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C-DOT

ANNUAL REPORT
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MAKE IN INDIA

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.

CEO's Message

Centre for Development of Telematics (C-DOT), established in 1984 is a premier R&D center of the Department of Telecommunications, Ministry of Communications, Government of India. 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.

During the year 2022-23, C-DOT completed the successful trials of indigenous 4G Core in BSNL commercial network at Chandigarh and Ambala, which resulted in TCS led consortium of C-DOT and Tejas Networks getting commercial order for Pan-India deployment of 4G upgradable to 5G in BSNL's network. C-DOT's 4G RAN/eNodeB technology also received TEC certification. The indigenous 5G Non-Stand Alone (5G NSA) Core developed by C-DOT and deployed at BSNL Chandigarh was successfully launched at IMC 2022 by Honorable Prime Minister of India.

In the area of cyber security, indigenous traffic probes were installed at gateways for generating real time alerts and securing country's infrastructure from malicious attacks. C-DOT's secured Quantum Key Distribution (QKD) and Post Quantum Cryptography (PQC) solution saw deployment in the network with public participation to hack the systems with an award of Rs 10 lakh per breach. In Disaster Management, NDMA project for early warning platform for disaster was operationalized in all 36 states and integrated with various alert generating agencies. Billions of messages have been sent through this platform during disasters during 2022-23. For the benefits of common man, www.sancharsaathi.gov.in portal developed by C-DOT was launched by the government that enables blocking and tracing lost/stolen mobiles across mobile networks and lets a subscriber know connections working in his/her name. Apart from some of the technologies above mentioned, many other solutions have been designed, developed and deployed in the field. The details of all the solutions have been briefly mentioned in the Annual report.

It is also worth mentioning that C-DOT took a step ahead in Collaborative Research and launched its collaborative development program CCRP (C-DOT Collaborative research program) for joint R&D with Indian telecom Industry, Academia and Startups. Under CCRP Indian Collaborative two consortiums were funded for development of 5G RAN. Centre of Innovation (COI) and Entrepreneurship Cell were launched by Hon'ble Minister of Communications at C-DOT Delhi. C-DOT has also been fulfilling the role of the implementing agency of USOF's TTDF (Telecom Technology Development Fund) program. The year 2022-23 has also saw our revenue jump from Rs 170 Cr in FY 2021-22 to Rs 259 Cr in FY 2022-23. During the year we received the "Telecom Person of the Year" award in the "22nd Voice & Data Telecom Leadership Award 2022" for Made-in-India 4G technology solution, and two ELCINA Defennovation Awards for Excellence in R&D for Quantum Key Distribution (QKD) and for Excellence in Indigenization for SAMVAD, QKD and BBWT.

I look forward to the year ahead in continuing our journey in an accelerated manner to fulfill the dream of becoming self-reliant in the telecommunication sector.

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Dr Rajkumar Upadhyay,
Chief Executive Officer

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CONTENT

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

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

Secretary, MeitY

Member (In charge - C-DOT), DCC

Member (Finance), DCC

CMD, BSNL

Chief Executive Officer, C-DOT

Directors, C-DOT

Steering Committee

Chairman
Chairmain, 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

Chief Executive Officer, C-DOT

Directors, C-DOT

Project Board

Chairman
Dr. Rajkumar Upadhyay
Chief Executive Officer, C-DOT

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

Shikha Srivastava
Director-II, C-DOT

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Director-III, C-DOT

Overview

Centre for Development of Telematics (C-DOT) was established in 1984 as an autonomous Telecom R&D centre of the Department of Telecommunications (DoT), Ministry of Communications, Government of India. Its R&D endeavours are aimed at meeting the Telecom requirements of the nation with key focus on rural connectivity and emerging dynamics of security and strategic communications landscape.

C-DOT has been in the technology forefront building indigenous capabilities in the design, development & production of cost-effective telecom technologies and innovative solutions. C-DOT, over the years, has continued to reorient its indigenous R&D initiatives as per the overarching objectives of national development and global telecom trends resulting into a diverse product portfolio spanning 4G/5G, Switching, Optical, Wireless, Quantum Communication, Security, Network Management Solution and host of Telecom Software applications based on Disaster management, Secure Chat and Call, M2M/IoT, AI, etc.

C-DOT has successfully executed various projects of national & strategic importance that have played a pivotal role in achieving self-reliance, reducing dependence upon technology imports, boosting entrepreneurship, augmenting Intellectual Property (IP) assets and creating an ecosystem for indigenous Telecom manufacturing. C-DOT solutions caters to multiple industry stakeholders including System Integrators, Component Manufacturers, TSPs, ISPs, etc. for proliferation of indigenous solutions.

C-DOT has made significant contributions towards several flagship missions of the Government of India viz. "Digital India", "Make in India", "Skill India" and "Smart Cities". C-DOT has been steadfast in its commitment towards building an "Aatmanirbhar Bharat" as envisioned by the Hon'ble Prime Minister.

Accomplishments and Activities

1. Key Project Achievements

- **5G Non Standalone (NSA) Core** was successfully launched at IMC 2022 by Honorable Prime Minister of India at Pragati Maidan on 1st October 2022. 5G and E-health use cases were demonstrated using Remote patient cataract diagnosis portal and vital health parameters including ECG, BP, and temperature were shown to be monitored. It has been successfully integrated with indigenous RAN developed in collaboration with WiSig and VVDN.

- **4G Converged CORE -** 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. Load of 10 million subscribers at Ambala PoC site was successfully demonstrated in BSNL network.

- **4GRAN -** ToT agreement was signed for 4G RAN with ITI for making pilot systems. Initial prototypes of C-DOT RAN technology are being manufactured by ITI. TEC testing of C-DOT eNodeB (Band 28) completed.

- **NDMA CAP -** The system has been operationalized in all 36 States & UTs for location based SMS services, and integrated with Alert Generating Agencies (IMD, CWC, INCOIS, DGRE). 200 Crore location-specific SMSs were disseminated during cyclone Sitrang, Assam and Gujarat floods and for Lightning alerts in Bihar.

- **QKD -** C-DOT has completed the development of QKD solution which can coexist on existing data carrying fibers (i.e. doesn't require dark fiber for QKD's Quantum or Classical channels). Design and development of MDI-QKD has been started. Approval for partial funding was received from NSCS in December 2022. C-DOT designed QKD solution has been commissioned between Sanchar Bhawan and NIC Headquarters in February 2023 and the data traffic between these two sites is being encrypted by C-DOT's router (co-located with the QKD equipment at each site) using keys generated by the QKD system.

- **TSOC (Telecom Security Operation Centre) -** Additional 10 C-DOT's 200 G probes (out of total 120) were commissioned at ISP sites and were integrated with TSOCs central system. A total of 38 ISP Gateways have been covered till date. C-DOT successfully developed 400G IPFIX probe and tested it successfully in the field. Dashboard for organizational level monitoring was also made available.

- **PM-WANI Central Registry** has been enabled with 17 regional languages now. PM-WANI hotspots are now shown on the MAP on the main page of Central Registry. Complete BSNL Wi-Fi network as well as Railtel network were successfully migrated to PM-WANI by deployment of WANI token handler.

- **PM-WANI Service Delivery Platform -** C-DOT has enabled 82 PDOAs and 77 APP providers on C-DOT developed "WANI as a Service" (WaaS) stack. Migration of BBNL WiFi deployment was done in cluster of villages in Akola to PMWANI configuration.

- **Samvad** a secured Chat and Call solution, was enhanced with several new security features. It received 12th edition of AGBA awards on February 25, 2022. The solution has been hosted and offered to many Government organizations like DoT, Prasar Bharati, DRDO, MHA, NSCS, CSIR, SPG, Delhi Police, MP Police, Income Tax Department etc. on trial basis. We initiated SAG certification was initiated. Samvad in a box solution was also tested.

- **Wayfinder** web client was integrated with Zoho backbench App for IMC event. Visual positioning system based indoor navigation and positioning system using AI

based algorithm is accomplished. The solution was successfully commissioned at UNOG, Geneva, Switzerland.

● **Face recognition solution** was deployed successfully in TCIL on commercial basis. Intrusion detection and PPEKit Compliance safety solution with online dashboard and alerts are now live in NCRTC.

● **Video Conferencing solution** has been hosted and is being used by various Government departments / organizations including India Post, Railways, Prasar Bharti, DoT, TSDSI and IITs. PoC of CDOTmeet was done successfully with other govt. agencies.

● **Quantum Safe Cryptography** 80Mbps Quantum-safe IP encryptor developed and its 3rd party security evaluation is in final stage. Software for 1Gbps PQC IP Encryptor is ready and tested on reference boards. Lab prototype of Quantum-safe smart Video IP Phone has been developed and has been offered for 3rd party Security Evaluation.

● **XGS PON -** XGS-PON 4 Port Mini-OLT Technology Approval accorded by TEC. C-DOT has received PO from RailTel for 100,000 GPON/EPON ONTs. The same will be supplied by C-DOT ToT partners.

● **CEIR -** Renewal of annual security audit on CEIR and ICDR web-portal and mobile apps has been initiated. POC is 60% complete for various LSAs for fraud detection using C-DOT tools like Image matching and SDR data analysis. ICDR for local manufactures was launched from 1 Jan 2023. Updation of SDRS application in Karnataka and six North-East states was completed. Joint DPR for CEIR and DIU was also submitted to DoT on 11 May, 2022.

● **Indigenous WiFi -** Development of indigenous Wi-Fi-6 Access Point and low cost Wi-Fi-5 Access Point for PMWANI segment was completed. Wi-Fi 6 AP was deployed in Ganpati Univ. for POC in Aug-2022. Wi-Fi Access points were deployed in Indian Navy & CSCs. Pan-Navy deployment activity was 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. Wi-Fi-5 has been deployed in Kamthana Panchayat at Bidar, Karnataka as part of eSiksha imparting Digital Classes at Government High School.

The TEC Technology Type Approval testing for Dualband Outdoor Accesspoint (DOA) Wi-Fi-5 product is completed successfully and the certificate is expected by mid July 2023.

● **M2M/IoT Ecosystem** - Centre of Innovation for (COI) for IoT/M2M was setup and was formally launched by Sh. Ashwini Vaishnaw, Hon'ble Minister of Communications on 23rd Nov, 2022. 47 Industry partners/Startups have been registered with COI. MoU was signed with Vodafone Idea.

● **Broadcast & Converged Solutions:** Field trial of Broadcast to Broadband (BBG) for LiveTV services successfully completed in Varanasi and the solution is formally inagurated by Honourable Minister of State for Communications, Government. of India, Sri Devusinh Chauhanji on 20th May, 2023 in Varanasi. MoU Signed-by C-DOT with Prasarbharati and M/S MCBS on Broadcast & Converged solutions.

The progress made in major technology programs

1.1 Next Generation Mobile technologies

◆ **5G-CORE -** 5G-CORE - 5G Non-Stand Alone (NSA) Core was successfully launched in IMC 2022 by Hon'ble PM of India.

5G SA Core development is ongoing. This core is being modified towards making it carrier grade.

CDOT-VVDN-WISIG 5G NSA RAN is under development for integration and being tested at C-DOT labs. Integration is expected to be complete by June 2023.

◆ **5G-RAN (Radio Access Network)** –MOU has been signed with IITM for collaborative development of 5GRAN and supply of gNodeB systems. 3 units of gNodeB Systems will be supplied by IITM. Two proposals of 5G RAN development in collaboration with the industry are in advance stage of approval. Development of accelerator card for 5G is under progress.

◆ **4G CORE-** 4G PoC was being conducted at two sites Chandigarh and Ambala in the BSNL. PoC was formally completed on 20 Oct 2022. Load stability of 10 million subscribers load at Ambala POC site was successfully demonstrated. Rollout of 200 eNodeB will start in BSNL network with PoC Chandigarh core network site. Regarding 4G Core PoC for Railways, the 4G Core and MCX (Mission Critical Applications) are successfully installed at Secunderabad. PoC is expected to be completed by March 2023. Remote testing of Kavach Application Server was completed.

◆ **4G-RAN** – Development of 4G RAN in various Band (1, 3, 8, 28, 40, and 41) is being done and is under various stages of development. ToT for multiple bands has been executed with ITI. The initial prototypes of C-DOT RAN technology manufactured by ITI is expected in February 2023. ToT agreements for 4G RAN are also being perused with BEL, L&T, Vista-ISPL, ECIL and VVDN.

DTR Testing of C-DOT RAN with BSNL Chandigarh PoC Core for TEC/BSNL is currently being done at two sites. Band -28(700MHz, 40W) at C-DOT Banglore campus and Band-3 (1800MHz, 20W) at C-DOT Delhi campus using BSNL provided links.

1.2. Carrier networks transport technologies

◆ **Packet Optical Transport Platform (POTP)** –1.6T POTP Development has been completed. Internal Validation of 1.6 Tbps POTP system completed with Partial Configuration (3 nodes with 4 Lambda). For 4.8T System, Development of Hardware of Line Interface Module, Client interface Module, Fabric Interface Module is complete. 9.6T Architecture has been completed and hardware development of Fabric Card, Backplane is in-progress. MoU has been signed with PEL (Priyaraja Electronics Limited) for collaborative market proliferation.

◆ **XGS-PON (10-Gbps Symmetrical Passive Optical Network) -** Multiple variants of XGS-PON equipment (OLT/ONT) have been developed for various use-cases (Chassis based OLT, 4 Port Mini-OLT, XGS-ONT, XGS-ONT-R, XGS-ONT with 802.11ac WiFi). The technology approval Certification for XGS-PON 4 Port Mini-OLT has been completed by TEC. PO received from RailTel for 100,000 GPON/EPON ONTs. PO awarded to C-DOT's ToT partners for supplying ONTs. Supply to commence soon.

1.3. CoE (Centre of Excellence) for Lawful Interception

◆ **Samvad -** SAMVAD solution has been hosted and offered to many Government organizations like DoT, Prasar Bharati, DRDO, MHA, NSCS, CSIR, SPG, Delhi Police, MP Police, Income Tax Department etc. on trial basis. Samvad has been working successfully in two strategic agencies for more than 3 years and is in process of implementation in SPG. PO has been received from SPG for Samvad deployment. C-DOT has initiated SAG certification process which opens the opportunity for deployment in strategic networks.

PoC of Samvad App and web client with audio/video conference calls for Indian Army for their tactical Communication network is currently ongoing. Samvad in a box solution has been tested for Army PoC. Samvad received for 12th edition of AGBA awards on February 25, 2022.

◆ **Artificial Intelligence (AI) / Machine Learning (ML) Solutions -** 5G and e-health use cases were demonstrated before Hon'ble PM during 5G launch at IMC 2022. Heart health monitoring application was showcased at IMC as an e-health use case. The AI model took various health parameters from different sensors and predicted the possibility of having a Heart disease in next 10 years. It can be used as an assistive technology for doctors during diagnosis. Mask detection/social distancing solution has been deployed in C-DOT Delhi and Bangalore campuses. Drone based video surveillance is also in progress. Indoor Visual Positioning System algorithms have been developed and optimized to run on the edge devices for Way finder application.

Content Based Image Retrieval (CBIR) has been augmented to generate the sketch of any indoor scene in real time to improve the positioning accuracy.

Engagements with IIT Delhi for Haptics and Easiofy for AR/ VR/ MR/ XR have been initiated and project plans for execution have been finalized. E-health solution has been launched in Vidhisha.

◆ **C-DOT Video Conferencing Solution** - VC solution has been hosted and is being used by various Government departments / organizations including India Post, Railways, Prasar Bharti, DoT, NSCS, TSDSI and IITs.

