Ministry of Electronics and Information Technology
Government of India

Common Services Centres

PMGDISHA

Electronic Manufacturing

eSign

e-Hospital

National Scholarship Portal

Digital Locker

India BPO Scheme

Digital India
Power To Empower

Aadhaar

UMANG

Digital Payments (BHIM)

National Knowledge Network

ELECTRONICS AND INFORMATION TECHNOLOGY

ANNUAL REPORT
2017-18

Ministry of Electronics & Information Technology (MeitY)
Government of India

ANNUAL REPORT

2017-18

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Chapter 1

Overview

Vision, Mission, Objectives, Structure and Functions of MeitY

1.1 Introduction

Ministry of Electronics and Information Technology (MeitY) is responsible for formulation, implementation and review of national policies in the field of Information Technology, Electronics and Internet (all matters other than licensing of Internet Service Provider).

1.2 Vision

The Vision of the Ministry coincides with the overarching vision outlined under the Digital India programme for making Digital infrastructure as a utility to every citizen, Governance and Services on Demand and Digital empowerment of citizens.

1.3 Mission

The Mission is to promote e-Governance for empowering citizens, promoting the inclusive and sustainable growth of the Electronics, IT & ITeS industries, enhancing India's role in Global Platforms of Internet Governance, adopting a multi pronged approach that includes development of human resources, promoting R&D and Innovation, enhancing efficiency through digital services and ensuring a secure cyber space.

1.4 Objectives

- Providing e-infrastructure for delivery of e-Services

- Promotion of electronics hardware manufacturing and IT&ITeS industries

- Implementation of R&D Framework - Enabling creation of Innovation/ R&D Infrastructure in emerging areas of ICT&E/ Establishment of mechanism for R&D translation

- Providing support for development of e-Skills and Knowledge network

- Securing India's cyber space

- Promoting the use of ICT for more inclusive growth

- Enhancing India's role in Global Platforms of Internet Governance.

1.5 Functions of Ministry of Electronics and Information Technology

MINISTRY OF ELECTRONICS AND INFORMATION TECHNOLOGY (ELECTRONIKI AUR SOOCHANA PRAUDYOGIKI MANTRALAYA)[1]

1. Policy matters relating to information technology; Electronics; and Internet (all matters other than licensing of Internet Service Provider).

2. Promotion of internet, IT and IT enabled services.

   2A. Promotion of Digital Transactions including Digital Payments.[2]

3. Assistance to other departments in the promotion of E-Governance, E- Commerce, E- Medicine, E-Infrastructure, etc.

4. Promotion of Information Technology education and Information Technology-based education.

5. Matters relating to Cyber Laws, administration of the Information Technology Act. 2000 (21 of 2000) and other IT related laws.

6. Matters relating to promotion and manufacturing of Semiconductor Devices in the country excluding all matters relating to Semiconductor Complex Limited (SCL), Mohali.[3]

7. Interaction in IT related matters with international agencies and bodies e.g. Internet for Business Limited (IFB), Institute for Education in Information Society (IBI) and International Code Council – on line (ICC).

8. Initiative on bridging the Digital Divide: Matters relating to Digital India Corporation (DIC) [earlier Media Lab Asia (MLA)].

9. Promotion of Standardization, Testing and Quality in IT and standardization of procedure for IT application and Tasks.

10. Electronics Export and Computer Software Promotion Council (ESC).

11. National Informatics Centre (NIC).

12. Initiatives for development of Hardware/Software industry including knowledge– based enterprises, measures for promoting IT exports and competitiveness of the industry.

13. All matters relating to personnel under the control of the Ministry.[4]

14. Unique Identification Authority of India (UIDAI).[5]

1.6 Organization Structure:

The Secretariat of the Ministry of Electronics and Information Technology (MeitY) is headed by Secretary, who is assisted by AS & FA, and Group Coordinators and Heads of Organisations under the administrative charge of Meity. The organisational chart is given below:-

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1 Inserted vide Amendment series no.327 dated 16.07.2016. Earlier (as Department) modified vide Amendment series no.300 dated 26.02.2012

2 Inserted vide Amendment series no. 332 dated 13.02.2017.

3 Inserted vide Amendment series no.279 dated 01.03.2005 and further modified vide no.322 dated 17.03.2016.

4 Modified vide Amendment series no.281 dated 01.09.2005, Further modified vide amendment series no.327 dated 16.07.2016.

5 Inserted vide Amendment series no.318 dated 12.09.2015 (Earlier inserted under Planning Commission vide Amendment Series no.296 dated 22.02.2010, and in NITI Aayog vide series no.312)

MINISTRY OF ELECTRONICS AND INFORMATION TECHNOLOGY (MeitY) ORGANISATION STRUCTURE

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                              ┌──────────────────────┐
                              │   Minister ( E & IT)  │
                              └──────────┬───────────┘
                                         │
                              ┌──────────▼───────────┐
                              │      MOS (E & IT)     │
                              └──────────┬───────────┘
                                         │
                              ┌──────────▼───────────┐
                              │      Secretary        │
                              └──────────┬───────────┘
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| Groups and their Heads in MeitY | Attached Offices | Autonomous Societies | Section 8 Companies | Statutory Organizations | Company registered under Company Act, 1956 |

- Attached Offices:
  - National Informatics Centre (NIC)
  - STQC Directorate

- Autonomous Societies:
  - → CDAC (Pune)
  - → C-MET (Pune)
  - → NIELIT (New Delhi)
  - → SAMEER (Mumbai)
  - → STPI (New Delhi)
  - → ERNET-India (New Delhi)

- Section 8 Companies:
  - → NICSI (PSE under control of NIC)
  - → National Internet Exchange of India (NIXI)
  - → Digital India Corporation (DIC)
    i) My Gov
    ii) NeGD
    (Independent Business Divisions (IBDs) within DIC

- Statutory Organizations:
  - → Controller of Certifying Authority (CCA)
  - → Indian Computer Emergency Response Team (ICERT)
  - → Unique Identification Authority of India (UIDAI)

- Company registered under Company Act, 1956:
  - → CSC e-Governance Services India Ltd.

In order to operationalise the objectives of MeitY, schemes are formulated and implemented, either directly or through its Responsibility Centres (Organizations / Institutions) under its jurisdiction. To make the technology robust and state-of-the-art, collaborations with the academia and the private / public sector is also sought. MeitY has two Attached Offices (viz., NIC, STQC), six Autonomous Societies (viz., CDAC, CMET, NIELIT, SAMEER, STPI and ERNET india), Three Statutory Organizations (viz., CCA, ICERT and UIDAI) and three Section 8 companies (viz., NICSI, NIXI and Digital India Corporation(DIC)), One Company registered under Company Act. 1956 (viz., CSC e-Governance Services India Ltd.) under its charge to carry out the business allocated to the Ministry.

Shri Ajay Prakash Sawhney, Secretary

Group Coordinators (GCs) and their respective Groups

Ms. Anuradha Mitra, AS & FA/GC
(i)   Financial Management Group

Shri Rajiv Kumar, JS/GC
(i)   IP:S&ITS Division
   •   Investment Promotion
(ii) IT/ITES /Pers/Admn/Soc/E-commerce/
      International Cooperation & STPI

Shri Sanjay Kumar Rakesh, JS/GC
(i)   Electronics Hardware
   (a) IPHW
      •   ITIR
      •   Semiconductor Fab
(ii) Internet Governance Division
      •   NIXI
(iii) Productivity and Employment
      Generation

Shri Gopalakrishnan S., JS/GC
(i)   Chief Vigilance Officer(CVO), MeitY
(ii)   DigiDhan Mission
(iii) Artilicial Intelligence
(iv)   IoT and Emerging Technologies areas,
       Start Ups & Innovation

Shri Sanjay Goel, JS/GC
(i)   E-Governance, SWAN, NKN & Smart Cities,
      E-Governance Infrastructure (SDC), NIC,
      NICSI, Website, Social Media, Print Media
      & TDIL, NeGD, MyGov., CSC

**Ms. Simmi Chaudhary,
Economic Adviser/GC**
(i)   Digital Economy
(ii)   GST
(iii) Economic Planning Division
(iv)   Coordination Division
(v)   Grievance
(vi)   RTI
(vii) Parliament

Shri Arvind Kumar, Scientist-G / GC
(i)   R&D in Electronics and C-MET
(ii) R&D-Cyber Security

Dr. B.K. Murthy, Scientist-G / GC
(i)   R&D in IT
       •   Digital India Corporation(DIC), ITRA
(ii)   PhD Scheme, CDAC
(iii) HRD, NIELIT & ERNET India
(iv)   E-Learning, E-Infrastructure and National
       Digital Library

Shri Rakesh Maheshwari, Scientist-G/GC
(i)   Cyber Law, Cyber Security, UIDAI,
       CERT-In and CCA
(ii)   STQC

Shri A.K. Balani, Scientist-G/GC
(i)   R&D in Convergence and Public
       Broadband Access & WiFi and SAMEER
(ii)   E-Governance Infrastructure, NKN
       [Sl. No (ii)- Report through JS(e-Gov) as HoD]

1.7   Client's /Citizens' Charter (CCC):

Details on CCC are available on MeitY's website, url: meity.gov.in/contents/citizens-charter (which is a part of About MeitY).

Digital India: Power to Empower

" Digital India is more for the poor and underprivileged. **It aims to bridge the gap** between the digital haves and have-nots by using technology for citizen."

- Shri Ravi Shankar Prasad
Hon'ble Minister of Electronics &
Information Technology and Law & Justice,
Government of India

Digital India is an umbrella programme to prepare India for a knowledge based transformation. It weaves together a large number of ideas and thoughts into a single comprehensive vision so that each of them is seen as part of a larger goal. The focus of Digital India programme is on being transformative to realize - IT (Indian Talent) + IT (Information Technology) = IT (India Tomorrow) and making technology central to enable change. This programme pulls together many existing schemes. These schemes have been restructured and re-focused and are being implemented in a synchronized manner.

Vision of Digital India

The Digital India programme is centred on three key vision areas:

1. Digital Infrastructure as a Utility to Every Citizen

2. Governance and Services on Demand

3. Digital Empowerment of Citizens

Vision Area 1: Digital Infrastructure as a Utility to Every Citizen includes:

- Availability of high speed internet as a core utility for delivery of services to citizens

- Providing cradle to grave digital identity that is unique, lifelong, online and authenticable to every citizen

- Mobile phone & bank account enabling citizen participation in digital & financial space

- Easy access to a Common Services Centre

- Shareable private space on a public cloud

- Safe and secure cyber-space.

Vision Area 2: Governance & Services on Demand includes:

- Seamlessly integrated services across departments or jurisdictions

- Services availability in real time from online & mobile platforms

- All citizen entitlements to be available on the cloud

- Digitally transformed services for improving ease of doing business

- Making financial transactions electronic & cashless

- Leveraging GIS for decision support systems & development

Vision Area 3: Digital Empowerment of Citizens includes:

- Universal digital literacy

- Accessible digital resources universally

- All documents/ certificates to be available on cloud

- Availability of digital resources / services in Indian languages

- Collaborative digital platforms for participative governance

- Portability of all entitlements through cloud

Pillars of Digital India

This transformational programme has been designed to build holistic capabilities across infrastructure, manufacturing, processes, skill sets and delivery platforms which, in turn, will lead to the creation of a self-reliant, knowledge economy. The focus is on improving direct services to citizens, as well as making the country ready for ease of doing business. Accordingly, the initiatives under this programme aim is to build and sustain all associated layers required for a digital empowerment of the people and building a digital economy.

To ensure focus on each of these layers, following nine pillars of growth areas have been identified under the Digital India Programme:

1. Broadband Highways

2. Universal Access to Mobile Connectivity

3. Public Internet Access Programme

4. e-Governance – Reforming Government through Technology

5. e-Kranti - Electronic Delivery of Services

6. Information for All

7. Electronics Manufacturing – Target NET ZERO imports

8. IT for Jobs

9. Early Harvest Programmes.

Implementation Approach

Digital India is an umbrella programme that covers multiple Government Ministries and Departments. It weaves together a large number of ideas and thoughts into a single comprehensive vision so that each of them can be implemented as part of a larger goal. Each individual element stands on its own, but is also part of the entire Government. Digital India is implemented by the entire Government and being coordinated by MeitY.

All the initiatives, including establishing and expanding core ICT infrastructure to delivery of services under this programme, have a definitive completion time target and are being tracked accordingly. A majority of the initiatives are planned to be realized within next three years. Many of the quick-wins (being tracked under the umbrella of "Early Harvest Programmes") and citizen communication initiatives (being tracked under "Information for All") have been implemented in 2015.

The Digital India Programme aims at pulling together many existing schemes. The schemes have been restructured and re-focused and are being implemented in a synchronized manner. The common branding of programmes as Digital India highlights their transformative impact. While implementing this programme, the Government of India is making wider consultation with Citizens, Industry and Academia to discuss various issues to arrive at innovative solutions for achieving the desired outcome of Digital India. MeitY has already implemented a digital platform, namely "MyGov"(www.mygov.nic.in), to facilitate collaborative and participative governance.

Programme management and Monitoring

Programme management structure of Digital India has been established for monitoring the implementation of the Digital India Programme. Key components of the management structure would consist of a Monitoring Committee on Digital India headed by the Prime Minister, Digital India Advisory Group chaired by the Minister of Electronics and IT, an Apex Committee chaired by the Cabinet Secretary and the Expenditure Finance Committee (EFC) / Committee on Non Plan Expenditure (CNE).

The meetings of Apex Committee on Digital India were held on 26th November, 2014, 28th February, 2015,15th December, 2015, 16th June, 2016 and 23rd March, 2017.

2.1 Digital Infrastructure as a Core Utility to Every Citizen

2.1.1 Digital Identity: Aadhaar: An Efficient and Targeted Service Delivery Platform

Unique Identification Authority of India (UIDAI) has been mandated to empower every resident of India with a Unique Identification Number and provide a digital platform for authentication in an easy, electronic, cost-effective way.

The Aadhaar System is built on a sound strategy and a strong technology backbone and has now evolved into a vital digital identity infrastructure.

Key features of Aadhaar include :

- 12-digit random unique number obtained through the process of de-duplication involving biometrics.

- Only a number and not a card.

- The number does not contain any intelligence.

- Scalable technology architecture

- Open source technologies

- One Resident = One Aadhaar

Aadhaar, being a unique digital ID – provides a powerful platform for authenticating a resident anytime and anywhere which is in line with the vision of the UIDAI. The purpose of Authentication is to enable residents to prove their identity and for service providers to confirm that the residents are 'who they say they are' in order to supply services and give access to benefits.

2.1.1.1 e-Pramaan

MeitY has conceptualized and initiated the e-Pramaan framework (notified in The Gazette of India in December 2012) for e-Authentication for public services. The objective is to electronically deliver the government services to its intended recipients in a secured manner, as well as to build citizen's trust in online environment, which is always prone to identity thefts and other associated risks. MeitY has made e-Pramaan available for public usage with the help of implementing agency C-DAC, Mumbai.

e-Pramaan is a centralized standard based strong multi-factored authentication system which provides
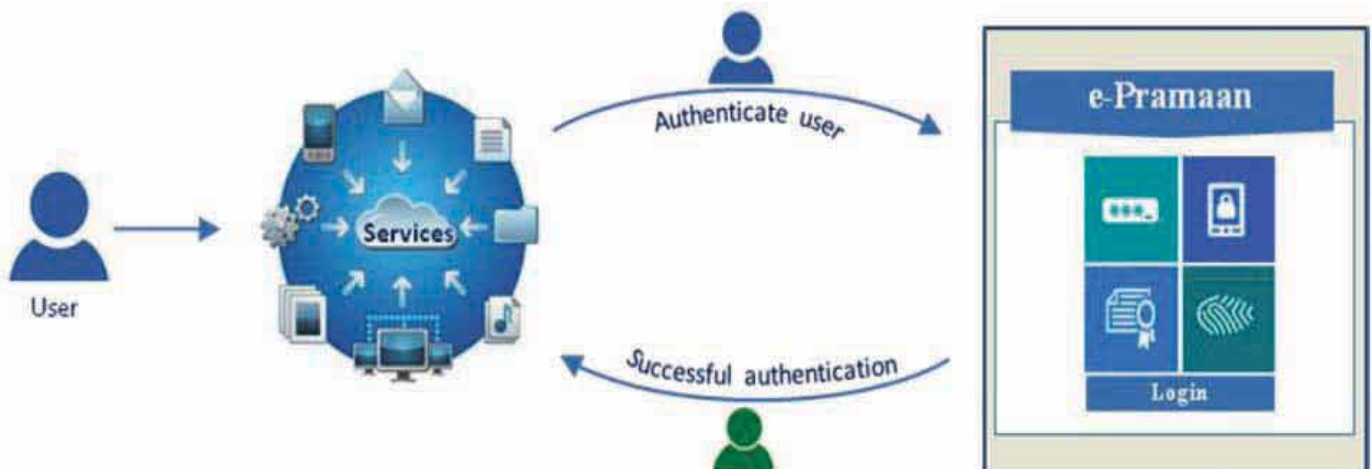
Biometric Authentication

four factors for user authentication : Password (text, image), One Time Password (SMS, email, mobile app), Digital Certificate (Indian CAs), and Biometric (Finger Print, IRIS) in its production environment. Major features of e-Pramaan are:

1) Single Sign On (SAML 2.0 based)
2) Support in Java, Dotnet, PHP
3) Seamless upgrade to new technology
4) Two way authentication
5) Flexible authentication chaining
6) Role based authorisation
7) Secured communication channel

Various workshops were organised to create awareness about e-Pramaan. At present, 105 services are integrated and using e-Pramaan for authentication.

Another major component of e-Pramaan is Aadhaar Ecosystem. C-DAC Mumbai is ASA/KSA – AUA/KUA of UIDAI to provide Aadhaar services and compliant with UIDAI latest API and has 56 departments using its services with more than 6 Crore transactions, at present.

Achievements

- All the four levels (Login-Password, OTP, Digital Certificate, Fingerprint Biometric using Aadhaar Services) of authentication are available in production set-up on cloud at NIC Shastri Park, Delhi.

- Image Password introduced as a factor for authentication which is a new feature added.

- Provided a solution compatible with all the browsers without applets.

- A new improved version of e-Pramaan with better performance launched.

- A mobile app developed for e-Pramaan.

- Complete compliance with UIDAI latest requirements.

- Five region wise workshops organized to spread awareness about e-Pramaan.

- 165+ Services registered

- Over 6 Cr + transactions

2.1.1.2 Online e-Sign (e-Hastakshar)

One of the initiatives taken under Digital India Programme is to provide non-repudiable authentication of applicant's identity through a facility called eSign. This facility is an online digital signature service. eSign was formally launched by Hon'ble Prime Minister on July 1, 2015.

eSign is an online electronic signature service, which can be integrated with service delivery applications via an open API to facilitate an Aadhaar holder to digitally sign a document. Using authentication of the Aadhaar holder through Aadhaar e-KYC service, online electronic signature service is facilitated.

Notification of Electronic Signature or Electronic Authentication Technique and Procedure Rules, 2015, in which the technique known as "e-authentication technique using Aadhaar e-KYC services" for the e-Sign Online Service was introduced, which allows everyone to have the ability to digitally sign electronic documents.

Five agencies, namely, eMudhra, C-DAC (govt. ESP), nCode, NSDL and Capricorn are empanelled to offer e-Sign Services.

Achievements

- C-DAC's e-Sign Service enables instant signing of documents online by citizens in a legally acceptable form. This service was launched by Shri Ravi Shankar Prasad, Hon'ble Minister for Electronics & IT, Government of India on September 3, 2016. This service enables an Aadhaar holder, with registered mobile number with Aadhaar, to electronically sign a form/document anytime and anywhere using a device.

- C-DAC has enabled 39 agencies to leverage e-Hastakshar for eSign purposes

- Total Signatures offered : 23,42,671

2.1.2 State Wide Area Network (SWAN)

The Government has approved the Scheme for establishing State Wide Area Networks (SWANs) across the country, in March, 2005 to connect all State/UT Headquarters up to the Block level via District/sub-Divisional Headquarters, in a vertical hierarchical structure with a minimum bandwidth capacity of 2 Mbps per link. Each of the State / UT can enhance the bandwidth up to 34 Mbps between SHQ and DHQ and upto 8 Mbps between DHQ and BHQ depending upon the utilization.

Presently, SWANs have been made operational in 34 States/UTs, namely, Andhra Pradesh, Telengana, Chandigarh, Chhattisgarh, Delhi, Gujarat, Goa, Haryana, Himachal Pradesh, Jharkhand, Kerala, Karnataka, Lakshadweep, Maharashtra, Odisha, Punjab, Puducherry, Sikkim, Tamil Nadu, Tripura, Uttar Pradesh, West Bengal, Assam, Bihar, Madhya Pradesh, Uttarakhand, Manipur, Arunachal Pradesh, Mizoram, Nagaland, Meghalaya Rajasthan Dadar and Nagar Haveli and Daman & Diu. The States/UTs are utilizing the core infrastructure of SWAN for providing the closed user connectivity to various Government offices in the States/UTs. These offices access their applications through SWAN in a secure environment hosted at State Data Centres (SDCs). SWAN implementation is, however, pending in the State of J&K and UT of Andaman & Nicobar Islands and the concerned State/UT Government is taking further necessary action in this regard.

The States have been utilizing the core infrastructure of SWAN for connectivity and dedicated close user application access connectivity. SWAN has been integrated with NKN in 29 States/UTs at SHQ level and 440 at the district level to provide the high bandwidth.

Increasing digitization amongst States has led to higher utilization of bandwidth. Presently, 30 States/UTs are utilizing more than 60% of bandwidth of the existing link capacity. To monitor the performance of SWANs, the Department has mandated positioning of Third Party Auditors (TPAs) in the States/UTs. As on date, 29 States have empanelled the TPAs for monitoring the performance of the SWANs in the respective States/UTs. Remaining States/UTs are in the process of empanelment of TPA.

2.1.3 State Data Centre (SDC)

State Data Centre (SDC) is one of the three core infrastructure components under the NeGP. Under the SDC Scheme, it is proposed to establish Data Centres in

all the States/UTs to consolidate services, applications and infrastructure in order to provide efficient electronic delivery of Government to Government (G2G), Government to Citizen (G2C) and Government to Business (G2B) services. These services can be rendered by the States through common service delivery platforms seamlessly supported by core connectivity infrastructure such as SWAN and CSCs as the front-end delivery outlets at the village level. Some of the key functionalities that can be provided through SDC are central repository for the State, secure data storage, online delivery of services, citizen information/ services portal, State Intranet Portal, disaster recovery, remote management and service integration, etc. SDCs also provide better operation & management control with minimized overall cost of data management, IT resource management, deployment and other costs for States/UTs.

As on 28th February, 2018, 28 SDCs have been declared operational in Tamil Nadu, Puducherry, West Bengal, Andhra Pradesh, Meghalaya, Goa Karnataka, Manipur, Odisha, Sikkim, Haryana, Kerala, Maharashtra, Gujarat, Tripura, Rajasthan, Nagaland, Uttar Pradesh, Andaman & Nicobar, Madhya Pradesh, Lakshadweep, Chhattisgarh, Jammu & Kashmir, Mizoram Bihar, Himachal Pradesh , Jharkhand and Punjab.

In order to make SDCs Cloud enabled, MeitY has circulated a template Request for Proposal (RFP) to States for initiating a bid process for Cloud Enablement of SDCs. 15 States, namely, Maharashtra, Haryana, Madhya Pradesh, Chhattisgarh, Rajasthan, West Bengal, Kerala, Meghalaya, Tamil Nadu, Himachal Pradesh, Jharkhand, Punjab, Goa, Sikkim and Lakshdweep have completed Cloud enablement.

Since the SDCs are expected to host critical Government applications/services, including important citizen data, protection of the same is of prime importance. In this regard, the SDC scheme has provisioned for a Disaster Recovery (DR) mechanism through storage based replication as part of the SDC enhancement. Till now 22 States, Tamil Nadu, West Bengal, Meghalaya, Manipur, Odisha, Kerala, Maharashtra, Tripura, Rajasthan, Uttar Pradesh, Madhya Pradesh, Chhattisgarh are DR enabled.

MeitY is providing continuous support and guidance to the States/UTs in order to ensure smooth implementation of the project across the country. Policy guidelines, roles and responsibilities of different agencies/stakeholders including various issues/concerns to be addressed while planning, implementation operations & maintenance of the Data Centres have been formulated. Guidelines are updated from time to time and are communicated to the States/UTs, leading towards creation of consistent and state of art infrastructure.

Achievements

- In FY 2017-18, Goa and Punjab SDC got operational.

- In Assam, Uttarakhand, Arunachal Pradesh, Daman & Diu and Dadar and Nagar Haveli, State Data Centres are in various stages of implementation.

- 7 State Data Centres (Karnataka, Madhya Pradesh, Maharashtra, Meghalaya, Puducherry, Sikkim and Uttar Pradesh) completed 5 years of operation during the financial year 2017-18.

2.1.4 GI Cloud (MeghRaj)

In order to realize the Digital India vision, and to utilize and harness the benefits of Cloud Computing, Government of India has embarked upon an ambitious initiative – GI Cloud which has been named as 'MeghRaj'. MeghRaj initiative is intended to deliver ICT services over cloud to all the departments/ ministries at the Centre and States/UTs. The vision of this initiative is to accelerate delivery of e-Services in the country while optimizing ICT spending of the Government. As per the MeghRaj policy, "Government departments at the Centre and States have to first evaluate the option of using the GI Cloud for implementation of all new projects funded by the Government. Existing applications, services and projects have to be evaluated and assessed", whether they should migrate to the GI Cloud.

Some of the major benefits of GI Cloud are as listed below:

- Driving cost efficiencies with increased utilization of IT Infrastructure resources through cloud.

- Enable conversion of CAPEX to OPEX, paving the way for consumption based billing and faster procurement of IT Infrastructure services.

- Rapid development, deployment and re-use of ICT applications.

- On demand scalability of infrastructure to meet the long term capacity requirements and elasticity to cater to the peak load requirements.

Major components of MeghRaj include:

- Setting up of State and National Clouds

- Setting up of an e-Gov AppStore

- Empanelment of Cloud Service Providers

- Empanelment of Cloud Auditors

- Setting up of Cloud Management Office (Policies, Guidelines, templates, security norms, certification etc.)

- Awareness workshops, training programmes and migration support for cloud adoption by Departments

- Megh Raj (GI-Cloud) service Directory

- Setting up of Cloud by other Government entities

Achievements

- The first National Cloud implemented by NIC was launched in February, 2014, which is being used by more than 680 applications of Government Departments. NIC Cloud may be accessed using the following link:https://cloud.gov.in/

- Initiatives under Digital India Programme hosted on National Cloud include:

  - o Digital India Portal

  - o Digital Locker

  - o Digitize India

  - o Make-in-India

  - o Skill Development

  - o Smart Cities

  - o Online Registration System (e-Hospital)

- o Aadhaar based Biometric Attendance of Government employees

- o Jeevan Pramaan - service for pensioners

- o MyGov-largest citizen engagement platform of the Government

- The e-Gov AppStore under GI Cloud was launched in May 2013. The same can be accessed using the link http://apps.gov.in/.

- MeitY has empaneled 12 Cloud Service Providers after audit compliance for a variety of Cloud deployment models (Public Cloud, Virtual Private Cloud, and Government Community Cloud) and Cloud Service offerings (IaaS, PaaS, VDaaS, DRaaS, DevOps as a Service). The empaneled CSPs are Microsoft Corporation (India) Private Limited, IBM India Private Limited, Tata Communications Limited, Bharat Sanchar Nigam Limited (BSNL), ESDS Software Solutions Private Limited, Net Magic IT Services Private Limited, Sify Technologies Limited, CtrlS Data Centers Limited, Cyfuture India Private Limited, Web Werks India Private Limited, AMAZON Internet Services Pvt. Limited and NXTRA Data Limited The current status of the audit and the contact details of the empaneled CSPs can be accessed using the link http://meity.gov.in/content/gi-cloud-meghraj.

Activities in progress

- MeitY, through STQC is in the process of empanelling the Cloud Auditors for auditing the empanelled CSPs

- MeitY is in the process of setting up of CMO (Cloud Management Office) to facilitate an ecosystem for GI Cloud, leading to faster implementation of the cloud policy. CMO RFP has been published.

2.1.5 Service Delivery Gateway

National e-Governance Plan was established in 2006 with a vision to "Make all Government services accessible to the common man in his locality, through common service delivery outlets and ensure efficiency, transparency & reliability of such services at affordable costs to realize the basic needs of the common man". The

Government services should be seamlessly integrated across departments or jurisdictions to provide easy and a single window access to all citizens. It will reduce the time and efforts involved in various approvals, clearances, etc. It would also ensure transparency to the system. In order to meet the objective of seamless integration across the departments, architecture of the application should be designed in a way that interfaces with other systems may be built whenever required. The Service Delivery Gateway is an initiative of MeitY that has provision of single point access for citizens and middleware to enable sharing of information across databases for efficient service delivery.

The State Portal, SSDG and E-Forms initiative facilitates Electronic Service Delivery by providing significant benefits to the citizens, especially in the form of a single gateway to service delivery. Thus, holistic and harmonious use of the Common Service Centres (CSCs), along with the common infrastructure (SWAN and SDC) and technology across the States/UTs for all application and services shall be achieved.

This project intends to provide easy, anywhere and anytime access to Government services (both informational & transactional) and thereby reducing the number of visits of citizens to a government office / department for availing the services. It also aims to reduce administrative burden and service fulfillment time and costs for the government, citizens and businesses and creating a more efficient communication and service delivery system through an Integrated State Portal.

Achievements

- At present, 26 States/UTs have gone live with 800+ services and 594,51,912 transactions have been reported.

- 3 States/UTs (Gujarat, Daman & Diu and Jharkhand) have completed implementation and waiting for Go-Live.

- 2 States/UTs are in process of IA selection.

The National e-Governance Plan (NeGP) of the Government of India aims to make all Government services accessible to the common man in his locality, through common service delivery outlets and ensure efficiency, transparency & reliability of such services at affordable costs to realize the basic needs of the common man. One of the goals of the Government to meet this vision is the need to cooperate, collaborate and integrate information across different departments in the Centre, States and Local Government. Government
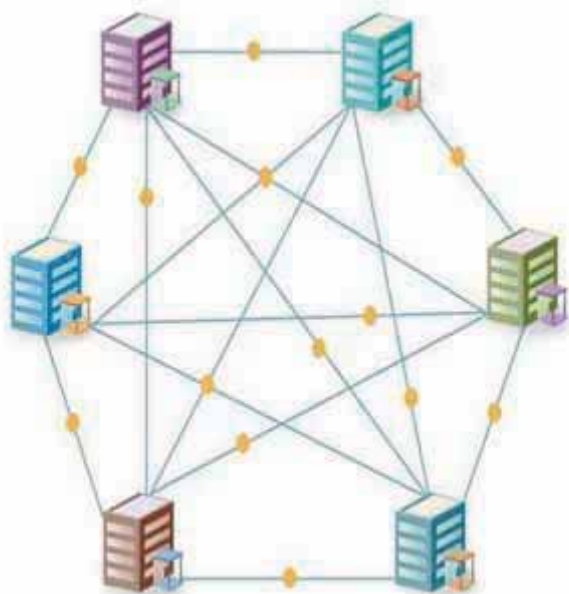
Without NSDG: Point to Point connection using heterogeneous platforms and technologies

With NSDG: Standards-based messaging switch and providing seamless interoperability and data exchange

systems characterized by islands of legacy systems using heterogeneous platforms and technologies and spread across diverse geographical locations, in varying state of automation, make this task very challenging.

eSangam: Service Delivery Gateway (NSDG) is a middleware infrastructure, being implemented by C-DAC Mumbai, acting as a standards based routing and message switch which provides seamless interoperability and exchange of data across heterogeneous applications of geographically dispersed departments. The National e-Governance Service Delivery Gateway (NSDG), a MMP under the NeGP, can simplify this task by acting as a standards-based messaging switch and providing seamless interoperability and exchange of data across. It facilitates the following:

- Interoperability between various e-Governance applications

- Secure Messaging between governmental applications

- Shared Services Hub for Departmental Application – Payment Gateway Services, Mobile Gateway Services, Authentication services (via UID)

eSangam National Gateway is hosted at NIC Data Centre (Primary DC) in Delhi with Disaster Recovery Centre (DR) at NIC, Hyderabad.

Achievements

- 500+ Services were registered in the production environment of eSangam

- Infrastructure enhancement (DC and DR) of eSangam Infrastructure (Both at DC and DR) completed

- Functionality enhancement of eSangam Product completed in staging environment, Security and Performance testing under progress.

- Average monthly transaction for the year 2017: 17,87,272.

2.1.6 National Knowledge Network (NKN)

In March 2010, the Cabinet Committee on Infrastructure (CCI) approved the establishment of the National Knowledge Network (NKN) to be implemented by NIC over a period of 10 years. The objective of NKN is to inter-connect all knowledge institutions across the country through high speed data communication network, to encourage sharing of resources and collaborative research. It was envisaged to cover about 1500 institutions, comprising all Universities, Institutions of Higher Learning and Research.

NKN with its multi-gigabit capability aims to connect all universities, research institutions, libraries, laboratories, healthcare and agricultural institutions across the country and has connected 1,641 such institutions, including links migrated to NKN from National Mission on Education through Information and Communications Technology (NMEICT) of MHRD. By facilitating the flow of information and knowledge, NKN addresses critical issue of access and creates a new paradigm of collaboration to enrich the research efforts in the country. This has brought about a knowledge revolution that has been instrumental in transforming society and promoting inclusive growth.

The salient features of the NKN are

a) Establishing an ultra-high-speed national information network for the country.

b) Connecting all major knowledge institutions (Universities & Research Institutions) for knowledge creation, collation and dissemination of information.

c) Connecting the Indian knowledge institutions to the international knowledge community for knowledge sharing.

d) Enabling sectoral virtual networks in various application areas (Agriculture, Health, Education, E-governance and Grid Computing).

e) Setting up a platform for development of new processes and technologies based on high bandwidth and low latency networks.

f) Enabling a test-bed for network and securing technology development for the country.

g) Link to Global Networks to collaborate with the research communities across the globe.

Also, as per the vision of Hon'ble Prime Minister of India, Shri Narendra Modi, at the 18th SAARC summit in November, 2014, for making the South Asian region more connected and more prosperous. This would entail NKN connectivity with National Research & Education Networks (NRENs) of Nepal, Bhutan, Sri Lanka and Bangladesh in the near future.

Accordingly, Tender has been floated for NKN connectivity with National Research and Education Networks of Nepal, Bhutan, Sri Lanka, Bangladesh, Afghanistan and Maldives. Pre-bid meeting with perspective bidders were conducted on 18th October 2017. The process is expected to be completed shortly and links will be operational within few months.

NKN in the current scenario facilitates creation, acquisition and sharing of knowledge resources among the large participating institutions, collaborative research, countrywide classrooms (CWCR) etc. and help the country to evolve as Knowledge Society.

Current Status

- 1646 links to institutions have been commissioned and made operational. This includes 386 links to institutions under National Mission on Education through Information and Communications Technology (NMEICT), which have been migrated to NKN.

- 14 NKN links have been upgraded to 10G based on their usage i.e. TIFR, IIT Roorkee, IIT Delhi (2 links), IIT Kharagpur, IIT Guwahati, IIT Chennai, IIT Kanpur, IIT Bombay, Delhi University, Banaras Hindu University, JNU, & Gujarat Data Centre.

- NKN connectivity has also been extended to 500 NIC district centres.

- 66 Virtual Classrooms have been set up.

- 94 Core Links have been commissioned and made operational.

- NKN connectivity has been extended to SWAN in 25 States/UTs and SDC in 28 States/UTs.

- NKN has established High Capacity SCPC VSAT Connectivity at Kavarati, Lakshadweep and the same is being established at Port Blair, Andaman & Nicobar Islands.

- 16 NKN locations i.e. Point of Presence (PoPs) are now ISO 27001 certified.

- NKN Services, such as, Bandwidth Testing Service, OSIR (Open Source IP Registrar), DNS (Domain Name Server) & NKN One have been launched and more than hundred institutes are on-board and BitAmbulator is updated with Drag & Drop along with various other interactive features, while testing of version 2 is underway.

- NKN offering DDOS (Distributed Denial of Service) managed security services for the customers, who are connected to NKN backbone to protect their services from DDOS attacks

- Stratum Network Time Protocol (NTP) Server installed at 7 Super core PoPs

- Video Conferencing (VC) by President and Prime Ministers are being regularly conducted over NKN.

- NKN has commissioned its international PoPs at Amsterdam, Singapore and Geneva with 2 x 5 Gbps links each. The links have been operational from Mumbai to Amsterdam, Chennai to Singapore and Amsterdam to Geneva PoP with 2 x 5 Gbps links (two diverse cable systems).

- International NKN PoPs at New York, Canarie and other global RENs are being established.

- 43rd APAN International Conference was organized on 12th –16th February, 2017 at India Habitat Centre, wherein TEIN5 (Asi@connect) was launched. NKN organized the same with ERNET as a partner.

- NKN has extended its collaborations with international RENs, such as, Asi@Connect, SingAREN, GEANT, Internet2, CERN & NORDUnet. Apart from this, NKN has peering with content providers, such as, Google, Akamai and Microsoft.

Final round of NKN Ideathon 2017 was organized on 27th October, 2017 at IIT Delhi Campus. Wherein, 19 finalist team have participated which were selected via regional competition (NKN Ideathon 2017 Phase I) held at Delhi, Guwahati, Pune, Lucknow and Bangalore.

NKN Peering with LEARN Sri Lanka

Hon'ble Prime Minister of India, Shri Narendra Modi at 18th SAARC, had a vision of making the region more connected and prosperous. His vision for the region rests on the primary pillars of trade, investment, assistance, cooperation, people-to-people contacts and seamless connectivity.

As part of his vision, Hon'ble Minister of Electronics &IT, Shri Ravi Shankar Prasad on 15th January, 2018 (the first day of his three days visit), inaugurated the 1Gbps connectivity between National Knowledge Network of India and LEARN network of Sri Lanka. Accordingly, an MoU for cooperation in IT & Electronics was signed. The scope of MoU inter alia includes e-Governance, m-Governance, e-Public Services Delivery including e-learning, tele-medicine, cyber security etc. A pilot programme on E-Office, an electronic platform developed by National Informatics Centre of India (NIC), which enables conduct of office procedures electronically was launched in Sri Lanka.

Inauguration of 1gbps connectivity between NKN India and LEARN network of Sri Lanka

A knowledge partnership between National Knowledge Network (NKN) of India and Lanka Education and Research Network (LEARN) of Sri Lanka was also launched. This would enable secure and reliable connectivity between educational institutions of India and Sri Lanka under an Ultra High Bandwidth network.

National Knowledge Network (NKN) & Lanka Education and Research Network (LEARN)

National Knowledge Network, a multi-gigabit pan-India network is the backbone of our country's Digital India initiative. It is the largest network of its kind globally as it carries education, internet and e-Governance traffic. In addition to over 1,646 institutes connected as of today, NKN also carries traffic for all our Government that includes, States Data centres, Ministries, State Wide Area Networks etc.

Launch of connectivity between educational institutions of India and Sri Lanka under an Ultra High Bandwidth network.

NKN has connected with all major research and education networks globally and today our Indian institutes have high speed access to GEANT connected institutes in Europe, Internet2 in USA, Asi@Connect in Asia Pacific and its peering with SingaRen in Singapore and NorduNet - the National research and education networks in the Nordic countries.

Lanka Education and Research Network (LEARN), formerly the Lanka Experimental Academic and Research Network, is a specialised internet service provider dedicated to support the continuous need of research and educational communities within Sri Lanka. LEARN currently connects all of the UGC funded Sri Lankan national universities, a number of public universities, higher education institutes under other ministries, the University Grants Commission, the Ministry of Higher Education and six national research institutions. It connects the academic, world research internet through the TEIN4 network, SingAREN, Intenet2 and Google. LEARN is Sri Lankan's National Research and Education Network (NREN) and forms the Sri Lankan component of the global advanced Research and Education Internet network.

Collaboration between NKN and LEARN

• Extension of NKN to LEARN will act as a catalyst for knowledge transfer from some of the premier leading mission oriented agencies of India in the field of education, health and research etc.

• This would enable secure and reliable connectivity between educational institutions of India and Sri Lanka under an Ultra High Bandwidth network.

• Several Universities in India and Sri Lanka were linked through a Digital Video Conference during the launch.

• Also, Sri Lankan Universities would now be able to connect with Educational Institutions in Europe through this network.

• Top educational institutions in India & Sri Lanka are now connected through NKN such as IIT, Delhi, IISC, Bengaluru, JIPMER, Puducherry, MSU& MKU from India & Open University, Universities of Jayawardenapura, Ruhuna, Jaffna, Moratawa, Rajarata and Eastern University from Sri Lanka.

2.1.7 National Information Infrastructure (NII)

The Department has deliberated in detail and initiated a proposal on National Information Infrastructure (NII) which proposes to integrate various ICT infrastructures created across all the States, namely, SDCs, SWAN, NKN, NICNET, SSDG, including NOFN/BharatNet. The proposed NII would make available upgraded infrastructure from technological, administrative and e-Governance perspective. However, the present proposal on National Information Infrastructure is on hold

for the time being till the acceptance of Infrastructure Committee Report on BharatNet by DoT.

A pilot proposal for a period of one year on National Information Infrastructure for one district each in 7 States, namely, Nagaland, Karnataka, Kerala, Gujarat, Uttarakhand, UTs of Chandigarh and Puducherry is already under implementation. The pilot project would facilitate to have broad idea on gaps/challenges that exist in rural areas in the delivery of various e-Governance and other social sector services. The State Government of Nagaland has, however, formally launched the pilot project in Peren District on 6th January, 2017. The pilot in remaining States/UTs are in advance stage and likely to be made operational by March, 2018.

2.1.8 Mobile Seva Platform

MeitY has initiated a massive countrywide initiative on mobile governance, being implemented by C-DAC Mumbai, to provide government services to the people through mobile phones and tablets. As a part of this initiative, the Framework for Mobile Governance was notified in February 2012. Mobile Seva has been developed by MeitY as the core infrastructure for all Government departments and agencies in the country for enabling the availability of public services through mobile devices.

Mobile Seva enables the integration of the mobile platform with the common e-Governance infrastructure consisting of SDCs, SWANs and SSDG/NSDG. It enables a Government department to integrate both web and mobile based services seamlessly and enhances the access to electronic services tremendously due to the very high penetration of mobile phones, especially in rural areas.

It provides all possible mobile based channels for delivering services, such as SMS, USSD, IVRS and mobile applications (m-Apps). Availability of government wide shared infrastructure and services enable rapid development and reduced costs for the departments in rolling out electronic services.

Achievements

• Around 3856 Government departments and agencies integrated with the Mobile seva platform.
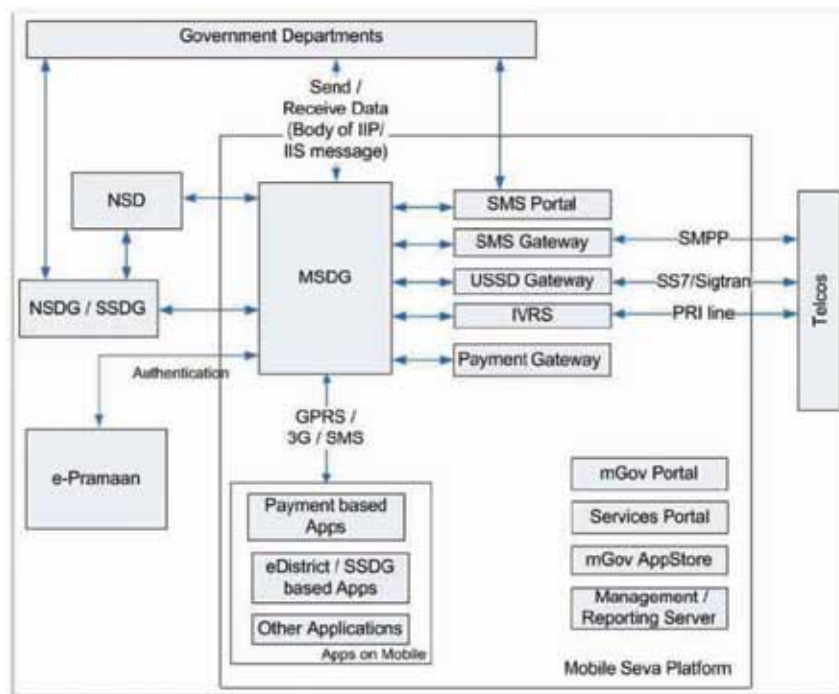
Diagram of Mobile Seva Platform

- Over 2000 crore of push SMS were delivered till February 2018.

- The total number of services available to citizens and businesses over Pull SMS has reached 724.

- Total 1030 live m-apps have been developed and hosted on Mobile Seva Ap pstore on different platforms. Till February, 2018, over 2 crore downloads of different apps have been done.

- Over 94 lakh transactions in IVRS Services and over 15 lakh transactions inUSSD Service have been completed till February, 2018.

- Mobile Seva project has been selected as one among 41 Gems of Digital India 2017 (Analyst's Choice) for excellence in eGovernance.

- Mobile Seva Project is a winner for showing Excellence in Designing the Future of eGovernment at Global mobileGov World Summit May 2017.

2.1.9 Geographical Information System (GIS)

Geographical Information System (GIS) based decision making is being promoted by National Centre of Geo-Informatics (NCoG), MeitY. The GIS platform established by NCOG is a GIS based decision support system (DSS) platform for sharing, collaborating, undertaking location based analytics, which caters the requirements of Government departments/ agencies. The system is designed to promote acceptability, adoptability and affordability across Governance by integrating geographic science systems, information science systems.

Some of the key features of NCoG include base map available up-to 1:5000 scale, ensures compatibility of multi-purpose geo-datasets, allows user to plot assets/ features on their own, cost effective and based on Open-Source software.

GIS platform has provision to integrate with MIS data of Ministries/Departments, e.g. MNREGA, Panchayati Raj, Mines, etc.GIS Platform provides the citizen centric services on web and mobile platform, navigation facility, including location based information system.

Achievements

I.   Under NCoG, following GIS applications have been developed under implementation:

- Government Land Bank Information System (MoUD)

- Rural Electrification System (M/o Power)

- Mining Surveillance System (Ministry of Mines)

- Saltpan Information System (DIPP)

- DSS for AICTE (MHRD)

- PESA (MoPR)

- National Asset Directory (MoPR)

- e-District services with CSC locations (MeitY)

- Digital India outreach (MeitY)

- GIS for North-Eastern States (M/o Development of North Eastern Region)

- Road Information System (MoRTH)

- Industrial Information System (DIPP)

- Delhi Police GIS systems (MHA)

- Mapping of forest resources under National Green India Mission (MoEF) - pilot for Madhya Pradesh

- Mapping of water resources under Accelerated Irrigation Benefits Programme and Repair, Renovation & Restoration of Water Bodies (MoWR,RD&GR)

- GIS system for NHAI (NHAI)

- Textile Mills Information System (NTCL)

- Coal Mining Surveillance System (M/o Coal) - (Pilot project)

- AMRUT / Smart Cities (MoUD) - (POC)

- Soil Information System (NBSS&LUP, M/o Agriculture)

- Integration of Soil Health Card with NBSS&LUP soil survey data (M/o Agriculture)

- Mapping of mortgaged land assets of companies (M/o Corporate Affairs)

- GIS based applications for States such as Telangana, Haryana, Kerala, Uttarakhand

- Logistics Information System (Ministry of Commerce & Industry)

II. NCoG is also working on developing the portal for NITI Aayog (for Asset Management and identification of backward households) and Capacity building for Town and Country Planning Organisation, Ministry of Housing & Urban Affairs etc.

2.1.10 High Speed Broadband Connectivity

High speed broadband connectivity would be made available upto all 2.5 lakh Gram Panchayats in the country under NOFN/BharatNet programme presently being implemented by Department of Telecommunications. With the availability of high speed broadband connectivity upto Gram Panchayats, it would be easier for the Central and State Governments to deliver various G2B, G2G and G2C services to the citizens across the county. Currently, 2,58,233 kms optical fibre has been laid connecting 1,10,848 Gram Panchayats.Besides, availability of robust connectivity in turn would make it feasible to plan and deliver other social sector services like e-Health, e-Education, e-Agriculture, Skill Development and also financial inclusion. It is envisaged that it would be possible in the near future under the Digital India Programme to have inter and intra State socio-economic development in the country.

2.1.11 Public Internet Access Programme (including Wi-Fi in 5 Universities)

One of the Early Harvest Programmes under Digital India is setting up of Wi-Fi in Universities. MeitY is providing model Wi-Fi enabled campus networks at five universities, namely, University of Allahabad, University of Pune, Osmania University, Hyderabad, Utkal University, Bhubaneswar and North Eastern Hill University (NEHU), Shillong. The model is replicable and can be replicated at other higher learning institutions/universities/hospitals across India. This would enable on campus students, faculty, teachers, visitors, guests to have entry to cyber world with Wi-Fi devices to access, retrieve and post information on any-time-anywhere basis.

ERNET India is deploying Wi-Fi in these five universities. The Wi-Fi connectivity at Allahabad University is operational since 31st January.2016. A total of 1200 Wireless Access Points have been installed in various buildings/departments. In Pune University, the Wi-Fi deployment is completed, and is in use since 24th May, 2016.A total of 53 buildings/departments/ hostels have been covered. Total 130 Access Points (APs) installed and commissioned under the project. At Osmania University(OU), partial implementation of the Wi-Fi Enabled Campus Network has been completed in the selected buildings/departments/hostels of Osmania University(OU), and made it operational w.e.f. 24th April, 2017. The Wi-Fi network is being used by the users of Osmania University(OU), Approximate 12.7 Kms of OFC has been laid and 482 Wireless Access Points (WAPs) have been installed and commissioned in 29 buildings as approved by Osmania University(OU),. Work is in progress at remaining buildings/departments/hostels of Osmania University(OU), At Utkal University(UU), partial implementation of the Wi-Fi Enabled Campus Network has been completed in the selected buildings/ departments/hostels of UU and made operational w.e.f 25th May, 2017. 182 Access Points (APs) have been installed. However, internal work is in progress in some locations. At NEHU University, partial implementation of the Wi-Fi Enabled Campus Network has been completed in the selected buildings/departments/ hostels of NEHU and made operational w.e.f. 22nd April, 2017. Approximate 6.7 kms of OFC has been laid and 187 Wireless Access Points (WAPs) have been installed and commissioned. Work is in progress at remaining buildings/departments/hostels of NEHU.

Setting up Eduroam Services in India

• Eduroam stands for Education Roaming. It is a secure, world-wide roaming access service developed for the international research and education community. It allows students, researchers and staff from participating institutions to obtain Internet connectivity across campus and when visiting EDUROAM enabled institutions by simply opening their mobile devices and working on local Wi-Fi network. The project is funded by MeitY and being implemented by ERNET India.

• ERNET has connected more than 200 institutes in India like IITs, IIMs, NITs and various other renowned institutions. The project has met its objectives and has been successfully completed on 30th April, 2017.

Setting-up VSAT connectivity for Internet/Intranet in the North-Eastern part of the country

• The objective of the project is to establish C-band VSAT connectivity at 60 institutes (research institutes/ colleges and government organizations) in remote areas of North Eastern of the country to provide Internet access. As part of the project only those institutes will be connected, that do not have any form of Internet connectivity. The project is implemented by ERNET India.

• VSAT has been installed and is operational at all 60 sites.

IPv6 Training Programme for Staff of Government/ Ministries and Institutions

• The objective of the project is capacity building in the area of next generation Internet protocol IPv6 to enhance adoption and deployment of IPv6, especially in Government organizations and associated institutions. It is expected that around 3000 staff from Central/State Government/ Ministries and related organizations will be trained on use and deployment of IPv6 free of cost. ERNET India is implementing the project.

• More than 300 staff of the Central and State Governments have been provided hands-on training and skilled in IPv6 network and Infrastructure. The project has completed on 13th February, 2017.

2.1.12 Safe and Secure Cyberspace

National Cyber Coordination Centre (NCCC) : Evolving cyber threat landscape and its impact on well being of Information Technology and National economy, necessitates the need for near-real time situational awareness and rapid response to cyber security incidents. Realizing the need, Government has initiated actions to set up the National Cyber Coordination Centre (NCCC) to generate macroscopic views of the

cyber security breaches and cyber security threats in the country. NCCC is a multi-stakeholder body and is being implemented by Indian Computer Emergency Response Team (CERT-In) at Ministry of Electronics and Information Technology (MeitY).The centre will work with various organizations and entities in the country to counter and mitigate attacks and cyber incidents on a near real time basis. The phase-1 of NCCC has been operationalised in July, 2017.

Cyber Swachhta Kendra (Botnet Cleaning and Malware Analysis Centre) : Cyber Swachhta Kendra (Botnet Cleaning and Malware Analysis Centre) has been established by the Government for detection of systems infected by malware/botnets in the country and to notify, enable cleaning and securing systems of end users to prevent further malware infections.

The Cyber Swachhta Kendra was launched on 21 February 2017. The website of the centre is "www.cyberswachhtakendra.gov.in".

The centre is working in close coordination and collaboration with Internet Service Providers, Academia and Industry and providing detection of malicious programmes and free tools to remove the same for common users and Banks. Number of downloads of tools by users is 7,05,167 as on 28 February 2018.

2.2   Governance and Services on Demand

2.2.1   e-Kranti: Electronic Delivery of Services

The National e-Governance Plan (NeGP) was approved in 2006 with a vision to make all Government services accessible to the common man in his locality through common services delivery outlets and ensure efficiency, transparency and reliability of such services at affordable costs. NeGP has achieved significant success in its objectives. MeitY has implemented a number of projects in the e-Governance domain. These include the core ICT infrastructure projects, such as, State Data Centres (SDCs), State Wide Area Networks (SWANs), Common Services Centres(CSCs), National/State Service Gateway (SSDGs), Meghraj Cloud platform, Mobile Seva etc.

Under Digital India programme, NeGP has been revamped to e-Kranti. The Vision of e-Kranti is "Transforming e-Governance for Transforming Governance". The Mission of e-Kranti is "To ensure a Government wide transformation by delivering all Government services electronically to the citizens through integrated and interoperable systems via multiple modes, while ensuring efficiency, transparency & reliability of such services at affordable costs."

The objectives of e-Kranti are as follows:

(i)   To redefine NeGP with transformational and outcome oriented e-Governance   initiatives

(ii)   To enhance the portfolio of citizen centric services

(iii)   To ensure optimum usage of core Information & Communication Technologies (ICTs)

(iv)   To promote rapid replication and integration of e-Governance applications

(v)   To leverage emerging technologies

(vi)   To make use of more agile implementation models

e-Kranti is based on the following principles:

(i)   Transformation and not Translation

(ii)   Integrated Services and not Individual Services

(iii)   Government Process Reengineering (GPR) to be mandatory in every Mission Mode Project (MMP)

(iv)   Cloud by Default

(v)   Mobile First

(vi)   Mandating Standards

(vii) Language Localization

Various schemes/projects are being implemented by MeitY under e-Kranti. There are 15 Central, 17 State and 12 Integrated MMPs.

Achievements

a.   29 MMPs are providing full/partial services, 5 MMPs are under implementation and 10 are under design, development and scoping stage.

b.   1898 e-Governance services are being rendered under the said MMPs (Source: eTaal.gov.in from 01-01-2013 to 28-02-2018).

c. These MMPs delivered more than 304.64 crore e- transactions with an average of 25.38 crore transaction per month during Year 2017.

d. From April, 2017, more than 261 crore electronic transactions per month have taken place at both national and state level e-governance projects including the MMPs, in current FY 2017-18 till 28th February, 2018.

2.2.2 e-District

e-District is a Mission Mode Project (MMP) that aims at electronic delivery of identified high volume citizen centric services at the district or sub-district level. Ministry of Electronics & Information Technology (MeitY), Government of India (GoI) is the nodal Ministry for e-District MMP. This MMP is being implemented by State Governments/UT Administrations through their designated agencies. The MMP envisages leveraging and utilizing the four pillars of e-infrastructure namely, State Data Centre (SDC), State Wide Area Network (SWAN), State Service Delivery Gateway (SSDG) and Common Services Centre (CSC). The Scheme for the National Rollout of the e-District MMP has been approved with a financial outlay of 1663.08 crore, in April, 2011.

Objective: e-District MMP

The objectives of the e-District project are to ensure end-to-end workflow to ensure delivery of e-Services by undertaking Business Process Re-engineering (BPR) of services and providing easy, anywhere and anytime access to Government services.

Intended Benefits / Outcomes: e-District MMP

The project intends to achieve benefits / outcomes as mentioned below :

(a) Assured, reliable and efficient delivery of high volume citizen services, electronically and with process reengineering at the district level in all the districts of the country

(b) Service fulfilment for the citizens will be quicker

(c) Citizens save time & money.

(d) Modernization of District Administration with training and capacity building at all levels.

(e) Transparency and Good Governance resulting in empowerment of citizens.

Coverage and Services under e-District MMP

The e-District MMP currently covers all districts across all 36 States/UTs. Under the scheme, MeitY is funding the State Designated Agencies (SDAs) of each State/ UT for implementation of the project over a period of 4 years. 10 categories (5 mandatory + 5 State/UT Specific) of identified high volume citizen centric public services at district and sub-district level will be taken up for implementation to be electronically delivered under this project.

Services Launch Status: e-District MMP: e-District services have been launched in 649 districts (including 40 pilot districts) across 32 States / UTs. The status is indicated in the table below:

eDistrict services launched / covered in 100% districts			
1.	Andhra Pradesh (13/13)	17.	Maharashtra (35/35)
2.	Arunachal Pradesh (16/16)	18.	Manipur (9/9)
3.	Assam (27/27)	19.	Meghalaya (11/11)
4.	Bihar (34/34)	20.	Mizoram (8/8)
5.	Chandigarh (1/1)	21.	Nagaland (11/11)
6.	Chhattisgarh (27/27)	22.	Odisha (30/30)
7.	Dadra & Nagar Haveli (1/1)	23.	Puducherry (4/4)
8.	Delhi (11/11)	24.	Punjab (22/22)
9.	Goa (2/2)	25.	Rajasthan (33/33)
10.	Gujarat (33/33)	26.	Sikkim (4/4)
11.	Haryana (21/21)	27.	Tamil Nadu (32/32)
12.	Himachal Pradesh (12/12)	28.	Telangana (10/10)
13.	Jharkhand (24/24)	29.	Tripura (8/8)
14.	Karnataka (30/30)	30.	Uttar Pradesh (75/75)
15.	Kerala (14/14)	31.	Uttarakhand (13/13)
16.	Madhya Pradesh (51/51)	32.	West Bengal (18/18)

Achievements

- Empowered Committee has approved DPRs of all 35 States / UTs (Approval of revised DPR from new States -Telangana and Andhra Pradesh is Pending).

- SPMU selected in 36 States/UTs (100% in 36 States/UTs)

- DeGS formed in 36 States (100% in 34 States/UTs, partially completed in 02 States/UTs).

- e-District Managers selection initiated in 34 States/UTs. (100% selected in 28 States/UTs, partially selected in 03 States / UTs, process initiated in 03 States / UTs and 02 States /UTs have not initiated)

- Bid process in Advance stage/implementation about to start – 1 State in advance stage.

- 13 States/ UTs have decided to appoint NIC as their Application Development Agency-MoU signed by 13 States/UTs

- Launch of eDistrict services – Overall, eDistrict services have been launched in 649 districts across 32 States. (FY 2012-13: 102 districts; FY 2013-14:196 districts; FY 2014-15: 116 districts, FY 2015-16: 99 districts, FY 2016-17: 05 districts, FY 2017-18: 131)

- Issuance of Guidelines / Advisories

- National Rollout Guidelines

- eDistrict Manager Hiring Guidelines

- Integrated Framework for Delivery of e-District Services Guidelines

- Implementation Guidelines 2012 (Providing Flexibility to States)

- Horizontal Connectivity Guidelines

- Draft Agreement Template for States / UTs opting NIC as the Implementation Agency for eDistrict MMP

- Report on "Business Process Re-engineering of High Volume Government to Citizen Services"

- Advisory on Operational Expenses of eDistrict Manager

- Advisory on Implementing Ration Card services under e-District project

- Advisory on Implementing Birth & Death services under e-District project

- Guidelines for using Handheld devices for eDistrict Services.

2.2.3   All Services through online & mobile

The focus today is on designing e-Governance applications in such a way that the related information, services and grievance handling mechanism are accessible online on a real time basis and across all types of access devices such as desktop computers, laptops, tablets, mobiles, etc.

JAM Trinity – Jan Dhan, Aadhaar, Mobile- It can help government to implement large-scale, technology-enabled and real-time Direct Benefit Transfers (DBTs) to improve economic lives of India's poor. Introduction of DBT in LPG and MGNREGS have proved that use of JAM can considerably reduce leakages, reduce idle funds, lower corruption and improve ease of doing business with the government.

Unified Mobile Application for New-Age Governance (UMANG): Unified Mobile Application for New-Age Governance (UMANG) has been developed as a single mobile platform to deliver major Government services. Hon'ble Prime Minister has dedicated UMANG to nation on 23rd November, 2017.

- UMANG has been developed as a single mobile platform to deliver major Government services with Core Platform integrated with Aadhaar, DigiLocker, PayGov, Rapid Assessment System (RAS) etc.

- About 185 services from 33 departments and 4 States are already available on UMANG and the count is increasing day by day.

- It supports around 12 Indian languages, in addition to English and has been hosted on cloud. UMANG aims to bring power to the finger tips of citizens.

- Citizens can access pan India Government services from the Central Government, State

Governments, local bodies and their agencies and some important utility services from corporate.

2.2.3.1   Programme on Good Governance and Best Practices

This scheme has been initiated to promote Information and Communication Technology (ICT) enabled good governance in the country. Under this scheme, MeitY has finalized a scheme to promote e-Governance in the country, wherein, the replication of successful e-Governance practices and applications would be taken up and departments would also be encouraged to come up with new applications in uncovered domains. Under this scheme, project proposals sought (from Central / State /UTs Government departments) which will be funded after due assessment, depending upon the merit of the project. 5 Working Group meetings have been conducted and 13 projects have been recommended for approval in the Working Group.

Achievements

- 5 projects have been approved.

- 3 projects have been Gone- live

- 2 projects are under implementation.

2.2.3.2   World Bank assisted "India: e-Delivery of Public Services" Project

Following approval of a Development Policy Loan amounting to US$ 150 from the World Bank for programme management and financial support for National e-Governance Plan (NeGP), MeitY has been utilizing this support as a focal point to convene all the associated departments of the central and State Governments around a concrete reform agenda for e-governance in the country. MeitY is supporting critical policy and institutional actions of the Central/State/UT Governments that entail e-delivery of services leading to more robust implementation of NeGP, with significant social benefits for the population and positive impacts on the poor.

As on 28th February, 2018,   a total of 39 projects amounting to 487.82 crore have been approved. Funds for all 39 projects have been released to the implementing agencies in various States/UTs. A total

of 47 projects with a total outlay of 646.89 crore have been considered under e-Bharat scheme for funding assistance till date.

Achievements

- 6 projects amounting to ₹44 crore have been implemented.

- 6 projects amounting to ₹46 crore have Gone-live.

- 21 project amounting to ₹285 crore have been under implementation stage

- 6 projects amounting to ₹109 crore have been closed.

- As on 28th February, 2018 funds amounting to ₹280 crore have been released for various projects funded under this scheme.

2.2.3.3   National Scholarships Portal

National Scholarship Portal is a PMO initiative envisaged to be a single unified portal for online scholarship application submission, verification and final disbursement of scholarships amount directly into student's bank account. This system brings transparency by avoiding duplication and ensures timely disbursement. It aims at providing a Simplified, Mission-oriented, Accountable, Responsive & Transparent 'SMART' System for faster and effective disposal of Scholarships applications and delivery of funds directly into beneficiaries account without any leakages by providing common electronic portal for implementing various Scholarships schemes launched by Union Government, State Government and Union Territories across the country.

Objectives

- Ensure timely disbursement of Scholarships to students

- Provide a common portal for various Scholarships schemes of Central and State Governments

- Create a transparent database of scholars

- Avoid duplication in processing

- Harmonisation of different Scholarships schemes and norms

- Application of Direct Benefit Transfer

Benefits

- Simplified process for the students
  - o   All scholarships information available under one umbrella
  - o   Single integrated application for all scholarships

- Improved transparency
  - o   System suggests the schemes for which a student is eligible
  - o   Duplicates can be reduced to the maximum extent

- Helps in standardisation
  - o   Master data for Institutions and courses at all India level
  - o   Scholarships processing

- Serves as a decision support system (DSS) for Ministries and departments as up-to date information will be available on demand.

- Comprehensive MIS System to facilitate monitoring every stage of Scholarships distribution i.e. from student registration to delivery of funds

Achievements (Academic Year 2017-18)

In the Academic Year (AY) 2017-18, A total of 14 Ministries/States have on-boarded their 32 scholarship schemes and 1.40 crore (fresh and renewal) applications have been received under all on-boarded schemes and 44.86 lakh students have received scholarship of the amount ₹1270 crore from Ministry of Minority Affairs. Disbursement is still in process by all the Ministries/States.

