gigabit Passive Optical Network) Technology –** New ONT, ONT-27 with .ac wifi is completed and ready for field deployment. Validation of New Cost Effective Office OLT is completed and OLT is offered for TOT to manufacturers. EMS Validation of 16 Port GPON MiniOLT is completed and TOT done to M/s HFCL. Cost effective ONT-23 (Optical Network Termination-23) validated and ToT done to ITI, Surabhi Satcom, PEL and VVDN for deployment in RailTel network. ONT17A, ONT-24 and ONT-23 were successfully tested in xPON mode with Surabhi Satcom Network. ONT-23 is also tested in xPON mode in Railtel Network

### 1.10. Technologies transferred

In line with Government's Make in India and Digital India national programs, C-DOT promoted the indigenous technology development and manufacturing eco-system. During the FY 2021-22, ToTs are signed for 6 technologies with 9 different licensee.

## Intellectual Property Rights

Intellectual Property Asset	Number	Related Project / Product	Subject Invention
Patents Granted	6	NOFN NMS	Trouble Ticket Generation And Management System (India)
		Generic/Optical Networks	Central Office Side Redundancy Scheme For Fiber To-The-Home Passive Optical Networks (India)
		Geo-Intelligence	GIS Based Centralized Fiber Fault Localization System (UK, Canada)
		Wi-Fi	Dynamic Channel Selection In IEEE 802.11 Networks(US)
		GPON	A Gigabit Passive Optical Network (GPON) Ring Architecture (India)
		SG-RAN	A Method for Spectrum Sharing In GSM-BSS (India)
Patents Filed	8	Interoperable STB	Method And System For Confidential Data Based Broadcast Content Transmission In A One Way Broadcast Network (India)
		GPON / OTSC Card	A Learning-Based Method And System For Configuring An Optical Time-Domain Reflectometer In A Gigabit Passive Optical Networks (USA)
		Integrated CAP Alert system	System And Method For Geo-Targeted Automated Emergency Alerting Through Analog Radio Broadcast (PCT)
		C-DOT Converged Service Delivery Platform	A Secure Mechanism For Linear Content Streaming (India)
		Design & Development of Quantum Key Distribution (QKD)	Apparatus And Method For Adjusting The Phase- Modulator's Modulating Signal Time Reference In A Quantum-Key-Distribution System (PCT)
		DVB-S2 hub Baseband system	Method Of Transporting A Fragmented Ethernet Packet Over A RapidIO Network (India)
		Design & Development of Quantum Key Distribution (QKD)/ Alice and Bob Node of the QKD Solution	Methods And System For Fast Synchronization In Long Range Quantum Key Distribution (India)

Intellectual Property Asset	Number	Related Project / Product	Subject Invention
		Central Equipment Identity Register (CEIR)	System And Method For Real-Time Cloning Detection And Blocking Of Cloned And Stolen Mobile Devices In A Country's Mobile Network (PCT)
Copyright Granted	3	NMS Trials And Enhancements / NOFN NMS	Location Management System
		DVB -S2 Hub Baseband System	High Throughput DVB-S2 Modulator Baseband System
		4G	Long-Term Evolution-Network Management System (LTE-NMS)
Copyright filed	3	CNMS-IP (NMS for IP Networks)	CNMS-IP (NMS for IP Networks)
		Generic Mobile App Framework	Mobile App for Light Weight NMS
		NMS Trials And Enhancements	Business Exchange Gateway for TSP's, ESP's and ISP's
Designs Granted	3	Interoperable STB	COSN (SET TOP BOX)
		GPON	ONT17 (OPTICAL MODEM)
		TWDM PON	XGPON ONT
Designs Filed	1	Wi-Fi	XAP WiFi Plastic Enclosure
Trademark Granted	2	Wi-Fi	Massive Wi-Fi
			Bamboo Wi-Fi
Trademark Filed	2	Hybrid Media OTT Player	OM PLAYER+
		C-DOT OTT MEDIA PLAYER	OM PLAYER

<b>Intellectual Property Asset</b>	<b>Number</b>	<b>Related Project / Product</b>	<b>Subject Invention</b>
Papers presented and published	5	Wi-Fi	Fast Band Power Measurement Technique In Wi-Fi System Using Spectrum Analyzer. The International Journal of Applied Power Engineering (IJAPE).
		CAP Compliant Integrated Early Warning Platform	Categorizing Disaster Tweets Into Actionable Classes For Disaster Managers: An Empirical Analysis On Cyclone Data. International Conference On Electrical, Computer, Communications & Mechatronics Engg. (ICECCME 2021), Mauritius, 07-08 october 2021
		Generic	Quantum Key Distribution - The future of Secure Communication. Electronics For You, March 2022
		Generic	SEHC: A Benchmark Setup to Identify Online Hate Speech in English. IEEE Transactions on Computational Social Systems
		Generic	Quantum Key Distribution at C-DOT. 91st Annual Session of The National Academy of Sciences , India (NASI), 4-6 December 2021

## EVENTS 2021-22

### ❖ Showcased Indigenous Telecom technologies & innovative solutions at Mobile World Congress (MWC) 2022, Barcelona, Spain

Centre for Development of Telematics (C-DOT), the premier Telecom R&D Centre of the Department of Telecommunications, Ministry of Communications, Government of India showcased its indigenous Telecom technologies & innovative solutions at Mobile World Congress (MWC) 2022, Bracelona, Spain, aimed at strengthening the spirit of "Atmanirbhar Bharat" across the globe. The event was held from 28<sup>th</sup> February to 3<sup>rd</sup> March 2022.



*Dr. P. D. Vaghela, Chairman (TRAI), Sh. Dinesh Patnaik, Indian Ambassador to Spain, Smt. Meenakshi Gupta, Member (TRAI), Sh. Arun Gupta, DG (TEPC), Lt. Gen. S. P. Kochhar, DG (COAI), Sh. V Raghunandan, Secretary (TRAI), Dr. Raj Kumar Upadhyay, ED, C-DOT at C-DOT Booth*

## ❖ Workshop on “Exploiting the Potential of Indian Telecom R&D Together- The Way Forward”

C-DOT conducted a workshop centred on the theme, “Exploiting the Potential of Indian Telecom R&D Together-The Way Forward” with the awardees of the Production Linked Incentive (PLI) and Digital Communication Innovation Square (DCIS) schemes on 02 Dec 2021. The workshop focused on exploiting the complementary strengths & C-DOT’s R&D expertise to promote innovations and boost cost-competitive indigenous manufacturing to realize the vision of “Atmanirbhar Bharat”. Shri K.Rajaraman, Chairman, Digital Communications Commission & Secretary, Telecom, Government of India delivered the inaugural address.



*Shri K. Rajaraman, Chairman, DCC & Secretary, Telecom, Government of India delivered the inaugural address at the Workshop on 'Exploiting the potential of Indian Telecom R&D together-The way forward' on 2nd Dec, 2021 (Virtual mode)*



*Special address by Ms Anita Praveen, Special Secretary (T), Department of Telecommunications, Government of India at the Workshop on 'Exploiting the potential of Indian Telecom R&D together- The way forward' on 2nd Dec, 2021 at C-DOT campus, Delhi*

## ❖ AfricanCom 2021 during 8th to 12th November, 2021

C-DOT participated in AfricaCom 2021 held during 8<sup>th</sup> to 12<sup>th</sup> November 2021 as a virtual exhibitor. This year's main focus was “Paving the road to a 5G-enabled Africa”. C-DOT showcased its indigenous Telecom technologies & innovative solutions.

### ❖ MoU signed between C-DOT and RailTel on 14 Oct 2021

C-DOT and RailTel signed MoU for cooperation in diverse areas of Telecom sector with key focus on modernization & expansion of nationwide communications networks.



*Sh Puneet Chawla, CMD Railtel and Dr Rajkumar Upadhyay, Executive Director, C-DOT at the MoU signing ceremony.*

### ❖ Webinar on “Quantum Communication” on 12th October 2021

C-DOT organized a webinar on "Quantum Communication" as part of "Azadi Ka Amrit Mahotsav" on 12 Oct, 2021 amid a galaxy of field veterans from C-DOT and academia who offered thoughtful insights into this novel area of research including Quantum Key Distribution (QKD) & Post-Quantum Cryptography (PQC).

### ❖ Visit of Chairman, DCC & Secretary (Telecom) to C-DOT, Delhi on 09 Oct 2021

Shri K. Rajaraman, Chairman, Digital Communications Commission & Secretary, Telecom, Government of India visited C-DOT Campus, Delhi on 09 Oct 2021 and witnessed the demonstration of C-DOT's indigenous Telecom technologies & innovative solutions. He also inaugurated the futuristic Quantum Communication Lab and unveiled indigenously developed C-DOT Quantum Key Distribution (QKD) solution.



*Shri K. Rajaraman, Chairman, DCC & Secretary, Telecom, Government of India, addressing the C-DOT engineers.*



*Shri K. Rajaraman, Chairman, DCC & Secretary, Telecom, Government of India, inaugurated the Quantum Communication Lab.*

### ❖ Virtual Technical Conference during C-DOT's 38th Foundation Day Celebrations on 3rd Sept,2021

C-DOT organized a virtual international technical conference as part of its 38th Foundation Day Celebrations in the august presence of Shri Anshu Prakash, Chairman, Digital Communications Commission & Secretary, Telecom, Government of India. Shri Anshu Prakash inaugurated the C-DOT Common Alerting Protocol (CAP) Lab for pan-India implementation of integrated disaster & emergency alert system.



*Shri Anshu Prakash, Chairman, DCC & Secretary, Telecom, Government of India and Shri Deepak Chaturvedi, Member (Services), DCC, Government of India attended C-DOT's 38th Foundation Day*



*Shri Anshu Prakash inaugurated the C-DOT Common Alerting Protocol (CAP) Lab for pan-India implementation of integrated disaster & emergency alert system*

### ❖ Visit of Hon'ble Minister of State for Communications to C-DOT, Bengaluru on 17th July 2021

Honourable Minister of State for Communications, Government of India, Shri Devusinh Chauhan Ji visited C-DOT Bengaluru campus on 17th July, 2021. C-DOT showcased its indigenous Telecom technologies & innovative solutions to Honourable Minister of State for Communications.



*Hon'ble Minister of State for Communications, Government of India, Shri Devusinh Chauhan Ji visited C-DOT Bengaluru campus on 17th July 2021 and witnessed C-DOT's indigenous Telecom technologies & innovative solutions*

#### ❖ **Visit of Hon'ble Minister of State for Communications to C-DOT Campus, Delhi on 13th July 2021**

Hon'ble Minister of State for Communications, Government of India, Shri Devusinh Chauhan Ji visited C-DOT Campus, Delhi on 13th July 2021 and witnessed the demonstration of C-DOT's indigenous Telecom technology innovations. Hon'ble Minister provided valuable guidance for accelerating innovative research to fulfil the needs of the people, boost local manufacturing and achieve rural development.