CDOTmeet Media and load enhancements is being under development. CDOTmeet Security enhancement (quantum safe) is also under progress. Secured VC in SDCN network using CEM was also demonstrated at India Mobile Congress.

Secure VC solution using Post quantum Cryptography has been successfully completed in lab. PoC of CDOT Meet in Army Network has been completed in Sena Bhawan, NSWS and Airforce (Dalhousi).

Chatbot Solution: Chatbot solution for C-DOT website and Samvad using open source framework has been developed. Validation of Chatbot is currently in progress.

◆ **Wayfinder (UN navigational App) -** Wayfinder web client was integrated with Zoho backbench App for IMC event 2022. Enhancements like support for French language in Audio and Text instructions, Navigation across multiple buildings, autonomous building/Campus detection, and video gallery are included. Visual positioning system based indoor navigation and positioning system using AI based algorithm has been accomplished. Optimizing AI algorithms for sketch based Image recognition to run upon user's mobile device for enhanced augmented reality user experience is also being developed. Support for interfacing with differently abled like visually impaired, crippled, deaf etc. is in the progress. Other organisations are also showing interest in WayFinder App.

◆ **Face recognition -** Implementation of Face recognition in C-DOT is completed in Delhi and is ongoing for Bengaluru. Solution has been deployed in TCIL on commercial basis.

Generic face recognition based API for integration with any App authentication process validation is under development. Human Pose and Gait detection along with Person Re-Identification and Tracking have been developed and are being tested upon real data.

PoC with NCRTC is currently ongoing, Intrusion detection and PPEKit compliance safety solution with online dashboard and alerts are now live in NCTRC.

◆ **Quantum Safe Cryptography (QSC)** – 80Mbps Quantum safe IP encryptor has been developed and its 3rd party security evaluation is in final stage. Integration of CEM

(PQC enabled) with C-DOT Video Conferencing (VC) solution, to provide Quantum security for VC solution has been completed. Design and development of software for 1Gbps PQC IP Encryptor is ready and tested on reference board.

Quantum Secure Smart Video IP Phone (QSSVIP) - Lab prototype of Quantum-safe smart Video IP Phone is developed and has been offered for 3rd party Security Evaluation.

◆ **Quantum Key Distribution (QKD) -** C-DOT has completed the development of QKD solution which can coexist on existing data carrying fibers, where it doesn't require dark fiber for QKD's Quantum or Classical channels. C-DOT's QKD solution is installed at JIIT, Noida (in Feb 2022) against the commercial Order. System is currently working as per expectation. C-DOT has integrated QKD solution with its 100G Muxponder and the same has been tested without requiring dark fiber for QKD's Quantum Channel.

Design and development of MDI-QKD has been started. Approval for partial funding has also been received from one govt. agency in Dec. 2022.

1.4. Telecom Service Applications

◆ **M2M Communication -** Centre of Innovation for (COI) for IoT/M2M was formally launched by Sh. Ashwini Vaishnaw, Hon'ble Minister for Railways, Communications, and Electronics & Information Technology on 23rd Nov, 2022. 47 organizations/ startups have registered with COI. Integration is ongoing with shortlisted Industry partners. Assistance is being offered to understand oneM2M and develop applications as well as to integrate with C-DOT Common Service Platform. MoU has been signed with Vodafone Idea for Vodafone IoT lab. Testing with BEL is ongoing for a possible MoU signing. Preparation of initial draft of test cases for Vi C-DOT IoT lab has been completed. Participation in ETSI Task Force (TF) - on developing Conformance test suite for oneM2M which started in May 2022 has been completed successfully. Enhancements for developer guides and new commands for Industry partner registration and management in CCSP Portal has been completed. Phase 1 load testing of CCSP has also been completed.

Enhancements for integration with NB-IOT eNodeB in 4G SCEFF are ongoing.

◆ **PM-WANI Service Delivery Platform** – C-DOT has enabled 82 PDOAs and 77 APP providers on C-DOT developed "WANI as a Service" (Waas) platform as on date. C-DOT has upgraded the WaaS as per the PDOA requirements. Modules like Revenue Settlement amongst PDOs, Remote Device Management and Helpdesk module have been offered to all the PDOAs. BSNL's existing WiFi network as well as Railtel network have been sucessfully migrated to PM-WANI with the help of C-DOT Wani token handler. Migration of BBNL WiFi deployment in cluster of villages in Akola to PMWANI configuration has been done.

Monetization module PoC has been completed in December 2022. Integration with C-DOT PDOAs is expected to be complete by March 2023.

◆ **Smart Energy Meter** – Hardware development of Lab Prototype of smart energy meter has been completed. The software integration is being done.

1.5. DOT Projects

◆ **TSOC (Telecom Security Operation Centre) -** C-DOT's 200 G probe has been commissioned at 38 ISP sites (out of 120) and is integrated with TSOCs central system. Detailed Project Report (DPR) of TSOC on PAN India basis got approved in May 2022. Work on Pan-India expansion of the project has been started as per defined timelines. Several POs has been placed to procure the hardware for the deployment of IPFIX Probes at 82 new ISP Gateways, setting up a Big-Data Platform for Security analytics and deployment of ISRP portal.

Features like Critical Infrastructure Monitoring (CIM) framework, Communication attempts to Malicious Domains by compromised hosts, NTP Amplification Attacks, Management of Threat Intelligence Framework, Identification of SIP Gateways in the country, Bulk Download of events and SIP attacks, Generation of Blocking information for VPNs and other Apps and monitoring have also been released in the ISRP (Information Sharing and Response Portal).

◆ **CEIR (Central Equipment Identity Register) -** Stolen Device Reporting System (SDRS) has been launched in Maharashtra/Goa, Mumbai, Karnataka, North East and Delhi circles. Indian Counterfeited Device Restriction (ICDR) system has been launched on Pan India basis for checking validity of imported mobile devices. New features and Enhancements for SDRS and ICDR have been released viz. Enhancements in NMS for CEIR, Configurable Public Alert module, Reports, Audit facility, Bulk blocking, notification to TSP for large BLO, EIR response handling tested with Airtel, ICDR enhancement as per modified SOP. Renewal of annual security audit has been initiated on CEIR and ICDR web-portal and mobile apps. POC is ongoing for various LSAs for fraud detection using C-DOT tools like Image matching and SDR data analysis. ICDR for local manufactures was launched on 1st Jan 2023.

◆ **PM-WANI Central Registry** – Translation of CR into multiple languages (Total 17 Indian languages including English) has been completed. PMWANI hotspots shown on the MAP on the main page of Central Registry. PDO, PDOA and APP booklet (in English) are provided to all LSAs. Implementation completed for KPI dashboard publishing KPI data collected from all major PDOAs viz. BSNL, Railtel along with Omnia Information, Microsence and WiFi Dabba. Certification started at C-DOT Delhi and Bangalore Certification Lab. Certification complete for M/s Immunity Networks, M/s Nanovise, M/s Aagile, M/s Ambe and M/s BHR. More than 30 PDOA certifications completed so far and report finalization is in process.

The Roaming among PDOAs development is undergoing and its PoC is to be done. On completion of PoC C-DOT will submit techno-commercial proposal for PAN India roaming feature implementation through Central Registry.

1.6. NSCS Projects

The NSCS has approved the following research & development projects to C-DOT:

◆ High Capacity FPGA based IP flow information Export (IPFIX) probe and Data Analytics.

◆ Design and development of Measurement Device Independent Quantum Key Distribution (MDI-QKD).

◆ Design and development of National Trust Centre.

1.7. Major Field implementations, roll-out, customizations

◆ **National Disaster Management Authority (NDMA) CAP EWS** - The system has been operationalized in all 36 States & UTs for location based SMS services, and has been integrated with Alert Generating Agencies (IMD, CWC, INCOIS, and DGRE). During Cyclone Mandous 5.03 crore SMSs disseminated in Tamil Nadu, Puducherry, and Andhra Pradesh. Alerts over TV (Tata Play DTH) and Cell Broadcast were also disseminated for the same.

200 Crore location-specific SMSs disseminated during cyclone Sitrang, Assam and Gujarat floods and for Lightning alerts in Bihar.

PoC of Indigenously developed Cell broadcast solution is in progress with different TSPs.

C-DOT successfully conducted a national workshop on "CAP Integrated Alert System" on 31st August 2022 for the stakeholders of the project with officials' participation from MHA, DoT, MoIB, NDRF, State governments and all other stakeholders across India.

◆ **NMS (Network Management System) -** Unified Network Management System (UNMS) for monitoring "State Led, Satellite & BharatNet Phase I and II projects" has been deployed. Enhancements & support for the same is in progress. Support and maintenance of Business Exchange Gateway to integrate multiple software systems/applications for BharatNet project namely state led NMSs, CSC NMS, and Satellite NMS in progress for BBNL. CiSTB Billing -Pre paid Cable billing V2.0.0 released to PI and is under support. WiFi EMS Development is also in progress. Mobile App developed by C-DOT is also deployed in BharatNet. LTE NMS has been deployed for Railways PoC at Secunderabad. 5G SMO (Service Management Orchestration) design and development is also in progress.

◆ **C-DOT Routers and Switches** – Terabit Routers are supplied for TSOC network. C-DOT's high capacity switch was used in POC of 4G solution as the switch fabric and is currently used as 4G data plane acceleration solution. C-DOT STBR is being positioned for additional requirements of TSOC and CMS-IMS network. The assembly of the first prototype of 400G Telco Data Centre Switch and hardware integration testing has been completed. Porting of platform software is in progress. High capacity routing system has been offered for Security Testing to NCCS and its EAL-3 certification has been initiated. The EAL-3 testing of Secure Router is also in progress.

PoC of 4 CRDT-100, 2 CRAT-200 & 2 CTX-2000 has been initiated at BSNL, Bengaluru. Functional & inter-operational testing has been completed successfully. 6 nos of STBR routers are installed at Indian Railways and are under trial. 2 STBRs has been deployed in Indian Army Network as part of PoC.

◆ **GPON (Gigabit Passive Optical Network) Technology** – New ONT-27 with.ac wifi is completed and ready for field deployment. ONT 27 is under TEC testing for Technology Approval and is being deployed in MTNL network for Field Trial.

Validation of New Cost Effective Office OLT has been completed and OLT has been offered for TOT to manufacturers. Cost Effective Office OLT (4-PON Port OLT) is currently under TEC testing for Technology Approval and is being deployed in MTNL network for Field Trial. Also the TOT of OLT has been given to five manufacturers (ITI Ltd., Surabhi Satcom Pvt. Ltd., PEL, Aggressive EMS Pvt. Ltd. and GoIP.

EMS Validation of 16 Port GPON Mini OLT is completed and TOT has been done to M/s HFCL. Cost effective ONT-23 (Optical Network Termination-23) has been validated and ToT has been done to ITI, Surabhi Satcom, PEL, VVDN Aggressive EMS Pvt. Ltd. and GoIP 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. ONT 23 is under TEC testing for Technology Approval and being deployed in MTNL network for Field Trial.

IPR Asset Status

Intellectual Property Asset	No.	Related Project / Product	Subject invention
Patents Granted	4	GPON	A Method And A Mirrored Serial Interface (MSI) For Transferring Data (UK and USA)
		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 (India)
		BBWT	Dynamic Channel Selection In IEEE 802.11 Networks (Nigeria)
		4G/5G	A Method And A System For Tuning Tunable Optical Transceivers (India)
Patents Filed	13	STB	Collaborative viewing in Linear Content Delivery Platform (India)
		C-DOT Converged Service Delivery Platform	A Method And A System For Automatic Network Provisioning(India)
		4G/5G	A Method And A System For Tuning Tunable Optical Transceivers(India)
		TWDM PON	An Optical Communication Network(India)
		1.6T P-OTP System	Data Communication Method And System(India)
		Optical Core Networks(OCN) SW	System For Managing Alarm Notifications Of Network Entities And A Method Thereof(India)
		CAP Compliant Early Warning Platform	Emergency Alerting System For Transmitting An Alert Message To Users Through TV Infrastructure(India)
		UN Navigation App (Way Finder)	System And Method For Route Guidance Using Augmented Reality (India)
		C-DOT Converged Service Delivery Platform	System And Method For Self Detection Of Security Breach In A Hybrid Set-Top-Box (India)
		WiFi Tech Enhancement - Wireless Access Controller	A Wireless Local Area Network For Supporting Wireless Layer-Three Roaming And A Method Thereof (India)

Intellectual Property Asset	No.	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
		Integrated CAP Alert system	System And Method For Geo-Targeted Automated Emergency Alerting Through Analog Radio Broadcast (Brazil, Canada, Portugal, Mexico)
		DWDM System	System And Method For Data Communication Among Transceiver Cards Over A Common Data Bus (India)
Copyrights Granted	3	CNMS-IP (NMS for IP Networks)	CNMS-IP (NMS for IP Networks), India
		Generic Mobile App Frame work	Mobile App for Light Weight NMS (India)
		Network Management System	Business Exchange Gateway for TSP's, ESP's and ISP's (India)
Copyrights filed	5	DVB-S2 hub Baseband system	FPGA Implementation Of Real Time Programmable Multi-Rate Digital Down Converter(India)
		DVB-S2 hub Baseband system	Design Of DSP-Based MF-TDMA Baseband Demodulator For DVB-S2/RCS Hub System(India)
		WiFi Tech Enhancement	EMS Software Management system for Wireless Access Points(India)
		WiFi Tech Enhancement	EMS Software to Control, Configure and Organize Wireless Access Points(India)
		WiFi Tech Enhancement	EMS Software to Control, Configure and Organize Wireless Access Points(India)
Designs Granted	2	Wi-Fi 6	XAP WiFi Plastic Enclosure (India)
		DWDM-Line Card Platform	Line Card Platform (India)
Designs Filed	2	Packet Optical Transport Platform	Data Switching Subrack (India)
		DWDM-Line Card Platform	Line Card Platform(India)
Trademarks Granted	3	Hybrid Media OTT Player	OM PLAYER+

Intellectual Property Asset	No.	Related Project / Product	Subject invention
		C-DOT OTT Media Player	OM PLAYER
		Interoperable STB	C-CAS
Trademarks Filed	7	LTE RAN	cTarang, c.Tarang, c-Tarang and 3 device marks of cTarang, c.Tarang, c-Tarang
		IPTV CAS	C-IPCAS
Papers presented and published	9	CAP protocol	AI-enhanced Integrated Alert System for effective Disaster Management. European Geosciences Union (EGU) General Assembly 2022, Vienna, Austria & Online, 23-27 May 2022
		Generic	Energy efficient Receiver-End Distributed Beamforming using orthogonal transmissions. IEEE Communications Letters. (Volume: 26, Issue: 7, July 2022)
		Wi-Fi	Whitepaper on Jamming margin in wi-fi systems. International Journal of Engineering Research and Applications (IJERA). ISSN: 2248-9622, Vol. 12, Issue 7, (Series-I) July 2022, pp. 64-66
		CAP protocol	COVID-19 Savdhan: Harnessing the Telecom infrastructure for Covid19 Management 7th Conference on Information Technology in Disaster Risk Reduction (ITDRR-2022), University of Agder, Kristiansand, Norway; 12-14 October 2022
		Hub Baseband	Synchronization in Multi-channel Burst Mode Demodulator for DBV-RCS Satellite Receiver: A multi-core DSP Implementation 4th International Conference on Advances in Signal Processing and Artificial Intelligence (ASPAI), Corfu, Greece 19-21 October 2022
		CAP protocol	Geo-targeted Emergency Alert Messaging to DTH Subscribers International Conference on Electrical, Computer, Communications & Mechatronics Engg., ICECCME'22, Maldives; 16-18 November 2022

Intellectual Property Asset	No.	Related | Project / Product	Subject invention
		IOT	On the Analysis of NB-IoT in the Context of Monitoring Services | IEEE INDICON 2022, 24th to 26th November, 2022, Kochi, Kerala, India
		Generic	Method comprising one-to-one Web based Real time communications International Conference on Embedded and Real-time communication system-Digital, March 06-07 2023, Rome, Italy. World Academy of Science, Engineering and Technology International Journal of Electronics and Communication Engineering Vol:17, No:03, 2023
		Generic	Bi-directional Central-Coordinated Resource-Reserved Multiple Access (CRMA) Scheme Analysis with TCP and UDP Traffic IEEE International Conference on Communications 16-20 May 2022

Business Promotion Activities
FY 2022-23

1. Events and Exhibitions

● **Conference with the members of Voice of Indian Comm Tech Enterprises (VoICE) on C-DOT Collaborative Research Program on 26 April 2022, in Delhi**

C-DOT held deliberations with the members of Voice of Indian Comm Tech Enterprises (VoICE) on C-DOT Collaborative Research Program in line with the objectives of "Aatmanirbhar Bharat" amid insightful talks by domain experts. The representatives from industry, academia & startups offered their enriching views and suggestions on strengthening the proposed collaboration and innovation framework for indigenous capacity-building.