2.2.3.4   Digital Locker & other initiatives

Digital Locker

Digital Locker is a key initiative under Digital India, the Indian Government flagship programme aimed at transforming India into a digitally empowered society and
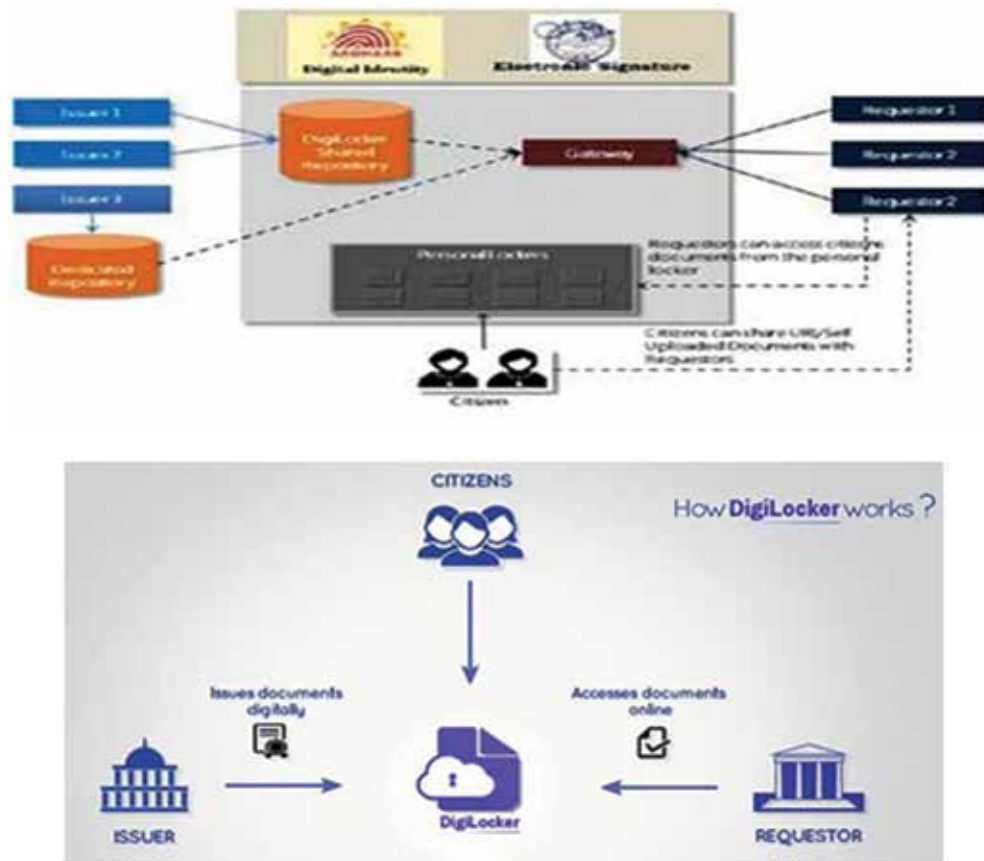
Working of Digital Locker

knowledge economy.Targeted at the idea of paperless governance, Digital Locker is a platform for issuance and verification of documents and certificates in a digital way, thus eliminating the use of physical documents. Indian residents who sign up for a DigiLocker account get a dedicated cloud storage space.

Organizations that are registered with Digital Locker can push electronic copies of documents and certificates (e.g. Driving License, School certificates) directly into citizens' lockers Citizens can also upload scanned copies of their legacy documents in their accounts. These legacy documents can be electronically signed using the eSign facility.

The following are the key stakeholders in the Digital Locker system:

- **Issuer:** Entity issuing e-documents to individuals in a standard format and making them electronically available, e.g.,UIDAI, CBSE, Ministry of Road Transport and Highways, etc.

- **Requester:** Entity requesting secure access to a particular e-document stored within a repository, e.g., University, Passport Office, Regional Transport Office, etc.

- Resident: An individual who uses the Digital Locker service based on Aadhaar number.

Benefits of DigiLocker

- **Access:** Citizens can access their digital documents any time, any where and share it online.

- **Paperless:** It reduces the administrative overhead of Government departments by minimizing the use of paper.

- **Authenticity:** Digital Locker makes it easier to validate the authenticity of documents as they are issued directly by the registered issuer.

- **eSign:** Self-uploaded documents can be digitally signed using the eSign facility (which is similar to the process of self-attestation).

Achievements for DigiLocker (The Government of India provided Digital Locker)

- As on 19th March, 2018 there are

  o More than 1.08 crore Registered Users

  o More than 235 crore Available Documents

  o More than 1.44 crore Uploaded Documents

  o More than 5.98 lakh eSigned Documents

2.2.3.5   Citizen Contact Centre

Citizen Contact Centre (CCC) is a G2C pilot project being implemented by MeitY to provide non-emergency (Informational and Transactional) cloud based call centre services over a single unique number 166 across the country. The project aims to simplify Government-Citizen relationship where the hardships experienced by citizens in accessing Government services are eased.

The project envisages using Automatic Speech Recognition (ASR), Automatic Query Identification and Customer Relationship Systems to enhance the effectiveness and responsiveness. It is currently being implemented in as a pilot project in four States, namely, Tamil Nadu, Jammu &Kashmir, Jharkhand and Chhattisgarh for the State level non- emergency services and also a few Central Government services.

Achievements

- The project implementation is in progress by CDAC - Mumbai in two pilot States, namely, Chhattisgarh, J&K and Central Government Departments.

- A total 30 of services hosted for the States of Chhattisgarh and Jharkhand as well as for the Central Government Service "Digital Locker" is in the pilot set up.

- Total 10 services integrated with Automatic Speech Recognition (ASR) in the CCC pilot set up and further work of integration of around 200 additional services is in progress.

- IVRS: Open source based Asterisk software customised and configured to act as Automatic Call Distribution (ACD), Declaration of Holidays,

Call flow for various pilot States and its associated services, including its integration with Text-to-Speech (TTS) System, thereby giving responses to the caller automatically without the intervention of Human Operator.

- CRM: The Open source based Suite CRM customized to hold information of multiple States and its services in such a way that this information is managed by means of embedded content management portal.

- ASR: Around 3500 speaker speech data collected from States of Jharkhand, Chhattisgarh and Tamil Nadu, transcribed and used in ASR system building.

2.2.3.6   Enabling All Schools with Virtual Class Rooms

MeitY is implementing a scheme on "Enabling All Schools with Virtual Class Rooms". The project is proposed to be implemented in the Pilot States of Andhra Pradesh, Gujarat, Haryana, Himachal Pradesh, Rajasthan, Tamil Nadu and Tripura.

The total number of targeted schools in Phase – I are 3500 plus 50 DIET / any central locations in the district. The project will enable the school teachers to reach at far locations without physical presence and on the other hand empower the student to be taught by subject expert sitting at far end. It is envisaged that in Phase – I of the project the five States (taken as pilot States as identified by MHRD) will be taken where a substantial number of DIET locations (to be selected based on availability of raw power / Internet connectivity, etc.) along with schools under its jurisdiction from all the five States will be picked for implementation of project.

Achievements

- Installation has been completed for Smart Virtual Classrooms in 3204 Schools.

- Setting-up of 50 high-end smart virtual classrooms in each of the identified 50 DIETs has been completed.

- Setting-up of Central Location for Hosting MCU, scheduling software, Recording/ Streaming

Solution for enabling storage of live sessions, offline access and multiparty conferencing has been completed.

- Setting-up of knowledge aggregation portal, which would contain redirection links to course contents generated and available on internet has been completed.

- Operational hands-on training to the DIETs/school staff with a training manual (2 teachers per school/DIET) has been completed.

- Approx. 64,512 teachers have been trained (including direct & indirect training to teachers) & approx. 30,84,210 students have been attended the live virtual sessions as on date.

2.2.3.7 Open Government Data (OGD) platform for National Data Sharing & Accessibility Policy (NDSAP):

The Open Government Data (OGD) Platform India (https://data.gov.in) has been set-up by the National Informatics Centre (NIC) under Ministry of Electronics & IT (MeitY) in compliance with the Open Data Policy (NDSAP) of India. The objective of the policy is to provide proactive access to Government owned shareable data, along with its usage information in open/machine readable format, through a wide area of network across the country, in a periodically updated manner, within the framework of various related policies, rules and acts of the Government. Developed using Open Source Stack, the project is one of the initiatives under Pillar 6 (Information for All) of the Digital India initiative.

Hon'ble MEIT Shri Ravi Shankar Prasad Launches Open Data Hackathon

It facilitates community participation for further development of the product with Visualizations, APIs, Alerts, etc. It has an easy to use and user friendly interface with dynamic/pull down menus, search based reports, secured web access, bulletin board, based on Dublin Core metadata standards and parametric and dynamic reports in exportable format. The platform reflects how innovative use of information technology has led to a paradigm shift in accommodating huge data potential of the country.

- Till 28th February, 2018, OGD India has 1,60,343 dataset resources, 4,240 catalogs contributed by 110 Ministry/Departments, 1,350 Visualizations created, 3617-Application Programming Interfaces (APIs) created, 115 Chief Data Officers. OGD India has 15.18 million times viewed and 5.54 million datasets have been downloaded.

- OGD is strongly promoted through Newsletters, Social media, Workshops, Challenges and participation in Data-meets etc.
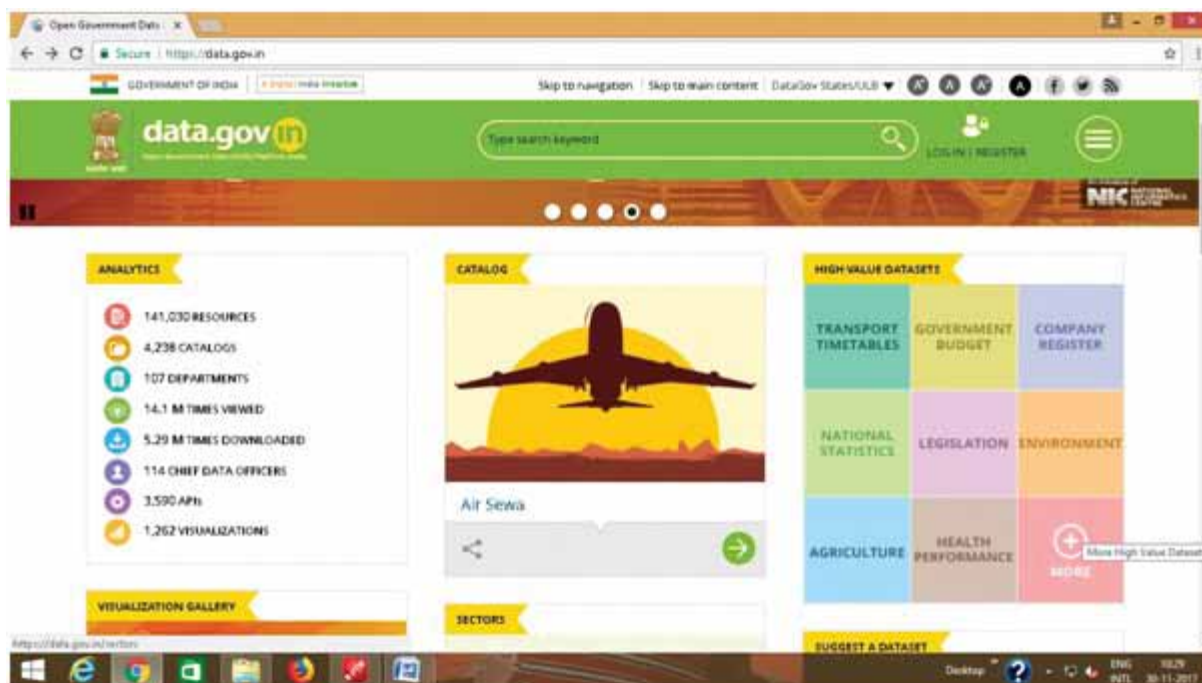
Achievements

Items	1st April 2017	28th February 2018	Achievements (2017-18 till 28-02- 2018)
Dataset resources	75,146	1,60,343	85,197
Catalogs	4,114	4,240	126
Contributed by Departments	105	110	5
Visualizations created	1,056	1,350	294
Application Programming Interfaces (APIs) created	444	3, 617	3,173
Chief Data Officers	111	115	4
Viewed	10.38 million	15.18 million	4.8 million
Downloaded	4.22 million	5.54 million	1.35 million

Open Government Data License of India has been recently approved by MeitY to ensure that the data sets released are not misused or misinterpreted (for example, by insisting on proper attribution) and that all users have the same and permanent right to use the data. The said License has been notified in the Gazette of India on **13th February, 2017**.

https://data.gov.in/sites/default/files/Gazette_Notification_OGDL.pdf

2.2.3.8 Electronic Transaction Aggregation & Analysis Layer (eTaal)

A large number of e-Governance initiatives, including various Mission Mode Projects (MMPs) under e-Kranti, are being implemented in the country by the Central and State Governments and organizations for ensuring efficient, affordable, transparent and convenient service delivery to citizens. Several of these initiatives have national importance and are included in the country's IT strategy. Some applications use internal performance measurement mechanisms defined through Service

Levels and Key Performance Indicators (KPIs), but there is no standard Government-wide criterion or metric to evaluate the impact of all initiatives. In view of the rapid growth in the number of services delivered through electronic means in India, Ministry of Electronics and Information Technology (MeitY) and National Informatics Centre (NIC), the nodal ICT organization, identified the number of end-to-end electronic transactions as the best indicator for measuring the real-time performance of e-Governance services in terms of service delivery to citizens.

MeitY and NIC have developed eTaal; URL: http://etaal.gov.in, as an electronic dashboard for providing a real-time aggregated view of eServices being delivered across different States and levels of government. e-Taal provides an aggregated view of e-Transactions performed through e-Governance applications implemented including, but not limited to, the national-level projects like Digital India initiatives and MMPs defined under the Pillar 5: e-Kranti – Electronic Delivery of Services of Digital India. e-Taal automatically pulls the e-transaction count from the applications integrated with it using Web Services technology.

The present system deals with quantitative analysis only, whereas, plan is afloat to develop e-Taal 2.0 to address the qualitative aspects of service delivery, thereby, bringing in the concept of 'QUANTILITY', which means 'QUANTIty' with 'quaLITY'. In eTaal 2.0, a system is being developed for assigning appropriate weightages for various categories of e-Services. To facilitate view of eServices being delivered across the country, eService Directory has been developed under eTaal 2.0. It provides the details of e-Governance application delivering the service such as name of the department, description of service etc. along with the spatial spread for a given service.

Electronic Transaction Aggregation & Analysis Layer

Achievements

- **Over 5968.13 crore** e-Transactions have been recorded since inception of eTaal till 28th February, 2018; Among this, over 3142.63 crore transactions recorded in FY 2017-18 till 28th February, 2018.

- National e-Transaction count in 2016 = **1089.81 crore** (i.e. **average txn of 91 cr. per month** approx.).

- 3,541 eServices integrated since inception from 20 Central Ministries and all 36 States/UTs and 22 Mission Mode Projects (MMPs) since inception of eTaal.

2.2.3.9 e-Hospital Project/ Online Registration System (ORS)

Hon'ble Prime Minister of India launched Online Registration System (ORS) under e-Hospital project during Digital India Week on 28th February 2017. ORS services include taking online appointment, viewing of lab reports and checking of status of blood availability in blood banks. Apart from this, online payment has been facilitated wherever applicable. So far these services have been implemented in AIIMS, New Delhi, Dr RML Hospital New Delhi, Sports Injury Centre (SIC), Safdarjung Hospital, New Delhi and NIMHANS, Bengaluru.

e-Hospital is aimed at implementation of Hospital Management Information System (HIMS) for internal workflow of hospital. The patient interface of the e-Hospital has been facilitated through ORS where services related to patients will be delivered electronically.

e-Hospital is available to government hospitals through Software as a Services (SaaS) model. Hospitals are relieved from Application & Server Management as e-Hospital is available on cloud. This simplified the on-boarding process and master data management for Hospitals. It enables single interface for Patients through Online Registration System (ORS) for various services and also create uniformity of e-Hospital Application across the all Government Hospitals. e-Hospital application built using open source technology and standards recommended by Ministry of Health &

Family Welfare (MoHFW). e-Hospital application has 16 modules, which are loosely coupled and implementable in phase manner. e-Hospital is an Open Source based HMIS application software developed by NIC.

Achievements

- e-Hospital application is hosted on MeghRaj Cloud

- eHospital: Total number of Hospitals on board are 203, Total no. of transactions are 2.61 crore as on 19th March, 2018

- 143 hospitals on boarded the Online Registration System (ORS) as on 19th March, 2018

- 14 lakh appointments have been taken through ORS as on 19th March, 2018.

2.2.3.10   Jeevan Pramaan

In a big relief to over a crore retired employees of Government and PSUs, with Jeevan Pramaan, a pensioner can now digitally provide proof of his existence to the authorities for continuity of pension every year instead of requiring to present himself physically or through a Life Certificate issued by specified authorities.   This facility has been widely acclaimed by the pensioners. The Aadhaar enabled biometric digital certification does away with the requirement of a pensioner having to submit a physical Life Certificate in the month of November every year calendar, in order to ensure continuity of pension being credited in the account.

From November, 2016 to 31st October, 2017, more than 75 lakh pensioners availed the Jeevan Pramaan service, which is more than a six fold increase compared to the previous year. Around 54 lakh Digital Life Certificates (DLCs) have been processed successfully for continuity of pension. New version of Jeevan Pramaan Windows and Mobile Application has been developed and released to support 'Registered Biometric Devices' as mandated by UIDAI. A total of 46 Pension Sanctioning Authorities and 33 Pension Disbursing Agency are on-boarded on Jeevan Pramaan. Since 1st November, 2017 till date, 27.85 lakh pensioners have registered for

Jeevan Pramaan and maximum number of registrations on a single day has crossed 3 lakh.
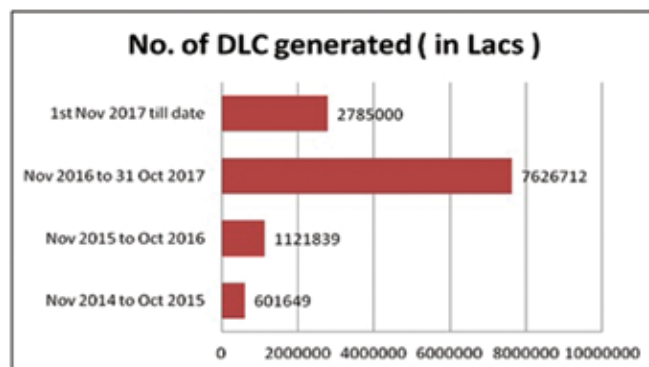
2.2.3.11 Aadhaar Enabled Biometric Attendance System (AEBAS)

Digital India's AEBAS Project has been established and rolled out during September, 2014 in Government of India and extended to all State Governments successfully from March 2015 onwards.
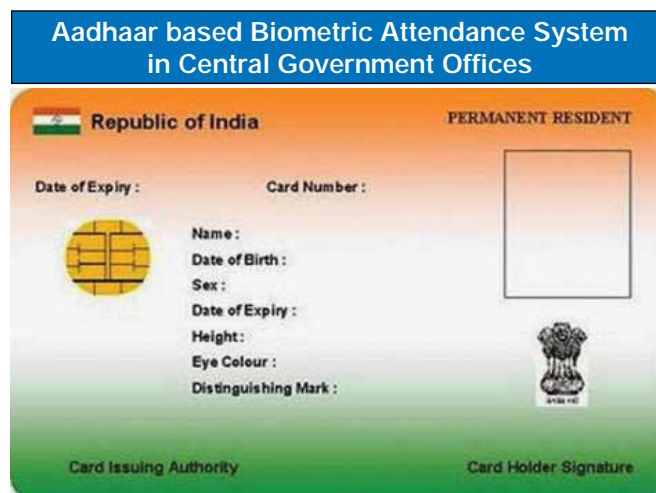
It is an enabling system to register an employee's attendance by presenting his/her biometric (Finger Print / Iris), which is authenticated online within seconds in real time with UIDAI records.

The Cloud-based software is installed and operated from NIC National Data Centre. Front end system is the BAS tablets or the desktop devices. The connectivity of terminals / devices is established through Wi-Fi/GPRS/LAN with Internet, Broadband or SIM based GSM connectivity on tablets.

Till date, 7144 Central and State Government organisations are on-boarded with 23 Lakh employees / candidates registered. Real time attendance statistics are reflected in individual attendance dashboards. Around 120,000 devices are installed across the country in form of Tablets / Desktop devices / Iris Scan machines. Close to 800,000 employees / candidates are now marking attendance all over India on this system.

Facility of advanced MIS reports are made available with separate web-service feature provided for some organisations who requested.

AEBAS is made highly scalable and caters to various type of requirements with respect to Ministry scheme beneficiary verification and attendance, eg. Skill Development trainees, Culture Ministry "Gurus", Sports Authority coaches and athletes, and so on.

Eight AEBAS awareness workshops were conducted for representatives of Centre and States for Nodal Officers,

Users and support engineers of organisations across the country, face to face and through VC.

Separate 24x7 Helpdesk team is rendering support to users. Various monitoring mechanisms have been enabled and are monitored online with SMS facilities on the health system of all AEBAS Servers and functions.

Timely updations and enhancements with necessary security features in accordance with UIDAI's security guidelines are being incorporated into the system for safety and smooth process.

2.2.3.12 PRAGATI (Pro-Active Governance And Timely Implementation)

As a part of Digital India programme, Hon'ble Prime Minister of India launched his ambitious multi-purpose and multi-modal platform PRAGATI on 25th March, 2015. The Hon'ble Prime Minister of India started using videoconferencing facility every fourth Wednesday of the month for directly monitoring the progress of PRAGATI schemes /projects. This facility brings the Secretaries to Government of India and the Chief Secretaries to the State Government on a single platform, through which Prime Minister is able to discuss the issues with the concerned Central and State officials directly with full information and latest visuals of the ground level situation. This enables faster implementation of Central level schemes/projects, state level projects and resolution of grievances between State and Central level departments.

This is a unique initiative of the Hon'ble Prime Minister of India for resolving bottlenecks in project implementation, cutting delays, reviewing the progress of flagship government initiatives and keeping tabs on handling and resolution of public grievances. PRAGATI is turning out to be quite a help for the Government as it tries to speed up development schemes.

Every project or issue taken up at PRAGATI meetings comes with a deadline, which government agencies have to adhere to. About 150 sites participate in each PRAGATI VC session in interactive mode, which is managed by NIC.

PRAGATI VC has pushed 200 projects (Central/State) involving investment of around ₹ 9.31 lakh crore till date. 40 Programmes/Schemes of various Ministries/ Departments and 17 Sector Grievances have been reviewed (Ministries/Department).

A Total of 23 PRAGATI sessions have been chaired by Hon'ble Prime Minister till date. During 2017, 7 PRAGATI sessions dated 22nd February, 26th April, 24th May,12th July, 30th August, 27th September and 22nd November,2017 have been conducted.

2.2.3.13   Digitize India Platform (DIP)

Digitize India Platform (DIP) is an initiative of the Government of India under the Digital India Programme to provide digitization services for scanned document images or physical documents for any organization. The aim is to digitize and make usable all the existing content in different formats and media, languages, digitize and create data extracts for document management, IT applications and records management. This platform was launched in August, 2015 under Digital India.

The main objective of this project to provide an end-to-end workflow based IT framework for digitization of Government records to enhance service delivery to the citizen and to empower numerous self-identified volunteers, part-time workers, housewives, students and general public, who add small portions of their contribution through crowd sourcing mechanism to achieve the greater result.

DIP provides an innovative solution by combining machine intelligence and a cost effective crowd sourcing model. It features a secure and automated

platform for processing and extracting relevant data from document images in a format that is usable for meta-data tagging, IT application processing and analysis.

Achievements

Items	1st April 2017	28th February 2018	Achievements (2017-18 till 28-02-2018)
Digital Contributors	1.85 lakh	5.03 lakh	3.18 lakh
Document Digitized	8,56,289	14,83,483	6,27,194
Snippets Digitized	2,05,70,080	3,69,48,375	1,63,78,295

Items	1st April 2017	22nd January 2018	Achievements (2017-18 till 28th February 2018)
Digital Contributors	1.85 lakh	5.03 lakh	3.18 lakh
Document Digitized	8 lakh	14 lakh	5.88 lakh
Snippets Digitized	2 crore	3.6 crore	1.54 crore

2.2.4 Financial transactions electronic & cashless

Electronic payments and fund transfers have the advantage of targeted and direct delivery to the intended beneficiaries without the involvement of middlemen who may otherwise subvert the system.

Similarly, online mechanisms for payment of fees for certain public services offer a transparent, friendly and expeditious channel to citizens for payments. It is envisaged that all financial transactions above a certain threshold shall be made electronic and cashless. Further, there is also a move towards strengthening the implementation of Direct Benefits Transfer (DBT) by leveraging the "JAM Trinity" (Jan Dhan, Aadhaar and Mobile).

As Aadhaar is unique and does not change over the lifecycle of an individual, the 12-digit Aadhaar is sufficient to transfer any payments to an individual. Today, in order to transfer money to a beneficiary, the Governments/ Institutions need to know the bank account, IFSC Code, and bank branch details etc. which is prone to change. However, Aadhaar offers the possibility of sending money by just using the 12-digit number for life without bothering about any changes in the bank account of the individuals. Thus, with this unique property of being valid for a lifetime, Aadhaar is very well perceived as a Financial Address in the banking sector.

2.2.4.1 Direct Benefit Transfer (DBT)

The Direct Benefits Transfer (DBT) programme envisages a switch from the present electronic transfer to bank accounts of the beneficiary to transfer of benefits directly to Aadhaar seeded bank accounts of the beneficiaries. The scheme is being headed by DBT Mission. Under the DBT Mission, it is instructed that DBT Cell is to be constituted in each Ministry. In the similar fashion, a DBT cell has been constituted in MeitY under the chairmanship of Joint Secretary(e-Gov). This DBT cell will be responsible for on boarding of various welfare schemes/Services on DBT. It will coordinate with respective Programme Divisions and IFD for DBT transition of the Schemes and help in meeting the timelines for the implementation of DBT reform initiative.

Till date four Schemes/Services have been identified for DBT on boarding by MeitY namely NIELIT O, A, B and C Scholarship Scheme, Visvesvaraya PhD Scheme for Electronics and IT, Reimbursement of training fees under Scheduled Caste Sub Plan and Tribal sub Plan and Jeevan Pramaan.

2.2.5 Technical & Other Support

Considering the complexity of the e-Kranti and the need to look at issues such as overall technology architecture, framework, standards, security policy, funding strategy, service delivery mechanism, sharing of common infrastructure etc. at a programme level,

MeitY is providing technical and other support like technical appraisal of all NeGP projects prior to a project being placed before the EFC/ CNE. MeitY has already set up a Programme Management Unit, namely National e-Governance Division (NeGD) to provide support to departments in conceptualizing, developing, appraising, implementing and monitoring respective MMPs.

2.2.5.1   e-Gov App Store

The e-Gov AppStore (https://apps.gov.in), launched in May 2013, is a National level common repository of customizable and configurable applications, components and web services, that can be re-used by various Government agencies/departments at Centre and States, with the vision to accelerate delivery of e-services as envisaged under NeGP and optimizing the ICT spending of the Government. Core and common applications that have high demand and are replicable across the Central and State levels, are the potential applications to be included in e-Gov AppStore, and they can be hosted on the National Cloud. The project enables re-use of already developed applications without incurring further cost and effort in development of those applications. Therefore, the Appstore facilitates the Govt. Departments with the following objectives:

- Speeding up the development and deployment of e-Gov applications.

- Easy replication of successful applications across States.

- Avoid duplication of effort and cost in development of similar applications.

- Ensure availability of certified applications following common standards at one place.

Achievements

- Currently 57 applications, that includes applications, web services and components,

have been uploaded on e-Gov AppStore. Out of these 57 applications, 19 applications have been funded under the outlay of the project.

- Selection Criteria has been prepared for shortlisting applications for productization/re-engineering has been finalized.

- Guidelines on Application Development & Re-engineering have been prepared in consultation with various Govt. & Private agencies (CGG, CDAC, NIC & industry experts) and have been published, on MeitY Website.

- The Project Implementation Committee of App Store meets at regular intervals for evaluating the proposal submitted, funding of contributed applications for productization, implementation and monitoring.

- 20 applications have been funded so far for productization. The applications funded for productization this year are Collabland, e-Pariksha, CollabERP, CollabCAD, CollabDDS and e-Sanad. One more application on "Paddy Procurement" by Chhattisgarh has been   approved by PIC for productization.

- State level awareness workshops have been organized in various states to educate the Application Owners on Cloud ready application development & deployment.

2.2.5.2   India Portal

India Portal, a Mission Mode Project in the integrated services category under the NeGP, has been envisaged to be a unified portal that would provide 'single window access' to information and services to be electronically delivered from all Government departments, institutions and organizations. It has been most popular source of information to a wide range of stake holders form citizens, to government, to business and to Indian Diaspora. It is a gateway of Indian Government websites at centre, state and district levels and has a rich repository of Forms, Documents, Services, Acts, Rules, Schemes and Web Links. The second phase of India Portal has been initiated in June 2013.

Achievements:

- **Enhancement and capacity building programme for National Government Services Portal (http://services.india.gov.in)**

  National Government Services Portal has been designed for enabling Citizens to find Government services easily. Following activities were undertaken during the period:

  o A detailed study was carried out in consultation with UNDP and DARPG to define the taxonomy and meta data creation guidelines as per international standards.

  o Distributed Content Management System (CMS) has been developed for capturing services provided by various Government entities from Ministry/Department and State/UT levels.

  o Nomination of Nodal Officers (31) and Data Contributors (61) from Ministry/Departments and State/UTs was received through DARPG, for which user accounts were created for contribution of Services on the National Government Services Portal.

  o Workshops for Master Trainers was conducted on 13th October 2017 in collaboration with DARPG and UNDP. 54 participants from 22 State/UT(s) and 7 Ministry/Department(s) attended the workshop. Demonstration of CMS workflow and best practices in creating the metadata for the Service URLs was made during the workshop which was followed by an interactive hands on session.

- **Revision of Guidelines for Indian Government Website (GIGW) (http://web.guidelines.gov.in)**

  Under the India Portal project, NIC had formulated 'Guidelines for Indian Government Websites' (GIGW) to make Indian government websites Usable, User Centric and Universally Accessible. GIGW were released in February 2009 and were made on a part of Central Secretariat Manual of Office Procedure by DARPG.

Since then, there have been a lot of changes in user demands and technology. Social Media has also come a long way and Government Departments are coming forward to use Web and Mobile platforms to increase public participation. In view of this, a need was felt to update the guidelines and increase its scope. A committee has been formed to study the current scenario and advice on the revision of the guidelines so that it may fulfil its mandate of benchmarking Websites and Mobile Apps that are Usable, User Centric and Universally Accessible. The terms of reference of the committee were:

- To study the existing guidelines and propose enhancement.

- Inclusion of the latest standards in HTML and CSS, as there has been major revision of these two standards.

- Formulate guidelines with respect to Mobile Apps, as the means of accessing the web by citizens, has seen a major shift. With the introduction of smart phones, Mobile apps have become an important mode of dissemination of information and services by the Government Departments.

- Upgrade the standards with regard to Web Content Accessibility, as this has received a major focus with the introduction of Persons with Disability Act and the Accessible India campaign.

- Devise the compliance matrix.

The recommendations of the committee are being consolidated.

- **Promotion of Government initiatives/events**

  o Micro site for Republic Day showcasing the republic day celebrations, President's speech to the nation and awardees of various awards has been designed, developed and maintained at http://knowindia.gov.in/republicday/rpday.php

  o Micro site for Independence Day has been designed, developed and maintained at

http://knowindia.gov.in/independenceday/independenceday.php.

- o Spotlights covering important Government initiatives and events like Digital India, Maan Ki Baat by PM , DIKSHA - National Digital Infrastructure for Teachers, Pradhan Mantri Krishi Sinchayee Yojana, Pradhan Mantri Bhartiya Janaushadhi Pariyojana, Soil Health Card, Ek Bharat Shreshtha Bharat, Government e-Marketplace : Procurement Made Smart, Pradhan Mantri Kaushal Vikas Yojana, UDAAN: A Programme to give wings to girl students, Pradhan Mantri Vidya Lakshmi Karyakram - Towards a Bright Future, Rashtriya Yuva Sashaktikaran Karyakram (RYSK) .

- o Monthly newsletters were sent to registered user of India Portal to keep them updated with the latest happenings related to Nation.

- **Social Media Presence**

  - o Facebook page has been maintained at https://www.facebook.com/NationalPortal India.

  - o Twitter handle has been maintained at https://twitter.com/indiagovin.

2.2.5.3 National Centre for e-Governance Standards and Technology (NeST)

Government of India (GoI) is implementing the Digital India programme as an umbrella programme to prepare India for knowledge based transformation into a digitally empowered Society and knowledge economy. Under the over-arching vision of Digital India, GoI aims to make all Government services digitally accessible to citizens through multiple channels, such as web, mobile and common service delivery outlets. To implement e-Governance projects successfully the solution shall have to be interoperable, secure, scalable, reusable, leading to efficiency, effectiveness, reduction in cost and risk, standardization is only way to achieve this objective. Under NeST project following are the achievements.

Achievements

- Following standards/Guideline have been approved by Apex Committee.

  - o Indian Standard on enhanced in-script for Keyboard layout

  - o Meta Data Standard for Drinking water and sanitation

  - o Guidelines for Adoption of Electronic Payments and Receipts

  - o Guidelines on Mobile as Digital Identity

  - o Interoperability Framework for e-Governance

  - o MDDS Panchayati Raj

  - o e-Government Service Maturity Model

  - o Security Guidelines for use of Biometric Technology in eGov projects

  - o Encryption Decryption Mechanism for open Bids in GeM

- Following standards are under Apex Committee Approval:

  - o Project Management Framework for e-Governance Projects

  - o Guidelines on e-Governance Project Lifecycle

  - o Guidelines for Functional Requirements Specification

  - o Guidelines for Software Requirements Specification

  - o INDEA Enterprise Architecture Framework

  - o INDEA Adoption Guide on Method based Approach

  - o Adoption of OWASP –MASVS 0.9.4

  - o MDDS in Health Domain

- 63 Awareness Training Programmes have been organizedon the e-Governance standards.

2.2.5.4   Capacity Building Scheme II

Capacity Building (CB) scheme Phase II, is a continuation of initiative under CB scheme Phase I. And the scheme would also support the implementation of vision of Digital India including e-Governance and e-Kranti. The key components of the existing scheme are proposed to be continued for a further period of 2 years at total outlay of ₹ 423.87 crore and the scope has been enlarged to cover central line ministry in various training and knowledge initiatives. The objective of the CB scheme Phase II is to provide professional resources and training to political and policy level decision makers for all State/UTs to build the in-house capacity for implementation of various e-Governance initiatives.

Major components:

- Recruitment, deployment and HR management of the 340 specialized resources in the SeMTs in all States and UTs.

- Training and development initiatives, including, inter alia,

  o   Development of competency frameworks, training guidelines, content, case studies etc for different groups of stakeholders.

  o   Developing a pool of certified trainers.

  o   Develop Online and Web Based Training and Learning Management System.

  o   Certification programmes for specialized/ key roles.

- Knowledge management and sharing through workshops, development of case studies, sharing best practices and creation of knowledge repositories etc.

Achievements

The following training programmes/workshops have been conducted under CB schemes Phase II till 07.12.2017 in FY 2017-18:

Training Programme/ Workshops	No. of Programmes	No. of Participants
Thematic Workshop	9	2046
CIO programme	4	81
Central Specialized Training Programmes	3	123

Highlights of Capacity Building Efforts

- Special focus on training the Central Line Ministry /Department.

- Special focus on emerging area technologies – 9 Thematic workshops have been conducted. This includes, 5 Regional workshops on electronic payment and receipts, one 1day workshop on Digital Payment Promotions and 2 National workshops on buyer and seller perspective on Government e-Market Place.

- 1 day Workshop on Trillion Dollar economy was inaugurated by Hon'ble Minster of Electronics & Information Technology on 14th December, 2014.

- Impact Assessment Study has been completed.

- Through Content & Faculty support for ensuring Institutionalization of e Gov trainings at ATIs & CTIs: 2000 Govt. officials have attended e-Governance training across the country. Institutes supported are, Postal Academy-Ghaziabad, Anna Institute-Chennai, Assam Administrative Training Institute, ATI–Goa, ATI -Kerala, Police Academy -Hyderabad & IGNFA Deharadun.

- MOU has been signed with Yashada, Pune, IIM Ahmedabad, IIPA New Delhi, CIPS,Hyderabad, APHRD, Vizag, MCRHRD-Hyd, NIFM, ATI West Bengal and RIPA, to take up specialized e Gov and embedded Trainings.ISB & IIM Banglore are under the process of joining an MoU.

- LMS and KMS have been launched and webinars are being conducted on various critical topics on various emerging technology areas, process, frameworks etc in e-Governance domain.

- Global collaborations are explored to bring in global learning and exchange of experiences.

Hon'ble MEIT Shri Ravi Shankar Prasad during Industry & Stakeholders Consultations on
Moving Towards Trillion Dollar Digital Economy

- Short duration fellowships have been designed and rolled out to take up research and in-depth study in niche areas.

- Selection of 25 scholarships are under process and are proposed to be offered in the 2017/2018 programme cycle.

- Partnership with academia and research institutes to establish Centre of excellence.

2.2.6 Common Services Centre (CSC)

The Common Services Centres (CSCs) being setup across the country as ICT enabled access points for delivery of services to the citizens are integral part of "Digital India" initiative of Government of India. Altogether these CSCs are **becoming a game changer** by providing a common platform for socially-inclusive community participation through transparent and timely delivery of Government and other eServices at affordable cost, leading to empowerment and development of society. Government of India has also provided guidelines, which, inter alia, prescribe the incentives/shares of fee for G2C services to the VLEs in the ratio of 80:20 between VLE and other stakeholders. It would enhance sustainability of the programme.

The Common Services Centres (CSCs) Scheme was launched in September 2006, with an aim to cover all 6 lakh census villages by one lakh CSCs, as per 1:6 ratio equitably spread across rural India. The duration of the erstwhile CSC scheme has ended on 31st March, 2017. Based on the assessment of the CSC Scheme, the Government of India has formally introduced CSC 2.0 Project in December, 2015, under the pillar-3 of Digital India, to expand the outreach of the CSCs to all Gram Panchayats (GPs) across the country. The project aims to establish a network of **2.5 lakh CSCs covering all Gram Panchayats, estimating at least one CSC in every Gram Panchayat.** The project is a service delivery oriented model with effort towards optimum utilisation of backend infrastructure already created in terms of other MMPs.

Some of outcomes and advantages provided by the CSC scheme are as follows:

- Transparent and timely delivery of Government and other eServices at affordable cost.

- Reducing citizens' efforts and resources in availing services within their localities by eliminating their visit to Government offices for the same.

- Integrated framework for delivery and dissemination of various government initiatives and benefits through ICT enablement.

- Introducing change agents for skill development, education and trainings, financial inclusion and indirect employment generation.

- Acting as last mile distribution units for various Governments' direct benefits to marginalised/backward communities.

- Encouraging women participation to become VLEs and increasing their contribution in the social and economic development.

- The CSCs are acting a medium for rural citizens to get digitally empowered and interact with the government and its schemes.

Launch of Aadaar Services through Common Services Centre

Presently, CSCs are acting as the following:

- Service Delivery Centres for – G2C, B2C, Utility Services, etc.

- Permanent Enrolment Centres (PEC) for Aadhaar, and Aadhaar Printing Centres

- Insurance service centres,

- Business Correspondent Agents (BCAs) under Financial Inclusion for Banking services,

- Educational and Skill Development Centres,

- Electoral Registration centres,

- Wi-Fi distribution centres (Wi-Fi Choupal under the direction and project of Department of Telecom, Ministry of Communication).

- Information Centre for various schemes through awareness generation etc.

- CSCs would also be functioning as White Label Business Correspondents (Bank Mitras) for providing desired banking services, such as withdrawal, deposits, remittances and balance enquiry through Aadhaar enabled Payment Systems (AEPS)- DigiPay.

The CSC network has been designed not only to enable delivery of eServices, but also to create a digital highway, empowering digitally excluded communities by changing the way rural citizens learn, communicate, and manage their livelihoods, access health, financial and other government services, CSC initiative has been encouraging more and more participation of women to become VLEs and increasing their contribution in the social and economic development.

Some of the few achievements / milestones achieved during the last few years under both the CSC programmes:

Milestone	2013-14	2014-15	2015-16	2016-17	2017-18 (Till Jan, 2018)	Achievement in 2017-18
Registered CSCs – Cumulative (overall including Gram Panchayat- GP level)	1.34 lakh	1.40 lakh	1.99 lakh	2.91 lakh	4.84 lakh	1.93 lakh additional CSC registered
Registered CSCs – Cumulative (Gram Panchayat- GP level)	92,000	92,000	1.23 lakh	1.8 lakh	3.46 lakh	1.66 lakh additional CSC registered
Functioning CSCs – Cumulative (overall including Gram Panchayat- GP level)	83,000	80, 200	1.66 lakh	2.5 lakh	2.92 lakh	0.42 lakh additional CSC made functional
Functioning CSCs – Cumulative (Gram Panchayat- GP level)	64, 000	70,000	97,300	1.59 lakh	1.83 lakh	0.24 lakh additional CSC made functional

Growth of services:

In May, 2014, there were only 32 services in national CSC portal (now, Digital Seva), which were increased to 170 services (46 G2C & 124 B2C) till March, 2017 and further increased to 300 services (50 G2C & 250 B2C) till January, 2018.

Apart from this, eDistrict/State Govt. G2C services are being accessed through CSC-Digital Seva portal in integrated manner.

Transactions through CSCs (Apna CSC Portal / Digital Seva Portal):

• 2015-16: 247.47 lakh

• 2016-17 (only Digital Seva portal services): 480.29 lakh (Growth: 94.08%)

• Last 10 months of 2016-17 (including Digital Seva portal services and other non-portal services): 1275.18 lakh

• First 10 months of 2017-18 (including Digital Seva portal services and other non-portal services): 1428.89 lakh (Growth: 12%)

Hon'ble MEIT Shri Ravi Shankar Prasad launches Association of Common Services Centres with IFFCO and Patanjali Ayurveda

Development of Common Minimum Framework (CMF) for Government Websites:

CMF is a Common Minimum Framework for Government websites developed under the Early Harvest Scheme of Digital India Programme. This framework, developed by NIC and based on open source technology, facilitates standardization and improvement in presentation and content delivery of Government websites. CMF enables static websites to migrate to dynamic portals and a set of functional features will be available to the websites of Ministries/Departments on adoption of CMF. This framework also simplifies content updating of the websites.

Achievements (Status as on 28th February, 2018)

• Number of websites made GIGW compliant : 79

2.3 NIC projects in Digital India

2.3.1 Aadhaar Authentication Services

NIC has setup Aadhaar Authentication Services for E-governance Application of NIC. These services are setup at Shastri Park, Pune and Hyderabad data centres. NIC has redundant leased line connectivity with UIDAI Data centre at Hebbal Bangalore and Manesar. Aadhaar Authentication services also been extended to the applications hosted in the NIC data Centres. The Dept. has to sign MoU with NIC for Aadhaar Authentication services. Using the Aadhaar Authentication services of NIC, many real time projects are being executed like Biometric Attendance System, PDS for various States, Scholarship etc. The services being offered for applications are Aadhaar Authentication - Demographic Authentication, Biometric Authentication, OTP Authentication and eKYC based on Biometric, OTP. NIC is one of the leading transaction requestor for Aadhaar services of UIDAI. NIC has also launched Aadhaar service based on the new framework of UIDAI i.e. Registered Device Concept. The Division is involved in helping the application developers to migrate to new RD service environment.

NIC has signed agreement with UIDAI to provide AUA/ASA platform for NIC's e-Governance projects. Aadhaar Enabled Authentication Division, NIC has established redundant links with UIDAI Data Centre to provide authentication services which can be used by the e-Governance applications. At present more than 100 State/Central Projects are on board at AUA/ASA services of NIC. More than 21 crore transactions were

held in the month of February'2018 using AUA/ASA services of NIC.

2.3.2 Agriculture Informatics

Various projects are developed and implemented for the benefit of the Agriculture sector.

2.3.2.1 Direct Beneficiary Transfer: (http://dbtdacfw.gov.in)

Agriculture Informatics Division of NIC-New Delhi has developed a comprehensive centralized DBT portal for Department of Agriculture Cooperation & Farmer Welfare at a national level. The Central DBT portal will act as a repository of Beneficiaries details of all Agriculture schemes.

Total number of Farmer data: 8,42,18,231

2.3.2.2 HORTNET

Key milestones have been achieved under HORTNET (http://midh.gov.in) project like online application filing, authentication, and processing, online payment to the beneficiary's bank account with Digital Signatures and/or Bio-Metric authentications in a complete secured manner. A total of 88,920 applicants / beneficiaries have digitally filed various schemes under MIDH using the HORTNET Portal in the Financial Year

2017-18 out of which 72,337 beneficiaries have received online subsidy using the HORTNET payment gateway with a total disbursement of 154.1 crore disbursed to the bank accounts of the beneficiaries. Mobile app and payment gateway are also implemented. DBT details are being captured in the portal.

New features are added in Retail and Wholesale Price Monitoring System, Crop production Statistics Information System (http://aps.dac.nic.in/apy) Land Use Statistics (http://aps.dac.nic.in/lus). Horticulture Area Production Information System, National Bamboo Mission, National Bamboo Mission(http://nbm.nic.in). Websites have been developed and being maintained for National Centre for Cold Chain Development (NCCD) http://nccd.gov.in, National Bee Board http://nbb.gov.in, http://cacp.dacnet.nic.in, http://eands.dacnet.nic.in

2.3.2.3 Soil Health Card (http://soilhealth.dac.gov.in)

Soil Health Card portal facilitates generation of Soil Health Cards for the benefit of farmers in uniform and standardized format across country. It supports 22 languages, alerts to farmers, Automatic Fertilizer Recommendation calculations and micronutrient suggestions, Fertilizers Recommendations for Fruits and Vegetable Crops based on crop stage/age.

Soil Health Card Portal

Major Activities includes Designing of Dashboard, Recommendations for horticulture crops, Easy & Fast interfaces, Database optimization, e-learning sessions are conducted regularly. Total 3,06,35,593 samples are registered and 2,43,31,758 Test results are entered. More than 10 crore Soil Health Cards have been printed and dispatched.

2.3.3 CollabCAD

CollabCAD® is an indigenous 3D CAD/2D Drawing/ PLM Software system for collaborative network enabled design & creation of Industrial 3D Designs and 2D drawings. It provides a total low cost IT solution for industry applications including MSME's and Educational Institutions. CollabCAD desktop version 2.5.0 v250ag, released for Windows and Linux OS in May 2017, includes numerous improvements and minor enhancements in different modules. CollabCAD NIC Cloud VM's has been activated for development, testing and deployment on Linux OS and security certificate update for www.collabcad.com website. A development project proposal for CollabCAD CFD applications for HPC National Supercomputing Mission, Meity R&D project with BARC, DAE, Mumbai scientists was initiated. CollabCAD productization project to design and build a web-enabled platform for visualization of CAD and Mesh 3D data using open-source technologies has been funded by NIC eGovAppStore.

2.3.4 DARPAN (Dashboard for Analytical Review of Projects across Nation):

Government at various levels implements lot of welfare programmes and schemes at district and below levels for the benefit of the citizens. It is important that such programmes are monitored effectively at various levels so as to measure outcome and impact of the projects and take appropriate decisions and actions. NIC has prepared a very comprehensive, generic and configurable Dashboard which is a consolidated dashboard product for Chief Ministers, Chief Secretaries, Divisional Commissioners and District Magistrate/District Commissioners across Districts & States. DARPAN is an online tool that can be used to monitor and analyse the implementation of critical and high priority projects of the State. It facilitates presentation of real time data on Key Performance Indicators (KPIs) of selected schemes/projects to the senior functionaries of the State Government as well as district administration which can be used for planning, evaluation and monitoring. The dashboard displays information in an objective and quantifiable way, helping to get a comprehensive view of the whole issue in a single window access for centre, state or district specific projects.

The Key Highlights of DARPAN are:

• DARPAN gives the State and District administration a tool, needed to deliver real-time, dynamic project monitoring without the need for coding or programming through web services.

• Enhances analysis through data collection by consolidating multiple data sources into one centralized, easy-to-access platform. Identifying

Assam DARPAN launched by Hon'ble Chief Minister of Assam

trends in data to gain enhanced perspectives of the district level projects and allows users to prioritize the information they require.

• Availability of graphical and statistical reports/ Multiple Graph Choices for administrative monitoring or informational purposes.

• Projects can be ranked and rearranged to reassign display priorities. Project can be maintained in view according to District as well State Review Priorities.

• Regular data updating at predefined frequency through APIs.

2.3.5 e-Office

E-Office is an efficient and Open Government suite of products to go paperless and streamline workflows for both intra-government and inter-government processes. The product, built on Open Architecture, is easy to replicate across Governments at the Central, State and District levels. eOffice adoption has been proliferating since inception with implementation in over 50 Central Government entities, 20 States/Districts, and 12 other entities.

2.3.6 eProcurement Project

e-Procurement system, GePNIC is developed to cater to the tendering requirements. This caters to various kinds of procurement requirements but still is generic in nature and can easily be adopted for all kinds of procurement such as Goods, Services & Works. System completed 10 years. Broad Product functionalities are Registration of Govt officials & Bidders in different roles, Tender Creation (Multiple Packets) and Publishing RFP/RFQ/ EOI/Global tenders with Multi Currency/ Open /Single/ Limited/Tender Cum Auction (eRA), Corrigendum, decisions of Pre-bid meeting, Online Bid submission/ resubmission/withdrawal, Item wise evaluation, Configurable Technical Parameter sheet, Auto Tendering Process with NO manual intervention, Quality and Cost Based System, Online Payment and Refund, Forward and Reverse Auction, Complete transparency in Public Domain & SMS / Mail alerts. Security Features & Transparency Indicators are Two factor authentication, Bid encryption (Technical & Financial) at client end, Encryption using PKI Technology, Digital Signing of all documents, Secured Hosting, Role based access, Log shipping, NTP configured, 24 X 7 availability Visibility of each other's offers for participating Bidders after Opening & Periodic audits by STQC.

Electronic tender traffic per month is around 60-70,000 tenders per month. In this long journey we have been able to bring in varied requirements in to the same platform which can be configured as per need. More features like Non-Disclosure Agreement, Pre and Post Integration with other systems for seamless e-tendering are under development.

e-Procurement Dash Board

2.3.7 Immigration, Visa and Foreigners Registration & Tracking (IVFRT)

The project was approved by the Cabinet Committee on Economic Affairs (CCEA) on 13th May, 2010 at a cost of ₹ 1011 crore under the National e-Governance Plan (NeGP). The project cost has been revised to ₹ 638.10 crore with implementation period up to 31st March, 2017 and further extended up to 31st March, 2020.

e-Visa has been implemented in 163 Indian Missions Abroad out of 178 Indian Missions Abroad, Biometrics has been implemented in 115 Indian Missions Abroad out of 178 Indian Missions, C-FRO has been implemented in all 13 FRROs, 607 FROs out of 674+ FROs across the country, C-FORM has been implemented in all 13 FRROs, 607 FROs out of 674+ FROs across the country, S-FORM has been implemented in all 13 FRROs, 607 FROs out of 674+ FROs across the country, E-Tourist Visa (eTV) has been introduced in 163 countries, 24 airports and at 5 Sea Ports, Since the launch of the scheme (November'2014) approx. 41 lakh Visas has been issued till 28th February, 2018.

2.3.8 India Portal 2017

India Portal, a Mission Mode Project in the integrated services category of NeGP, has been envisaged to be a unified portal that would provide "Single-Window-access" to information and services to be electronically delivered from all Government departments, institutions and organizations. It is a gateway Indian Government websites at centre, state and district levels and has a rich repository of Forms, Documents, Services, Schemes and web Links.

- **National Government Services Portal (NGSP)**

  NGSP has been designed for enabling Citizens to find Government services easily. Taxonomy and Meta data creation guides created under consultation with UNDP and DARPG. Workshops for Master Trainers was also conducted on 13th October 2017.

- **Revision of Guidelines for Indian Government Website (GIGW)**

  GIGW were released in February 2009. A committee has been formed to study and advice on the revision of the guidelines to keep it current w.r.t latest standards. The recommendations of the committee are being consolidated.

- **Promotion of Government initiatives/events**

  o **Micro site for Republic Day** and **Independence Day**

o **Spotlights** covering important Government initiatives and events

o Monthly newsletters to over 2 lakh registered users

• Social Media Presence

o Facebook page maintained at

https://www.facebook.com/NationalPortal India

o Twitter handle maintained at https://twitter. com/indiagov.in

2.3.9 Mobile App Development Centre

NIC has created a mobile development centre which has created approx 230 mobile apps for various eGovernance projects. These apps are extensively used by the concerned stake holders including citizen at large.

2.3.10 MyGov: A platform for citizen Engagement towards Good Governance

MyGov

MyGov platform has become a key part of the governance decision making process of the country. The platform has been able to provide the citizens a voice in the Governance process of the country and create grounds for the citizens to become stakeholders not only in policy formulation and recommendation bit but also implementation through actionable tasks. MyGov platform has been successful in keeping the citizens engaged on important policies, issues and governance.

Some of the **prominent activities** on MyGov are as follows:

Single Sign-on- MyGov Auth auth.mygov.in has also been incorporated in various other Government portals such as Data.gov.in. 'Mann Ki Baat', Radio Show of Hon'ble Prime Minister Shri Narendra Modi commenced on 3rd October, 2014 seeking citizen-ideas. So far 41 shows have been on air (till February, 2018). New India Challenge Activities has been launched. Special platform for citizen engagement as SANKALP SE SIDHI has been launched. Quizzes such as India quiz, Governance quiz, Gandhi quiz, Ek Bharat Shrestha Bharat, etc. have been published for citizen engagement. Other activities includes SMART INDIA HACKATHON, Paryatan Parc,

New economy for new India, BIRAC-SoCH Innovation Challenge Award'17, Global Cyber Challenge at the Global Conference on Cyber Space (GCCS), Skill champions from India at WorldSkills Abu Dhabi 2017 and World Food India Hackathon 2017.

MyGov Analytics (as on 28th February, 2018)

1. 5363.52 K people have registered on the Platform.

2. 64 Groups, 765 discussion themes, 725 tasks, 166 Talk, 243 blogs.

3. Weekly newsletters are being sent to all registered users of MyGov.

4. 212.65 K submissions have been made in Tasks.

5. 3862.58 K comments on discussions.

6. Created special section "Mann Ki Baat"- Prime Minister's radio address and successfully crowd sourced ideas from the registered users on the radio address.

7. Creative corner has been facilitated for citizens' participation which has recorded 545 submissions. MyGov has great impact on social media with 1.37 M followers on twitter and 325,044 likes on Facebook page..

MyGov Home Page

2.3.11 National Data Centres

NIC is operating National Data Centres at Delhi, Hyderabad and Pune. Hosting support for e-Governance Applications, Web portals and Websites is being provided on 24x7 basis. These Data Centres are also hosting National Cloud services for Government Projects. Mini-Data Centres are also operational in all NIC State Centres to cater to the e-Governance requirements at the State level. Hosting support is being provided for various critical e-Governance Projects viz. e-Procurement, Public Financial Monitoring System (CPSMS), eLekha, e-Panchayat, Aadhaar Enabled Biometric Attendance System (AEBAS), IVFRT, PDS, Swachh Bharat Mission, National Portal of India, Jeevan Pramaan, CCBS, and NREGA.

National Data Centre at Bhubaneswar has been setup and establishment of National Data Centre at Bhopal is under planning.

2.3.12 NIC National Cloud

NIC National Cloud is the first National Cloud under 'Meghraj', Government of India Cloud Initiative of MeitY. Cloud services are being offered with the aim to provide scalable ICT infrastructure for quick deployment of

e-Governance initiatives. These services support Self Service provisioning, Multi-location cloud and seamless integration of various Cloud Applications. Offerings include IaaS (Infrastructure as a Service), PaaS (Platform as a Service), etc. Currently over 680 eGovernance projects are hosted on over 12740 Virtual Machines. Major projects hosted include MyGov, Digital India Portal, Digital Locker, National Scholarship Portal, Biometrics Aadhaar Attendance system for Govt. Employees (BAS), National Scholarship Portal, Prime Minister Office Portal, Transport Project, JoSSA (admission counselling), Government eMarketplace, eHospital and Online Registration System for appointments, Swachh Bharat, Cyber Swachhata Kendra, Bharat Ke Veer Portal, National Centre of Geoinformatics, Open Forge, ePrisons, Open Data, UMANG, eLearning, eNAM(National Agriculture Market) Portal, National Power Portal, eSamiksha, Pollution Control Boards etc.

2.3.13 Public Finance Management System (PFMS)

PFMS is a one stop solution to address the demands of citizens, Central Ministries and departments, implementing agencies and banks to create an integrated platform for payments and non-tax receipts of the Government of India. Public Financial Management System solution of NIC establishes a comprehensive payment, receipt & accounting network, promotes better management of public funds and enhance public accountability. It facilitates capturing of the entire span of a financial transaction. For both payment and receipt transactions, PFMS caters to all elements of an online financial transaction i.e. the user interface, the payment/receipt functionality, Government banking arrangement (agency banks and RBI), accounting of the transaction, reconciliation and audit trail.

Implementing Agencies - 21.09 lakh, Beneficiaries regd - 34.19 crore, No of schemes Regd - CS-679; CASP-104, No of Banks Integrated - 168 Non-tax receipts - 3,196 crore,E-Payments - No of Trans - 51.2 crore, E-Payments - Amt - 13,67,487 crore, Payments processed per day (2017-18) - >11 lakh

2.3.14 Swachh Bharat Mission – Gramin (SBM-G)

Online Monitoring System (http://sbm.gov.in): To accelerate the efforts to achieve universal sanitation coverage and to put focus on sanitation, the Prime Minister of India launched the Swachh Bharat Mission (SBM) on 2nd October, 2014. Keeping the timeline set by the Hon'ble PM and the challenging nature of the programme, in view, the Ministry decided to depend completely on a paperless system of reporting and monitoring, by leveraging ICT. SBM Online Monitoring

Dashboard Swachh Bharat Mission - Gramin

System is a work flow based e-Governance system and is available at http://sbm.gov.in. It captures information from the field, for all the programme components under SBM-G at the Centre/State/District/Block and Panchayat level. This system is accessible by all stakeholders, providing them a single window interface for all SBM related activities. It has extensive data on Open Defecation free (ODF) status of villages, household sanitation including beneficiary photos and the geo-codes (lat/long).

The SBM-G online software, supports programme monitoring and decision making with the help of a comprehensive GIS dashboard. Awards - Microsoft Data Heroes 2017, Open Group Enterprise Architecture Award 2017, India Today SafaiGiri Awards 2016, Smart Governance Award 2016.

2.4   Digital Empowerment of Citizens

2.4.1   DigiDhan - Digital Payments

India is at the cusp of transformation towards Digital Economy, enabled by Digital Payments. In the last decade, there have been great advancements in the mobility, internet usage, banking sector, greater enrolments of Aadhaar, evolution of innovative payments platforms and advancements in banking sector accompanied by suitable regulatory guidelines by Reserve Bank of India (RBI) regarding digital banking. Such developments have allowed the payments space to mature, forming the core while building a cohesive ecosystem with enabled services like m-Commerce / e-Commerce, fintech and sector specific integrated services etc.

DigiDhan Mission :-

In 2017-18 union budget speech, it was decided to set up a mission to achieve a target of 2500 crore digital transactions. Pursuant to this, DigiDhan mission was constituted and a Project Management Unit (PMU) has been set up.

- MeitY further allocated Digital Transactions targets to banks on the basis of number of Current and Savings Account (CASA),

- MeitY further allocated digital transaction targets to 35 Ministries on the basis of citizen touch points

for each Ministry/Department and its affiliated institutions. Further digital transaction targets were distributed to States on the basis of GDP and Population,

- In order to achieve BHIM Aadhaar PoS targets, MeitY further allocated targets totaling 20 lakh BHIM Aadhaar PoS to 38 Banks which have the capability to acquire Merchants,

- MeitY notified two incentive Schemes of BHIM namely BHIM Referral for Individuals and Merchant Cashback schemes. An incentive scheme for BHIM Aadhaar scheme was also launched,

- DigiDhan mission has been tracking and monitoring the growth of digital transactions with Banks, Ministries and States,

- In order to enhance the awareness level on digital payments modes, its benefits and its enablement process, MeitY regularly participates in training workshops with various stakeholder agencies,

- MeitY has developed a Digital payments dashboard for tracking periodic growth in digital transactions by Banks, States and Ministries. Dashboard constitutes information from all the 38 banks, NPCI, RBI, PFMS and other sources.

Growth in Digital Payments

Over the years there has been a significant growth in digital payments, as indicated below:

In 2016-17, country has seen 1076 crore digital transaction which reflected an increase of 77% YoY. This
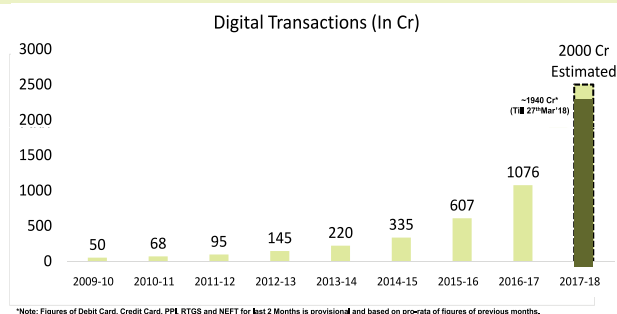
Figure 1: Growth of Digital Payments (Source: RBI, NPCI and Banks)

growth is sustained in 2017-18 as well with 1000+ crore digital transactions, having taken place by February, 2018. This increase can be attributed to development of innovative digital payments platforms such as Bharat Interface for Money (BHIM)-UPI, BHIM Aadhaar and BharatQR code. In Dec, 2016, NPCI launched BHIM app (based on BHIM- UPI platform), which has been downloaded by more than ~2. crore users. A number of Payment Service Providers (PSPs) have launched. BHIM-UPI based apps such as Google (Tez), PhonePe

and PayTm. This has made BHIM- UPI cross a milestone of 55 lakh transactions per day and emerge as the most used digital payment platform after cards and wallets. Since demonetization, five modes of payments namely BHIM-UPI, Immediate Mobile Payments System (IMPS) Aadhaar enabled Payments System (AePS), mWallets and Debit Cards have significantly contributed to the growth of digital transactions:

Mode Specific Growth in Digital Transactions

Average Daily Transactions (In Lakh)

*till 21th Mar,2018   Source: RBI, NPCI
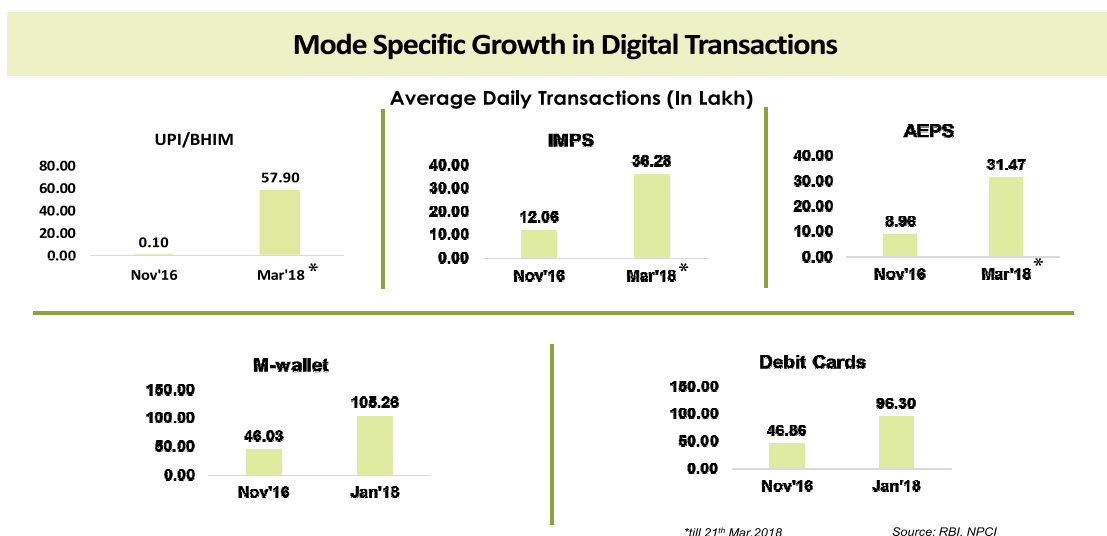
Figure 1: Growth of Digital Payment Transactions (Source : NPCI and RBI)

The trinity of Jan Dhan, Aadhaar, Mobile (JAM) is serving as the foundation for schemes that benefit the citizens. Direct Benefit Transfer (DBT) has various initiatives under its umbrella namely PAHAL, MGNREGA, NSAP etc. wherein direct funds transfer is executed to beneficiaries or through State/Government agencies / institutions to beneficiaries. The digitized mode of transactions is the underlying engine behind DBT and it is just one example of the transformative effect of digital payments. The number of central and state schemes onboarded on DBT platform has reached 414[1] with cumulative fund transfer of ₹ 3,42,169.64 crore[2] (till Mar 12, 2018) resulting in a savings of ₹ 57029 crore (as compared to FY 2016-17).