Hon'ble Minister of State for Communications, Government of India, Shri Devusinh Chauhan Ji visited C-DOT Campus, Delhi on 13th July 2021



*Hon'ble Minister of State for Communications, Government of India, Shri Devusinh Chauhan Ji reviewing C-DOT projects at C-DOT campus, Delhi*



*Hon'ble Minister of State for Communications, Government of India, Shri Devusinh Chauhan Ji interacted with C-DOT engineers and witnessed the demonstration of C-DOT's indigenous technology solutions at C-DOT campus, Delhi*

### ❖ Webinar on “The National Standards for IoT - Smart Cities Perspective” during 5-8 July 2021

C-DOT and TSDSI organized a webinar series on "The National Standards for IoT – Smart Cities Perspective" during 5<sup>th</sup> -8<sup>th</sup> July 2021 amid insightful deliberations with field experts on diverse themes related to "IoT Standardization", "Security, Privacy & Trust" and "oneM2M use cases". Shri Anshu Prakash, Chairman, Digital Communications Commission & Secretary, Telecom, Government of India delivered the inaugural address.



*Shri Anshu Prakash, Chairman, Digital Communications Commission & Secretary, Telecom, Government of India delivered the inaugural address in the webinar series organized virtually on “The National Standards for IoT – Smart Cities Perspective” during 5th -8th July 2021*

## Awards Received

### C-DOT bags 3 awards for its indigenously designed & developed innovative Telecom solutions at 12th Annual Aegis Graham Bell Awards

C-DOT Declared Winner in the categories of Tech for Social Good, Preventive measures to combat COVID 19, and Innovation in Lockdown Management

C-DOT bagged three awards at 12th Annual Aegis Graham Bell Awards in a virtual ceremony on 25th Feb 2022 for its indigenously designed & developed innovative Telecom solutions in various categories. C-DOT is declared TOP WINNER in following three categories:

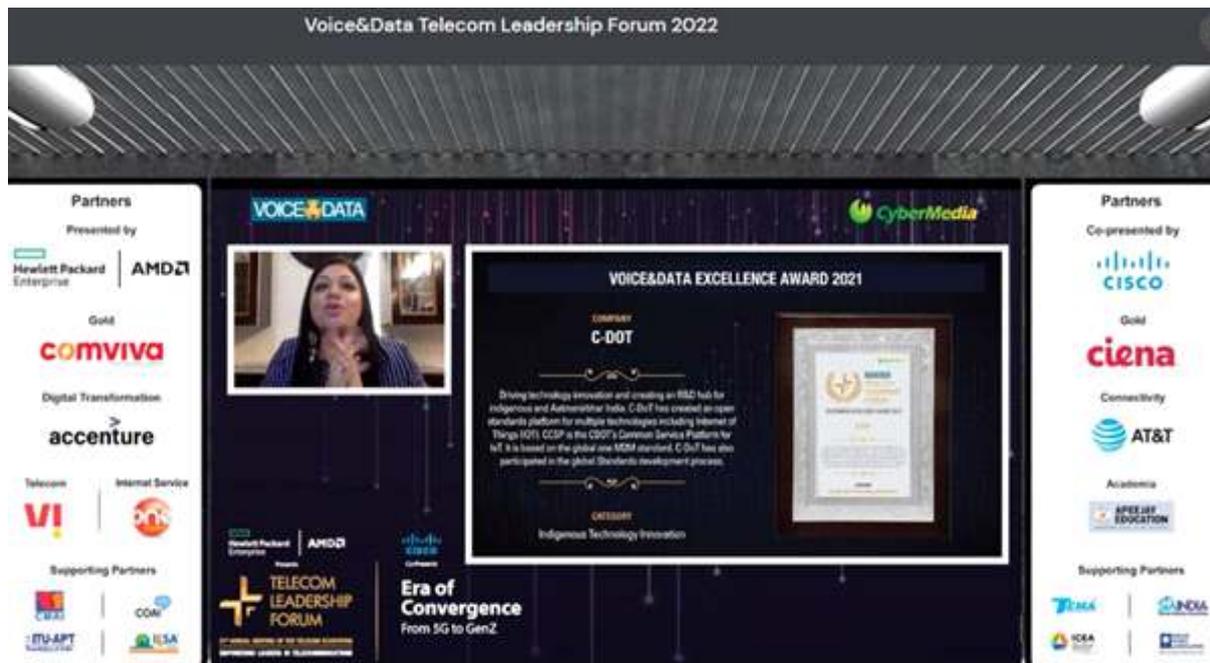
1. Indigenous Early Warning Platform for Disaster Management & Preparedness based on ITU's Common Alerting Protocol (CAP) in the "Tech for Social Good" category
2. C-DOT SAMVAD – A Unified Platform for Secure Messaging and Calling Solution in the category of "Innovation in Lockdown Management"
3. C-DOT Quarantine Alert System (CQAS) has won the first prize in the category of "Preventive measures to combat Covid 19"



Virtual Award Ceremony of 12th Annual Aegis Graham Bell Awards

## C-DOT Common Service Platform (CCSP) for standardized M2M/IoT applications awarded at 21st edition of Telecom Leadership Forum

C-DOT Common Service Platform (CCSP) for standardized M2M/IoT applications, conferred with Voice & Data Excellence Award in the category of Indigenous Technology Innovation at 21st edition of Telecom Leadership Forum



Virtual Award Ceremony of 21st Edition of Telecom Leadership Forum

## MAJOR TECHNICAL ACHIEVEMENTS



In the midst of the ongoing 4G pilot trials being conducted by C-DOT in partnership with M/s Tata Consultancy Services (TCS); India witnessed a historic moment when Hon'ble Minister of Communications, Sh. Ashwini Vaishnaw, on 10th October 2021, received the first call over the Indian 4G network of BSNL (powered by C-DOT's 4G Core Solution) and took to Twitter expressing happiness that Prime Minister Narendra Modi's vision of Atmanirbhar Bharat is taking shape.

### ❖ 4G / 5G Solution

Technology development programs are also ongoing in the next generation mobile technologies like 4G & 5G whereby a converged platform is being developed for delivery of services to fixed and mobile subscribers.

### ❖ CAP (Common Alerting Protocol)

C-DOT launched Pilot project for CAP implementation in the state of Tamil Nadu in Jan 2020 which was successfully completed in March 2021. After successful completion of this Pilot, C-DOT's proposal for implementing PAN India Integrated Alert System was accepted and sanctioned by the competent authority. MoU for the same has been signed between C-DOT and NDMA in August 2021. The Platform is being extensively used for disseminating alerts during natural disasters in the country. Also, approximately, 300 Cr + SMS based alerts have been sent during the ongoing Covid-19 pandemic.

### ❖ Platform for implementing the National Security Directive on Telecommunication Sector

C-DOT developed a platform for implementing the National Security Directive on Telecommunication Sector for facilitating the maintenance of the Trusted Sources, Secured Content and Trusted Products within the administrative jurisdiction of India.

### ❖ Quantum Technology and other Advanced Cyber Security Projects

C-DOT developed Post-Quantum Cryptography solution and Quantum Key Distribution System (QKD) for applications in the areas of Government, Defense & strategic sector as well as in Banking & Financial sector.

## HR Initiatives

### Women Empowerment

C-DOT's Management has always been sensitive towards gender issues and has constantly worked towards building a gender-neutral environment whereby the employees can grow and work freely. Presently, about 33% of the employees in C-DOT are women and one Female Director representation in the existing Board of Directors.

### Existing Policies

- ◆ All female employees are allowed to avail up to 180 days maternity leave & 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.
- ◆ Child Care leave is also granted to eligible female staff on their applying for the same, as per rules.
- ◆ 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 100% of the women staff.
- ◆ Career growth opportunities are available to women employees in C-DOT.
- ◆ In management cadres (Team Leaders, Group Leaders, Technical Experts and Sr. Technical Experts) about 26% are women.
- ◆ As per the directives of Supreme Court of India, C-DOT, both at Delhi and Bengaluru, has an independent Internal Complaint Committee, to redress the grievances relating to sexual harassment at workplace, raised by the women employees, in case they suffer/observe any instance of the same.

### Employee's 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. for

employees (and their families). The employees in E1 grade and below has a coverage of Rs.3.5 lakhs and above and employees in E11 grade and above have a coverage of Rs. 5 lakhs and above (Rs.7.5 Lakhs, Rs.10 Lakhs and Rs.15 Lakhs). The Group Medi-claim policy has been made effective from 01 April 2006.

- ◆ C-DOT has Grievance redressal mechanism for its employees to provide them with an easy & accessible machinery for prompt disposal of their day-to-day grievance

### 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.

### Director Recruitment (1 Post) for Bengaluru

- ◆ Recruitment for the post of Director, Bengaluru (1 post) was completed in the month of October, 2021. All interviews were conducted in Sanchar Bhavan.

### Benefits for persons with disabilities

- ◆ C-DOT follows guidelines issued by the Government of India with respect to reservations in jobs for specially abled persons.
- ◆ The specially abled employees are eligible for double the rates of transport allowance.
- ◆ The C-DOT Campus at Delhi has been constructed in such a manner so as to ensure barrier free environment for the specially abled employees. The main entrance/exit can be approached through a ramp together with stepped entry. The elevators connecting the various working areas have been installed in way to facilitate especially abled employees to move around freely from one wing to another.

## Technology Commercialization

### MOU & PROJECT AGREEMENTS

S. No.	Name of the Party	Timeline	Remarks
1.	Institute for Development and Research in Banking Technology (IDRBT)	07/04/2021	This is MoU  Purpose: To establish a collaborative working partnership in the areas of 5G and Quantum Security in Banking use cases; Deep Learning and Cryptography Techniques for Banking use cases; Communications & Networking technologies and products for Banking use cases; Inclusion of indigenously developed Wi-Fi 6 technology/product based on latest IEEE 802.11ax standard in 5G Testbed for financial inclusion and better connectivity; Inclusion of indigenously developed Post-Quantum-Cryptography based Encryptor as well as Quantum Key Distribution product in IDRBT 5G testbed for enhanced futuristic security; Networking, communication and security aspects of BFSI use-cases.
2.	C-DAC, C-DOT and IISc (tripartite agreement for MPPLab)	18/06/2021	This is MoU Regarding Mathematical Programming in Parallel Laboratory program dealing with High Impact Applications of Optimization and Statistics (Big Data).
3.	M/s. Matrecomm	18/08/2021	This is MoU Purpose: Mutual interest of the Parties with respect to sharing of roaming exchange software for PM-WANI for Railtel tender (Tender No. RAILTEL/TENDER/LT/CO/Marketing/2021-22/PM-WANI/02 dt. 02.08.2021)
4.	National Disaster Management Authority (NDMA)	23/08/2021	This is MoU Purpose : Early Warning Platform for Disaster Management
5.	M/s. Broadcast Engineering Consultants India Limited (BECIL)	17/09/2021	This is MoU Purpose: To work jointly on projects in the field of IT/ICT and communication systems for Conditional Access System (CAS)

S. No.	Name of the Party	Timeline	Remarks
6.	The Institution of Electronics and Telecommunication Engineers (IETE)	07/10/2021	This is MoU Purpose: To establish skill-based training, educational and research programmes under the C-BUDDHI Program of C-DOT
7.	RailTel Corporation	14/10/2021	This is MoU Purpose : Deployment of C-DOT products in RailTel Portfolio of Products to used to fulfil the customer services that include RailWire, Internet Bandwidth, MPLS VPN etc.
8.	Global IEEE Institute for Engineers (GIEEE)	18/11/2021	This is MoU Purpose: For the establishment of skill-based training, educational and research programmes under C-BUDDHI Program.
9.	ITI Ltd	01/12/2021	This is MoU NSCS PINE PROJECT WORK
10.	VISTA INFORMATION SYSTEMS PVT LTD.	16/12/2021	This is Teaming Agreement Regarding Modernization of Signaling System in the Indian Railways Network.
11.	Telecommunications Consultants India Ltd. (TCIL)	23/12/2021	This is MoU Purpose : Joint Exploration of deployment of C-DOT Products and generation of other business opportunities in India and abroad.
12.	C-DOT - IISc Project Agreement for Consultancy in Verifiable Computation	March 2022 Final Signature Pending	This is Project Agreement. Purpose: For consultancy in Verifiable Computation by Assistant Professor Dr. Chaya Ganesh from IISc.
13.	Lekha Wireless Solutions Pvt Ltd	03/12/2021	Collaboration in 4G & 5G Technologies.

