Executive summary

Centre for Development of Telematics (C-DOT) was established in 1984. It is an autonomous Telecom R & D organization of Department of Telecommunications. The organization receives funding as grants-in-aid from the Government through DoT.

C-DOT, for more than last three decades has been in the technology forefront with its earnest and targeted R&D efforts, thus spurring the indigenous design, development and manufacturing of telecom technologies catering to the typical Indian requirements. C-DOT’s contribution to the digitization of Indian telecom network has been phenomenal. There are more than 20 million exchange lines based on C-DOT’s technology in the Indian network. C-DOT R&D efforts, therefore, helped the country in bridging the digital divide between urban and rural, establishing strong telecom manufacturing infrastructure, and generating employment.

C-DOT, over the years evolved from single technology mission-oriented R&D program for fixed-line switching to a telecom R&D institution. The organization has highest level of process maturity adjudged at level 5 of Capability Maturity Model –Integrated (CMMI). This shows that organization is ready to undertake large-scale state-of-the-art telecom technologies development programs.

This document summarizes the initiatives, activities and achievements of C-DOT during last one year i.e. w.e.f. May 2014.

Major achievements since May 2014

PRODUCTS LAUNCHED: C-DOT launched various indigenously designed products during last one year. Launch of these products would not only enable saving a lot of forex for the country but it would also foster the manufacturing eco-space in the country.

1. Launch of Broadband Products developed by C-DOT aimed to enable Digital Broadband Connectivity by Hon’ble MoC&IT Sh. Ravi Shankar Prasad and Dr. Fred Okeng’o Mutiang’, Cabinet Secretary, Min.of IC&T Govt. of Kenya, alongwith Secretary DoT Sh. Rakesh Garg and Executive Director, C-DOT, Sh. Vipin Tyagi during Digital India Week.

During Digital India Week, C-DOT launched four products and inaugurated IMS compliant NGN Services in MTNL network.

High Speed, long distance Wi-Fi solution is ideal for increasing the penetration of broadband services in difficult and inaccessible terrains e.g. hilly areas, dense vegetation, islands, unconnected villages, disaster sites, border areas, tunnels, Battlefield Surveillance.

C-DOT Solar powered Wi-Fi is ideal for Hot spots for smart cities/rural schools/Panchayats, Extending broadband connectivity to remote/unconnected places, Ship to ship communications in deep seas, Remote Video Surveillance and site monitoring, Meteorological application, Sensor networks, Disaster Management Networks, Rural and Remote area network and Metropolitan Area Network.

C-DOT Green Power Source is developed for self sustained Wi-Fi operations in areas where reliable grid supply is not available. It can also power various low power telecom equipments.

C-DOT 100Gbps OFC link system is a system for Campus, Enterprise Networks, & Data Centers that require carrier grade features yet a compact integrated solution. It presents modular and cost effective way of quickly rolling out telecom services in Greenfield projects like Smart Cities, IT/Business Parks etc. The solution fits perfectly for MAN Edge Layer Transport as well as Core transport Networks.
C-DOT IMS compliant NGN services were launched by Hon’ble Minister in the MTNL network at Delhi and Mumbai for supporting migration to IP for 1000 subscribers at each location. This allows ease in introduction of newer services and provides Centralized remote control to the operators and enables operator to have considerable savings in the power consumptions MTNL can now think of launching various services (voice, video and data) through various access modes based on IP. It is now possible to migrate existing 3.5 million landline subscribers of MTNL to IP based network. The product launch event was a huge success and widely covered by Indian print, visual, audio and web media.

2. Launch of “GyanSetu” and MAX-NG technologies as a part of Good Governance Day Celebration

25th December 2014 was celebrated as ‘Good Governance Day’ by Government of India. On the occasion, C-DOT dedicated its two citizen friendly technologies to the Nation.

On this occasion Hon’ble Minister of MoC&IT launched C-DOT’s ‘GyanSetu’ and ‘MAX-NG’ technologies. These new developments from C-DOT would prove to be the stepping stones towards taking the benefits of Internet Services to the Masses of Country.

‘GyanSetu’ is an internet based real-time ICT system designed by C-DOT, primarily to provide various e-services to the under privileged rural population of India. GyanSetu is a Platform for rendering an innovative user access method for illiterate and rural population adopting internet based applications. It is expected that the deployment of this innovative technology platform at every panchayat or CSC (Community Service Centre) will enable easy use of Internet based services. GyanSetu is a simple yet advanced application that offers a multitude of services such as ‘Mandi Bhaav’, land record, railway reservation, health tips, online doctor consultation, e-education and many others in highly interactive, convenient, comfortable and user friendly manner. GyanSetu, developed as a generic service delivery platform for rural population, is capable of providing huge number of services and applications to users.