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[1] Source: https://dbtbharat.gov.in/

[2] Source: https://dbtbharat.gov.in/
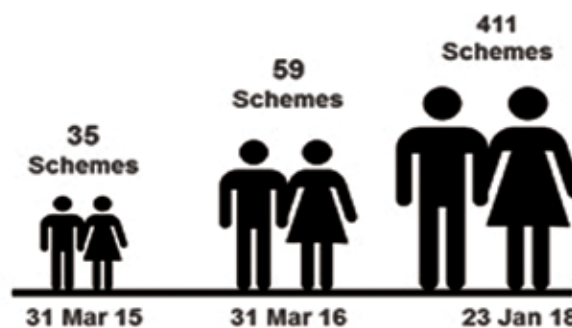
Figure 2: Growth of DBT Transfers and Schemes
(Source : DBT mission)

Growth of Digital Payment Acceptance Infrastructure:

The associated institutions – Banks and NPCI have also upped the ante on the payment acceptance infrastructure front, wherein the digital Payment acceptance infrastructure has increased from 15.11

lakh PoS machines in Oct, 2016 to 134 lakh [PoS machines, Bank's wallets, BHIM(UPI), Bharat QR Code, BHIP app, Bank's own QR Code, BHIM Aadhaar Pay, USSD (*99#)] in February, 2018. Similarly there has been growth in number of Pre-Paid Instruments (PPIs) in the market and regulatory regime is moving towards greater interoperability of PPIs.

Digital Payments Acceptance Infrastructure
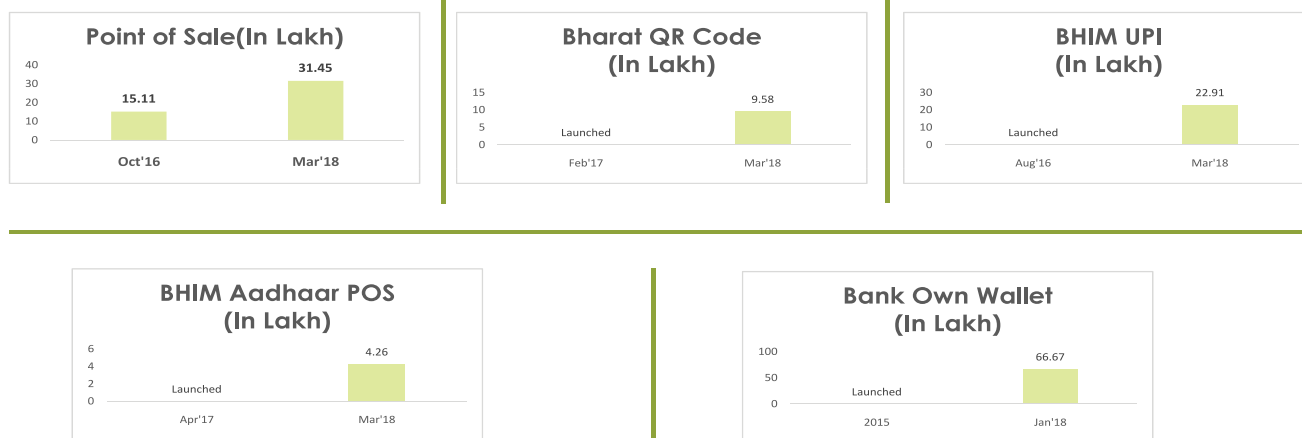
Figure 3: Growth of Digital Payments Acceptance Infrastructure

Universalization of Digital Payment Infrastructure

In order to enable every citizen in the country who may belong to any economic strata, suitable technologies are adopted. People with smart phones applications have a host of options to make payments through apps that run on BHIM-UPI platform. People having feature phones can opt to make transactions using USSD. People who do not have any phone can use Aadhaar enabled Payment System (AePS) and BHIM Aadhaar Pay for banking transactions.

Incentivization of Digital Payments& Dis-incentivize Cash transactions

Steps are afoot to bring in place a Merchant Discount Rate (MDR) regime in which the rates are set at reasonably low levels for small value transactions and in order to incentivize the merchants to accept digital payments. As volume of transaction goes up there may be further scope of reduction in MDR.

Preferred Approach

On digital payment acceptance infrastructure side, Government of India has strategized to saturate the acceptance points with BharatQR code and BHIM Aadhaar, in addition any other mode. In respect of payments that are repetitive in nature such as utility payments, the strategy is to onboard all the utilities on the Bharat Bill Payment System (BBPS). This will enable to have the option of accepting payments from any consumer through any mode from any bank. Ultimately any entity receiving payments, should be able to offer following options to the citizens:

A. Printing of Bharat QR code (preferably dynamic) on bills

B. Enabling at least two of the following options in all physical payment receipt counters:

- Pull request through Mobile no. /Virtual Payment address (VPA) wherein a request

DIGIDHAN GO CASHLESS, GO DIGITAL

of bill amount is received on BHIM/UPI enabled App of the customer,

- Prominent display of printed static9 Bharat QR code at the billing counter to enable customer to scan and pay,

- Dynamic Bharat QR code on a display facing the customer.

Considering benefits of digital payments, any payment acceptance entity may consider to offer a visible discount on digital payment vis-à-vis cash.

Promotion and Publicity of Digital Payment Transactions

In order to create awareness of this programme amongst citizens of India and proliferate the intended benefits of digital transaction, it has been decided that a 360 degree communication and awareness campaign be undertaken through various channels, including Print, Television, Radio, Digital and on-ground activities. In this regard, the major initiatives are as follows:

➢ **Digital Payments promotion template for Banks:** MeitY has created a template for Banks

on promotion of digital payments. The promotional plans from 27 Banks has been received and those plans have been assessed.

➢ **Digital Payments page on MeitY website:** The page containing matter related to the Digital Payments is being regularly updated on the details of incentives and promotion schemes to make the common citizen well-informed.

➢ **Launch for incentive/promotion schemes:** MeitY has launched several incentive/promotion schemes such as,

- Promotion scheme on BHIM Aadhaar

- BHIM cashback scheme for Merchants

- BHIM referral bonus scheme for Individuals

➢ **Meeting with Ministries & Departments:** MeitY Digital Promotion team has conducted a number of meetings and workshops with various Ministries & Departments across Central and State level for promotion and creating awareness for digital payments.

➢ **Digital Jagriti** -Common Service Centres are conducting Digital Financial Inclusion Awareness and Access (Digital Jagriti) programmes for citizens on usage of digital payments modes and supporting merchant on-boarding for acceptance of digital payments.

➢ **Digishala**-Free Doordarshan DTH educational channel available in Hindi, English and regional languages for creating awareness regarding various forms of electronic payment. DigiShala is available through GSAT15 (DD Direct DTH), 93.5 degree East, Receiver frequency: 11590 MHz.

PMGDISHA- The programme aims at training beneficiaries on use of electronic payment system also. So far 1.05 crore candidates have been registered and trained and 52 lakh have been certified.

2.4.2 e-Learning

e-Learning is the learning facilitated and supported by Information and Communication Technologies. It is one of the areas identified by the Ministry for imparting education using educational tools and communication media. e-Learning is an effective tool for quality and lifelong education to learners. e-learning mode and the related tools provide a platform for enhanced learning, cost effective delivery, flexibility of learning at the convenience of the learner, uniform quality content delivery, catchability only limited by the penetration of IECT, promotion of collaborative learning among distributed learners, re-usability of the content etc. The Ministry has been financially supporting R&D projects in this area at various academic educational institutes, R&D Labs etc for development of tools and technologies to promote e-learning.

Achievements

Achievements for the ongoing R&D projects during 2017-18, are as follows::

i.   **Rollout of Online Labs (OLabs) for schools, CDAC, Mumbai jointly with Amrita Vishwa Vidyapeetham, Kollam, Kerala**

Major objectives of the project are to create infrastructural and support framework for making OLabs (online labs for schools) accessible and usable by students and teachers across India and to train approximately 30000 teachers across India in effective use of OLabs resources to enhance the teaching learning experience. Total duration of the project is 3 years with budget outlay of ₹ 816.00 lakh. So far ₹ 667.46 lakh has been released in two installments.

For level 1 support, Olabs is available for public access at www.olabs.edu.in. For Olabs Offline, it is hosted with helpdesk at http://support.olabs.co.in/, email id provided for helpdesk is support@olabs.co.in together with Helpline Number, which is provided on website. Level 2 is handled by the respective lab development team at CDAC, Mumbai and Amrita University. OLabs is fully setup at NKN and all labs are shifted to the NKN server. Regarding Security audit of content, it is under process by third party. With regard to training of CBSE teachers, as per latest data so far 18,993 CBSE teachers have been trained from 6042 CBSE schools.

ii.   **Online Assessment and Evaluation System (OAES) for National Level Certification Examinations, IIIT, Bangalore jointly with NIELIT, New Delhi**

The objectives are to create item banks, development of evaluation methods and online assessment and evaluation system (OAES) for O-Level examination of NIELIT. The expected outcome of the project is to develop item banks for O-Level courses. Online evaluation of students' performance will also be done against all the items in the item bank. Further, a software platform will also be developed that will enable any agency to design and conduct online examination, and thereby evaluate the students' performance. The project duration was for 18 months; however it has been extended for 3 years due to various administrative and technical issues. Total outlay of the project was ₹220.11 lakh, out of which MeitY contribution was ₹165.08 lakh and NIELIT Contribution was ₹55.03 lakh.

All four modules, namely Item Authoring module, Assessment Instrument Generation module, Exam module and Evaluation module have been completed. Question bank of approx. 7000 questions (total 18 types) has also been completed. With regard to deployment activities, installation of OAES software and Mock examination by IIIT, Bangalore, has already been conducted. Also security testing (as part of development testing) has already been done at IIITB. For NIELIT, procurement of servers on Meghraj cloud has been done. Mock examination by NIELIT has been recently done and feedback has been shared with IIIT, Bangalore. For security, first round of security audit by NIELIT (through agency) has been done and its report findings have been received from service provider and investigation of the same is in progress. Further security audit on live server is also in progress by NIELIT.

iii. **Setting up ICT E-Learning Centres in 204 schools in Srikakulam district of Andhra Pradesh, implemented by ERNET India**

The objective is to set up e-Learning ICT centres in 204 high schools in rural and tribal area of district Srikakulam to integrate ICT for learning and teaching to improve learning outcomes of rural and tribal children.

The expected outcome/ deliverables of the project is to set-up ICT Centres in schools in rural and tribal area of Srikakulam and to develop digital content of Science, Maths and English in Telugu and English language mapped with Andhra Education curriculum and to make it available to rural and tribal students equitably and uniformly. It is expected that approx. 50000 students would be benefited through the use of e-Learning ICT deployment in the rural and tribal area of Srikakulam. Total duration of the project is 3 years with total outlay of ₹ 24.96 crore.

Setting up of ICT infrastructure has been completed and operational in all 204 schools. ICT Labs at 204 schools have been handed over to Education Department, Government of Andhra Pradesh. e-content has been procured and given by the State Government and further has been deployed in all 204 schools. It is based on State curriculum for up to high schools in local language. Internet connectivity has been provided in all schools except 3 schools, which is likely to be resolved very soon. Basic level computer training of 2 teachers per school has already been completed in all 204 schools. Advanced level training involving connectivity and e-contents, the relevant training has been provided by the concerned agency of State Govt. while deploying e-content in all 204 schools

iv. **Development of Personalized and Performance based E-Learning tool for existing e-resources, by NIT Durgapur jointly with Bannari Amman Institute of Technology, Erode District, Tamil Nadu and IIT Kanpur**

The objectives are to estimate the online learners' proficiency based on their navigation & search history, to sort and prioritize search results in the learning contents, tracking the searching process in a content particular for learners, improve search engine performance and to increase user (online learners) satisfaction.

The expected outcome of the project is to develop the content in new format for five courses, which can be used to profile dependent learning experience through Brihaspati-3 LMS. The source code for the proposed module of the Brihaspati-3 shall be released in open source along with Brihaspati. The project duration is 3 years and extension of 18 months with total outlay of ₹ 99.90 lakh.

Overall architecture of the system with its layout and incorporating with Brihaspati-3 platform has been completed. The homepage of the website has links for registration, sign up, and sign in link for students and a separate section for the various administrators. The student section of the project has been built. The system as described above is working well. Total 10 courses; (6 IT &

4 Electrical Engineering courses) namely 'High Voltage Engineering', Power System', 'Operating System', 'Data Structures', 'Theory of Computer Science', Introduction to Computing', 'Distributed Computing', 'Algorithm Analysis', 'Illumination Engineering' and 'Introduction to Electrical Engineering' have been developed and uploaded to the e Guru Portal and is ready to use.

Other tasks like making code compatible to Brihaspati-3 LMS and integrating the same with Brihaspati-3 etc. are in process.

v. **Deployment and management of Brihaspati-3 services over NKN for Indian Academia, by IIT, Kanpur**

The main objective of the project is to make installations on the servers deployed in NKN network and to maintain and upgrade them with every new patch and version being released. The academic institutes, which are subscribing to NKN connectivity, will get very good reliable access to the services of Brihaspati-3 and its upgraded versions. All other services developed in open source, which are being integrated with Brihaspati-3 will also be deployed and managed.

The expected outcome of the project is to deploy Brihaspati-3 services and allied services on NKN. The experience of the deployment and running Brihaspati- services shall be documented. The feedback from the services will be used in the development process to add more features and remove all kinds of bugs. Total duration of the project is 3 years with total outlay of ₹ 46.50 lakh.

The server access at NKN Data Centre has been received and with this, the installation and transfer of existing user data from IITK server to Brihaspat -3@NKN has been completed. The services are up and running. Few more institutes have been added. Server from NKN Data centre was earlier accessible from the network of NICnet, ERNET and NKN only. After continuous follow-up with NKN, now it is accessible from anywhere in the world. As on 18th Oct. 2017, there are total 291 Institutional Accounts, number of course are 674

and 22137 user accounts at Brihaspati. Many workshops have also been organized for user institutes in order to popularize Brihaspati-3 usage. An online workshop was also conducted on use of BGAS system (Brihaspati general Accounting System). In addition, help videos are added on www.youtube.com. BrihaspatiSync - live lecture streaming service is also added.

vi. **Enhancing the outreach of Electronic System Design and Training through e-learning, by CDAC, NOIDA**

The main objective of this project is to develop low cost educational kits and to educate and provide training in the areas of Embedded System Design (ESD), Designing using Field Programmable Gate Array (FPGA) and Digital Signal Processing (DSP). Both hands-on and training through e-learning will be organized periodically throughout the project duration.

The expected outcome/ deliverables of the project is to develop educational kits for performing lab along with user manuals to perform experiments. Project will generate trained faculties, students, and other participants in different areas of Electronic Systems. Furthermore, the design & development of boards and training using different kits will enhance the knowledgebase for commercial production of electronic systems. Total duration of the project is 2 years and extension of 18 months with budget outlay of ₹183.50 lakh.

List of experiments related to Digital Logic Design has been prepared after reviewing the syllabus of some universities in a brainstorming workshop for all three kits. FPGA board has been developed and few workshops have been conducted at various institutes for field testing. Interaction with Indian Electronics industry is in the process for transfer of technology (ToT). For other two boards, various tasks have been performed. For ESD board, it is in testing mode as two prototype Boards have been fabricated and assembled. For DSP Board, after making prototype, still

some problem is being faced as all ICs are not compatible with each other. The latest DSP Board is in layout design mode and after that it will be fabricated for final testing. With regard to E-Learning portal & content development, Web-portal of the project has been uploaded. Security audit clearance of the portal is also done. Work related to content development of all three boards is in process.

vii. ICT-based framework to enhance the teaching and learning experience in large classroom', by IIT, Guwahati

Objectives of the project are to develop the framework and interface to deliver the lecture on the diverse portable computing devices, carried by the students and for interaction between the teacher and the students both in the class and outside the class. In addition, the project also aims to develop a framework and interface for examination management (conduct and evaluate short exams/ quizzes/ home assignments).

The expected outcome of the project is to develop a framework for an ICT-based large classroom management system for automatic collection of attendance and scalable for real-time delivery of lecture content (slides and voice) to students and synchronization between mobile devices in the classroom (e.g. smart phones, tablets and laptop). This system will enable personalized interaction between the teacher and students and also facilitate to conduct and evaluate short exams. Total duration of the project is 2 years and extension of 18 months with budget outlay of ₹ 94.32 lakh.

With regard to progress, integration and testing of various modules have been done, which includes automatic attendance-taking system, proposed learning outcome evaluation methodology, evaluation of the system in classes, query prioritization and filtering mechanism, evaluation system(keyword-based matching), lecture delivery system for large and multiple classrooms, fixing of bugs related to the Login and Examination module, demonstration of the system in different educational institutions of North Eastern region, rigorous testing of the system in different network conditions, identifying and fixing some minor bugs of the system have been

done. The system has good response from students and is acceptable and is more interactive. The framework so developed is called 'Avabodha' which means system for classroom interaction and learning which has been developed for teachers and students for large classroom. Different workshops were conducted on the demonstration of the above developed system.

2.4.2.1   Language Computing

(1)   Text To Speech (TTS) in Indian Languages:

➢ **Development of Text to Speech System (TTS) integrated with screen reader in Indian Languages:**

Under the consortium mode project Text to Speech System for 13 Indian Languages namely Hindi, Bengali, Marathi, Tamil, Telugu, Malayalam, Gujarati, Odia, Assamese, Manipuri, Kannada, Bodo and Rajasthani have been developed using fully Open Source engines.

➢ **Technology Transfer and TTS integration with Mobile devices :**

- Integration of TTS in Mobile Devices will enable large section of the society particularly rural and Tire-2 & Tier-3 Cities to have voices based information Access in Indian Languages.

- MOU has been signed with OS Labs India Pvt Ltd. for integration of the TTS in 9 Indian languages in Android based Regional Operating System INDUS OS so that the same may be available in Mobile/ Wireless devices. So far TTS with Indian OS has been integrated with 8 different mobile handset manufacturers.

- TTS has been successfully integrated with INDUS OS and has currently made available in 8 models of Indian Mobile Manufactures namely Micromax, Swipe, CelKon and Karbonn. The models would be launched in market.

- TTS Systems for SMS Application, WhatsApp, Emails and Web Browser in mobile devices has been made in 7 Indian

languages namely Hindi, Gujarati, Marathi, Malayalam, Tamil, Telugu and Bengali.

(2) Automatic Speech Recognition (ASR)

- Automatic Speech Recognition (ASR) for Agricultural Commodity prices for 6 Indian Languages have been developed, namely Hindi, Bengali, Assamese, Tamil, Telugu and Marathi. The systems would act as a voice interface for NIC Agmarknet portal (http://www.agmarknet.nic.in).

- Pilot deployment effort in collaboration with the Ministry of Agriculture has been initiated for ASR system in Marathi and Tamil languages for Maharashtra and Tamil Nadu States. Speech Recognition Systems for agricultural commodity prices and weather information system for 11 Indian languages/ dialects have been initiated and they are under implementation.

(3) Multi-Lingual Basic Information Processing Tools

Lack of content in Indian languages is a big challenge and it was discovered that there is lack of content creation tools. To bridge this gap language CDs containing various software tools like Libre Office, Open Type Fonts, Keyboard Drivers, Firefox Web Browser, E-mailing Client,

etc. has been released for free public use for all 22 constitutionally recognized Indian languages. Various different PSUs, Banks, Educational Institutions, etc are using these software tools for their day to day working. As on date more than 13 lakh CDs have been distributed and there has been about 1.43 crore downloads. These software tools can also be downloaded freely from http://www.ildc.in.

(4) Language Technology Information Dissemination & Repository

TDIL Data Centre (www.tdil-dc.in) portal provides language technology services and resources developed under various TDIL projects. NLP applications such as MAT, WebOCR, IndoWordNet, HindiWordnet, Glossary tool, UTRRS, Sanskrit NLP tools, Sanskrit E-learning application, Sandhan-CLIA, TTS, Mobile based MT service, LPMS etc. have been hosted on the portal for public use. 460 linguistic resources, such as annotated text and speech corpora for Indian languages have also been made available through this portal. Text to Speech systems as a browser plug-in for Mozilla and Chrome Browser for eight Indian Languages, namely Hindi, Bengali, Marathi, Tamil, Telugu, Malayalam, Odia and Gujarati languages are also available on the portal.

Indian Language Technology Proliferation and Deployment

2.4.3 Initiatives on Accessibility

1. A National Policy on Universal Electronic Accessibility was formulated by Ministry of Electronics and Information Technology (MeitY) and it was notified on October 25, 2013. The policy facilitates equal and unhindered access of Electronics and ICTs products and services by differently-abled persons.

2. Under this Policy, accessibility audit of 50 most popular/visited Government Websites was conducted with the help of ERNET India. A High Level Advisory Committee (HLAC) was constituted with multiple stakeholders' participation to decide further course of action to implement the policy. As per decisions taken by the HLAC, various initiatives have been taken.

3. MeitY has funded a project titled 'Development of Content Management Framework (CMF) for Government Websites' implemented by NIC, in which, 100 Central Ministries/Departments Websites will be made accessible as per Guidelines of Indian Government Websites (GIGW). This project is fully funded by MeitY and it does not have cost implications on the Ministries/Departments. Under this project, as on 31st January, 2018 total 78 websites have been made accessible by NIC as per Guidelines of Indian Government Websites (GIGW).

4. For remaining Government websites, HLAC decided that respective organization may take necessary action regarding making their websites accessible, either by their own team or through agencies empanelled by NICSI. In this regard, MeitY has written to various organizations for the same vide communication no. 18(2)/2009-e-Infra (Vol. IV) dated June 04, 2015. The expenditure for the same will be borne by the respective departments from their respective budget.

5. In order to make the Government websites accessible, MeitY has also issued an office memorandum no. 3(4)/2009-EG-II) dated May 28, 2015 regarding various accessibility guidelines viz. Making Government notifications/circulars etc. accessible by putting them into ePub or OCR (Optical Character Recognition) based PDF and making all procurement GIGW complaint, to the Secretaries of all Central Ministries/Departments and IT Secretaries of all States/UTs. After multiple follow-ups and discussions in HLAC, IRCTC, which is one of the most visited website/citizen centric portal, has made its website accessible by providing One Time Password (OTP) in addition to Visual CAPTCHA.

6. Regarding accessibility audit, MeitY (e-Governance Group) has been supporting a project titled 'Website Quality Evaluation' of 2000 Government websites (including 100 above websites) as per GIGW, which is executed by STQC. Under this project, 151 websites have been certified on GIGW as on February 28, 2018.

7. In addition, MeitY provides technological support to the Nodal Ministry for differently-abled person (Divyang) i.e., Department of Empowerment of Person with Disabilities (DEPwD) for various initiatives related to differently-abled person e,g., Accessible India Campaign (Sugamya Bharat Abhiyan).

2.4.4 Conference of State IT Secretaries & Ministers' Conclave

A Conference of State IT Secretaries and State IT Ministers' Conclave was held under the chairmanship of Shri Ravi Shankar Prasad, Hon'ble MEIT on 12th and 13th February 2018 respectively, to discuss the progress on Digital India and the way ahead.

2. During his inaugural address, Hon'ble MEIT expressed his keenness on regularly meeting with States for successful execution of a strong Digital India Programme. He highlighted key achievements and progress made by various Programmes like Aadhaar, JAM trinity, Bharatnet, Ayushman Bharat, eHospital, National scholarship portal, GeM, Jeevan Praman, BPO scheme, CSC, Digital Payments, Digital Locker, Electronic Manufacturing and Cyber Security.

3. The exercise (called $1 trillion digital economy) taken up by MeitY with M/s McKinsey in consultation with other Departments, industry,

academia and other stakeholders to capitalize on India's trillion dollar digital opportunity by 2025 was highlighted / appreciated / emphasized by him and requested everyone to participate in the discussion in order to bring upon this transformation, which is envisaged to be Government-neutral, technology-neutral, politics-neutral and State-neutral. The Digital economy report elaborates 30 point implementation module across 9 focus areas targeting $1 trillion digital economy, which is expected to facilitate direct employment growth with 55 million new jobs being created by skilling and re-skilling of 40 million Indians.

4. States were requested to resolve right of way (RoW) issues for smooth implementation of BharatNet 2.0 by using Preferential Market Access (PMA) Policy for procurements under BharatNet. Border States of J&K and N-E States may provide location of towers and electrical lines, so that proper planning for BharatNet phase 2 can be undertaken. States have been requested to identify and propose locations for setting up WiFi hotspots.

5. Detailed discussions were held on connectivity issues, Aadhar integration apart from elaborate presentations on various initiatives of Digital India on numerous initiatives including CSC, e-District, Digital Payments, m-Kisaan, Soil Health Card, e-Hospital, eVisa, eSign, UMANG, Digilocker, RAS, NCoG and the major MMPs like e-Courts.

6. While addressing the Valedictory address, Hon'ble MEIT thanked all the Ministers, IT Secretaries and officials for the meaningful exchange on cyber security, digital payments, Aadhaar card, NIC operations, new Electronics Policy; Progress of Digital India and vision of trillion dollar digital economy by 2025. Some of the major decisions conveyed by him were as under:

    (i)   Suggestions and feedback and way ahead for India may be communicated within a fortnight.

    (ii) Establish a cyber security centre in their States with the help of required technical assistance by MeitY.

    (iii) Establishment of Seven centres of excellence across the country, wherein the centre, states, industry and academia shall work together on the new technologies

Conference of State IT Secretaries & Ministers' Conclave

(iv) UMANG to be the one stop platform, where all central and State services (including eDistrict services) can be availed by the citizens of India .

(v) More than 232 crore documents are already uploaded on the DigiLocker

(vi) All districts to come up with their websites by the end of 2018 April, by using NIC's SWAAS platform of website building and uploading the essential required content. The website is expected to showcase the socio economic, tourism etc., profile of the district thus showcasing the digital diversity of India to the world.

(vii) An appeal to the all the State Governments, regarding the decision taken by the Government of India, i.e., "No poor person shall be denied essential services in absence of Aadhaar". In absence of Aadhaar, alternative means of identification, like BPL card etc., may be accepted. Also in case of biometric mis-match for old people, the Aadhaar number of the prospective beneficiary shall be noted on an exception register and the benefit shall be provided.

(viii) All the CSCs across all states shall be trained on BHIM QR code. It has also been resolved that 1 crore merchants shall be on-boarded on BHIM QR code with the aid of State Governments. NIC shall integrate all digital payment facilities like rupay, BHIM, mastercard, VISA etc. An appeal was made to the States to use Bharat Bill Payment Service (BBPS), for facilitating utility payments like electricity, gas, water etc., through digital means in their States.

(ix) It has also been resolved that CSCs shall be operationlised in the remaining 70 thousand Gram Panchayat in addition to existing 2.98 lakh CSCs, of which 1.7 lakh CSCs are established in Gram Panchayats. These 70 thousand CSCs are expected to be established and operationalised by May 2018.

(x) The Hon'ble MEIT re-iterated the decision taken during the last meeting at Siri Fort in the presence of about 5000 women VLEs, it was resolved that the VLEs shall start one sanitary napkin production unit in each block, wherein sanitary napkins shall be produced at nominal cost in order to promote menstrual hygiene among the rural women, thus employing about 7000 women VLEs. This shall also help in promoting Swacch India.

Hon'ble MEIT expressed his gratitude to all the Ministers, State IT Secretaries and other participants requesting them to work as a team, to establish and enhance India's digital footprint across the globe, making India more powerful.

Make in India: Electronics Manufacturing

The demand of Electronics System Design and Manufacturing (ESDM) is estimated to grow exponentially to USD 400 Billion by 2023-24. The Government attaches high priority to electronics & IT hardware manufacturing. It has the potential to generate domestic wealth and employment, apart from enabling cyber-secure ecosystem. The electronic manufacturing sector requires continuous push with the overall objective of promoting "Make in India", not only to meet the domestic demand but also to promote India as a hub for electronics manufacturing. Several policy initiatives under the "Digital India" and "Make in India" programmes are designed to facilitate investment, foster innovation, protect intellectual property, and build best-in-class manufacturing infrastructure towards creating conducive environment for attracting investment in the electronics hardware manufacturing sector. The intent of the Government is to ensure a level playing field for domestic manufactures to enable them to compete with imports in the sector by rationalization of tariff structure,

simplification of procedures, providing incentives and upgrading infrastructure. As a result of various measures taken over the last few years, production of electronics hardware has shown significant increase. The demand of electronics hardware is increasingly being met by domestic production. The following initiatives have been taken in this regard -

3.1 Modified Special Incentive Package (M-SIPS):

In order to promote large scale manufacturing in the country, a Modified Special Incentive Package Scheme (M-SIPS) was announced by the Government in July 2012 to offset disability and attract investments in Electronics System Design and Manufacturing (ESDM) Industries. The scheme mainly provides subsidy for investments in capital expenditure- 20% for investments in Special Economic Zones (SEZs) and 25% in non-SEZS. The incentives are provided on reimbursement basis. The policy provides for an inter-ministerial Appraisal

Committee to evaluate investment applications. Based on the recommendation of Appraisal Committee, approval of Competent Authority is obtained.

The Union Cabinet in its meeting held on 21st July 2015 has approved the extension of M-SIPS and also approved amendment of M-SIPS in order to simplify the procedure and enhancement of scope and the notification of amendment in M-SIPS (simplifying procedure, enhancement of scope and extension for 5 years) was issued on 3rd August, 2015. Further, the Union Cabinet in its meeting held on 18th January, 2017, approved certain amendments in the M-SIPS policy which were notified on 30th January, 2017. As per the aforesaid amendments, applications under the Scheme will be received till 31st December 2018 or till such time that the incentive commitment reaches ₹10,000 crore, whichever is earlier. Incentives under the scheme will now be available for investments made within 5 years from the date of approval. These amendments are expected to expedite investments in electronic manufacturing. As per the directions of the Cabinet, a separate committee headed by Cabinet Secretary has been set up for mega projects, envisaging more than ₹ 6850 crore investments (investment above 1 billion USD).

The status of M-SIPS applications as on 28th February 2018: So far, total 322 applications, with investments amounting to ₹1,33,861 crore have been received under M-SIPS. Of which, 148 applications with investment of approximately ₹27,460 crore have been approved. 19 applications with investments of approximately ₹12,253 crore have been recommended by the Appraisal Committee for approval, 80 applications with investments of approximately ₹42,193 crore have been closed due to incomplete applications or not meeting the eligibility criteria under the scheme and 73 applications involving investments of ₹14,378 crore are under appraisal. There are following 2 mega projects with proposed investments of over 1 billion USD :

i.   Proposal from M/s Twin Star Display Technology with proposed investment of Rs 23,591 crore for manufacturing of Display Fab.

ii. Proposal from M/s Mundra Solar Limited with proposed investment of ₹13,985 crore for manufacturing of Solar Panels (2 GW)

The above mega projects are under initial stage of appraisal.

For verification of disbursement claim applications under the scheme, M/s IFCI Limited has been appointed as verification agency. Disbursement of incentives have made to M/s. Bosch Automotives Electronics, Bangalore to the tune of ₹ 11.82 crore and of ₹23.16 lakh to M/s. Desai Electronics (P) Ltd., Pune in FY 2014-15. The incentives of ₹2.48 crore to M/s. SGS Techniks; ₹1.91 crore to M/s. Bosch Automotive and ₹39 lakh to M/s. Desai electronics have been disbursed in the FY 2015-16. In 2016-17, the disbursement of incentives have been made to M/s. Desai Electronics (P) Ltd., Pune of ₹16.96 lakh and to M/s. Genus Power Infrastructure Pvt. Limited, Jaipur of ₹2.80 crore.

In 2017-18, so far disbursement of incentives have been made to M/s. Bosch Automotives Electronics, Bangalore of Rs. 8 crore; Rs 24.97 crore to M/s Jabil Circuit India Pvt. Ltd, Pune; Rs 12.67 crore to M/s Nidec India Private Limited, Neemrana; Rs 1.35 crore to M/s Smart Card IT Solutions, Pune; Rs 12.8 crore to M/s Velankani Electronics Pvt. Ltd., Bangalore; Rs 6.41 crore to M/s HiQ Electronics Pvt Ltd, Bangalore, Rs 18.27 crore to M/s Magneti Marelli Powertrain, Bangalore and Rs 4.6 crore to M/s.Secure Meters Ltd., Udaypur.
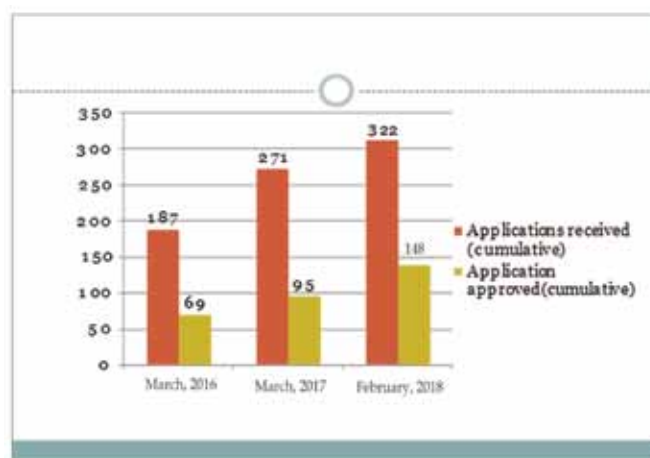
Modified Special Incentive Package Scheme
Applications Status

3.2 Electronic Manufacturing Clusters (EMC)

To create and strengthen the infrastructure ecosystem for electronics manufacturing, the Government notified Electronics Manufacturing Cluster (EMC) Scheme

in October 2012 to support creation of world-class infrastructure for attracting investments in Electronics System Design and Manufacturing Sector. The Scheme was open for receiving applications for a period of five years from the date of notification. Assistance for the projects in Greenfield Electronics Manufacturing Clusters is restricted to 50% of the project cost subject to a ceiling of ₹50 crore for every 100 acres of land. For larger areas, pro-rata ceiling applies. At the lower end, the extent of support is decided by the Steering Committee for Clusters (SCC) subject to the ceiling of ₹50 crore. For Brownfield EMC, 75% of the cost

of infrastructure, subject to a ceiling of ₹50 crore is provided as grant.

MeitY received 50 applications under EMC scheme [46 applications for setting up of Greenfield EMCs and 4 applications for setting up of Common Facility Centres (CFC) in Brownfield Clusters]. Till 28th February, 2018, MeitY has accorded final approval to Twenty (20) Greenfield EMCs and Three (3) Common Facility Centres (CFCs) and In- Principle approval to Three (3) Greenfield EMCs. The details are as under:

List of Final Approved Greenfield EMC

S.No.	State	Location/City
1	Andhra Pradesh	Village-Cherivi, Satyavedu Mandal, Chittor District
2		Vikruthamala Village, Yerpedu Mandal, Chittor District
3		Renigunta and Yerpedu Mandal, Chittoor District, Near Airport, Tirupati
4	Assam	Bongora (Village), Chayani (Mouza), Palasbari (Revenue Circle), Kamrup (R) (District)
5	Chhattisgarh	Village-Tuta, Sector-22, Naya Raipur, Tehsil-Abhanpur, Raipur District
6	Gujarat	Village-Tunda, Taluka- Mundra, District-Kutch
7	Goa	Village-Tuem , Taluka- Pernem Goa
8	Jharkhand	Adityapur, Saraikela-Kharsawan District
9	Kerala	Kakkanad Village, Kanayannur Taluk, Ernakulam District
10	Madhya Pradesh	Badwai-Bhopal
11		Purva-Jabalpur
12	Odisha	Infovalley, Bhubaneswar Industrial Area, Khurda District
13	Rajasthan	IA, Salarpur, Khushkera, Bhiwadi
14		Karoli Industrial Area, Bhiwadi, Alwar District
15	Telangana	E-city, Fab City, Hyderabad
16		Maheshwaram, Ranga Reddy District
17	Uttar Pradesh	Plot No. 6/A, sector-24, Yamuna Expressway
18		Plot No.1, Block C, Ecotech-VI Industrial Area, Greater Noida.
19	West Bengal	Sector-IV & V, Falta Industrial Centre, P.S. Ramnagar, South 24Parganas District
20		Naihati town, North 24 Parganas District

List of Final Approved Common Facility Centre (CFC)

S.No.	State	Location/City
1	Karnataka	Plot No.360, KIADB Industrial Area, Hebbal, Hottagalli, Mysore
2	Maharashtra	Plot No.-P 30, Shendra Five Star Industrial Area, Aurangabad District
3		Plot No. J/P-8, J 462 and J 462/P, Pimpri Industrial Area, Pune

Till date, the Government Grant-in-aid amounting to ₹ 251.85 crore has been released to 12 EMC projects to kick-start the infrastructure activities.

List of Greenfield EMCs accorded In-Principle approval

S.No.	State	Location/City
1	Andhra Pradesh	Visakhapatnam
2	Bihar	Abgilla village, Gaurichak district, Patna
3	Gujarat	Village-Khoraj, Taluk-Sanand, District-Ahmadabad
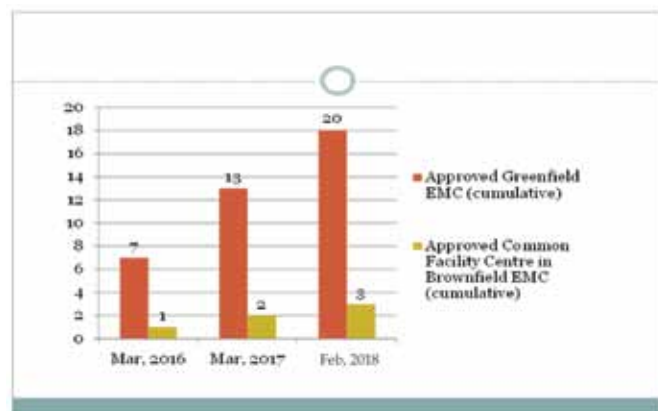
Electronics Manufacturing Cluster Application Status

3.3 Electronic Development Fund (EDF):

Electronics Design & Manufacturing is a sector, which is characterized by high velocity of technological change. Intellectual Property is the most critical determinant of success, not only for the companies of this sector but also to the countries and economies as a whole. Setting up of EDF was one of the important strategies which would enable creating an electronics industry ecosystem in the country. Creating a vibrant ecosystem of innovation, Research and Development (R&D) with active industry involvement is essential for a thriving electronics industry. It is with this objective that an Electronics Development Fund (EDF) is set up as a "Fund of Funds" to participate in professionally managed "Daughter Funds", which in turn will provide risk capital to companies developing new technologies in the area of Electronics, Nano-electronics and Information Technology (IT). This fund is expected to foster R&D and innovation in these technology sectors EDF enables creation of an ecosystem for providing risk capital to both industry and academia to undertake Research and Development in these technology areas. It will, in the process, enrich the intellectual property in the country and encourage more entrepreneurs towards product and technology development.

M/s. Canbank Venture Capital Funds Ltd. (CVCFL), a 100% subsidiary of Canara Bank, is the Investment Manager and MeitY is the anchor investor of EDF. EDF was launched on 15th February, 2016 by Hon'ble Minister for Electronics & IT. Twenty two Daughter Funds have been selected for investment through EDF. The cumulative commitment of EDF to these 22 Daughter Funds is ₹1227 crore and the total targeted corpus of these 22 Daughter Funds is around ₹10,900 crore. Till date EDF has drawn ₹56.99 crore from its contributors, which includes ₹51.24 crore from MeitY and has invested ₹16.38 crore to two Daughter Funds. As on date EDF has invested in Two Daughter Funds, which in turn have made investments in 14 Ventures.

3.4 Compulsory Safety Standards for Electronics:

Keeping in view the safety of Indian consumers and to curb the inflow of substandard electronic products, the "Electronics and Information Technology Goods (Requirements for Compulsory Registration) Order, 2012" was notified on 3rd October, 2012 under the provision of Compulsory Registration Scheme of BIS Act, 1986. This Order had come into effect from 3rd July 2013. The Order necessitates creation of institutional mechanism for developing and mandating standards and certification for electronic products to strengthen Conformity Assessment infrastructure nationwide.

As per the Scheme, the manufactures seeking registration of goods with the Bureau of Indian Standards (BIS), have to get their products tested at BIS recognised labs. Testing is also to be performed on selected samples during the surveillance, subsequent

to registration. The surveillance is to be conducted by MeitY.

This Order initially covered 15 notified electronic products categories and 15 additional electronic items were notified under the ambit of CRO on 13th November 2014.

Further, the Indian Language support for Mobile Phones as per IS 16333 (Part 3) has been added to the schedule of this Order vide Gazette notification dated 24th October, 2016. The order has come into effect from 23rd February, 2018.

MeitY has notified the following product categories under the Compulsory Registration Order-Phase-III vide Gazette notification dated 23rd August, 2017. The items include recessed LED Luminaries, LED Luminaires for Road and Street lighting, LED Flood Lights, LED Hand lamps, LED Lighting Chains, LED Luminaires for Emergency Lighting, UPS/Inverters of rating ≤ 10kVA,Plasma/ LCD/LED Television of screen size up-to 32",Visual Display Units, Video Monitors of screen size up-to 32",CCTV Cameras/CCTV Recorders, Adapters for household and similar electrical appliances, USB driven Barcode readers, barcode scanners, Iris scanners, Optical fingerprint scanners and Smart watches. The Order is scheduled to come into effect from 23rd May 2018.

The Compulsory Registration Scheme has resulted in high compliance of notified electronic goods to Indian safety standards and more than 11000 registrations have been granted by BIS to manufacturing units covering approximately 55,000 products models/series.

Scheme for setting up / up-gradation of Electronic products testing / Quality Control Laboratories

To strengthen the conformity assessment infrastructure, DeitY notified "Scheme for setting up / up-gradation of Electronic product testing / Quality Control Laboratories" on 25th August 2013.The objective of the scheme is to encourage setting up testing facilities by Central / State / Academic Institutions which will be used for evaluating goods under the "Electronics and Information

Technology Goods (Compulsory Registration Order, 2012). The following project proposals have been approved:

- CEC, IIT Madras, Chennai for total GIA of ₹140 lakh and amount of ₹56.00 lakh as 1st instalment, 2nd instalment of ₹50.03 lakh & 3rd instalment of ₹21.82 lakh released.

- CSIR -Central Institute of Mining and Research (CIMFR), Dhanbad for total GIA of ₹142.75 lakh and amount of ₹57.10 lakh released as 1st instalment.

- MPSEDC, Bhopal for total GIA of ₹127.50 lakh and amount of ₹51 lakh released as 1st instalment & ₹28.16 lakh released as 2nd instalment.

- NRTC-Parwanoo for total GIA of ₹140.27 lakh and ₹ 56.10 lakh released as 1st instalment & ₹ 56.10 lakh released as 2nd instalment.

- Institute for Design of Electrical Measuring Instruments (IDEMI)Mumbai for total GIA of ₹150 lakh and 1st installment of ₹60 lakh has been released.

3.5 Growth of Electronics Sector:

The total global electronics hardware industry is about US $ 2 Trillion, out of which, India's Production was about US$ 47 billion during the year 2016-17. The domestic consumption in India was about $ 86.4 billion during the year 2016-17, while exports were about US$ 6 billion.

The current value addition in the sector ranges from 5-30% in India, depending upon the constituent of value chain. For example, it is around 25-30% in components, whereas, it is approx. 5-15% at SKD assembly level.

The Electronics sector has several verticals in terms of its main constituents. At present, the availability of Production data of this sector is limited to the information provided by various Industry Associations. Based on the same, the production profile of the Electronics Sector is as follows:-

Production of Electronics Sector (Rupees in crore)						
SNo	Item / vertical	2013-14	2014-15	2015-16	2016-17	2017-18*
1	Consumer Electronics@	47,599	55,806	55,765	64,742	73,524
2	Industrial Electronics	33,600	39,374	45,083	62,214	69,057
3	Computer Hardware	17,484	18,691	19,885	20,382	21,401
4	Mobile phones	26,650	18,900	54,000	90,000	1,32,000
5	Strategic Electronics	13,800	15,700	18,055	20,760	23,562
6	Electronic Components	32,102	39,723	45,383	52,099	58,351
7	Light Emitting Diodes (LED) Products	1,941	2,172	5,092	7,134	9,630
	Computed Total	1,80,454	1,90,366	2,43,263	3,17,331	3,87,525

Notes:- (1) Data above is as provided by respective Industry Associations.

(2) Source: 1 - CEAMA; 2, 5, 6 & 7 - ELCINA; 3 - MAIT; 4 - ICA;

(3) @- Includes Home Appliances, viz., Refrigerator, Washing Machine, Air Conditioner & Microwave Oven - from 2012-13 onwards.

(4) * - Estimates are as provided by respective Industry Associations.

The total production of the aforesaid verticals of electronics sector in India is estimated to be about ₹3,87,525 crore in 2017-18, compared to ₹3,17,331 crore in 2016-17, exhibiting a growth of about 22%. As a result of various initiatives taken by the Government and efforts of Industry, production of electronics in India has shown significant growth during the last three years.

3.5.1   Consumer Electronics

The Flat panel TV market has shown a substantial growth in the last 5 years as a result of digitalization of broadcast sector and increased affordability due to reduction in price. As a result of conducive Government policies, the production of LCD/LED TVs got a boost and has increased to 16.0 million numbers valued at about ₹26,400 crore in 2017-18, from 14.5 million Nos. valued at about ₹23,925 crore in 2016-17, exhibiting a growth rate of about 10%.

The production for Home Theaters is estimated to witness a growth of about 0.76 million nos., valued at about ₹924 crore in 2017-18, compared to 0.7 million nos., valued at ₹840 crore in 2016-17.

With the advancement of technology, the conventional TV (with Picture Tube / CRT), in contrast to the LCD / LED segment, has continued to register negative growth of production. As per CEAMA, production of CRT TVs is estimated to be one million during 2017-18 valued at ₹400 crore. Similarly, production of DVD players has continued to decline due to rapid growth of DTH sector, digitalization of TV network and use of set Top Boxes (STB). Public Address System segment of consumer electronics is estimated to continue to grow steadily by about 10% in 2017-18, with an estimated production value of about ₹1,210 crore, as against ₹1,100 crore in 2016-17.

Consumer Durables / Home Appliances

This sub-sector comprising of Air Conditioners, Washing Machines, Refrigerators and Microwave Ovens has shown a growth rate of about 17.2% with a value of ₹44,590 crore in 2017-18, as against ₹38,035 crore in 2016-17.

As per CEAMA, the overall production of this segment of electronics industry, including Consumer Durables / Home Appliances was ₹64,742 crore in 2016-17 and is estimated to grow by 13.6% to about ₹73,524 crore in 2017-18.

3.5.2   Industrial Electronics

Fresh investments in engineering, electrical, automotive and electronics segments are driving the growth of

Industrial Electronics sector. The key application segments of the Industrial Electronics industry are process control equipment, test & measuring equipment, power electronics equipment, automation and analytical instruments. These technologies are gaining ground as modernization, automation and robotics are the future growth areas. Information Technology and software are playing a major role in value added Industrial electronics.

The Industrial electronics segment viz., power electronics, process control and automation equipments with built-in software and analytical instruments account for nearly 81% of the total industrial electronics production. Most of the domestic demand is catered to by domestic manufacturing.

The power electronics space is dominated by unorganized regional players, which is expected to grow at higher rate due to huge demand and low penetration. Inverters and UPS are becoming household items driving the growth of this segment. Some of the larger players include BHEL, Bluestar, ABB, GE, Keltron, Allen-Bradely, Amara Raja, Sukam, APC, Numeric, Honeywell, etc. Some of these players have set up global tie-ups over the last few years and have brought in newer technologies into the Indian markets. Solar Photovoltaic and allied equipments is another segment, which is likely to grow at a sustained high growth rate.

As per estimates provided by ELCINA, the total production of Industrial Electronics during 2017-18 is estimated to be about ₹69,057 crore, as against ₹62,214 crore during 2016-17, exhibiting a growth of about 11%.

3.5.3 Computer Hardware

Computer hardware comprises of Desktops, Laptops, Note Books, Tablets/Net Books, Servers, other computing devices, Microprocessor based systems and Computer peripherals. With the advent of technology, varieties of mobiles, viz., smart phones and hand-held devices with the capabilities/ power / features of computers have been entering the market. Hence, the usage of conventional Desktops has diminished for personal purposes. However, the usage of the computers and its peripherals in commercial, industrial and Offices is likely to grow at a steady pace. The Indian computer

hardware Industry has been undergoing a change in its product composition.

The production of computer hardware increased from ₹19,885 crore in 2015-16 to ₹20,382 crore in 2016-17, exhibiting a growth rate of 2.5%. It is expected to reach to about ₹21,401 crore during the year 2017-18, exhibiting a growth rate of about 5%.

3.5.4 Mobile Phones

The Mobile handsets sector has emerged as the champion category under the 'Make in India' initiative of the Government. There has been massive growth in Mobile handsets and components manufacturing and India has emerged as the new manufacturing destination for mobile handsets and components.

Mobile handsets and components manufacturing activity continued to accelerate during 2017-18. As many as 120 manufacturing units of Mobile handsets and components have been set up in India during the past three years. Out of these, about 59 units are producing mobile handsets and rest of them are engaged in manufacturing various components of mobile handsets, such as chargers/ adapters, battery packs, wired headsets, mechanical parts, USB cables etc., spread across India.

Most of the big companies associated with the mobile handset manufacturing eco-system in the world are now in India. Names like Foxconn, Samsung, Wistron(Apple), Micromax, Intex, Lava, HTC, Huawei, Vivo, Oppo, Pegatron, Xiaomi, HMD(Nokia) etc. are currently having significant manufacturing operations in India across various States viz., Uttar Pradesh, Andhra Pradesh, Telangana, Karnataka, Rajasthan, Uttarakhand, Delhi, West Bengal, Haryana, Tamil Nadu, Himachal Pradesh, Maharashtra, Daman, Punjab. Employment of about 4.5 lakh (direct & indirect) has been generated in this sector during the past three years.

India's dependency on imported handsets has drastically reduced due to the growing manufacturing activity of handsets during the past couple of years. Consequently, drop-in-growth of imports has been approx. 30% in 2016-17 over 2015-16, which is estimated to continue further to reach about 25% in the current financial year 2017-18 over 2016-17.

The production of Mobile handsets grew to approx. ₹90,000 crore in 2016-17 compared to ₹54,000 crore in 2015-16, exhibiting a growth rate of about 66%, whereas, the production of Mobile handsets is estimated to be about ₹1,32,000 crore in 2017-18. In volume terms, production grew to about 175 million in 2016-17, over 110 million in 2015-16, exhibiting a growth of about 60%, which is further estimated to grow to 225 million units in 2017-18.

India has the second largest wireless network in the world. The country has witnessed a significant rise in manufacture of mobile handsets during the last three years. The value share of mobile handsets industry in the total electronics segment in India is estimated to be nearly 35%, which makes mobile handsets industry the largest electronics vertical.

Several initiatives have been taken during the year leading to significant investments in new manufacturing operations. Some of the important initiatives like Phased Manufacturing Programme (PMP) for mobile handsets have played a key role to transform the manufacturing space.

3.5.5 Strategic Electronics

Electronics is a key area of defence technologies and become a vital component of nearly all the weapon systems, platforms and equipment designed and developed for defence purpose.

The strategic electronics segment consists of Military Communication systems, Radars and Sonars, Network Centric systems, Electronic Warfare systems, Weapon systems, Satellite based Communication, Navigation and Surveillance systems, Navigational aids, Underwater electronic systems, Infra-Red (IR) based detection and ranging system, Disaster management system, Internal security system etc.

However, the sector is dependent on imports and foreign technology. Recently, few domestic small and medium scale companies have come up and they have the capability to absorb technology and meet stringent requirements of strategic equipment. Some of these companies provide EMS services and meet critical supply requirements of MNCs as well as Defence

PSUs. These include companies such as Rangsons, Centum Electronics, Kaynes Technology, Data Patterns and more. Some of the larger Indian business groups are foraying into strategic electronics sector and these include, Tata, L&T, Wipro and HCL, who have the capability and resources to take up big offset projects and collaborate with global leaders.

As per ELCINA, the production of Strategic Electronics has grown from ₹18,055 crore during 2015-16 to ₹20,760 crore during 2016-17. The production is estimated to be about ₹23,562 crore during 2017-18, exhibiting a growth of about 13.5% over 2016-17.

India's defence, aerospace and nuclear sectors are poised for substantial growth on the back of economic growth and the need to maintain national and energy security. The role of IT in defence is also expanding with the focus on cyber security.

3.5.6 Electronic Components

The policies and schemes of the Government, including, inter-alia, rationalization of tariff structure, Phased Manufacturing Programme (PMP), Modified Special Incentive Package Scheme (M-SIPS) and notification of electronics products under the Public Procurement (Preference to Make in India), Order 2017 for the growth of electronics sector, under the umbrella of 'Make in India' and 'Digital India' Programmes and increase in the customs duty on LED Lights, Set Top Boxes (STBs), Energy Metres, Flat Panel TVs, Mobile Phones, Microwave Ovens etc., will have a cascading positive impact on the domestic demand for relevant components. It is also expected that the export in the components segment shall witness a gradual upward trend as Merchandise Exports from India Scheme (MEIS) benefit for electronic components has also been increased. The focus by the Government and the Industry on Electric Vehicles (EVs) will also add value to the sector, encouraging local manufacturing.

As per ELCINA, Electronic Industries Association of India, the domestic production of electronic components for the year 2017-18 is estimated to be about ₹58,351 crore vis-à-vis ₹52,099 crore during 2016-17, exhibiting a growth of about 12%.

It is, however, noteworthy that a significant share (over 70%) of this component production is being exported leaving about 25% for domestic consumption, which is used in domestic electronic equipment production. Majority of electronic components are not manufactured in the country and have to be imported. As such, Government has been taking proactive measures for promotion of domestic manufacturing of electronic components.

The emerging high growth areas for domestic manufacturing are LED lighting, Automotive electronics, Energy meters, Solar energy, Mobile Phones and IT products apart from the existing sectors, viz., telecommunications, consumer electronics and industrial electronics, which are driving the growth of electronic components manufacturing in the country.

The Indian electronic component production is dominated by electro-mechanical components (like printed circuit boards, connectors, etc.,) with 29% share and passive components (like wound components, capacitors, resistors, etc.) with 24% share. Further, the shares of active components (like ICs, diodes, transistors, picture tubes, etc.) and the associated components (like optical disc, magnets, RF tuners etc.) of the components industry are about 18% and 29%, respectively.

The Electronics Manufacturing Services (EMS) industry in India is growing rapidly and key global players as well as a number of domestic companies are operational in the country. This segment needs very high efficiency of operations to stay profitable. Availability of components and an effective supply chain is vital for EMS companies for their growth. Domestic companies have generally followed the business model of staying in low-volume and high-mix business segments, where the margins are better. However, the EMS players need to operate in high-volume and low-margin segments to compete with the global players.

3.5.7 Light Emitting Diodes (LEDs) Products

One of the driving forces for growth in electronics manufacturing and for growing electronic components demand is the Indian Lighting market. The demand for energy efficiency has brought forward an immediate need for more energy efficient products, such as Light Emitting Diode (LED) products.

LED is the choice for next generation energy efficient lighting for its technical and economic virtues. Many countries have set LED as the national strategic industry. It is foreseen that LED products will have a penetration of about 75% by 2020. LED products save about 70% and 50% energy, as compared to the use of Incandescent Lamps (IL) and Fluorescent Lamps (FL), respectively. Over the years, opportunities for Light Emitting Diodes (LEDs) have increased in automobiles, communications, signage, signaling, architecture and entertainment sectors. The opportunity for LEDs in the general space illumination segment of residential and commercial buildings is expanding rapidly.

As per ELCINA, the LED Products manufacturing in India is estimated to reach ₹9,630 crore in 2017-18, as compared to the production of about ₹7,134 crore in 2016-17, exhibiting a growth of about 35%.

3.5.8 Automotive Electronics

With the growth of Automobile industry and the increasing digitization of automobile controls, Automotive electronics has come to occupy an important segment of the electronics industry. Automotive Component Manufacturing Association (ACMA) has projected that Indian Automotive Electronics Sector will reach approximately ₹36,500 crore by 2020. The global market for automotive electronics is set to account for 230 Billion US $ in 2020, from 140 Billion US $ in 2010. Some key technologies used in automotive electronics are as Anti-lock Braking System (ABS), Body Control Module (BCM), Tyre Pressure Monitoring System (TPMS), Electronic Power Steering (EPS) etc., while parking, cam, crank and oxygen sensors are the key sensors to be focused.

3.5.9 Medical Electronics

Medical devices play a crucial role from the diagnosis to the after-care phase of medical treatment and significantly impact affordability of and access to healthcare. As per the Annual Report of Department of Pharmaceuticals, the global medical devices market is expected to grow to US $ 332 billion by 2020, from

an estimated US $ 228 billion in 2015 due to rising prevalence of chronic diseases; ageing population; increasing income and affordability, resulting in higher demand & utilization of healthcare services. The Indian market is among the top twenty in the world by market size, and fourth in Asia after Japan, China and South Korea. Indian market is import–dependent to the extent of 70%. The Government has also taken various steps to promote this sector, which include the following:

o   100% FDI in medical devices under automatic route

o   Notification of Medical Device Rules 2017

o   'Make in India' initiative for promoting indigenous manufacturing

o   The development of a quality standardization framework in India that is based on international standards and certifies the quality, safety and performance of medical devices.

o   Several policy measures to address the challenges of medical devices industry.

To promote scientific and technological research in Medical Electronics sectors in India, MeitY in association with Biotechnology Industry Research Assistance Council (BIRAC) is implementing Industry Innovation Programme on Medical Electronics (IIPME). The Project aims to fund a portfolio of Indian led pilot Projects that target innovations in the multi-disciplinary areas, comprising of electronics, engineering, medical devices, healthcare, software, algorithms and information technology. MeitY will provide a funding support of ₹10.5 crore over a period of 3 years, which has been extended till December 2019. Under this program, support is provided at Seed, Early transition and transitions to scale stages. 25 proposals are being supported through BIRAC under the programme out of which, 18 proposals are in Idea-to-PoC stage, 5 proposals are in Early Transition stage and 2 proposals are in Transition to Scale stage.

3.5.10 Exports

Government has taken several measures for the growth of the exports of Electronics Hardware sector. Special Economic Zones (SEZs) set up to enable hassle-free

manufacturing and trading for export purposes and EHTP units are the major contributors to exports. 100% Income Tax exemption on export profits is available to SEZ Units for 5 years, 50% for next 5 years and 50% of ploughed back profits for 5 years thereafter. The Electronics Hardware Technology Park (EHTP) Scheme is an export oriented scheme for undertaking manufacturing of electronic goods.

Merchandise Exports from India Scheme (MEIS) benefits are available for export of electronic goods under the Foreign Trade Policy (FTP 2015-20). The other schemes for export promotion are Export Promotion Capital Goods (EPCG) Scheme, Duty Exemption and Remission Schemes, Duty Free Import Authorization (DFIA) Scheme, Deemed Exports, etc. Due to the effective steps taken, exports have been showing signs of improvement during the year 2017-18, as compared to the year 2016-17.

As per the Directorate General of Commercial Intelligence and Statistics (DGCI&S) data, the export of electronic goods was US $ 5962.9 Million (₹39,979.6 crore) during 2016-17, as compared to US $ 5959.5 Million (₹39,063.5 crore) during 2015-16.

3.5.11 Imports

As per the DGCI&S data, the total import of Electronics into India in 2016-17 was US$ 42,878.9 million (Rs.2,87,558 crore), as compared to the import during the preceding year 2015-16, which was about US$ 40,939.8 million (Rs.2,68,105.3 crore), an increase of 4.74% in US $ terms and 7.26% in rupee terms.

3.6   Public Procurement (Preference to Make in India) Order 2017

The Government has issued Public Procurement (Preference to Make in India) Order 2017 vide the Department of Industrial Policy and Promotion (DIPP) Notification No. P-45021/2/2017-B.E.-II dated 15.06.2017 to encourage 'Make in India' and to promote manufacturing and production of goods and services in India with a view to enhancing income and employment.

In furtherance of the aforesaid Order, Ministry of Electronics and Information Technology has issued Notification for 10 Electronic Products viz., Desktop PCs,

Laptop PCs, Tablet PCs, Dot Matrix Printers, Contact and Contactless Smart Cards, LED Products, Biometric Access Control/ Authentication Devices, Biometric Finger Print Sensors, Biometric Iris Sensors and Servers, vide Notification No.33(1)/2017-IPHW dated 14.09.2017, wherein preference has been provided to domestically manufactured electronic products on the basis of prescribed domestic value addition ranging from 40% to 70%.

3.7 Development and Implementation of Indian Conditional Access System (iCAS)

Conditional Access System (CAS) is a system used to limit the access of TV signals to only authorized viewers and forms an integral part of Set Top Boxes (STBs). A major impediment in design and development of domestic STBs was identified as the licensing of CAS. Therefore, the need as well as an opportunity was felt to develop Indian CAS (iCAS) for boosting the development and manufacturing of STBs in the country. In November, 2014, M/s. ByDesign India Pvt. Ltd., Bangalore, was selected and awarded the task for development and implementation of iCAS, in association with Centre for Development of Advanced Computing (C-DAC), with best in class technical specifications.

The Development Stage of iCAS was successfully completed in November, 2015, within the specified time limit. The development of iCAS has enabled India to enter a niche market hitherto dominated by five big global companies. The iCAS is available to domestic STB manufacturers at a price of USD 0.5 per license for a period of three years as against market price of USD 3-5 per license for other competing products. The implementation of iCAS in the cable networks has already started. The solution has been well received by Indian Operators at large. Over 11,50,000 STBs with iCAS have been deployed with more than 130 cable operators. Doordarshan is leveraging the iCAS solution to upgrade its dish DTH platform.

3.8 Tariff Rationalization:

Rationalization of tariff structure for electronics hardware manufacturing sector is an on-going exercise. To promote indigenous manufacturing of electronic goods,

several steps have been taken during the year, as under:

1.   **Promotion of indigenous manufacturing of Digital Payment Devices:** Following goods and parts/ components for use in the manufacture of these goods, subject to actual user condition, have been exempted from Basic Customs Duty (BCD) vide S.No.468 of Notification No.50/2017-Customs dated 30.06.2017:

(i)   Micro ATMs as per standards version 1.5.1;

(ii)   Fingerprint reader / scanner;

(iii)   Iris scanner;

(iv)   Miniaturised POS card reader for mPOS (other than Mobile phone or Tablet Computer).

2.   **Promotion of indigenous manufacturing of LED (Light Emitting Diode) Lights:** BCD on all parts for use in the manufacture of LED lights or fixtures including LED lamps has been reduced to 5%, subject to actual user condition vide S.No.471 of Notification No.50/2017-Customs dated 30th June, 2017, as amended from time to time. BCD on all inputs for use in the manufacture of LED driver or MCPCB (Metal Core Printed Circuit Board) for LED lights and fixtures or LED lamps has also been reduced to 5%, subject to actual user condition vide S.No.472 of Notification No.50/2017-Customs dated 30th June, 2017, as amended from time to time.

3.   **Increase in Basic Customs Duty on identified electronic goods to promote their indigenous manufacturing:** Vide Notification No.91/2017-Customs and Notification No.92/2017-Customs both dated 14.12.2017, Basic Customs Duty (BCD) has been increased from 10% to 15% on Cellular Mobile Handsets, CCTV Camera/ IP Camera, Digital Video Recorder (DVR)/ Network Video Recorder (NVR) and Electricity Meters and from 10% to 20% on Set Top Boxes for Televisions, Colour Televisions, Microwave Ovens and Light Emitting Diode (LED) Lamps.

4.   **Phased Manufacturing Programme (PMP) for cellular mobile handsets and its sub-assemblies/ parts/ components:** The cellular mobile handsets and components manufacturing has emerged as one of the flagship sectors under the "Make in India" initiative of the Government. All major brands (both foreign and Indian)

either have already set up their own manufacturing facilities or are in the process of doing so or have sub-contracted manufacturing to Electronics Manufacturing Services (EMS) companies operating from here.