## Promotion of Hindi

On the occasion of 75th anniversary of India's independence, the Amrit Mahotsav, being celebrated across the country, was made an integral part for promotion of Official Language in C-DOT. All the activities of the Official Language Unit at C-DOT were woven around this to bring the attention of our young generation towards important contribution of Hindi language in the freedom struggle.

The Official Language Unit at C-DOT is constantly determined and striving to ensure the implementation and compliance of the Official Language Act. In order to facilitate working in Hindi, information about various aspects of Official Language Hindi is shared regularly from time to time with all staff members through internal e-mail system.

### Compliance of Section 3(3) of Official Languages Act, 1963

In compliance with Section 3(3) of the Official Languages Act, 1963 in C-DOT, all office orders, notifications, contracts, agreements, tender forms, administrative and other reports have been issued bilingually in C-DOT.

### Hindi Training

**Samvad-** Hindi Workshops were organized in every quarter at C-DOT to promote the usage of Hindi in day-to-day official work and remove hesitation to use of Hindi effectively as well as to create awareness about acts and rules of the Official Language policy of the Government of India.

### Meetings of Official Language Implementation Committee

To review the progress made in the implementation of Official Language in C-DOT, quarterly meetings of the Official Language Implementation Committee were held at regular intervals in both Delhi and Bangalore offices.

### Hindi Utsav

Hindi Utsav was celebrated in the month of September in both the offices of C-DOT in Delhi and Bangalore— a

celebration in which all the members of C-DOT family – employees as well as their children were encouraged to work in the official language Hindi. On the occasion of Hindi Diwas on September 14, 2021, all C-DOT employees took the Official Language Pledge under the leadership of the Executive Director. All the employees took a pledge that they would try their best to do most of their official work in the Official Language Hindi and would also emphasize on linguistic empowerment along with digital empowerment. This year, an attempt was made to link the competitions organized during the Hindi festival in C-DOT with the freedom struggle and through some competitions like quiz, children's poetry recitation, a successful attempt was made to inculcate the spirit of patriotism in the younger generation.

### Paramparik Abhivadan: Traditional Indian Greetings

As in the past, this year also a competition was organized during the Hindi Utsav to promote Indian traditional greetings. During the Utsav, volunteers of the Official Language Unit made random calls to C-DOT members at different times throughout the month and the members who answered calls with traditional Indian greetings such as Namaste, Namaskar, Adaab, Sat Sri Akal, Salaam, Namo Narayan, Ram Ram, Jai Shri Krishna, Jai Gurudev, Jai Sai Ram etc. were awarded a memento.

### C-DOT Rajbhasha Shree Award

To promote working in official language Hindi and increasing its usage in day-to-day work, like last year, this year also three members were honored with Rajbhasha Shree Award for doing maximum work in Hindi/contributing to the promotion of Hindi in C-DOT. They were rewarded with a citation and a cash prize of Rs.5000. This award is in addition to the regular incentive schemes.

### Competition for children of C-DOT members

In order to inculcate respect and love for their language, civilization and culture, a Poetry Recitation Competition based on the theme of patriotism was organized among the children of C-DOT members. Students from Nursery to Class 12th participated in this competition. The video recordings of children in varied backgrounds of national flag and dress were uploaded on YouTube and sent to the official language unit. Altogether 34 children participated in the poetry recitation. All the entries were evaluated by internal and external selection committee associated with theater and media. Books and cash were given to the children as prizes.

### Essay Writing Competition

With the aim of developing writing skills among C-DOT employees, Essay writing competition was organized. The topic of the essay was informed through e-mail 5 minutes before the start of the competition and the participating members were allowed to write the essay from their seats in the time duration of 1 hour on the answer-book provided by the Official Language Unit. Separate prizes were kept for Hindi and non-Hindi speaking in this competition

### Noting, Drafting, Translation and Language Knowledge Competition

In order to maintain the excitement and enthusiasm of employees, "Noting-Writing, Translation and Language Knowledge Competition" was organized in the Hindi Utsav. Translation in Hindi and English was to be done in the competition and interesting questions related to language knowledge were asked. Out of the three conditions given for noting-drafting, the employee had to prepare the draft of the noting/letter for one of them. Separate prizes were kept for Hindi and non-Hindi speaking in this competition.

### Azadi Ka Amrit Mahostav - Special Quiz Competition

In an effort to bring Science and Hindi on one platform, an online quiz competition was organized for C-DOT members. In this quiz, objective type questions (MCQs) and short

answer questions were asked on various topics. These questions were based on C-DOT, Official Language, Posters relating to Official Language placed at various places in C-DOT campus, Films, Literature, Current topics, Indian Freedom Struggle and Indian Democracy.

### Acting Competition

In order to make the competitions exciting, and also bring forward the creativity and acting talent among C-DOT members, entries were invited for the Acting Competition. It was proposed to conduct the competition in a hybrid way i.e. employees could send video recordings of their performances to the Official Language Unit or show their performances live in the auditorium as per their convenience.

### Theatrical Performance

With the aim of bringing awareness to the burning social problems, along with the promotion of official language, Hindi street play "Mard" was staged in C-DOT by the famous theater group "Asmita Theater" in C-DOT campus on the occasion of World Women's Day on March 8, 2022,

## Special Mention

Despite the fact that C-DOT, Bengaluru office is located in the "C" zone category as defined by the Government of India, with the collective efforts of the employees the primary correspondence was done 100% in Hindi, while the target set for the region is only 55%. C-DOT, Bengaluru was awarded Third Prize by the Town Official Language Implementation Committee (O-1) for doing remarkable work towards the progressive use of official language Hindi during the year 2021-22.



*Hindi Street Play "Mard" staged in C-DOT, Delhi Auditorium by "Asmita Theatre"*



*Prize distribution on Hindi Utsav at C-DOT Bengaluru*



*Competition being organized on the occasion of "Hindi Utsav"*



*Prize distribution on the occasion of Hindi Diwas at C-DOT Delhi*

## Knowledge Management

### Training in C-DOT

Training is an important cornerstone for the growth and sustenance of an organization. So to enhance knowledge and upgrade skills of our employees regular training programmes are conducted across the year. And employees are encouraged to participate in various seminars and conferences.

Various internal and external training on technical, managerial and soft-skills are arranged for the employees.

### C-DOT Delhi Office

Following are the key trainings conducted during the FY 2021-22:

- Induction and Orientation Training of REs 2021
- Training Session on "Office Procedure, Noting & Drafting"
- Training Session on "Prevention of Sexual Harassment (POSH)" at workplace
- Online training module on "Noting & Drafting" for staff on C-DOT LMS (Learning Management System)
- Training for ITS-2019 Batch Officer Trainees & WPC IRRS Officer Trainees.

### Training Metrics For 2021-22

S.NO.	Training Details for C -DOT, Delhi	No. of Persons Attended	Total Time in Trainings (in hrs)
1.	1st Quarter of FY	11	117
2.	2nd Quarter of FY	55	385
3.	3rd Quarter of FY	97	964
4.	4th Quarter of FY	83	229
	<b>TOTAL</b>	<b>246</b>	<b>1695</b>

### Internship At C-DOT Delhi:

#### Summer Student Trainees

Applications received	Offer Letter Issued	Joined
27	27	27

#### Winter Student Trainees

Applications received	Offer Letter Issued	Joined
5	5	5



*Induction and Orientation Training of REs 2021*



*Session on "Office Procedure, Noting & Drafting"*



*Training of ITS-2019 Batch OTs*

KMG Delhi also circulates regular mails on topics of employee's development and relevant technical articles. Information related to useful webinars, workshops and events is regularly broadcasted to C-DOT staff on various topics like 5G (Status, Myths & Reality), 5G Security & Testing, 6G-Road Ahead, Vehicular Communication Technology & Evolution towards 6G, Lessons from Life Experiences, Quantum Communications, Artificial Intelligence in Telecom, PM WANI, IoT & Smart Cities.

## About Knowledge Management Centre

Knowledge Management Centre has been established to provide latest scientific and technical information to support C-DOT research and development activities. It includes a rich collection of more than 20138 technical books, 3495 Hindi books and over 62 periodicals and magazines besides country's 13 leading Newspapers and Newsletters (across locations). For the year 2021 -2022 a total of 54 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.

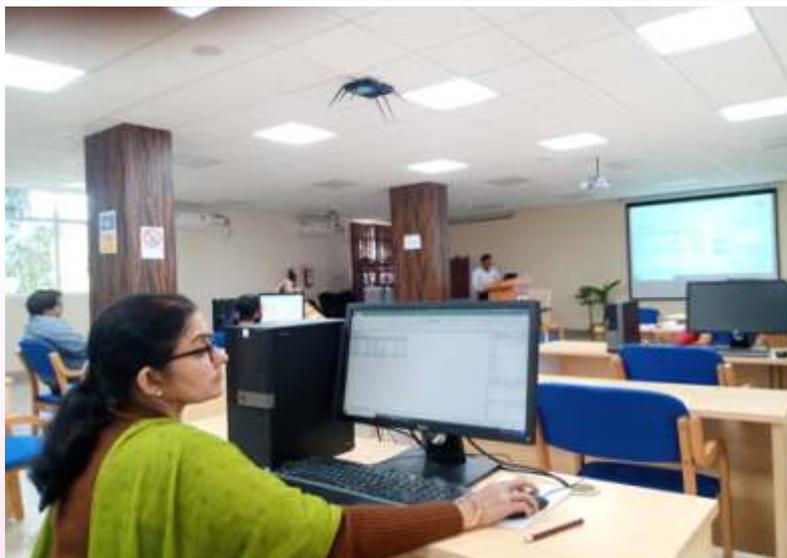
## C-DOT Bengaluru Office

Continuous efforts are made to enhance the skill sets of C-DOT employees. Employees are encouraged to participate in various seminars and conferences. Various internal and external trainings on technical and managerial skills are arranged for the employees. Knowledge Management Group, Bangalore also broadcasted the notifications of webinars conducted by other institutions on various topics to update the skill set of staff.