MAX-NG, C-DOT’s Next Generation Network (NGN) solution addresses the needs of the changing telecom scenario and enables a smooth transition from Plain Old Telephone System (POTS) to NGN based Voice-over-IP (VoIP). It helps service providers to build a packet network capable of providing new services. The open architecture of C-DOT NGN platform makes it an ideal solution for building a flexible and scalable next generation network. MAX-NG replaces all existing C-DOT telephone exchanges in BSNL network, and migrates the subscribers to the IP world. The transition to IP is seamless without any disruption of the telephony services to the subscribers. MAX-NG through its innovative design approach provides a very cost effective solution by leveraging on the existing line interface modules and the external copper media and replacing only the select modules that would result in maximum power savings. The migration of existing C-DOT MAX exchanges to VoIP based NGN through C-DOT MAX NG proves technology capability and its possible adaptations to developing countries in the world.

Transfer of Technology of C-DOT ‘GyanSetu’ and ‘MAX-NG’ technology was given to Electronics Corporation of India Limited (ECIL) for mass manufacturing and deployment of the equipment.
Unveiling of Transfer of Technology (ToT) package of C-DOT MAX-NG & GyanSetu

C-DOT Exhibited its current set of products on Good Governance day at Manekshaw centre, New Delhi.

C-DOT Stall attracted more than 125 visitors from Government, Defence and private sector and online real-time demonstrations of the products were shown.

3. Inauguration of C-DOT Terabit Router & Fiber-to-the-Desk (FTTD) solution

C-DOT has designed and developed India’s first indigenous Terabit Router. Hon’ble Minister of Communications & IT, Shri Ravi Shankar Prasad inaugurated C-DOT Terabit Router along with GPON based Fiber-to-the-Desk solution (FTTD) during a TSDSI function held at C-DOT Campus on 14th October 2014.

C-DOT Terabit Router can address the needs of the service next generation telecommunication core network for Data Centre & Telecom Service Providers. As against IP/MPLS routers available from the imported vendors, C-DOT switches and routing systems are built bottom up using indigenous resources. They are assured to be free of any Malware, Trap Doors, Trojans or other forms of embedded intentional or unintentional sniffing/interception software.

C-DOT FTTD solution is a compact GPON solution targeted for office desktop usage. Its Optical Line Terminals (OLT) as well as Optical Netwrok Terminals (ONT) are of small form factor, low priced, consume very less power but still armed with full feature set.

Other Major Achievements since May 2014

B Transfer of Technology Agreements signed during last one year

- Transfer of technology for MAX-NG and Terabit Router technology has been done to M/s ECIL, Hyderabad.
- Transfer of technology for L2 switch technology has been done to M/s BEL.
- Various versions of C-DOT GPON OLT and ONTs have been transferred to C-DOT’s Licensed manufacturers.
- Transfer of technology for Broad Band Wireless Terminal (BBWT) technology was done to M/s ECIL and many ones have shown keen interest in taking transfer of technology of C-DOT’s BBWT.

C Deployment of C-DOT designed GPON solutions commenced in BharatNet (supplied by M/s. UTL ltd) : Till date 1000 OLTs and 13200 ONTs have been supplied by UTL.

D Important Patents granted during last year

<table>
<thead>
<tr>
<th>Invention</th>
<th>Patent No./ Date of Grant</th>
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<tbody>
<tr>
<td>ATM Architecture</td>
<td>260876 / 27-05-2014</td>
</tr>
<tr>
<td>Heatsink Adapter Removal Tool for Ball Grid Arrays</td>
<td>26289 / 17-09-2014</td>
</tr>
<tr>
<td>Interoperability of Set-Top-Box through smart card (US Patent)</td>
<td>8978057 / 10-03-2015</td>
</tr>
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E Agreements signed with and gave deliverables to various strategic agencies and defence establishments

F Test Bed for managing the BharatNet nodes was set up by C-DOT as part of an Agreement signed with BBNL. C-DOT has developed a Network Management Solution (NMS) for about 2.5 Lakh Gram Panchayats (GPs) and 6600 Blocks which is scalable to 6 lakh GPs, on PAN-India basis as part of NOFN Project. The NOFN NMS solution shall centrally monitor, configure,
provision, manage and control the performance of GPON Network Elements online in real-time from NOFN Network Operations Centre (NOC). The product has been developed for Bharat Broadband Network Limited (BBNL).

G. Successful Demonstration for Fiber Fault Detection and Localization Solution (FFLS) in the Fibre Network for BharatNet Project. FFLS is automatic centralised and web based solution to find fault in fiber locations of the fiber network in terms of longitude and latitude along with its display with location based services on GIS. It has inbuilt Fiber Management System that facilitates repair team to resolve problem quickly.

H. Successful Proof of Concept demonstration to examine data collection options from BTS

I. Agreement signed with BBNL for Geo Intelligence Solution for GPON Planning. The solution is being used for BharatNet planning.

J. As per the requirement from Department of Telecommunication (DoT), Govt. of India, C-DOT demonstrated its Tower Monitoring Solution at BSNL site in Sec. 64, Noida, where, it is still working. C-DOT’s Tower Monitoring Solution is a M2M based proprietary, temper proof, real time, web based centralised Power Monitoring System.

K. C-DOT received a Certificate of Merit by ELCINA-EFY (2013-14) for its outstanding achievement in ‘Research and Development’ Category for design of ChaturDamini, a compact version of GPON OLT.