An ongoing session on C-DOT Collaborative Research Program

● **MoU signing between C-DOT and Indian Railways on 27 April 2022, in Delhi**

C-DOT and Indian Railways signed a MoU for establishing a robust collaborative working partnership to meet the emerging requirements of Indian Railways with indigenous Telecom technologies & innovative solutions

MoU exchange between C-DOT and Indian Railways

● **MoU signing between C-DOT and C-DAC at SemiconIndia 2022, on 30 April 2022**

C-DOT and C-DAC signed a MoU at SemiconIndia 2022, held in Bengaluru for cooperation in diverse areas of Telecom & ICT to boost indigenous technological design & development

Exchange of MoUs between C-DOT and C-DAC in the august presence of Shri Rajeev Chandrasekhar, Hon'ble Minister of State for Electronics & Information Technology and Skill Development & Entrepreneurship, Government of India

● **Webinar on "Centre of Innovation (COI) for IoT / M2M" on 17 May 2022**

C-DOT organized a webinar on "Centre of Innovation (COI) for IoT/M2M" to mark the observance of World Telecommunication & Information Society Day (WTISD) 2022; The webinar underscored the critical need of having a dedicated Centre of Innovation to achieve synergy across relevant stakeholders & spur development & deployment of standards based indigenous IoT/M2M solutions

Snapshots from a session in the webinar

● **MoU signing between C-DOT & Vodafone Idea, on 18 May 2022**

C-DOT & Vodafone Idea signed an MoU for cooperation in the area of IoT/M2M to fast track indigenous development & deployment of oneM2M standardized interoperable solutions in collaboration with IoT device and application providers

● **Showcased its indigenous AI/ML solutions at BIS-22, BEL IETE Symposium, on 20 May 2022**

C-DOT showcased its indigenous AI/ML solutions at BIS-22, BEL IETE Symposium; Ms Shikha Srivastava, Director, C-DOT made a presentation on C-DOT's AI/ML product portfolio. The event was held in Bengaluru.

A glimpse of C-DOT stall at the Symposium

● **C-DOT demonstrated its indigenous Telecom technologies at CommunicAsia 2022, Singapore, during 1-3 June 2022**

Mr. P. Kumaran, High Commissioner of India to Singapore visited the C-DOT stall at the exhibition

● **C-DOT signed agreement with VVDN Technologies and WiSig Networks for Collaboration in 5G, at C-DOT Delhi on 2 June 2022**

C-DOT, VVDN Technologies and Wisig Networks signed an agreement for collaboration in 5G. This aimed at leveraging the complementary strengths of Telecom R&D and industry to accelerate the indigenous design, development & deployment of end-to-end 5G solutions

Exchange of MoU amongst C-DOT, VVDN Technologies and WiSig Networks

● **Agreement signing with Galore Networks for indigenous development of 5G ecosytem at C-DOT Delhi, on 24 June 2022**

C-DOT signed a collaborative agreement with Galore Networks for indigenous development of 5G in furtherance of the objective of creating a multi-party 5G ecosystem powered by cutting-edge innovation & healthy competition

MoU signing between C-DOT and Galore Networks

● **Visit of Shri Devusinh Chauhan, Hon'ble Minister of State for Communications, Government of India at C-DOT Delhi Campus on 28th June, 2022**

Shri Devusinh Chauhan, Hon'ble Minister of State for Communications, Government of India, visits C-DOT labs
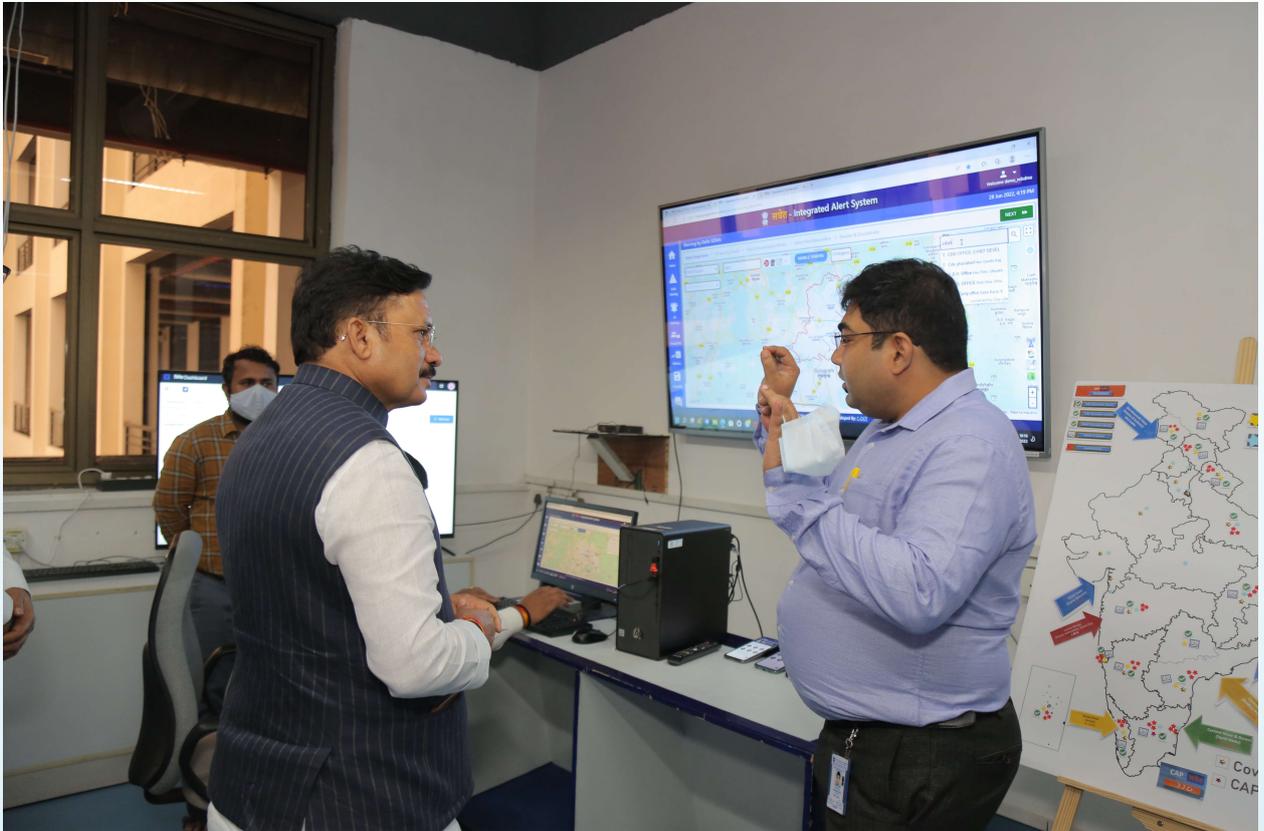
Shri Devusinh Chauhan, Hon'ble Minister of State for Communications, Government of India, visits C-DOT labs

● **MoU was signed between C-DOT and ITI for mass manufacturing on July 7, 2022**

MoU was signed between C-DOT and ITI on July 7, 2022 in Bangaluru to establish a framework for cooperation in technology transfer of LTE/LTE-A/4G technology based Wireless Communication Systems for ITI Limited to mass manufacture and supply it to potential customers

Exchange of MoU between C-DOT and ITI in the presence of Shri Harwesh Bhatiya, Member (Services), DCC, DOT, Government of India

● **C-DOT at Electronics Summit 2022 in Bengaluru, during 7 -8 July 2022**

C-DOT showcased its security-centric indigenous Telecom technologies & innovative ICT solutions for building robust networks for Defence applications at ELCINA Strategic Electronics Summit 2022 in Bengaluru
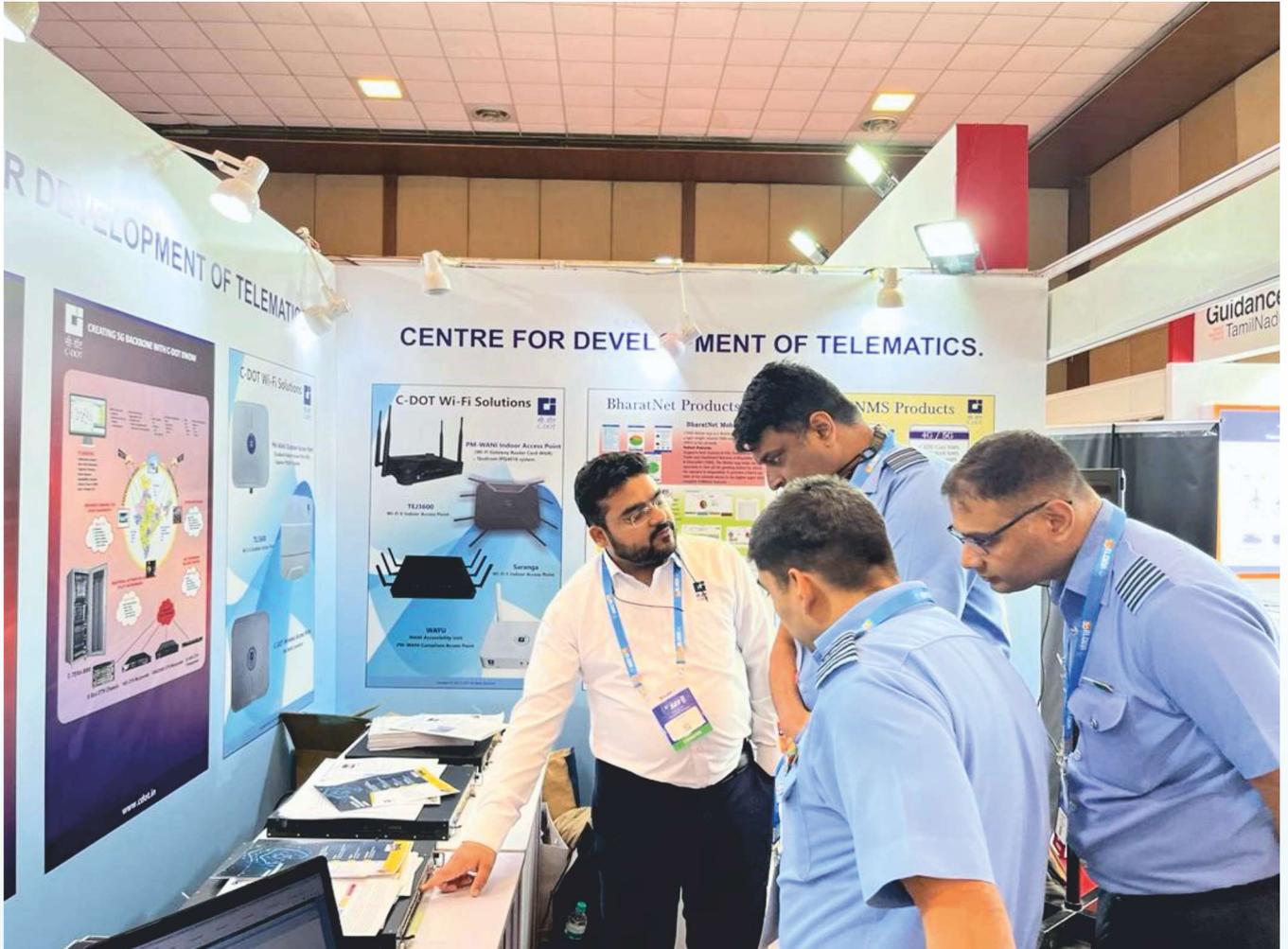
Visitors from Defence establishments being briefed about C-DOT's indigenous technologies

● **C-DOT showcased its indigenous technologies at "Telecom Investor Roundtable" on 30 July 2022**

C-DOT showcased its indigenous technologies at "Telecom Investor Roundtable: The Indian 5G Opportunity" & held insightful deliberations with industry, startups & investors for 4G & 5G deployments. The event was held in Mumbai.

Shri Ashwini Vaishnaw, Hon'ble Minister for Railways, Communications, Electronics & IT
at C-DOT's stall in the exhibition

● **Demonstration of 4G & 5G systems at ITU Regional Standardization Forum, New Delhi on 8 August 2022**

C-DOT demonstrated its indigenous 4G & 5G systems to dignitaries & delegates from around the world at ITU Regional Standardization Forum on Regulatory & Policy aspects of Telecommunications/ICTs in New Delhi

Shri Devusinh Chauhan, Hon'ble Minister of State for Communications, Government of India at C-DOT stall in the exhibition

● **Brainstorming session with various stakeholders for collaboration in areas of 5G Core & RAN, on 12 August 2022**

C-DOT conducted an interactive brainstorming session with various stakeholders of indigenous Telecom ecosystem including startups & academia to discuss proposals for funding & collaboration in areas of 5G Core & RAN

Dr. Rajkumar Upadhyay, CEO, C-DOT discussing with startups and academia on the collaboration in the area of 5G at C-DOT Bengaluru

● **All India Workshop on Common Alerting Protocol (CAP) based Integrated Alert System- SACHET organized by C-DOT and NDMA, on 31 August 2022, in New Delhi**