The differential Excise Duty dispensation, which was enhanced to 11.5% in favour of domestic cellular mobile handset manufacturers vis-a-vis imports in the Budget 2015-16 [i.e. Countervailing Duty (CVD) @12.5% on imports of cellular mobile handsets and Excise Duty @1% without input tax credit] gave an impetus to the Assembly, Programming, Testing and Packaging (APTP) model of manufacturing of cellular mobile handsets. The Excise Duty based Phased Manufacturing Programme (PMP) was formulated and implemented in 2016-17 for

Charger/Adaptor, Battery Pack and Wired Headset, with the objective to substantially increase the domestic value addition for establishment of a robust cellular mobile handsets manufacturing eco-system in India. As a result, India rapidly started attracting investments into this sector and significant manufacturing capacities have been set up in India during the past two years. The following PMP roadmap, formally notified in April 2017, has enabled the cellular mobile handsets and related sub-assembly/ component industry to plan their investments in the sector. Presently, the PMP has been implemented based on Basic Customs Duty (BCD) based differential duty in favour of domestic manufacturers:

Year	Sub-Assembly
2016-17	(i) Charger/ Adapter, (ii) Battery Pack, (iii) Wired Headset
2017-18	(iv) Mechanics, (v) Die Cut Parts, (vi) Microphone and Receiver, (vii) Key Pad, (viii) USB Cable
2018-19	(ix) Printed Circuit Board Assembly (PCBA), (x) Camera Module, (xi) Connectors
2019-20	(xii) Display Assembly, (xiii) Touch Panel/ Cover Glass Assembly, (xiv) Vibrator Motor / Ringer

As a result of implementation of the PMP, starting in 2016-17, wherein 14 sub-assemblies of the cellular mobile handsets are being indigenized in a phased manner, the Domestic Value Addition (DVA) in manufacturing of feature phones is estimated to go up from about 15% to 37% and the DVA in manufacturing of smart phones is estimated to go up from about 10% to 26% by 2019-20.

5.   Ease of Doing Business: The Customs (Import of Goods at Concessional Rate of Duty) Rules, 2017, notified vide Notification No.68/2017-Customs (N.T.) dated 30.06.2017, as amended vide Circular No.48/2017-Customs dated 08.12.2017, have further eased import clearance.

6.   Rationalization of GST Rates for Electronic Goods: Based on representations of electronics industry associations, the GST rates for electronic goods have been rationalized. Accordingly, Mobile Phones and Light Emitting Diode (LED) Lamps attract GST of 12%; CCTV Camera/ IP Camera, Personal Computers, Printers, Video Recorders, Computer Monitors and Projectors not exceeding 20 inches, Electrical Switches, Relays,

Connectors, Fuses, Plugs and Sockets attract GST of 18%; Computer Monitors and Projectors more than 20 inches and Televisions attract GST of 28%.

Tariff rationalization in the Union Budget 2018-19: To promote indigenous manufacturing of electronic goods, several steps have been taken in the Union Budget 2018-19 for the rationalization of tariff structure, which, inter-alia, include:

7.   Promotion of indigenous manufacturing of cellular mobile phones, its sub-assemblies and parts/ sub-parts/ inputs of the sub-assemblies thereof: Basic Customs Duty (BCD) on cellular mobile phones has been increased from 15% to 20%. BCD has also been increased from 7.5%/ 10% to 15% on the specified sub-assemblies (viz., Charger/ Adaptor, Battery pack, Wired headset, Microphone, Receiver, Key pad, USB Cable, notified Mechanics and Die Cut Parts etc.) of cellular mobile phones covered under Phased Manufacturing Programme (PMP) roadmap for 2016-17 and 2017-18.

BCD has also been increased from Nil to 10% on the Printed Circuit Board Assembly (PCBA) (HS Code

85049090) and Moulded Plastics (HS Codes 39269099 or 85049090) for use in the manufacture of Charger or Adapter of cellular mobile phones. BCD on inputs or parts for use in the manufacture of PCBA and Moulded Plastics of Charger or Adapter of cellular mobile phone has been exempted, subject to actual user condition.

8. Promotion of indigenous manufacturing of Cochlear Implants (a medical electronic device): BCD on raw materials, parts or accessories for the manufacture of Cochlear Implants has been reduced from 2.5% to Nil, subject to actual user condition.

9. Promotion of indigenous manufacturing of smart watches: BCD on wrist wearable devices (commonly known as smart watches) (HS Code 85176290) has been increased from 10% to 20%.

10. Promotion of indigenous manufacturing of solar cells/ panels/ modules: BCD on solar tempered glass or solar tempered (anti-reflective coated) glass for manufacture of solar cells/ panels/ modules has been reduced from 5% to Nil, subject to actual user condition.

3.9 Setting up of Semiconductor Wafer Fabrication facilities in India

The Union Cabinet, in its decision dated 20th April, 2011 had set up an Empowered Committee (EC) with the mandate, inter-alia, to identify technology and potential investors for setting up semiconductor wafer fabrication (FAB) manufacturing facilities in the country, and to recommend nature and quantum of Government support. The EC was subsequently reconstituted by the Cabinet vide its decision dated 28th January, 2015.

The EC adopted a proposal-based initiative for inviting Expression of Interest (EoI) for setting up of FAB facilities with the aim of attracting investments into a complex and financially challenging hi-tech manufacturing sector. In response to the EoI, proposals were received from two business consortia, one led by M/s. Jaiprakash Associates Limited (with IBM, USA and Tower Semiconductor Limited, Israel as partners and proposed location as Uttar Pradesh) and the other led by M/s. HSMC Technologies India Pvt. Ltd. (with ST Microelectronics and Silterra Malaysia Sdn. Bhd. as partners and proposed location as Prantij, Gujarat). Based on the recommendations of the EC, the Cabinet

in its meeting held on 12.02.2014 had accorded approval to the aforesaid proposals. Letters of Intent (LoI) were issued to the two consortia for setting up FAB facilities in India on 19.03.2014. Both the consortia were required to take certain actions and submit the requisite documents, as enunciated in the LoI for demonstration of commitment.

Both the consortia sought extensions on multiple occasions for submission of requisite documents for demonstration of commitment, which were provided to them by EC. The consortium led by M/s. Jaiprakash Associates Ltd. has withdrawn from the project. The consortium led by M/s. HSMC Technologies India Pvt. Ltd. has been putting in efforts to attract equity and debt funding for setting up the Semiconductor FAB project.

3.10 Marketing and attracting Investment in Electronics sector

MeitY has engaged with the stake holders of the Electronics System Design & Manufacturing (ESDM) sector through various activities:

During 5th edition of Global Conference on Cyber Space (GCCS 2017) held at New Delhi, a Curtain Raiser events on **'Rising ESDM Sector in India'** was organised on November 21, 2017 with participants and dignitaries from Government, Industry, Academia etc. Inter-alia, the following three programmes were launched :

- Design and Development of NavIC Receiver

- Microprocessor Development Programme

- Investment Promotion: Hands on Programme for Mobile Handset Engineers Phase II.

CURTAIN RAISER EVENTS ON 'ESDM SECTOR IN INDIA'
during GCCS 2017

- Hon'ble Minister for Electronics & Information Technology, Shri Ravi Shankar Prasad inaugurated a conference organized by Qualcomm Technologies at New Delhi on 17th January, 2017. The company announced expansion of its Design in India Programme with investment of $8.5 million to expand their design initiatives in India that will support companies in the areas of rural technology, biometric devices, payment terminals and others.

Hon'ble MEIT Sh. Ravi Shankar Prasad addressing the audience during the Inauguration Session of a Conference organized by QUALCOMM TECHNOLOGIES

- ELCINA Golden Jubilee Commemorative Conference was held on 13th September 2017 at New Delhi. During the event, ELCINA Industry Book, a manuscript, which traces the journey of the electronics sector, was unveiled. The Industry Book is to enable readers to appreciate the role played by pioneers in driving the growth of the Indian Electronics industry over last fifty year Also, the ELCINA Investor's Manual, a hand book of procedures and policies for the investors, who wish to understand and navigate emerging

opportunities in the India ESDM sector was unveiled.

- Sh. S. K. Marwah, Director, MeitY, participated in the International LED EXPO & Summit 2017 held in Mumbai on May 12, 2017. The event brought together LED innovators and entrepreneurs from across the globe on one common platform. On account of enormous progress made in the field of LEDs and their energy efficient and eco-friendly advantages, LED-based lighting systems

are revolutionizing lighting practices across the world, as well as in India. The LED lighting market in India is projected to grow at a CAGR of over 32% by 2020. With relatively low LED light penetration and huge untapped opportunity, India has become an attractive market for both domestic as well as international LED players.

- Sh. Sanjay Kumar Rakesh, Joint Secretary, MeitY, addressed the delegates in "8th Strategic Electronics Summit (SES 2017)-Defence & Aerospace" heid on 6th July, 2017 at Bangalore. The theme for the conference at SES 2017 was

"Policy push & Strategic Partnerships for Self-Reliance in Defence Electronics" to highlight the opportunities, policy changes and supportive ecosystem required to galvanize the industry.

- MeitY participated with CMAI delegation in CommunicAsia from 23-25 May, 2017 at Singapore to promote investment & technology for indigenous manufacturing of electronics. More than 1,150 exhibitors from 52 countries / regions participated in the event. CommunicAsia provided

an opportunity for people of the world involved in the electronic industry to actively cope with the rapidly changing environment as well as make a contribution to the acceleration of technology advancement and the expansion of the market in the world's electronic industry.

- Dr. Ajay Kumar, Additional Secretary, MeitY participated in the inaugural session of INDIA PHARMA 2017 and INDIA MEDICAL DEVICE

2017. The theme of the event was "Shaping the Future of India Pharma Industry".

- A meeting under the Chairmanship of Additional Secretary, MeitY with Taiwanese Government Industry Delegation led by Ms. Mei-hua Wang, Vice Minister, Ministry of Economic Affairs, Taiwan was held on 09th May, 2017 at New Delhi. Taiwanese companies have shown interest for establishing PCB manufacturing and establishing FAB facility in India.

- Shri Ajay Sawhney, Secretary, MeitY chaired the awareness-cum interaction workshop organized by Delhi Mumbai Industrial Corridor (DMIC), in collaboration with MeitY. Key stakeholders and major corporate players operating in the IT sector participated on 20.09.2017 at New Delhi. The theme was Smart Cities an ideal manufacturing and investment destination for companies in the IT/ ITES, ESDM, ICT sectors. Shri Alkesh K Sharma, CEO, DMICDC also addressed the participants.

- The 10th Edition of IPCA Electronics Expo 2017 was held from August 3-5, 2017 at Pragati Maidan, New Delhi. It brought together the PCB Industry, OEMs, EMS companies and the suppliers of raw materials, consumables and equipment from all over the world at one place for business development and networking.

- A Government-Industry delegation visited Germany during March, 2017 to attract investment

in ICTE sector and participated in CeBIT 2017. The Indian delegation had several one-to-one meetings with various interested companies/ entities including EPO, Huawei, ADVA optical Networks, Deutsche Messe, Intel etc. at Hannover and Munich. On the side lines of CeBIT, a Make in India Mittelstand (MIIM) Workshop/ Seminar on "Opportunities in Electronics System Design and Manufacturing (ESDM) & India's Digitalisation Mission" was also organised at Hannover.

- MeitY participated with ELCINA delegation in KPCA Expo from 24-26 April, 2017 at South Korea for promotion of investment covering manufacturing of PCBs for LED/ Nano/ Solar products, packaging of LEDs/ semiconductor devices/ electronic components. Over 250 of the world's most prominent corporations from more than 15 different countries participated in the KPCA show 2017.

- The Government-Industry delegation led by Shri Ajay Sawhney, Secretary, MeitY visited Taiwan for promotion of investment in ESDM sector and participation in Taitronics 2017. The delegation was represented by the State Governments of Andhra Pradesh, Kerala, Karnataka and industry across various sub-sectors like consumer electronics, automobile electronics, semiconductors, components, PCB manufacturing industry, Optics manufacturing industry etc. The major industry associations, namely ELCINA, IESA, ICA, ACMA and IEEMA also participated in the show.

Besides participation in Opening ceremony and events/ seminars connected with TAITRONICS 2017, meetings were organized with companies, which included following companies: First Hi-Tec Enterprise Co., FoxLink, AU Optronics, Pegatron, ASUS, Largan, Wistron, Foxconn, Suyin Corporation, Mediatek, Innolux and Compal in Taiwan with the objective to attract investment in the electronics sector in the country.

The 5th India – Japan Joint Working Group (JWG) Meeting was convened during November 14-15, 2017

at New Delhi. The meeting was attended by Government and Industry representatives from both India and Japan, which comprises of Industry to Industry session, Government to Industry session and Government to Government session. The matters discussed for co-operation/ collaboration included:

- Interested Indian companies and partner Japanese companies on manufacturing machines and component supply

- HPC applications including processors

- IT Talent exchange between Japan and India

- Emerging ICT technologies such as Big Data, Artificial Intelligence and IoT

- Japanese businesses & institutes in Centres of Excellence (COE) including IoT and incubation facilities of MeitY

With the successful completion of Phase-I of the programme "Investment Promotion for Mobile Manufacturing - Practical Hands-on for Mobile Handset Design Engineers", MeitY has approved phase-II of the project with the assistance/partnership of MediaTek, ICA and National Institute of Electronics and Information Techonology (NIELIT). The project envisage training of mobile handset design engineers in Taiwan as well as in India for a total period of 27days with the objective to stimulate the growth of Mobile Industry, flow of capital and technology, create employment opportunities, promote higher value addition in the Mobile handset manufactured in the country and reduce dependence on imports.

To establish a specific connection between Korean and Indian Business leaders to discuss the investment opportunities and inform them about the rapidly improving investment climate in the country, 2nd India–Korea Business Summit has been organised at New Delhi. Hon'ble Prime Minister inaugurated the Summit.

During the Summit, MeitY has organized a parallel session on Electronics System Design & Manufacturing (ESDM), Skill Development to scale up the Special Strategic relationship through trade and investments. Hon'ble Minister of Electronics and IT, Shri Ravi Shankar Prasad chaired the session. Andhra Pradesh and Assam presented Business Environment and available Infrastructure for Electronics Companies in the states during the session. Leading South Korean companies like Samsung & LG also presented and shared 'Make in India' initiatives and their growth journey in India to attract investment in ESDM sector from Korea.

➢ **Handholding and facilitation for Investors**

Investment Facilitation Cell has been established at MeitY to handhold and help investers during their various stages of transition. To expedite and facilitate the proposals of investment from companies; facilitate interactions with State Governments and other agencies of Government of India, a dedicated Taiwan Desk led by Ms. Meenakshi Rai Bhatia, Joint Director, MeitY has also been constituted at MeitY. This is a new addition to the series of Help desk for Japan and Israel which were already operating in the Ministry.

➢ **Twitter Handle:**

In the global scenario of cyberspace prominence, social media has emerged as an increasingly preferred media by the decision makers and general public at large to communicate, interact and engage with each other. Taking view of this emerging reality, social media forms an important media vehicle for Electronics India to engage with the stakeholders.

Electronics India operates in a space, which is a symbiosis of electronics and information technology, with all the stake-holders making an extensive use of the new forms of communication and media tools, especially the Social Media. As a matter of fact, the Social Media has been developed out of the industry that Electronics India focuses to nurture and grow. All the stake-holders of Electronics India have an active presence on the Social Media, and they have been known to prefer the engagement over Social Media when compared to other means of public communication.

Hence, given its characteristics to potentially give "voice to all", immediate outreach and 24x7 engagement, Social Media offered a unique opportunity to Electronics India to engage with various ESDM stakeholders in real time to make policy making more stakeholder centric.

In order to tap this media tool, MeitY launched a Twitter Handle "Electronics_GoI", which is being well preferred by all the ESDM stakeholders and engagement medium by the people with MeitY.

B2B Portal

In order to attract investment into ESDM sector and create opportunities to introduce latest technologies to Indian industry, a need was felt of a common platform where the Technology providers, Technology seekers and JV seekers could come together to explore possibilities of tie up.

So in its endeavour to encourage development of ESDM ecosystem in India, MeitY created a platform on its website, which helps various technology players to explore potential synergetic partners for technology transfer and joint ventures for electronics manufacturing in India.

Till now the platform has been utilized by 39 multinational and domestic companies to display their intent to seek suitable partners.Link for the Portal is: http://www.MeitY.gov.in/esdm/offers.

Make in India: Software & Services

4.1 Global Perspective

The Indian Information Technology / Information Technology enabled Services (IT/ ITeS) industry has contributed immensely in positioning the country as a preferred investment destination amongst global investors and creating huge job opportunities in India, as well as in the USA, Europe and other parts of the world. The industry has differentiated itself in the global competition on account of consistent service and guaranteed results and has also helped forge strong bilateral ties with nations. Over the last decade, the industry has grown over five fold in revenue terms, thus contributing a substantial share to India's GDP. More importantly, the industry has led the economic transformation of the country and altered the perception of India in the global economy.

The global sourcing market continues to grow at a higher pace compared to the IT-BPM (Business Process Management) industry. The global IT & ITeS market (excluding hardware) reached US$ 1.2 trillion in 2016-17, and the global sourcing market increased by 1.7 times to reach US$ 173-178 billion. India remains the world's top sourcing destination in 2017-18 with a share of about 55 percent. Indian IT & ITeS companies have set up over 1,000 global delivery centres in over 200 cities in about 80 countries around the world.

As per NASSCOM's (National Association of Software and Services Companies) projections for FY 2017-18, industry revenue (excluding hardware) would touch US $ 151.50 billion, up from US $ 140 billion in FY 2016-17 showing a growth of over 7%. In addition, e-Commerce would fetch over US $ 39 billion, assuming the existing 19% Y-o-Y (Year on Year) growth pattern. Overall, the industry is estimated to employ over 3.96 million people, an addition of about 105,000 people (approx) in FY 2016-17. IT-BPM exports from India are expected to reach US $ 125 billion during FY 2017-18, with over 7% growth.

Driven by the increased digital adoption and growing Internet Economy, India's domestic IT-BPM market

(excluding hardware) is expected to reach US $ 26.5 billion at 10% growth in FY 2017-18. India has the 2nd largest Internet user base after China with over 432 million subscribers, with more than 300 million Smartphone users

Government of India has undertaken a consultative approach with the industry associations and industry members to discuss measures to improve the overall state of the IT industry and key challenges being faced towards realizing the US$ 1 Trillion digital economy by 2022. Goods & Services Tax (GST) is one of the big reforms that India has undertaken. Other efforts include measures to streamline the tax regimes, streamlining procedures and improving the overall ease of doing business. Government initiatives such as Start-up India, Digital India and Smart Cities are expected to give boost to e-Governance and m-Governance related business activities. There is significant push from the Government to go digital and adoption of digital payments. Efforts are also being made to diversify and increase presence in other markets such as Europe (besides UK which is a mature market), Africa, South America, Israel, Australia, China and Japan.

4.2 BPM Industry Promotion

(i) India BPO Promotion Scheme (IBPS)

Under Digital India Programme, the Government has launched India BPO Promotion Scheme (IBPS) for creation of employment opportunities and promotion of BPO/ITeS operations across the country particularly in small cities/towns including rural areas. Around 48,300 BPO/ITeS seats have been distributed across State(s)/UT(s) based on population percentage as per Census 2011, excluding metro cities along with their urban agglomeration viz. Bangalore, Chennai, Hyderabad, Kolkata, Mumbai, NCR, Pune, and North East Region (NER).

The scheme provides financial support in the form of Viability Gap Funding (up to ₹1 lakh per seat) towards capital and operational expenditure along with special incentives such as encouraging employment to women and physically disabled persons, setting up operations at other than State Capitals, promoting local entrepreneurs. The selection of eligible companies

to set up operations under IBPS, is through online bidding process. Till now about 127 companies have been selected to setup operations for ~31732 seats distributed around 90 locations covering 29 States and 2 UTs. Details of the scheme are available at www.meity.gov.in/ibps and https://ibps.stpi.in.

(ii) North East BPO Promotion Scheme (NEBPS)

Government has also launched North East BPO Promotion Scheme (NEBPS) under Digital India Programme to incentivize setting up of 5,000 seats BPO/ITeS Operations in North East Region (NER), for creation of employment opportunities for the youth and growth of IT-ITeS Industry. NEBPS provides similar financial support as IBPS. Till now, 2060 seats have been allocated to successful bidders to setup operations spread across the 5 States of NER, namely Assam, Nagaland, Meghalaya, Manipur and Arunachal Pradesh. Further details of the scheme are available at www.meity.gov.in/nebps.

4.3 International Cooperation Division (ICD) and e-Commerce

With the Government's outlook on Digital diplomacy, Digital Economy and launch of Digital India Programme, this Ministry has been synergized its efforts to expand IT/ITeS sector globally including diversification to geographies, domain expertise, High Skill Work Forces to enhance business opportunities. Efforts have also been made to evolve strategic cooperation with potential foreign partners in emerging and frontier areas of Information and Communication Technology under bilateral and multilateral framework of cooperation. The Ministry regularly engages with various Governments including academic and industy bodies for forging partnerships for mutual progress, also provide an opportunity for sharing of knowledge and experience. The International Cooperation Division has been involved in the following tasks:

- Aligning foreign collaboration activities in India's 'Digital India Programme' and 'Make in India' initiatives of the Government of India.

- Strengthen India's position on multilateral forums for the different issues like e-Commerce, Digital Divide, and Gender Divide etc.

- Creating a conducive environment for international cooperation to help industries to cooperate with the industries of other countries.

- Fostering, encouraging and promoting research and development in the application of information technology related facilities.

- Coordinating technical and policy issues with international bodies/institutions like UN, WSIS, World Bank, WTO etc. to safeguard India's interest.

- Initiating joint projects like IT institutes, software parks, programmes for joint R&D and facilitating IT Advisers etc.

- Showcasing India's Information and Communications Technology(ICT) strength across the globe by organizing, sponsoring and participating in trade fairs, symposiums, exhibitions etc.

The International Cooperation Division of this Ministry has been pursuing the above objectives through Memorandum of Understandings (MoUs), Joint Working Groups (JWG) meetings, Projects in other geographies/countries, participating in major International events to showcase India's strength and enhance business opportunity for Indian IT Industries. Also, issues faced w.r.t India's IT exports, a mobility of Indian IT professionals have been handled at various bilateral forums and platforms from time to time. India has also emerged as a fast growing e-commerce destination. This is reflected through the fact that Free Trade Agreements (FTAs), being signed have a specific chapter on e-commerce. The division has spearheaded negotiations on e-Commerce issues in FTAs being signed under Regional Comprehensive Economic Partnership (RCEP), World Trade Organization(WTO), BRICS, Broad-based Trade & Investment Agreement (BTIA) etc. In addition to this, to provide further impetus to Indian IT industry and more value addition in the Industry within the country, a draft policy on National Software Product was also released for public consultation. The policy is also aligned with Make-in-India, Digital India and Start-up India Programme. India has also actively participated in the G20 where deliberations on Digital

Economy are going on through G20 Digital Economy Task Force (DETF) forum. The Digitalization Agenda was further adopted during the G20 Leaders Summit in 2017; DETF forum adopted the following agenda to strengthen the cooperation in Digital Economy under the future Presidencies:

a) Digital Economy Ministerial Declaration

b) G20 Leaders' Declaration 2017

The Ministry has also spearheaded the negotiations on e-commerce chapter under various forums/FTAssuch as RCEP, WTO, BRICS, and EU-India Bilateral Trade etc.

4.4 Cooperation through Bilateral Interaction:

To strengthen cooperation with other emerging economies, the MoUs/Agreements in the field of Information Technology and Electronics were signed with Republic of Portugal, Bangladesh, Belgium and Palestine. The MoUs were based on a comprehensive study on potential cooperation areas in ICT domain. In addition to these MoUs, specific MoUs on Cyber Security cooperation were also signed with USA and Bangladesh.

In addition, Joint Working Group (JWGs) meetings with Russia, Vietnam, China, Germany, Serbia and South Africa, were held during the year to further ICT and IT/ITeS trade with these geographies and also to forge cooperation in the area of innovation and R&D. A concrete outcome based action plan and specific initiatives including projects were identified for furthering such cooperation.

A delegation led by Secretary, MeitY visited West Coast USA during 6th-9th May, 2017 to attend US-India Business Council (USIBC)'s Annual West Coast Summit and highlighted opportunities for Bussiness to Bussiness(B2B) cooperation in the light of increasing Digital opportunities under DIGITAL INDIA Programme.

Also, Secretary, MeitY visited United Kingdom during 7th to 9th November, 2017 to attend India-UK Innovate 2017 at Birmingham and other Government to Business engagements at Birmingham, Manchester and London. An MoU in IT&E with UK is under consideration to create Indo-UK Digital Start-up Exchange Platform.

During the GCCS-2017 event held on 23rd–24th November 2017, bilateral meetings were held with Denmark, Mauritius, Iran, United Kingdom, Syria, ICAANN, Israel, USA, Czech Republic & Serbia resulted in enhanced cooperation in cyber space.

During the year various high level delegation visited India which includes ministerial level from Belgium, Portugal, Canada, Finland and Vietnam. Bilateral cooperation through parliamentary delegation of USA and EU was also held during the year.

4.4.1   International Projects in ICT:

To showcase India's prowess in IT/ITeS, MeitY has been assisting the Ministry of External Affairs to execute a number of projects in developing and least developed countries. Under such initiatives, more than 40 Centres of Excellence on IT, IT Parks, Capacity Building Institutes, tele-medicine and tele-education facilities, e-network have been established till date. During the year, India-Kazakhstan Centre of Excellence in ICT at Astana, Kazakhstan, Setting up of Computer Labs at 37 Schools in Tajikistan and Strengthening of India – Myanmar Centre of Excellence in ICT in Yangon were completed and operationalised. Also following projects are under execution and initiated during the year:

Ongoing Projects during FY 2017-18

- Centre of Excellence in IT in Ibarra – Ecuador.

- Centre of Excellence in IT in Lima – Peru.

- Setting up of computer labs in 50 schools under Vayots Dzor region in Armenia.

- Centre of Excellence in IT in San Jose – Costa Rica.

- Centre of Excellence in IT in Roseau – Commonwealth of Dominica.

- Setting up of a sustainable IT Infrastructure for Advanced IT Training using conventional, virtual classroom & e-learning technologies in Phnom Penh -Cambodia

- ICT Resource Centre at Nelson Mandela African Institute of Science & Technology in Arusha – Tanzania.

- Setting up of a sustainable IT Infrastructure for Advanced IT Training using conventional, virtual classroom & e-learning technologies in Myitkyina – Myanmar.

- Setting up of a sustainable IT Infrastructure for Advanced IT Training using conventional, virtual classroom & e-learning technologies in Vientiane – Lao PDR.

- Setting up of Centre of Excellence in IT in Cairo – Egypt.

- Setting up of Centre of Excellence in IT in Casablanca – Morocco.

- Setting up of a sustainable IT Infrastructure for Advanced IT Training using conventional, virtual classroom & e-Learning technologies in Hoi Chi Minh City – Vietnam.

- Up-gradation of existing IT Infrastructure and associated software at CARICOM Secretariat in Guyana & Offices in Barbados & Jamaica.

- Setting up of Centre of Excellence in IT in Port Moresby – Papua New Guinea.

- Setting up of Centre of Excellence in IT in Vanuatu in Port Vila – Vanuatu.

New Initiated Projects FY 2017-18

- e-Office suit to Government of Sri Lanka.

- Centre of Excellence in IT in Georgetown – Guyana.

- Extension of IMCEITS in Myanmar as ATC of CDAC for 3 years Centre of Excellence in IT in Niue.

- Centre of Excellence in IT in Cook Islands.

- Centre of Excellence in IT in Samoa.

- Setting up of Centre of Excellence in IT in Fiji.

- Setting up of Centre of Excellence in IT in Nauru.

4.5   Growth of Software and Services Sector

The sector is in a transitional phase and in order to sustain its competitive advantage, it needs to constantly upgrade itself in line with global trends. Given the recent

developments in the global market for Indian IT services, especially on account of growing protectionism in key economies, it is imperative to think differently and collaboratively. Every sector requires re-skilling and the fast changing digital technology area requires it even more. According to NASSCOM, the skills profile is set to undergo a rapid change as demand for skills around digital technologies grows exponentially. Many firms have established dedicated programmes to re-skill their existing employees.

While Indian IT companies have shown strong character and readiness to face new challenges by upgrading their capabilities and offerings in line with emerging technologies and exploring collaborative opportunities with global manufacturers, challenges of the future must also be foreseen, to prosper in this increasingly competitive global environment and to transform our country into a positive and new India.

Some pointers, placed below, provide a glimpse of the developments, during the year and projected, in the Indian IT-ITeS sector :

• IT exports are projected to grow over 7 percent in 2017-18, and generate about 1,05,000 new jobs during the same period;

• Indian start-up ecosystem ranks third among global start-up ecosystems with more than 4,750 start-ups;

• Increased penetration of internet (including in rural areas) and rapid emergence of e-commerce are the main drivers for continued growth of data centre co-location and hosting market in India;

• 100+ Centres of Excellence focussing on Blockchain, IoT and Analytics;

• More than 15 Global In-house Centres (GIC's) have been added in India;

• Cross-border online shopping by Indians is expected to increase 85 percent in 2017, and total online spending is projected to rise 31 percent to ₹ 8.75 lakh crore (US$ 128 billion) by 2018;

• The internet industry in India is expected to double and reach US$ 250 billion by 2020, growing to 7.5 percent of gross domestic product (GDP);

• Driven by the by fast adoption of digital technology, the number of internet users in India is expected to reach 730 million by 2020;

• The Indian Healthcare Information Technology (IT) market is valued at US$ 1 billion currently and is expected to grow 1.5 times by 2020;

• India's business to business (B2B) and business to consumer (B2C) e-commerce market is expected to reach US$ 700 billion and US$ 102 billion respectively by 2020; and

• India's digital economy is projected to reach US$ 1 trillion by 2022, with potential to touch US$ 4 trillion.

The industry's core competencies and strengths have attracted significant investments from major countries. The computer software and hardware sector in India attracted 8 percent of cumulative Foreign Direct Investment (FDI) of ₹19,50,584 crore during April-September 2017 period.

Leading Indian IT firms are diversifying their offerings and showcasing leading ideas in blockchain, cloud computing, big data analytics, artificial intelligence and machine learning to clients using innovation hubs, research and development centres, in order to create differentiated offerings.

4.5.1 Overall IT-ITeS Performance

The IT-ITeS industry revenue aggregate (Exports + Domestic) is expected to grow over 7 percent and reach US $151.5 billion in FY 2017-18 as compared to US $140 billion in FY2016-17. The IT-ITeS industry revenue trend over the past 5 years is depicted below:

Source : NASSCOM June 2017   E-Estimates   P-Projections
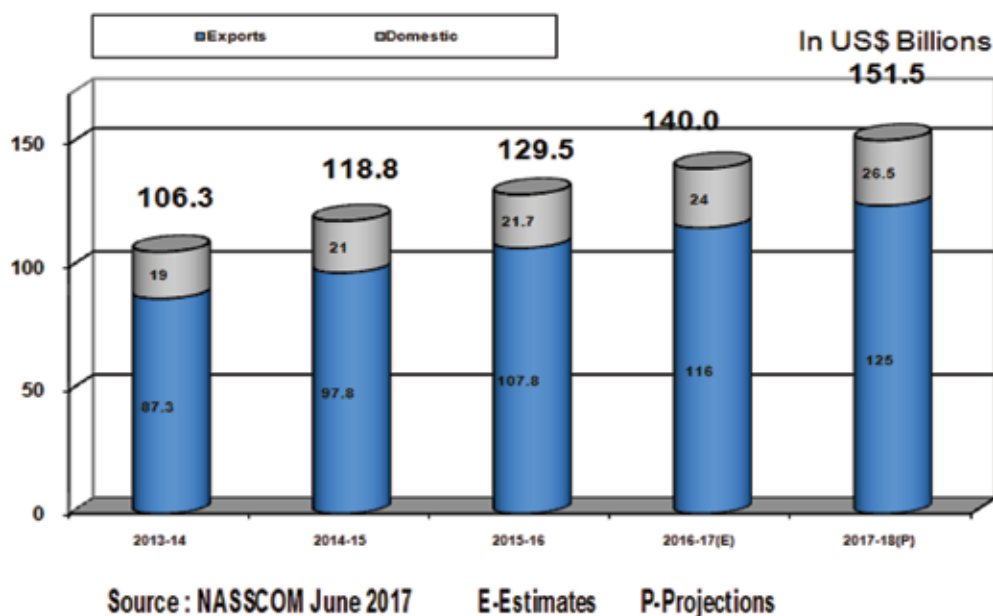
4.5.2 Exports Revenue

IT-BPM exports are projected to reach US$ 125 billion showing a 7 percent Y-o-Y growth. Engineering Research and Development(ER&D), digital projects and embedded solutions, product engineering and new technologies are key growth drivers. The IT- ITeS industry export trend over the past 5 years covering IT Services, ITeS/ BPO, Engineering R&D and Product Development segments is depicted below:
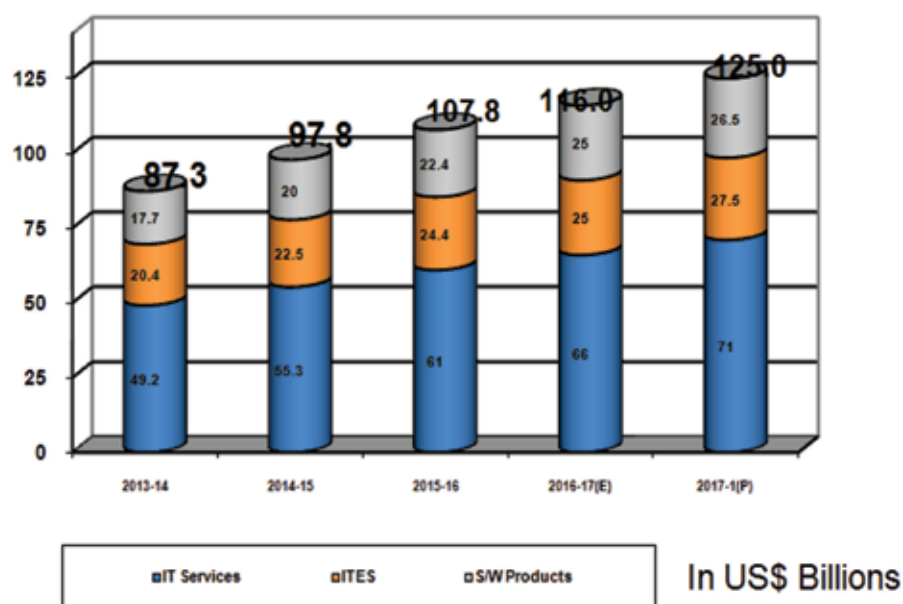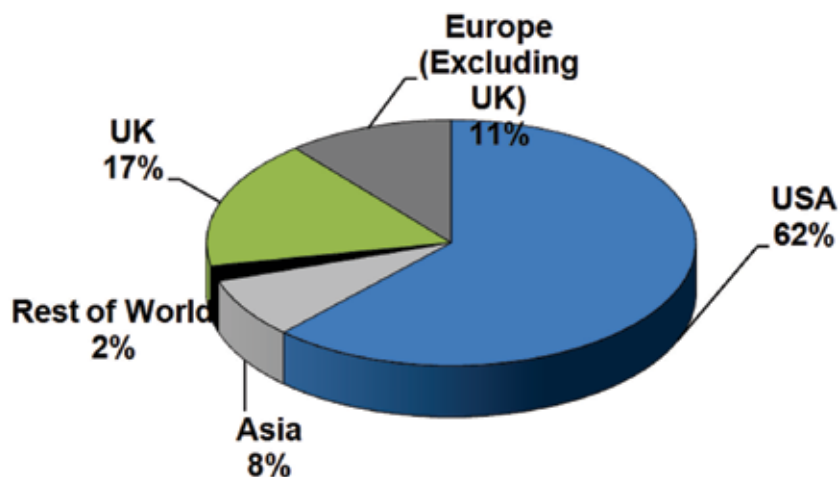
Pattern of IT-ITES Exports across Geographies (2017-18 P)
Source: NASSCOM June 2017   E-Estimates   P-Projections

USA, UK and EU account for ~ 90% of the total IT-ITES exports, however, there are new challenges surfacing in these traditional geographies. Demand from Asia Pacific(APAC), Latin America and Middle East Asia is growing and new opportunities are emerging for expanding in continental Europe, Japan, China and Africa.

4.5.3 Domestic Revenue

The size of the domestic market is becoming significant now in the IT-ITeS sector, though it largely remains export driven. In FY 2017-18, the domestic market (excluding e-Commerce and hardware) is expected to grow 10 percent Y-o-Y to reach US $ 26.5 billion. The Government initiatives such as Digital India, Start-up India, Smart Cities, and Digital Payments are catalysing growth in this segment. The domestic revenue trend over the past 5 years covering IT Services, ITeS/ BPO, Engineering R&D and Product Development segments is depicted below:

Source : NASSCOM June 2017   E-Estimates   P-Projections
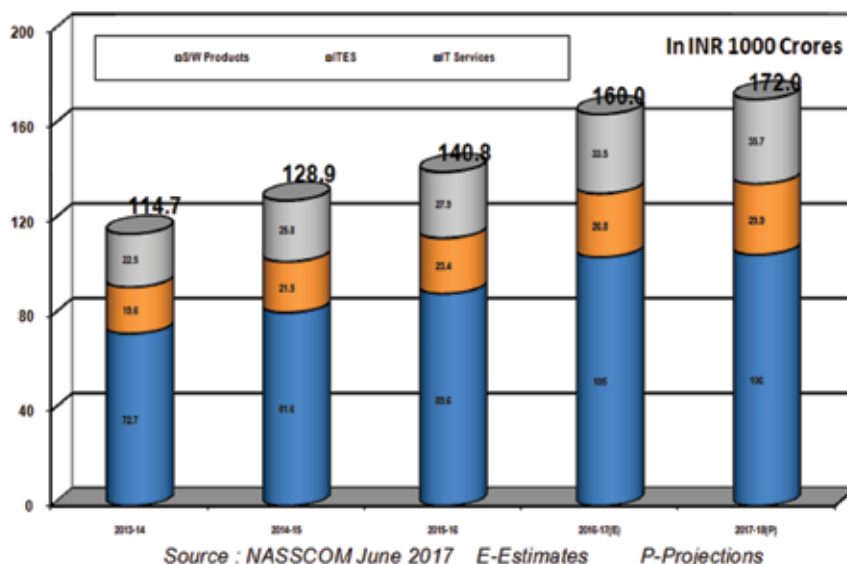
4.5.4 IT-ITES Employment Scenario

The direct employment in the IT services and BPO/ ITeS segment is expected to grow by about 4.0 percent and add around 1,05,000 employees during the year 2017-18 reaching a total of 3.96 million, which is a significant achievement for the sector. In addition to being one of the largest job provider and creator in the organized industry segment, this sector also plays a key role in enabling higher levels of employment in other verticals such as transportation, real estate and hospitality, Security services, and Housekeeping. The estimated indirect employment generated by the sector is over 10.0 million. The Table below gives employment trend over the past 5 years.

Direct employment in the IT-ITES segment (In Millions)

	2013-14	2014-15	2015-16	2016-17	2017-18(P)
Direct Employment	3.267	3.485	3.688	3.863	3.968
Net Addition	0.301	0.218	0.203	0.173	0.105

Source : NASSCOM June 2017   E-Estimates   P-Projections

The skills profile in the industry is set to undergo a rapid change as demand for skills around digital technologies grows exponentially in the wake of new technologies and digitization initiates of the Government. Subject experts and hybrid professionals are being added around emerging job roles. New job roles include Cybersecurity, mobile app development, new user interfaces, social media, data scientists, and platform engineering. New skills are being demanded by new technologies/ areas such as Big data analytics, cloud & cyber security services, IoT, service delivery automation, robotics, Artificial Intelligence, machine learning/NLP (Natural language processing). NASSCOM is working with its members to establish a comprehensive digital skilling platform to re-skill 1.5–2.0 million workforce over the next 4 to 5 years.

4.6 Software as a tool for Economic Growth

For the holistic growth of the IT industry and to move it up the value chain, a vibrant software product sector is essential. Hence the need for a comprehensive ecosystem to support a sector primarily comprising of young entrepreneurs is required, that can synergize the efforts of the Government and Industry to create a robust Software Product Industry, which enables the germinating ground for large number of Software product startups, promotes development of an ecosystem encouraging R&D and innovation, IT/ITeS sector, opens up multitude of opportunities of access to capital and helps build and improve the domestic demand. MeitY during the year through the interaction with the stakeholders evolved a comprehensive roadmap for building a strong software product industry and thereby contributing equitably in the growth of IT sector.

Chapter 5 — Innovate and Design in India

5.1 Creation of Research Eco-System

5.1.1 National Supercomputing Mission (NSM)

"National Supercomputing Mission (NSM): Building Capacity & Capability", has been launched by Government in 2015, which is to be jointly steered and implemented by MeitY and Department of Science and Technology (DST) over a period of 7 years. The programme is being implemented by C-DAC and Indian Institute of Science (IISc.)

The main objectives of the Mission are:

- Creation of state-of-the-art HPC facilities and infrastructure to enhance the national capability to enable cutting-edge research in various domains in solving grand challenge problems.

- Development of HPC Applications for major Science and Engineering domains.

- Promote Research and Development in HPC leading to next generation Exa-scale computing readiness.

- Human Resource Development to handle and spearhead HPC activities in the country.

Progress during the year:

Infrastructure: An integrated approach is being followed for building systems with scalable architecture, ranging from workstation class having performance of a few teraflops to single rack mid-range self-contained systems with performance of 100 teraflops to high end systems with performance up to 10s of petaflops.

It is planned to establish several supercomputing systems of different computational powers in various academic and R&D institutions in India. These systems will be deployed using both Build approach and Buy approach. Major focus of MeitY is on Build approach.

Under Build approach, it is envisaged to design and manufacture the sub-systems of HPC system locally in India. C-DAC is entrusted with building systems indigenously in phased manner (Phase-I: Assembly in India, Phase-II: Manufacturing in India, Phase-III:

Design and Manufacturing in India) with all the phases to start simultaneously.

- In phase I, plan is to build two 650 TF systems and one 1.3 PF system to be installed at IIT Varanasi, IISER Pune and IIT Kharagpur respectively and to build cumulative capacity of 10 PF in Phase-II. RFP for Phase-I, Phase-II and Phase-III design support has been finalized and floated.

- Four pilot systems of 100TF with different technologies (Intel, IBM, ARM & AMD), will also be built. This will allow evaluating and deciding technology most appropriate for Phase-III design. The systems once developed can be deployed as per requirement of Mission. RFP for 100TF systems has been floated.

- RFP for Data Centres and Storage systems for Phase-I and Phase-II have been finalized.

- HPC Lab has been set up for HPC system design, development and integration. Setting up of System Software Lab for developing HPC System Software stack is in progress. Basic constructs of HPC test bed for evaluating latest technologies and testing of software components have been put in place.

- Started developing a next generation HPC network "Trinetra" that is scalable to higher speeds offering world class performance for use in HPC systems.

- Started development of critical system software components and tools along with use of available Open Source Software (OSS) components with appropriate modification, customization and optimization.

Application Development: Various applications development proposals have been evolved in consortium mode involving C-DAC, academia, and industry in the areas of Computational Biology, Weather and Climate modelling, Seismic data analysis, Materials and Computational Chemistry. These proposals have been evaluated and recommended by NSM Technical Advisory Committee (NSM-TAC) for implementation.

Research & Development: Consortium mode proposals have been evolved in identified exa-scale research areas such as System Architecture, System Software, Infrastructure Management, and Scalable Algorithms/Libraries for future HPC systems.

Human Resource Development: The mission includes building capacity in HPCaware human resources at all levels for meeting the challenges of development of HPC applications and managing, monitoring and running complex HPC systems. Short term (1-2 weeks) and medium term (6 months) training courses have been designed for faculty and industry professionals. Few batches have already been trained by C-DAC and IITs. For further proliferation of these courses HPC nodal centres are being identified across the nation. Introduction of HPC at higher education level has also been planned at UG and PG levels and curriculum for the same has been designed.

5.1.2 Electronic Development Fund (EDF)

Electronics Design & Manufacturing is a sector which is characterized by high velocity of technological change. Intellectual Property is the most critical determinant of success, not only for the companies of this sector but also to the countries and economies as a whole. Setting up of EDF was one of the important strategies which would enable creating an electronics industry ecosystem in the country. Creating a vibrant ecosystem of innovation, Research and Development (R&D) with active industry involvement is essential for a thriving electronics industry. It is with this objective that an Electronics Development Fund (EDF) is set up as a "Fund of Funds" to participate in professionally managed "Daughter Funds" which in turn will provide risk capital to companies developing new technologies in the area of Electronics, Nano-electronics and Information Technology (IT). This fund is expected to foster R&D and innovation in these technology sectors. EDF enables creation of an ecosystem for providing risk capital to both industry and academia to undertake Research and Development in these technology areas. It will, in the process, enrich the intellectual property in the country and encourage more entrepreneurs towards product and technology development.

M/s. Canbank Venture Capital Funds Ltd. (CVCFL), a 100% subsidiary of Canara Bank, is the Investment Manager and MeitY is the anchor investor of EDF. EDF was launched on 15.02.2016 by Hon'ble Minister for Electronics & IT. Twenty two Daughter Funds have been selected for investment through EDF. The cumulative commitment of EDF to these 22 Daughter Funds is ₹1227 crore and the total targeted corpus of these 22 Daughter Funds is around ₹10,900 crore. Till date EDF has drawn ₹56.99 crore from its contributors, which includes ₹51.24 crore from MeitY and has invested ₹16.38 crore to two Daughter Funds. As on date EDF has invested in Two Daughter Funds, which in turn have made investments in 14 Ventures.

5.1.3   R&D and IP development

A total of 68 patents have been filed under EMCD since 2010. This year seven new applications have been processed in the areas of e-waste recycling, PEM fuel cells and low temperature co-firable ceramic technologies. A schematic diagram is provided below:
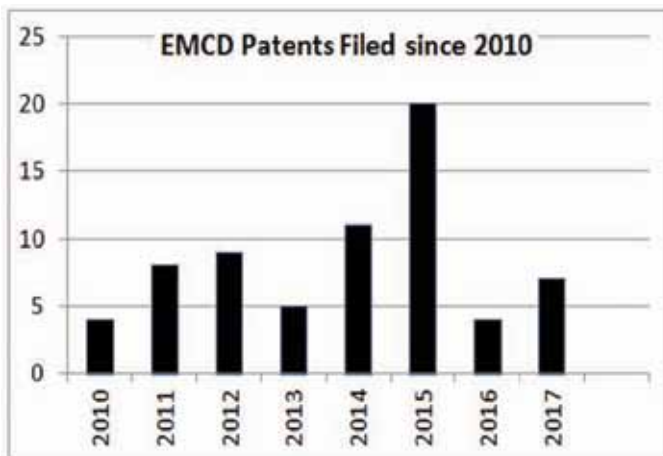
5.1.3.1   Perception Engineering Initiatives:

• Brain-machine interfaces are being developed to assist paralyzed patients by enabling them to operate machines with recordings of their own neural activity. At IIT Delhi we are undertaking development of brain-machine interface for brain directed control of interfacing devices including robotic manipulators (algorithms and embedded system). First Prototype of 3DOF Articulated arm has been designed and realized. Subsequently,

a 3DOF robot was successfully controlled using two mental commands and one facial expression namely wink. Also an underactuated gripper for object manipulation was designed and fabricated which allows 4 degrees of freedom but using just 2 degrees of actuation. This is great importance since the tediousness in training subsequent mental commands increases exponentially. The fabricated gripper will be manipulated in conjunction with a 3DOF robot to emulate full arm movement. The 3DOF robot and the gripper will be controlled using mental commands using Emotiv Epoc+ EEG headset. This system is planned to be made wearable to enable patients with non-functional arms.
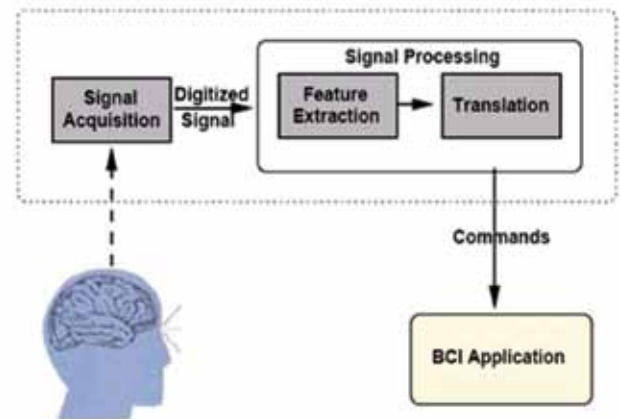
Brain Computer Interface (BCI) directly measures brain activities, does signal processing and translates user's intent into the corresponding signals for application. Such systems are particularly useful for people with severe motor disabilities and who are in 'Locked-in-state'.

• **Developing Novel Biomarker for Alzheimer's Disease:** National Brain Research Centre, Manesar has proposed to develop a unique predictive technology for detection of Alzheimer's disease (AD) at the earliest stages, i.e. amnestic Mild Cognitive Impairment (aMCI), using a non-invasive state-of-art functional Magnetic Resonance Imaging (fMRI) technique. Specifically, they aim to develop a unique predictive scale of visuospatial (VSP) deficits that

will represent depreciative changes in VSP brain network of individuals as they develop aMCI and further, as they progress to AD. This VSP scale technology will thus be a correlative indicator of AD stage, and matching the VSP profile of a given individual to this scale will not only identify people who are likely to develop aMCI and/or AD, but also provide a diagnostic indication of disease progression.

So far, in this research grant, a unique predictive visuospatial perception (VSP) brain network model using activation pattern in fMRI has been developed for healthy subjects. This VSP network is standardized and characterized based on the brain regions activated during VSP task processing. Based on functional connection determined between different brain regions, a VSP network model for healthy ageing has also been developed with characterization of functional changes in the specific VSP regions.

A comprehensive MATLAB-based signal analysis toolbox, KALPANA, has been developed for processing, visualization, and quantitation of single-voxel (SV) magnetic resonance spectroscopy (MRS), Mega-PRESS and multi-voxel MRS imaging (MRSI) spectra obtained from both proton 1 H and phosphorous 31P MRS. The toolbox has been developed to match the signal analysis needs in both research and in clinical settings and has tremendous value in both sectors The toolbox is compatible to different MRS data-types from different scanners i.e. Philips, General electric and Siemens. We have successfully filed the patent on spectroscopy signal processing methodology and apparatus, with the Patent application no. 20161100194 dated 19th January, 2016. International patent application no. PCT/IB2016/054978 has been filled in August 2016.

- **Development of Serious Games for physical and neurorehab therapy for stroke/injury/ arthritis patients(IIIT Hyderabad):**

IIITH has been developing technology tools to trigger perceptual, affective and motor systems of the brain to enhance motor/muscle recovery after damage from injury or artery blockage. IIITH has devised three serious games for compelled body weight shift for lower limb movement, upper arm movement, ankle pressure and finger control. The integrated rehab games systems include using hardware sensors for physiological parameters, gesture capture and interactions in virtual/augmented reality. Devised serious games as an alternative to traditional physiotherapy exercises wherein integrated games, designed for a particular therapy task use biofeedback control system to provide an immersive virtual environment for therapy. Such an intervention is novel for neuro-rehab and was designed on concrete understanding of the functioning of the brain and present therapy technique. To test the prototypes developed, the systems were installed in a rehab hospital and empirical data collected. The systems have been technology transferred to a company and efforts are underway to market these in Indian and western markets.

- **Visual Speech Training Software for the Hearing Impaired:**

Hearing loss (HL) and deafness are global issues which affect at least 278 million persons worldwide and two-thirds of them live in developing countries. In India, persons using hearing aids have been treated as persons with disability (PwD) in the Census 2011 and their number is 50,71,007 (26,77,544 males, 23,93,463 females). For the children with hearing disability to acquire speech, there is a need to provide a visual feedback of articulatory efforts involved in speech production to assist in the acquisition of speech and language despite a lack of auditory feedback.

A software as Vocal Tract Display is being developed at SPI Lab, IIT Bombay which make Direct visualizations for vocal tract shape with speech signal. The system incorporates a Linear Predictive Coding (LPC) based method by Wakita to estimate the vocal tract from the speech signal. Graphics are developed from the values estimated from the LPC method. Geometric techniques

are being developed for estimating the place of maximum constriction from the image available in XRMB and other databases.

A software is being developed for a Visual Speech Training Aid, as a desktop or tablet based application. The software will be based on integration of (i) state-of-the-art techniques for estimating the articulatory efforts of the hearing impaired person undergoing speech training and (ii) information display and user interface designed by involving speech teachers and therapists as active collaborators and stake holders
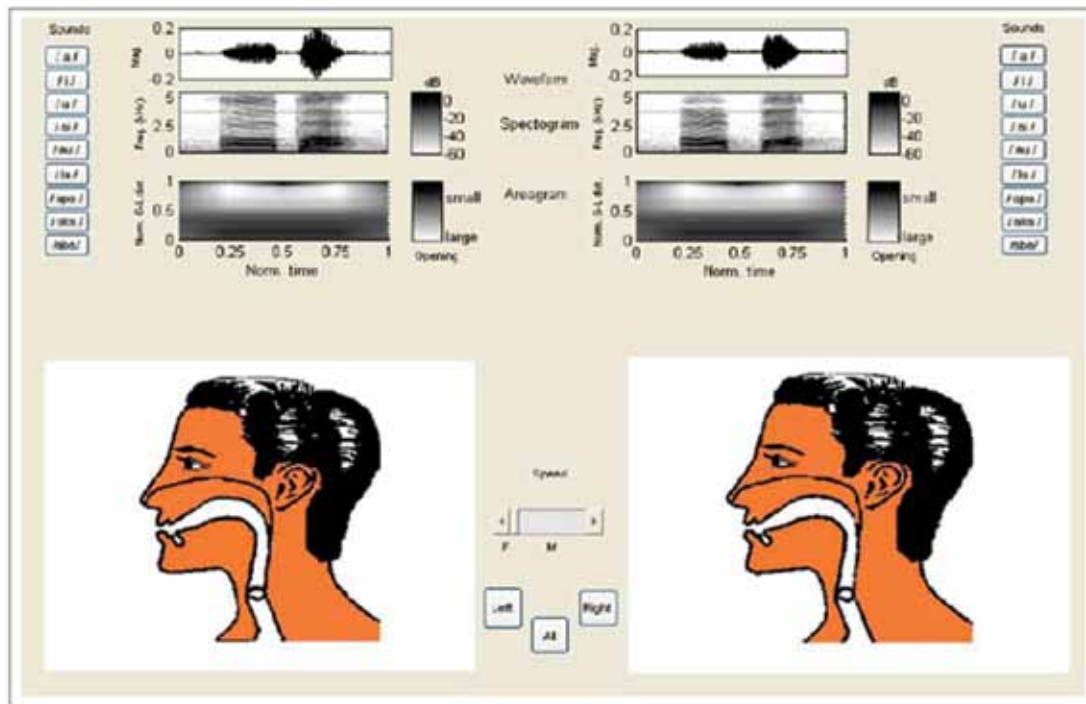
Diagram of Visual Speech Training Aid

5.1.3.2 Convergence, Communications & Broadband Technologies and Strategic Electronics

R&D initiatives in Convergence Communications, Broadband Technologies and Strategic Electronics is aimed at developing indigenous capability in the thrust areas which include - Next Generation Communications & Convergence technologies (Massive MIMO, Software Defined Radio, Software Defined Networks, Network Function Virtualization (NFV), Cognitive Radio including white spaces, Heterogeneous Wireless Networks); Green Communication; Cyber Physical Systems, Internet of Things (IOT) & Machine to Machine (M2M), Wireless Sensor Networks; Convergence of wired/wireless networks and fixed mobile convergence; ICT applications in strategic sector; Broadband Wireless Access Technologies for last mile access; Visible Light Communication (VLC), Vehicular ad-hoc Networks (VANET); IP based products/services & Low Cost Broadband Internet access devices; Electro-magnetic wave applications; High power RF/microwave tubes; Terahertz (THz) wireless systems; ST Radar Systems; Alternate Technologies for Connectivity etc.

Achievements

A number of technology development projects initiated at various institutions/R&D organisations across the country in the thrust areas were successfully completed. Initiatives in Next Generation Communications and Convergence have yielded in notable achievements in the year which include "initiation of 5G Research and Building Next Gen Solutions" project with consortium of 5 premier academic/research institutions collaborating to do advanced research in 5G technologies, participate in global standardization and develop advanced simulation and technology prototypes for 5G. 40 patents

have already been filed in the projects which include both national and international patents. Prototypes have been developed for Full Duplex nodes, Cloud RAN, Antenna design for mmWave, SDN test bed, the Control

And Provisioning of Wireless Access Points (CAPWAP) based controller etc. The project will contribute towards 5G standardization particularly addressing the aspects of heterogeneous networks, distributed connectivity and computing.
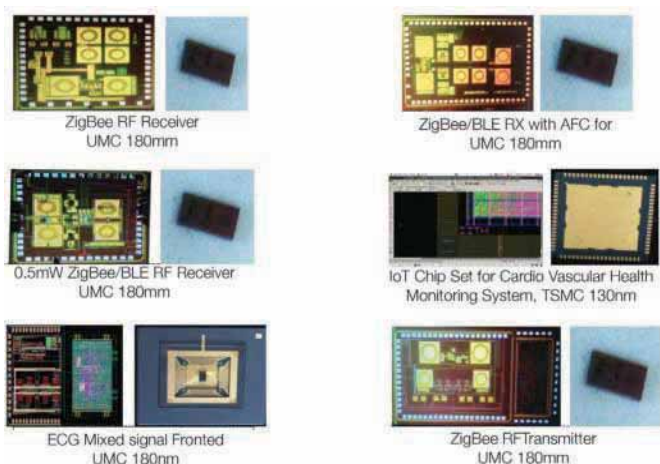
Chips ASICs tapped out of IoT for Smarter Healthcare Project

Test bed based on KeyStone C6614 Multicore SoC

Humanoid Robot Cooperative Load Sharing

Snake Robot using Smart Actuators

Telepresence Robot for Healthcare

Electromagnetic Pulse (EMP) test system

Notable achievements under different niche areas this year have yielded in transforming systems to Smart Systems in various domains which include Cyber Physical System, Design & Development of Indian Sign Language Captioning Framework, Internet of Things (IOT) for smarter healthcare, Technology development for Mobile AdHoc Networks (MANET), Design and FPGA prototyping of multicarrier multiple access schemes for variable rate multimedia satellite communication , Project on Green Symbiotic Cloud Communications, Pilot Deployment of Multilingual DVB Subtitle Solution in 4 Metro Centres of Doordarshan, Development of re-configurable frequency hopping transmitter and receiver for long haul SDR in the HF and the L-band, Development of tracking system for controlling illegal mining and coal transportation in North Eastern Coalfields, Technology Development for Autonomic Energy Aware Management of Network & Cloud. Six numbers of SDR-DP, Dual connectivity Wi-Fi Simulator, An Early Fire Detection and Safe Guiding Exit System have been developed.

Ongoing Activity

The on-going projects supported in the identified thrust areas include 5G Research and Building Next Gen Solutions for Indian Market, Decision Support System for integrated hydro geological modeling, Low Power Terabit for Broadband Communication Links, Converged Cloud Communication technologies, Small Cell Wi-Fi Networks for the enterprise, Energy Management in Wireless Sensor Networks, Development of Unified IP based Communication Platform for Voice, Video, Data, Messaging and Chat services, Smart Campus Water Management, Distributed Bayesian learning for Big Data, QoS Provisioning in Internet of Things (IoT), Collaborative Data Processing and Resource Optimisation for Post Disaster Management and Surveillance using Internet of Things, Big Data, Internet of Things and Cloud Computing: architecture, Issue and Application in Indian perspective, Development of National Disaster Spectrum and Disaster Communication Backbone architecture (DiCoBA) with Prototype Development, Safety Alert System using dedicated Short Range Communication etc.

Under Indo-Dutch collaboration for collaborative research in Pervasive Communications & computing, 5 projects are in progress: Code self-verification for IoT devices, Big imaging data approach for Oncology, Data mining & prediction in airlines operations and privacy aware smart public buildings and Crowd control Management for Kumbh Mela using Big data.

The promotion of R&D in the area of applied microwave electronics & engineering is being further strengthened by establishing two new centres of SAMEER. Establishment of new centre specializing in high power microwave tubes/ components, in collaboration with IIT Guwahati. The Centre will focus on R&D of 3.1 MW magnetron at 2.998 GHz, design and development of 3 kW circulator at 2.998 GHz and 6 kW RF load at 2.998 GHz. Another new Centre for Electromagnetic Environmental Effects (E3) is being established at Visakhapatnam for highly specialized state-of-the-art EMI/EMC test facilities including Electromagnetic Pulse (EMP) and Pulse Current Injection (PCI) set up to meet the requirements as per International EMC Standards. ST Radar for prediction of accurate weather patterns and provide warning of severe climatic conditions at Gauhati University for NE states is being established.

New Initiatives in the current year

New R&D projects have been initiated in the areas of Open Hardware based Communication Digital Bio-sensing Platform and Design and development of Antennas for Communication in TV White space frequency band etc

5.1.4   Free & Open Source Software (FOSS)

MeitY has been promoting and fostering the adoption of FOSS, including development of indigenous Operating System distribution BOSS with 76 Indian languages support and its wide deployment in various organizations. BOSS Desktop, Server and educational variant EduBOSS are released under GPL license and are available for free downloads from http://bosslinus.in. Pan-India Support Centres have been established for hand-holding support to users. Development of BOSS MOOL, Dhara and Bharti Sim are notable outcome of these efforts. For promotion of usage of FOSS, MeitY
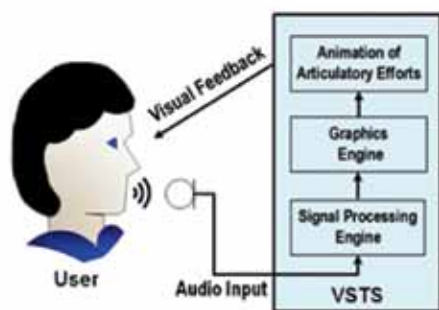
Schematic of VSTS

User Interface of VSTS

has brought out a Policy on Adoption of Open Source Software for Government of India.

(i) Self-Aware Service –oriented Component-based Operating System.

The new Component based Operating System 'DHARA' has been developed. This is achieved through redesign of kernel in service oriented architecture with different subsystems and modules designed as collection of services to optimize process execution time on multicore environment.

(ii) In BOSS-MOOL (minimalistic Object Oriented Linux) project

The existing Linux kernel has been redesigned to provide Object Oriented abstractions of various subsystems of the kernel (e.g. Interrupt Handler, Kernel Memory Manager etc.). MOOL achieves this by providing OO wrappers for the core kernel in C++. The MOOL kernel has been made real-time(RT) capable. A distance learning programme is designed on database & BOSS-MOOL. The course is aimed to provide a real time exposure to the students on Database and MOOL kernel. SETS Lab, Chennai have ported the Integrated Threat Management Application on BOSS-MOOL. ECIL will be taking up the production of this and use BOSS MOOL operating system in laptops/Desktops/Servers to be deployed across the country in all government departments and educational institutions for their productivity and they have started selling systems with preloaded BOSS-MOOL. BOOS-MOOL has been adopted in around 100 institutions and 1000 students registered for online certifications by IIT Madras.

(iii) BOSS Proliferation & Adoption Development of BOSS

The indigenous Linux based Operating System distribution with Indian Languages support is a significant milestone of National Resource Centre for Free & Open Source Software(NRCFOSS). BOSS has been widely deployed in education and government sectors in various States/ UTs across the country. BOSS deployments have resulted in indirect saving of over 300 crore not using proprietary software.

(iv) Bharti Sim: an Advanced Micro-Architectural Simulator

BhartiSim (renamed as Tejas) has been developed at IIT Delhi, as a highly configurable simulator with simple Extensible Markup Language (XML) interface. The salient features of the simulator are parallel execution, support for multiple emulators, transactional, memory accelerators and Network on Chip (NoC). This simulator has been released on the web with an open source Apache 2 license. The simulator has been integrated into the teaching curricula of various universities worldwide. it is also being used to teach courses at various institutes in India.

5.2 Translational R&D

5.2.1 Visual Speech Training System (VSTS)

5.2.1.1 Visual Speech Training System (VSTS) for the Hearing Impaired

The Visual Speech Training System (VSTS) is a computer-based speech training system which uses information obtained by speech signal analysis to

provide a visual feedback of efforts involved in speech production. It is an application software which runs on a PC with sound card, without needing any additional hardware. It has been developed for use as an analysis and diagnostic tool by speech therapists and speech training professionals and as a speech training aid to assist in acquisition of correct articulatory efforts by children with hearing impairments and second language learners.

The main features of the system are following:

i)   Signal acquisition: recording of speech signal as an audio clip of up to 10 s and loading of pre-recorded sounds;

ii)   Signal analysis and display: signal waveform, pitch, energy, spectrogram (2D plot of time-varying magnitude spectrum), and areagram (2D plot of time-varying vocal tract shape);

iii)   Animation of articulatory efforts: display of time-varying vocal tract shape (as obtained from the analysis and displayed in the areagram) with adjustable animation speed along with optional indicators for frame energy, pitch, and place of articulation.