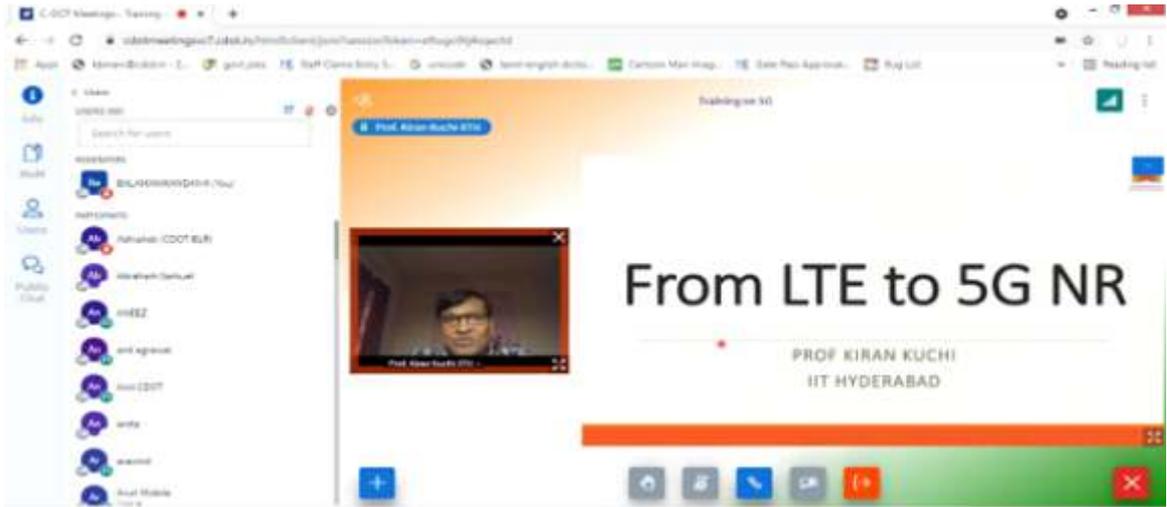
Topics on which training were arranged are 4G, 5G, Linux shell scripting, Network security, Python, Dockers and Kubernetes, Microsoft Excel, General Financial Rules 2017, Problem Solving and Decision making, Competency based Interviewing skills, Leadership for Managers, Driving innovation etc.,.

## Trainings Conducted

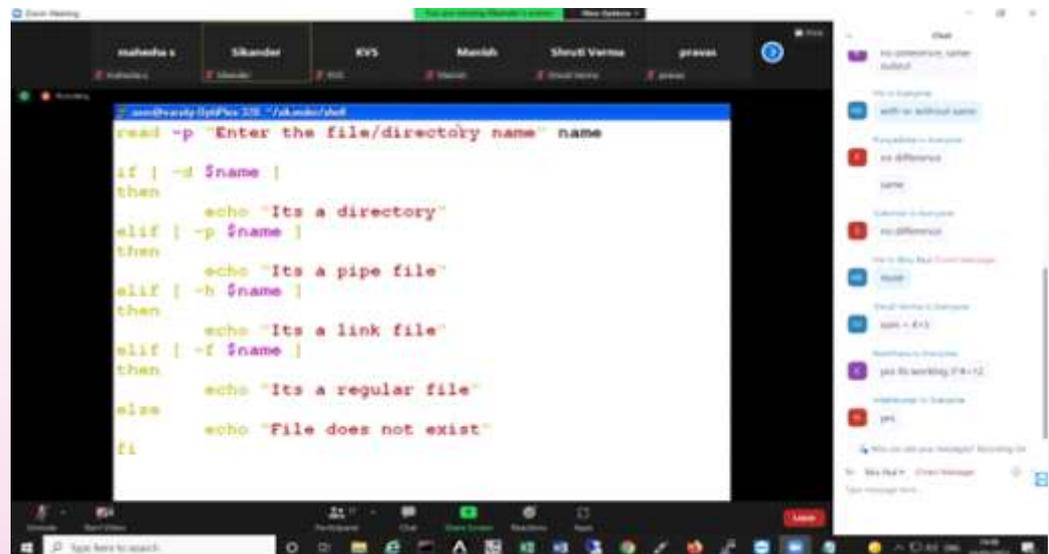
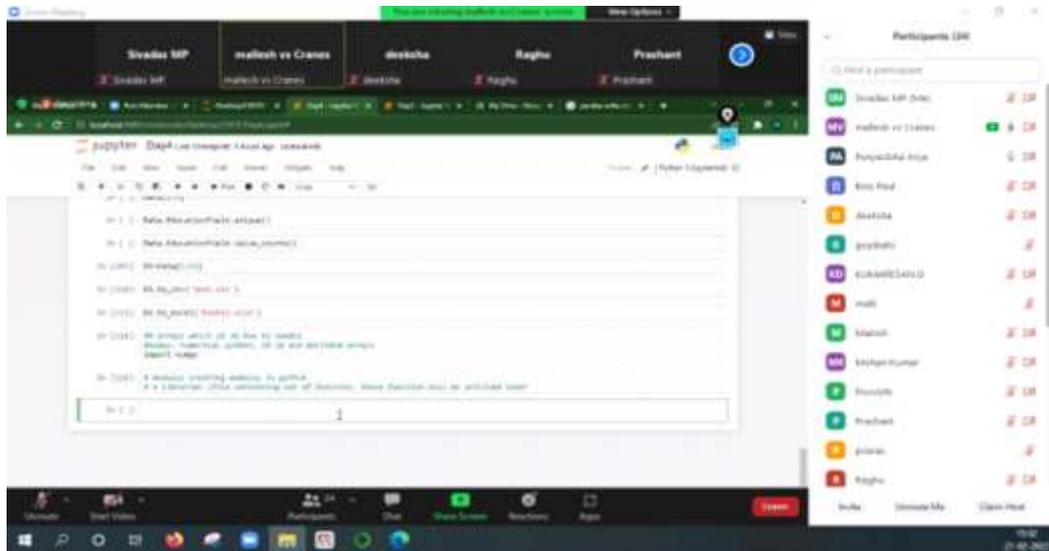
Sl. No	Type of Training for FY 2021-22	No. of Trainings conducted	Participants benefitted
1	Organizational training	7	222
2	Group specific training	13	75



*Training on Advanced Microsoft Excel conducted by C-DOT's in-house experts to staff members of C-DOT*



Training on 5G by Professor Kiran Kuchi, IIT Hyderabad.



### Knowledge Management Centre Bangalore

Library, Knowledge Management Centre at Bangalore has been established to provide latest scientific and technical information to support C-DOT research and development activities. It includes a rich collection of more than 12800 books (technical and Hindi books). It also subscribes periodicals, magazines and newspapers. Library stock verification for 2021-22 was completed. For the year 2021-2022 a total of 78 (21 technical books and 57 Hindi) new books were added to the library collections. Purchase of library books, magazines, Hindi books are governed by Library committee members

In FY 2021-22, Library infrastructure has been improved by providing air conditioning, cubicle partitioning and creating separate access path for staff.

### Apprenticeship 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 Apprenticeship Act, 1961. As per these guidelines C-DOT also takes apprentices (graduate, diploma and ITI) on yearly basis.

Category	On roll as on 31-3-2021	Period from 1st April 2021 - 31st March 2022				Present strength as on 31-03-22
		Inducted	Absent	Resigned	Completed	
Graduate	4	11	0	2	2	11
Diploma-Technical	0	01	0	0	0	01
ITI	0	0	0	0	0	0
<b>Total</b>	<b>4</b>	<b>12</b>	<b>0</b>	<b>2</b>	<b>2</b>	<b>12</b>

### Student internship

As per C-DOT's internship policy, KMG Bangalore engages students pursuing Bachelors and Masters Degrees enrolled in recognized University / Institution within India, as "Interns". The purpose of this scheme is to allow short term exposure of young academic talent to various Verticals / Divisions / Units within C-DOT and be associated with C-DOT's work for mutual benefit. Under this scheme, 12 students got benefitted in FY 21-22.

### C-DOT holds the following memberships:

Sl. No.	Membership	Membership Details
1.	All India Management Association (AIMA)	Institutional Membership since 1994
2.	Broadband India Forum, Internet Protocol Television Society (IPTV)	Corporate Membership since 2015
3.	Asia Pacific Network Information Centre (APNIC)	Associate Membership since 2005
4.	Current Science Association	Institutional Membership since 2016
5.	Delhi Management Association (DMA)	Patron Membership since 1996
6.	Electronic Industries Association of India (ELCINA)	Associate Membership since 2010
7.	European Telecommunication Standards Institute (ETSI)	Associate Membership since 1999
8.	Fiber To The Home (FTTH) Council	Silver Membership since 2010
9.	3GPP	Individual Membership through TSDSI since 2014
10.	India Electronics & Semiconductor Association (IESA)	Corporate Membership since 2013
11.	Institute of Directors (IOD)	Institutional Membership since 2015
12.	Institution of Electronics and Telecommunication Engineers (IETE)	Organizational Membership since 2010
13.	International Telecommunication Union (ITU)	Academia Membership since 2019
14.	ITU-APT Foundation of India	Institutional Membership since 2018
15.	National Association of Software and Service Companies (NASSCOM)	Associate Membership since 1996
16.	oneM2M	Individual Membership through TSDSI since 2014
17.	Open Networking Foundation (ONF)	Membership since September 2021
18.	O-RAN Alliance	Academic Membership since January 2022

Sl. No.	Membership	Membership Details
19.	PICMG	Associate Membership since 2015
20.	Telecom Equipment & Services Export Promotion Council (TEPC)	Corporate Membership since 2015
21.	Telecommunications Standards Development Society, India(TSDSI)	Institutional Membership since 2014
22.	VoICE	Membership since December 2021
23.	WiFi Alliance	Regular Membership since 2016
24.	Wireless Broadband Alliance	General Membership since 2016
25.	IEL and ACM	Institutional Membership since 2004
<b>Library Memberships</b>		
26.	American Centre	Organizational Membership
27.	British Council Library	Access 10 Membership
27.	Delnet (Developing Library Network)	Institutional Membership

## Campus Infrastructure

C-DOT having fully developed and integrated 40 acres of green campus at Mandi Road, New Delhi. C-DOT has achieved self-sufficiency to meet his water demand of 286 KLD through in house 4 Nos of Borewells duly approved by the Central Ground Water Authority. The rain water harvesting system in the C-DOT Campus is valuable resource for enriching ground water table of this area. C-DOT Campus having Sewerage Treatment Plant (STP) of capacity 125 KLD. No sewage or wastewater is permitted in the external municipal sewerage system and all the treated sewerage is recycled within the Campus for Horticulture purposes.