L. A High level Kenyan delegation headed by Dr. Fred Okeng’o Matiang’i, Cabinet Secretary, Min.of IC&T, Govt. of Kenya visited C-DOT labs and had a discussion with C-DOT and its ToT partners. Dr. Matiang’i praised C-DOT technology and congratulated C-DOT for the new launched products.

Major initiatives taken at C-DOT during last year

Make in India- Telecom Conclave, 12th February 2015

To foster close co-operation among indigenous technology developers, manufacturers, academia, and policy makers of the country, C-DOT organized a half day 'Make in India – Telecom' conclave at its campus in New Delhi on 12th February 2015. The event was inaugurated by Shri Rakesh Garg, Secretary Department of Telecommunications, Government of India. Telecom industry luminaries comprising of policy makers, operators, manufacturers, academia, etc. participated in the conclave and shared their understanding of present telecom landscape, future telecom trends and approach for furthering telecom manufacturing in India. Recent initiatives by the Government like Preferential Market Access have reinvigorated Indian telecom fraternity.

C-DOT presented its offerings for various consumer segments e.g. TSPs, ISPs, Building networks, Campus Networks, Public Wifi Hotspots, Rural BPO etc. During the panel discussion, speakers stressed on the need to revive the telecom manufacturing in the country in line with the needs of operators and other users of telecom solutions. C-DOT discussed its future research roadmap with the industry and assured that it would continue to bring indigenous telecom products as per the requirements of the nation. As the forex outflow on the account of Electronic imports is increasing day by day, it is of paramount importance to further indigenous technologies and take them to manufacturers. This will not only save huge forex for the country, but would also develop a eco space of manufacturers, vendors, application developers in the country.
NGO Meet at C-DOT campus Bangalore Theme: Reach the unreached: ICT as the Facilitator, on Jan 9th 2015

C-DOT invited over 100 NGOs across south India working in ICT areas for the workshop on Reach the unreached: ICT as a facilitator. Live demonstration of Gyansetu was done to the audience so that they may take the benefits of technology to the unreached viz. Rural masses, illiterate people and differently abled people. Executive Director, C-DOT, Shri. Vipin Tyagi gave the inaugural address and the occasion was graced by C-DOT founder Executive Director, Padmashree G. B. Meemamsi. The response from the NGOs was good and C-DOT got constructive feedback from them.

Other Events in which C-DOT participated during last year

Israel Innovation Conference

C-DOT participated in Israel Innovation Conference, MXiii 2014 held in Tel Aviv during May 2014. C-DOT showcased its GPON, and BBWT technologies at its stalls along with the description of its other products through posters, and brochures etc. C-DOT’s innovations were much appreciated during the exhibition.

Participation in Defence Communication 2014

C-DOT participated in Defcom 2014 held at Manekshaw Centre during November 17-18, 2014. C-DOT demonstrated its Terabit Router, and GPON solution at its stall during the event. Other C-DOT technologies suitable to the needs of Defence establishments were also explained to the Defence officers during their visit to C-DOT stall.

Global Exhibition on Services

C-DOT participated in The First Global Exhibition on Services, which was held on April 23-25, 2015 in Pragati Maidan, New Delhi, India. C-DOT products GyanSetu Fibre-to-the Desk, WiFi Solution, and Terabit Router etc. was displayed in the exhibition.

5th Strategic Electronics Summit 2014 (SES 2014) – Defence & Aerospace

C-DOT participated in the 5th Strategic Electronics Summit 2014 (SES 2014) – Defence & Aerospace, It was organised by ELCINA on 30th & 31st July, 2014 at Bangalore International Exhibition Centre (BIEC), Bengaluru. Over 150 organisations participated as Exhibitors and / or Delegates. C-DOT demonstrated Broad Band Wireless Terminal, Unified-NMS, LTE-A (Femto eNodeB), Gigabit Passive Optical Network (GPON). Terabit Router, ONTs and Bhavan Damini OLT, Shared GSM Radio Access Network, IP DSLAM and SDCN VoIP phone were also put on display.

DEFTRONICS 2014

DEFTRONICS-2014 was held from 23rd - 25th September 2014 in the Bangalore International Exhibition Centre, Bangalore, India. The high profile event was organized by IESA and included events namely conference sessions, mini-exhibitions & one-
to-one business meetings for the participants. Conference theme was "Impact India: Indian ESDM ecosystem in Defense, Internal Security & Aerospace- Challenges & Solutions". Executive Director, C-DOT, Shri. Vipin Tyagi, participated in the key Panel discussion.

Vibrant Gujarat 2015

Vibrant Gujarat 2015 was held from 7th to 13th January 2015 at Mahatma Mandir, Gandhinagar, Gujarat, India.

In this Summit other states and countries showcased their strengths, highlighted business opportunities and facilitated knowledge dissemination. C-DOT displayed following products during the summit:

1. BBWT (BroadBand Wireless Terminal)
2. Gyan Setu
3. GPON OLT