C-DOT and NDMA organised an All India Workshop on Common Alerting Protocol (CAP) based Integrated Alert System-SACHET to train state Governments to mitigate effects of disasters. The workshop aimed to provide a platform to all the stakeholders including Alert Generating Agencies, Alert Authorising Agencies and Alert Disseminating Agencies across India to discuss their underlying concerns and challenges and evolve the technology-based solutions to address these in an effective manner amid insightful discussions by a galaxy of experts and technologists.
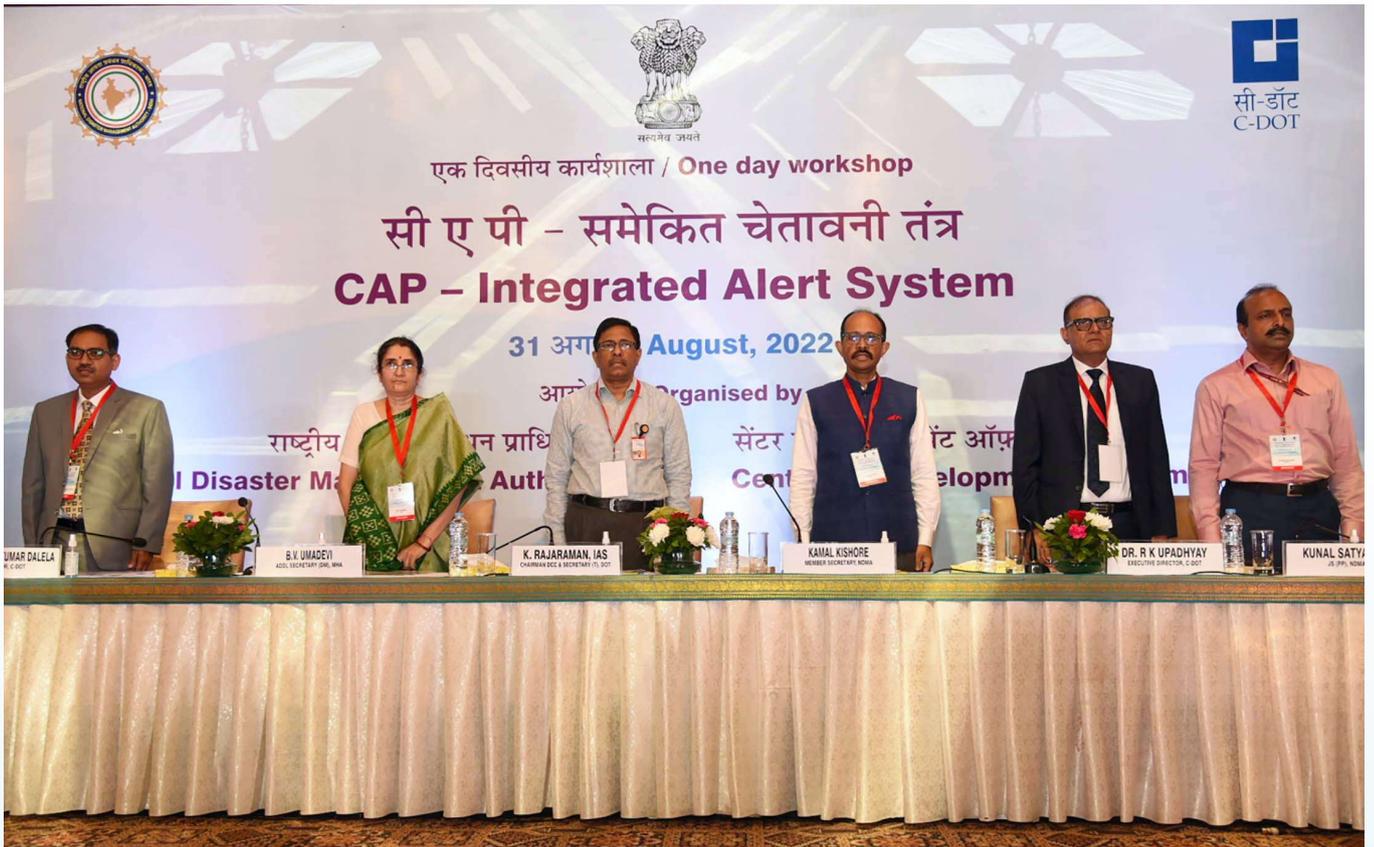
Shri K Rajaraman, Chairman, DCC & Secretary (Telecom), Government of India and Smt. BV Umadevi,
Additional Secretary (Disaster Management), Ministry of Home Affairs, Government of India at the inaugural
session of the workshop

● **Showcased telecom technologies at India Africa ICT Expo, Accra, Ghana, during 14 – 15 Sep 2022**

C-DOT showcased its indigenous telecom technologies & innovative solutions at India Africa ICT Expo, Accra, Ghana and held deliberations with dignitaries & visitors to explore business opportunities in Africa

Dignitaries from the Government of Ghana at C-DOT stall in India Africa ICT Expo, Accra, Ghana

● **Visit of Lt Gen M U Nair, SO-in-C, Indian Army to C-DOT Campus, Delhi, on 17 September 2022**

Lt Gen M U Nair, SO-in-C, Indian Army visited C-DOT Campus, Delhi, interacted with researchers amid demonstration of C-DOT's home-grown   technologies and offered valuable advice on aligning the indigenous technologies   with defence-centric requirements

Demonstration of C-DOT designed Platform for Disaster Management to Lt Gen M U Nair, SO-in-C, Indian Army

● **MoU signed with IIT Delhi for cooperation in various emerging areas of Telecom including IoT/M2M, AI/ML, Cyber Security and 5G & Beyond technologies, on 27 September 2022**

C-DOT and IIT, Delhi signed an MoU for cooperation in various emerging areas of Telecom including IoT/M2M, AI/ML, Cyber Security and 5G & Beyond technologies; The MoU aimed at strengthening the collaboration between R&D and academia paving the way for expeditious design & development of indigenous Telecom solutions; This would be conducive for establishing a collaborative framework based on synergy and convergence amongst students, faculty and researchers right from the stage of ideation & conceptualization

Prof. Rangan Banerjee, Director, IITD and Dr. Rajkumar Upadhyay, CEO, C-DOT exchanging the MoUs at IIT Delhi

● **Launch of indigenous 5G NSA Core at India Mobile Congress 2022, New Delhi during 1-4 October 2022**

C-DOT demonstrated its cutting-edge indigenous telecom technologies and innovative solutions at India Mobile Congress (IMC) 2022; Hon'ble Prime Minister of India, Shri Narendra Modi Ji launched wholly indigenous 5G NSA Core designed and developed by C-DOT, at India Mobile Congress 2022. End-to-end indigenous 5G NSA call was demonstrated using C-DOT's Core and Radio Access Network (RAN) developed in collaboration with industry and start-ups. A 5G use-case pertaining to remote medical assistance in rural areas and hilly terrains was also demonstrated to Hon'ble Prime Minister

Hon'ble PM Shri Narendra Modi launching C-DOT 5G NSA Core in the august presence of Shri Ashwini Vaishnaw, Minister for Railways, Communications, Electronics & Information Technology, and Shri Devusinh Chauhan, Minister of State for Communications, Government of India

● **Showcased live demonstration of indigenous telecom technologies at DefExpo 2022, Gandhinagar, Gujarat, during 18 – 22 Oct 2022**

C-DOT showcased the live demonstration of its indigenous Telecom technologies & innovative solution at DefExpo 2022, Gandhinagar, Gujarat (18 – 22 Oct 2022) with key focus on building secure communications infrastructure for defence & strategic applications.

C-DOT's booth at DefExpo 2022 exhibition, Gandhinagar, Gujarat

● **Show cased indigenous telecom technologies & innovative solutions at AfricaCom 2022 from 7th Nov to 12th Nov, 2022 at Cape Town, South Africa**

C-DOT showcased its indigenous Telecom technologies & innovative solutions at AfricaCom 2022, South Africa & conducted meetings with key African Telecom industry players to explore the opportunities for business & collaboration

C-DOT's booth at AfricaCom 2022, Cape Town, South Africa

● **Demonstration of home-grown telecom technologies at Bengaluru Tech Summit**

Home-grown Telecom technologies including the live 5G call powered by the fully indigenous technology built in collaboration with local industry & startups were demonstrated at Bengaluru Tech Summit on Nov 17, 2022

C-DOT Stall at Bangaluru Tech Summit   *Visitors at C-DOT Stall at Bangaluru Tech Summit*

● **Webinar for strengthening the indigenous telecom ecosystem with home-grown world-class technologies**

C-DOT conducted a webinar on its home-grown world-class technologies on Nov 17, 2022. The webinar was inaugurated by Dr. Mahesh Shukla, Member (Services), DCC
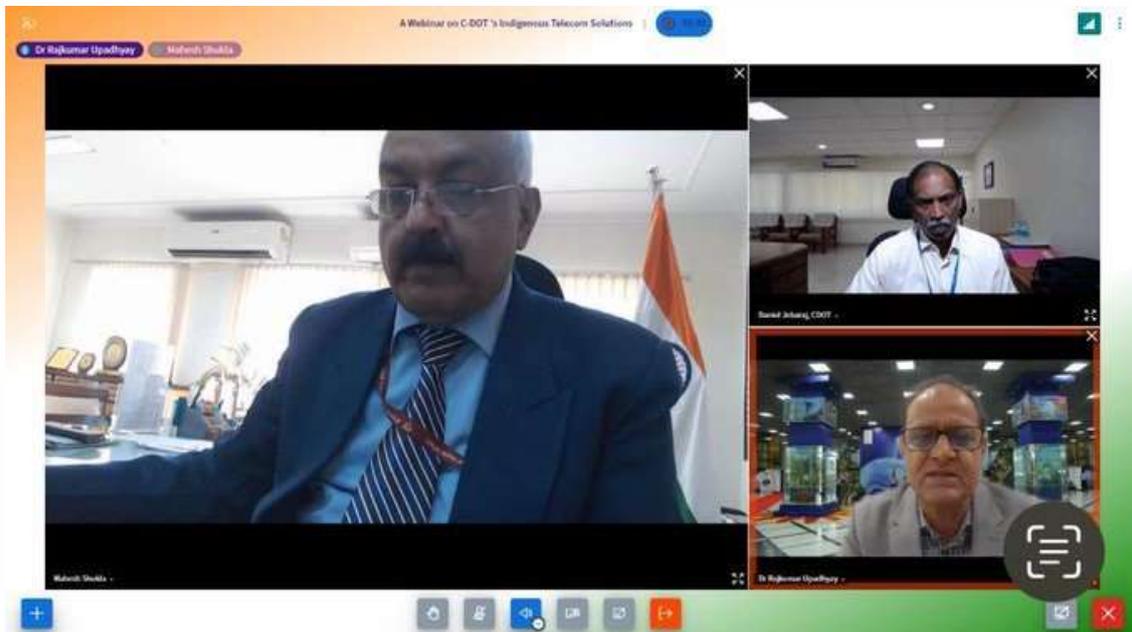
Snapshots during the Webinar for strengthening the indigenous Telecom ecosystem with home grown world class technologies

● **Workshop on Cryptology**

Three-day National Workshop on Cryptology (NWC 2022) was conducted at C-DOT Delhi in association with Cryptology Research Society of India (CRSI) & IEEE Communications Society - Delhi Chapter on Nov 22, 2022

Glimpse of inauguration ceremony of National Workshop on Cryptology

● Inauguration of Entrepreneurship Cell & Centre of Innovation

Inauguration of Entrepreneurship Cell & Centre of Innovation at C-DOT Delhi was done by Hon'able Minister Shri Ashwini Vaishnaw on Nov 23, 2022

Shri Ashwini Vaishnaw, Hon'ble Minister for Railways, Communications and Electronics & IT
inaugurated Entrepreneurship Cell & Centre of Innovation at C-DOT Campus, Delhi

Shri Ashwini Vaishnaw, Hon'ble Minister for Railways, Communications and Electronics & IT
addressing C-DOT Staff at Delhi Campus

Shri Ashwini Vaishnaw, Hon'ble Minister for Railways, Communications and Electronics & IT visits Entrepreneurship Cell & Centre of Innovation at C-DOT Campus, Delhi

Shri Ashwini Vaishnaw, Hon'ble Minister for Railways, Communications and Electronics & IT visits C-DOT Labs

● **Showcase of C-DOT's indigenous Telecom technologies at 65th Annual Day Technical Symposium & Exhibition Of IRISET on Nov 24, 2022**

C-DOT showcased its indigenous Telecom technologies with focus on specific requirements of Railways networks at Indian Railway Institute of Signal Engg & Telecommunications' 65th Annual Day Technical Symposium & Exhibition at Secunderabad, Telangana.

● **Two-day global IoT/M2M conference at C-DOT in association with DoT and TSDSI on 14 – 15 Dec 2022**

C-DOT conducted a two day global IoT/M2M conference on 14 – 15 Dec 2022 at C-DOT Campus, New Delhi centered on the theme 'Growth of IoT/M2M ecosystem through standardized implementations'

K Rajaraman (Chairman DCC & Secretary(T))
delivering the key note address

Inauguration ceremony IoT/M2M conference
at C-DOT, New Delhi

- **Demonstration of C-DOT's home-grown innovations in diverse areas of Telecom at Indian Science Congress, ISC2023, Nagpur during 03 – 07 Jan 2023**.

C-DOT demonstrated its indigenous Telecom technological innovations to academia & scientific research community at 108th Indian Science Congress, ISC2023 organised at R.T.M. Nagpur University, Nagpur during 03-07 Jan 2023. The visiting scientists & engineers showed keen interest in C-DOT's advanced Telecom solutions including 5G, Post-Quantum Cryptography, Quantum Key Distribution and Network Security.

Visitors at C-DOT stall at Indian Science Congress, Nagpur

- **Demonstration of wholly indigenous 5G solution designed and developed by C-DOT in collaboration with VVDN Technologies at 5G launch event in Odisha on 05 Jan 2023**

The wholly indigenous end-to-end 5G solution designed and developed by C-DOT in collaboration with VVDN Technologies was demonstrated at 5G launch event in Odisha on 05 Jan 2023. Shri Ashwini Vaishnaw, Hon'ble Minister for Railways, Communications and Electronics & IT visited C-DOT booth and interacted with researchers and engineers.
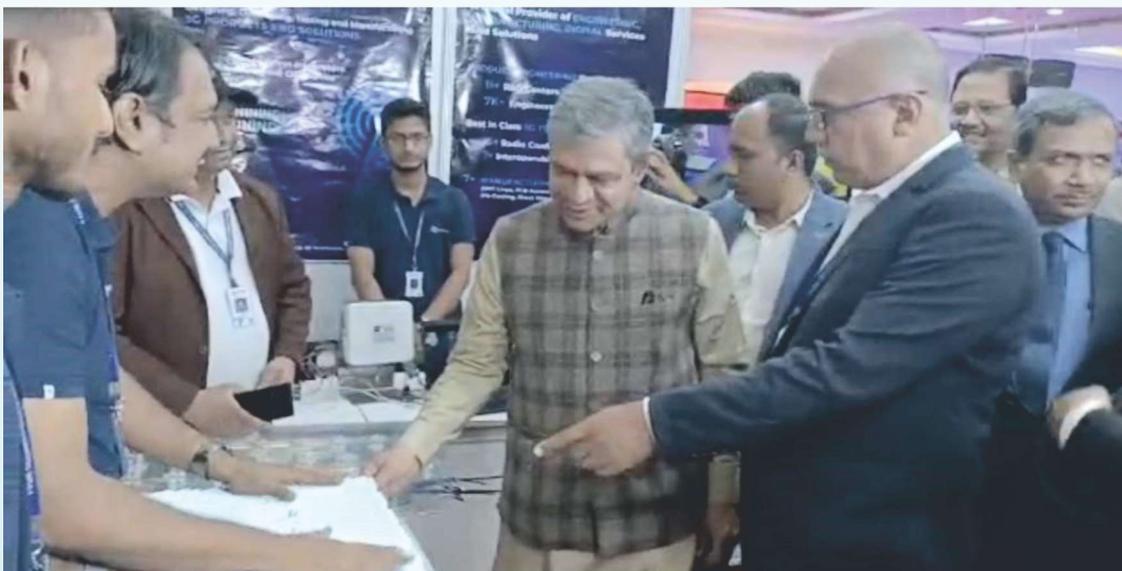
Shri Ashwini Vaishnaw, Hon'ble Minister for Railways, Communications and Electronics & IT
visiting C-DOT booth at 5G launch event in Bhubaneshwar, Odisha

● **Demonstration of C-DOT's fully indigenous 4G solution at BSNL booth in Pravasi Bharatiya Divas Convention 2023 at Indore during 08 - 10 Jan 2023**

C-DOT demonstrated its fully indigenous 4G solution at BSNL booth in Pravasi Bharatiya Divas Convention 2023 at Indore during 08 - 10 Jan 2023

Showcasing 4G solution at BSNL booth in Pravasi Bharatiya Divas Convention at Indore

● **Participated in the G-20 Digital Economy Working Group (DEWG) Meeting at Lucknow and showcased the live demonstration of Telecom solutions for building advanced digital infrastructure (13 – 15 Feb 2023)**