Under the Swachh Bharat Mission, C-DOT has installed the AAGA community composter as solution for managing the waste at source for all bulk waste generators. This process is completely organic, environmentally friendly as it requires no

electricity to operate, there is no mechanical procedure involved. It is very effective to handle the kitchen waste & horticulture residue to convert in compost and using it for Horticulture purpose in the Campus. The power supplied by BSES directly from the grid of 66 KVA. To achieve eco-friendly campus, 1.157 MWp Roof Top Solar (Solar RTS) System has been installed at C-DOT Delhi campus in partnership with Central Electronics Limited (CEL). These systems are installed for 600 KWp and 557 KWp at C-DOT Delhi and Bengaluru Campuses respectively and operating successfully. C-DOT Delhi campus has 3 no. of DG set each having capacity 1500kVA as a power backup. The DG sets are equipped with acoustic enclosure to minimize noise generation and adequate stack height for proper dispersion.

## Transfer of Technology

Technology Development and efficient Transfer of Technology results in building an 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' and 'Atma Nirbhar Bharat' initiatives 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 manufacturers with vital details about sources and specifications for the capital equipment and components.

C-DOT is closely working with various units of M/s ITI and with private manufacturing partners. These deployments

give a positive boost to building BharatNet which provides enabling infrastructure to the Government of India's 'Digital India' initiatives and to connect 6 Lakh villages of India. Efforts are on to include MSMEs and small private sectors to get engaged with C-DOT. ToT together with Marketing, Finance and Legal, is in the process of recovering pending ToT fee and Royalty.

C-DOT technology Manufacturing Partners including CPSUs, and more notably the Licensees from private sector like M/s Aggressive EMS, M/s PEL, M/s GOIP, M/s VVDN and M/s Surbhi are working closely with C-DOT in reaching out to non-Government segment of business for WiFi based products such as WiFi5 & WiFi6, STB, Optical products such as 4 Port OLTs and ONTs.

C-DOT Technologies / Products	C-DOT Licensees (ToTs Completed as on 31.03.2022)				
	PSUs(Govt.)	PSU Count	Private	Private Count	TOTAL
GPON Damini	BEL BLR, ITI RBL	2	SIS,SMCEL, UTL,VMC,HFCL	5	7
Bhavan Damini	BEL BLR, ITI RBL	2	SIS, VMC,UTL, HFCL	4	6
Daksh Damini	ITI RBL	1	HFCL, Tejas, RHPL, CYIENT, KAYNES HFCL	5	6
Mini OLT – 16 Port				1	1
6 slot OLT/Damini	BEL BLR, ITI RBL	2	VMC, UTL, HFCL	3	5
GPON OLT 5X	BEL BLR, ITI RBL	2	VMC, UTL, HFCL, SCTSPL,CYIENT, KAYNES	6	8
Chatur Damini &Titli Damak	ITI	--	HFCL, CYIENT, CSC, KAYNES	4	4
Titli Damak		1	Tejas, VMC	2	3
COLT (Joint Dev.) ONT 11 ONT 17, 17A, 23, 24 and 27	--	--	Tejas Tejas, CSC, KAYNES PEL, Surbhi, VVDN, GOIP	1 3 4	1 3 4
ATM	BEL BLR	1			1
MAX-NG	ECIL, IL-KOTA ITI-MKP, BEL-KOT	4	--	--	4
AN RAX	ECIL, IL-KOTA, ITI-BLR, BEL-KOT	4	--		4
256 P RAX/SBM (Extn)	KELTRON(2), ITI MKP, IL Kota	4	--	--	4
BBWT Basic	ECIL, ITI-MKP	2	HFCL, SCTSPL, COMINT, Tarangg (MSME)	4	6
BBWT Solar	ITI- MKP	1	COMINT, TARANGG	2	3
BBWT Long Range	ITI-MKP	1	COMINT, TARANGG	2	3
BBWT (SOLAR NEW )	ITI, BEL-KOT	2	Cyient, Elcom, KAYNES, Aggressive	4	6
BBWT( HSAP)	ITI, BEL-KOT	2	Cyient, Elcom, KAYNES, Aggressive	4	6
PDO Mini PDO	ITI	1	RCV LTD., KAYNES RCV	2 1	2 2

C-DOT Technologies / Products	C-DOT Licensees (ToTs Completed as on 31.03.2022)				
	PSUs(Govt.)	PSU Count	Private	Private Count	TOTAL
STBR /Extn. CRTR-210	BEL KOT, ECIL, ITI BLR BEL-KOT	4 1	HFCL	1	5 1
L2 Switch /Extn. Enhanced L2 Switch	BEL KOT BEL-KOT	2 1	HFCL	1	3 1
DRAX/Gyan Setu	ECIL ,ITI	2	--	--	2
NGSG Card	BEL BLR	1	--	--	1
GPSU (75W/125W) GPSU(250W)	ITI-Naini ITI-Naini	1 1	SCTSPL, Tarangg (MSME)	2	3 1
CGRAN	ITI-MKP	1		–	1
Power Amplifier	-		TPSED	1	1
STB C-CAS	-	-	Surbhi Rurutek	1 1	1 1
WAP	ITI	1	Aggressive-EMS	1	2
<b>35 Technologies</b>	<b>9 Licensees</b>	<b>47 ToTs</b>	<b>22 Licensees</b>	<b>65 ToTs</b>	<b>112 ToTs 31 Licensees</b>

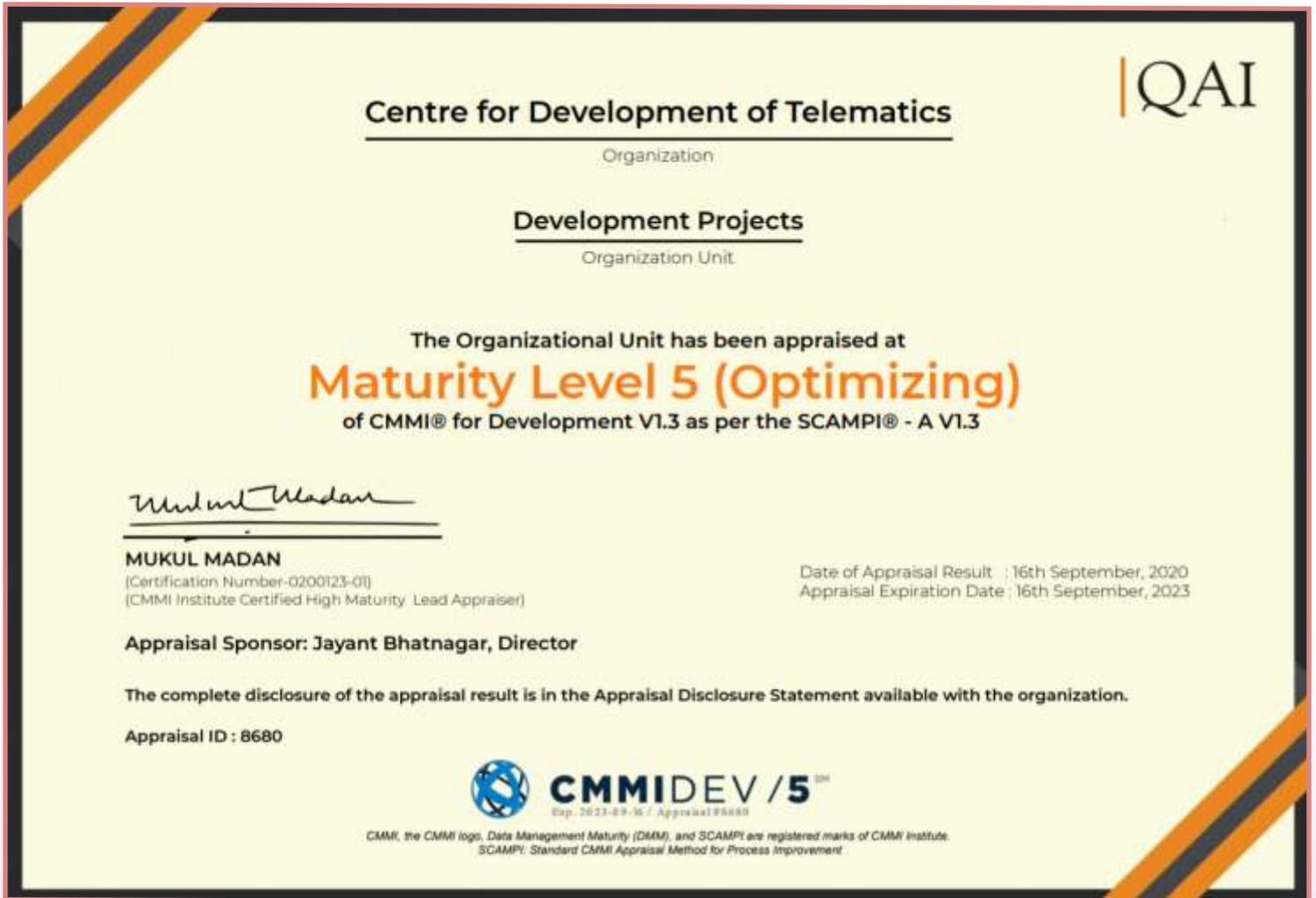
## Organizational Processes and Practices

### Organizational processes and practices for sustenance of CMMI Maturity Level 5

The organization was successfully appraised for CMMI Maturity Level 5 in 2014, for first time, and after expiry of validity period, successfully re-appraised in 2017, for its processes and practices related to hardware as well as software development projects.

During FY 2020-21, C-DoT has been appraised successfully for sustenance at CMMI Maturity level 5 – with validity till

16.09.2023. This is third time being successful in-a-row, since May-2014. Prior to this, Spot Checks by external assessor as preparations for a formal appraisal were done. Findings were resolved to have a formal appraisal (SCAMPI-B appraisal in July and final SCAMPI-A appraisal at CMMI level 5 in September 2020). Since then continuous improvement of process practices by updating C-DOT QMS and Internal Process audits are scheduled quarterly.



## Swachhta Action Plan

Under the initiative of Swachh Bharat Mission, C-DOT's main focus was to prevent the spread of Novel Corona virus. C-DOT had maintained a regular clean and hygienic environment within its campus for the safety of its staff. 70% alcohol based sanitizers were placed in every block to maintain health and hygiene of the staff. 2 OAK Mist Sanitizer Dispenser Machine were placed in the office premises for the above mentioned purpose. Staff desks were cleaned thrice during the office hours to maintain clean and hygienic environment within the C-DOT Premises.

## Vigilance Awareness Initiatives



*Integrity Pledge being administered by Dr. Pankaj Dalela, Director, C-DOT*

During the year 2021-22 a number of initiatives were undertaken to carry out our vigilance activities, primarily preventive Vigilance, as per the directives of CVC. Practices and procedures related to Operation and Maintenance for various services were reviewed and monitoring mechanisms were strengthened. Few pending disciplinary cases were reviewed and efforts were made to expedite their conclusion. Annual Property Return and intimation for acquiring movable/ immovable property are now filed regularly by the staff of C-DOT. Efforts are under progress to make the intimation of movable/ immovable property transaction and issue of acknowledgement completely on-line through internal MIS portal. To increase probity, weblink has been made available on C-DOT website to view Annual Immovable Property Return filed by C-DOT officials. Further, processing of Vigilance Clearance cases for resignation/ superannuation/ clearance of no dues/ promotions (lateral and vertical)/ foreign travel etc. have been made on-line and process has been improved further.