5.2.1.2   VSTS at YMCA School for the Deaf, Pune

In order to provide corrective feedback with reference to a model speech utterance, the system has two side-by-side display panels which can be used for acquisition and processing of two speech signals. For example, one signal can be from the learner and the other signal can be from the teacher or a reference speaker. It is also possible to use the same signal in both the panels with analysis, result in one panel and animation in the second

Field Visit of Project Team at MR School for the Deaf, Pune

panel. The animation is reconfigurable. In each panel, the face can be selected as that of a man, woman, boy, or a girl, and its orientation can be selected as left or right facing. The color scheme of the overall display can be modified and saved for subsequent use. The present version of the system can be used for speech segments containing vowels, semivowels, and diphthongs.

5.2.2 Technology Development & Demonstration for Indian Industries

5.2.2.1   National Mission on Power Electronics Technology (NaMPET-II)

Following sub-projects/ activities have progressed under the NaMPET-II programme.

I).   **Medium Voltage Drive with Selective Harmonic Elimination:** The objective of the project is to indigenously design and develop a Medium Voltage Converter with selective harmonic compensation for Medium Voltage (MV) Drives. The design and development of the MV converter for MV drive system (3.3kV, 250kW) has been completed. The developed drive has been load tested in industry environment. The project has been completed.

II).   **Gallium Nitride (GaN) devices for Power Electronic switching Applications and Design and Development of high frequency GaN Converter:** The objectives of the project is design and fabrication of GaN based High Electron Mobility Transistor (HEMT) devices for switching applications, micro integration of GaN device with diode and design & development of a high-frequency GaN based converter topology. The GaN based HEMT devices with an ON current of 5A at a Voltage rating of 40V have been developed by project team at IISc-Bangalore and it is named as iGaN540. The project team at CDAC has developed and tested the mentioned GaN HEMT devices for a DC-DC converter application. About 4 Indian patents and 6 International patents have been filed during the technology development of this project. Project has been completed.

III).   **Implementation and demonstration of micro-grid for village application with integration**

of technologies developed in NaMPET-II: The objective of this activity is to develop, deploy and demonstrate a microgrid capable of grid connected/ standalone operation with indigenous Power Conditioning Unit (PCU) and intelligent load management. The system will integrate solar Photo Voltaic (PV) and battery for rural applications. The developed system is being installed at a tribal village in Marayoor near Munnar, Idukki district of Kerala state. Fabrication, assembly and testing of PCUs, LED driver design, pole design for street light, control room etc., have been completed. Agency for Non-Conventional Energy and Rural Technology (ANERT) and local Panchayat authorities are helping in deployment of the project.

Power Conditioning Unit of Solar PV plant for Microgird

IV). **Deployment of technology developed under NaMPET-II for Grid Connected Solar Photovoltaic Power Plant of 330 kW:** The objective of this activity is to deploy grid connected

330kW Power Conditioning Unit

Solar PV power plant of 330kW at CDAC-Pune building. The Power Conditioning Unit (PCU) for the mentioned PV plant is indigenously designed by CDAC(T) under NaMPET-II. The development of 330 kW PCU has been completed. The procurement of Solar PV panels and site preparation at CDAC-Pune building are in progress.

V). **DSTATCOM for Distribution Power Quality Centres (using Silicon Carbide technology and STATCOM technology of NaMPET-II):** The objective of this activity is to deploy and demonstrate Distribution STATCOM (DSTATCOM) of rating 100 kVA in utility distribution network around which a futuristic Power Quality Centre incorporating features like voltage regulation, local storage, and integration of renewable and uninterrupted power supply can be built. The proposed DSTATCOM is being developed using a Silicon Carbide (SiC) based inverter. The mentioned development will be deployed at Kerala State Electricity Board (KSEB) site in Trivandrum. The development and testing activities of 100 kVA DSTATCOM have been completed. This development may provide reduction in size of the system by more than 60% as compared to Silicon based systems.

KSEB site for deployment of DSTATCOM

5.2.2.2 Automation of the Sugar Plant using Indigenous Technology

The technologies/systems for automation developed under MeitY sponsored programme are being deployed at Thandava Co-operative Sugar Factory

(TCSL), Visakhapatanam for improving the productivity and energy efficiency of the Sugar plant. Phase-I of the SCADA system has been successfully installed and commissioned at TCSL. The phase-II installation activities and commissioning have been completed with field trail in the sugar mill.

5.2.2.3 Advanced Automation and Process Optimization System for 1200 TPD Malabar Cements Factory at Walayar, Palakkad

Advanced automation indigenous technology developed under Automation Systems Technology Centre (ASTeC) project has been deployed in the four important areas of Cement factory i.e. Kiln, Cement Mill, Cyclone jamming & detection and Stacker-reclaimer. The benefits of indigenous system in terms of productivity, savings in energy, qualities etc. have shown encouraging results. The technology has been propagated to user agencies.

5.2.2.4 Microelectronics Development

Some of the technologies developed/ are being developed under the R&D projects initiated by Microelectronics Development Division:

(i)   CEERI Pilani transferred the Technology for MEMS based Ammonia Sensor, capable of detecting Ammonia concentration as low as 10ppm, to M/s Macwin India, New Delhi along with an agreement to provide the Technology to M/s Macwin India for next 10 years.

(ii)   IISc Bangalore developed the Technology of 20 GHz wideband RF Low Noise Amplifier.

An agreement has been signed between IISc, Bangalore and BEL, Bangalore for transfer of this technology for its field trial by BEL.

(iii)   IIT Hyderabad developed the low temperature, low pressure and fine-pitch bump-less Cu-Cu bonding Technology for 3D IC and heterogeneous Integration Applications, which has been transferred to M/s Solid Blocks, Cochin.

(iv)   Under project entitled "Bluetooth Transceiver RFIC", IIT Madras is designing the RF circuits based on the requirement of ANURAG (DRDO) that make up the Bluetooth (Class 2) Transceiver in the 2.4-2.5 GHz ISM band compatible with the latest Bluetooth version 4.0.

(v)   Under project entitled "Microprocessor Development Programme", CDAC, IIT-Madras & IIT-Bombay are in the process of developing a family of 32-bit/ 64-bit, quad-core Microprocessors operating up to 2.0 GHz using Open Source RISC-V ISA for identified users like Nuclear Power Corporation of India Ltd., Indira Gandhi Centre for Atomic Research etc.

Nanotechnology Initiatives

Some of the devices developed/are being developed under the Centres of Excellence for Nanotechnology established by Nanotechnology Initiatives Division are:

(i)   Nanowire based field effect transistor (NW-FET) for rapid and ultrasensitive detection of enteric pathogens and drug resistant cancer phenotypes at IIT Guwahati.

(ii)   Bio-MEMS Sensor for Rapid Point of Care Detection of α-Amylase Activity at IIT Guwahati.

(iii)   Paper-Based α-Amylase Detector for Point-of-Care Diagnostics at IIT Guwahati.

(iv)   SAW devices for accurate, sensitive detection of hepatitis B antigen and transgenic crops at IIT Guwahati.

(v)   Detection of Glutathione by Glutathione-S-Transferase-Nanoconjugate at IIT Guwahati.

(vi)   Organic Field effect transistor for the detection of bacteria at IIT Guwahati.

(vii) Low Cost Electro Chemical Transistor as a Bio-sensor at IIT Guwahati.

(viii) Fully Packaged gas sensor array for CO, CO2, NO2 and SO2 developed by IISc, Bangalore.

(ix) Soil moisture sensors developed jointly by IIT Bombay and IISc Bangalore.

(x) GaN RF-HEMT devices prototyped and tested at IIT B.

(xi) Detection using Cantilevers of Cholera toxin, IFN-γ as a biomarker for tuberculosis and nM levels of Urea and Triglyceride at IIT Bombay.

Two new projects initiated:

(i) Project titled "Three-Dimensional Nanostructure based Miniaturized and Flexible rechargeable lithium batteries for flexible electronics" is being initiated at Centre for Materials for Electronics Technology (C-MET), Pune.

(ii) A project titled "Nanoelectronics Network for Research and Applications (NNetRA)" is being initiated in collaboration with DST.

Publications and Patents

Microelectronics Development Division

More than 450 research papers have been published/ presented in National/ International journals and conferences of repute in FY 2017-18.

Nanotechnology Initiatives

More than 50 research papers have been published in National and International journals. Some of the Patents published/filed this year are as follows:

International Patents

1. "A device with integrated methods for reverse transcription polymerase chain reaction (RTPCR) and/or DNA/Protein array based analyses", Arun Chattopadhyay, Sunil Kumar Sailapu, Deepanjalee Dutta, Amaresh Kumar Sahoo, Siddhartha Sankar Ghosh. (International Patent filed with Application number: PCT/IN2016/000141, date of filing 04/06/2016) (International patent Publication number WO2017098521 A1, date of publishing 15.06.2017)

2. "A Microfluidic Electrolyzer for the Continuous Production and Separation of Hydrogen/Oxygen", Dipankar Bandyopadhyay, Tapas Kumar Mandal, and Saptak Rarotra, (International Patent filed with Application number: PCT/IN2017/050022, date of filing 16/01/2017, International patent Publication number WO/2017/175237, date of publishing 12.10.2017).

3. "A Point-of-Care Hand Tremor Detection System", Mitradip Bhattacharjee, Dipankar Bandyopadhyay, and Sunny Kumar, PCT/IN2017/050366, date of filing 29.08.2017).

4. "A Lung Condition Monitoring Device", Mitradip Bhattacharjee, Dipankar Bandyopadhyay, and Harshal Nemade PCT/IN2017/050363, date of filing 29.08.2017.

5. "A Microfluidic Electrical Energy Harvester", Mitradip Bhattacharjee, SeimTimung, Dipankar Bandyopadhyay, Tapas Kumar Mandal, PCT/IN2017/050364, date of filing 29.08.2017

Indian Patents

1. "Wirelessly Operated LED Device for in vitro Photodynamic Therapy and Subsequent Monitoring of Therapeutic Success of multiple samples", Arun Chattopadhyay, Sunil Kumar Sailapu, Deepanjalee Dutta, Siddhartha Sankar Ghosh, Anitha T. Simon (Indian Patent Application No.: 201731031603, date of filing 06.09.17)

2. "A Point-of-Care Hand Tremor Detection Device", Mitradip Bhattacharjee, Dipankar Bandyopadhyay and Sunny Kumar (TEMP/E-1/18774/2017-KOL, Indian Patent Application No.: 201731018530, date of filing 26.05.17).

3. "Integrated MEMS-Microfluidic CO2-sequestration Device to Produce Essential Organic Products Emulating Photosynthesis", Saptak Rarotra, Dipankar Bandyopadhyay and Tapas Kumar Mandal (TEMP/E-1/29803/2017-KOL, (Indian Patent Application No.: 201731029391, date of filing 18.08.17).

4. "A MEMS-POCT Device for Quantitative Estimation of the Biomarker α- Amylase in Human Blood Serum", Nilanjan Mandal and Dipankar

Bandyopadhyay (E-12/187/2017/KOL, Indian Patent Application No.: 201731032122, date of filing 11.09.17).

5. "Acoustic Diagnostic Point-of-Care Testing Device for Blood Urea Detection", Mitradip Bhattacharjee, Siddharth Thakur, Dipankar Bandyopadhyay (TEMP/E-1/37965/2017-KOL, Indian Patent Application No.: 201731037223, date of filing 20.10.17).

6. "A Point-of-Care System for Detection of the Physical Stress at Different Parts of Body", Mitradip Bhattacharjee, Sagnik Middya, Dipankar Bandyopadhyay (TEMP/E-1/37937/2017-KOL, Indian Patent Application No.: 201731037222, date of filing 20.10.2017)

7. "A Mobile RF Radiation Detection Device", Mitradip Bhattacharjee, Dipankar Bandyopadhyay (TEMP/E-1/37920/2017-KOL, Patent Appl. No.201731037221, date of filing 20.10.17)

5.2.2.5 Electronics Components & Material Development Programme promotes research and development activity since 1986 to nurture electronics development in the country to boost local manufacturing. The current focus of the programme is development of technologies in the areas of energy storage and energy harvesting, printed circuit board, information display, optical technologies (optical fiber, indigenization of optical components, optical computing and quantum communication), environment & E-waste and process technology development leading to product development and technology transfer to industries.

(i) New technologies are ready for transfer of technology to the industry in the areas of Aerogel supercapacitor, stent making equipment, transparent heating films etc.

- **Technology for production of Carbon Aerogel:** Developed complete indigenous technology for production of carbon aerogel for manufacturing aerogel supercapacitors for various applications, made SOP for the complete process and demonstrated the technology @2-3 kg/batch. The technology is now ready for transfer to the industry. Major benefits of this technology are -

cost effective, highly reproducible with yield of >95%, enable the use of industrial grade input materials and recyclable for the wastes solvent/gases.

- **Technology for Fabrication of Aerogel Electrode:** Developed state-of-art technology for making aerogel electrodes in spool form for direct use in manufacturing aerogel supercapacitor of different size/values. This process technology has been successfully demonstrated and the spools of Aerogel electrodes passed the tests for use in supercapacitor manufacturing machines.

- **Technology for Fabrication of Aerogel Supercapacitors:** Developed indigenous process technology for fabrication of aerogel supercapacitors of different sizes/vales (cell capacitance 0.47F to 50F) including designing of indigenous machines for making aerogel supercapacitors. Development of this process technology has been completed, but minor fine tuning of the process parameters for different size/values of supercapacitors are in progress which will be completed soon (by end of FY2017-18).

- **Technology for Transparent heater film:** A cost effective scalable technology for transparent heater film has been developed. The heater film provides uniform heating on its surface by applying a small electric power. The technology has many applications such as defrosting and anti-icing applications for cars, applications on glass top/ door of freezers to maintain transparency and many more.
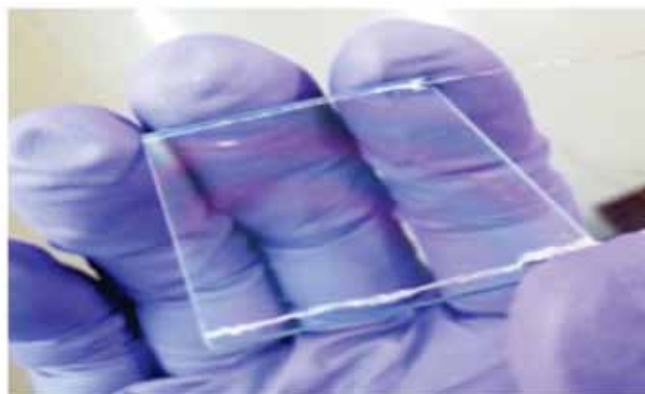
Transparent Heater Film

• **CW Laser for stent cutting:** An indigenous technology for laser stent cutting has been developed with prototype module with specifications of 100 W CW Yb fiber laser having M2< 1.2 with power stability of 1%. The prototype was show cased at Laser World of Photonics 2017 held at Pragati Maidan, Delhi and it received good response Being a Made in India product and having the scope of adjusting the specification as per application specific requirement, the acceptance is better than the Chinese counterparts. Several companies are interested to have the commercial products as well as the technologies.

CW Laser for Stent Cutting Module

(ii) There are several other technologies being developed under EMCD which are in advanced stages for conversion into products:

• **High Energy Pulsed Laser for Marking and engraving:** Two versions of the 20 W pulsed laser module at 1 μm have been developed: First which is compatible with existing off-the-self isolator-collimator and second with novel fiber design, suitable for deep engraving.

• Fiber Bragg Grating (FBG) sensor for condition monitoring of railway catenary-pantograph structure: A FBG transducers based online monitoring of railway catemary-pantograph system has been developed using indigenous technology. The prototype is being converted to a product with the collaboration of M/s. Stone India and with specifications suited to Indian Railways.

5.2.2.6   Medical Equipments/Tools:

6 MeV Linear Accelerator (LINAC) for cancer treatment has been deployed at Indian Institute of Head and Neck Oncology, Indore, which is being used for patient treatment. On an average 30 patients are being treated per day using this LINAC machine. The installation and commissioning of second LINAC machine is completed at Amaravati Cancer Foundation, Amravati. Hospital

High Energy Pulsed Laser Module for Marking and engraving

FBG sensor for condition monitoring of railway catenary-pantograph structure

has received Mandatory AERB Clearance for patient treatment and Patient treatment has been started since June, 2017. So far, more than 2500 exposures have been delivered to the patients. The deployment of third LINAC Machine is in progress at BKL Walawalkar Hospital, Chiplun, Maharashtra and its radiation testing has been accomplished.

5.3 Centres of Excellence

5.3.1 Nanotechnology Centres

The aim of the Nanotechnology Initiatives Division is to develop Nanoscale products/ devices for societal and strategic applications. Several Centres of Excellence in Nanotechnology have been established to take the basic R&D outcomes to the prototype and then to manufacture Nano devices, subsystems, systems for the social benefits.

- **Nano Fabrication Prototyping Facility for SMEs and Start-ups in the area of Micro Electromechanical Systems (MEMS) & Nano Electromechanical Systems (NEMS) at IIT, Bombay**

  A National Prototype facility has been created, commissioned & fully operational to enable researchers and industrial partners/ incubator companies to fabricate and manufacture nanoscale devices. This facility aims to provide facilities for scaling up of nano-manufacturing operations in contamination and quality controlled environments also which will be an accessible platform to bring technologies from Technology Readiness Level TRL 4 to TRL 9.

- **Centres of Excellence in Nano-electronics Phase II – a joint project between IISc, Bangalore and IIT, Bombay**

  The project Centres of Excellence in Nanoelectronics (CEN) Phase II have been initiated to carry out research and development activities in the areas of nanoelectronics, nano-materials, nano-structures and integrated sensor systems. Facilities (Growth and Characterization) established at these centres have brought India as a pioneer in Nanoelectronics globally. Faculties and researches of various institutes widely utilized these centres to carry out the world class R&D in the Nanotechnology. R&D at these centres have resulted in a large number of Nano devices. The project is completing in FY 2017-18.

- **Centre of Excellence in R&D in Theranostics Devices at IIT, Guwahati**

  Centre for Nanotechnology at IIT Guwahati is being created to provide a platform for the scientific and technological developments in the NE region of the country. The focus of the R&D at this centre is to develop interdisciplinary experimental facility in the NE region for the fabrication of theranostics devices based on chemical, biological, and environmental sensors, transistors, and MEMS/NEMS applications.

5.3.2 Demonstration Facility of Supercapacitors at C-MET, Thrissur:

C-MET has developed complete indigenous technology for making carbon aerogel supercapacitors, The technology has passed stringent quality testing, done by several end users including VSSC, BARC, IIT Bombay, Tata Motors, etc. C-MET also demonstrated few application of prototype Aerogel Supercapacitors.

Demonstration Facility of Supercapacitors at C-MET, Thrissur

5.3.3 RoHS Testing facility at C-MET, Hyderabad:

MeitY had created world class, first government testing laboratory facilities for hazardous substances present in electronics and electrical equipments at 333333 Hyderabad. The laboratory can certify and issue internationally valid certificate as per ISO 17025 and it can also test mercury levels in CFLs and Fluorescent Lamps(FLs) as per test method IS 15906 (Bureau of Indian Standards). The laboratory has served till date 218 different companies/Institutions and tested 4448 samples for RoHS and non RoHS categories. The laboratory recently signed a MoU with Central Pollution Control Board (CPCB), New Delhi which has recognized it as a reference testing laboratory f33333or RoHS testing as per MoEF&CC's E-waste Rule 2016. The laboratory is now slated to become self sufficient with its function running through its own generated revenue. To raise awareness and augment revenue, the laboratory is conducting the training/awareness programmes and short term courses on RoHS on regular basis.
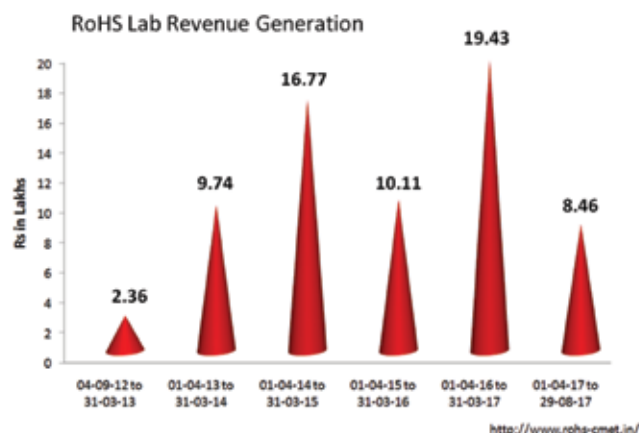
5.3.4 Silicon Carbide single crystal bulk growth facility at C-MET, Hyderabad

High Power Electronic materials are required for many applications such as LEDs, high power switching devices (MOSFETs, thyristors, Schottky diodes) etc. Silicon carbide (SiC) is a promising material for high power, high temperature, high frequency device applications due to its wide bandgap, high thermal conductivity and high breakdown field. In view of above strategic uses of SiC in electronic industry, an advanced sublimation reactor facility is established at C-MET, Hyderabad for single crystal growth of 6H and 4H SiC boules, in collaboration with DMRL / SSPL (DRDO) to supply boules / wafers required for substrates to be used in GaN technology at SSPL, as also to cater India's first ever initiative to develop SiC based electronic devices. Desirable specifications of grown 6H SiC crystal namely

size, bandgap, singularity of polytype and crystallinity have been achieved. However, optimization of other parameters are still ongoing for achieving high quality semi-insulating 6H SiC single crystal.

Silicon Carbide single crystal bulk growth facility at C-MET, Hyderabad

5.3.5 High Purity Material Development at CMET, Hyderabad

The materials in a high state of purity are vital for electronics industry and strategic sector. CMET has developed high purity and ultra high purity materials up to 7N purity like Cadmium, Tellurium, Gallium. Currently, research is carried out to develop 7N purity for Germanium and Zinc. These materials are used for infrared detection, high power electronics, solar cells, semiconductor doping etc.
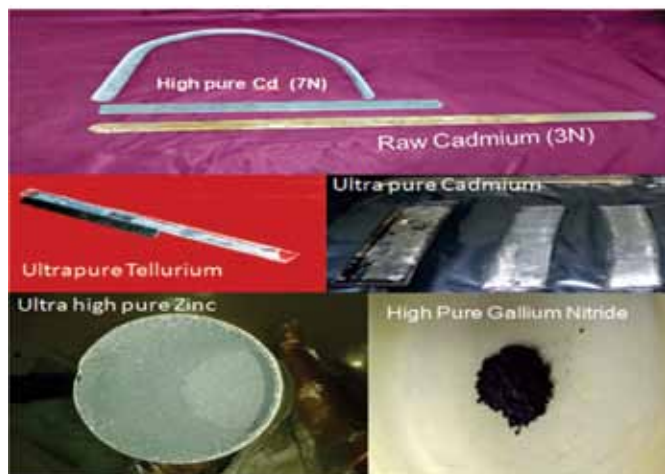
High Purity Material Development at CMET, Hyderabad

5.3.6 Printed Circuit Board Substrate development facility at C-MET, Thrissur

C-MET has developed indigenous microwave Printed Circuit Board substrates through a patented SMECH process for strategic sector and established nations first pilot plant production facility for the fabrication of planar copper cladded microwave substrate up to 10 x 10 size. C-MET has signed a MoU with Department of Atomic Energy for the development and continuous supply of microwave substrates suitable for 750 W high power solid state amplifier designs in collaboration with RRCAT, Indore. 250 Numbers of Gold Finished PCB boards have been delivered till date under the MoU. C-MET is also developing rigid and flexible magneto-dielectric substrates for various commercial and defence applications.

Printed Circuit Board Substrate development at C-MET, Thrissur

5.3.7 Lithium Ion Battery Research facility at C-MET, Pune

Lithium batteries are characterized by high specific energy, high efficiency and long life. These unique properties have made lithium batteries the power sources of choice for the consumer electronics market such as in mobiles and in renewable energy plants, as well as power systems for sustainable vehicles, such as hybrid and electric vehicles. C-MET Pune has successfully developed prototype Li-ion batteries in form of coin/button cells and pouch cells which are being tested to meet commercial specifications. The development of materials for high energy batteries is a continuous

process and C-MET is working for the development of novel materials for the high charge capacity and high

energy density. The facility has capacity for the large scale synthesis of active different materials.

Lithium Ion Battery Research facility at C-MET, Pune

5.3.8 Piezoceramic Materials and its components at C-MET, Thrissur

Centre for Materials for Electronics Technology (C-MET), Thrissur has indigenously developed piezoceramic materials with various compositions and its components (PZT Ring, PZT disc and PZT plate). Advantages of developed materials are lower sintering temperatures, high-density microstructures, enhanced electromechanical properties, improved insulation resistance in components. These materials and components have many different applications such as Piezoactuators, SONARS Hydrophones and other ultrasonic applications.

Piezoceramic Materials and its components at C-MET, Thrissur

5.3.9 Internet of Things

MeitY has approved setting up of 3 Centres of Excellence (CoE) for Internet of Things at Gurugram in Haryana, Ahmedabad in Gujarat and Visakhapatnam in Andhra Pradesh (IoT) on a Public Private Partnership (PPP) model to "Enable IoT ecosystem through maximizing indigenous solutions across the IoT value chain, leveraging India's strength in IT through collaborative efforts of Industry - Government - Academia – Start -ups/Entrepreneurs" for India's contribution to global competitiveness and well being. The total outlay of the project is 6795 lakh, with MeitY contribution of ₹ 3234 lakh for 5 years. Earlier, a CoE on IoT was set up by MeitY with ERNET India and NASSCOM at Bengaluru with total outlay of ₹2195.22 lakh with MeitY contribution of ₹1077.72 lakh in PPP mode for 5 years The CoE for IoT was launched by Hon'ble Prime Minister on 1st July 2015 and the Centre was inaugurated by Hon'ble Minister of Electronics and Information Technology on 7th July 2016.

2. The CoE, over a period of time and through IoT will enable India to emerge as a "Consumption + Creation Economy" and act as an enabler/catalyst for IoT eco system supporting policy and regulation development, resident competency, monitor the IPR

generated in the system and support other incubators in the country with programme support.

3.   The CoE will create an innovation platform for start-ups/entrepreneurs, enterprises in the space of IoT with 'Democratisation of Innovation' as the key pillar. The CoE will energise research mind-set and reduce cost in research and development by providing neutral and interoperable, multi-technology stack laboratory facilities. It will reduce import dependency on IoT components and promote indigenization.

4.   AT CoE for IoT at Bengaluru, 29 Start-ups have been incubated as of 31st December 2017. Regular meetings/ workshops are being conducted with start-up and Entrepreneurs 29 prototypes have been developed by start-ups. 12 patents have been filed by start-ups and 7 patents have been received. More than 200 virtual entrepreneurs are connected to the CoE. MoU has been signed for Collaboration with Georgia Tech University. MoU signed up for collaboration with GIIC, Guiyang, China. CoE for IoT is focusing on Agriculture, Water, Health, Transportation, Security & Safety and Energy as vertical segments.

5.   Government of Karnataka has joined the initiative as a State partner through grant of space as well as program execution support in the State.

5.3.10 Innovation & IPR

- In today's environment India have more Startups and entrepreneurs than ever before. According to a NASSCOM study, India of late has emerged as one of the major startup hubs globally. Today, India ranks third among global startup ecosystems with more than 4,750 ICT startup companies. Many of these Start-ups are focusing on emerging technologies like Internet of things, Artificial Intelligence, Big Data, Machine Learning, Cloud etc. Also, several of the new age companies are raising money at valuations which far exceed the market capitalizations of many traditional and well-established players which have been in existence for decades. However many Startups do not reach their full potential due to limited guidance and access.

- The Government of India has taken a number of initiatives with regard to boosting startup ecosystem. Startup India is a flagship initiative of the Government of India, intended to build a strong eco-system for nurturing innovation and Startups in the country that will drive sustainable economic growth and generate large scale employment opportunities.

- Ministry of Electronics & IT (MeitY) has also taken various initiatives and measures to improve innovation-led ecosystem with technology and theme based incubation centres, scheme and programmes to support researchers, start-ups and MSMEs protect IPRs nationally and internationally. A brief overview of such activities include:

- Technology Incubation and Development of Entrepreneurs (TIDE) Scheme:Technology Incubation and Development of Entrepreneurs (TIDE) Scheme was put in place by MeitY in 2008 to promote innovation by nurturing startups in Information Technology, Communications & Electronics (ICTE) domain. Under the TIDE Scheme, financial assistance is provided to Institutions of Higher Learning to strengthen their Technology Incubation Centres for enabling young entrepreneurs to create technology startup companies for commercial exploitation of technologies developed by them. Under the scheme, 27 TIDE Centres and 2 Virtual TIDE centres have been supported at institutes of higher learning all over India.

Following are the main outcomes of TIDE Scheme:

- 27 TIDE Centres and 2 Virtual TIDE centres supported at IITs/IIMs/NITs/Premier Institutes all over India.

- 207 startups benefited.

- 384 entrepreneurs emerged and out of which 34 are women entrepreneurs.

- 52 startups attracted Venture Capitalists resulting into investments of ₹172.39 crore.

- Out of 207 startups, 95 have successfully graduated till date.

- More graduations likely to follow as some of the startups incubated in recent years

- 74 successful patents registered based on the products developed by the startups.

- Till date, 243 products have been developed by these startups.

- 2846 jobs have been created throughout 27 TIDE Centres.

- **Multiplier Grants Scheme:** Multiplier Grants Scheme (MGS) is to encourage collaborative R&D between industry and academics/ R&D institutions for development of products and packages. There are three Projects have been supported under the scheme as on date.

- **Support for International Patent Protection in E&IT (SIP-EIT) Scheme for SMEs:** A significant initiative of MeitY is the SIPEIT scheme which within a short span of time has become one of the flagship schemes of the ministry. SIPEIT encourages international patent filing by Indian companies-MSMEs. As of now, 30 applications from startups, MSMEs have been supported since the inception of the scheme. SIP-EIT aims to provide financial support to MSMEs and Tech startups for international patent filing so as to encourage innovation and recognize the value and capabilities of global IP. The scheme for a period of 5 years provides 50% reimbursement upto a maximum of ₹15 lakh to Indian MSMEs and Startups.

- **IP Awareness Programme for E&IT Sector:** The aim of this scheme is to create a holistic sustainable model for creating IPR awareness among various stakeholders. Till date, 56 IPR awareness workshops have been supported out of which 16 workshops have been supported in year 2017 with great success. As part of MeitY-European Patent Office (EPO) workplan, 5th Indo-European Conference on Creating a Robust IP Ecosystem for ICT in the 21st Century was held on

4th December 2017 at India Habitat Centre, New Delhi.

- **IPR Facilitation for MeitY R&D / Innovation Outcomes:** To translate the Ministry's various efforts for creating state-of-the-art R&D paradigm in the country, MeitY has been supporting its R&D societies and grantee institutions in filing IPRs which includes patents, copyrights, industrial designs and trademarks. MeitY's IPR portfolio now consists of a total of 65 granted patents with 281 patents filed, 494 copyrights and 87 registered Trademarks.

- **Centre of Excellence (CoE) in Intellectual Property Rights:** With the growth of IT industry as well as other technical sectors, an urgent need is felt to protect the IPR generated out in India. To cater this aim, a Centre of Excellence (CoE) on Intellectual Property Rights (IPR) is being implemented by CDAC, Pune and operational at MeitY and CDAC Pune. Apart from prior-art search, CoE on IPR is offering a bouquet of services in order to create awareness around the opportunities for protection of technologies which are outcomes of innovation and creativity.

- **Establishment of Incubator for Electronics Start-ups in Delhi-NCR (Electropreneur Park):** The Electropreneur Park established in collaboration with Software Technology Parks of India (STPI), India Electronics & Semiconductor Association (IESA) and Delhi University (DU) with state of the art facilities at South Campus, Delhi University. The project aims to support 50 start-ups and as of date 12 startups are on-board out of which 2 startups joined as pre-incubates. As an outcome, 6 products & 7 working prototypes have been developed and 2 IPs & 4 provisional patents have been filed.

- **Electronics Incubator by IIITM-Kerala and KSUM at Cochin, Kerala:** The project for setting up of Consumer Electronics Incubator at Cochin, Kerala by Indian Institute of Information Technology and Management Kerala (IIITM-K) and M/s Kerala Startup Mission (KSUM) aims to creation of new enterprises focused on Consumer Electronics

through a holistic incubation ecosystem. This Incubator will incubate 40 startups over a period of 4 years. Infrastructure setup is completed. Testing and Equipment / IOT, Robotics Lab and Prototyping Room for SMT Assembly Line has been completed. 34 incubates are on-board out of which 9 incubates have joined as pre-incubates.

- **Setting up of Incubation Centre in the area of ESDM with focus on Medical Electronics at IIT Patna:** The incubation facility developed through MeitY and State Government partnership aims to incubate 50 startups over a period of 5 years. The primary objective of this is to promote innovation and entrepreneurship with the aim to identify, nurture and translate technological ideas and innovation in broad areas of ESDM sector with a focus in Medical Electronics. 6 startups have joined the Incubation Centre out of which 1 startup has joined as pre-incubate.

- **Fabless chip design incubation centre at IIT Hyderabad:** The objective of the fabless chip design incubator is to incubate start-ups in semiconductor design. The vision is to provide one-stop service to start-ups intending to enter this space. This Incubator will incubate 50 startups over a period of 5 years. 1 startup has joined the Incubation Centre.

- **Industry Innovation Programme on Medical Electronics through BIRAC:** With an aim to promote scientific and technological research in Medical Electronics sector and to address the pressing challenges associated with the development of innovative medical electronics and making it available, accessible and affordable to the people at the bottom of the pyramid, a project has been initiated at Biotechnology Industry Research Assistance Council (BIRAC). Under this programme support will be provided at Seed or idea to PoC, early transition and transitions to scale stages. 25 proposals are being supported through BIRAC under the programme out of which, 18 proposals are in Idea-to-PoC stage, 5 proposals are in Early Transition stage and 2 proposals are in Transition to Scale stage.

- **Global Innovation and Technology Alliance (GITA):** To provide funding and support to Industry and Academic institutions for doing collaborative research to promote Innovation, IP, R&D and commercialization of products etc. in the ESDM sector, a project is being implemented by GITA. For this bilateral programme, Canada, Finland, UK, South Korea, Spain, Israel, Japan, Taiwan and Sweden have been identified. Six projects have been initiated which include India-Finland (01), India-UK (03) and India-Canada (02).

- **Nasscom-ERNET Centre of Excellence on IoT:** Centre of Excellence (CoE) on Internet of Things (IoT) with an outlay of ₹2195.22 lakh, with MeitY's contribution of ₹1077.72 lakh is being executed jointly by ERNET India and NASSCOM in PPP mode. It is operational at NASSCOM Bengaluru. The vision of the CoE is to enable India as the Innovation hub for the emerging technologies like Internet of Things domain through Innovation, Standardization, Realization of prototype/ products before deployment of the IoT devices in the public domain/ infrastructure and support Govt. initiatives on IoT solutions for specific India needs in areas like water, energy, agriculture, health, security and privacy of data.

The state of the art physical laboratory infrastructure is already operational. 19 Start-ups have been incubated in the CoE. More than 200 start-ups are virtually connected. 10 patents were filed by start-ups incubated in the CoE and 1 patent has been granted to start-up. 19 prototypes have been developed by start-ups. Nine IoT start-ups were invited by Japan for CEATEC, an annual high technology exhibition. Partnership MoU has been signed by CoE for IoT with Georgia Tech University, Atlanta. Regular meetings/ workshops are being conducted with start-up and Entrepreneurs.

5.3.11 National Centre of Excellence in Technology for Internal Security (NCETIS):

National Centre of Excellence in Technology for Internal Security (NCETIS) established at IIT Bombay by Ministry

of Electronics and IT has mandate to collaborate with stakeholders, to address requirements through joint technology development projects, to realize home grown Police and Paramilitary technologies, for manufacturing. The NCETIS made progress in initiating several innovation/R & D projects, subsequent to it's establishment. Explosive Detector technology based on Amplifying Florescent Polymer has been developed by the centre and industry started manufacturing, with the following specifications:

Explosive Detector

The developed Explosive Detector is a handheld device with the capabilities to detect, TNT, RDX,PETN, SEMTEX, Ammonium Nitrate etc. and features such as

- Low warm-up time
- Minimal False Rate
- Remote connectivity
- Real-time detection
- Trace Vapour detection
- Particle Detection
- No-Radioactive source
- Easy to use with minimal training

The other technologies under collaborative development for homeland security are in various stages of technology developments/translation levels and trials.

5.3.12 National Centre of Excellence for Large Area Flexible Electronics (NCFLexE):

National Centre of Excellence for Large Area Flexible Electronics under establishment for State of Art Facility at IIT Kanpur has mandate to collaborate with stakeholders in emerging electronics area, to address requirements through joint technology developments, to realize home grown technologies for manufacturing. The Sate of Art Facility of the FlexE centre is expected to be dedicated to the nation, for it's Pan India usage, shortly in June/July 2018

Presently, the Centre is working on 10 nos. of joint technology development projects, which are in various stages of developments. There are four R & D demonstrable prototypes are developed and demonstrated to industry with already established facilities. There developments fall in the area of OLEDs, TFTs, Smart Tags, Sensors.
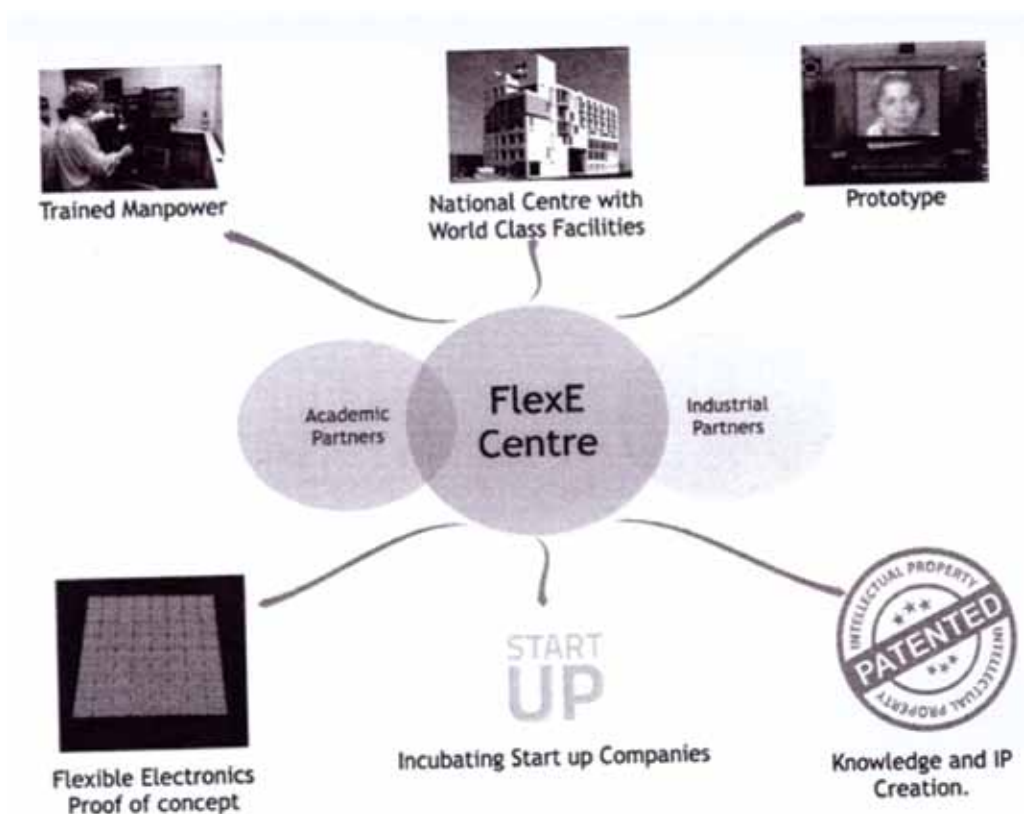
New Centres of Excellence:

Centre of Excellence for Micro Nano Systems at IISc, Bangalore with an outlay of 151. crore over a period of 5 Years to set up at IISc Bangalore and National Centre of Excellence for Electronics and ICT Applications in Agriculture and Environment (NCAEE) with an outlay of 57.75 crore over a period of 5 Years to setup at CDAC, Kolkata are in various stages of approval by MeitY

5.3.13 Bioinformatics

The Bioinformatics group at C-DAC have made pioneering efforts towards bridging the gap between biologists & High Performance Computing technology. The Bioinformatics Resources and Applications Facility (BRAF) is infrastructural set up for national use.

BRAF provides a high-end supercomputing facility to Bioinformatics researchers round the globe on the lines of worldwide Bio grids like NCBI of NIH and EBI of Europe.

- BRAF is the dedicated facility of multi - teraflop supercomputing cluster called PARAM BIOGENE, PARAM BioChrome, and PARAM BioBlaze with high end storage known as PARAM Biobank. Various software for molecular modelling and genome analysis, have been installed on the BRAF clusters BRAF is also equipped with hardware accelerators developed by C-DAC for few bioinformatics software. There are in house developed software's, commonly used commercial software, commonly used chemical databases ported on BRAF. Other MeitY developed algorithm/tools all hosted as freeware for use by bioinformatics national community. For enhancement of bioinformatics services to meet cloud requirement, BRAF User Management portal for online BRAF registration was developed. Also BRAF Ticket Management System has been incorporated to make BRAF user get a better

BRAF Hardware : Param Biogene

BRAF Hardware : Param Biochrome

experience for their email interactions with BRAF Help.

5.4 Cyber Security R&D

R&D, Innovation & Design

Cyber Security R&D is aimed at development / enhancement of skills and expertise in areas of cyber security by facilitating basic research, technology demonstration and proof-of-concept and R&D test bed projects. Research and Development is carried out in the thrust areas of cyber security including (a) Cryptography and Cryptanalysis, (b) Network & System Security, (c) Monitoring & Forensics and (d) Vulnerability Remediation & Assurance through sponsored projects at recognized R&D organisations.

New projects are formulated / initiated in thrust areas identified on continuous basis to enable enhancement of expertise /skills in R&D for Cyber Security. Accordingly, R&D projects in the area of Cyber Security have a

special focus and emphasis on R&D infrastructure creation, capacity building and enhancement of skills and expertise in the interest of a conducive R&D eco-system in the country to support vision of robust Digital India and needs of the society. In addition, specific efforts have been made to nurture institutions and capacity enhancement in the entire North East Region.

Cyber Security R&D Projects

During the year 2017-18, R&D efforts were continued and strengthened. New projects have been initiated in the following areas:

I. **Development of Algorithms for Speech based Bilingual Keyword Search to Detect Fraud/ Spam Calls :** The objective of the project is to develop algorithms for speech-based bilingual (English + Hindi) keyword spotting, (b) develop algorithms for classifying machine generated (robot speech) and natural human speech, (c) demonstrate the effectiveness of the developed

algorithms for spam/fraud calls detection application using telephonic standard speech and (d) collect a speech database and a keyword database of fraud/spam calls in bilingual mode over telephone channel as no similar database exists.

II. **Design and Development of Deception Framework for capturing and collection of APT and Botnets:** The aim of this project is to develop a generic scalable deception framework for capturing and detection of APTs targeting organizational network.

III. **Cryptanalysis of cryptographic ciphers with emphasis on AES and RSA:** The objective of the project is to carryout research on cryptanalysis of two most popular and widely used ciphers AES and RSA.

IV. **Design of JPEG Anti-Forensic Scheme(s) for evaluation of existing JPEG Forensic schemes:** The aim of the project is to design anti-forensic scheme which may act as a standard benchmark for evaluation of JPEG compression based forensic methods from robustness and security perspective.

V. **Development of Cyber Forensics Training Facility in Arunachal Pradesh :** The aim of the project is to a) establish Cyber Forensics Training Facility in Arunachal Pradesh (b) Update the existing course materials (developed earlier) for various Cyber–forensic training modules and (c) Conduct training programmes in the Cyber forensics.

VI. **Development of SCADA security solutions- Secure update and monitoring of RTU:** The objective of the project is to develop security solutions at the device (RTU) level which includes (a) Security monitoring unit (SMU) and (b) Secure update module.

The R&D activities in the programme will be carried forward during 2018-19 to promote research and development of indigenous cyber security solutions, proof of concepts and prototypes and skilled manpower

in the thrust areas of Cyber Security with special focus on mobile device security, cloud security and cloud forensics, intelligent traffic analysis, predictive intelligence based on Big Data Analytics, malware detection and advanced cyber forensics.

Efforts / activities in North East

Efforts were made to continue and strengthen the cyber security activities in the North East region. The efforts were towards strengthening the R&D capability building and training and awareness creation activities.

During 2017-18, activities to train the judiciary utilizing the Cyber Crime investigation, training Labs set up in the states of Northeast were continued. More than 100 judicial officers in the NE were trained with regard to Cybercrime forensics and legal aspects. Infrastructure at these labs has also been upgraded.

5.5 Societal Reach R&D

5.5.1 Medical Tools, Equipments & Software

i. **Repair and Maintenance of Medical Electronics Equipment:** Medical Electronics Laboratories for repair and maintenance of medical electronic equipment and training of medical and paramedical personnel have been established at NIELIT, Shillong and NIELIT, Kohima. The Medical Electronics Lab has been set up and training of 133 candidates (NIELIT, Shillong – 49, NIELIT, Kohima- 74 and Para medical Staff-10) has been completed. By virtue of the training some of the participants trained from NIELIT, Kohima have got employment.

ii. **Leukoanalyser:** A prototype tool using deep learning based classifier has been developed by IIT Delhi for Minimal Residual Disease Estimation (MRD) in B-Lineage Acute Lymphoblastic Leukemia (ALL) residual disease after suboptimal induction chemotherapy of leukaemic cells (cancer cells from the bone marrow) that remain in the patient during treatment. The accuracy of the classifier as tested on the datasets is 94%. This has been deployed at AIIMS, New Delhi for testing and validation.

iii. **Design and Development of 1.5 Tesla Magnetic Resonance Imaging (MRI) Systems:** The objective of the proposed project is to design, develop and test an indigenous 1.5 Tesla MRI System for medical imaging. Magnetic Resonance Imaging (MRI) is a medical imaging technique used in radiology to visualize internal structures of the body with high contrast images. The Graphical User Interface & framework for Image reconstruction has been completed and evaluation methodology for the IMRI software is ready for the addition of new plug-in modules. Technical design reports on design of magnet, bobbin, Vacuum-Impregnation system, External Interfacing shield and MRI cryostat has been prepared after numerous design simulations.

iv. **High energy 30 MeV linear accelerator (LINAC):** The objective of the project is to design & develop 30MeV electron linear accelerator with 5-10kW beam power. The proposed LINAC will generate Molybdenum (Mo-99) which will be used to elute radio isotope Technetium (Tc-99m). The novel Tc-99m radio labelled analogues generated will also be clinically assessed. Electronic Gun for 20KV triode has been designed, developed and being tested. Target water cooling has been redesigned to dissipate up to 3KW power. Bending magnet with One Dipole 90 Degree has been developed. The coils and vacuum chamber design is in final stage. Procurement of power supply for electron gun of 20kV & for Klystron with duty cycle 0.002 is in progress. Various sub system have been designed, fabricated and are being tested.

v. **Design & Development of Indigenous Colour Doppler Ultrasound Scanner with centralised PNDT database compliance:** The objective of the project is design & development of Indigenous Color Doppler Ultrasound Scanner. Eight channels Ultrasound DAQ System has been designed and developed by NIELIT, Calicut. NIELIT has acquired a Ultrasound research platform which is a unique facility for Ultrasound research. NIELIT has indigenously designed 128 channel Ultrasound Transceiver board and developed Ultrasound Probe connector board.

vi. **Studies on detection of cancer, processing infrared images and developing appropriate Instrumentation system for initial deployment in N.E. States:** A Labview based Data collection software has been developed and one unit is already being used in IR data collection Programme at Cachar Cancer Hospital & Research Centre (CCRHC). A Graphical User Interface (GUI) has been developed to retrieve the Doctors marking as image overlay using the collected coordinate values on the IR images. Development of a Labview based advanced clustering algorithm has been done for getting improved Region of Interest (ROI) Selection. The same has been implemented in the breast cancer screening software. The testing of the IR images for breast cancer subjects collected from CCHRC is completed.

vii. **Electronic Health Record (EHR) System:** Clinical Record Integration Platform powered by C-DAC's Distributed Healthcare Store technology (DHS) has been deployed at Jai Prakash Narayan Apex Trauma Centre (JPNATC), AIIMS, New Delhi. The DHS technology brings all relevant clinical data from different systems and consolidates them into single viewable EHR. Integration of DHS technology with AIIMS main centre is under process.

viii. **Certification Schemes for Compliance with EHR Standards:** This project will make it possible to implement standardized Electronic Health Record at National/State level for e-Governance in Health Care Sector. It will also help public and private healthcare operators to become compliant to notified EHR standards of Ministry of Health & Family Welfare. CDAC has developed and submitted artifacts to STQC for comments and feedback.

ix. **Personal Health Record Management System (PHRMS):** It is Aadhar enabled cloud based application which has been designed after taking

inputs from industry experts, medical practitioners and researchers in the health informatics domain. It can store Personal Health record of Individual. User can store reports, diagnostics which are accessible by individual/doctor for online consultation and prescription. System has been developed and being tested on the cloud. Trails on more users are being undertaken. It has been put up NHP (National Health Portal) and integrated with e-Sushrut Hospital Management system of Govt. of Telangana.

x. Repair and Maintenance of Medical Electronics Equipment: A Medical Electronics Laboratory for repair and maintenance of Medical Electronic Equipment is being established at NIELIT, Silchar, Assam for undertaking repair and maintenance of Medical Electronics equipments of various hospitals in Assam. Procurement of capital equipment has been initiated. Training for project staff on Medical Electronics Equipment has been completed.

xi. Maxillo-Facial Surgery Planning and Simulation System: A reliable & cost effective planning and simulation system is being developed for maxillo-facial surgery which enables precise 2D cephalometric analysis and interactive manipulations of three dimensional reconstructions of the facial tissues in order to visualize the patients postoperative appearance. Product Requirement Specification has been prepared by CDAC Thiruvananthapuram. 400 Cephalometry images collected in bmp format from publically available sources

5.5.2 Healthcare

*   **Paper-Based α-Amylase Detector for Point-of-Care Diagnostics at IIT Guwahati**

    A transmittance based system /kit for point-of-care quantification of biomarker samples is comprised of: a stage supporting a detection unit, an optical transmittance unit, and a signal processing unit. The detection unit i.e. reactive substrate is capable of undergoing a specific biomarker sample interactive reaction and generating a quantifiable

optical signal proportional to the concentration of the said biomarker sample wherein the intensity of the color varies with the concentration of the analyte in the bio-sample. The simple, single step, cost-effective easily disposable system / kit is useful for point-43 of-care detection of a host of important biomarkers such as amylase, creatinine, or albumin, among others
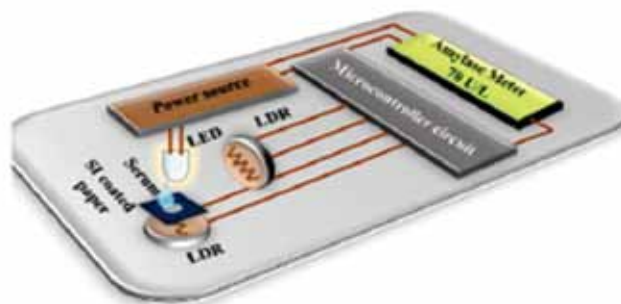
Paper-Based α-Amylase Detector for Point-of-Care Diagnostics

*   **An Electrochemical Sensor for POC detection of Amylase developed at IIT Guwahati.**

    Activity of α-amylase enzyme in human blood serum indicates the onset of many acute diseases such as pancreatitis, mumps, cancer, stress, and depression. IIT Guwahati has developed a portable and economic prototype for the instant point-of-care-testing (POCT) of α-amylase concentration in blood serum. The prototype is an assembly of an electrical biosensor, a sample stage, a signal processing unit (SPU), and a liquid-crystal-real-time display (LC-RTD).
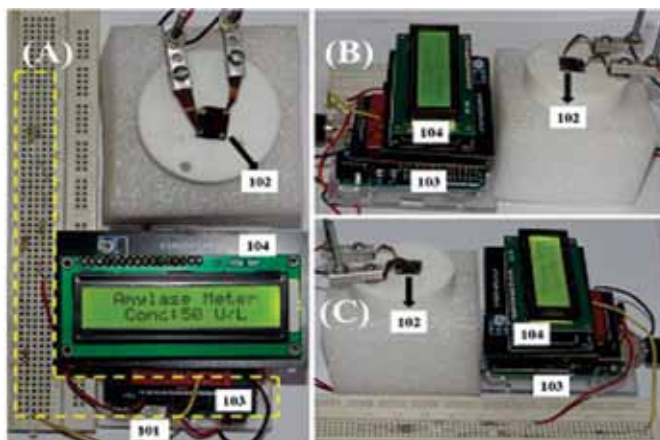
An Electrochemical Sensor for POC detection of Amylase

• **Flexible Paper Touchpads for Low-cost Electronic Appliances developed at IIT Guwahati.**

The invention discloses an economic and eco-friendly resistive type touchpad device designed and fabricated from commonly available materials such as paper, poly-dimethylsiloxane (PDMS), and graphite coating. The touchpad device includes paper based touchpad substrate pair with conductive graphite coating on one side of touchpad substrate surface and dielectric PDMS thin film on the other side of the touchpad substrate surface as a protective coating.
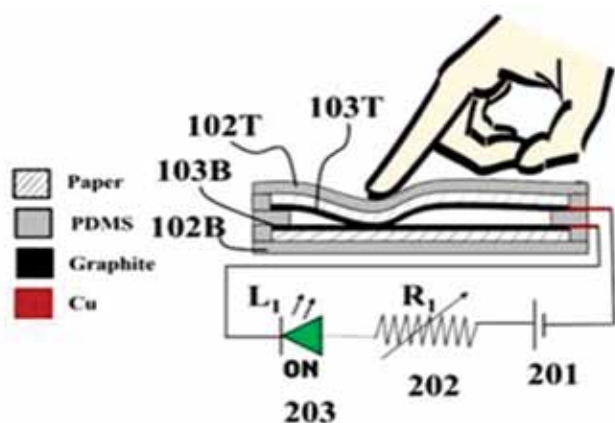
Flexible Paper Touchpads for Low-cost Electronic Appliances

• The A start-up company "Path Shodh" has been incubated by a Ph.D student at IISc Bangalore for the hand held device for monitoring blood based indicators for diabetes.

Hand held device for monitoring blood based indicators for diabetes

5.5.2.1   Smart Warehouses Technology

The technology development and deployment is in progress for safe storage of food grains. This along with moisture measurement & its correction, fumigation process, measurement and concentration of gases etc. are being tried as a pilot project in a Godown of Food Corporation of India (FCI) at Raipur. Along with this an image processing based system is being upgraded to detect various characteristics of rice.

5.5.3   Environmental Pollution Monitoring

• A CO2 gas sensor, with 4 element array for a projected range of 300ppm to 1000ppm, with a resolution of at least 1 ppm with a temperature range of 25oC to 400oC and power consumption of less than 1 watt has been deployed at 20 locations in Bangalore city, using EnviroMote wireless sensing platform

5.5.4   Rehabilitation of Divyang

ICT Centre of Excellence on Tactile Graphics

According to Census 2011, there are more than 5 million visually impaired persons in this country with a significant fraction of them are in Schools and Colleges. A typical text book that is available to visually impaired student in India consists of only text made accessible using Braille while all the diagrams and pictures are removed. This is in sharp contrast to developed countries where process of production of tactile diagrams is well developed and integrated in the education process of visually impaired. This is primarily because of the high cost of production of tactile diagrams. The net impact is that very few visually impaired children in India are able to pursue STEM subjects in school. Centre of Excellence in Tactile Graphics setup at IIT Delhi under the project has developed processes for end to end production of affordable tactile diagrams. Working closely with NCERT, a large number of Science & Mathematics textbooks have been produced and tried out with the visually impaired children studying in both separate blind schools as well as in inclusive schools. IIT Delhi is making efforts to scale up this activity through incubation.
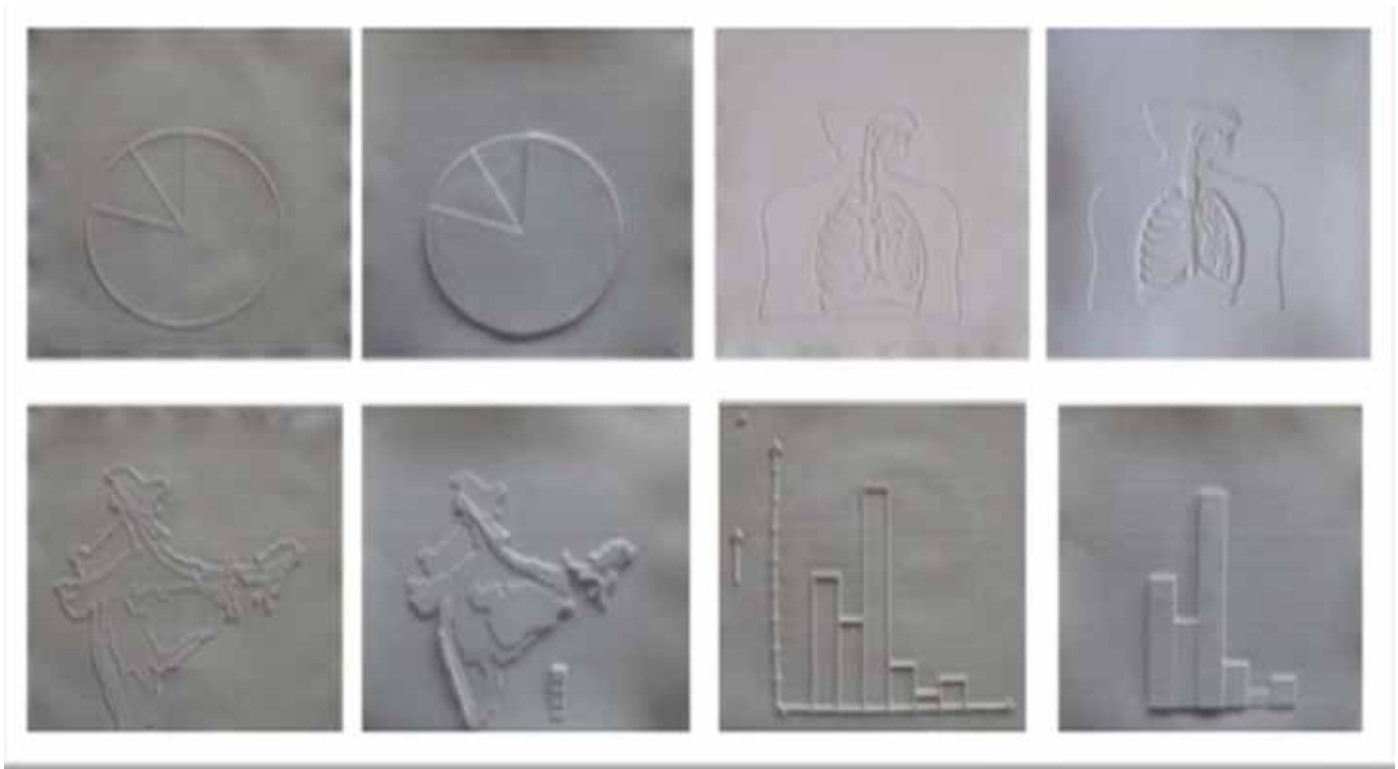
Tactile diagrams and pictures

5.5.5   Societal Misc.

(i)   Design and Development of NavIC Receiver

For effective use of Navigational services based on Indian Constellation of Satellites, named NavIC (Navigation with Indian Constellation), a prototype of Integrated Chip for NavIC Receivers with Multi-Constellation support (i.e. NavIC (L5 and S frequency band) & GPS (L1 frequency band)) for Standard Positioning Service and Restricted Service is being developed by SAMEER Mumbai in collaboration with IIT Mumbai, IIT Madras, IIT Jodhpur & IIST Thiruvananthapuram.
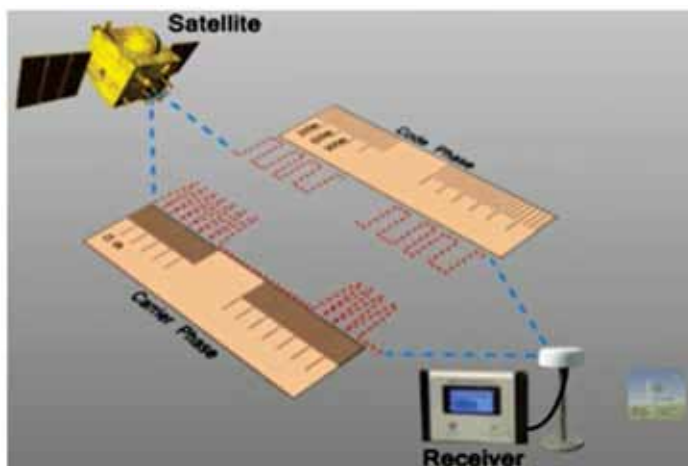
NavIC Receiver
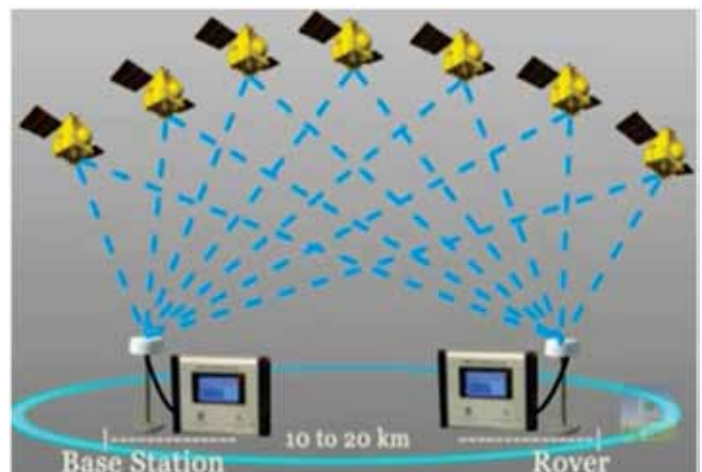
Constellation of 7 Satellites

5.5.5.1 Development and Field Testing of Panic Switch Based Safety Device for Cars for aiding women's safety.

The project, aims at design and development of a tamper proof safety switch for the passengers travelling through public transport like Cabs, Taxis and buses. The first level of prototype as Proof of Concept has been designed, developed and field tested. Prototype has been made for Cabs/Taxis by incorporating the feedback of field trials with advanced features including compatibility with sub-set of AIS (Automotive Industry Standard) standards.

5.5.5.2 Open source Computer Aided Design (CAD) Tools for weaving of Banarasi Sarees.

It is a Computer Aided Design (CAD) package for design of Banarasi sarees and preparation of corresponding punch card for use in Jacquards. This has been developed and deployed at 5 locations at Weaver Service centre/ Community Service Centre, Varanasi. This is an open source application which will help the designer /weavers of Banarasi Sarees in reduction in designing time and enhancement of productivity. The package has been demonstrated to local weavers, professional, industries etc. Weavers/designers/ students have been trained to operate the developed package. Project has been completed.

5.5.5.3 Development of Intelligent Transportation System (ITS) Solution for Pedestrian Safety Enhancement and Emergency Service Vehicle Priority at Signalized Traffic Junctions.

The project envisages development and implementation of ITS solution for Pedestrian Safety Enhancement and Emergency Service Vehicle Priority System at Signalized Traffic Junctions. The Pedestrian Safety enhancement System (PeSCo) enables safe crossing of differently-able pedestrians at motorways by enhancing the crossing time by assessing the level of disability of the pedestrians by detection through Smart Cane and RFID tags. PeSCo also provides audio-visual indication for the pedestrians for safe crossing. Normal users can register their demand for pedestrian signal through Pushbutton Switch. The emergency service vehicle priority system (EmSerV) provides priority green at signalized traffic junction for emergency service vehicle using Vehicle to Infrastructure (V2I) communication. Both the systems have been developed and laboratory tested. The Pedestrian Safety Enhancement System has been evaluated by the faculty and students of 'Government school for the visually impaired, Thiruvananthapuram' and the Emergency Service Vehicle Priority System has been field trialed at Kumarapuram junction, Thiruvananthapuram. Both PeSCo and EmSerV are put live on traffic junction in Thiruvananthapuram city.

Faculty of Government School for the visually impaired, Thiruvananthapuram being trained on PeSCo

5.5.6 Early Detection and Screening of Breast Cancer

Earlier high precision, reliable and fast response nano NTC powder based chip-in-glass thermal sensors were developed under EMCD. These sensors are now being used for development of a system for Early Detection and Screening of Breast Cancer by C-MET which can be used for a low cost initial screening for breast cancer in women by health service sector and only the suspected cases can be referred for further medical investigations such as costly MRI. The uniqueness of this technology is that the mass screening for breast cancer is possible at an affordable rate plus early detection of breast cancer has the potential to achieve 100% cure of the disease. Cost of the developed device comes around 1.5 lakh which comes only 1 by 100th cost of the current digital mammogram machines. No trained manpower is required for the operation of the device. The technology is going through Clinical Trials.