C-DOT participated in the G-20 Digital Economy Working Group (DEWG) Meeting at Lucknow during 13 – 15 Feb 2023 and showcased the live demonstration of indigenous Telecom solutions including 5G, Quantum Communications and Network Security & Encryption for building advanced digital infrastructure

Live demonstration of C-DOT technologies in front of diginitaries at DEWG meeting at Lucknow

● **Demonstrated AI solutions at the AI India Show 2023, International Engineering & Technology Fair, IETF2023, New Delhi (17 – 18 Feb 2023)**

C-DOT showcased the live demonstration of its indigenous technological innovations in the area of Artificial Intelligence (AI) at the AI India Show 2023, International Engineering & Technology Fair, IETF2023, New Delhi on 17th and 18th February 2023
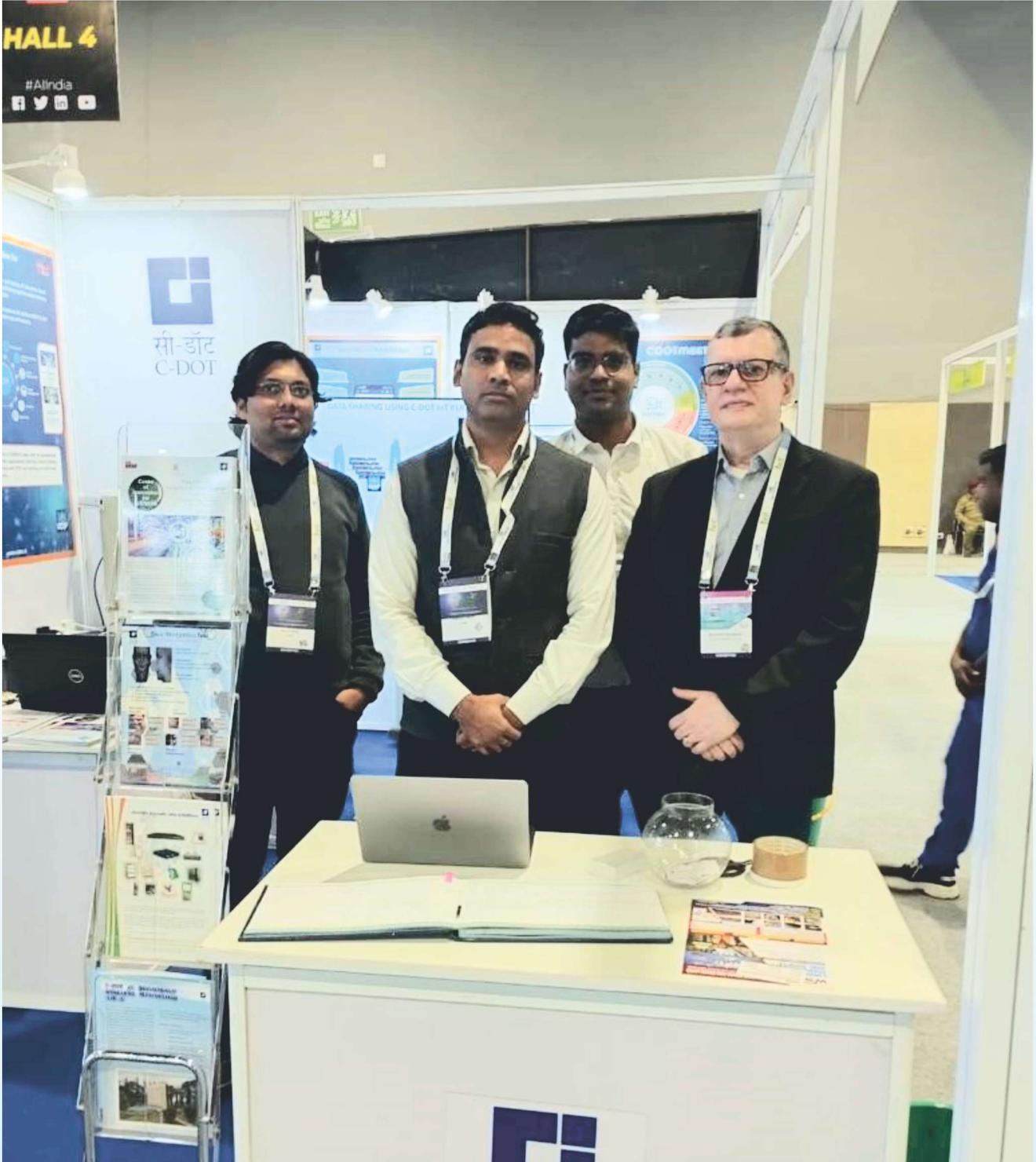
C-DOT booth, IETF 2023 , New Delhi

● **Live demonstration of C-DOT's indigenous Telecom technologies at India Telecom 2023 in New Delhi during 22 – 23 Mar 2023**

C-DOT showcased live demonstration of its indigenously designed & developed telecom technologies and innovative solutions at India Telecom 2023 in New Delhi during 22 – 23 Mar 2023. Shri Ashwini Vaishnaw, Hon'ble Minister for Railways, Communications and Electronics & IT visited C-DOT booth & appreciated C-DOT's home-grown technologies

Glimpse of C-DOT booth at India Telecom 2023, New Delhi

● **Demonstration of C-DOT's indigenous Telecom solutions at Mobile World Congress 2023 (MWC23) at Barcelona, Spain (27 Feb – 02 Mar 2023)**

C-DOT demonstrated its Telecom technologies & innovative solutions including 5G, Quantum Communication & Disaster Management Alert System at Mobile World Congress 2023 (MWC23) at Barcelona, Spain during 27 Feb -02 Mar 2023. Several dignitaries from around the world visited C-DOT booth and appreciated innovative Telecom solutions and their diverse applications.

Dr. Pilvi Torsti, State Secretary Ministry of Transport and Communications, Finland witnessing the demonstration of C-DOT's solutions at MWC 2023

Mr. Stefan Schnorr, State Secretary, Federal Ministry for Digital and Transport, Germany at C-DOT booth in MWC 2023

● **Demonstration of C-DOT's indigenous Quantum Key Distribution (QKD) & Post-Quantum Cryptography solutions at 'First International Quantum Communication Conclave' in New Delhi during 27 – 28 Mar 2023**

C-DOT demonstrated its Quantum Key Distribution (QKD) & Post-Quantum Cryptography solutions at 'First International Quantum Communication Conclave' organized by TEC in association with C-DOT and TSDSI in New Delhi during 27 – 28 Mar 2023; On this occasion, Shri Ashwini Vaishnaw, Hon'ble Minister for Railways, Communications and Electronics & IT lauded C-DOT's indigenous endeavours in Quantum Communications and declared C-DOT a nodal agency for Quantum technologies in India.

Dr. R.K. Upadhyay (CEO, C-DOT) delivering lecture at First International Quantum Communication Conclave, Delhi

Shri Ashwini Vaishnaw, Hon'ble Minister for Railways, Communications and Electronics & IT visiting C-DOT stall at Quantum Communication Conclave, Delhi

● **Demonstration of C-DOT's home-grown telecom technologies and innovative solutions at Convergence India 2023 at New Delhi during 27 – 29 Mar 2023**

C-DOT showcased the live demonstration of its diverse Telecom technologies including 5G, Quantum Technologies, Integrated Alert System for Disaster Management, AI & IoT/M2M based Telecom Software Applications and Unified Communications Solutions at Convergence India 2023 at New Delhi during 27 – 29 Mar 2023

Visitors at C-DOT stall in Convergence India 2023

Awards and Recognition

- C-DOT was declared winner at ELCINA Defennovation Awards - Strategic Electronics Summit (SES 2022) in the month of July 2022 at Bengaluru in following two categories-

  (1) Excellence in R&D

  Quantum Key Distribution (QKD) solution secured "Certificate of Merit" in "Excellence in R&D" -Large scale category

  (2) Excellence in Indigenisation

  SAMVAD, QKD and BBWT secured "First prize" in "Excellence in Indigenisation"- Large scale category

Daniel Jebaraj, Director C-DOT receiving award at ELCINA Defennovation Awards

- *"Telecom Person of the Year " award at the "22nd Voice & Data Telecom Leadership Award 2022"* for their Made-in-India 4G technology solution, which was jointly shared with TCS, Tejas & BSNL was awarded to Dr. Rajkumar Upadhyay, CEO, C-DOT.

HR Initiatives in C-DOT

Women Empowerment

C-DOT's Management has always been sensitive to gender issues and has consistently worked towards creating organizational culture reflecting gender equality. Presently, about 32.3% of staff in C-DOT are women.

Existing Policies:

All female staff members 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 the current financial year, of the total employees promoted to higher grades 26% of them were women.

- In management cadres (Team Leaders, Group Leaders, Technical Experts and Director) about 26% are women.

- As per the directives of Supreme court, C-DOT has a Complaint Committee for its Centres, at Delhi and Bangalore in case of any complaints relating to Sexual Harassment of women staff at work place for fair and justified view of the complaints, if any, and recommend suitable action on the same to the C-DOT Board.

Employee's Welfare

- For the purpose of coverage for hospitalization expenses, C-DOT has taken a Tailor-made group medi-claim insurance from New India Assurance Company Ltd. For employees (and their families). The employees in EI grade and below has a coverage of Rs. 3.5 Lakhs and above and employees in EII 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 Special Abilities

- For recruitment of persons with special abilities and candidates belonging to SC/ST category, C-DOT follows government rules providing for reservation in jobs in C-DOT.

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

Benefits for persons with disabilities

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

- The especially 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 especially 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.

Recruitment of senior officers

- Recruitment for the post of Chief Finance Officer & Registrar was done in the year 2022-23.

- Recruitment process for 10 nos. of Scientist-G positions in Level 14 of 7CPC has been initiated.

- Recruitment of experienced engineer professionals was completed for various technology projects.

Technology Commercialization

MoUs and Project Agreements

#	Executable Project	Organisation concerned	Purpose
A	**Next Generation Mobile Technology**		
1	*Academic Interaction on 4G and 5G technology*		
1a	4G and 5G technology development	IIT Bombay, India	Joint collaborative research projects in the areas of 4G and 5G
1b	4G and 5G technology development	MoU Ghana	Development of a reliable and cost effective world class communications infrastructure and services in Ghana.
2.	*Development of 4G/5G*		
2a	Development of 5G	IIT Roorkee, India	5G technology and related communication system
2b	Development of 5G	NUICC	Manufacturing and delivery of innovative and advanced telecommunication products/services to customers and service providers
2c	Development of 5G	Federal Ministry of Comm. Nigeria	Synergizing Indian Research and development solutions and services to customers and service providers in Nigeria with the support from 'Telesuprecon FZE (and Associate Companies)'
2d	Development of 5G	IIT Madras	- High frequency RF modules - Air Interface layer 1 Algorithm and optimization - Massive MIMO baseband algorithm
2e	Development of 5G	MoU with CSIR CEERI, Pilani	- MmWave technologies - Last-mile connectivity - High data-rate communication - Augmentation and establishment of fabrication and testing facilities 5G use-case-specific devices and component fabrication - Edge-automation platform - IoT-enabled smart sensors - M2M common service platform
2f	C-DOT 4G/LTE/IMS for Defense Networks	Alpha Design Technologies Pvt. Ltd., Bengaluru	Framework of cooperation between C-DOT and ADTL for the concerned projects
2g	Joint development of 4G Core	Tata Consultancy Services Ltd.	Framework of cooperations of the parties in research and development activities related to the field of telecommunications.

#	Executable Project	Organisation concerned	Purpose
2h	Development of 5G	King's College London, UK	Establishment of 5G Test Bed, M2M/NBIOT, Cloud RAN, End-to-end orchestration
2i	Development of 5G	University of Surrey, UK	Establishment of 5G Test Bed, M2M, Cloud RAN
2j	Development of 5G	University of Bristol, UK	Establishment of 5G Test Bed, Cloud RAN, Machine Learning/AI, Mobile Edge Computing
2k	Development of 5G	Institute for Development and Research in Banking Technology (IDRBT)	Establishment of a collaborative working partnership in the areas of 5G and Quantum Security in Banking use cases; Deep learing and cryptography Techniques for Banking use cases; Communications and Networking technologies and products for Banking use cases; Inclusion of indigenously developed Wi-Fi 6 technology/product based on latest IEEE 802.1 lax 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 BFS use-cases.
2l	Development of 4G / 5G	Lekha Wireless Solutions Pvt Ltd	Collaboration in 4G & 5G Technologies.
2m	Collaborative Research Work in 4G/5G	Centre for Development of Advance Computing (C-DAC)	Collaborative Research Work in 4G/5G, broadband, IOT/M2M, packet core, computing etc.
2n	Collaborative Research Work in 4G/5G	Galore Networks Pvt. Ltd.	Collaborative Research in 4G/5G Network Technology.
B	**Enhancements, upgradations, adaptations and technical support for developed technologies**		
1	Applicable to all relevant projects	Bharat Electronics Limited (BEL), India	Framework for R&D, manufacturing, creation, delivery of solutions, services and support.
2	Applicable to all relevant projects	Mahanagar Telephone Nigam Limited (MTNL), India	Co-operative framework for R&D, manufacturing, operation and delivery of equipments.

#	Executable Project	Organisation concerned	Purpose
3	Applicable to all relevant projects	ITI Limited	Synergy between R&D efforts and expertise in manufacturing, creation and delivery of innovative telecommunication services and support activities of mutual interest.
4	Applicable to all relevant projects	Telecommunications Consultants India Limited (TCIL), India	Cooperation for delivery of telecom products.
5	C-DOT's wireless, optical products and SW solutions	MOU Telecon, Cambodia	Synergising Indian research and development efforts in telecommunication with delivery and implementation of C-DOT's innovative and advanced telecom solutions and services to customers and service providers in Cambodia.
6	Creation of advanced technologies for establishing secure high-speed communication network and services	Centre for Artificial Intelligence and Robotics (CAIR), Defence, India	For establishing secure high-speed communica-tion network and services.
7	Design support for developed technologies – ATM	BEL and Integrated Head Quarters, Ministry of Defence (Indian Navy), India	Establishing a frame-work for co-operation in development, production and deployment activities relating to ATM technology products.
8	Geo-intelligence and technology planning for NOFN, NMS for NOFN	Bharat Broadband Network Limited (BBNL), India	Establishing a frame-work for cooperation in telecommunication R&D, creation and delivery of innovative telecommunication services and support activities relating to the telecommunication equipment management and services.
9	C-DOT 4G/LTE	ITI Ltd.	To establish a framework for cooperating in Technology transfer of LTE/LTE-A/4G technology based wireless communication systems for ITI to mass manufacture and supply it to potential customers.
10	Support for Switches & Routers: Routers for Indian Defense Networks	Alpha Design Technologies Pvt. Ltd. (ADTL), Bengaluru	Framework of cooperation between C-DOT and ADTL for the concerned projects.