Integrity Pact has been implemented in C-DOT with the appointment of Independent External Monitor (IEM) and meetings with IEM are being held regularly. Moreover, most of the procurement is done either through Central Procurement Portal (CPP) or Government e-Marketplace (GeM)

Vigilance Awareness Week 2021 was observed enthusiastically in C-DOT (both at Delhi and Bengaluru campus) from 26th Oct to 1st Nov-2021. Integrity pledge was administered by Dr. Pankaj Kumar Dalela, Director, C-DOT. Various events like poster making, slogan and essay writing were organized during the week and winners were suitably awarded. Executive Director, C-DoT Dr. Rajkumar Upadhyay presided over the prize distribution function. The keynote address was delivered by Dr. S. K. Tapasvi, Professor of Public Management, Management Development Institute, Gurugram, Haryana, who was the Guest of Honour for the prize distribution function. Most of the employees of C-DOT have also taken integrity e-pledge.



## INDEPENDENT AUDITOR'S REPORT

### To the Members of the Board of Centre for Development of Telematics (C-DOT)

#### Opinion

We have audited the accompanying financial statements of **Centre for Development of Telematics (C-DOT)** a society registered under Societies Registration Act XXI 1860 bearing regn. no S/14839 of 1984 (**the society**), which comprises the Balance Sheet as at 31st March 2022 and the Income & Expenditure for the year ended on that date, and notes to the financial statements, including a summary of significant accounting policies.

In our opinion, the accompanying financial statements give a true and fair view of the financial position of the society as at March 31, 2022, and of its financial performance for the year ended on that date in accordance with the Accounting Standards issued by the Institute of Chartered Accountants of India (ICAI).

#### Basis for Opinion

We conducted our audit in accordance with the Standards on Auditing (SAs) issued by ICAI. Our responsibilities under those standards are further described in the Auditor's Responsibilities for the Audit of the Financial Statements Section of our Report. We are independent of the entity in accordance with the ethical requirements that are relevant to our audit of the financial statements, and we have fulfilled our other ethical responsibilities in accordance with these requirements. We believe that the audit evidence we have obtained is sufficient and appropriate to provide a basis for our opinion.

#### Emphasis of Matter

We draw attention to:

- Note 4(b)(i) of Schedule 14, that outstanding dues amounting to Rs. 3,286.85 lakhs included in Sundry debtors, due from one of the licensees, were to be adjusted by transfer of land and building at Bangalore unit. The status continues from the year 2004-05.
- Note 4(b) (i) of Schedule 14, that Sundry debtors of Rs. 15,033.75 lakhs, remain unconfirmed, and most of dues are from PSU's and Govt. Agencies, recovery of which are being under Synergy initiative of ministry, hence considered good.
- Note 5 of Schedule 13, that inventories of Bangalore comprises of spares etc. worth Rs. 7,051.44 Lakhs (out of total stock of Rs. 7,059.11) which are intended to be used for in-house research & development and are held till obsolescence of entire technology of project and valued at cost, and net realizable value is not considered as the sale of spares are not intended.
- Note 8 of Schedule 13, that revenue is recognized when it is not unreasonable to expect ultimate collection.

#### Responsibilities of Management and Those Charged with Governance for the Financial Statements

Management is responsible for the preparation and fair presentation of the financial statements in accordance with the aforesaid Accounting Standards, and for such internal control as management determines it necessary to enable the preparation of financial statements that are free from material misstatement, whether due to fraud or error.

In preparing the financial statements, management is responsible for assessing the society's ability to continue as a going concern, disclosing, as applicable, matters related to going concern and using the going concern basis of accounting unless management either intends to liquidate the society or to cease operations, or has no realistic alternative but to do so.

Those charged with governance are responsible for overseeing the society's financial reporting process.

## **Auditor's Responsibilities for the Audit of the Financial Statements**

Our objectives are to obtain reasonable assurance about whether the financial statements as a whole are free from material misstatement, whether due to fraud or error, and to issue an auditor's report that includes our opinion. Reasonable assurance is a high level of assurance but is not a guarantee that an audit conducted in accordance with SAs will always detect a material misstatement when it exists. Misstatements can arise from fraud or error and are considered material if, individually or in the aggregate, they could reasonably be expected to influence the economic decisions of users taken on the basis of these financial statements.

### **For Hingorani M. & Co.**

Chartered Accountants

Firm Reg. No. 006772N

Sd/-

**CA. Sanjay Kumar Narang**

Partner

Membership No. 090943

UDIN: 22090943AQLCNL9476

Place: New Delhi

Date: August 31, 2022

## BALANCE SHEET AS AT MARCH 31, 2022

(in Rupees)

Particulars	Schedule No.	2022	2021
<b>CORPUS/CAPITAL FUND AND LIABILITIES</b>			
Corpus/Capital fund	1	6,11,39,59,821.20	4,18,80,10,721.73
Current liabilities and provisions	2	2,24,70,23,325.59	1,59,39,26,429.82
<b>TOTAL</b>		<b>8,36,09,83,146.79</b>	<b>5,78,19,37,151.55</b>
<b>ASSETS</b>			
Fixed assets	3		
Gross block		6,96,19,14,739.06	6,86,07,83,833.05
Less :- Depreciation		6,12,20,72,951.26	5,94,32,92,010.75
Net block		<b>83,98,41,787.80</b>	<b>91,74,91,822.30</b>
Capital work-in-progress	4	72,46,064.50	72,46,064.50
Current assets, loans, advances and deposits	5	7,51,38,95,294.49	4,85,71,99,264.75
<b>TOTAL</b>		<b>8,36,09,83,146.79</b>	<b>5,78,19,37,151.55</b>
<b>Significant accounting policies</b>	<b>13</b>		
<b>Contingent liabilities and Notes on accounts</b>	<b>14</b>		

Schedules 1 -14 form an integral part of the Financial Statements.

As per our report of even date .  
For Hingorani M & Co.  
Chartered Accountants  
Firm Regn. No. 006772N

For and on behalf of  
Centre for Development Of Telematics

Sd/-  
(Sanjay Kumar Narang)  
Partner  
Membership No.090943

Sd/-  
(Sangeeta Abrol)  
Chief Finance Officer

Sd/-  
(Dr. Rajkumar Upadhyay)  
Executive Director

Place : New Delhi  
Date: August 31, 2022  
UDIN: 22090943AQLCNL9476

## INCOME AND EXPENDITURE ACCOUNT FOR THE YEAR ENDED MARCH 31, 2022

(in Rupees)

Particulars	Schedule No.	2022	2021
<b>INCOME</b>			
Income from TOT, Royalty, TSR/FSR & Publications	6	1,55,43,73,263.62	84,04,55,456.00
Interest earned	7	8,63,79,608.79	5,04,24,345.21
Other income	8	6,59,21,176.56	1,00,53,561.25
<b>TOTAL (A)</b>		<b>1,70,66,74,048.97</b>	<b>90,09,33,362.46</b>
<b>EXPENDITURE</b>			
Establishment expenses	9	2,97,98,67,423.18	2,36,48,03,290.69
Operational expenses	10	30,50,70,194.66	20,27,46,152.19
Other administrative expenses	11	32,43,95,836.35	32,81,26,517.29
Depreciation	3	17,90,91,320.12	19,90,37,303.09
<b>TOTAL (B)</b>		<b>3,78,84,24,774.31</b>	<b>3,09,47,13,263.26</b>
Excess of expenditure over income for the year [(B)-(A)]		2,08,17,50,725.34	2,19,37,79,900.80
Add/(Less) :- Adjustments pertaining to prior period items (Net)	12	(76,99,824.81)	(2,59,76,096.51)
<b>Balance being excess of expenditure over income</b>		<b>2,07,40,50,900.53</b>	<b>2,16,78,03,804.29</b>
Add :- Excess of expenditure over income of previous years		35,42,61,42,440.39	33,25,83,38,636.10
<b>Balance being deficit carried to Corpus / Capital fund</b>		<b>37,50,01,93,340.92</b>	<b>35,42,61,42,440.39</b>
<b>Significant Accounting Policies</b>	13		
<b>Contingent Liabilities and Notes on Accounts.</b>	14		

Schedules 1 -14 form an integral part of the Financial Statements.

As per our report of even date .  
For Hingorani M & Co.  
Chartered Accountants  
Firm Regn. No. 006772N

For and on behalf of  
Centre for Development Of Telematics

Sd/-  
(Sanjay Kumar Narang)  
Partner  
Membership No.090943

Sd/-  
(Sangeeta Abrol)  
Chief Finance Officer

Sd/-  
(Dr. Rajkumar Upadhyay)  
Executive Director

Place : New Delhi  
Date: August 31, 2022  
UDIN: 22090943AQLCNL9476

## SCHEDULE 1- CORPUS/CAPITAL FUND

(Forming part of the Balance Sheet as at March 31, 2022)

(in Rupees)

Particulars	2022		2021	
<b>Grants</b>				
(i) Grants from Department of Electronics & Information Technology (Formerly known as Department of Electronics)	33,52,00,000.00	33,52,00,000.00	33,52,00,000.00	33,52,00,000.00
(ii) Grants from Department of Telecommunication				
Balance at the beginning of the year	39,27,89,53,162.12		36,21,97,53,162.12	
Add:- Contributions towards corpus/capital fund during the year	4,00,00,00,000.00	43,27,89,53,162.12	3,05,92,00,000.00	39,27,89,53,162.12
<b>Total Grants (A)</b>		<b>43,61,41,53,162.12</b>		<b>39,61,41,53,162.12</b>
<b>Less :- Balance of net expenditure transferred from the Income and Expenditure account (B)</b>		<b>37,50,01,93,340.92</b>		<b>35,42,61,42,440.39</b>
<b>TOTAL (A-B)</b>		<b>6,11,39,59,821.20</b>		<b>4,18,80,10,721.73</b>

## SCHEDULE 2-CURRENT LIABILITIES AND PROVISIONS

(Forming part of the Balance Sheet as at March 31, 2022)

(in Rupees)

Particulars	2022	2021
<b>A. CURRENT LIABILITIES</b>		
1 Sundry Creditors		
a) For Goods	3,63,26,954.48	4,21,39,147.03
b) Others	31,74,84,663.72	20,23,01,639.66
2 Advances received for funded projects		
a) Prebilled invoices	7,11,55,786.00	9,20,26,399.00
b) Others	71,63,79,553.47	37,60,98,942.28
3 Statutory Liabilities	10,33,34,958.57	8,84,38,862.32
4 Other Current Liabilities	1,28,32,159.35	1,47,29,302.53
<b>Subtotal (A)</b>	<b>1,25,75,14,075.59</b>	<b>81,57,34,292.82</b>
<b>B. PROVISIONS</b>		
1 Gratuity	6,84,07,441.00	-
2 Earned leave	92,11,01,809.00	77,81,92,137.00
<b>Subtotal (B)</b>	<b>98,95,09,250.00</b>	<b>77,81,92,137.00</b>
<b>TOTAL (A+B)</b>	<b>2,24,70,23,325.59</b>	<b>1,59,39,26,429.82</b>