Camp for breast Cancer Awareness by C-MET Thrissur
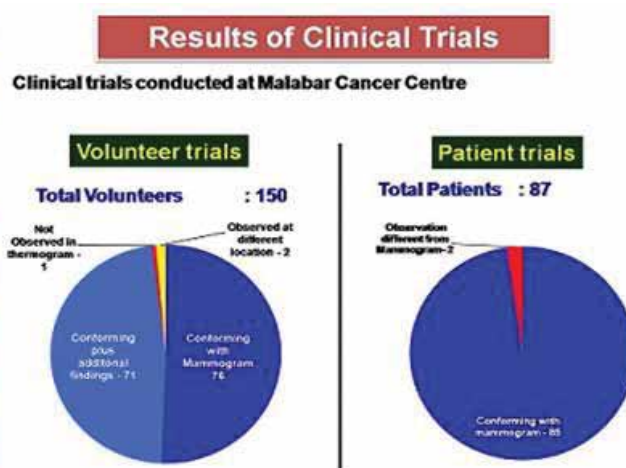
5.5.7 E-waste Recycling:

Recovery of metals from electronic waste: PCBs: The printed circuit board comprises a number of valuable metals and precious metals like copper, gold, silver, palladium and platinum group metals. However, extraction of these metals leads to a number of environmental issues due to the release of toxic materials such as dioxins, furans, brominated compounds and toxic elements such as lead mercury, cadmium and bromine to the environment. C-MET Hyderabad is jointly executing a project with M/s E-Parisaraa, Bangalore financially supported by Ministry of Electronics and Information Technology and Karnataka Institute of Biotechnology and Information Technology for the development of process technology for the recovery of valuable metals from PCBs using environment friendly methods.

Prototype systems for the depopulation, shredding, pyrolysis, calcinations, smelting and electro refining are developed and successfully demonstrated up to 1000 kg per day capacity. A full scale pilot plant is being established alongwith industry partner M/s E- Parisaraa, Bangalore for a capacity of 1 tonne printed circuit boards per day. C-MET technology involves a combination of pyrometallury and hydrometallurgical operations wherein quantity of liquid effluents has been made minimal. Unique flux combination has been arrived at for effective separation of metal and slag. Technology is ready for transfer upto black copper on as-is-where is basis to the interested entrepreneurs. Entire process is environmentally sound as the evolved gases are thermally processed for the complete destruction as per the CPCB norms.
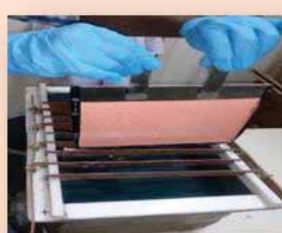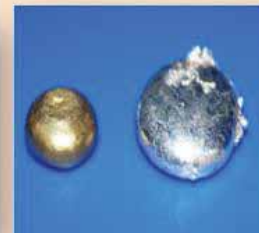
Demonstration of the prototype for PCBs recycling facility at C-MET, Hyderabad and E-Parisara, Bangalore

A patent have been filed on centrifugal type de soldering and depopulation system for separation of solder and components from used printed circuit boards.

- **Electronic waste Awareness programme:** Lack of awareness amongst the citizens about the ill-effect of e-waste recycling in informal sector is one of the serious challenges to our society. An "Awareness Programme on Environmental Hazards of Electronic Waste" has been initiated since March 2015 under the aegis of Software Technology Parks of India (STPI), New Delhi to create awareness among the public about the hazards of e-waste recycling by the unorganized sector and to educate them about alternate methods of disposing their e-waste.

The programme stresses the need for adopting environment friendly e-waste recycling practices. Short modules and films have been created for spreading general awareness about the hazards of the recycling methods being used by the unorganized sector vis-à-vis best practices available for environmentally friendly recycling. The general public would be encouraged to participate in "Swachh Digital Bharat" by giving their e-waste to the authorized recyclers only. A total of 1,23,087 participants from school, colleges, RWA, manufacturer, refurbishers, informal operators etc. have participated in cities including Bhubaneshwar, Guwahati, Imphal. Indore, Kolkata, Moradabad, Panjim, Ranchi, Patna, Puducherry. A dedicated website, twitter

handle and facebook page have been created in order to spread awareness through social media. Also, E-Waste Mass Awareness Campaign through cinema and awareness program for Government officials has also been completed in above ten cities. The campaign through cinema has covered 815 theatres encompassing nearly 7.15 crores audience while more than 2273 government officials all over the country have been trained on e-waste management. The inventory study has been completed in states, namely, Uttar Pradesh, Jharkhand, West Bengal, Odisha, Madhya Pradesh, Goa, Bihar, Puducherry, Assam & Manipur..

Electronic waste Awareness programme

Chapter 6
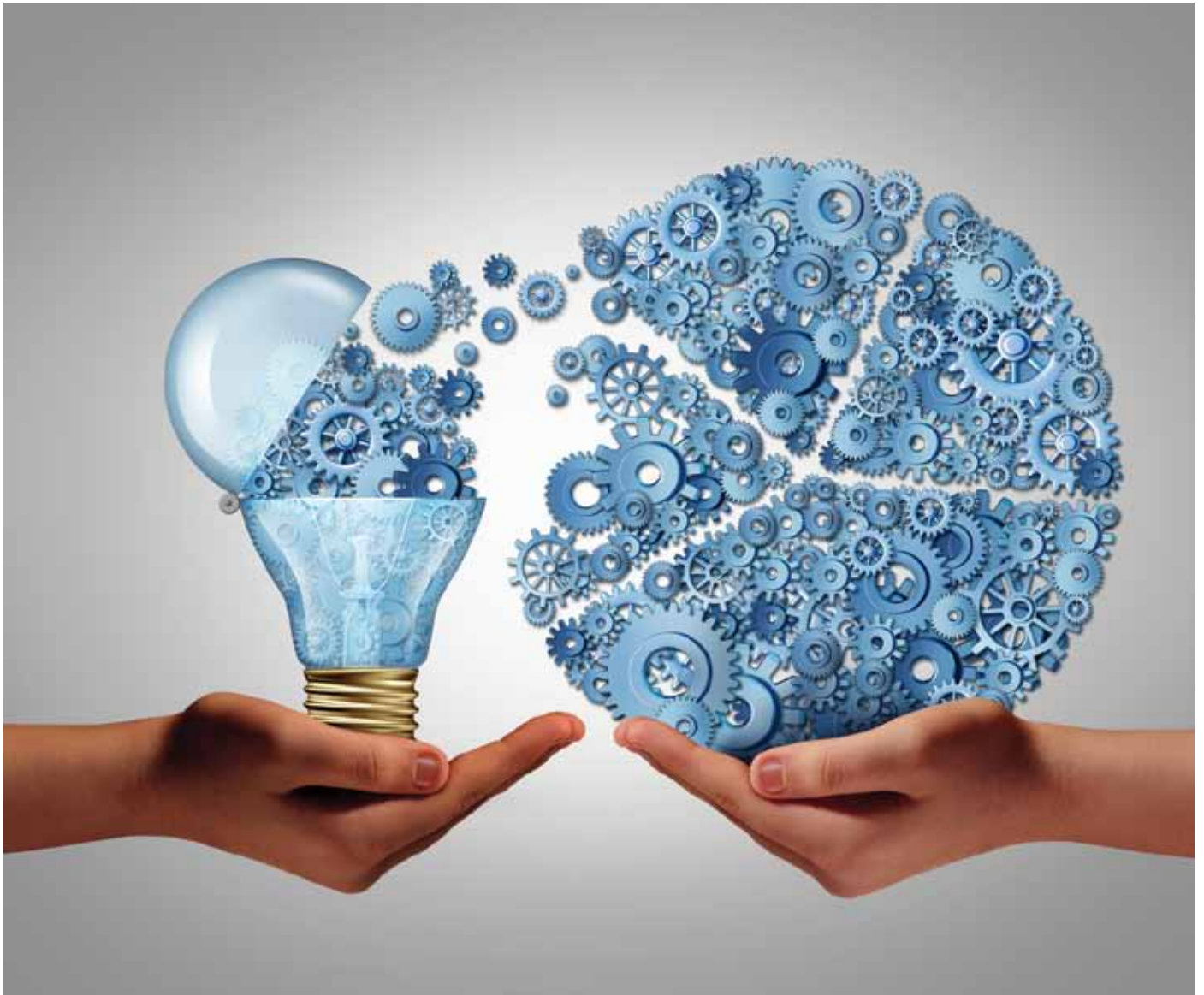
Internet Governance and Security of Cyber Space

6.1   Internet Governance

Overview

Internet Governance, broadly defined, is the development and application by Governments, the private sector and civil society, in their respective roles, of shared principles, norms, rules, decision-making procedures, and programmes that shape the evolution and use of the Internet. It includes development and coordination of technical standards, operation of critical infrastructure and public policy issues.

Conceptually Internet Governance includes following layers

– Physical Infrastructure layer

– Code or Logical layer

– Content layer

– Security Layer

Internet Governance involves Internet Protocol Addressing (IP Addressing), Domain Name System

(DNS), Routing, Technical Innovations, Standardization, Security, Public Policy, Privacy, Legal Issues, Cyber Norms, issues pertaining to Intellectual Property and taxation

6.1.1   Achievements

Some of the significant achievements of MeitY include representation of India's Public Policy Concerns on global platforms, creating awareness on Internet Governance, encouraging greater participation in Internet Engineering Task Force (IETF) Working groups, engagement with Internet Society (ISOC), promotion of Multistakeholder model of Internet Governance within India etc.

6.1.1.1   Engagement in International Forums/ Meetings

i.   **Engagement with ICANN:** MeitY is actively involved with the activity of ICANN (Internet Corporation for Assigned Names and Numbers) and participates in its proceedings through GAC

(Governmental Advisory Committee) and other public engagement fora. The GAC's key role is to advice ICANN on issues of public policy, and especially where there may be an interaction between ICANN's activities or policies and national laws or international agreements. Indian Government comments on various international forums/discussions can be accessed at www.indiaig.in.

ii. IGF - The Internet Governance Forum (IGF) serves to bring people together from various stakeholder groups as equals, in discussions on public policy issues relating to the Internet. India's concerns on the issues of public policy on Internet and its Governance are appropriately voiced in the meetings of the IGF through regular participation, multi-lateral and bi-lateral meetings. With the renewal of its mandate by United Nations in December 2015, the IGF consolidates itself as a platform to bring people together from various stakeholder groups as equals. While there's no negotiated outcome, the IGF informs and inspires those with policy-making power in both the public and private sector at their annual meeting delegates discuss, exchange information and share good practices with each other. The IGF facilitates a common understanding on how to maximize Internet opportunities and address risks and challenges that may arise. IGF 2017 meeting was held from December 17-21, 2017 at Geneva, Switzerland. MeitY represented in IGF 2017.

iii. Multistakeholder Consultations: India supports multi-stakeholder model of Internet Governance, which would involve all stakeholders and helps to preserve the character of the Internet as a unified, dynamic engine for innovation, and which encourage equity and inclusion.

6.1.1.2 The Research, Development and awareness agenda

The Research, Development and awareness agenda that have been undertaken in the area of Internet Governance include:

a) Wireless Internet Protocol enabled time slotted and channel hopping Senior Network (WIPSeN) jointly by C-DAC, Thiruvananthapuram and IISc Bangalore

The Internet Engineering Task Force (IETF) has set up the 6TiSCH group to focus on enabling IPv6 over the Time Slotted Channel Hoping (TSCH) mode of the IEEE 802.15.4e standard. There is immense scope for participating and contributing to the IETF standardization effort for the emerging 6TiSCH architecture which focus real time applications using low power wireless sensor networks, mainly for the industries.

The main activities envisaged in the project are:

• Active participation in the IETF draft proposals in terms of Providing feedback to the 6TiSCH working group discussions through the implementation / experimentation in lab set-up.

• Setting up of a 6TiSCH testbed facility for emulating realistic environments to evaluate the proposed architectures and IETF drafts and developing additional protocol specifications based on the inputs from the IETF WG members, end users comprising of industry, R&D groups and academic community, to evaluate their functionality and performance on the testbed.

• Conducting 6TiSCH workshops to highlight the various activities of the IETF WG and demonstrate the working implementation of related IETF standards to enhance adoption of the same.

Implementing agency actively participated in more than 8 IETF draft proposals. Three drafts that are proposed by the team are:

i. Packet expiration time in 6LoWPAN Routing Header.

ii. Asymmetric AODV-P2P-RPL in Low-Power and Lossy Networks (LLNs).

iii. Scheduling Function One (SF1) for hop-by-hop Scheduling in 6tisch Networks

The IETF draft proposed by the Implementing Agency to IETF on "Packet Delivery Deadline time in 6LoWPAN Routing Header" has been adopted by the 6lo WG.

b) An Ecosystem for Active Participation in Internet Standard Organizations implemented by Centre for Development of Advanced Computing(C-DAC), Bangalore

The primary objective is to get involved in the process of Internet Standard development by developing internal competencies in order to propose & contribute to select areas of Internet Security, create and foster focus groups to work on specific technical issues of interest concerning Internet Standards, propose new standards and contribute to ongoing drafts in areas related to Internet Security, encouraging direct participation in the meetings of the Internet organisations, engaging with academic community (students and faculty), industry and civil society for their participation and making contributions towards Internet organizations, awarding scholarships & fellowships to deserving candidates in order to encourage participation in IETF activities and make efforts to host similar such events in India. Implementing agency is contributing on ongoing Drafts - tls, uta, tokbind, ace, oauth, secevent and Initiating new Draft - Digital Tokens. 16+ awareness programmes have been conducted and IIREF (Indian Internet Research & Engineering Forum) established where 2 expert meetings were organized so far. Total 8 Fellowships awarded to attend IETF meetings so far.

c) Internet Research & Policy Hub- Centre for Communication Governance at National Law University, Delhi

The Centre for Communication Governance (CCG) aims to direct its research expertise at filling the knowledge gaps in internet policy clusters identified by the 2014 UN Commission on Science and Technology for Development (CSTD) mapping report, with a view to build capacity and inform policymaking among Indian stakeholders.

In this regard, policy papers have been prepared and are sent for peer review:

i. To formulate a draft legislation/regulation for improvement in the operation of Country Code Top Level Domains (ccTLDs) including delegation and re-delegation of ccTLDs to feed into the work of the GAC

ii. Potential uses of new gTLD auction proceeds

iii. Existing challenges with ecommerce companies and Legal Framework for Consumer protection online

iv. Privacy and legal concerns with smart cities and required legal Framework-including draft legislations governing CCTV's, and other Networked devices which share data both analog and digital etc.

v. The analysis of existing mechanisms points to a knowledge gap on data and research about taxation on the Internet and to create the legal framework around it.

vi. Impact of the Trade in Services Agreement (TISA) on India's IT Sector.

vii. Protecting Children Online Abuse- Analyzing the existing legal frameworks such as POCSO Act and suggesting required changes.

viii. **Cybercrime and the International Law Framework, including recommendations on what the Indian approach could be.**

ix. Data Protection Guidelines for Digital India Programme.

x. There exists a policy gap due to a lack of widely accepted standards on digital signatures that will ensure global compatibility, reduce transaction complexity, and facilitate faster development of e-commerce. There is a felt need for a universally acceptable legal framework for global acceptance of digital signatures/e-sign.

xi. Protecting Women Rights Online and the required legislative measures.

d) "Activities related to India Internet Governance Forum (IIGF)" carried out by the National Internet Exchange of India (NIXI)

The major objectives include:

i. To provide a space for multi-stakeholder dialogue among Governments, the private sector, the technical community, academia and civil society organizations on the issues related to Internet and Internet based services/applications;

ii.	To inform the India's stakeholders on the issues and trends observed in the debates and discussions of the global IGF;

iii.	To consolidate India's views and initiatives on the issues of concern for Internet Proliferation and its Governance that could be highlighted in the Internet Governance Forum meetings;

iv.	To arrive at national strategies and action plan for proliferation and governance of Internet and Internet based services in the country;

v.	To deliberate on policy areas vis-à-vis Internet for Governance and inclusive development.

Approximately 11 multistakeholder consultation have been conducted on various issues like IETF capacity building, CCWG accountability, IANA transition, WSIS+10 review, New gTLD programme, WHOIS, 3 letter country and territory name etc.

Studies on various discussions have been conducted for providing inputs/comments on various technical and public policy issues at global forum like WGEC, IGF and GAC/ICANN. Considerable efforts have been made in the areas of Internationalised domain names and Universal Acceptance.

**e)	"MeitY Chair for Internet Policy: Value, Security and Governance" implementing by Indian Council for Research on International Economic Relations (ICRIER).**

The objective is to provide MeitY with evidence based research that will build capacity for India's participation in multiple international fora while strengthening domestic policy. The research and related activities will be conducted under three broad themes

a.	Assessing the value generated by the Internet

b.	Enabling a secure and open Internet

c.	Developing a framework for Internet governance

## 6.2	National Internet Exchange of India (NIXI)

NIXI is a not for profit organization set up under section 25 of the Companies Act, 1956 (now section 8 under Companies Act, 2013) for peering of ISPs among themselves and routing the domestic traffic within

the country, with seed funding from Department of Information Technology. NIXI is performing the following three activities.

•	Internet Exchange

•	.IN Registry and Internationalized Domain Names (IDNs)

•	National Internet Registry (NIR)

Internet Exchange: Eight Internet Exchange Nodes are functional at Delhi (Noida), Mumbai, Chennai, Kolkata, Bengaluru, Hyderabad, Ahmedabad and Guwahati. The Internet Exchange nodes have been successful in ensuring peering of ISPs among themselves for the purpose of routing the domestic traffic within the country, instead of taking abroad, thereby resulting in better quality of service (reduced latency) and reduced bandwidth charges for ISPs by saving on International Bandwidth. The maximum volume of Internet traffic being handled by NIXI at present is 123 Gbps. All functional NIXI nodes are IPv6 ready. NIXI also undertakes training and workshop for Network managers and other Technical engineers in co-operation with Asia Pacific Network Information Centre (APNIC).

.IN Registry and Internationalized Domain Names (IDNs): Since 2005, NIXI also manages the .IN Registry (www.registry.in). At present, 119 Registrars have been accredited to offer .IN domain name registration worldwide to customers This has helped proliferation of web hosting in the country and promotion of Indian language content on the Internet. Over 19.45 lakh .IN Domain names have been registered till February 2018.

IDN's in Hindi, Bodo, Dogri, Konkani, Maithili, Marathi, Nepali Sindhi, Bangali, Gujarati, Manipuri, Punjabi, Tamil, Telugu and Urdu languages were launched during the year 2014-15 and over 25000 IDNs domain names have been registered till date. NIXI has recently got delegation of all remaining languages (Assamese, Kannada, Malayalam, Oriya, Sanskrit, and Santali in Devanagari Script and Kashmiri & Sindhi in Perso-Arabic Script) from ICANN

National Internet Registry (NIR) : Since March, 2012 NIXI is also running the National Internet Registry (NIR) for India named as Indian Registry for Internet Names and Numbers (IRINN). IRINN is responsible

for allocation of IP addresses and ASN(Autonomous System Numbers) within the country. As on February 2018. over 2401 affiliates have joined IRINN. Out of 2401 Affiliates, 379 affiliates have taken IPv6 as well as IPv4.

6.3 Security of Cyber Space

Web and social media have emerged as one of the important public communication channels. It brings social groups together in one virtual place for interaction in real time. Cyberspace today is the common tool used by citizens, civil society, businesses and Governments for communication and dissemination of information.

Cyberspace has distinct and unique characteristics as compared to physical space.The cyberspace is virtual, borderless and offers complete anonymity. As a result, attacks can be launched from anywhere in the world with limited possibility of trace back and positive attribution.

Cyberspace has been facing many security challenges due to emerging cyber threats. Security of cyber space has become important and focussed area. Government of India has taken several initiatives as legal, technical and administrative policy measures for addressing cyber security. This includes National Cyber Security policy (2013), Framework for enhancing Cyber Security (2013), enactment of Information Technology (IT) Act, 2000 and setting up of CERT-In and National Critical Information Infrastructure Protection Centre (NCIIPC) under the IT Act, 2000.

6.3.1 Cyber Law

Comprehensive legal framework in terms of IT Act 2000 and its amendment provides for:

Stakeholders' consultation At Bengaluru and Hyderabad

- Collection and sharing of information related to cyber incidents (sections 69B & 70B) for effective proactive/reactive actions by CERT-In and investigative actions by law enforcement agencies

- Prescription and implementation of security best practices and guidelines to prevent occurrence and recurrence of security incidents (section 43A & 70B (Protection of critical information infrastructure (section 70A)

- Effective deterrence provisions (sections 43, 43A, 66, 66B, 66C, 66D, 66E, 66F, 72 & 72A) in terms of compensation and punishment to deal with cyber crime such as cyber terrorism, online pornography including child pornography, criminal act using computer, identity theft, cheating by personation, violation of privacy, breach of confidentially and privacy, breach of lawful contract etc.

Data Protection Framework

MeitY has been mandated to develop a Framework for Data Protection Law for protection of online personal data. In this regard, the Government of India has constituted a Committee of Experts under the Chairmanship of Shri B.N. Srikrishna, Former Judge, Supreme Court of India comprising of members from Government, Academia and Industry to study and identify key data protection issues and recommend methods for addressing them. The Committee, after several deliberations, has put out a White Paper on Data Protection Framework for India and has sought public comments. The Committee also conducted stakeholders' consultation meetings at various cities.

Expert Committee Meeting on Data Protection

6.3.2 National Cyber Security Policy

National Cyber Security Policy was released for public use in July 2013. The Policy caters to the cyber security requirements of Govt. and non-Govt entities as well as large, medium & small enterprises and home users. The policy recognises the need for objectives and strategies that need to be adopted both at the national level as well as international level. This policy aims at facilitating creation of secure computing environment and enabling adequate trust and confidence in electronic transactions and also guiding stakeholders' actions for protection of cyber space. Considering the developments in cyber technology, delivery of services through cyber space and the changing nature of cyber threats over the years, Government is in the process to review the National Cyber Security Policy.

6.3.3 Indian Computer Emergency Response Team (CERT-In)

CERT-In is a statutory organisation under Ministry of Electronics and Information Technology, Government of India. CERT-In has been designated under Section 70B of the Information Technology Act, 2000 to serve as the national agency to perform the following functions in the area of cyber security:

- Collection, analysis and dissemination of information on cyber security incidents

- Forecast and alerts of cyber security incidents

- Emergency measures for handling cyber security incidents

- Coordination of cyber security incident response activities

- Issue guidelines, advisories, vulnerability notes and white papers relating to information security practices, procedures, prevention, response and reporting of cyber incidents

- Such other functions relating to cyber security as may be prescribed.

CERT-In creates awareness on security issues through dissemination of information on its website (http:// www. cert-in.org.in) and operates 24x7 incidence response Help Desk. CERT-In provides Incident Prevention

and Response services as well as Security Quality Management Services. The activities carried out by CERT-In during April 2017- February, 2018 comprised of the following:

Activities	Numbers (April 2017 to February 2018)
Incidents handled	69539
Security Alerts/ Incident Notes	55
Advisories	49
Vulnerability Notes	174
Trainings	20
Indian Website Defacement tracked	23282
Security Drills	7

Cooperation and Collaboration

Strengthening International cooperation to effectively deal with cyber security issues has been one of the main focus areas of the Government. As such, this aspect is being dealt with by way of security cooperation arrangements in the form of Memorandum of Understanding (MoU) between Indian Computer Emergency Response Team (CERT-In) and its overseas counterpart agencies that are willing to work together and share information in a timely manner for preventing cyber crimes and cyber attacks as well as collaborating for providing swift response to such incidents. At present such MoUs have been signed with counterpart agencies / CERTs of United States of America (USA), United Kingdom, Japan, South Korea, Australia, Malaysia, Singapore, Canada, Vietnam, Uzbekistan and Bangladesh. CERT-In is regularly coordinating with leading service providers and product vendors within and outside the country to obtain advance information on latest cyber threats and attack trends and devise appropriate proactive and prevent measures.

CERT-In under the aegis of Ministry of Electronics & Information Technology hosted the Asia Pacific CERT (APCERT) Annual General Meeting and Conference 2017 during 12-15 November 2017 in New Delhi India. During the Annual General Meeting, CERT-In, for the

Hon'ble MEIT Sh. Ravi Shankar Prasad along with Sh. K.J. Alphons Hon'ble MoS E&IT inaugurating Asia Pacific CERT (APCERT) Annual General Meeting and Conference 2017 during 12-15 November 2017 in New Delhi.

first time, was elected as a member of APCERT Steering Committee. CERT-In will also lead two new working groups across APCERT, namely "IoT Security working group" and "Secure Digital Payments working group".

Cyber Security Assurance

Under Security Assurance Framework, CERT-In has created a panel of 'IT security auditing organisations' for auditing, including vulnerability assessment and penetration testing of computer systems , networks & applications of various organizations of the Government, critical infrastructure organizations and those in other sectors of Indian economy. CERT-In has empanelled 67 auditors, to carry out information security technical audit, including the vulnerability assessment and penetration test of the networked infrastructure of government and critical sector organizations. Government and critical sector organizations are implementing the security best practices in accordance with ISO 27001 standard and as per the advice issued by CERT-In and compliance verification by the empanelled auditors.

Cyber Crisis Management Plan

Government has formulated a Cyber Crisis Management Plan (CCMP) for countering cyber

attacks and cyber terrorism for implementation by all Ministries/Departments of Central Government, State Governments/UTs and their organizational units in critical sectors. In addition, guideline documents and templates have been published to assist development and implementation of sectoral Crisis Management Plans. CCMP for countering Cyber-Attacks and Cyber Terrorism is updated periodically on annual basis to take into account changing scenario of cyber threat landscape. CERT-In has conducted 8 workshops since April- 2017 to appraise various organizations under the Central Ministries/States/UTs about the CCMP implementation. Till date, 54 CCMP enabling workshops have been conducted. Necessary guidance and assistance is being provided to Ministries/Departments of Central Government, State Governments/UTs and their organizational units with regards to implementation of CCMP.

Cyber Security Exercises

Cyber Security Mock Drills are being conducted by CERT-In to help the organisations to assess their preparedness to withstand cyber attacks. These drills have helped tremendously in improving the cyber security posture of the information infrastructure and

training of manpower to handle cyber incidents, besides increasing the cyber security awareness among the key sector organizations. Till date CERT-In has conducted 25 Cyber security drills of different complexities, including table top exercises, with participation from more than 300 organizations covering various sectors of Indian economy from Government/Public/ Private i.e. Defence, Paramilitary forces, Space, Atomic Energy, Telecommunications(ISPs), Finance, Power, Oil & Natural Gas, Transportation(Railways & Civil Aviation), IT/ ITeS/ BPO sectors and State Data Centres. 4 such drills have been conducted in June 2017 covering ransomware scenarios to enhance preparedness of organisations for such threats. CERT-In conducted a joint cyber security mock drill with the Directorate General of Civil Aviation for incident response on October 3, 2017. A workshop and table top exercise for cyber crisis situation was carried out on August 11, 2017 and December 21, 2017 for all the Indian Ports along with Indian Ports Association under the Ministry of Shipping and ISRO respectively. Joint Cyber Security Drill by CERT-In & RBI was successfully conducted on November 17, 2017 for various commercial banks to enable them to assess their emergency incident response preparedness including for Web application, phishing and BharatQR code attacks. Parallel Test bed facility for CERT-In has been established at Indian Institute of Science, Bangalore to provide support in conducting cyber security exercises.

CERT-In participated in the ASEAN CERTs Incident Response Drill (ACID) in September 2017 wherein the objective was strengthening cyber security preparedness of ASEAN member states and Dialogue partners in handling cyber incidents and reinforce regional coordination to test incident response capabilities. This year the theme of the drill was handling incidents of Ransomware.

CERT-In participated in The Organisation of The Islamic Cooperation – Computer Emergency Response Teams (OIC-CERT) drill in September 2017. This year the theme of the drill was Encountering Cyber Terrorism and Human Trafficking.

CERT-In participated in the APCERT Drill 2017 conducted in March 2017 based on the theme "Emergence of a New DDoS Threat" to test the response capability of leading Computer Security Incident Response Teams (CSIRT) from the Asia Pacific economies.

Security awareness, skill development and training

In order to create security awareness within the Government, Public and Critical Sector organisations, CERT-In regularly conducts trainings / workshops to train officials of Government, critical sector, public sector industry, financial & banking sector on various contemporary and focused topics of Cyber Security. During 2017-18, CERT-In has conducted 16 trainings (including a separate training programme for women IT officers) on various specialized topics of cyber security (Till January). 470 officers including system/Network Administrators, Database Administrators, Application Developers, IT Managers, Chief Information Security Officers (CISOs)/ Chief information officers (CIOs), and IT Security professional have been trained.

CERT-In in collaboration with Securities and Exchange Board of India (SEBI) and The Insurance Regulatory and Development Authority of India (IRDA) conducted a workshop for 180 participants on cyber security and incident response for Financial Sector Organsiations.

Cyber Forensics

CERT-In is equipped with the tools and equipment to carry out retrieval and analysis of the data extracted from the digital data storage devices using computer forensics and mobile device forensic techniques. CERT-In's facility for Digital Forensics data extraction and analysis is being utilised in investigation of the cases of cyber security incidents and cyber crimes, submitted by central and state government ministries, departments, public sector organisations, law enforcement agencies, etc. CERT-In imparts training through training workshops organised by CERT-In on computer forensics and mobile device forensics through lectures, demonstrations and hands on practical sessions, which covers seizing, preservation, imaging and analysis of the data retrieved from the digital data storage devices. CERT-In also provides support to the other training institutes in imparting training by delivering lectures with demonstrations on various aspects of cyber forensics.

National Cyber Coordination Centre (NCCC)

Evolving cyber threat landscape and its impact on well being of Information Technology and National economy, necessitates the need for near-real time situational awareness and rapid response to cyber security incidents. Realizing the need, Government has initiated actions to set up the National Cyber Coordination Centre (NCCC) to generate macroscopic views of the cyber security breaches and cyber security threats in the country. NCCC is a multi-stakeholder body and is being implemented by Indian Computer Emergency Response Team (CERT-In) at Ministry of Electronics and Information Technology (MeitY).The centre will work with various organizations and entities in the country to counter and mitigate attacks and cyber incidents on a near real time basis. The phase-1 of NCCC has been operationalised in July, 2017.

Cyber Swachhta Kendra (Botnet Cleaning and Malware Analysis Centre)

Cyber Swachhta Kendra (Botnet Cleaning and Malware Analysis Centre) has been established by the Government for detection of systems infected by malware/botnets in the country and to notify, enable cleaning and securing systems of end users to prevent further malware infections.

The Cyber Swachhta Kendra was launched on 21 February 2017. The website of the centre is "www.cyberswachhtakendra.gov.in".

The centre is working in close coordination and collaboration with Internet Service Providers, Academia and Industry and providing detection of malicious programmes and free tools to remove the same for common users and Banks. Number of downloads of tools by users is 7,05,167 as on 28th February, 2018.

Security of digital payment systems

- CERT-In issues alerts and advisories regarding latest cyber threats/vulnerabilities alongwith countermeasures to create awareness among stakeholders to take appropriate measures to ensure safe usage of digital technologies. Regarding securing digital payments, 27 advisories have been issued for users and institutions.

- All authorised entities/banks issuing Prepaid Payment Instrument (PPI) in the country have been advised by CERT-In through the Reserve Bank of India to carry out security audit by the empanelled auditors of CERT-In on a priority basis and to take immediate steps thereafter to comply with the findings of the audit report and ensure implementation of security best practices.

- All organizations providing digital payment services have been mandated to report cyber security incidents to CERT-In expeditiously.

- Two workshops have been conducted regarding security of digital payments for participants from banks, Internet Service Providers and entities offering Prepaid Payment Instruments.

- CERT-In sensitized 38 Chief Information Security Officers of Banks regarding the threat trends and scenarios in the banking sector at The Institute for Development and Research in Banking Technology (IDRBT).

- Cyber security awareness sessions have been recorded under the DigiShala Awareness Campaign, a free Doordarshan DTH channel, for educating citizens and creating awareness amongst internet users to sensitize measures to be taken to protect against online frauds.

Upgrading of the technical Infrastructure

Additional bandwidth with Distributed Denial of Service (DDoS) prevention feature has been added to the infrastructure, to prevent potential attacks and better allocation of browsing as well as downloading speed to the users. Latest version of mail messaging is being tested and shall be integrated with the network. Reverse proxy servers are deployed for faster and secure response. Disaster recovery site has been integrated with the main site for online replication of real time data. Link balancers have been introduced at the disaster recovery site for better management of bandwidth and for maximizing security.

6.4. Initiatives towards Security in Digital Payments

Cyber Security Activities Pertaining to DigiDhan Mission

A primary objectives of the mission is to ensure security of digital payments ecosystem. As part of ensuring cyber security of the system, it is necessary to continuously evaluate the digital payments ecosystem on basis of key security regulations & guidelines defined by RBI and CERT-IN. Also, such guidelines are required to be periodically evaluated and enhanced due to advancement of technology and platforms.

Since the inception of DigiDhan mission, the threat landscapes has also evolved and accordingly, following efforts have been taken to address cyber security concerns and risks in the area of digital payments:

➢ **Cyber Incident Analysis – Related to Digital Payments**

A detailed analysis of banks' cyber incidents reported to CERT-In, was conducted. In the analysis, the types of attacks were categorized into seven types – Phishing, Distributed Denial of Service (DDoS), Ransomware, Network Scanning, Website Defacement, Malicious code / virus and website intrusion. The incident profile was created for each type of attacks, detailing out threat vectors and impacts. Key actions were identified for sharing with banks. Banks were advised to develop a constantly evolving risk assessment and mitigation strategy pertaining to online transactions by introducing a risk monitoring and review programme. Banks were also advised on need to up the ante in their strategies pertaining to cyber security user awareness.

➢ **Threat Analysis related Bharat QR code**

Since Bharat QR code is a policy favored instrument it is necessary that all security threats relating to Bharat QR code have to be understood and analyzed. Hence,

a detailed threat analysis of Bharat QR security aspects was conducted, comprising of following activities:

A. Identification of threat vectors and Security aspects:

Global attacks pertaining to QR code scan and pay feature were studied for China and Russia. As outcome of study, four types of threat vectors were identified – Phishing Attacks also known as QRishing, Malware Software Distribution, Browser Exploits and Attacks resulting from obtaining privileged access to the device. Based on the actions taken in other countries to secure the QR code payment ecosystem, six main aspects were considered: Encryption, Authentication, Detection of Correct QR Code, Retaining control of the Final payment infrastructure, User cyber security awareness and Dispute handling mechanism at the bank's or payment service provider's end.

B. Cyber Security Drill by CERT-In & RBI was

successfully conducted on November, 17, 2017 for commercial Banks to enable them to assess their emergency response preparedness against Bharat QR Code attacks.

C. Evaluation of Security guidelines listed by NPCI:

NPCI plays a critical role in maintenance of digital payments infrastructure in the Country. It is essential that NPCI is equipped with security layers to adequately mitigate security risks. A detailed questionnaire was sent to NPCI for assessment of security aspects of the BharatQR Code architecture. It included the information related to various security aspects including Encryption and Signage within the BharatQR Code architecture, Applications allowed to access BharatQR Code, Security guidelines issued by NPCI for securing BharatQR Code, Certification provided by NPCI for applications accessing BharatQR Code.

D. Evaluation of BharatQR Security aspects at Banks

Existing and newly initiated security measures taken at Banks pertaining to BharatQR code, were benchmarked across four aspects – Authentication, Security of mobile devices, Network security, Incident response and User awareness and business continuity plans. The assessment was performed for four banks, as a sample study to understand the security gaps.

E. Recommendations:

Recommendations that surfaced from the analysis pointed at enhancement of user awareness, defining the dispute handling mechanism, creation of crisis management plan, inclusion of encryption and signage in BharatQR code architecture, update of RBI security guidelines on Scan and Pay functionality.

➢ Cyber Security Awareness Plan :

In addition to the promotion of transactions, it is necessary that Cyber Security awareness be spread to ensure that with increasing scale of transactions, cyber security awareness levels also rise and reach deeper into the society and the relevant employees in the stakeholder organizations. Considering this, a cyber security awareness plan has been developed which involves strategies for awareness, training and education.

Future Benefits

Digitization has been affecting our lives in a revolutionary way, be it the Government, merchants or citizens and the same applies to payments also. The cost of cash management is a huge component of the operational expenditure the Government has to bear, which can only be brought down by greater adoption of digital payments. The impact on the economy further inclines towards the positive side, when we see that the float reduces considerably, while the tax base widens. From a citizen standpoint, by participating in digital payment / transactions with persistent consumption, the access to credit becomes easier. In the past, most merchants had to avail credit from informal sources at unviable rates of interest. In future, with digital payment, we will be moving to a system there will be flow credit availability to the individuals thereby enabling them to join the financial mainstream by becoming active participants in the formal financial sector. Gradually, the ecosystem matures further and results in a virtuous economic cycle translating into an uplift for all sectors with concomitant job creation.

6.5 Cyber Surakshit Bharat

MeitY has partnering with industry consortium and initiated a national level programme "Cyber Surakshit Bharat". The objective of this programme is to educate & enable the Chief Information Security Officers (CISO) & broader IT community to address the challenges of cyber security. The training will be conducted in 5 to 6 cities over a period of one year to train and enable around 1200 officials working in Central/State Governments, Banks and PSUs. The programme has been launched on 19th January, 2018 by Shri Alphons Kannanthanam, Hon'ble Minister of State for Electronics and Information Technology.

6.6 Global Conference on Cyberspace 2017

23-24 November 2017

The Global Conference on Cyber Space (GCCS) is a prestigious global event bringing together international leaders, policymakers, industry experts, think tanks, cyber wizards to deliberate on issues and challenges for optimal utilization of cyber space. GCCS was launched with a view to establish internationally agreed 'rules of the road' for behavior in cyberspace, and create a more focused and inclusive dialogue between all those with a stake in the internet (governments, civil society and industry) on how to implement them.

India became the first non-OECD country to host GCCS in 2017 and became a part of the Sextet of countries (UK, Hungary, South Korea, Netherland and USA). The main theme of GCCS 2017 was

"Cyber4All: A Secure and Inclusive Cyberspace for Sustainable Development". The GCCS2017 was inaugurated by Hon'ble Prime Minister of India, Shri Narendra Modi. He alluded to Indian philosophical dictum of Vasudhaiv Kutumbakam for universal inclusion through technology and need for information sharing. His appeal for coordination among nations to counter cyber threats found wide acceptance. Hon'ble Prime Minister of Sri Lanka, Shri Ranil Wickremesinghe emphasized on persisting with net neutrality and on striking balance between individual freedom and free flow of information through good governance. Smt. Sushma Swaraj, Hon'ble External Affairs Minister of India, stated that GCCS2017 will be remembered for the rich debate, widely enthusiastic participation and the launch of India initiative of Digital Knowledge Sharing Platform. Shri Ravi Shankar Prasad, Hon'ble Minister for Electronics & IT of India, emphasized on bridging digital divide through inclusion and empowerment by providing technologies which are developmental & affordable. He projected India as voice of assertion for the digitally marginalized.

Hon'ble MEIT Shri Ravi Shankar Prasad receiving Hon'ble Prime Minister of India on his arrival for Inaugural Ceremony of Global Conference on Cyber Space 2017

Goal and Objectives

GCCS 2017 was held in India for the first time with the goal to promote an inclusive Cyber Space with focus on policies and frameworks for inclusivity, sustainability, development, security, safety & freedom, technology and partnerships for upholding digital democracy, maximizing collaboration for strengthening security and safety and advocating dialogue for digital diplomacy. The main theme of GCCS 2017 was

"Cyber4All: A Secure and Inclusive Cyberspace for Sustainable Development".

Main Events and Side Events

• GCCS2017 was inagurated by Hon'ble Prime Minister of India in the presence of Hon'ble Prime Minister of Sri Lanka.

• There were 3 plenary and 16 parallel sessions in the main Event. Due to tremendous demand for sessions during the main Event, it was decided to hold 16 Curtain Raiser Events also for the first time in the history of GCCS. There were 31 run up events which too is unprecedented. All plenary and parallel sessions were centred around theme and subthemes namely Cyber4Growth, Cyber4DigitalIncllusion, Cyber4Security and Cyber4Diplomacy.

• The closing sharing was graced by the Minister of External Affairs, GoI.

GCCS 2017

Record Participation in GCCS2017

GCCS2017 was much bigger in size and outrea compared to previous 4 GCCSs. 132 nations participated in New Delhi as against 98 nations in the last edition. Huge participation has taken place from developed nations including 265 persons from G20 countries. From USA alone, 55 distinguished persons came despite November 23 being ThanksgivingDay.

There were 3862 participants during 4 days of Curtain Raiser and Main Event which is more than twice compared to the GCCS at The Hague. There was virtual outreach through up to 2800 VC/ Webinar locations at a time.

Outcomes of GCCS2017

Along with being the first non-OECD country to host the GCCS, India became part of the Sextet of countries (UK, Hungary, South Korea, Netherland and India + USA) hosting GCCS. There was knowledge sharing among international leaders, policymakers, industry experts, think tanks, cyber wizards.

The tangible outcomes of the GCCS are as follow:

oIndia Book on transformation ICT based success stories, Book on Global Innovations in Cyberspace, Dedication of UMANG to the nation, the Chairman's Statement and Institutionalization of Digital Knowledge Sharing Platform.

Launch of UMANG by Hon'ble Prime Minister Shri Narendra Modi during GCCS2017

Photo of Political Leaders of participating countries in GCCS2017

Chapter 7
Skill India: Capacity Building

7.1 Skill India

Human Resource Development activities of MeitY are targeted to ensure availability of trained human resources for the manufacturing & service sectors of electronics and IT industry. Initiatives include identifying gaps emerging from the formal sector and planning programmes in non-formal and formal sectors for meeting these gaps. This includes Skill Development in the domain of Electronics & IT and related areas. In the succeeding sections, brief details about various ongoing initiatives including skill development and indicative list of major Schemes/Projects are presented.

The Skill Development activities of the Ministry are primarily being taken up by its two autonomous societies viz. National Institute of Electronics and Information Technology (NIELIT, previously known as DOEACC) and Centre for Development of Advanced Computing (C-DAC). In addition, the various organizations / attached offices under the Department viz. ERNET India, Digital India Corporation, CSC & E-Governance Services India

Limited, STQC, NIC etc. are also engaged in training of various stakeholders in small numbers.

The following schemes/activities pertaining to Human Resource Development for Electronics and ICT sector have been targeted and have been approved/ under implementation:

7.1.1 Post Graduate and Doctorate Level

VIsvesvaraya PhD Scheme for Electronic System Design & Manufacturing [ESDM] and IT/IT Enabled Services [IT/ITeS]

The objective of the Visvesvaraya PhD Scheme is to generate 1500 PhDs for each of Electronics System Design & Manufacturing (ESDM) and IT/ITeS sectors over a period of five years. This would promote innovation and development of new products in these areas. 500 PhD scholars for each ESDM and IT/ITeS sectors would receive fellowship support over a period of 5 years and other 1000 enrolled/registered candidates for each ESDM and IT/ITES would receive

one time incentive. This would encourage working professional and non PhDs faculty members to pursue PhD in these technology areas. In addition, 200 Young Faculty research Fellowships would be provided to encourage and recognize the eligible Young Faculty, involved in research and technology development in ESDM and IT/ITeS areas, to retain as well attract young faculty in academia.

The scheme is initiated for a period of five years for selecting the PhD candidates for support under the scheme. However the funding would be continued till th year for the commitments made during the scheme period. The scheme is being implemented with a total estimated budget of ₹466 crore.

As on 28st February 2018, a total of 1160 PhD (970 Full Time and 190 Part Time) scholars are pursuing PhD at various academic institutions of the country. The academic committee also approved Young Faculty research Fellowships to 128 young faculties at various academic institutions across the country.

7.1.2 Graduate level

Scheme of Financial Assistance for setting up of Electronics and ICT Academies

The objective of the scheme is to set up seven (07) Electronics and ICT Academies as units in IITs, IIITs, NITs, etc., for faculty/mentor development/upgradation to improve the employability of the graduates/diploma holders in various streams, through active collaboration of States/UTs with financial assistance from the Central Government. Electronics and ICT Academies are aimed to provide specialized training to the faculties of the Engineering, Arts, Commerce & Science colleges, Polytechnics etc, by developing state-of-the-art facilities. Out of the Seven(07) Academies, Five(05) Academies have been setup in Category 'A' at IIT Kanpur (Uttar Pradesh), IIT Guwahati (Assam), NIT Patna (Bihar), NIT Warangal (Telangana) and IIITD&M, Jabalpur (Madhya Pradesh) with an annual target to train 4000 faculty each. Further two (02) Academies have been setup in Category 'B' at IIT, Roorkee (Uttarakhand) and MNIT, Jaipur (Rajasthan) with an annual target to train 1600 faculty each. These Academies have become operational and conducting various faculty

development programmes in Electronics and ICT. As on 28th February 2018, 347 faculty Development Programmes (FDPs) covering 13,220 participants have been conducted by these Academies.

7.1.3 Vocational, Skill development level

(i) **Two Schemes on Skill Development in ESDM sector** have been approved:

(a) **Scheme for financial assistance to select States/UTs for Skill Development in ESDM sector**

The Scheme has been approved with a target of skilling 90,000 candidates (at 5 levels) up to March 2019. The Scheme is under implementation in Eight (08) States viz. Andhra Pradesh (50% target) Telangana (50% target), Jammu & Kashmir, Karnataka, Kerala (for 3 levels only), Punjab (for two levels only), Uttarakhand and Uttar Pradesh.

(b) **Scheme for 'Skill Development in ESDM for Digital India'**

This expanded Scheme has been approved with a target of skilling 3.28 lakh candidates up to March 2019 for implementation in 32 States/UTs.

Under the above two Schemes, training is imparted in 59 National Standard Qualification Framework (NSQF) aligned courses through 1885 training partners duly registered with National Institute of Electronics and Information Technology (NIELIT)/ Electronics Sector Skill Council of India (ESSC)/ Telecom Sector Skill Council of India (TSSC). As on 28th February, 2018, under both the above Schemes, a total of 2.83 lakh candidates have been enrolled for training in various States/UTs, out of which 1.76 lakh candidates have been certified.

(ii) **'Skill Development in Electronics Hardware' being implemented by NCPUL/NIELIT Chandigarh**

Under this project, a One-year Diploma course is conducted jointly by National Council for Promotion of Urdu Language (NCPUL) and NIELIT, Chandigarh with a target of training 10,000

candidates. The training is being conducted at 50 select NCPUL centres, where requisite training facilities has been set up and trained faculty has been provided by NIELIT. As on 14th December 9,747 candidates have been enrolled under the programme, out of which 7,696 candidates have been trained and 5,820 candidates have been certified.

(iii) Efforts to generate greater participation of Industry through Sector Skill Councils – Electronics, Telecom, IT/ITeS

MeitY is actively associating and supporting the various skill development activities of the following Sector Skill Councils (SSCs) concerning the domains addressed by this Ministry:

i. Sector Skill Council: Electronics

ii. Sector Skill Council: IT-ITeS

iii. Sector Skill Council: Telecom

iv. Sector Skill Council: Health (for Medical Electronics)

v. Sector Skill Council: Automotive (for Automotive Electronics)

The above Sector Skill Councils have taken up various courses for skilling of candidates in their respective domains.

iv) Special Manpower Development Programme in Chips to System Design (SMDP-C2SD)

An umbrella Programme has been initiated under 'Digital India Programme' in December 2014 for duration of 5 years with an outlay of ₹99.72 Crore at 60 academic/Research & Development institutions spread across the country including IITs, NITs, IISc, IIITs & other Engineering Colleges. The broad objectives of the programme are to broaden the VLSI Design base in the country by generating 50,000 number of specialized manpower over a period of 5 years in the area of VLSI design, inculcating the culture of System-on-Chip/System Level Design at Bachelors, Masters and Research level, generating Intellectual Property Cores, publication of papers, broadening

the base of quality research in the country by supporting 'Networked PhD programme' etc. Under the programme:

(i) About 10,000 number of students trained at B.Tech, M.Tech & PhD level in VLSI/ System design area in FY 2017-18.

(ii) Fifteen (15) projects are in progress for development of working prototype of Systems/ Sub-systems/ SoCs along with the development of 70 Application Specific Integrated Circuits (ASICs) and 30 Field Programmable Gate Array (FPGA) based board level design projects.

(iii) 30 Chips taped out at SCL, Mohali & foundries outside the country. 5 Fabricated Chips are being tested and characterized.

(iv) 4 IEPs organized in FY 2017-18 to train the faculty members of institutes participating under the programme.

13 students hired by Intel Bangalore out of 40 students from 22 SMDP-C2SD institutes selected by Intel last year for 6 month- 1 year internship to make available industry ready specialized manpower in VLSI/ System design area.

v) Indian Nanoelectronics Users Programme (INUP)

INUP Phase II programme initiated in March 2014 continued to facilitate and support the generation of expertise and knowledge in Nanoelectronics through participation by external users in INUP and their utilization of the facilities established at the Centres of Excellence in Nanoelectronics (CEN) at IISc, Bangalore and IITB.

During the year 2017-18, 6 familiarization workshops on Nanoelectronics have been organized at IIT Bombay, IISc Bangalore and IIT Roorkee. Also, 10 hands-on-training in various categories such as Fabrication of cantilevers and MEMS based sensors and Nanofabrication technologies have been conducted. More than 400 persons have been trained on nanofabrication through Hand-on training workshops at the CEN

facilities at IISc Bangalore and IIT Bombay. An Introductory Workshop on Nanotechnology for UG Students during 12-13 April 2017 and a National Symposium on Nano Science and Technology (NSNST- 2017) during 2-4 July 2017 for Young Faculty Members from around the country and Startups Industries were also conducted at IISc Bangalore. The small and medium term projects being executed under INUP Phase II have resulted in around 60 research publications and 6 patents by the researchers from all over the country during the past one year. A New Webportal (https://www.inup.cense.iisc.ac.in/) is also developed for the awareness of the programme in the country and abroad.

7.1.4 Capacity Building in Niche Areas

(i) Information Security Education and Awareness (ISEA) Project Phase-II

Under the ISEA Project Phase-II (isea@gov.in), 1.14 lakh persons are proposed to be trained under formal and non-formal courses and faculty training etc. In addition, about 400 Paper publications are expected. The project also aims to provide training to more than 13,000 Government officials and creating mass information security awareness targeted towards Academic users, Government users and General users (approximately 3 crore Internet users in five years through direct and indirect mode). 52 institutions have been identified for the implementation of academic activities under the project. As on 28th February, 2018, as many as 28,069 candidates under-going training/trained in various formal/non-formal programmes, 4,457 Government officials have been trained and 606 awareness workshops are conducted covering 65,342 participants.

(ii) Capacity building in the areas of Electronic Product Design and Production Technology

This is an ongoing project for development of human resource at various levels including Certificate, Diploma, Post Graduate and Research Professionals with adequate competence levels with a target of training 11,515 candidates in five years. The project further aims at upgrading the competence of working professional in Indian Industries and knowledge/ skills of faculty of technical institutions. The project is being implemented by NIELIT Centres at Aurangabad & Chennai and CDAC, Hyderabad. Under this project, NIELIT Aurangabad has launched M.Tech(part time) in Electronic product design and B.Tech(full time), both in affiliation with Dr. B.A.M. University, Aurangabad with a vision to bridge the gap between academia and Industry. The implementing agencies have launched 6 week modular courses in Electronic Product Design, Embedded System Design, Electronic Packaging, Wireless Embedded System. Further, a 6 month (full time) Post Graduate Diploma in Electronic Product Design has also been launched.

As on 28th February 2018, 8,762 candidates have been trained/under-going training in various formal/non-formal programmes in the area of Electronics Product Design and Production Technology at CDAC-Hyderabad and NEILIT Centres at Aurangabad & Chennai.

7.1.5 Grass root level - Pradhan Mantri Gramin Digital Saksharta Abhiyan (PMGDISHA)

The Government has approved a scheme titled "Pradhan Mantri Gramin Digital Saksharta Abhiyan (PMGDISHA)" to usher in digital literacy in rural India by covering 6 crore rural households (one person per household) by 31st March, 2019. This is in line with the announcement made by Hon'ble Finance Minister in the Union Budget 2016-17. To ensure equitable geographical reach, each of the 2,50,000 Gram Panchayats would be expected to register an average of 200-300 candidates.

Special focus of the said Scheme is on training the beneficiaries on use of Electronic Payment System. The outcome measurement criteria includes undertaking at least 5 electronic payments transactions by each beneficiary using UPI (including BHIM app), USSD, PoS, AEPS, Cards & Internet Banking.

The PMGDISHA Scheme is being implemented as a Central Sector Scheme by this Ministry, through an implementing agency namely CSC e-Governance

Services India Limited, with active collaboration of all the State Governments and UT Administrations.

To create awareness about the scheme, the Implementing Agency i.e. CSC e-Governance Services India Ltd., has conducted 34 State level workshops and 461 District level workshops across the country. They have empanelled 81,930 training Centres so far for the conducting the training of the beneficiaries.

As on 28th February 2018, under the PMGDISHA Scheme, more than 1.09 crore candidates have been enrolled, out of which more than 1.08 crore candidates have been trained and more than 54 lakh have been certified.

7.1.6 Create skill development facilities in deprived areas through strengthening of National Institute of Electronics and Information Technology (NIELIT)

Project was approved by the Cabinet with the total budget outlay of ₹388.68 crore for a period of 5 years Further, the budget outlay was revised to 366.78 crore (Govt. Contribution: ₹325.98 crore) for a duration of 5 years with an extension of 9 months till March 2018. The project objective includes upgradation of the six existing NIELIT centres located at Imphal, Aizawl, Guwahati, Shillong, Gangtok, Itanagar; setting up of ten new Extension centres at Senapati and Churachandpur

in Manipur; Dibrugarh, Silchar, Jorhat and Kokrajhar in Assam; Lunglei in Mizoram; Tura in Meghalaya; Tezu and Pasighat in Arunachal Pradesh; and upgradation of two existing extension centres located at Chuchuyimlang in Nagaland and Tezpur in Assam, to increase the training capacity from 3,080 per year to 14,400 per year from the 5th year onward. All 18 NIELIT Centres/extension centres have been established/made operational under the project and around 34,852 candidates have been trained in various Electronics & ICT courses.

7.1.7 IT for Masses Programme

Development of Weaker Sections

The objectives of IT for Masses Programme are to provide Training, Infrastructure creation and Entrepreneurship for empowering Women and development of SC/ST communities.

The following projects were initiated / on-going:

Projects covering Scheduled Tribe (ST) beneficiaries

- IT skills & e-Inclusion through low cost access devices based awareness programme for Scheduled Tribes candidates – Kerala

- Capacity building in IT skills of Scheduled Tribes (ST) candidates - Chhattisgarh

- Capacity building in IT skills of Scheduled Tribes (ST) candidates - Andaman & Nicobar

- IT infrastructure creation and capacity building in IT tools of Scheduled Tribes (ST) candidates - Madhya Pradesh

- Empowering underprivileged ST of four backward districts of Nagaland through ICT skills training - Nagaland

Gender Empowerment

Gender Empowerment through ICT has been one of the major initiatives of the Government. The objective of this initiative is to empower women through capacity building in ICT and IT training so as to enhance their employability. Accordingly, MeitY has been implementing number of ICT training / capacity building projects for empowerment of women in different States / UTs.

The following projects were initiated / on-going:

Projects covering Gender (Women) beneficiaries

- IT oriented Handloom Sector Development Programme for creative design, development & deployment by Artisians / Weavers of Jharkhand & Odisha. State.

- ICT based integrated development programme for women empowerment in Lallapura craft cluster of Varanasi – Uttar Pradesh

- Skill- Enhancement & Health Awareness via Knowledge Transformation using ICTs for Women Empowerment in Bithoor Cluster of Kanpur – Uttar Pradesh.

CONTROLLER OF CERTIFYING AUTHORITIES
6, CGO Complex, Electronics Niketan
Lodhi Road, New Delhi - 110003
E-mail : info@cca.gov.in   Website : http://cca.gov.in

Ministry of Electronics and Information Technology
Government of India

Chapter 8

Statutory Organisations

8.1 Authentication framework under the IT Act, 2000: CCA

The Information Technology Act, 2000 facilitates acceptance of Electronic Records and Electronic Signatures through a legal framework for establishing trust in e-Commerce and e-Governance. For authentication of electronic transactions using electronic signatures, the Controller of Certifying Authorities (CCA) licenses Certifying Authorities to issue Electronic Signature Certificates under the IT Act 2000. Currently, Nine Certifying Authorities (CA) are operational. The total number of Electronic Signature Certificates (ESC) issued in the country grew to more than 68 million (out of which 47 million ESCs are for eSign) by 31st December, 2017 and continues to grow rapidly and is expected to increase significantly with the launch of various e-Governance/e-Commerce programmes.

For ensuring continued trust in this authentication framework, Annual Compliance Audits of Certifying Authorities were conducted as per the requirements of the Information Technology Act, 2000. In addition to the regular Annual Compliance Audits, Special Audits were also carried out for ensuring compliance to the Identity Verification Guidelines (IVG) to be followed in the Digital Signature Certificate (DSC) issuance process.

Two CAs licence were renewed this year & four applications from prospective organizations have been received to become licensed CA/ eSign Service Providers (ESP). Their applications are under examination & processing for grant of licence.

8.1.1 eSign online electronic signature Service for Aadhaar Holders

Five licensed CAs which are empanelled ESPs (viz. eMudhra, (n)Code, CDAC, NSDL & Capricorn) are providing eSign service in the country. Total number of eSign Electronic Signatures reached 47 million by 28th February, 2018. Initiatives are being taken in this respect through coordinated interactions between the e-Governance/e-commerce application service

providers and these ESPs (CA) to facilitate the maximum use of eSign.

Technical Infrastructure

The Root Certifying Authority of India (RCAI) set up by the CCA is at the root of trust for authentication through Digital Signatures. Renovation of the physical infrastructure has been initiated for the Strong Roomhousing the RCAI. Repository containing certificates issued by CCA to the licensed CAs and the Certificates issued by the licensed CAs to subscribers has been established and is being operated by the Office of CCA for checking compliance with the Interoperability Guidelines and for Statistical Purposes. The Disaster Recovery Site for the RCAI continues to be operational.

Enhancing trust

CCA's Root certificate(s) & special purpose certificates have been installed in Microsoft IE Browser and in Adobe products.

To further enhance the level of trust in digital signatures, and to know the status of CA certificate issued by Root CA in real time, the Office of CCA has setup an Online Certificate Status Protocol (OCSP) service. OCSP service of Root CA is one of the mandatory baseline requirements of the CA Browser (CAB) forum/community. The OCSP service has been released for citizens & stakeholde.Further steps for inclusion of Root CA certificate in Mozilla, Firefox, Java store etc. will now be taken up since this pre-requisite of CAB Forum has been met.

Digital Locker Authority (DLA)

Under the Digital India Programme, Government of India has planned to provide shareable private space on a public cloud and to digitize all documents and records of the citizens and make them available on a real-time basis. These mechanism of 'e-Document repositories' and 'Digital Lockers' will greatly improve citizen convenience and usher in paperless transactions across the entire ecosystem of public services. The framework for the Digital Locker Ecosystem has been set up by the Controller of Certifying Authorities (CCA) who has been given additional charge to function as 'Controller of Digital Locker Authority (CDLA)'.

The office of DLA has designed, registered & launched the website (http://dla.gov.in). The necessary rules, regulations & guidelines along with application form, eligibility criteria, technical specifications, practice statement, undertakings & other documents related to Digital Locker Service Providers (DLSPs) and Repository Providers (RPs) are available on DLA website.

Two Workshops for prospective DLSPs & Repository Providers (Issuers) were organized by the DLA at Delhi & Bangalore to facilitate & discuss with the prospective stakeholders/business entities to become licensed DLSP or Certified Repository. One application for DLSP licence has been received by the DLA and is being processed.

Training / Awareness Generation & Promotion of Digital Signatures

PKI Body of Knowledge: Development & Dissemination programmes on Digital Signatures, PKI & eSign have been conducted at Guwahati, Bengaluru, Hyderabad, Vijayawada & Patna and interactions with other States for organising such workshops have been initiated. Also, relevant content is made available on social media channels like YouTube, Face book & Twitter.

The International Conference on Public Key Infrastructure (PKI) and its Applications (PKIA 2017) was held during November 14-15, 2017 at Bengaluru, jointly organized by CCA India & CDAC under PKI Awareness Programme.

The Asia PKI Consortium International Symposium – 2017 on Public Key Infrastructure - Global adoption and emerging trends was co-hosted by India PKI Forum during November 16-17, 2017 at Bengaluru.

Newspaper advertisements for generating awareness about eSign have been published and more are in the pipeline.

8.2 Unique Identification Authority of India (UIDAI)

8.2.1 Introduction

The Unique Identification Authority of India (UIDAI) is a statutory authority established under the provisions of the Aadhaar (Targeted Delivery of Financial and Other

Subsidies, Benefits and Services) Act, 2016 (referred as "Aadhaar Act 2016") on 12th July, 2016 by the Government of India, under the Ministry of Electronics and Information Technology (MeitY).

Prior to its establishment as a statutory authority, UIDAI was functioning as an attached office of the then Planning Commission (now NITI Aayog) vide its Gazette Notification No. A-43011/02/2009-Admn.I dated 28th January, 2009. Later, on 12th September, 2015, the Government revised the Allocation of Business Rules to attach the UIDAI to the then Department of Electronics & Information Technology (DeitY) of the then Ministry of Communications and Information Technology.

The Aadhaar (Targeted Delivery of Financial and Other Subsidies, Benefits and Services) Act, 2016

The Aadhaar (Targeted Delivery of Financial and Other Subsidies, Benefits and Services) Bill, 2016 was introduced by the Government in the Lok Sabha on 03.03.2016, subsequent to the Cabinet Approval for introduction of the same on 29.02.2016. The Bill was discussed and passed by the Parliament on 16.03.2016 and received the assent of the President on 25th March, 2016.The Act was published in the Official Gazette of India, Extraordinary, Part-II, Section 1, dated 26th March, 2016 (Act No. 18 of 2016; referred to as "Aadhaar Act, 2016") by the Legislative Department, for general information. The Aadhaar Act, 2016 has come into force on 12.09.2016, after notification of various Sections of the Act.

The Aadhaar Act, 2016 provide for good governance, efficient, transparent and targeted delivery of subsidies, benefits and services, the expenditure for which is incurred from the Consolidated Fund of India, to individuals residing in India through assigning of unique identity numbers (called Aadhaar numbers), to such individuals and for matters connected therewith or incidental thereto.

Further, the following regulations are notified under the said Aadhaar Act, 2016:

- Unique Identification Authority of India (Transaction of Business at Meetings of the Authority) Regulations, 2016 (No. 1 of 2016)

- Aadhaar (Enrolment and Update) Regulations, 2016 (No. 2 of 2016)

- Aadhaar (Authentication) Regulations, 2016 (No. 3 of 2016)

- Aadhaar (Data Security) Regulations, 2016 (No. 4 of 2016)

- Aadhaar (Sharing of Information) Regulations, 2016 (No. 5 of 2016)

- Aadhaar (Enrolment and Update) (First Amendment) Regulations, 2017 (No. 1 of 2017)

- Aadhaar (Enrolment and Update) (Second Amendment) Regulations, 2017 (No. 2 of 2017)

- Aadhaar (Enrolment and Update) (Third Amendment) Regulations, 2017 (No. 3 of 2017).

Besides, UIDAI, in exercise of Regulation 12A of the Aadhaar (Enrolment and Update) (Second Amendment) Regulations, 2017 (No. 2 of 2017) and the Aadhaar (Enrolment and Update) (Third Amendment) (No. 3 of 2017), has directed all Scheduled Commercial Banks to provide Aadhaar enrolment and update facilities to their customers, in the manner detailed in Notification No. 13012/79/2017/Legal-UIDAI (No. 4 of 2017) dated 14th July, 2017, issued in this regard.

A key objective of Aadhaar programme is to provide an identity infrastructure for delivery of various social welfare programmes and for effective targeting of welfare services. The potential of Aadhaar can be realized through its use of the infrastructure as an ID proof and

as a unique key by various State Departments, Central Ministries, PSUs, and private sector entities to provide service delivery to residents in an integrated fashion.

There are many benefits associated with such integration for the various stakeholders that range from better compliance management to significant savings in leakages and increased efficiency and accountability in service delivery.

In order to carry forward the mandate given to UIDAI, besides its Head Quarters in New Delhi and technology Centre at Bengaluru, UIDAI had set-up eight (8) regional offices at the following locations at Bengaluru, Chandigarh, Delhi, Guwahati, Hyderabad, Lucknow, Mumbai and Ranchi.

Presently, one part time Chairman and two part time members have been appointed in UIDAI. The authority is headed by Chief Executive Officer (CEO), who is a Secretary level officer to the Government of India. The UIDAI Headquarter has seven functional divisions, headed by a Deputy Director General (Joint Secretary level officer). Additionally, each of the eight (8) Regional Offices is headed by a Deputy Director General.

8.2.2 Value Proposition of Aadhaar

Uniqueness

Any individual, irrespective of age and gender, who is a resident in India and satisfies the verification process laid down by the UIDAI, can enroll for Aadhaar. An individual is required to enroll only once; the process is free of cost. In case, the resident enrolls more than once, only one Aadhaar shall be generated, as the Uniqueness is achieved through biometric de-duplication.