#	Executable Project	Organisation concerned	Purpose
11	Support for Switches & Routers: Layer2/Layer3 Ethernet Switches for Indian Defense Networks	Alpha Design Technologies Pvt. Ltd. (ADTL), Bengaluru	Framework of cooperation between C-DOT and ADTL for the concerned projects.
12	Conditional Access System (CAS)	M/s. Broadcast Engineering Consultants India Limited (BECIL)	To work jointly on projects in the field of IT/ICT and communication systems for Conditional Access System (CAS)
13	Educational and research programmes under the C-BUDDHI Program of C-DOT	The Institution of Electronics and Telecommunication Engineers (IETE)	To establish skill-based training, educational and research programmes under the C-BUDDHI Program of C-DOT
14	Educational and research programmes under the C-BUDDHI Program of C-DOT	Global IEEE Institute for Engineers (GIEEE)	To establish skill-based training, educational and research programmes under the C-BUDDHI Program of C-DOT
15	Usage of C-DOT products in RailTel Portfolio of Products	RailTel Corporation	Usage of C-DOT products in RailTel Portfolio of Products that is used to fulfil the customer services that includes RailWire, Internet Bandwidth, MPLS VPN etc.
16	NSCS PINE PROJECT	ITI Ltd	Post quantum Inline Network Encryptor
17	Indian Railway Network	VISTA INFORMATION SYSTEMS PVT LTD.	To Modernize Signalling System on the Indian Railway Network.
18	C-DOT Interoperable Set top box	Modern Communication & Broadcast Systems Pvt. Ltd.	Mutual Interest of the Parties with respect to Set Top Bos (STB Projects)
19	Mass Manufacturing of LTE/LTE-A/4G systems	ITI Limited	Technology Transfer of LTE/LTE-A/4G technology based wireless communication systems for ITI to mass manufacture and supply it to potential customers.

#	Executable Project	Organisation concerned	Purpose
20	Applicable to All products	ITI Limited	Dissemination of telecommunication products designed, developed and engineered by the parties.
21	IOT/M2M/Cyber Security	IIT Delhi	The list of proposed technology field for projects between IITD & C-DOT are: i) OneM2M based Software Platform for enabling M2M/IoT Communication. ii) Software Application based on Artificial Intelligence and Machine Learning iii) Cyber Security based Solution 5G & Beyond Communication Technology based solution for commercial and strategic applications
22	DVB WiFi Gateway Solution	Eduisfun Technologies Pvt. Ltd (EIF)	Mutual interest of the parties with respect to integration of EIF's stepapp with C-DOT's DVB Wifi gateway solution.
C	**Communication and security research and monitoring**		
1	CMS	National Technical Research Organisation (NTRO), India	Joint R&D for shared interests and mutual benefits.
2	CMS national roll-out	BSNL, India	For infrastructural work of RMC DC.
3	CMS national roll-out	BSNL, India	Provision of MPLS services for CMS project.
4	CMS national roll-out	MTNL, India	For infrastructural work of RMC DC at Delhi and Mumbai.
5	R&D for security management for Law Enforcement Agencies : CMS	Centre for Artificial Intelligence & Robotics, (CAIR), Defence, India	● For IP multimedia system (IMS) ● Integration with CMS
D	**Synergizing efforts of various public sector understanding and autonomous bodies under DOT for increasing operational efficiency.**		
1	PM-WANI	M/s. Matrecomm	● 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)

#	Executable Project	Organisation concerned	Purpose
2	Joint Exploration of usage of C-DOT Products	Telecommunications Consultants India Ltd. (TCIL)	Joint Exploration of usage of C-DOT Products and identify other business opportunities in India and abroad.
E	**Synergizing efforts of various public sector understanding and autonomous bodies under DOT for increasing operational efficiency.**		
1	In the field of IT infrastructure for fibre and wireless networks, NMS, CDOT XPON variants, IoT, M2M, NGN	MOU with Burundi Backbone System, Burundi, Africa	• To establish ICT Industry base in Burundi Backbone System • Broadband delivery in Burundi Backbone System • To monitor, configure and manage the communication elements in Burundi Backbone System for optimal performance. • For extending connectivity in Burundi Backbone System. • Technology based planning of suited telecom network architecture for rural Burundi backbone system. • C-DOT will advise/assist as needed in providing Smart City Solutions for Burundi Backbone System. • Wi-Fi technology enhancement and roll outs, optical aggregation access system, NGN. • Consultancy Services, advice and assist as needed in selection of technologies and planning and implementation. • Advise/Assist as needed in establishment of Centre for Excellence at Burundi Backbone System.
2	Mathematical Programming in Parallel Laboratory program	C-DAC, C-DOT and IISc (tripartite agreeement for MPPLab)	To deal with High Impact Applications of Optimization and Statistics (Big Data).
F	**NMS technology for BharatNet**		
1	NOFN – For providing broadband connectivity to the rural areas initially by laying incremental fiber cable from nearby blocks.	MOU with BBNL, India	• To monitor configure provision and manage BBNL Network as per signed agreement dated 22.04.2014 • To provide integrated tools for fault localization • Field trial of new GPON technologies in BharatNet and to provide the support for implementation of GPON based networking solutions

#	Executable Project	Organisation concerned	Purpose
			• To provide software solutions for structured rule based transparent business interactions across stakeholders of BharatNet Project • To provide converged NMS solutions for integration of State lead NMSs/EMSs of Multi-vendor systems with centralized NMS Systems (UNMS) of BBNL • Extending the use of broadband delivery from ONT and Use for point to point and point to multipoint communication.
G	**Centre of excellence for Lawful interception**		
1	Open Souce Intelligence	IIT, Patna, India	Collaborative project on multi-lingual and multi-modal keyword search in a mix-lingual speech corpus.
2	Post-Quantum Cryptography	IIT Ropar, India	Commercial Hybrid post-quantum SW implementation planned in VoIP, IP encryptor along with an FPGA based post-quantum implementation on an FPGA reference board.
3	Quantum Key Distribution	Physical Research Laboratory (PRL)	Framework of cooperation of the parties for creation and delivery of innovatice Quantum Optical Communication technologies and products.
H	**Disaster Management**		
1	Early Warning Platform	National Disaster Management Authority (NDMA)	Early warning platform for Disaster Management
I	**Quantum Communication**		
1	MDI-QKD	JayPee Institute of Information Technology(JIIT)	Collaboration and partnership for Quantum Communication.
2	Post-Quantum Cryptography	CRRao AIMSCS	Collaboration for Post Quantum Cryptography

#	Executable Project	Organisation concerned	Purpose
J	**Carrier Networks Transport Technology**		
1	Packet Optical Transport Platform	Priyaraja Electronics	Collaboration Agreement for Optical Cross Connect and Optical Line Systems
K	**C-DOT Collaborative Research Framework**		
1	CCSP (C-DOT Common Service Platform)	Vodafone Idea Limited & Vodafone Idea Technology Solutions Limited	Collaborative Research Work in CCSP (C-DOT Common Service Platform)
2	5G RAN technology	VVDN Technologies Pvt Ltd. & WISIG Networks Private Limited	For the following Products i) Single Box Integrated Gnb ii) O-RAN Macro Cell Gnb

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 it's water demand of 286 KLD through in house 4 Nos of Bore wells 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 is having Sewerage Treatment Plant (STP) of capacity 125 KLD. 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. The power supplied by BSES is directly from the grid of 66 KVA. To achieve ecofriendly 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. C-DOT has recently renovated one Block at C-DOT Campus and handed over to ITU for its Area Office for South Asia and Innovation Center in India.

Two more labs (Quantum Key Distribution Lab, Common Platform for Early Warning System) have also been developed at C-DOT main Technical Block. Infrastructure work has also been initiated to develop 5G Test Bed at C-DOT campus.
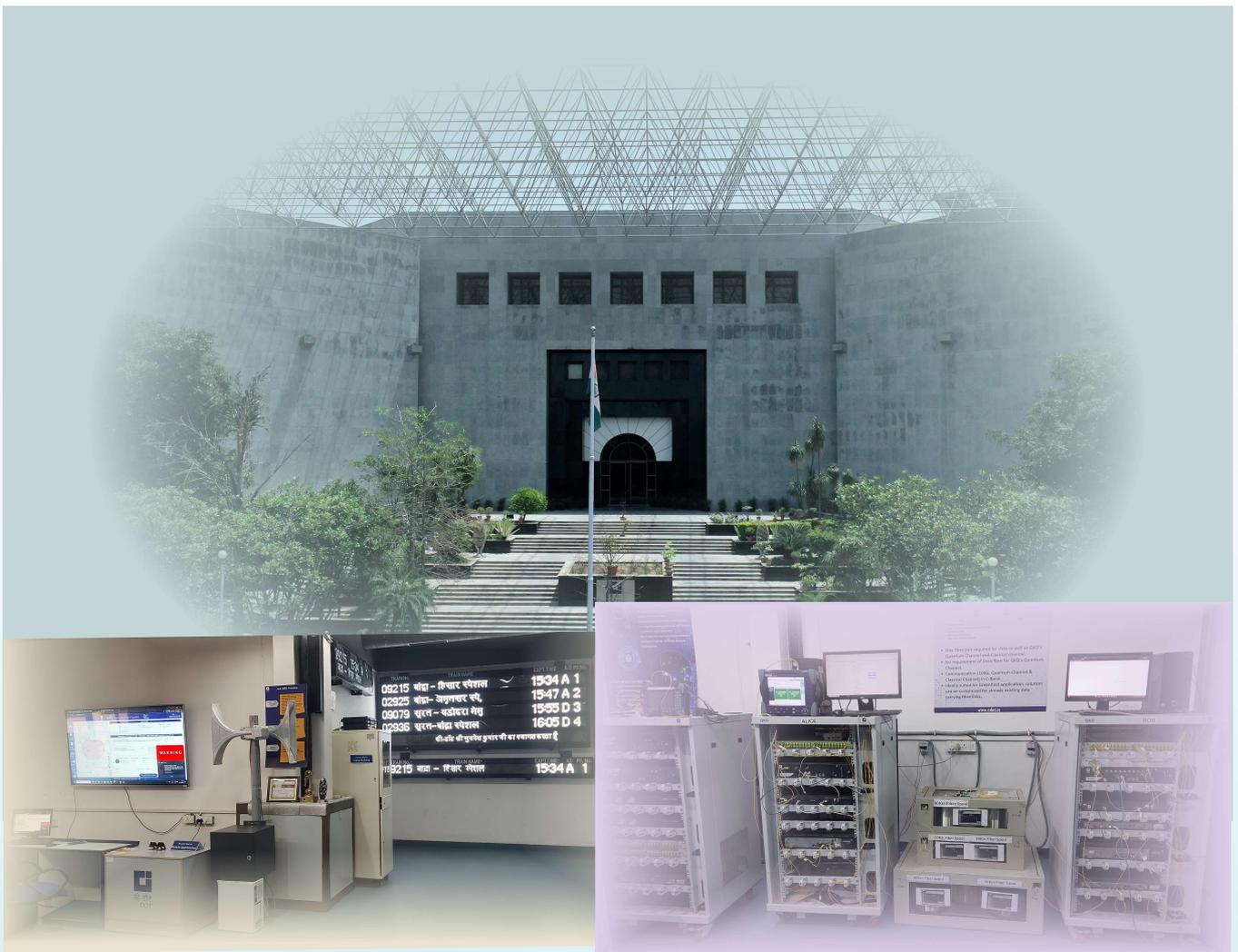
Organizational Processes and Practices

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-An 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.

QAI

Centre for Development of Telematics
Organization

Development Projects
Organization Unit

The Organizational Unit has been appraised at
Maturity Level 5 (Optimizing)
of CMMI® for Development V1.3 as per the SCAMPI® - A V1.3

MUKUL MADAN
(Certification Number-0200123-01)
(CMMI Institute Certified High Maturity Lead Appraiser)

Date of Appraisal Result : 16th September, 2020
Appraisal Expiration Date : 16th September, 2023

Appraisal Sponsor: Jayant Bhatnagar, Director

The complete disclosure of the appraisal result is in the Appraisal Disclosure Statement available with the organization.

Appraisal ID : 8680

CMMI DEV /5^{SM}
Exp. 2023-09-16 / Appraisal #8680

CMMI, the CMMI logo, Data Management Maturity (DMM), and SCAMPI are registered marks of CMMI Institute.
SCAMPI: Standard CMMI Appraisal Method for Process Improvement

Swachhata 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 hygiene 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 desk were cleaned thrice during the office hours to maintain clean and hygiene environment within the C-DOT premises.

Vigilance Awareness Initiatives

During the year 2022-23 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 online 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 online 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 2022 was observed enthusiastically in C-DOT (both at Delhi and Bengaluru campus) from 31st Oct 2022 to 6th Nov-2022. Integrity pledge was administered by Dr. Pankaj Kumar Dalela, Director, C-DOT. Various events like poster making & slogan writing were organized during the week and winners were suitably awarded. CEO, C-DOT Dr. Rajkumar Upadhyay presided over the prize distribution function. Most of the employees of C-DOT have also taken integrity e-pledge.

Transfer of Technology

In support of government's Make in India and Digital national programs C-DOT promoted the indigenous technology development and manufacturing eco-system.

Cumulatively, C-DOT ToT agreements stand at 129 with 34 Licensees for 40 technologies , and thereby a manufacturing eco-system for production of indigenous technology has been established to realize Government's Make-in India and Digital India programs.

One significant development is signing ToT with M/s ITI Limited for the LTE-4G RAN technology for the POC and for mass production. Efforts are being made to add few more ToT partners for LTE-4G RAN technology soon. Also, C-DOT has signed ToT Agreement with M/S ITI, M/S Priyaraj Electronics, M/s Aggressive EMS, M/s Surbhi for the WiFI-5 and WiFi-6 Technologies (DOA, WGR, EAP and XAP cards for indoor and outdoor solutions).

Another important milestone is signing the ToT Agreement with UTL for the OTN CROSS CONNECT and DWDM technology products. Efforts are being made to sign the ToT Agreement with ITI and BEL also.

Efforts are being made for the signing of ToT Agreement for the QKD, STB, IP TV-CAS, Video IP Phone, CIAS, BRTR-10(Branch Router) and SEM (Smart Energy Meter) Technology products during the financial year 2023-24.

ToT Agreements Signed with Prospective Manufacturers

CDOT Technologies / Products	CDOT Licensees (ToTs Completed as on 31.03.2023)				
	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	5	6
Mini OLT – 16 Port			HFCL	1	1
Mini OLT – 4 Port	ITI	1	GOIP,PEL,SURBHI,CANDID Optronix, Aggressive,VVDN	6	7
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		--	HFCL , CYIENT,CSC,KAYNES	4	4
Titli Damak	ITI	1	Tejas,VMC	2	3

CDOT Technologies / Products	CDOT Licensees (ToTs Completed as on 31.03.2023)				
	PSUs(Govt.)	PSU Count	Private	Private Count	TOTAL
COLT (Joint Dev.)	–	–	Tejas	1	1
ONT 11			Tejas,CSC ,KAYNES	3	3
ONT 17, 17A, 23, 24 and 27			PEL,Surbhi,VVDN,GOIP	4	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
AN RAX (Extn.)			RTL	1	1
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			RCV LTD., KAYNES	2	2
Mini PDO	ITI	1	RCV	1	2
EAP, XAP, DOA & WGR	ITI	1	PEL, Surbhi, Aggressive	3	4
LTE-RAN	ITI	1	–		1

CDOT Technologies / Products	CDOT Licensees (ToTs Completed as on 31.03.2023)				
	PSUs(Govt.)	PSU Count	Private	Private Count	TOTAL
STBR /Extn.	BEL KOT,ECIL,ITI BLR	5	HFCL, VVDN	2	7
CRTR-210	BEL-KOT	1			1
L2 Switch /Extn.	BEL KOT	2	HFCL	1	3
Enhanced L2 Switch	BEL-KOT	1			1
DRAX/Gyan Setu	ECIL ,ITI	2	–	–	2
NGSG Card	BEL BLR	1	–	–	1
GPSU (75W/125W)	ITI-Naini	1	SCTSPL, Tarangg (MSME)	2	3
GPSU(250W)	ITI-Naini	1			1
CGRAN	ITI-MKP	1	–	–	1
Power Amplifier	–	–	TPSED	1	1
STB	–	–	Surbhi	1	1
C-CAS			Rurutek	1	1
WAP	ITI	1	Aggressive-EMS	1	2
OTN Cross Connect & DWDM	–	–	UTL	1	1
C-IPCAS	-	-	MCBS	1	1
40 Technologies	**9 Licensees**	**50 ToTs**	**25 Licensees**	**79 ToTs**	**129 ToTs, 34 Licensees**

Promotion of Hindi

Activities of Official Language Unit during the year 2022-2023

The Amrit Mahotsav, being celebrated by Govt. of India on the occasion of 75th anniversary of Indian Independence, has been made a key component for promotion of Official language in C-DOT. To draw the new generation's attention towards the significant role of Hindi language in India's struggle for independence, all the activities of the Official Language Unit at C-DOT were woven around it.