### SCHEDULE 3-FIXED ASSETS

(Forming part of the Balance Sheet as at March 31, 2022)

(in Rupees)

Particulars	Gross Block			Depreciation			Net Block	
	As at 01.04.2021	Additions	Adj./ Write-off	As at 31.03.2022	For the year	Adj./ Write-off	As at 31.03.2022	As at 31.03.2021
(A) Fixed Assets								
Land -Free Hold	12,00,00,000.00	-	-	12,00,00,000.00	-	-	12,00,00,000.00	12,00,00,000.00
Building-Office	57,01,80,967.65	-	-	57,01,80,967.65	1,06,27,418.80	47,45,34,198.46	9,56,46,769.19	10,62,74,187.99
Building-Residential	2,36,27,434.00	-	-	2,36,27,434.00	3,31,300.48	1,73,32,724.90	62,94,709.10	66,26,009.58
R & D Equipment	2,24,87,88,963.10	2,13,95,019.51		2,27,01,83,982.61	5,67,49,585.64	1,94,86,02,981.27	32,15,81,001.34	35,69,35,567.47
R & D Computers	3,03,37,01,942.37	7,31,46,482.44	(2,88,086.37)	3,10,65,60,338.44	9,00,73,955.53	(2,68,447.33)	13,51,11,099.30	15,20,58,211.43
Office Equipments & Appliances	39,09,67,464.10	10,59,081.20	(61,717.50)	39,19,64,827.80	68,37,815.01	(41,932.28)	3,85,21,587.65	4,43,20,106.68
Furniture & Fixtures	41,37,15,617.45	54,20,622.73		41,91,36,240.18	1,40,11,740.66	29,64,49,618.96	12,26,86,621.22	13,12,77,739.15
Library Books	5,98,01,444.38	4,59,504.00		6,02,60,948.38	4,59,504.00	6,02,60,948.38	-	-
Total	6,86,07,83,833.05	10,14,80,709.88	(3,49,803.87)	6,96,19,14,739.06	17,90,91,320.12	(3,10,379.61)	83,98,41,787.80	91,74,91,822.30
Previous years total	6,81,34,06,967.35	4,74,34,536.31	(57,670.61)	6,86,07,83,833.05	19,90,37,303.09	(54,818.30)	91,74,91,822.30	1,06,90,97,441.39
(B) Assets in transit							-	-

## SCHEDULE 4-CAPITAL WORK IN PROGRESS

(Forming part of the Balance Sheet as at March 31, 2022)

(in Rupees)

Particulars	As at 01.04.2021	Additions	Trf. to fixed assets	As at 31.03.2022
<b>Campus - Delhi</b>				
Campus - Residential Complex	72,46,064.50	-	-	72,46,064.50
<b>Total</b>	<b>72,46,064.50</b>	-	-	<b>72,46,064.50</b>
Previous Year Balance	72,46,064.50	-	-	72,46,064.50

## SCHEDULE 5-CURRENT ASSETS, LOANS, ADVANCES AND DEPOSITS

(Forming part of the Balance Sheet as at March 31, 2022)

(in Rupees)

Particulars	2022	2021
<b>A. CURRENT ASSETS</b>		
1 Inventories (as taken, valued and certified by the Management)		
a) Stores and spares	69,60,32,098.12	64,41,08,633.25
b) Inventory in transit	1,05,34,204.66	16,73,883.27
	<b>70,65,66,302.78</b>	<b>64,57,82,516.52</b>
2 Sundry debtors		
a) Debts outstanding for a period exceeding six months	1,16,31,48,411.51	1,27,10,23,736.97
b) Others	34,02,27,500.38	25,34,05,236.00
	<b>1,50,33,75,911.89</b>	<b>1,52,44,28,972.97</b>
Less:- Provision for bad & doubtful debts	7,31,95,771.00	1,89,37,915.00
	<b>1,43,01,80,140.89</b>	<b>1,50,54,91,057.97</b>
3 Bank Balances		
a) With Scheduled banks		
On Current Accounts	5,36,18,953.29	5,05,64,572.29
On Deposit Accounts	4,39,36,94,584.00	1,82,71,56,951.00
On Savings Accounts	54,46,89,365.99	50,40,63,097.62
	<b>4,99,20,02,903.28</b>	<b>2,38,17,84,620.91</b>
<b>Total (A)</b>	<b>7,12,87,49,346.95</b>	<b>4,53,30,58,195.40</b>
<b>B. LOANS &amp; ADVANCES</b>		
1 Staff Loans	<b>30,53,524.00</b>	<b>38,36,008.00</b>
2 Advances and other Amounts Recoverable in Cash or in Kind or for value to be received		
a) Contractors & Suppliers	8,33,86,963.80	5,91,13,197.39
b) Employees	11,67,504.39	1,03,49,672.24
c) Prepaid expenses	1,72,18,772.45	1,16,70,179.01
	<b>10,17,73,240.64</b>	<b>8,11,33,048.64</b>
3 Interest Accrued		
a) Staff Loan	2,74,118.75	4,35,829.34
b) On Bank Deposits	4,49,60,422.00	1,12,16,721.47
	<b>4,52,34,540.75</b>	<b>1,16,52,550.81</b>
4 Claims Receivable	<b>3,44,58,165.53</b>	<b>3,91,38,838.94</b>
5 Tax deducted at source	<b>10,57,78,245.53</b>	<b>10,93,91,508.20</b>
6 Input Tax Credit	<b>8,51,45,670.09</b>	<b>6,95,15,341.76</b>
<b>Total (B)</b>	<b>37,54,43,386.54</b>	<b>31,46,67,296.35</b>
<b>C. DEPOSITS</b>		
1 Office Building	40,500.00	40,500.00
2 Others	96,62,061.00	94,33,273.00
<b>Total (C)</b>	<b>97,02,561.00</b>	<b>94,73,773.00</b>
<b>TOTAL (A+B+C)</b>	<b>7,51,38,95,294.49</b>	<b>4,85,71,99,264.75</b>

## SCHEDULE 6-INCOME FROM TOT, ROYALTY, TSR/FSR & PUBLICATIONS

(Forming part of the Income & Expenditure Account for the year ended March 31, 2022)

(in Rupees)

Particulars	2022	2021
1) Income from Royalty	29,10,696.00	35,07,027.00
2) Income from Transfer of Technology (TOT)	8,00,000.00	34,50,000.00
3) Technology/Field support receipts (TSR/FSR)	1,55,06,48,567.62	83,34,69,429.00
4) Income from Publications	14,000.00	29,000.00
<b>TOTAL</b>	<b>1,55,43,73,263.62</b>	<b>84,04,55,456.00</b>

## SCHEDULE 7-INTEREST EARNED

(Forming part of the Income & Expenditure Account for the year ended March 31, 2022)

(in Rupees)

Particulars	2022	2021
1) On term deposits with Scheduled Banks	7,40,60,966.00	3,36,27,868.01
2) On savings accounts with Scheduled Banks	53,94,802.53	26,88,076.66
3) On loans to employees	3,58,523.41	4,19,284.34
4) Others	65,65,316.85	1,36,89,116.20
<b>TOTAL</b>	<b>8,63,79,608.79</b>	<b>5,04,24,345.21</b>

## SCHEDULE 8-OTHER INCOME

(Forming part of the Income & Expenditure Account for the year ended March 31, 2022)

(in Rupees)

Particulars	2022	2021
1) Gain due to foreign exchange translation	4,85,818.74	10,90,955.08
2) Miscellaneous income	6,52,85,583.86	89,62,606.17
3) Profit on sale/disposal of assets	1,49,773.96	-
<b>TOTAL</b>	<b>6,59,21,176.56</b>	<b>1,00,53,561.25</b>

## SCHEDULE 9-ESTABLISHMENT EXPENSES

(Forming part of the Income & Expenditure Account for the year ended March 31, 2022)

(in Rupees)

Particulars	2022	2021
a) Salaries and wages	2,23,72,75,772.00	1,92,02,84,638.00
b) Contributions to provident fund	25,24,75,379.64	17,11,30,068.00
c) Contributions to other fund	1,20,51,893.00	1,24,17,016.00
d) Gratuity provided for employees	7,84,07,441.00	-
e) Leave liability provided for employees	14,22,56,066.00	2,32,94,050.00
f) Staff welfare expenses	25,41,62,061.54	23,62,13,762.69
g) Recruitment and training expenses	32,38,810.00	14,63,756.00
<b>TOTAL</b>	<b>2,97,98,67,423.18</b>	<b>2,36,48,03,290.69</b>

## SCHEDULE 10-OPERATIONAL EXPENSES

(Forming part of the Income & Expenditure Account for the year ended March 31, 2022)

(in Rupees)

Particulars	2022	2021
a) R&D components & consumables	9,37,94,198.11	7,15,16,672.17
b) Freight & forwarding charges	67,45,400.61	34,66,552.95
c) Liquidated Damages Expenses	-	1,33,000.00
d) Repair & maintenance - R&D/office equipments	6,85,96,917.42	5,34,48,117.46
e) Design, development & technology support expenses	11,81,02,152.83	5,91,26,738.61
f) Technical, Apprentice & Consultancy expenses	1,51,16,295.69	1,32,70,021.00
g) Testing charges	27,15,230.00	17,85,050.00
<b>TOTAL</b>	<b>30,50,70,194.66</b>	<b>20,27,46,152.19</b>

## SCHEDULE 11-OTHER ADMINISTRATIVE EXPENSES

(Forming part of the Income & Expenditure Account for the year ended March 31, 2022)

(in Rupees)

Particulars	2022		2021	
a) Travelling and conveyance expenses		1,52,93,522.55		52,74,407.21
b) Vehicle hire charges		30,45,250.55		14,96,844.36
c) Rent, rates & taxes		36,90,568.00		59,18,506.00
d) Interest/ penalty paid		13,359.64		3,12,345.94
e) Electricity & water charges		10,23,79,541.80		9,59,79,047.63
f) Repair & maintenance - Others		9,01,26,273.07		8,78,18,599.44
g) Newspaper , periodicals & journals		81,27,338.89		74,80,237.79
h) Insurance charges		17,08,928.48		17,52,574.37
i) Printing, stationery, photocopy & admin consumables		91,74,342.48		1,00,55,027.36
j) Postage, telephone and communication charges.		1,21,29,936.84		1,47,00,052.16
k) Exhibition, advertisement & publicity expenses		37,72,320.48		12,60,439.50
l) Conference/ seminar/ membership fees		45,38,371.96		46,48,403.76
m) Legal, professional fees & honorarium		1,01,33,964.89		1,32,93,952.91
n) Patent fees		37,84,246.00		40,21,448.00
o) Remuneration to auditors				
Audit fees	6,50,000.00		4,00,000.00	
Out of pocket expenses	65,678.00	7,15,678.00	40,500.00	4,40,500.00
p) Hospitality/ entertainment expenses		2,88,872.30		18,713.96
q) Bank charges		6,47,258.11		3,88,908.05
r) Loss due to foreign exchange translation		5,65,898.73		5,04,438.91
s) Miscellaneous expenses.		530.36		1,46,975.94
t) Loss on disposal of assets		1,777.22		-
u) Bad debts & provision for doubtful debts		5,42,57,856.00		7,26,15,094.00
<b>TOTAL</b>		<b>32,43,95,836.35</b>		<b>32,81,26,517.29</b>