Authentication

One of the challenges the resident frequently faced was to establish his/her identity. The problem gets further complicated owing to the fact of using proxy documents and circulation of counterfeit documents in the country, which leads to lack of trust between service providers and the resident. However, Aadhaar's property of **Authentication** enables an Aadhaar holder to authenticate with a service provider Anytime, Anywhere in the country to prove his/her identity. To facilitate this, UIDAI has established an ecosystem based on best global practices to ensure data privacy and reliability of authentication, with UIDAI being agnostic to the fact as to why was the authentication done.

8.2.3 Approach and Strategy: Enrolment Ecosystem

Enrolment Implementation Model

Aadhaar enrolment ecosystem is built in partnership with multiple Registrars, wherein Registrars are primarily State Governments, Public/ Private Sector Banks and other Financial Institutions etc. In view of amendment in PMLA rules, scheduled commercial Banks (Public / Private) have been mandated to open Aadhaar enrolment / Update centres at 1 out of 10 of their branches across the country and also India Post has been requested to open enrolment cum update centres at Post offices across the country.

As on date, UIDAI has partnered with 168 Registrars, consisting of Ministries/Departments/State Govts/UT Administration/PSUs and Banks.

Enrolment Statistics

As on 28th February 2018 (as per projected population 2017), total Aadhaar generation (Live) are 117.64 crore (89.4%).

Updation

In order to maintain the date of the residents current and up-to-date, UIDAI has provided an institutional mechanism to enable residents to update their data. The updates include corrections and/or changes in the demographic details of residents due to change of address, mobile number or change of name after marriage, etc. and biometric attributes that need to be updated by the children upon attaining the age of 5 and 15 years, etc.

UIDAI has institutionalized the process of Updation through post, manual updation through its Permanent Enrolment Centres and electronic/ online updation through its Self Service Update Portal (SSUP).

As on 28th February 2018, over 30 thousand Permanent Enrolment centres (PECs) for Aadhaar enrolment / Updates existed across the country. A total of 13.70 crore Demographic updates and, 4.89 crore Bio-metric updates processed since inception.

Enrolment Drive for Children below 5 years

In compliance to the UIDAI's policy, Aadhaar is issued to all residents including the children below 5 years of age. However, the biometrics viz. fingerprints and iris image is not captured for children below 5 years of age. In lieu of the same a dedicated client called "Child Enrollment Lite Client" has been developed to capture the demographic data and photograph of the children below 5 years of age. In order to facilitate and expedite enrolment of this age group, UIDAI leveraged Aaganwadi workers through partnership with Ministry of Women and Child development. UIDAI in coordination with RGI, has rolled out tablet based child enrolment client for Aadhaar linked birth registration wherein children are enrolled at birth and their enrolment is linked with birth Registration. The state governments have been requested to on-board State Health Departments or department handling birth registration as UIDAI registrars and do the Aadhaar linked birth registration.

Recovering lost EID/UID number

When a resident loses his/her EID slip or UID number/ letter, UIDAI has developed a process to recover the UID number by an Aadhaar holder. This requires an "identity check" which involves capturing the resident's biometrics and comparing it against the UID data base in order to locate the UID number of the resident. The services have been institutionalized through permanent enrolment centres. The resident can also use find EID/ UID, verify Aadhaar facilities available on the UIDAI website to recover the EID/UID details.

8.2.4 Aadhaar Letter Printing and Delivery

- Once the Aadhaar is generated, it has to be ensured that the same is printed and delivered to the Resident within permissible time limits.

- Each Aadhaar letter comprises of a Printed, Laminated document with a Photograph, Date of birth, Demographic information of the Resident, the Aadhaar number and Quick Response (QR) Code.

- For the Printing of Aadhaar letters, UIDAI has on-boarded three Printers at various locations. Currently the installed printing capacity is 7 lakh letters per day in 13 different regional languages.

- The Department of Post is the partner for delivery of the Aadhaar letters to the Residents at the address they have provided at the time of enrolment.

- UIDAI sends Aadhaar letters for new enrolments as well as for updates. Since inception and until 28th February 2018, a total of 119,43,13,578 Aadhaar letters have been printed and dispatched to the Residents through India Post as First Class Digitally Franked articles. Since inception and until 28th February 2018 a total of 10,46,26,696 Aadhaar letters have been updated and dispatched to the Residents through India Post as First Class Digitally Franked articles.

e- Aadhaar:

- UIDAI has launched the e-Aadhaar portal for downloading the Aadhaar letter in PDF format from the website of UIDAI (www.uidai.gov.in).

- An Aadhaar number, in physical or electronic form subject to authentication and other conditions, as may be specified by regulations, may be accepted as proof of identity of the Aadhaar number holder for any purpose. As such the e-Aadhaar, which is digitally signed, is a valid and secure electronic document, treated at par with the printed Aadhaar letter. In the Aadhaar system, the Resident's details can be verified through an established on-line authentication process. Therefore, the e-Aadhaar is acceptable as a valid Proof of Identity. The relevant circulars have been posted on the website of UIDAI and media publicity to the validity of e-Aadhaar. **The total e-Aadhaar downloads till 28th February 2018 are approximately 79.27 crore.**

Aadhaar Support Services

UIDAI has set up an Aadhaar Sampark Kendra (Contact Centre) which facilitate in resolving residents queries and grievances related to Aadhaar life cycle and related

services. Main objectives of the contact centre are as follow:

a) To provide a PAN India accessible toll free number and email using which the Residents can contact Aadhaar Sampark Kendra.

b) To provide support in multiple regional languages to cater complaints and queries from all parts of India.

c) To provide an Interactive Voice Response (IVR) System for the resident's calling the Aadhaar Sampark Kendra.

d) To provide residents to interact with Aadhaar Sampark Kendra executive in case they wish to do the same.

e) The Residents can also log the complaints through Resident Portal of UIDAI.

f) To create and maintain a common Customer Relationship Management (CRM) application to support Residents in addressing their queries & complaints.

Infrastructure and Technology of Aadhaar Sampark Kendra:

Currently Aadhaar Sampark Kendra consists of:

a)   **Toll-free-number 1947:** Toll Free Number is accessible from PAN India. The short code '1947' is a category –I toll free number allotted by DoT to UIDAI.

b) **Contact Centre Infrastructure:** Contact Centre Infrastructure comprises of Trunk lines, PBX solution, IVRS system, Automatic Call distributor for call distribution across Call Centre Facilitators, Computer telephony integration unit and Voice logger system (10% calls are recorded for technical quality evaluation). The IVRS interacts with the callers in duplex mode through synthesized recorded voice in Hindi/English/ Regional Languages depending on state from where call is placed to service their enquiries. Hindi, English, Gujarati, Kannada, Marathi, Telugu, Bengali, Punjabi, Odia, Tamil, Assamese, and Malayalam languages are currently supported in IVRS.

Following features are currently available in IVRS : -

• Frequently Asked Questions.

• Aadhaar enrollment status based on 14 digit Enrolment ID search.

• Aadhaar update status with 14 digit Update Request Number (URN) .

• Intelligent selection of language options on IVRS based on caller's area.

• Status of already logged Complaints.

• Know your Aadhaar number.

• Route calls to Aadhaar Sampark Kendra executive, if desired by the caller.

c)   **CRM Software Application:** Microsoft Dynamics 2011 based CRM software Application is being used for Aadhaar Sampark Kendra. This is the heart of the system that has back end integration with UIDAI's Central Identities Data Repository (CDIR), to give relevant information to the Contact Centre Firms (CCF) agents for handling resident queries. Same has also been integrated and extended to UIDAI divisions for end to end resolution of resident queries or complaints.

d)   **Contact Centre Firms (CCF):** Contract for providing Call Centre services is with two firms which handle traffic from 8 locations and provide support in 12 languages i.e. Hindi, English, Gujarati, Kannada, Marathi, Telugu, Bengali, Punjabi, Oriya, Tamil, Assamese, and Malayalam. Emails received at help@ uidai.gov.in are handled by M/s TBSS only and available in English language only.

e)   **Hardware components (Server and Storage):** CRM Application Servers are hosted within the two Data Centres located at Bengaluru and Manesar with accessibility outside the data Centre restricted only via P2P or secured MPLS lines to the CCF partners.

UIDAI's Contact Centre received approximately 149380 calls on Toll Free Number and 2995 emails on daily basis during the last 12 months. Out of the total calls received at the Contact Centre approximately 53% of the calls were handled and resolved at the IVRS level and rest 47% were transferred to the Aadhaar Sampark Kendra agents.

8.2.5 Authentication Ecosystem

Aadhaar Authentication

Aadhaar Authentication means the process by which the Aadhaar number alongwith demographic information or biometric information of an individual is submitted to the Central Identities Data Repository (CIDR) for its verification and such Repository verifies the correctness, or the lack thereof, on the basis of information available with it.

Authentication implementation Model

UIDAI provides Authentication and e-KYC services through agencies called as Authentication User Agency (AUA), e-KYC User Agency (KUA) and Authentication Service Agency (ASA), which are appointed as per Regulation 12 of Aadhaar (Authentication) Regulations, 2016.

Authentication User Agency (AUA)

AUA is any government/ public/private legal agency registered in India that uses Aadhaar Authentication for providing its services to the residents/customers. An AUA is connected to the UIDAI data centre/ CIDR through an ASA (either by becoming ASA on its own or taking services of an existing ASA) using secured protocol. As on 28th February, 2018, 307 ASAs (live) entities have been on-boarded by UIDAI as AUAs and 1696.38 crore Authentication transactions have been performed, since inception.

Authentication Service Agency (ASA)

ASA is the agency that has secured leased line connectivity with CIDR. ASAs transmit authentication requests of AUAs to the CIDR. They play the role of enabling intermediaries through secure connection established with the CIDR. ASAs receive CIDR's response and transmit back the same to the AUAs. As on 28th February 2018, 26 ASAs (live) are on-boarded with UIDAI.

Know your Customer Agency (KUA)

KUAs are extension of AUAs that use e-KYC Services of UIDAI. As on 28th February, 2018, 251 KUA (live)

entities are on-boarded on Aadhaar platform and 464.85 crore e-KYC transactions have been performed.

8.2.6 Aadhaar Seeding Ecosystem

Aadhaar seeding is a one-way process by which UIDs of residents are accurately included in the service delivery database of service providers for enabling Aadhaar based authentication during service delivery. The seeding process is accomplished in two steps. In the first step Aadhaar is to be captured into the beneficiary database and in the second step after verification with reference to UIDAI database (CIDR), it is linked to the beneficiary record in the database of the service provider.

UIDAI has undertaken multiple activities to ensure Aadhaar seeding is facilitated in various scheme databases.

Once the Aadhaar is captured in the Scheme database, it can be verified and linked using different services and facilities offered by UIDAI as follows:

• **Biometric Authentication and eKYC:** These methods provide the most accurate way of seeding but require physical presence of Aadhaar holder at the time of seeding.

• **Demographic Authentication:** UIDAI offers a facility for bulk demographic authentication. Using this facility the demographic data available in Scheme database can be matched with that of UIDAI (CIDR) and confirmed.

Aadhaar seeding in various large databases has grown steadily and as on 28th February 2018, around 19.70 crore Aadhaars were seeded in LPG database, around 9.97 crores in MGNREGS, over 18.84 crore in Public Distribution (Ration Card) and around 58.73 crore in bank accounts.

Aadhaar Authentication and Seeding Workshops

In order to help understand Aadhaar Services, Applications and Aadhaar Seeding, UIDAI has developed a training module for various Ministries, State Government Departments, Banks and other organizations. Every month, UIDAI has been conducting

multiple workshops in HQ and at various locations all over India.

8.2.7 Training, Testing and Certification ecosystem

For success of any programme, especially of the scale such as that of UIDAI, it is imperative that there is sufficient emphasis given to quality of data collected during enrolment. Additionally, it is equally important that the people who are responsible for capturing data are adequately trained and certified. UIDAI has worked diligently to create a Training, Testing and Certification ecosystem. This ecosystem consists of (1) Content Development Agency and (2) Testing and Certification Agency.

UIDAI engages Certified Operators, Supervisors and Child Enrolment Lite Client (CELC) Operators in Aadhaar enrolment process. Various training methodologies including Mega Training and Certification Camps, Refresher/orientation Training and DLO(District Level Officer)/(Panchayati Raj Institutions)PRI Training Programme were adopted by UIDAI to ensure that all the stakeholders involved in enrolment and other processes are trained effectively. This has led to well-organized enrolment and almost 100% enrolment in most of the States. Also, to increase the usage of Aadhaar across various Govt. organizations in delivery of services, Master Training on Aadhaar Seeding, Authentication and e-KYC were organized for Govt. officials.

- **Master Training on Seeding, Authentication and e-KYC:** The training content covers all the major processes involved in Aadhaar Seeding, Authentication & e-KYC. So far we have conducted 83 training programmes, in which 7390 Govt. officials were trained.

- **Mega Training & Certification Camps:** UIDAI undertakes an exercise through Mega Training & Certification camps to create a large pool of certified operators/supervisors to ensure no disruption of momentum in enrolments. A total of 81 Mega camps were organized by the various Regional Offices of UIDAI in which 4785 candidates were trained.

- **Orientation Programme:** Orientation programmes are being carried out for newly appointed Enrolment staff to make them well versed with the enrolment process and during the current year 225 Orientation programme were organized in which 14003 candidates were imparted training.

- **Refresher Programme:** To make certified enrolment staff understand the changes involved in Aadhaar processes, many Refresher programmes and Training of Trainer programme were conducted by UIDAI Regional Offices. From 1st January, 2017 to 28th February 2018, a total of 254 such programmes were organized which was attended by 9445 participants.

- **PRI/DLO Programme:** UIDAI also provides training to the members of Panchayati Raj Institutions (PRI) and District level officers (DLO) to make them understand their role in Aadhaar enrolment. Till 28th February, 2018, 49 such workshops have been conducted in which 1390 candidates participated.

As of 28th January, 2018, UIDAI in partnership with the Testing and Certification agencies has certified over 7.46 lakh Enrolment Operators, Supervisors and CELC Operators.

8.2.8 Intranet & Knowledge Management Portal.

To promote communication, deeper information exchange, and increased collaboration amongst UIDAI staff it was decided to establish an online, community based platform. The UIDAI took up this task of establishing an 'Intranet & Knowledge Management Portal'. The aim of this exercise is to go for a paperless office. Phase-I & Phase-II of the project has been completed and already in use.

8.2.9 UIDAI Website

The UIDAI Website is the single click Aadhaar Online service window for residents of India, as well as the primary web information Centre for various ecosystem partners and the public at large. Apart from English & Hindi, the website is also available in 11 other Indian languages. With this multilingual feature, the information

is made accessible to the diverse demographic population residing in every corners of the country. The website aims to:

- Empower Resident of India by providing quick access to various online Aadhaar services;

- Provide access to Aadhaar (Targeted Delivery of Financial and Other Subsidies, Benefits and Services) Act, 2016, and associated Rules, Regulations, Notifications, and Circulars;

- Ensure users to reach the intended information in the fastest possible manner whether it is via easy navigation or by search;

- Facilitate education and promotion of information about Aadhaar Services, business processes and technologies behind Aadhaar via published documents, infographics, and videos;

- Ensure latest news, events, campaign details are published regularly;

- Address public grievances by providing help desk contact and details of concerned divisions;

- Seeks visitor feedback on the performance of the website;

  The UIDAI website also provides a direct link to the following services, analytics and business specific portals:

- Resident Portal – Provides direct access to Aadhaar based self-service portals.

- Aadhaar Dashboard –The Analytic dashboard displays the big data for Aadhaar Enrolment, Authentication, Aadhaar updation and e-KYC services.

- Authentication Portal – Provides information on Authentication partners, operation model& direct benefits.

- The Website is certified for CSS and HTML by W3C and is currently undergoing audit by STQC for GIGW compliance.

- As mandated by Government of India, Rapid Assessment System (RAS) feedback link for Website users has been integrated.

- The Visitor Counter provides monthly, fortnightly and daily snapshot of numbers of visitors to the UIDAI website.

- FAQs on most sought after topics, various Aadhaar Services are provided in 13 languages.

8.2.10 Data security and privacy

UIDAI has a well-designed, multi-layer approach robust security system in place and the same is being constantly upgraded to maintain highest level of data security and integrity. The architecture of Aadhaar ecosystem has been designed to ensure data security & privacy which is an integral part of the system from the initial design to the final stage. For further strengthening of security and privacy of data, security audits are conducted on regular basis, and all possible steps are taken to make the data safer and protected. Legal status to UIDAI has further strengthened the security assurance of Aadhaar ecosystem manifolds by notification of (THE AADHAAR TARGETED DELIVERY OF FINANCIAL AND OTHER SUBSIDIES, BENEFITS AND SERVICES) ACT, 2016 passed by the Government of India and subsequent regulations having stringent penalties/punishments for offenders. In the ibid Act, Chapter VI on Protection of Information (Section 28 – Section 33) & Chapter VII on Offences and Penalties (Section 34 – Section 47) of the Bill, specifically relates to protection of information and related offences and penalties to offenders.

UIDAI certified as ISO 27001

UIDAI has established the Information Security Management System and obtained the ISO 27001:2013 certification from STQC.

Declaration of CIDR Infrastructure as "Protected System"

Security of UIDAI-CIDR information is of paramount importance for safeguarding resident data Confidentiality, Integrity and Availability of the information which is maintained at all times through controls that are commensurate to the criticality of the information assets, so as to protect the Information Systems from all types of threats (Cyber related, Virtual Logical Cross-border of CIDR Interface, National or International interests, internal or external, deliberate or accidental). UIDAI-

CIDR has also been declared as "Protected System" by National Critical Information Infrastructure Protection Centre (NCIIPC) adding another layer of IT security assurance.

Governance Risk Compliance and Performance Service Provider (GRCP-SP) On-boarded

The vision of GRCP-SP framework is to facilitate creation of a robust, comprehensive, secure environment for UIDAI to operate. To achieve the goals, the GRCP-SP shall provide UIDAI management with oversight of UIDAI and partner ecosystem in terms of Visibility, Effectiveness and Control, Information Security Assessment of External ecosystem partners

UIDAI Security has been enhanced further through regular Information Security assessment of various ecosystem partners.

Fraud Management System at UIDAI

UIDAI has a well-designed, multi-layer approach and robust fraud management system in place. The same has been consolidated vis-a-viz last year. With the establishment of Forensic lab, the fraud investigation capacity of UIDAI has increased manifolds.

8.2.11 Aadhaar - A Tool for Governance Reform

Aadhaars usage is not just restricted to its popular uses of Direct Benefit Transfer (DBT) alone. Many applications and new initiatives are being developed across Government Departments and private sector to enable ease of use and better accessibility of services by such service providers.

Some of the key applications which have eased the life of an Aadhaar holder are:

Digi-locker:

Digi-locker is a service provided by National Informatics Centre (NIC) to residents to open a digital locker account using their Aadhaar and upload their documents like driving license, certificates issued by educational institutes/boards etc on a cloud and subsequently consent based sharing with digital sign to ensure the receiver can use such digital documents. As on 28th February 2018, over 1.07 crore individuals have availed this facility and uploaded over 1.40 crore documents.

eSign:

eSign is an online service that can be integrated within various service delivery applications via an open Application Programming Interface (API) to facilitate digitally signing of a document by an Aadhaar holder. It is designed for applying Digital Signature using authentication of consumer through Aadhaar authentication and e-KYC service.

Aadhaar Enabled Biometric Attendance System (AEBAS):

Launched in year 2015, as on 28th February 2018, the service is now available at 700 organizations of Central Government with over 2.50 lakh registered employees and over 7700 active devices

Jeevan Pramaan:

Jeevan Pramaan is an Aadhaar enabled digital service for pensioners of Central Government, State Government or any other Government organization, who can take benefit of this facility. It eliminates the need of the pensioner to personally present himself before the Pension Disbursing Agency. As on 28th February 2018, around 1.60 crore pensioners have submitted Jeevan Pramaan Certificates since 2014.

Mobile SIM issuance with e-KYC:

Aadhaar has enabled telecom operators to issue mobile SIM without the need of physical application form, proof of address and identity documents. Use of e-KYC empowers an Aadhaar holder to get an instantly activated SIM card. As on 28th February 2018, over 85.7 crore people had linked their mobile with Aadhaar.

e-verification of Income Tax return:

Aadhaar has enabled Income Tax payer to e-verify their Income Tax Return using Aadhaar OTP authentication, obviating the need for sending the return in a physical form to Income Tax Authorities.

As on 28th February 2018, over 6.76 crore residents have already linked their Aadhaar with PAN Card and over 1.80 crore have e-verified their income tax returns.

Ease of getting Passport:

Aadhaar has enabled residents to get their passport being made in a convenient and faster manner. The Ministry of External Affairs (MEA) is now issuing the passport within a shorter time to applicants who are submitting Aadhaar along with other requisite documents. As of March 2017, over 1.36 crore residents obtained passport using their Aadhaar in a convenient manner.

8.2.12 Construction of UIDAI, HQ Building

All requisite statutory approval / NOCs towards construction of UIDAI Headquarters building for G+9 floors have been obtained. The overall progress of the building is around 92.2% and likely date of completion is 31st March, 2018.

8.2.13 Use of Rajbhasha

UIDAI is implementing Official Language Policy of Govt. of India in its Head Quarter as well as all 08 Regional Offices ensuring the compliance of the various provisions envisaged in the Official Languages Act and Official Languages (Use for Official Purposes of the Union) Rules, as well as orders of the Govt. of India issued from time to time.

During the year 2017-18 upto 28th February 2018, three meetings of Departmental Official Language Implementation Committee were held at Head Quarter and Regional Offices in which, among other items, progressive use of Hindi was discussed and decisions were taken to increase the use of Hindi in official work. Besides, 02 Hindi workshops were held for sensitizing the officials with the Official Language Policy. About 60 officers and staff participated in these workshops. As a help literature Hindi book "KaryalayaPraveenta" was distributed among the participants in one of the Workshops.

Progressive Use of Hindi in Head Quarter and all 8 Regional Offices of UIDAI is being reviewed in Internal Review Meetings held under the Chairmanship of CEO, UIDAI. Necessary guidelines are issued from time to time to the Regional Offices for promoting use of Hindi as per Govt. directions. Hindi Pakhwara was celebrated from 14th September, 2017 to 28th September, 2017 in UIDAI Headquarter.

8.2.14 Details of Budget & Expenditure during 2017-18

During 2017-18 (upto 28th February, 2018), an expenditure of ₹892.92 crore (provisional) has been incurred against Budget Estimate plus Supplementary Grants of ₹1150.00 crore. Since inception, a total expenditure incurred is ₹9686.82 crore (provisional).

8.3 Indian Computer Emergency Response Team (ICERT)

ICERT is a functional organisation of Ministry of Electronics and Information Technology, Government of India. ICERT has been designated under Section 70B of the Information Technology (Amendment) Act, 2008 to serve as the national agency to perform the following functions in the area of cyber security:

- Collection, analysis and dissemination of information on cyber security incidents

- Forecast and alerts of cyber security incidents

- Emergency measures for handling cyber security incidents

- Coordination of cyber security incident response activities

- Issue guidelines, advisories, vulnerability notes and white papers relating to information security practices, procedures, prevention, response and reporting of cyber incidents

- Such other functions relating to cyber security as may be prescribed.

Further details are placed in Section 6.4.

International Conference on Public Key Infrastructure and its Applications
PKIA 2017

Chapter 9

Attached Offices and Societies

In order to operationalise the programmes of Ministry of Electronics and Information Technology (MEitY), there are two attached organizations and six autonomous bodies which take up projects in the field of Electronics and IT including high end research and deployment of IT solutions in wide range of areas.

Centre for Development of Advanced Computing (C-DAC)

9.1 High-end Software Systems: Centre for Development of Advanced Computing

C-DAC, a scientific society under the Ministry of Electronics and Information Technology (MeitY), Government of India has completed 29 years of glorious existence in March 2017. The solutions and products developed by C-DAC play a vital role and have become a valuable instrument in realizing the Digital India dream of the Government of India. During the year 2017-18, C-DAC has made significant advancements in developing and deploying various solutions, organizing key events, providing training and collaborating with organizations of repute both at national and international

level. Key technological achievements of C-DAC during this year in each of its focus areas are outlined below:

9.1.1 High Performance Computing (HPC), Grid Computing and Cloud Computing

National Supercomputing Mission

The National Supercomputing Mission envisages harmonizing the efforts of stakeholders involved in R&D efforts in HPC through nationwide centralized coordination. C-DAC is entrusted with building systems indigenously. NSM is divided in four verticals: Facilities and Infrastructure Applications, Human Resource Development and Research and Development (R&D). Till date, 2 Executive Board (NSM-EB), 1 EC-Empowered Committee, 10 NSM-TAC and 15 Expert Group meetings have been held. RFP for build approach has been cleared by TAC. Phase-1 includes build and deploy of 3 systems at IIT Kharagpur (1.3 PetaFlops), at IIT BHU, Varanasi (650 TeraFlops) and IISER Pune (650 TeraFlops). In phase-2, multiple HPC systems with cumulative compute power of 10 PetaFlops is being planned. C-DAC has prepared the (Build Approach)

RFP for Phase-I and Phase-II. An HPC lab is setup with compute power of about 150TF for HPC System design, development and integration. For NSM human resource development, short-term, medium-term and formal-education programmes were conducted. Various application areas for development have been approved by Technical Advisory Committee.

Deployment of PARAM Shavak for HPC and PARAM Shavak Deep Learning Applications:

PARAM Shavak – A Supercomputer in a Box solution of C-DAC is being installed at various academic and research institutions across the country. C-DAC has deployed more than 50 systems till date. C-DAC has also designed "PARAM SHAVAK DL GPU System" for academic institutions and research organizations that employ deep learning techniques, for GPU accelerated machine learning applications and has deployed 5 such systems till November 2017.

PARAM Yuva-II (C-DAC's National Supercomputing Facility)

Since its inauguration in February 2013, C-DAC's PARAM Yuva II HPC system has executed 2,67,617 jobs as of end of February 2018, including 40,869 jobs for year 2017-18. Utilization of PARAM Yuva II has always remained above 95%. PARAM series has

been acknowledged in 243 publications and 34 PhDs. More than 60 HPC applications from various science and engineering domain were ported and optimized for PARAM Yuva II.

Panorama - GIS based Marine Visualization and Forecast System

Panorama is a GIS based Marine Weather Decision Support System. It processes numerical weather and ocean State global & regional forecast output, global observations, and satellite images in aid of naval operations at sea. It enables user friendly on-board 2D and 3D visualization of atmosphere as well as ocean forecast for 10 days. The project is sponsored by Naval Research Board (NRB), India. The product is successfully deployed at INMAC, Kochi in the month of August 2017.

HPC Applications: Bioinformatics

During the year, following activities were carried out in the domain of Bioinformatics.

1. An information and search portal is developed to ease storage and enable faster retrieval of variations in single nucleotide polymorphisms (SNP). Front end is enabled with multiple searching patterns from Genomic Data.
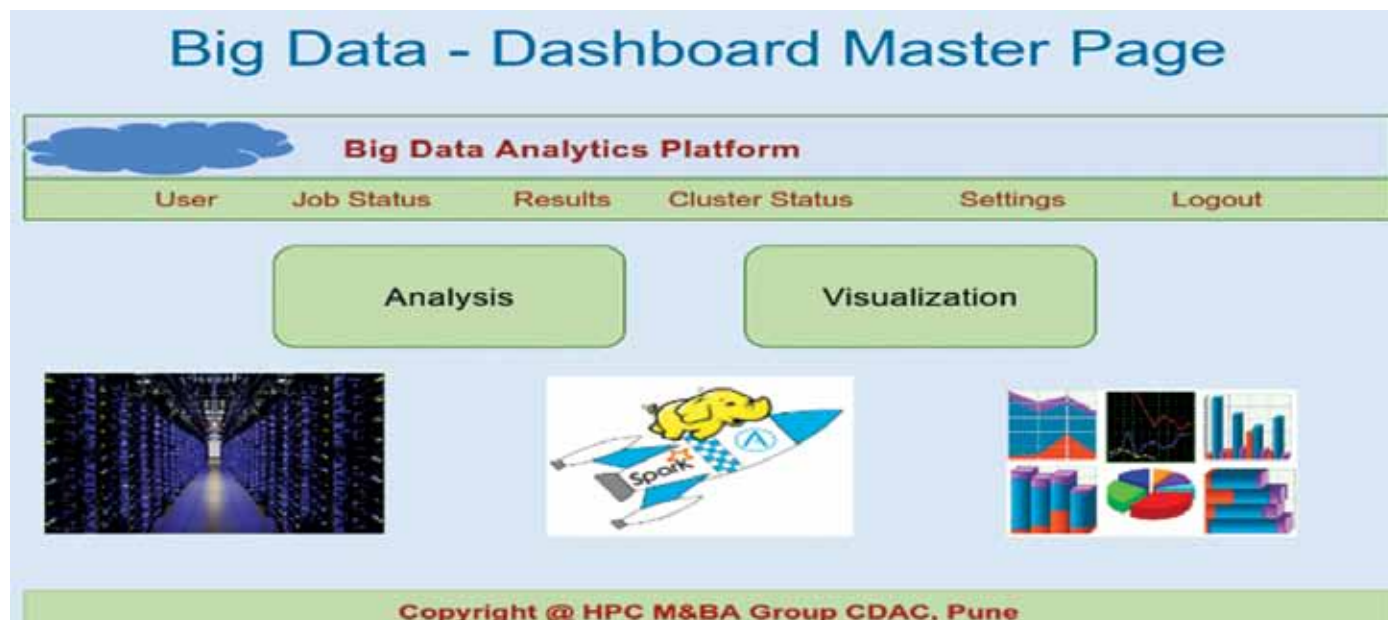
Structural Biology Big Data Analytics Dashboard Tool (SBDAD)
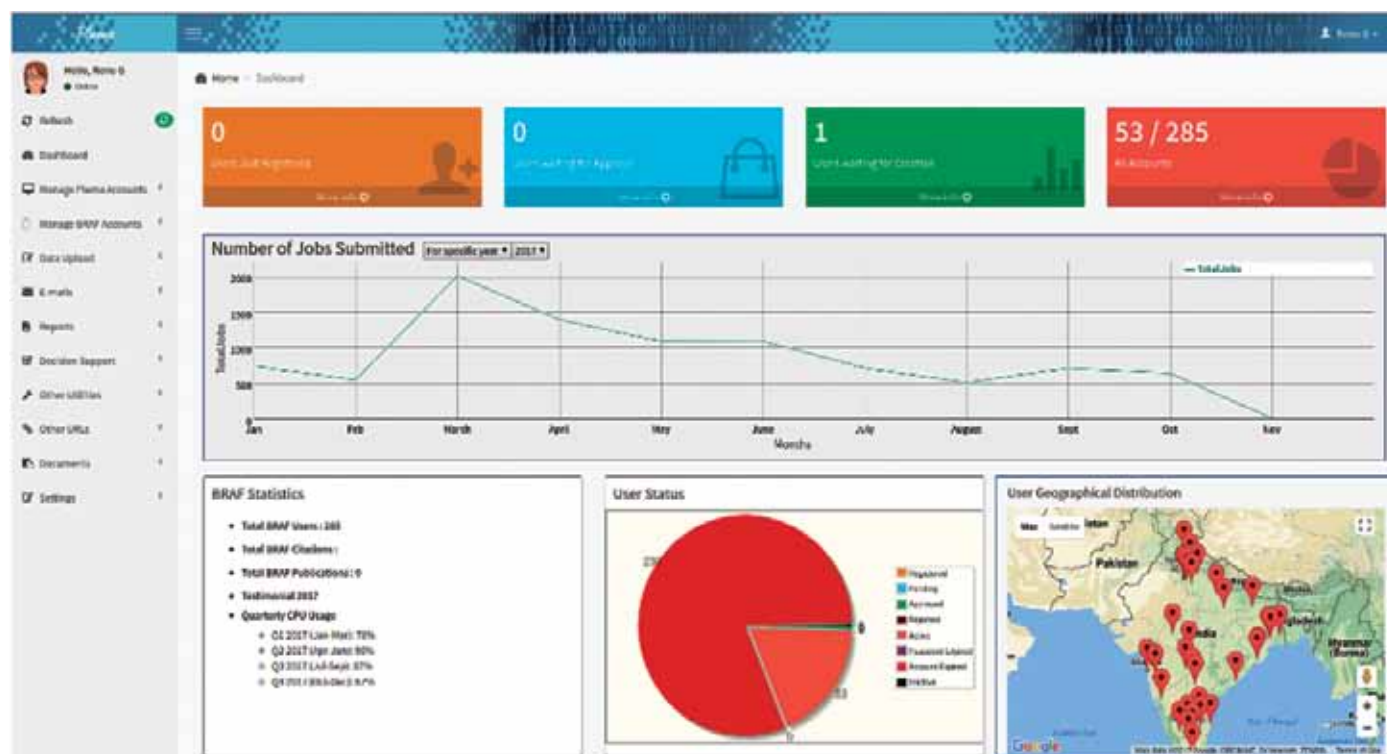
Pluma: HPC management and support software

2. Two new projects have been initiated, viz., Genovault and DBT-NE. Genovault project is funded by DBT. Genovault is related to developing software for Genomics data repository using cloud computing approach. DBT-NE related to anti-sense molecules in collaboration with Tezpur University, Assam.

9.1.2 Multilingual Computing and Heritage Computing

LILA – Rajbhasha

LILA-Rajbhasha (Learn Indian Languages through Artificial intelligence) is multi-media based intelligent self-tutoring application for learning Hindi. Hindi Prabodh, Praveen and Pragya packages offer a user-friendly tool to learn Hindi through the medium of English and other Indian regional languages. C-DAC's LILA–Rajbhasha on mobile was launched by Shri Ram Nath Kovind, Hon'ble President of India in presence of, Shri Rajnath Singh, Hon'ble Home Minister; Shri Hansraj Gangaram Ahir, Hon'ble Minister of State for Home Affairs; Shri Kiren Rijiju, Hon'ble Minister of State for

Home Affairs during Hindi Divas Samaroh function on September 14, 2017 at Vigyan Bhavan, New Delhi.

Localization of Government Portals

During the year, Localization Projects Management Framework (LPMF) was leveraged by following agencies:

1. Municipal Corporation, Gurugram website mcg.gov.in (completed on August 15, 2017).

2. CMET website cmet.gov.in (integrated on Hindi Diwas September 14, 2017).

3. Delhi RTI portal.

4. Modi-Lipi GoTranslate plugin was integrated in Government of Maharashtra websites.

5. New Indian Championship for celebration of three years of MyGov (gotranslate.mygov.in).

C-DAC also bagged projects from Ministry of Tourism for localisation of incredibleindia.org and an order from Andhra Pradesh Government for Localisation of their Brown-field projects.

Delhi RTI portal started using CDAC's Transliteration based Indian Language typing solution

Go-Translate framework was deployed for New Indian Championship for celebration of three years of MyGov (gotranslate.mygov.in)

JATAN: Virtual Museum Builder

During the year, JATAN has been deployed at National Council of Science Museums (NCSM), Kolkata. The Deployment of JATAN software at Indira Gandhi Rashtriya Manav Sangrahalaya (IGRMS) is in process. DARSHAK Mobile App has been developed and deployed at Symbiosis Society's Museum on Dr. Babasaheb Ambedkar at Pune, which provides QR Code based access to museum information for the visitors.

National Virtual Library of India

National Virtual Library of India is a project funded by the Ministry of Culture,Govt. of India. C-DAC has integrated the sample data for a wide variety of digital resources and developed the pilot version of NVLI Portal which is hosted on the cloud infrastructure provided by IIT Mumbai. C-DAC also conducted a workshop on data structuring on February 28, 2017 at New Delhi for the participants of 15 organizations under the Ministry of Culture.

Vikaspedia - Collaborative knowledge sharing portal

Vikaspedia is a multilingual, collaborative knowledge sharing platform which has been deployed as part of ongoing State /National programmes. The portal attracts about 80 million hits per month. Following applications of Vikaspedia have been deployed.

1. E-CHARAK (e-Channel for Herbs, Aromatic, Raw material and Knowledge) is developed for the National Medicinal Plants Board, Ministry of AYUSH,Govt. of India.

2. MOTHER has been launched in the states of Kerala and Assam to deliver mobile based voice alerts to MCTS (Mother and Child tracking system) beneficiaries.

3. A Knowledge sharing platform is deployed for more than 4000 Akshaya Kendra entrepreneurs of Kerala.

9.1.3 Professional Electronics, including VLSI and Embedded Systems

Adaptive Traffic control System (ATCS) for Hubli-Dharwad BRTS Corridor

C-DAC is implementing ATCS for traffic signalling at 43 junctions and 10 midblock pedestrian crossings in Bus Rapid Transit System (BRTS) between Hubli and Dharwad (22.25km) in the state of Karnataka using C-DAC Urban Traffic signal controllers (CUTE) and Composite Signal Control Strategy (CoSiCoSt) software. This shall reduce stop delay at intersections and midblock pedestrian crossings, leading to decreased travel time between the twin cities.

Commercialization and Deployment of TARANG - Digital Programmable Hearing Aid

C-DAC has developed TARANG - Digital Programmable Hearing Aid (DPHA). Transfer of Technology (ToT) of the above solution was carried to industry partners, and more than 35,000 units of Tarang have been sold through various channels.

Microprocessor Development Programme (MDP)

The project "Microprocessor Development Programme" has been approved by MeitY. C-DAC is to execute the project in two phases. In Phase-I of the project which is for one year duration, a 64-bit Quad core Processor has to be designed developed and implemented on an FPGA platform and its performance is to be demonstrated. In Phase-II of the project, which is of three years duration, a SoC-ASIC device integrating the 2.0 GHz 64-bit Quad Core processor along with peripheral IP needs to be realised. The full hardware-software ecosystem will also be developed for proliferation of the indigenous microprocessor.

Nationwide Emergency Response System (NERS)

NERS is an initiative of Ministry of Home Affairs (MHA), Govt. of India, to facilitate an integrated emergency response system to ensure a coordinated and effective emergency response service to citizens in distress. MHA is implementing this project with C-DAC as the technology partner for developing the total software solution for this. '112' is declared as the national emergency contact number. Implementation has been initiated in Mizoram and Himachal Pradesh.

Development of re-configurable, Frequency Hopping Transmitter and Receiver for long haul Software Defined Radios in HF Band and L Band (SDR-HF&L)

The product envisaged under this project is an RF front end, comprising of RF transceiver and power amplifier unit for HF band (3 to 30MHz) and L band (950-1250MHz). The product is a multi-band multi-mode unit capable of running waveforms supporting high data rate.

4-Channel SDR

This development has created a lot of interest in the defense sector. A single SDR can now replace multiple radios operating in different frequency bands. This would help them to reduce the inventory of different types of radios for various applications. As outcome of this project, orders were received from DRDO and Navy for wideband transceiver modules, baseband processing modules and SDR based VUHF receivers. Production houses ECIL and BEL have also shown keen interest in the project.

Vehicle Control Unit (VCU) as per Train Communication Network (TCN) standard for Rolling-stock applications

C-DAC has developed the technology TCN VCU, compatible for 3 phase loco provided with GTO/IGBT converters, for Chittaranjan Locomotive Works (CLW). The first VCU proto developed by C-DAC is under continuous run on IGBT loco by M/s ABB and has completed operation of about 4,00,000 km, based at Electric Loco shed, Tughlakabad, New Delhi. The system is operational since February 2013. The second VCU proto has started continuous trial, based at Electric Loco shed, Visakhapatnam from December 2016. CLW has given approval of Transfer of Technology (ToT) for the TCN based VCU developed by C-DAC to M/s BHEL Bangalore, M/s Crompton Greaves Ltd., Mumbai, M/s ABB India Ltd.,Bangalore and M/s AutometersAlliance Ltd., Noida
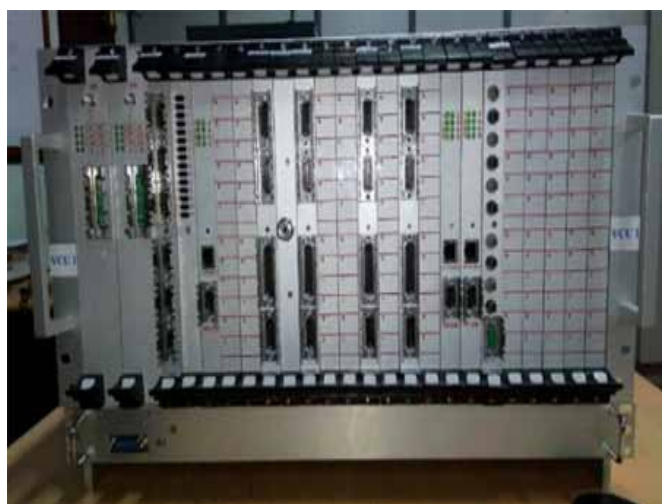
Integrated VCU Rack with SMPS, Processor, IO and TCN control cards

Integrated VCU with Enclosure for Loco Fitment
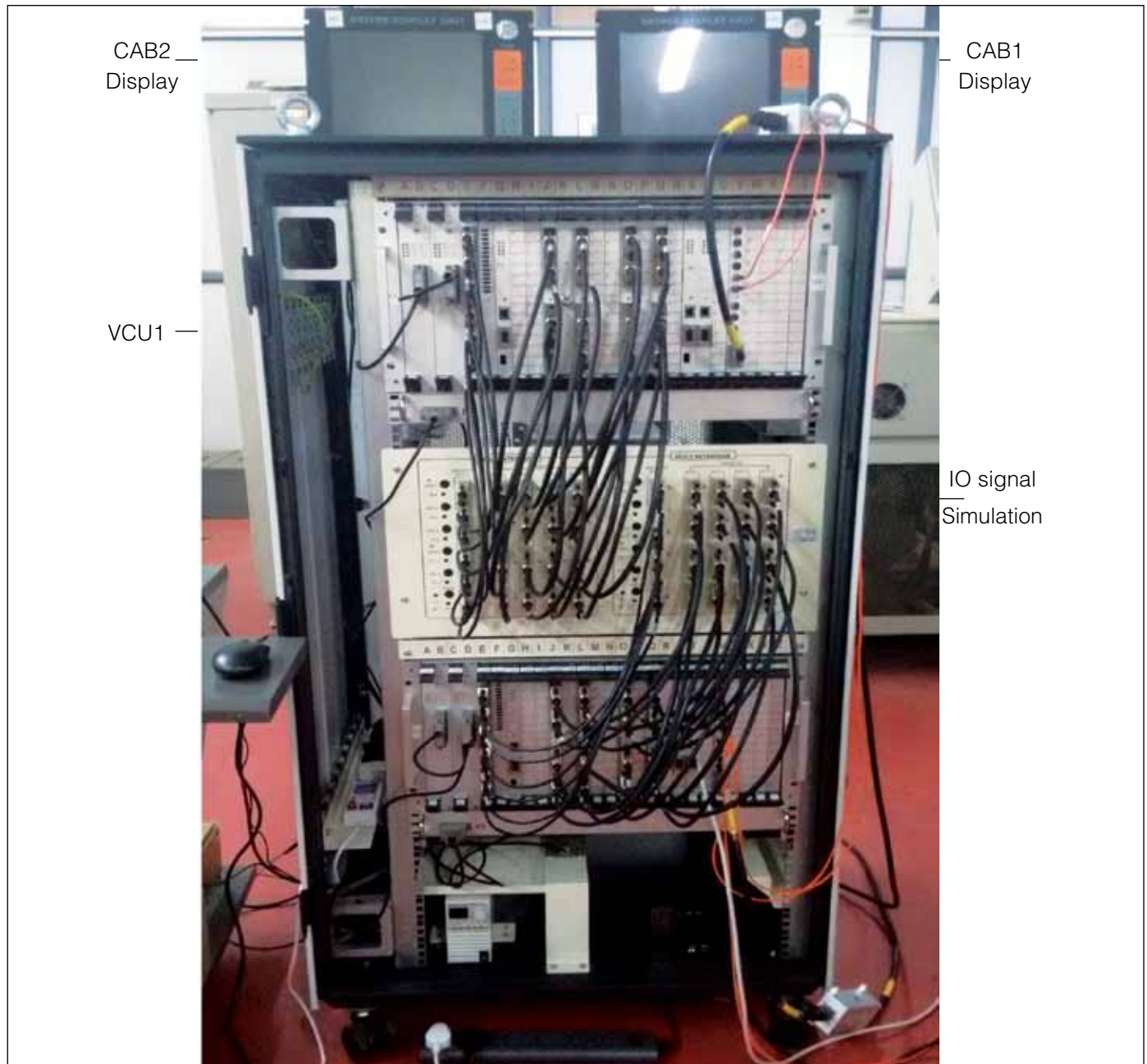
Integrated VCU functional test setup (Loco Control Simulator)

Indigenous Magnetic Resonance Imaging (IMRI) Software

MeitY has launched a National Mission programme, in the area of Medical Imagining Equipment targeting at indigenous technology development for a low cost, affordable and state-of-art 1.5 Tesla MRI Machine, to meet the large requirements of such machines in the country. IMRI software framework development has been completed by C-DAC and its integration/testing with the IMRI hardware platform, developed by SAMEER Mumbai has been carried out. MR Image Visualization is one of the activity in IMRI, which is jointly implemented by SAMEER, IUAC, Dayanand Sagar University with C-DAC being the executing agencies. Several key algorithms have been completed and validated by expert radiologists. These algorithms as packages are planned to be deployed at the hospitals of the radiologists who are TRAC members of IMRI project.

Deployment of SCADA Automation System developed by C-DAC in state-owned Meyong Hydel Power Station at North Sikkim

Deployed and Commissioned SCADA Automation system in the remotely located micro Hydel power station (2 × 2 MW) in North Sikkim. System reliability and fault tolerance are ensured at the Process Control Unit level, Communication network level and at the Computer level. The plant level Automation system is integrated with Regional level monitoring system at EPD (Energy & Power Department, Govt. of Sikkim) Zonal office at Mangan & Central Monitoring station at EPD Head office at Gangtok through the OFC/GSM Communication network.

Ultrasonic High Precision Diameter Measurement System - PreSys

PreSys has been developed to measure the diameter of pipe structures of heat-resistant composite alloy pipes employed in nuclear power plants with high precision better than 10μm in water/heavy water. It uses innovative digital signal processing techniques and real time calibration algorithm. The system is tested and accepted by BARC for heavy water reactors.

9.1.4 Software Technologies, including FOSS

Deployment and Proliferation of BOSS

During the year, C-DAC has carried out approximately 3.5 million deployments of BOSS and its variants across various States including Government and defence agencies. The system now supports 22 Indian languages.

eGovernance

1. **eBasta** is a framework to make the school books accessible in digital form as e-books. 2781 books have been published on the portal so far, from 14 State Boards and a few private publishers. About 90 school workshops have been conducted.

2. **e-Pramaan** is a centralized standard based strong multi-factored authentication system. Today 110 services are integrated and using e-Pramaan for authentication.

3. **e-Hastakshar** is C-DAC's eSign service which is an on-line platform enabling citizens to carryout instant digital signing of their documents securely in a legally acceptable form. A total of 43 application service providers are in Go-Live Level (L4) and C-DAC has offered more than 27 lakh signatures till February 2018. A total of 160 agencies are engaged at this time which include GSTN, EPFO, NIC and PMC.

4. **Mobile Seva** is a national mobile governance platform, that facilitates delivery of public services over mobile devices using mobile based channels such as SMS, USSD, IVRS and m-Apps. More than 3850 Government departments and agencies across the country have integrated their services with this Mobile Seva platform with more than 1987 crore Push SMS transactions, 94 lakh IVRS transactions, 15 lakh USSD transactions have been made. The AppStore currently hosts over 1030 mobile applications of various State and Central Government Departments.

Online Labs for Schools (OLabs)

CDAC in collaboration with Amrita University has developed Online Labs (OLabs) in multiple languages such as Hindi, Marathi, Malayalam, etc. C-DAC is working on an initiative to create the infrastructural and support framework for making OLabs accessible and usable by students and teachers across India under the project "Rollout of Online Labs for schools". As of January 2018 about 18693 CBSE teachers from 5988 CBSE schools covering most of states in India have been oriented to use OLabs and related technologies by OLabs team.

Roll-out of National e-Services of Election Commission of India

C-DAC has developed following solutions for Election Commission of India.

1. ERO-Net: ERO-Net is a web based system for seamless processing of electoral forms, management of electoral roll provides regular and simpler way of monitoring the activities at various levels and maintain the electoral health at National level. ERO Net has been developed and successfully launched in 28 States.

2. NVSP: National Voter's Service Portal (NVSP) is a web based portal (http://nvsp.in) for citizens of India. It offers various services like generation of voter information slip, locating polling station, online application for inclusion/deletion/modification in e-roll etc.

3. Electronically Transmitted Postal Ballot System (ETPBS) is developed with the help of Election Commission of India (ECI). It is used for service Voters in State elections in States of Uttar Pradesh, Goa, Manipur, Panjab, Uttarakhand, Puducherry, Gujrat and Himachal Pradesh.

Unified Portal for Employees' Provident Fund Organisation

Unified portal for Employees' Provident Fund Organization (EPFO) facilitates Online Registration of Establishment (OLRE), Universal Account Number Allocation, Electronic Challan cum Remittances, Integration with five Nationalized banks, integration with Unique Identification Authority of India (UIDAI) for demographic AADHAAR authentication for registering member KYC, integration with Income Tax Portal for PAN verification services and integration with e-Biz, e-Nivesh and Shram Suvidha Portal. The portal enables delivery of services, to more than 40 million members and more than 6 lakh establishments and handles remittances of more than ₹ 10,000 crore per month.

Online Examination System for Indian Air Force

C-DAC is developing an online examination system for "Air Force Common Admission Test (AFCAT)" and "Scheduled Test for Airmen Recruitment (STAR)". C-DAC shall build custom software to automate e-Examination solution for entire examination processing cycle of AFCAT and STAR exams from notifications to result processing with minimum human intervention and maintaining high security measures.

9.1.5 Cyber Security and Cyber Forensics

- Enhanced USB Pratirodh solution, that controls the usage of removable storage media like pen drives. Total number of downloads of the software during the year is 28192.

- AppSamvid is application whitelisting software for Microsoft Windows and there were 18412 downloads of the software during the year.

- M-Kavach is a comprehensive mobile device security solution for Android devices addressing various threats related to mobile phones. 1 lakh + users downloaded the software.

ToT agreement for Application and Device Control (ADC) between CDAC and Infomagnum IT solutions Pvt Ltd, Hyderabad

- DARPAN, a distributed Network Management System (NMS) has been deployed for managing National Information Infrastructure (NII) network, forming a distributed hierarchical NMS setup. DARPAN NMS has been deployed in seven selected States forming the lower level of the hierarchy and the master NMS at MeitY.

- C-DAC signed ToT agreement for Application and Device Control (ADC) with Infomagnum IT solutions Pvt Ltd, Hyderabad.

Information Security Education and Awareness (ISEA) Project Phase- II

Activities carried out as part of Information Security Education and Awareness (ISEA) Project Phase- II are as listed below:

- Trained 6,975 candidates as part of academic training and 811 officials as part of Government official training in association with 52 institutes.

- Conducted 74 Information Security Awareness workshops across many States covering 7229 participants and 139 Master Trainers including CBSE Teachers as part of National Awareness initiative.

- As part of indirect reach through radio/DD programmes, C-DAC conducted six live phone-in-programmes on cashless transaction security, cyber security and online gaming security on All India FM Radio and on Dooradarshan TV programme covering more than 25 lakh users in National network (Delhi), Telangana and Andhra Pradesh.

National Digital Crime Resource and Training Centre (NDCRTC)

During the year, C-DAC conducted various programmes as mentioned below:

- 59 Training Modules in various computer/digital forensic courses and covered 952 Participants from Police, Judiciary and other Law Enforcement Agencies (LEAs) across India.

- Four online courses on disc forensics have been conducted, covering 217 participants from West Bengal, Kerala, Telangana, National Investigation Agency (NIA) and other LEAs through Megh Shikshak platform at Sardar Vallabhbhai Patel National Police Academy (SVPNPA).

Cyber Forensics Lab setup for Law Enforcement Agencies

C-DAC has set up various Cyber Forensic analysis and training labs incorporating C-DAC's indigenously developed Cyber Forensic hardware and software tools. C-DAC has also supplied nearly 600 copies of its Cyber Forensic tools, including CyberCheck Suite, MobileCheck, WinLift, Advik CDR Analyser, NetForce Suite and Hardware tools such as True Imager, SIMXtractor, True Traveller and Portable Forensic Workstation. C-DAC has also conducted various cyber forensic training sessions for Naval officers, Army Cyber Group and officers at different level of the Law Enforcement Agencies.

Cyber Threat and Situational Awareness Project

C-DAC is implementing the Cyber Threat and Situational Awareness Project (TSAP) for CERT-In, MeitY, with active involvement of Government Departments, State Data Centres, Internet Service Providers, Network and Security Operation Centres, etc. TSAP setup is envisaged for the near real time detection, classification, assessment and trace back of malicious activities for generation of timely alerts and periodic reports.

9.1.6 Health Informatics

Deployment of e-Aushadhi Drug Warehousing Solution

C-DAC's "e-Aushadhi" solution is a web based Supply Chain Management System for drugs and vaccines. As per the mandate for Nation-wide rollout from the Ministry of Health and Family Welfare (MoHFW), Government of India (GoI), the solution is deployed in 16 States. During the year, C-DAC initiated State-wide implementation in Uttarakhand, Bihar, Jharkhand, Uttar Pradesh and Himachal Pradesh.

Deployment of e-Aushadhi Drug Warehousing Solution

Deployment of e-Sushrut, Hospital Management and Information Solution (HMIS)

"e-Sushrut", C-DAC's Hospital Management Information System, is a major step towards adapting technology to improve healthcare. C-DAC's HMIS solution is operational in **more than 80 Government hospitals** ranging from District Hospital to Super Specialty Hospital across the country, and caters **more than 70000 patients everyday**. Currently, the solution has state-wide presence in Rajasthan and pilot initiatives are underway in the states of Maharashtra, Andhra Pradesh and Telangana.
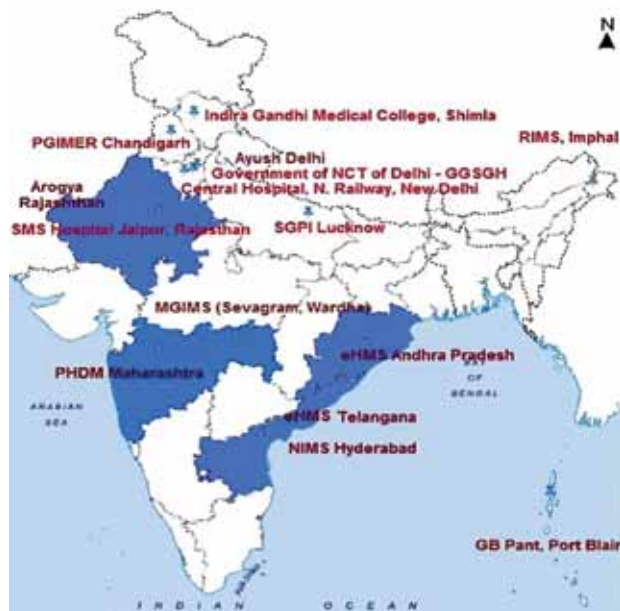
Deployment of e-Sushrut, Hospital Management and Information Solution (HMIS)

Deployment of e-Rakt Kosh, Blood Bank Management System

During the year, integration of e-RaktKosh with National Health Portal of India was completed and more than 1,300 blood banks in the country have been on-boarded in the system. Master training on e-RaktKosh was imparted to officials from 21 States at the National Institute of Biologicals, Noida with the help of Blood Cell, National Health Mission, Government of India.

Telemedicine Solutions

- C-DAC continued to extend its telemedicine services at Odisha and during the year has setup 13 e-ICU and 2 specialty nodes.

- As part of "Digital Inclusive and Smart Community (DISC)", telemedicine solutions have been deployed across various States as given below:

  o ESIC's Model Hospital Basaidarapur has been connected with three ESIC dispensaries at Katihar (Bihar), Unnao (UP) and Rudarpur (Uttrakhand)

  o ESIC dispensary, Dimapur (Nagaland), Shillong (Meghalaya) and Agartala (Tripura) connected to ESIC Hospital, Joka, Kolkata

  o Telemedicine deployment at 4 Hospitals of Rajasthan at Jodhpur and Pali

- During the year 420 Teleconsultations have been logged.

Setting up of National Resource Centre for EHR (Electronic Health Record) Standards (NRCeS)

NRCeS aims to setup and operate a Centre of Excellence (CoE) for providing tools, training and other resources in developing, implementing and using (Electronic Health Card) standards in healthcare applications within India. During the year, NRCeS issued 59 Affiliate Licenses for use/incorporation of SNOMED CT healthcare terminology, bringing the total of 236 for India. Total of more than 460 people have been trained.

9.1.7 Education and Training

Post Graduate Diploma in Advanced ICTE (Information and Communication Technology in Education) areas

C-DAC has been conducting Post Graduate Diploma programmes in advanced ICT areas such as Mobile Computing, VLSI Design, IT Infrastructure, Systems and Security, Geo-informatics, Embedded System Design, System Software Development, Internet of Things, Biomedical Instrumentation and Health Informatics, Big Data Analytics and HPC System Administration. C-DAC has trained 3053 students in above mentioned PG Diploma Courses by July 2017 batch. C-DAC shall train 3000 students by March 2018 batch for training through a network of 10 C-DAC training centres and 20 authorized training centres located in pan India.

PG Degree Awarding Courses

C-DAC also offers Master Programmes in collaboration with leading Universities in advanced areas of ICT. The new M.Tech programmes launched are in various disciples including Advanced Computing and Data Sciences, Embedded systems, IoT and VLSI Design.

National Skill Development Programme

During the year, 500 students have been trained as part of this initiative. As part of National Skill Development initiative, C-DAC has initiated various industry relevant formal and non-formal training programmes to generate skilled manpower, which includes short-term certificate courses and Skill Development Programmes targeted towards Engineering students.

Pradhan Mantri Gramin Digital Saksharta Mission (PMGDISHA)

MoU has been signed between C-DAC centres and CSC e-Governance Services India Ltd. for jointly conducting online remote proctored examination for learners trained under the PMGDISHA.

Automation for GATE/JAM 2017 Exams for IIT's and IISc's

GOAPS/JOAPS (GATE/JAM Online Application Processing Systems) provide automation of candidate registration, online application filling, application

scrutiny, seat allocation, hall ticket issue, answer-key verification, answer-key challenge, result processing and analysis, score generation, choice filling, application scrutiny and seat allocation for about 11 lakh candidates for GATE & JAM examinations. GATE & JAM 2018 examination process runs for 8-10 months. The system has been in use for over 5 years, without missing a single deadline.

Capacity building in Electronic Product Design and Production Technology

During the year, C-DAC has trained more than 137 persons by designing and launching several formal and non-formal (short-term and long-term) courses ranging from certificate, PG diploma, Post graduate level courses (M.Tech) and also undertaking research (MS/Ph.D) programmes. It is expected to train more than 500 students by March 31, 2018.

9.1.8   North-East Initiatives

1. C-DAC has developed and deployed Glacier Lake Monitoring System, first-of-its-kind Glacial Lake Outburst Floods (GLOF) early warning system in the world at Kupup Lake (13000 ft) & South Lohank Lake (17000 ft) in North Sikkim.

2. C-DAC has developed the Software for Online ABT Meter based System and deployed the same at Meghalaya State Load Dispatch Centre (SLDC).

3. C-DAC is developing a fully equipped vehicle mounted TETRA communication system, which can setup an emergency communication system at the disaster site with connectivity to Remote Control Centre at North Eastern Space Application Centre over VSAT link.

4. C-DAC has designed, developed and deployed Mobile based integrated surveillance system for malaria along international borders of North East Region, India (iMoSQuIT) in collaboration with Regional Medical Research Centre (RMRC)/Indian Council of Medical Research (ICMR). C-DAC team has given training to Medical officers, Health workers (ASHA, MPW, MTS) in Ambassa, Dhalai district, Tripura. Data collection

has been initiated in Primary Health Care Centres (Ganganagar, Gandachara, Raishyabari, Dalapati) from Dhalai district, Tripura reaching out to 64 paras (villages).

5. C-DAC has designed, developed and deployed Tuberculosis Screening, Diagnostic & Treatment Adherence System using ICT & Mobile Technology comprising Web, Mobile & IVRS components for TB treatment Adherence. Deployment in Primary healthcare centre covering different Tuberculosis units will be carried out in collaboration with RMRC and ICMR.

6. C-DAC has deployed and commissioned SCADA Automation system in the remotely located micro Hydel power station (2 x 2 MW) in North Sikkim. The plant level Automation system is integrated with Regional level monitoring system at EPD (Energy & Power Department, Govt. of Sikkim) Zonal office at Mangan and Central Monitoring station at EPD Head office at Gangtok through the OFC/GSM Communication network.

9.1.9   International Initiatives

1. Set up India – Kazakhstan Centre of Excellence in ICT (IKCEICT) and Computer Labs in 37 Schools of Tajikistan were completed during the year.

2. C-DAC completed development of Web based Integrated Office Automation System and CARICOM web Portal and it has been handed over to CARICOM Secretariat, Georgetown, Guyana. Specialized IT training has also been provided as part of this project.

3. Setting up following centres of excellence and computer labs in various countries:

    a) Centre of Excellence in Software Development and Training (CESDT) in Cambodia, Lao PDR, Myanmar & Vietnam

    b) Centre of excellence in IT at Lima, Peru; Ibarra, Ecuador; Casablanca, Morocco; Cairo, Egypt; Port Moresby, Papua New Guinea; Port Vila, Vanuatu; Guyana.

c) Central Asia e-Network to offer Tele-education and Tele-medicine services to support the 5 Central Asian countries

d) Computer Labs in 50 Schools of Vayots Dzor Region of Armenia

4. C-DAC has initiated activities towards setting up of centres of excellence at Nieu, Samoa, Cook Islands, Fiji and Nauru.

9.2 Society for Applied Microwave Electronics Engineering & Research (SAMEER):

Society for Applied Microwave Electronics Engineering & Research (SAMEER) is an autonomous R&D institution under MeitY, Govt. of India. SAMEER has five centres located at Mumbai, Chennai, Kolkata, Visakhapatnam and Guwahati.

• Mumbai Centre – The Centre for Microwave Research (CMR) specialises in the areas of Medical Electronics, Radar Instrumentation, Atmospheric Instrumentation, Signal Processing, High Power Radio frequency and Microwave Components and Systems, and Photonics.

• Chennai Centre – The Centre for Electromagnetics (CEM) specializes in the areas of Antennas, Communications and Electromagnetic Interference /Compatibility (EMI/EMC). It is also involved in research and development in the areas of RF & Microwave communication, Digital Signal Processing, antennas and electronics packaging. As a new initiative, second campus of SAMEER-CEM at Perungudi, Chennai has been built to establish Electronics Design Centre (EDC) for realizing System on Package (SOP).

• The Centre at Kolkata – The Centre for Millimeter wave Technology specializes in the areas of Antenna and Millimeter wave technology. It is involved in the development of RF, Microwave and Millimeter-wave (MMW) components, sub-systems and systems for various users in the country. The centre has established a state-of-the-art millimeter wave laboratory with test, measurement, simulation, fabrication and assembly facilities and a Compact Antenna Test Range (CATR) facility for evaluation of antennas,

radomes and scattering study with support of MeitY, at its second Campus of SAMEER, at Salt Lake, Kolkata. NABL accredited EMC test and measurement facilities have been established at Mumbai, Chennai & Kolkata and offers comprehensive test, consultancy, training, engineering and research services to national agencies and electronics industries in India.

- Centre for Electromagnetic Environmental Effects (E3), Visakhapatnam is being established at Visakhapatnam Dist, Andhra Pradesh in 13 acres of land allotted by Govt. of Andhra Pradesh. The E3 facility specializes in a variety of capabilities, ranging from box level to complete system level testing to cater to the increasing requirement from the strategic sectors.

- Centre for High Power Microwave Tubes and Components Technology is also being established at the Campus of Indian Institute of Technology, Guwahati for development of high power microwave tubes/components as well as research and development activity for design and development of magnetrons and circulators at GHz.

Phased Array SODAR Activities

The Mobile Sodar, fitted on a Eicher make minitruck and powered by solar panel, developed by SAMEER is deployed at IMD, Airport Observatory Premises, Kolkata in March 2017.

The smooth functioning of SAMEER Phased Array Sodar Systems at NPCIL Kaiga, S.K University Anantapur, NESAC, Umiam, Shillong, NPCIL Kakrapar and SPL, VSSC, Trivandrum are supported through AMC and spare parts supply.

Development of Conformal Antennas

Multi-arm multimode conformal antennas have been developed for broadband omni-directional coverage. A two element array of multi-arm multimode conformal antennas has been fabricated and tested by exciting in various phase differences for beam tilting. The radiation pattern has been measured. RCS has been measured for different spiral mode excitations. The project has been reviewed and recommended for closure.