The Official Language Unit (Rajbhasha Ekak) at C-DOT is determined and working hard to ensure the implementation and compliance of the Official Language Act. In order to facilitate working in Hindi, information regarding various areas 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 the 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 Workshops

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 in use of Hindi for official correspondence 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 Bengaluru offices.

Hindi Utsav

A grand opening of Hindi Divas and Second All India Official Language Conference was organized by Department of Official Language, Ministry of Home Affairs wherein Hon'ble Union Minister of Home Affairs and Minister of Co-operation, Shri Amit Shah   inaugurated Hindi Diwas' 2022 at Surat. On the occasion of Hindi Divas on September 14, 2022, all C-DOT employees took the Official Language Pledge under the leadership of the Chief Executive Officer.   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 lay emphasis on linguistic empowerment along with digital empowerment. Hindi Utsav was celebrated in the month of September in both the offices of C-DOT in Delhi and Bengaluru – a celebration in which all the members of C-DOT family were encouraged to work in the official language - Hindi. All the competitions were organized keeping Covid protocol in mind.

- **Traditional Indian Greetings**

  As in the past, this year also a competition was organized during the Hindi Pakhwada to promote Indian traditional greetings. During the Utsav, volunteers 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 Rajbhashashree Award**

  To promote working in   Official Language - Hindi and increasing its usage in day-to-day work, this year four members were honored with Rajbhashashree 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.

- **Essay Writing Competition**

An essay-writing competition was organized to encourage writing skills of C-DOT employees. The topic of the essay was informed through e-mail 5 minutes before the start of the competition and the participating members had to write essay in answer-books provided by the Official Language Unit within the time limit of 1 ½ hr. in a hall. 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.

- **Story Writing Competition**

In an attempt to enhance writing skills and creativity of C-DOT employees, Story-Writing competition was organized. An excerpt from the story "Chief ki Daawat, written by famous writer Sh. Bhishma Sahni was provided in answer sheet of competition. The participants had to write their own story using this passage in the beginning, middle and end of their story.

- **Self-Composed Poetry Recitation Competition:-**

In order to unleash the creativity talent among C-DOT employees, a poem recitation competition was organized during Hindi Utsav. The participants expressed their love for Official Language Hindi and presented present-day society's burning problems in the form of poetic compositions.

- **Elocution Competition**

In an attempt to enhance vocabulary, oratory skills and self-confidence of C-DOT employees, on-the-spot elocution competition was organized. In this competition, the participants had to come on the stage and speak for 3 minutes on the topic chosen by them through draw. Separate awards were kept for Hindi and Non-Hindi Speaking staff.

Overall, Hindi Utsav was celebrated with utmost zeal and enthusiasm in C-DOT in which more than 150 employees participated with great enthusiasm

- **Theatrical Performance**

On the occasion of Azaadi ka Amrit Mahotsav, 75th year of India's Independence, a special play "Swami Vivekananda" based on preachings of Swami Vivekananda, the great builder of modern India, who attacked the anomalies prevalent in Hindu religion and inspired the youth of India towards freedom struggle was staged by renowned Singer and Musician, Padmashree Awardee Shri Shekhar Sen.

- **Convening of "Shabdotsav"**

On the occasion of World Hindi Day and Pravasi Bhartiya Diwas, C-DOT organized a festival of poetry "Shabdotsav". Poetry plays a very important role in preserving our culture, rituals and promotion of language. Renowned poets from all over the country – Dr. Wasim Barelvi, Dr. Laxmi Shankar Vajpayee, Shri Aqeel Nomani, Shri Alok Srivastav, Shri Popular Merathi, Shri Amit Goswami, and Smt. Prerna Pratap participated in this grand event and mesmerized the C-DOT audience with their poetic compositions based on National Integration and Linguistic Harmony.

- **Katha-Kahaani Kaho Apni Zubaani Competition**

Under the aegis of City Official Language Implementation Committee, "Katha-Kahaani Kaho Apni Zubaani" competition was successfully organized online in C-DOT with the theme of "Azaadi ka Amrit Mahotsav" in mind. The participants had to recite in their own words the work of any writer/litterateur or any famous folk tale/legend composed in the background of Indian Freedom Struggle within the stipulated time of 5 minutes. C-DOT has been successfully conducting this competition for the last 17 years and it has proved to be a very effective tool in connecting participants to the vast heritage of Indian Literature, Language and Books.

- **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%.

Knowledge Management

Training at C-DOT Delhi

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 trainings on technical, managerial and soft-skills are arranged for the employees.

Following are the key trainings conducted during the FY 2022-23:

- Induction and Orientation Training of REs 2022

- Training module on "Advanced Kubernetes for Developers & Administrators"

- Training Session on "Office Procedure, Noting & Drafting"

- Online training modules on Red Hat Open stack

- Anytime Access for staff to thousands of e-learning courses through C-DOT LMS platform

TRAINING METRICS FOR 2022-23

S.No.	Training Details for C-DOT Delhi	No. of Persons Attended	Total Time in Trainings (in hrs)
1.	1st Quarter of FY	38	1467
2.	2nd Quarter of FY	118	4315
3.	3rd Quarter of FY	83	2304
4.	4th Quarter of FY	45	869
	Total	**283**	**8953**

STUDENT TRAINING AT DELHI FOR 2022-23

Summer Student Trainees

Applications Received	Offer Letter Issued	Joined
29	29	27

Winter Student Trainees

Applications Received	Offer Letter Issued	Joined
9	9	8

Induction and Orientation Training of REs 2022

Training Module on "Advanced Kubernetes for Developers & Administrators"

Knowledge Management Group (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 broadcast to C-DOT staff on various topics like WTISD 2022 Webinar on Centre of Innovation for IOT/M2M, First International Quantum Communication Conclave, IEEE Standards Workshop on Next Generation Connectivity, Webinar on "Intelligent Transport System (ITS)- Technology and standards", Workshop on "Bridging the coordination and collaboration gap" to name a few.

Knowledge Management Centre, Delhi

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 19,285 technical books, 2027 Hindi books and over 50 periodicals and magazines besides country's 13 leading Newspapers and Newsletters (across locations). For the year 2022 -2023 a total of 89 books were added to the library collections.

C-DOT also subscribes 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

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 31-3-2022	Period from 1st April 2022 - 31st March 2023				Present strength as on 31-03-2023
		Inducted	Absent	Resigned	Completed	
Graduate	3	11	0	5	3	6
Diploma - Technical	2	4	0	1	2	3
ITI	0	0	0	0	0	0
Total	**5**	**15**	**0**	**6**	**5**	**9**

Knowledge Management Group Bengaluru

Training

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 broadcast 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 5G essentials, 5G RAN, 5G Core, 4G Core, Python, Signal Integrity, Power integrity Analysis, Power Amplifier Design, DevOps tools, Understanding of Wi-Fi Technology advancement and Network Architecture, Quantum Computing and Communication, Advanced MS Excel, Inventory Management, Management skills, Vigilance awareness, POSH etc. The trainings conducted this year are:

S.No.	Type of Training	No. of Trainings conducted	Participants benefitted
1.	Organizational Training	17	409
2	Group Specific Training	15	51

Knowledge Management Centre, Bengaluru

Library, (Knowledge Management Centre) at Bengaluru 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 2022_2023 a total of 98 new books were added to the library collections. Purchase of library books, magazines, Hindi books are governed by Library committee members.

Apprenticeship Training

The scheme of Apprenticeship training provides opportunities for practical training to graduates (engineers and non-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 31-03-2022	Period from 1st April 2022 to 31st March 2023				Present strength as on 31-3-2023
		Inducted	Absent	Resigned	Completed	
Graduate	11	18	0	4	8	17
Diploma - Technical	1	0	0	1	0	0
Total	12	18	0	5	8	17

Student Internship

As per C-DOT's internship policy, KMG Bengaluru 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, 21 students got benefitted in FY 22-23.

Institutional Membership

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 (NASSCOM)	Associate Membership since 1996
16.	OneM2M	Individual Membership through TSDSI since 2014
17.	O-RAN Alliance	Academic Membership since January 2022
18.	PICMG	Associate Membership since 2015
19.	Telecom Equipment & Services Export Promotion Centre (TEPC)	Corporate Membership since 2015

Sl. No.	Membership	Membership Details
20.	Telecommunications Standards Development Society, India (TSDSI)	Institutional Membership since 2014
21.	VoICE	Membership since December 2021
22.	DLMS	Regular Membership since 2022
23.	5G-MAG	Membership since December 2021
24.	IEL and ACM	Institutional Membership since 2004
	Library Memberships	
25.	British Council Library	Access 10 Membership
26.	Delnet (Developing Library Network)	Institutional Membership

Auditors Report

Audited Financial Statements

Financial Statements 2022-23

Significant Accounting Policies

Notes on Accounts

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 STATUTORY AUDITORS

Hingorani M. & Co.
Chartered Accountants
35, Netaji Subhash Marg, Darya Ganj
New Delhi -110 002

OUR OFFICES

C-DOT
C-DOT Campus
Mandi Road, 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

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 2023 and the statement of 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, 2023, 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 3(b)(i) of Schedule 14 that outstanding dues amounting to Rs.3,343.27 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 No.3(b) of Schedule 14 that Sundry debtors of Rs. 8,768.97 lakhs, remain unconfirmed. Out of above, most of dues are from PSU's and Govt. Agencies, recovery of which are being under Synergy initiative of Ministry, hence considered good.

- Para No 5 of Schedule 13 whereby inventories of Bangalore comprising of components, stores, spares of Rs. 6,937.46 Lakhs 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 components, stores are not intended.

- Para No 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: 23090943BGPXGH4721

Place: New Delhi

Date: July 24, 2023

BALANCE SHEET AS ON MARCH 31, 2023

(in Rupees)

Particulars	Schedule No.	2023	2022
CORPUS/CAPITAL FUND AND LIABILITIES			
Corpus/Capital fund	1	8,25,49,95,138.89	6,11,39,59,821.20
Current liabilities and provisions	2	2,88,01,24,350.46	2,24,70,23,325.59
TOTAL		**11,13,51,19,489.35**	**8,36,09,83,146.79**
ASSETS			
Fixed assets	3		
Gross block		6,71,05,20,916.38	6,96,19,14,739.06
Less :- Depreciation		5,76,14,52,153.97	6,12,20,72,951.26
Net block		**94,90,68,762.41**	**83,98,41,787.80**
Capital work-in-progress	4	72,46,064.50	72,46,064.50
Current assets, loans, advances and deposits	5	10,17,88,04,662.44	7,51,38,95,294.49
TOTAL		**11,13,51,19,489.35**	**8,36,09,83,146.79**
Significant accounting policies	13		
Contingent liabilities and Notes on accounts	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/-
(Mahinder Singh)
Chief Finance Officer

Sd/-
(Dr. Rajkumar Upadhyay)
Chief Executive Officer

Place : New Delhi
Date: July 24, 2023
UDIN: 23090943BGPXGH4721

INCOME AND EXPENDITURE ACCOUNT FOR THE YEAR ENDED MARCH 31, 2023

(in Rupees)

Particulars	Schedule No.	2023	2022
INCOME			
Income from TOT, Royalty, TSR/FSR & Publications	6	2,32,27,15,646.47	1,55,43,73,263.62
Interest earned	7	23,53,71,139.19	8,63,79,608.79
Other income	8	3,76,49,582.04	6,59,21,176.56
TOTAL (A)		**2,59,57,36,367.70**	**1,70,66,74,048.97**
EXPENDITURE			
Establishment expenses	9	3,47,43,15,925.19	2,97,98,72,256.18
Operational expenses	10	1,21,91,12,356.96	30,50,70,194.66
Other administrative expenses	11	48,96,63,269.95	32,43,91,003.35
Depreciation	3	26,08,47,238.04	17,90,91,320.12
TOTAL (B)		**5,44,39,38,790.14**	**3,78,84,24,774.31**
Excess of expenditure over income for the year [(B)-(A)]		2,84,82,02,422.44	2,08,17,50,725.34
Add/(Less) :-			
Adjustments pertaining to prior period items (Net)	12	1,07,62,259.87	(76,99,824.81)
Balance being excess of expenditure over income		**2,85,89,64,682.31**	**2,07,40,50,900.53**
Add :- Excess of expenditure over income of previous years		37,50,01,93,340.92	35,42,61,42,440.39
Balance being deficit carried to Corpus / Capital fund		**40,35,91,58,023.23**	**37,50,01,93,340.92**
Significant Accounting Policies	13		
Contingent Liabilities and Notes on Accounts.	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/-
(Mahinder Singh)
Chief Finance Officer

Sd/-
(Dr. Rajkumar Upadhyay)
Chief Executive Officer

Place : New Delhi
Date: July 24, 2023
UDIN: 23090943BGPXGH4721

SCHEDULE 1- CORPUS/CAPITAL FUND
(Forming part of the Balance Sheet as at March 31, 2023)

(in Rupees)

Particulars	2023		2022	
Grants (i) Grants from Department of Electronics & Information Technology (Formerly known as Department of Electronics) (ii) Grants from Department of Telecommunication	33,52,00,000.00	33,52,00,000.00	33,52,00,000.00	33,52,00,000.00
Balance at the beginning of the year	43,27,89,53,162.12		39,27,89,53,162.12	
Add - Contributions towards corpus/capital fund during the year	5,00,00,00,000.00	48,27,89,53,162.12	4,00,00,00,000.00	43,27,89,53,162.12
Total Grants (A)		**48,61,41,53,162.12**		**43,61,41,53,162.12**
Less :- Balance of net expenditure transferred from the Income and Expenditure account (B)		**40,35,91,58,023.23**		**37,50,01,93,340.92**
TOTAL (A-B)		**8,25,49,95,138.89**		**6,11,39,59,821.20**

SCHEDULE 2-CURRENT LIABILITIES AND PROVISIONS

(Forming part of the Balance Sheet as at March 31, 2023)

(in Rupees)

	Particulars	2023	2022
A.	**CURRENT LIABILITIES**		
1	Sundry Creditors		
	a) For Goods	49,51,21,394.31	3,63,26,954.48
	b) Others	24,19,75,092.10	31,74,84,663.72
2	Advances received for funded projects		
	a) Prebilled invoices	1,91,58,256.00	7,11,55,786.00
	b) Others	82,79,51,343.35	71,63,79,553.47
3	Statutory Liabilities	10,45,12,128,98	10,33,34,958.57
4	Other Current Liabilities	3,54,99,924.49	1,28,32,159.35
	Subtotal (A)	**1,72,42,18,139.23**	**1,25,75,14,075.59**
B.	**PROVISIONS**		
1	Gratuity	12,34,46,140.23	6,84,07,441.00
2	Earned leave	1,03,24,60,071.00	92,11,01,809.00
	Subtotal (B)	**1,15,59,06,211.23**	**98,95,09,250.00**
	TOTAL (A+B)	**2,88,01,24,350.46**	**2,24,70,23,325.59**

SCHEDULE 3-FIXED ASSETS

(Forming part of the Balance Sheet as at March 31, 2023)

(in Rupees)