## SCHEDULE 12-ADJUSTMENTS PERTAINING TO PRIOR PERIOD ITEMS (NET)

(Forming part of the Income & Expenditure Account for the year ended March 31, 2022)

(in Rupees)

Particulars	2022		2021	
	Debit	Credit	Debit	Credit
<b>INCOME</b>				
Income from TOT, Royalty, TSR/FSR & Publications	-	51,66,062.00	65,13,600.00	-
Interest earned	-	80,330.00	-	-
Other income	-	-	-	3,000.00
<b>EXPENDITURE</b>				
Establishment expenses	3,51,209.00	-	-	6,97,088.49
Operational expenses	-	49,38,220.63	-	3,59,10,382.25
Other administrative expenses	21,33,578.82	-	41,21,224.23	-
Depreciation		-		450.00
<b>TOTAL</b>	<b>24,84,787.82</b>	<b>1,01,84,612.63</b>	<b>1,06,34,824.23</b>	<b>3,66,10,920.74</b>
<b>NET TOTAL</b>	<b>(76,99,824.81)</b>		<b>(2,59,76,096.51)</b>	

## SCHEDULE 13:-SIGNIFICANT ACCOUNTING POLICIES

(Forming part of the financial statements for the year ended March 31, 2022)

### 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 economic benefits from the existing asset beyond its previously assessed standard of performance.
- e) The Management conducts physical verification of fixed assets at the year end and its reconciliation with financial records. Such exercise is undertaken, taking into account the nature /size of activities of the Centre.

### 4. Depreciation

- a) The provisions of Appendix I to the Income Tax Rules, 1962(The Rules), as amended from time to time, are applied with the exceptions indicated below

- i. Assets put to use anytime during the year are depreciated at the full rate prescribed by the Rules.
- ii. Library books purchased during the year are depreciated fully in the same year.
- iii. Assets, which are sold or discarded or lost or disposed off during the year, do not suffer depreciation for that year.

### 5. Inventory Valuation

- a) Stores and Spares (including machinery spares) are valued at cost. The cost is calculated on weighted average method. Cost comprises expenditure incurred in the normal course of business in bringing such inventories to its present location. Such costs are measured at five percent of the value towards freight, forwarding and customs duty charges, wherever applicable. Further,
- i. Stores and spares lying in stock are intended to be used in in-house Research & Development.
- ii. Sale of spares is not intended, in general. However, obsolete spares are scrapped and sold with the approval of the competent authority.
- iii. The spares are acquired at different times for a particular project as they may be needed till the complete obsolescence of the entire technology used for the project.
- iv. Since, the stores and spares are not intended to be traded, valuation of the same at Net Realisable Value is not considered practical as the same would be contrary to their nature and the valuation, therefore, is done as stated above.
- 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 income in relation to these, are accounted for as income, 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 under current liabilities in the balance sheet.
- 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.
- c) Revenue & expenses are accrued as and when they are earned / incurred and recorded in the financial statements of the periods to which they relate.

#### **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) Provident Fund contributions are in the nature of defined contribution scheme. The Centre accounts for the monthly contributions towards Provident Fund which is mainly administered through duly constituted and approved Exempted Trust.
- b) 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.
- c) Provisions for compensated absences are accounted for based on actuarial valuation using the projected unit credit method at the year end.

#### **11. Adjustments pertaining to earlier years**

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

#### **12. Provisions and Contingent Liabilities**

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

## SCHEDULE 14:-NOTES ON ACCOUNTS

(Forming part of financial statements for the year ended March 31, 2022)

### PART –A: Balance Sheet

#### 1. Fixed Assets

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

#### 2. Capital work-in-progress

- It represents cumulative expenditure, incurred since the financial year 2008-09, on proposed housing facility within the C-dot Campus at New Delhi, amounting to Rs. 72.46 lakhs as at 31.03.2022 (Previous year- Rs.72.46 lakhs).
- This expenditure under this head will be capitalized appropriately under “Fixed Assets”, upon completion of the housing facility.

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

- C-DOT Alcatel Lucent Research Centre (CARC) Private Limited is a joint venture company engaged in Research & Development in the field of telecommunications. The Centre's equity participation in the joint venture is Rs.5,200 lakhs.
- The net worth of the said company is fully eroded as the company has accumulated losses. Hence, a provision against the said investment was earlier made under the head “Provision for Bad and Doubtful Investments” amounting to Rs. 5,200 lakhs in previous years. Now, pursuant to the approval of winding up of the Joint Venture by Cabinet vide Cabinet note dated 08-08-2022, said investment and provision has been written off in the books of accounts of the Centre. Liquidation proceeds received (if any), shall be remitted to the Consolidated fund of India.

#### 4. Current Assets, Loans, Advances and Deposits

- Inventories: -

The value of components, which were purchased in past years, issued to the indenters 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. 140.65 Lakhs (Previous year- Rs.234.95 lakhs).

- Sundry Debtors amounting to Rs. 15,033.76 Lakhs as at 31.03.2022 (Previous year Rs.15,244.29 lakhs) includes:-

- TOT, Royalty & Technology support dues amounting to Rs.3286.85 lakhs as at 31.03.2022 (Previous year- Rs.3283.05 lakhs) from one of the licensees is met by the value of land and building at Bangalore belonging to that licensee which was taken over by the Centre in the year 2005.

Awaiting decision of the Nodal Ministry regarding valuation and transfer of ownership of Land and Building at Bangalore from the particular licensee, the amount is yet to be settled.

- Dues for technology/field support/other services rendered to Telecom companies amounts to Rs. 7,751.56 lakhs as at 31.03.2022 (Previous year- Rs.8,232.09 lakhs). Letters for obtaining confirmation of the amount recoverable are sent to the respective parties. However, in majority of the cases the confirmations are not received back. Most of the recoverable amounts are due from Public sector undertakings and Government organizations. The dues have been taken up for realization during the synergy initiative by Nodal ministry. Pending finalization of such proceedings the management considers the said dues as good for recovery.
- Provision for Bad & doubtful debts amounting to Rs. 542.58 lakhs (Previous year- Nil) towards Technical support dues has been made during the current year. Further, Provision for Bad & doubtful debts made during earlier years amounting to Rs.189.38 lakhs towards TOT & Royalty dues of M/s PCL has been retained due to ongoing arbitration proceedings. Accumulated provision as at 31.03.2022 is Rs.731.96 lakhs (Previous year - Rs.189.38 lakhs).

- Loan to C-DOT Alcatel Lucent Research Centre (CARC) Private Limited:-

The aggregate of loans given to C-DOT Alcatel Lucent Research Centre (CARC) Private Limited in previous years amounts to Rs. 1845.79 lakhs. The said company has accumulated losses and its net worth has fully eroded. Hence, a provision against the said loan was earlier made under the head “Provision for Bad and Doubtful Loan” amounting to Rs.1845.79 lakhs in the

previous years. Aggregate of loans after providing for bad and doubtful loans as at 31.03.2022 is Nil (Previous year- Nil). Pursuant to the approval of winding up of the Joint Venture as specified in Note 3 (b), loan and provision has been written off in the books of accounts of the Centre.

d. Interest Accrued on loan to CARC Private Limited:-

Interest accrued on loan given to C-DOT Alcatel Lucent Research Centre (CARC) Private Limited as at 31-03-2022 is Rs.598.58 lakhs (same as previous year). From the Financial Year 2011-12, the said company defaulted in paying the interest. The said company has accumulated losses and its net worth has fully eroded. Hence, a provision against the said interest was earlier made under the head "Provision for Bad and Doubtful Debts" amounting to Rs.598.58 lakhs. Aggregate of interest accrued after providing for bad and doubtful debts as at 31.03.2022 is Nil (Previous year- Nil). Pursuant to the approval of winding up of the Joint Venture as specified in Note 3 (b), loan and provision has been written off in the books of accounts of the Centre.

e. Tax Deducted at Source:-

Tax deducted at source receivable pertaining to various years, amount to Rs.1057.78 lakhs as at 31.03.2022 (Previous year- Rs.1093.91 lakhs) is considered good for recovery.

## 5. Contingent Liability

On account of pending legal cases, the amount outstanding is Rs.782.55 lakhs as at 31.03.2022 (Previous year- Rs.861.61 lakhs).

## 6. Capital Commitments

Capital commitments as at 31.03.2022 amounts to Rs.968.65lakhs (Previous year Rs.941.64 lakhs).

## PART – B: Income & Expenditure Account

### a. Employees' Benefits

i. Gratuity

Net provision made towards Gratuity, using the Actuarial valuation method, based on existing pay and allowances is Rs.684.07 lakhs (Previous year- Nil). The Gratuity Trust,

which is managed by a separate Board of Trustees comprising of employees of the Centre, is responsible to discharge the liability on this account.

ii. Earned Leave (EL)

As per Rules of the Centre, Earned Leave is encashable by serving employees as well as by those leaving the services, either on superannuation or otherwise. Net expenditure recognized in Income & Expenditure account towards leave liability, based on existing pay and allowances, estimated using actuarial valuation method is Rs.1422.56 lakhs (Previous year- Rs.232.94 lakhs). Accumulated provision as at 31.03.2022 is Rs.9211.02 lakhs (Previous year- Rs. 7781.92 lakhs).

### b. Consumption of Components:

i. As per the practice followed consistently, value of consumption is arrived at by reducing the value of closing stock from the aggregate of the values of opening stock and the purchases made during the year.

ii. Accordingly, the value of components consumed during the current year was Rs. 937.94 Lakhs (Previous year- Rs. 715.17 Lakhs).

### c. Foreign Exchange Fluctuations:

i. The net result out of gains & losses due to fluctuations in Foreign Exchange on account of various transactions during the current year is a loss of Rs. 0.80 Lakhs (Previous year gain - Rs. 5.86 Lakhs).

ii. The gains and losses on account of foreign exchange fluctuations are disclosed in Schedule 8 and 11 respectively.

### d. Adjustments Pertaining to earlier years (Net)

It includes income of Rs. 52.46 lakhs (Previous year Rs. (-) 65.11 lakhs) and expenditure of Rs. (-) 24.53 lakhs (Previous year Rs. (-) 324.87 lakhs).

## PART – C: General

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

Sd/-  
Sangeeta Abrol  
Chief Finance Officer

Sd/-  
Dr. Rajkumar Upadhyay  
Executive Director

## Acronyms

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

### **Our Bankers**

#### **Canara Bank**

C-DOT Campus, Mehrauli  
New Delhi-110 030

#### **Canara Bank**

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

#### **Canara Bank**

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

#### **Central Bank of India**

Sona Towers, 71/1, Millers Road  
Bengaluru-560 052

### **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

### **Our Statutory Auditors**

#### **Hingorani M. & Co.**

Chartered Accountants  
35, Netaji Subhash Marg, Darya Ganj  
New Delhi -110 002



सी-डॉट  
C-DOT

## Centre for Development of Telematics

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