Particulars	Gross Block				Depreciation				Net Block	
	As at 01.04.2022	Additions	Adj./Write-off	As at 31.03.2023	As at 01.04.2022	For the year	Adj./Write-off	As at 31.03.2023	As at 31.03.2023	As at 31.03.2022
(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	47,45,34,198.46	95,64,676.92		48,40,98,875.38	8,60,82,092.27	9,56,46,769.19
Building-Residential	2,36,27,434.00	-	-	2,36,27,434.00	1,73,32,724.90	3,14,735.46		1,76,47,460.36	59,79,973.64	62,94,709.10
R & D Equipment	2,27,01,83,982.61	8,37,06,106.18	(29,07,28,776.11)	2,06,31,61,312.68	1,94,86,02,981.27	5,94,14,734.12	(28,11,57,294.61)	1,72,68,60,420.78	33,63,00,891.90	32,15,81,001.34
R& D Computers	3,10,65,60,338.44	29,71,62,911.46	(22,56,49,056.02)	3,17,80,74,193.88	2,97,14,49,239.14	17,27,98,150.28	(22,53,70,967.97)	2,91,88,76,421.45	25,91,97,772.43	13,51,11,099.30
Office Equipments & Appliances	39,19,64,827.80	30,79,176.51	(10,49,65,708.31)	29,00,78,296.00	35,34,43,240.15	55,25,981.38	(10,01,83,245.80)	25,87,85,975.73	3,12,92,320.27	3,85,21,587.65
Furniture & Fixtures	41,91,36,240.18	29,46,640.84	(1,74,75,583.23)	40,46,07,297.79	29,64,49,618.96	1,26,98,493.88	(1,47,56,526.95)	29,43,91,585.89	11,02,15,711.90	12,26,86,621.22
Library Books	6,02,60,948.38	5,30,466.00	-	6,07,91,414.38	6,02,60,948.38	5,30,466.00	-	6,07,91,414.38	-	-
Total	6,96,19,14,739.06	38,74,25,300.99	(63,88,19,123.67)	6,71,05,20,916.38	6,12,20,72,951.26	26,08,47,238.04	(62,14,68,035.33)	5,76,14,52,153.97	94,90,68,762.41	83,98,41,787.80
Previous year's total	6,86,07,83,833.05	10,14,80,709.88	(3,49,803.87)	6,96,19,14,739.06	5,94,32,92,010.75	17,90,91,320.12	(3,10,379.61)	6,12,20,72,951.26	83,98,41,787.80	91,74,91,822.30
(B) Assets in transit									-	-

SCHEDULE 4-CAPITAL WORK IN PROGRESS

(Forming part of the Balance Sheet as at March 31, 2023)

(in Rupees)

Particulars	As at 01.04.2022	Additions	Trf. to fixed assets	As at 31.03.2023
Campus - Delhi				
Campus - Residential Complex	72,46,064.50	-	-	72,46,064.50
Total	**72,46,064.50**	-	-	**72,46,064.50**
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, 2023)

(in Rupees)

Particulars	2023	2022
A. CURRENT ASSETS		
1 Inventories (as taken, valued and certified by the Management)		
a) Stores and spares	79,45,54,474.16	69,60,32,098.12
b) Inventory in transit	1,69,70,344.97	1,05,34,204.66
	81,15,24,819.13	70,65,66,302.78
Less:- Provision for unmoved stores & spares	9,43,12,964.00	
	71,72,11,855.13	**70,65,66,302.78**
2 Sundry debtors		
a) Debts outstanding for a period exceeding six months	1,13,20,12,283.43	1,16,31,48,411.51
b) Others	28,26,67,332.64	34,02,27,500.38
	1,41,46,79,616.07	1,50,33,75,911.89
Less:- Provision for bad & doubtful debts	20,34,55,421.84	7,31,95,771.00
	1,21,12,24,194.23	**1,43,01,80,140.89**
3 Bank Balances		
a) With Scheduled banks		
On Current Accounts	5,81,73,645.29	5,36,18,953.29
On Deposit Accounts	5,54,49,73,293.00	4,39,36,94,584.00
On Savings Accounts	2,09,67,84,626.15	54,46,89,365.99
	7,69,99,31,564.44	**4,99,20,02,903.28**
Total (A)	**9,62,83,67,613.80**	**7,12,87,49,346.95**
B . LOANS & ADVANCES		
1 Staff Loans	**30,54,235.00**	**30,53,524.00**
2 Advances and other Amounts Recoverable in Cash or in Kind or for value to be received		
a) Contractors & Suppliers	14,88,95,645.68	8,33,86,963.80
b) Employees	12,31,903.66	11,67,504.39
c) Prepaid expenses	1,96,94,725.15	1,72,18,772.45
	16,98,22,274.49	**10,17,73,240.64**
3 Interest Accrued		
a) Staff Loan	3,47,514.94	2,74,118.75
b) On Bank Deposits	9,62,60,395.00	4,49,60,422.00
	9,66,07,909.94	**4,52,34,540.75**
4 Claims Receivable	**2,97,92,561.78**	**3,44,58,165.53**
5 Tax deducted at source	**12,59,91,412.65**	**10,57,78,245.53**
6 Input Tax Credit	**11,44,64,653.78**	**8,51,45,670.09**
Total (B)	**53,97,33,047.64**	**37,54,43,386.54**
C. DEPOSITS		
1 Office Building	40,500.00	40,500.00
2 Others	1,05,83,501.00	96,62,061.00
3 EMD	80,000.00	
Total (C)	**1,07,04,001.00**	**97,02,561.00**
TOTAL (A+B+C)	**10,17,88,04,662.44**	**7,51,38,95,294.49**

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

(Forming part of the Income & Expenditure Account for the year ended March 31, 2023)

(in Rupees)

Particulars	2023	2022
1) Income from Royalty	72,43,611.00	29,10,696.00
2) Income from Transfer of Technology (TOT)	26,00,000.00	8,00,000.00
3) Technology/Field support receipts (TSR/FSR)	2,31,28,63,035.47	1,55,06,48,567.62
4) Income from Publications	9,000.00	14,000.00
TOTAL	**2,32,27,15,646.47**	**1,55,43,73,263.62**

SCHEDULE 7-INTEREST EARNED

(Forming part of the Income & Expenditure Account for the year ended March 31, 2023)

(in Rupees)

Particulars	2023	2022
1) On term deposits with Scheduled Banks	21,44,82,563.00	7,40,60,966.00
2) On savings accounts with Scheduled Banks	1,95,81,553.00	53,94,802.53
3) On loans to employees	4,53,049.19	3,58,523.41
4) Others	8,53,974.00	65,65,316.85
TOTAL	**23,53,71,139.19**	**8,63,79,608.79**

Centre for Development of Telematics

SCHEDULE 8-OTHER INCOME

(Forming part of the Income & Expenditure Account for the year ended March 31, 2023)

(in Rupees)

Particulars	2023	2022
1) Gain due to foreign exchange translation	6,05,257.38	4,85,818.74
2) Miscellaneous income	3,70,44,324.66	6,52,85,583.86
3) Profit on sale/disposal of assets	-	1,49,773.96
TOTAL	**3,76,49,582.04**	**6,59,21,176.56**

SCHEDULE 9-ESTABLISHMENT EXPENSES

(Forming part of the Income & Expenditure Account for the year ended March 31, 2023)

(in Rupees)

Particulars	2023	2022
a) Salaries and wages	2,66,77,85,987.00	2,23,72,75,772.00
b) Contributions to provident fund	24,85,69,390.54	25,24,75,379.64
c) Contributions to other fund	1,18,28,289.00	1,20,51,893.00
d) Gratuity provided for employees	12,34,46,140.23	7,84,07,441.00
e) Leave liability provided for employees	11,10,26,092.00	14,22,56,066.00
f) Staff welfare expenses	30,18,14,591.00	25,41,66,894.54
g) Rent on residentials	12,26,884.05	
h) Recruitment and training expenses	86,18,551.37	32,38,810.00
TOTAL	**3,47,43,15,925.19**	**2,97,98,72,256.18**

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SCHEDULE 10-OPERATIONAL EXPENSES

(Forming part of the Income & Expenditure Account for the year ended March 31, 2023)

(in Rupees)

Particulars	2023	2022
a) R&D components & consumables	43,80,57,847.70	9,37,94,198.11
b) Freight & forwarding charges	1,57,68,433.21	67,45,400.61
c) Liquidated Damages Expenses	10,000.00	-
d) Repair & maintenance - R&D/office equipments	5,88,33,685.96	6,85,96,917.42
e) Design, development & technology support expenses	54,62,01,640.01	11,81,02,152.83
f) Technical, Apprentice & Consultancy expenses	4,89,01,600.08	1,51,16,295.69
g) Testing charges	33,39,150.00	27,15,230.00
h) Collaborative research expenses	10,80,00,000.00	-
TOTAL	**1,21,91,12,356.96**	**30,50,70,194.66**

SCHEDULE 11-OTHER ADMINISTRATIVE EXPENSES

(Forming part of the Income & Expenditure Account for the year ended March 31, 2023)

(in Rupees)

Particulars	2023		2022	
a) Travelling and conveyance expenses		4,72,78,777.94		1,52,93,522.55
b) Vehicle hire charges		29,68,829.72		30,45,250.55
c) Rent, rates & taxes		47,76,027.00		36,90,568.00
d) Interest/ penalty paid		19,35,301.45		13,359.64
e) Electricity & water charges		11,56,06,241.07		10,23,79,541.80
f) Repair & maintenance - Others		10,44,80,010.32		9,01,26,273.07
g) Newspaper , periodicals & journals		78,72,062.20		81,27,338.89
h) Insurance charges		17,05,172.78		17,08,928.48
i) Printing, stationery, photocopy & admin consumables		1,20,22,763.38		91,74,342.48
j) Postage, telephone and communication charges.		1,08,90,591.95		1,21,29,936.84
k) Exhibition, advertisement & publicity expenses		2,03,67,601.96		37,72,320.48
l) Conference/ seminar/ membership fees		79,58,480.63		45,38,371.96
m) Legal, professional fees & honorarium		1,37,33,277.09		1,01,33,964.89
n) Patent fees		45,55,912.00		37,84,246.00
o) Remuneration to auditors				
Audit fees	6,60,000.00		6,50,000.00	
Out of pocket expenses	67,711.00	7,27,711.00	60,845.00	7,10,845.00
p) Hospitality/ entertainment expenses		2,24,305.82		2,88,872.30
q) Bank charges		9,81,877.67		6,47,258.11
r) Loss due to foreign exchange translation		13,15,375.13		5,65,898.73
s) Miscellaneous expenses.		3,300.00		530.36
t) Loss on disposal of assets		-		1,777.22
u) Bad debts & provision for doubtful debts		13,02,59,650.84		5,42,57,856.00
TOTAL		**48,96,63,269.95**		**32,43,91,003.35**

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

(Forming part of the Income & Expenditure Account for the year ended March 31, 2023)

(in Rupees)

Particulars	2023		2022	
	Debit	Credit	Debit	Credit
INCOME				
Income from TOT, Royalty, TSR/FSR & Publications	1,69,87,500.01	–	–	51,66,062.00
Interest earned	–	–	–	80,330.00
Other income	–	–	–	–
EXPENDITURE				
Establishment expenses	–	25,707.00	3,51,209.00	-
Operational expenses	–	52,77,394.03	-	49,38,220.63
Other administrative expenses	–	9,22,139.11	21,33,578.82	-
Depreciation	–			-
TOTAL	**1,69,87,500.01**	**62,25,240.14**	**24,84,787.82**	**1,01,84,612.63**
NET TOTAL	**1,07,62,259.87**		**(76,99,824.81)**	

SCHEDULE 13: - SIGNIFICANT ACCOUNTING POLICIES
(Forming part of the financial statements for the year ended March 31, 2023)

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 of 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.

c) Provision is made at ninety five percent of the value for stores & spares unmoved for the preceding five years.

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.

c) Grants given under Collaborative research program are considered as revenue expenditure.

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 ACCOUNT

(Forming part of the financial statements for the year ended March 31, 2023)

PART –A: Balance Sheet

1. Fixed Assets:-

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

2. Capital work-in-progress:-

a. It represents cumulative expenditure, incurred since the financial year 2008-09, on proposed housing facility within the C-DOT Campus at New Delhi, amounting to Rs. 72.46 lakhs as at 31.03.2023 (Previous year- Rs.72.46 lakhs).

b. This expenditure under this head will be capitalized appropriately under "Fixed Assets", upon completion of the housing facility.

3. Current Assets, Loans, Advances and Deposits

a. Inventories:

The value of components in Bangalore, which were purchased in past years, issued to the indentors and treated as consumed in the accounts of the year of issue, but part of which were returned to the stores during the current year by the indenting groups- Rs. 76.53 Lakhs (Previous year- Rs.140.65 lakhs).

b. Sundry Debtors amounting to Rs. 14146.80 Lakhs as at 31.03.2023 (Previous year Rs.15033.76 lakhs) includes:-

i. TOT, Royalty & Technology support dues amounting to Rs.3343.27 lakhs as at 31.03.2023 (Previous year- Rs.3286.85 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.

ii. Dues for technology/field support/other services rendered to Telecom companies amounts to Rs. 6050.89 lakhs as at 31.03.2023 (Previous year- Rs.7751.56 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.

iii. Provision for Bad & doubtful debts amounting to Rs. 1302.60 lakhs (Previous year- Rs.542.58 lakhs) towards Technical support dues has been made during the current year. Accumulated provision as at 31.03.2023 is Rs.2034.55 lakhs (Previous year- Rs.731.96 lakhs).

c. Tax Deducted at Source:-

Tax deducted at source receivable pertaining to various years, amount to Rs.1259.91 lakhs as at 31.03.2023 (Previous year- Rs.1057.78 lakhs) is considered good for recovery.

4. Contingent Liability:-

On account of pending legal cases, the amount outstanding is Rs.2024.85 lakhs as at 31.03.2023 (Previous year- Rs.782.55 lakhs).

5. Capital Commitments:-

Capital commitments as at 31.03.2023 amounts to Rs.3990.09 lakhs (Previous year Rs. 968.65 lakhs).

PART – B: Income & Expenditure Account

6. Employees' Benefits:-

I. Gratuity:-

Net provision made towards Gratuity, using the Actuarial valuation method, based on existing pay and allowances is Rs.1234.46 lakhs (Previous year- 784.07 lakhs). The Gratuity Trust, which is managed by a separate Board of Trustees comprising of employees of the Centre, is responsible to discharge the liability on this account.

ii. Earned Leave (EL):-

As per Rules of the Centre, Earned Leave is encashable by serving employees as well as by those leaving the services, either on superannuation or otherwise. Net expenditure recognized in Income & Expenditure account towards leave

liability, based on existing pay and allowances, estimated using actuarial valuation method is Rs.1110.26 lakhs (Previous year- Rs.1422.56 lakhs). Accumulated provision as at 31.03.2023 is Rs.10324.60 lakhs (Previous year- Rs. 9211.02 lakhs).

7. Consumption of Components:-

i. 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. Components consumed during the current year were Rs.4380.58 lakhs (Previous year- Rs.937.94 lakhs) which includes provision for stores and spares unmoved for preceding five years amounting to Rs.943.13 lakhs.

8. 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. 7.10 lakhs (Previous year loss- Rs.0.80 lakhs).

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

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

It includes income of Rs. (-) 169.87 lakhs (Previous year Rs. 52.46 lakhs) and expenditure of Rs. (-) 62.25 lakhs (Previous year Rs. (-) 24.53 lakhs).

PART – C: General

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

Mahinder Singh
Chief Finance Officer

Dr. Rajkumar Upadhyay
Chief Executive Officer

Centre for Development of Telematics

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