Spiral Antenna array

Design and Development of Switched beam array antenna for 5G Technologies at 60GHz

Design and Development of various types of array antennas for communications applications, is of immense importance and immediate interest for the upcoming 5G technology developments. Especially novel antennas that can provide, switched beam from the base station to the mobile user with small foot print will be the most desired for the project requirements. The requirements of sub-millisecond latency and bandwidth limitation in traditional wireless spectrum have driven the cellular networks, to break the Base Station (BS) centric paradigm and thus enabling the future 5G technologies. These 5G technology demands, large beam forming antennas with high gain characteristics in order to extend the coverage, while reducing interference and improving link quality at the cell edges. In the proposed approach, a periodic arrangement of electrically small unit cells : (viz. antenna element), are implemented for the specified application of beam switching. Beam switching will be accomplished by varying the phases between the antenna ports. Proposed antenna configuration uses multiple ports integrated into a single device, which is capable of steering the radiation pattern to a desired predefined direction. The radiation pattern with switching options exhibit wider elevation plane beam width and the small narrow azimuth plane beam width.

403 MHz Radiosonde System

SAMEER is executing a sponsored project to develop and fabricate 403 MHz Radiosonde Ground system and balloon-borne device with sensor package to measure the atmospheric pressure, temperature and humidity and transmitter, for India Meteorological Department (IMD).

Radiosonde Ground System

The development of Radiosonde Receiver ground system as well as balloon payload have been completed. Eight units of Radiosonde ground systems were already delivered and the remaining seven units are ready and expected to be delivered shortly. These systems shall be deployed in the field by IMD.

Indigenous Magnetic Resonance Imaging system:

SAMEER is the Nodal agency to execute the indigenous development of Magnetic Resonance Imaging System (MRI) with collaborating partners i.e. CDAC, IUAC & MIRC. During last one year, lot of progress has been made in designing various subsystems. Many MR coils have been fabricated & successfully tested. The Head Birdcage Coil and its supporting circuitry has been developed and tested. The Flat Spine Array both 4-Channel and 8-Channel are developed.Phased Array

Coils Circular ring structured and Rectangular Ring Structured 8-Channel Cardiac Array is developed and tested with phantom. The 2 KW of Power is generated successfully with the combined chain of Driver amplifier, combiner and high-power amplifier, with amplifier setup gain of 46dB. The signal generation and receiver is on the verge of completion. The first integration with other collaborating agencies were conducted in November 2016 where an image was given as input to the partially developed system and same image was obtained as output. A cuboid meta-material unit cell with $\mu = -1$ is realized. A periodic configuration consisting of the proposed 3D unit cell is realized for magnetic field focusing application. The unit cell of subwavelength consists of capacitor loaded planar printed rings on each face of cuboid of dimension $15 \times 15 \times 16$ mm^3. The unit cell is designed by considering the effect of capacitor's tolerance on the resonant frequency. A flat

(a)

(b)

(c)

(d)

(e)

(f)

Fabrication steps of metamaterial based flat lens

lens of $270 \times 270 \times 16$ mm^3 made of $18 \times 18 \times 1$ periodic array of proposed unit cells is fabricated and tested. The fabricated flat lens exhibits magnetic field focusing at 64MHz with an improvement of 10dB as compared to the power without the flat lens. The measured results are in good agreement with simulated results.

Application of EM Wave Based Technology for Disinfection of Grains, Pulse and Seeds for Safe Storage

Indian Council of Agriculture Research has sponsored a project titled "Application of EM Wave Based Technology for Disinfection of Grains, Pulses and Seeds for Safe Storage"with the objective of developing an Innovative electronics and electromagnetic based disinfestations for safe management of grains, pulses and seeds. The grains will be exposed to high power Electromagnetic radiations in an RF based disinfestation system. The thermal gradient between the pests and the grains ensures destruction of pests while keeping the grains intact. Such a system will limit the food wastage to a great extent. During the last one year substantial progress has been made in the project. The parallel plate applicator model has been design and simulated. The electrical characteristics of simulated model have been measured. The test model of parallel plate applicator for RF dis-infestation has also been designed and developed. The system is tested upto 200W RF power in open loop for high power.

Smart warehouses with Application of Frontier EM & Electronics based Technology (S.A.F.E^2.T.Y.):

Department has sanctioned project titled "Smart warehouses with Application of Frontier EM & Electronics based Technology "with the objective of having an indigenous programme for ensuring food safety. The objective will be achieved by developing online moisture measurement based on Dielectric properties of the material, E-Vision system for quality characterization of rice, high power RF system for thermal disinfestation and controlling moisture, temperature relative humidity sensors, and a centralized warehouse management. SAMEER is the nodal agency for the S.A.F.E^2.T.Y project

and it is not only responsible for design, development, system integration and testing but also for the overall technical and financial progress, co-ordination with other participating agencies and deliverables from the project. During last one year a lot of progress has been made in the project. Sensors for online moisture measurement, offline test structure for prototype measurement and 5.81 GHz transceiver has been developed successfully. For RF disinfestations system, design and development of high power parallel plate applicator and 1 KW RF amplifier @27.15 MHz has been completed successfully. Also, successful integration of disinfestation system (DDS + Amplifier + Applicator) is done.

High Power Parallel   Plate Applicator

Research and Development of High Energy Electron Linear Accelerator Technology for Medical and Other Applications:

Radio-isotopes are widely used in industry and medicine. Around 140 radio-isotopes are used worldwide in medical applications such as, diagnostic, therapeutic and preventive purpose. Medical isotopes are used in non–invasive nuclear diagnostic imaging techniques to identify illnesses such as heart disease and cancer at an early stage. The most widely used medical radioisotope is 99 mTc (Technetium) and an estimated 70,000 medical imaging procedures take place daily around the world. As large majority of 99mTc is produced from nuclear reactors, which are ageing and slowly shut down due to environmental considerations, there is a shortage of 99 Mo and 99 mTc. High Energy Linac offers clean alternative production methods.
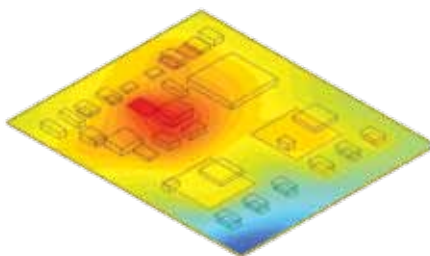
Temper

With SAMEER having a core expertise in linac systems, a project to develop the 30 MeV Linear accelerator system for irradiation of Molybdenum 100 to convert it to Molybdenum 99 from which, extraction of Technetium 99 has been initiated with the funding from MeitY.

The phase 1 of the project is under progress, where the design of major subsystems has been completed. The accelerating structure and electron gun has been finalized. Radiation lab layout has also been finalized.

Liquid level probe

Measurement of levels of liquids especially in harsh industrial environment poses a significant challenge. FMCW radar in X-band is being developed to accurately measure the level of corrosive liquid in a storage tank at very high temperature stored in a tank with accuracy of few millimeters. The probe needs to be designed to withstand temperature in excess of 200 degrees Celsius.

Hardware / Sub systems of Level sensor

Power supply board   Digital Board   Antenna

Back plane   Microcontroller card   RF Unit

Thermal Simulation of Multilayer Printed Circuit Board

Thermal design of a multilayer printed circuit board was carried out for onboard satellite application. The board consists of several Integrated Circuits and Components mounted both on its top side and bottom side and is specified to work in 20°C vacuum environment.

The Thermal design work had addressed modeling of all critical components with their respective heat flux. Each layer of the board was modeled with corresponding copper traces. Heating due to current flow through copper traces (Joule heating) is also considered for the thermal analysis. As there is no convection, the temperature of components had increased. As a solution, suitable thermal vias are incorporated underneath the critical components to spread the heat across the PCB thickness. With the optimization using **FloTHERM** simulations, the temperature of critical components has been reduced.
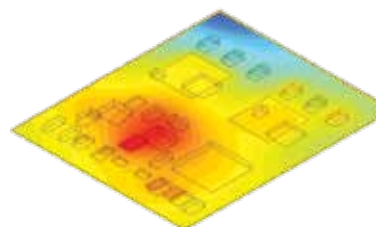
Temper

Thermal design of Power supply enclosure

Thermal design of Power supply cum power divider enclosure for airborne application is completed. Total dissipation from the system is around 20 Watts. As the circuit boards are housed inside a sealed enclosure the heat transfer by convection is low and the temperature rise of critical components was high. As a solution heat transfer path has been designed to effectively conduct the heat from electronics devices such as DC-DC convertor, MOSFET, power divider etc. to the outer surfaces of the enclosure. Heat sink is designed and realized on the surfaces of the enclosure to dissipate heat to the ambient. Parametric study was done to optimize the fin thickness, fin spacing and fin height to maintain the rise of case temperature of critical components within 20°C with respect to specified ambient temperature.

Thermal design of Airborne Patch Antenna

Thermal design of Patch antenna for application in airborne communication system has been carried out considering the kinetic heating due to air friction. Kinetic heating takes place on the outer surface of the radome, while the vehicle is moving at very high speed. Heat generated due to kinetic heating is a major concern in design of antennas for airborne systems. Temperature distribution across the thickness of the radome is predicted. Computational fluid dynamics analysis was undertaken to predict heat transfer from the radome to the patch antenna considering the operating time period. Thickness of the radome, heat transfer from radome to patch antenna etc. have been optimized for improved thermal performance in order to maintain the patch antenna under safe operating temperature limit.
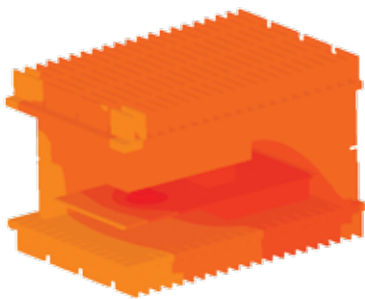
Prototype of Airborne Patch Antenna

Dual Band (S/C-band) Dual Linearly Polarized Microstrip Antenna

Shared aperture configuration has been employed to develop this microstrip antenna for S- and C-band communication. The antenna is dual feed dual linearly polarized at both S- and C-band. The impedance bandwidth is 23 % at C-band with an inter-port isolation better than 32dB. At S-band it yields 4.5% matching bandwidth.
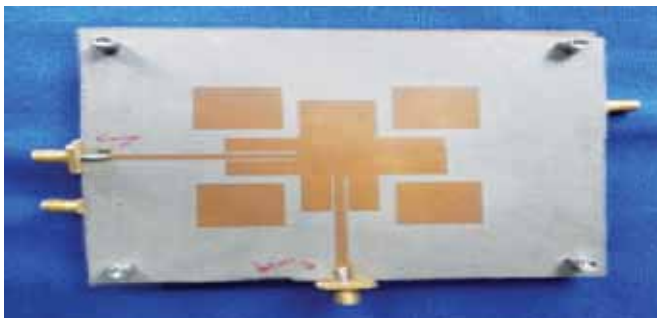
S- and C-Band dual linearly polarized microstrip antenna

Design and Development of Two axes Stabilization system

This two-axis stabilization system development at Ku-band was undertaken with an objective to track targets within a specified range and angle at a millimeter-wave frequency. The system accepts command from the user via serial interface and orient the antenna towards the target within a predetermined time using servo control mechanism. This active multi-frequency pulse Doppler monopulse tracking system operates with range channel gating. The system continuously tracks the target in azimuth and elevation plane, and generates the errors signal necessary for tracking. The antenna receives RF signal from target direction and the subsequent system analyzes the received signal to determine the target position. All associated devices and sub-systems like slotted waveguide array antenna, comparator, exciter, RF and IF receivers have been designed and developed.

A prototype of the two axes gimbaled RF tracker

Ku-band 3-channel receiver

A three channel MMIC based Ku-band RF front end receiver has been developed. It down converts a 17GHz RF signal into a 200MHz IF signal. The down conversion has been realized using a single stage converter, which is an important achievement. The three channels have been realized in a single module, which has made it compact, which is a critical requirement of the project in view of the stringent dimensions and weight.
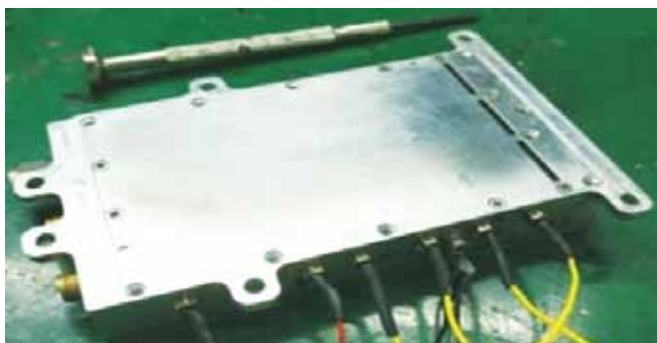
Ku-band 3-channel receiver

W-band six-port receiver

The objective of this assignment is to measure the reflection coefficient and phase of an unknown device under test. The six-port receiver consists of a hybrid along with VCO and 4 detectors. The six-port hybrid has been designed and developed as a major constituent. It is designed using power divider and 3 short slot hybrids. It operates over 91GHz to 97 GHz. The measured insertion loss for the hybrid is less than 1.5 dB; return loss and isolation are better than 20 dB. The amplitude and phase imbalances are less than ± 0.5dB and ± 2.5° respectively. The dimensions of the hybrid are 60mm × 60mm × 22mm.
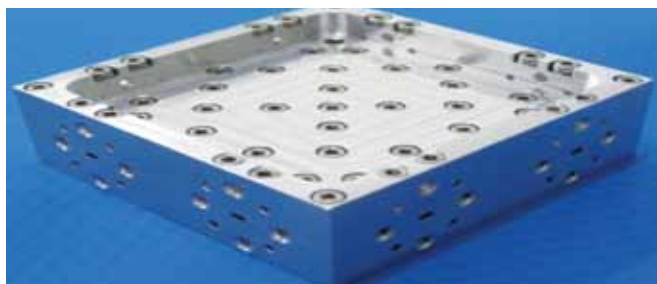
W-band six-port hybrid

EM Modeling laboratory is established with High-End Workstation PCs and 3D Electromagnetic Simulation software with state-of-the-art numerical methods for solving wide range of electromagnetic problems encountered in various industries. The softwares are suitable for solving geometrically complex models to electrically large structures and can address the failure aspects of the product during product design phase itself. The EMI/EMC modeling and Computational Lab consists of various 3D EM tools with advanced simulation methods and hardware equipment to solve the all the EMI/EMC problems of both civilian and defense products. Installation and training on the specialized softwares viz., **ANSYS HFSS, CST, FEKO** is completed.
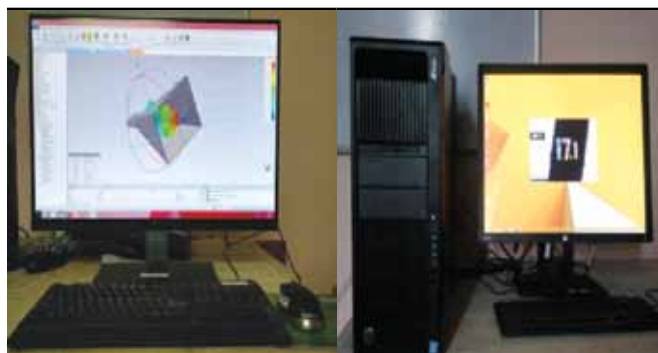
Considerable progress was made in civil works of the centre at Visakhapatnam. Compound wall construction along the site boundary is completed by CPWD and it is handed over to SAMEER. Civil works of Administration and utility buildings completed 90% and works of other buildings viz., laboratory, Security and canteen and guesthouse Buildings completed 65% including Electrical and Mechanical services.

9.3 Centre For Materials For Electronics Technology (C-MET)

Centre for Materials for Electronics Technology (C-MET) was set up as a registered Scientific Society in March 1990 under the then Department of Electronics (now Ministry of Electronics & Information Technology) as a unique concept for development of viable technologies in the area of materials mainly for electronics. C-MET is operating through its laboratories situated at Pune, Hyderabad and Thrissur. The objectives of C-MET are:

- To establish technology up to pilot scale for a range of electronic materials and transfer the same to industry for commercialization.

- To establish relevant characterization facilities.

- To undertake applied research activities in the areas of its operation.

- To establish national data base on Electronic Materials.

9.3.1 C-MET's Laboratories & their Core Competence

C-MET's R&D activities have been implemented in three laboratories at Pune, Hyderabad and Thrissur. Each of these laboratories has its own area of specialization with requisite infrastructure and expertise. This approach has proven to be successful in creating core competence at each laboratory as follows:

- **Pune Laboratory**

  Materials for Electronic Packaging

  Materials for Renewable Energy

  Nano-materials /composites,

  High pure chemicals and specialty polymers

- **Hyderabad Laboratory**

  Ultra High Pure (UHP) Materials

  Compound Semiconductors

  Refractory Metals, Alloys,

  Restriction of Hazardous Substances (RoHS) and E-Waste processing

- **Thrissur Laboratory**

  Microwave Dielectrics

  Multilayer Ceramics

  Actuators and Sensors

  Nanomaterials and Thin Films

  Aerogels & Graphene based supercapacitors

  Transparent Conductive Oxides (TCO) materials

9.3.2 C-MET's major activities

No	Core Programme	Criteria	Broad Objectives
1	Integrated Electronics Packaging	Low temperature co-fired ceramics (LTCC) is the logical extension of Thick film materials research already being done at C-MET and this is the only LTCC facility in the country	• Development of process at prototype level indigenous materials, circuits and devices in LTCC and to support strategic sectors. • LTCC Thrissur part: Indigenous development of LTCC material and tape. • Development of flexible microwave substrates and resonators for Microwave circuit applications
2.	Nano-materials and Devices	• Development of Transparent Conducting Oxide based Plasmonic materials and devices. • Synthesis of nanomaterials by plasma. • Nanomaterials for conventional and optical sensors • Nanostructures for solar hydrogen production, solar cells, fuel cells and thermoelectric cells	• To develop low loss transparent conducting oxide based plasmonic materials and devices. • Large scale synthesis of metal, metal oxide and metal nitride nanopowders by thermal plasma. • Development of nanomaterials for sensing applications in Smart cities.

No	Core Programme	Criteria	Broad Objectives
3.	Ultra High Purity Materials & Compound Semiconductors	• Expertise availability at C-MET and requirements of the products by strategic sectors	• To develop the technology and product upto pilot plant level and supply to meet the input materials requirements of strategic sectors e.g. Space, DRDO and DAE
4.	Materials for Renewable Energy	• Import substitution to meet Renewable energy input material requirements. • Solar hydrogen production by semiconductors • Materials for Li ion rechargeable battery • Solar cell material and devices • Thermoelectric materials and devices	• Develop process technology and supply of materials for solar energy and other renewal energy industries. • Develop semiconductor nanostructures for photocatalytic H2 generation by water and H2S splitting • Develop nanoscale cathode, anode and allied materials for different battery applications • Develop materials and fabrication of solar cells
5.	Piezo-sensors and Actuators	• Sensors/Actuators: Sensors and actuators are the backbone of any smart device. Essential for sensing various inputs and precise control of micron level displacements. C-MET has gained expertise in humidity, temperature, gas and photo sensors and on wide spectrum ranging from bulk to thin films to thick films to varieties of piezo actuator designs including polymer-ceramic composites.	• Development of various sensors in alignment with the SMART CITY programme of GoI such as sensors for proximity, security, gas, temperature, humidity, etc. • To develop early breast cancer detection system with highly accurate thermal sensors • Textured piezo ceramic through tape casting for improved actuation • Variety of piezoelectric actuators and devices for strategic, automotive and medical sectors.
6.	Electronic Waste and RoHS	• Expertise availability in C-MET for recycling, extraction, recovery and Characterization of metals and toxic elements and compounds	• E-waste : Development of pilot plant technology for environmentally safe recycling of E-waste and extraction and recovery of precious metals • ROHS: Characterization of electronic and other materials and products as per NABL requirements and certification of the products

9.3.3 Major Achievements

Hafnium Sponge for Strategic Applications: Demonstration of the process, production facility with a capacity of 320 kg per annum hafnium sponge has been set up at C-MET Hyderabad

Silicon Carbide (SiC) Semi-insulating Single Crystal for High Temperature, High Voltage and High Frequency Electronic Applications: C-MET, Hyderabad, has undertaken SiC single crystal growth process facility to develop SiC wafers required for substrates to be used in GaN technology. This is India's first ever initiative to develop SiC based electronic devices. Process technology demonstrated to grow 6H and 4H SiC Single Crystals.

Recovery of Precious Metals from Electronic Waste: PCBs (C-MET, Hyderabad): In order to develop the cost-effective environment-friendly solution for e-waste recycling technology, C-MET developed environmentally Sound Methods for Recovery of Metals from Printed Circuit Boards and setup a demonstration plant at E-parisara, Bangalore.

First Government owned Restriction of Hazardous Substances (RoHS) test Laboratory: Service to Industry (C-MET, Hyderabad): C-MET has created a unique RoHS testing facility with the financial support from MeitY. It is NABL accredited laboratory with certificate No. T-1780 in the area of chemical testing. 1220 samples were analysed for RoHS/Non-RoHS and as internal samples, served 87 companies for RoHS compliance testing during the 2016-17.

Low Temperature Co-fired Ceramic (LTCC) Packaging Technology (C-MET, Pune) and Development of Indigenous LTCC Tapes: C-MET possesses full-fledged LTCC fabrication laboratory. The facility is housed in a modest 150 m2 of class 10000 clean room.

Thermal Sensor Based Monitoring System for the Early Detection and Screening of Breast Cancer: C-MET has developed a wearable device by using high sensitivity thermal sensors for the early detection and screening of breast cancer. The initial trials were conducted and the results are very promising. During the year 2016-17, 10 numbers of wearable devices with different sizes were made. First phase clinical trials were completed with 75 patients and 200 volunteers. The results obtained using C-MET developed wearable devices are in line with standard diagnostic tools namely Mammography.

Cristobalite (High pure Silicon Oxide): C-MET has developed a technology for the production of space qualified phase pure cristobalite in pilot plant scale. ISRO successfully used cristobalite supplied by C-MET in their Space capsule recovery experiments.

Demonstration Facility of Super Capacitors at C-MET, Thrissur: A pilot-scale demonstration plant for production of aerogel supercapacitor has therefore undertaken for the first time in the country to facilitate the transfer of technology for commercialization for developed aero-capacitors upto 35 F capacitance at C-MET, Thrissur.

9.3.4 Technologies ready for transfer to industry

- Photopatternable Silver and Photoconductor (CdS) thick film pastes for Photo Sensors

- Development of Lead Free X-Ray Absorbing Materials and Medical Apron

- Synthesis of Nano-ZnO

- Synthesis of Cristobalite

- Microwave substrates with dielectric constant values 6.15 and 3.0

- Quickly rechargeable emergency lamp

- Piezoelectric composition

- Indigenous Technology for production of Carbon aerogel

- Graphene based super capacitor

9.3.5 Research Performance Indicator:

- 52 Research publications in peer-reviewed journals

- 53 Presentations in Conferences and Symposia

- 43 Invited talks

- 8 Awards and Honors

- 8 Patent applications

- 1 Technical Report

9.4 ERNET

9.4.1 NASSCOM–MeitY–ERNET Centre of Excellence (CoE) for Internet of Things (IoT)

NASSCOM-MeitY-ERNET CoE for IoT was setup in June 2015 with the overall objective of enabling India as technology hub for emerging technologies. In addition the CoE will support the government initiatives in the social areas such as agriculture, healthcare, water, transportation, energy, security and privacy of data. The CoE is funded 50:50 on Public Private Partnership (PPP) model between DeitY and NASSCOM through its industry partners.

As a part of this project, NASSCOM has setup a Internet of Things (IoT) lab at Diamond District facility, and it was formally inaugurated by Shri Ravi Shankar Prasad (Hon'ble Minister of Electronics & IT) and Shri. Priyank Kharge (IT Minister in Govt of Karnataka) in July 2016. The lab is being used by start-ups to work on technical design to product prototyping by way of democratising innovation in collaboration with academic/ industry partners. Total of 22startups incubated at CoE and most of them have prototypes and under which 4 patents have been filed. These start-ups are at various stages of commercialization namely – alpha trial with customers, beta trial with customers and field deployments and few received funding. Some of these start-ups were selected under various international programmes like ZF pitching session at Germany and ITAC/CEATAC Japan (2016).

Also, meetups were organized between start-ups and investors. Currently signed up with 12 strategic and 6 technology partners.

Under academic engagement plan, IoT curriculum group has been formed for active development of courseware for IoT. MoU has been signed for collaboration with Georgia Tech University, GIIC Guiyang China, IIC and with ICRISAT for demonstration of agricultural technology benefits.

Further, CoE organized the tech-talks from academia/ industries, academic community meet between academic community and industry partners, IoT innovation challenge for engineering colleges, workshops on current trends for academia/start-ups. Also, hackathon was organized at Hyderabad in November 2016 along with ICANN on the theme

of "Smart Cities/ Smart Villages" and winners were felicitated by Hon'ble Minister of E&IT Shri Ravi Shankar Prasad and ICANN Chairman Shri. Steve Crocker.

NASSCOM –MeitY– ERNET Centre of Excellence(CoE) for Internet of Things (IoT)

9.4.2 LiFi Experimental Testbed

ERNET India has initiated internally funded Li Fi pilot project jointly with IIT Madras for the duration of 2 years (2017-19). The objective is to study LiFi as an

alternate communication technology and perform visible light communication experiments and explore LiFi opportunities in various deployment scenarios such as smart city application. ERNET has setup LiFi internet

evaluation kit from leading vendor for the purpose of demonstration of LiFi capabilities, evaluation and Indoor performance experiments.

As part of indoor experiment, measurement of power received at different coordinates & outage analysis by varying distance was tested in Line of sight (LOS) settings. The measurement of outage analysis based on the reflection of colors was also tested in Non Line of Sight (NLOS) scenario. The above test results were published in APAN44.

9.4.3   IoT Activities in Smart Grid

• ERNET India in collaboration with Central Power Research Institute (CPRI), autonomous society under the Ministry of Power, has been evaluating a real-time integrated approach of power system network and IoT devices in the area of Smart Grid.

• ERNET is also evaluating 6LoWPAN based Smart Metering prototype using LoRA operating in 865-868MHz. Since LoRA can support single-hop long range communication as opposed to the short range multi-hop mesh, LoRA end nodes can reach the backhaul network better in sparse deployment scenario.

• ERNET is currently in discussion with CPRI along with academia for undertaking Cyber Security initiative for Smart Grid. Further, SDN approach to Smart Grid Security is also being explored.

9.4.4 Development/renovation of Government/ State Govt. websites accessible for Persons with Disabilities (PwD) as per GIGW /WCAG. 2.0 (A, AA level)

Under Accessibility India Campaign, one of the target is to make all Govt./ State Govt websites accessible to all. For this Department of Empowerment of Persons with Disabilities (DEPwD) has funded ERNET India to make State Govt. websites accessible as per GIGW and WCAG 2.0 (A,AA level). ERNET has been given 917 websites of 20 states and 3 UTs of the country to make

them accessible and responsive. Accessibility of all websites will be achieved by making them responsive, CMS based and compliant as per Guidelines for Indian Govt. Websites (GIGW) & Web Content Accessibility Guideline (WCAG) 2.0 (A,AA level) within a year.

9.4.5 Wi-Fi Campus Network in five Universities under Early Harvest Programme of Digital India Initiative

9.4.5.1   Setting up Wi-Fi enabled Campus Network at Allahabad University, Allahabad:

ERNET India has set up Wi-Fi enabled campus network at University of Allahabad, Allahabad, U.P. The project is a powerful combination of wired & wireless network technologies enable flexibility, resiliency, ease of access to information, data & services by any Wi-Fi enabled devices across the campus. It enables high speed wireless access to Internet/Intranet resources to campus staff, faculty, teachers, students, visitors on any-time any-where basis across the AU campus.

The Wi-Fi network with state-of-the-art technologies in conformity with international standard is installed commissioned & fully operational. The installed Wi-Fi network is highly available, secure, scalable & redundant with Centralized Wireless Controller, Management & Authentication systems.
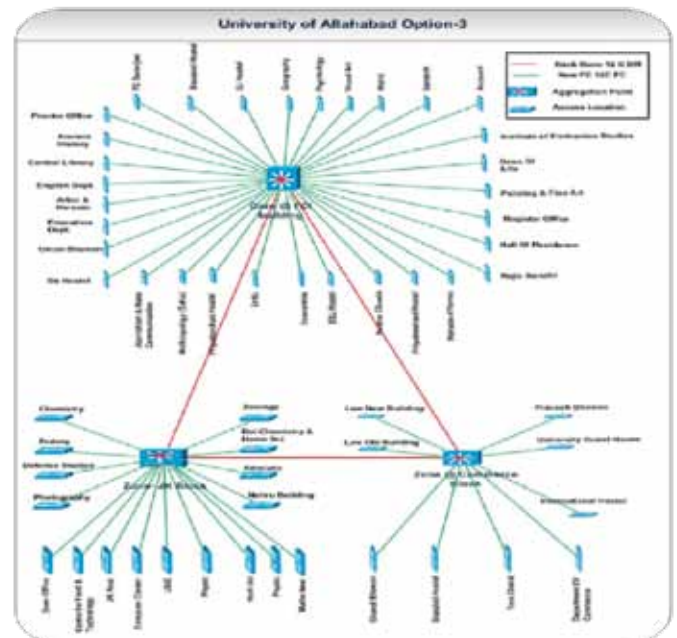
Wi-Fi enabled Campus Network at Allahabad University, Allahabad

9.4.5.2 Augmentation of Wi-Fi enabled Campus Network at Savitribai Phule Pune University (SPPU), Pune

ERNET India has set up Wi-Fi facility in the building, departments, hostels which were not connected or were not Wi-Fi enabled areas and integrated with the existing Campus network. Project Implementation is completed, made operational and in use by the Users of SPPU. The Augmentation of Wi-Fi enabled campus network at SPPU has improved the Wi-Fi coverage in the campus and facilitate connecting the leftover building to the campus network.

The state of the art components (Access Switch, Wireless LAN Controller, Wireless Access points and Servers, etc.) have been installed to improve Wi-Fi coverage in the SPPU campus network. These are deployed and integrated in the existing network of SPPU. Servers (Microsoft Windows 2012 Server and Linux Server) under the augmentation project have been configured to facilitate SPPU to deploy various applications and services in their running network.
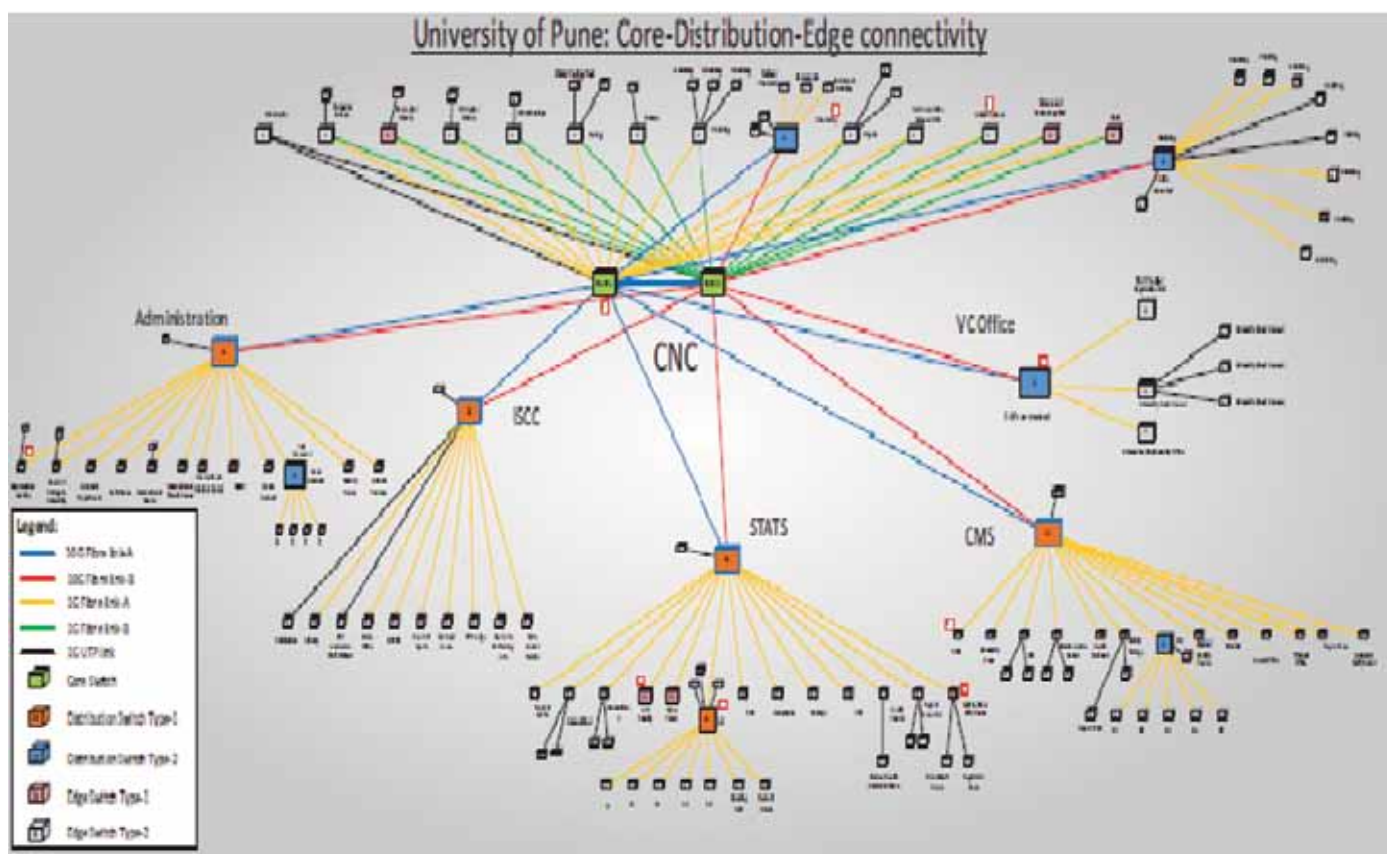
Wi-Fi enabled Campus Network at SPPU, Pune

9.4.5.3 Setting up Wi-Fi enabled Campus Network at Osmania University, Hyderabad, Utkal University, Bhubaneswar & North-Eastern Hill University, Shillong:

As per release of funds, active equipment with less quantity has been procured, delivered & installed at Osmania University, Utkal University & North-Eastern Hill University. With the limited equipment, Wi-Fi network is made operational in these Universities under the project "Setting up Wi-Fi enabled campus network at four Universities namely Osmania, NEHU, Utkal & Pune. Total outlay of the above referred project is ₹ 3551.21 lakh (i.e. for 4 Universities including NEHU, Shillong). The project is funded by Ministry of Electronics and Information Technology, New Delhi. The duration of the project is 3 years. Outcomes of the projects would be achieved only after complete setup of the Wi-Fi network. The released 1st instalment of fund has been utilized. Utilization Certificate has already been submitted. Balance fund is required from MeitY for completion
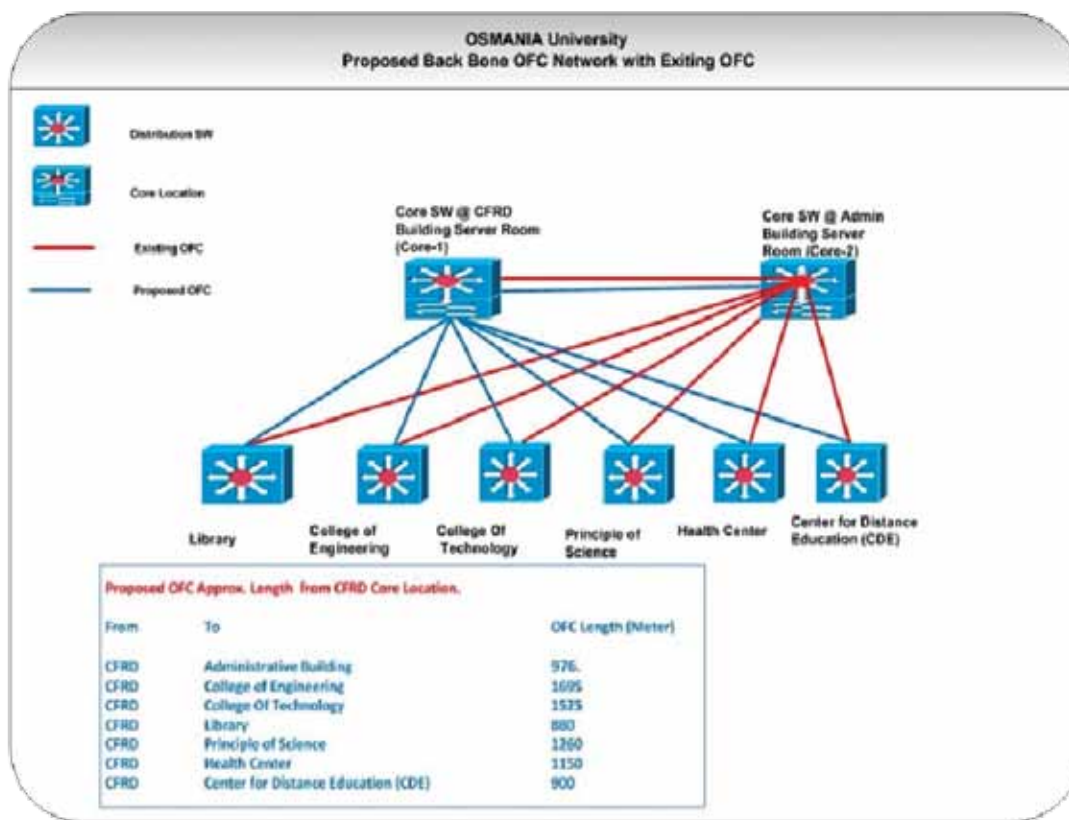
Wi-Fi Network at Osmania University, Hyderabad,
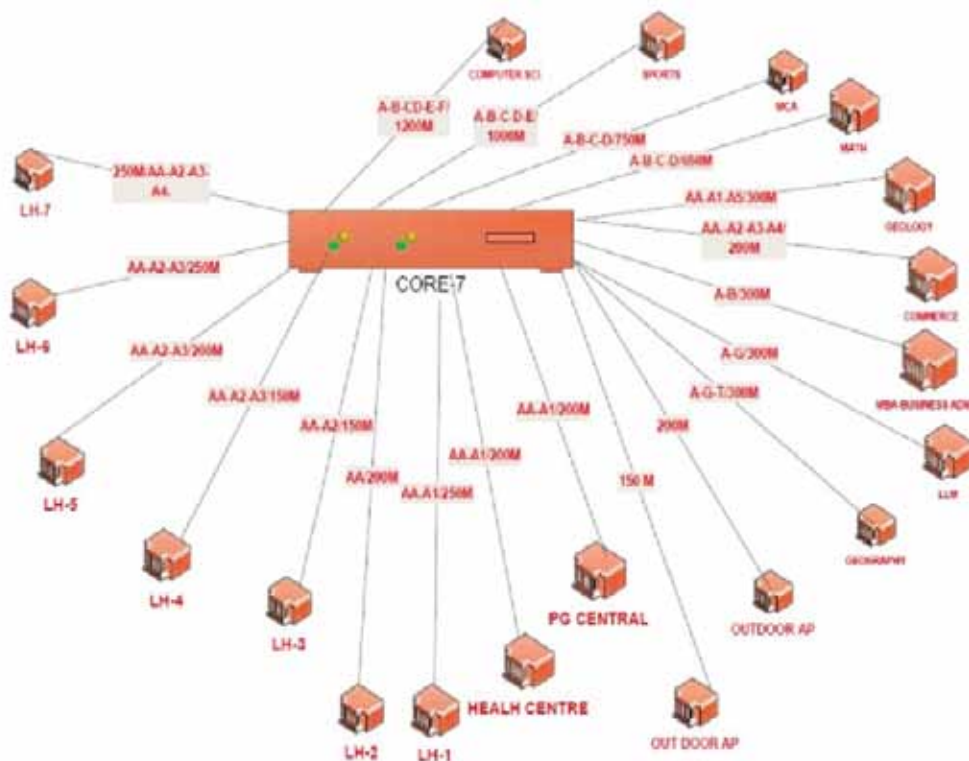
Wi-Fi Network at Utkal University, Bhubaneswar
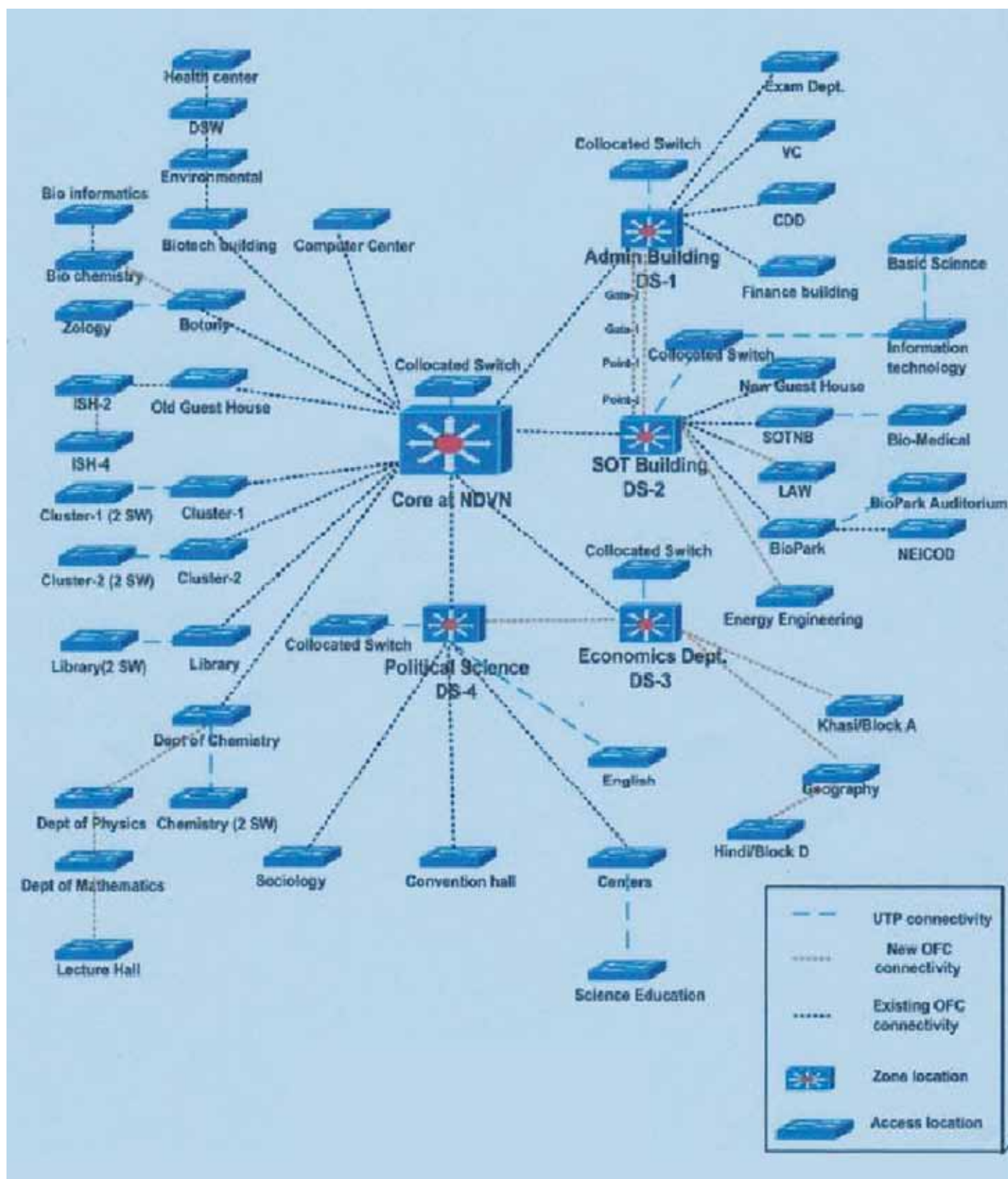
Wi-Fi Network at NEHU, Shillong

of project. Release for the balance fund towards the project outlay has already been requested.

9.4.6 Eduroam services in India

The Educational & Research global free wi-fi roaming service

eduroam stands for education roaming. It is the secure, world-wide roaming access service developed for the research and education community. It allows students, researchers and staff from participating institutions to obtain free Internet connectivity across campus and when visiting other participating institutions by simply opening their laptop and working on local Wi-Fi network. For benefits of educational community and being Education & Research Network, ERNET is mandated to propagate ICT for academician and researchers. ERNET maintains eduroam services for user's presently around 200+ institutions having subsequent number of academicians, students and researchers as well as propagate & promote the benefits to upcoming institutions.

9.4.7 Domain Registration

ERNET India is an exclusive domain registrar for education and research domains; registering the domains under ac.in, edu.in & res.in from 2005.The domain registration, renewal & modification process has been fully automated with online payment facility for registering and renewing domain names on just a click. The automated website is GIGW compliant and runs on dual stack IPv4 and IPv6. In automated system customer can modify online their DNS entries and other permissible information related to their institution avoiding security breaches. ERNET has also started registering domain names under विद्या.भारत under Internationalized domain names (IDN).

9.4.8 Campus Network for National Institute of Food Technology Entrepreneurship & Management (NIFTEM)

ERNET India had signed a Memorandum of Understanding (MOU) with NIFTEM & ERNET India for setting up the Network and other IT Infrastructure at NIFTEM campus. Under this MoU, a state-of-the-art high speed fiber optic based Campus Network connecting buildings/blocks spread across the campus has been setup. The network architecture is based on Star Topology with two Core locations each connecting to Zonal locations with redundant architecture over 10/1 Gigabit single mode fiber optic backbone. The project has been installed with redundant 10Gigabit Fiber optic backbone with 3-tier hierarchical architecture having Core, Aggregation and Access layer connecting all the buildings/blocks/academics, Hostels, Guest House and residences spread across the campus. The Hostels, Guest House and residential area had also be Wi-Fi enabled enabling Internet & Intranet access by Wi-Fi enabled devices as smart phones, Tablets, laptops, etc. The network has been made secure through deployment of Firewall, IPS and centralized Wireless controllers for protection from outside as well as inside of the network. The network can be managed & monitored from central point through Network Management System provisioned for the same. The implementation of the project had been completed and Network has been made fully operational and is being used extensively, by the users of NIFTEM .
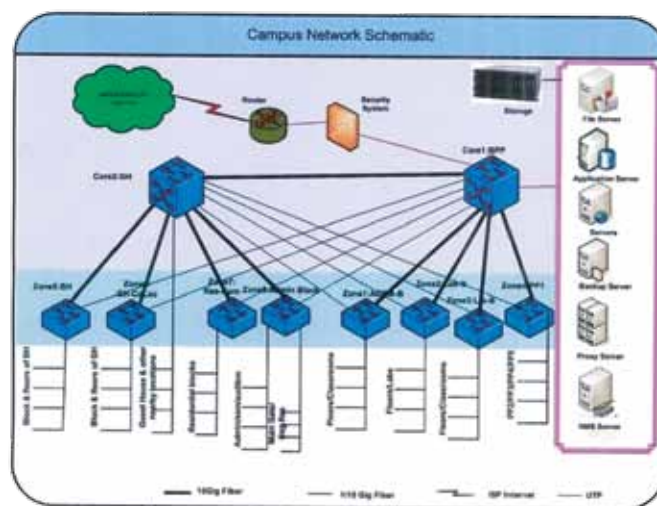
Wi-Fi Enabled Campus Network at NIFTEM

9.4.9 Setting up of Project ICT Scheme in the schools under DoE, U.T. of Daman & Diu and DoE, U.T. of Dadra Nagar Haveli

ERNET India has signed a separate Memorandum of Understanding (MoU) with Directorate of Education, Daman & Diu (DD) and Directorate of Education, Dadra Nagar Haveli (DNH) to set up ICT infrastructure in their schools. Under the MoU, 64 ICT labs (39 in DNH & 25 in DD) has been setup in the schools under DoE, Daman & Diu and DoE, Dadra & Nagar Haveli. The project has been installed & commissioned and is being used by the users/students of the concerned school.
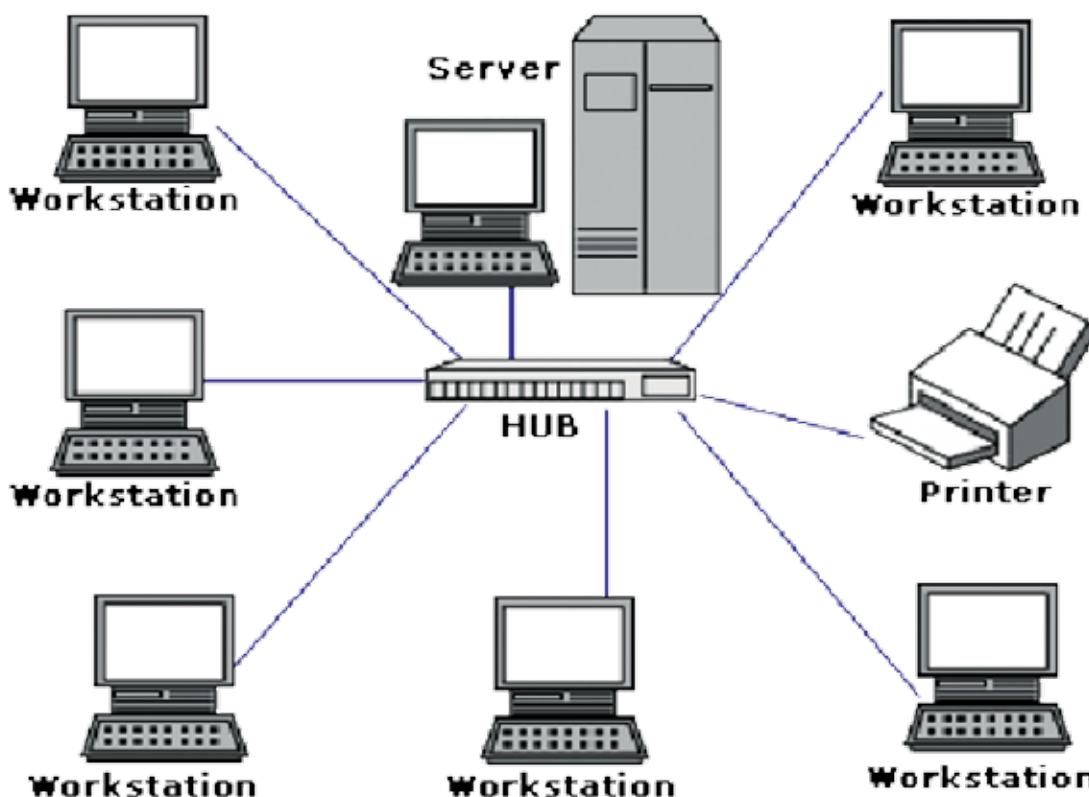
9.4.10 Smart Virtual Classroom Project

ERNET has implemented a project titled as "Enabling Schools with Smart Virtual Class Room Facility" under the Digital India initiative launched by MeitY. The project is aimed at enabling a virtual Classroom teaching through establishment of ICT enabled smart virtual classroom facility in 3204 schools plus 50 DIETs spread across 7 states of the country i.e. Himachal, Gujarat, Rajasthan, Tripura, Haryana, Andhra Pradesh and Tamil Nadu with the focus to improve the quality of education to students from remote/ rural part of the country. A Centralized control system has been established in Delhi at ERNET's data centre which hosted the MCU, Streaming/ Recording server and other associated component for multiparty audio/ video interaction and also offline access of classroom sessions round the clock for learning / collaboration between all the stakeholders The basic aim of the project is to create a technology enhanced classrooms that foster opportunities for teaching and learning by integrating learning technology, such as computers, electronic white boards, projectors, specialized software, interactive audio-video systems, etc.
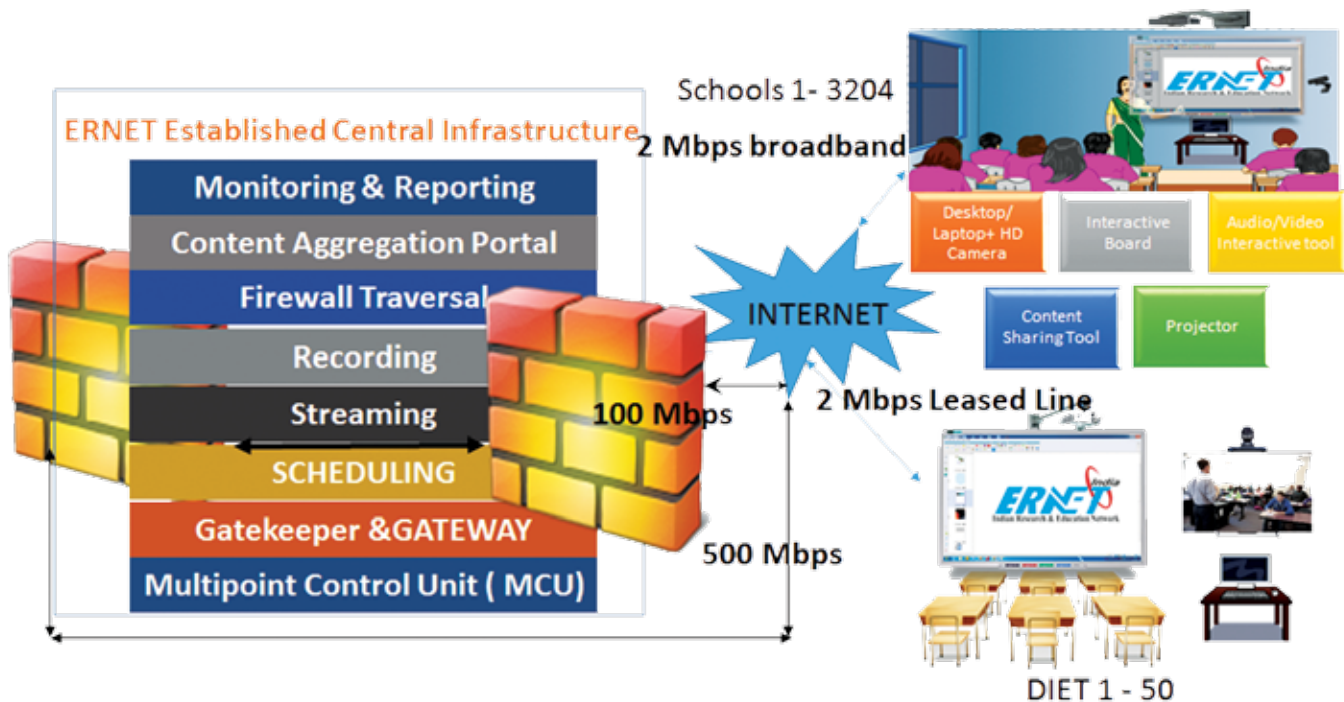
The scope of project includes:

➢ Creating Smart Virtual Class Rooms with Two-way Audio / Video Interaction Facility at **3204 Remote School locations** by installing Software based Video Conference Equipment, PC, Electronic white board, projector, UPS, etc.

➢ Creating Smart Virtual Class Rooms with Two-way Audio / Video Interaction Facility at **50 DIET locations (District Level centre)** by installing HD Video Conferencing End points/ Codec along with Display screen, PC, Electronic white board, projector, UPS, etc.

➢ Establishing Central Location for Hosting MCU and Recording/ Streaming Solution by installing MCU, Recording / Streaming server, Scheduling software, etc.

➢ Configuration of scheduling software for managing and providing information on the schedule of classes to be transmitted from various central / DIET locations. The application can be accessed over the internet on 24×7 through the ERNET's web portal / project portal.

➢ Formulation and Preparation of training manual in hard as well as soft form and making it available online. The manual will have detailed step-by-step description of the operational procedures of the installed system as a whole and also have operational steps for each supplied equipment.

➢ Imparting training for operational Staff/ Teachers on the installed equipments/Softwares and preparing a training manual for the help of trainees.

9.4.11 Establishment of VSAT connectivity for Internet/Intranet access in the North Eastern States of the country

ERNET India has successfully established VSAT connectivity for Internet / Intranet access in the 57 schools/ institutes out of 60 approved sites located in the remote parts of North Eastern States of the country. The project is funded by MeitY and is to help to narrow the gap between remote areas and other parts of the country. This will also help to promote equitable and sustainable development of remote areas of North Eastern states of the country through Internet connectivity.

9.4.12 Establishment of a High Capacity SCPC VSAT link at Kavaratti, the U. T. of Lakshadweep Islands for NKN Project of MeitY

ERNET India has established a High Capacity SCPC VSAT link at Kavaratti, the U. T. of Lakshadweep Islands for National Knowledge Network (NKN) Project of MeitY. Presently, the link is operating with 22Mbps (Rx)/ 10Mbps (Tx) data rates which will be enhanced to 40Mbps (Rx)/ 14Mbps (Tx).

9.4.13 IPv6 Activities – ERNET leads the way to the Future Internet

Internet Protocol version 6 is the new protocol on which the Internet will expand since it offers nearly unlimited number of IP addresses to connect devices to the Internet. However being a very new technology, adoption has been really slow, while number of internet connected devices due to the IT and Telecom revolution has exploded many folds in India.

ERNET India which spearheads the research in network and related technologies was one of the few organizations in India to have implemented IPv6 in its networks and application in collaboration with International partners and consortiums about a decade ago. It has full IPv6 enabled infrastructure not only at its core but also reaching IPv6 connectivity to its customers wherever technically feasible and required.

Some of the initiatives and activities undertaken by ERNET India in the area of IPv6 are:

• Operation of an IPv6 enabled Pan-India Network across the country.

• Setting up an IPv6 Lab for demonstrating IPv6 applications and imparting hands-on training facility to organizations wanting to use IPv6.

• Participation in global IPv6 experimentation and research

9.4.14 Capacity Building & Skill Development

With the aim of churning out competent technical resource in the area of ICT and IPv6 networking apart from other areas, ERNET has embarked on the process of designing courses and creating central training infrastructure to expose participants to hands-on live environment. These courses would help in capacity

building and enhancing the skillsets required for propagating ICT knowledge and experience. It aims at creating pool of trained technical resource manpower for managing and advancing its Information technology infrastructure in terms of operating the existing computer network / WAN network and on the same time keeping the pace of advancement as per latest technological needs.

9.4.15 Yeti-IPv6 only Root Domain Name Service Testbed

ERNET is participating in the world wide effort of experimenting on IPv6 only root DNS servers. 25 root servers have been deployed, world over with three presently hosted by ERNET. This will provide with the experience and knowledge of running root DNS server in the country as and when the opportunity is available on the current set of Internet root servers

9.4.16 E-Learning ICT Centres in 204 schools of Srikakulam, Andhra Pradesh

ERNET India had signed a Memorandum of Understanding (MOU) in January 2014 with Department of School Education, Andhra Pradesh Government to establish e-Learning Information & Communication Technologies (ICT) Infrastructure in 204 Schools located in rural/tribal areas of Srikakulam, Andhra Pradesh with the objective to deliver state-of-art e-Learning ICT infrastructure model in schools.The project is intended to achieve "freedom from distance" and bridge the gap between the increasing demands of education for all and the inability of existing educational systems to meet such demands without support of ICTs especially in the terms of access, equity, and resources due to urban-rural divide.

These ICT centres not only involve IT infrastructure but a combination of IT technologies, educational contents, communication system, training of teachers, support & maintenance, and develop wide collaborative system among student and teachers to produce, store, process, distribute and exchange information. The ICT infrastructure consists of standalone desktop PC's with speaker, webcam, microphone, laser printer cum scanner, Projector, UPS, LAN & Electrical cabling, Computer software (OS, Antivirus, MS Office), Computer Furniture, Educational Contents and internet connectivity. The management and control of these ICT Centres is transferred to the Department of School Education, Andhra Pradesh Government.

The ICT Centres are commissioned, operational and functional in all the 204 schools. These ICT centres are being used by school students & teachers for inculcating computer literacy and enhancing education through use of ICT labs. ERNET India had also conducted basic level training for 408 teachers on ICT.

ERNET had provided broadband internet connectivity in 36 schools from BSNL and also carried out experiment on TV Whitespace Technology first time in India through which provided internet connectivity in 05 schools. In the remaining 168 schools ERNET leveraged internet through APSFL considering its wider presence & sustainable infrastructure.

9.4.17 Pilot Project of White Space TV

The Government of India (GoI) had a vision to connect the rural masses to the national mainstream by creating Digital Highways through National Optical Fiber Network (NOFN) up to Gram Panchayats. ERNET India had initiated a research experiment on emerging technologies; an attempt to use the available White Spaces("defined as the frequencies allocated to a broadcasting service but not used locally") for low cost connectivity in remote areas. The research experiment proposes to effectively use channels in TV band for internet connectivity, while continuing to allow TV transmission unhampered.

ERNET India had applied for necessary licenses in Wireless Planning & Coordination (WPC)/ Department of Telecommunication (DOT) for experimentation.

As ERNET India is already implementing project for establishing e-Learning ICT Centres in schools located in rural & tribal area of Srikakulam, Andhra Pradesh &internet connectivity is an important part of project; ERNET desires to carry out experiment on TV White Space by setting up of Proof of Concept (PoC) test bed for these schools located in remote/ tribal belt of Srikakulam A.P. After obtaining experimental licenses from WPC, the PoC has been carried out by connecting 05 schools with backbone of 10 Mbps during July 2015-June 2016, the experiment benefited to identify whether TV Whitespace will be effective mode of last mile connectivity beyond NOFN termination at Gram Panchayats. A Working Group Committee formed by MeitY and the committee is working on framing policy for use TV whitespaces after gaining the experience by various experimenters. ERNET had obtained experimental License from DOT of 60 MHz in the frequency range of 500-510 MHz & 518-568 MHz.

ERNET had carried out video conferencing through Skype over TV-Whitespace setup flawlessly; Mr. Satya Nadella, CEO Microsoft had interacted with school children of Kasturba Gandhi Balika Vidyalaya (KGBV) Singupuram, Srikakulam (A.P) & school located in Kenya on 29.07.2015. CM, AP interacted over VC with various schools.

The setup of PoC is presented below:

Setup of TV Whitespace at 5 locations
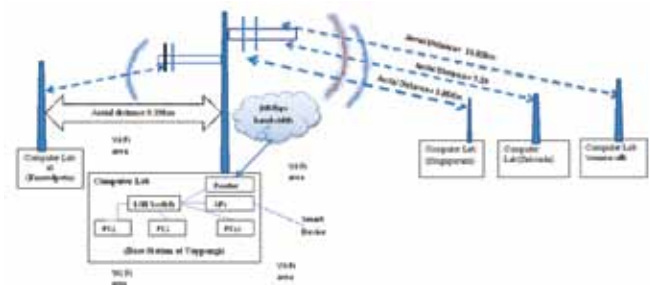
9.4.18 Various Activities under operations

- Upgradation of ERNET Delhi PoP. Using the upgraded Infrastructure, ERNET is able to provide safe and secure Internet services to its users.

- The Webhosting services have been migrated to more robust and secure infrastructure. VPN

facility has been provided to clients for uploading and downloading the contents on their websites.

- ERNET is connected to TEIN4 through NKN and in turn Education and Research community of the country has seamless access to South Asian Countries, Europe and USA.

- ERNET India provides VSAT connectivity in C-Band using INSAT/GSAT satellite for Internet & Intranet access in remote areas all over the country including North-Eastern region, Andaman & Nicobar & Lakshadweep Islands. Recently, ERNET VSAT network has been upgraded to provide the state-of-the-art VSAT links to provide data rates ranging from 64Kbps to 40Mbps to the users.

- ERNET India has established a high capacity SCPC VSAT Link at Port Blair, the UT of Andaman & Nicobar Islands under NKN Project. The establishment of links was completed on January 2018.

- **Hosting of Asia Pacific Advanced Network (APAN) Meeting in India-**

  Asia Pacific Advanced Network (APAN) represents consortium of education research networks (ASIA and OCEANIA region). It also represents a high speed network which interconnects education research networks in Asia & OCEANIA regions. The APAN Ltd is the not-for-profit association which is the legal entity created to undertake activities on behalf of APAN members. APAN members are the entities representing research and education network interests in the countries of Asia and Oceania. **ERNET India is primary member of APAN.**

  APAN coordinates developments and interactions among its members and with peer international organizations, in both network technology and applications, and is a key driver in promoting and facilitating network-enabled research collaboration, knowledge discovery, telehealth, and natural disaster mitigation. APAN organizes two meetings each year where its members and other interested participants come together in working groups, committees, plenary sessions, and other meetings to review progress, demonstrate advances in technology and application, and make plans for the future

activities. The meetings venues are various APAN members.

ERNET India hosted the 43rd Asia Pacific Advanced Network (APAN) Conference/Meeting 2017 during February 12-17, 2017 at India Habitat Centre, New Delhi co-hosted by CII.

Outcome of 43rd APAN Meeting

The event promoted network technology developments and advances in network-based applications and services across India that will:

- Lead to significant improvements in educational outcomes by providing the foundation for a knowledge-based economy.

- Allow educators and students in India to share knowledge and to discover and learn remotely.

- Enhance the ability of Indian educational and research community in global collaborative innovation through unprecedented access to digital resources, instrumentation and expertise for education, research and societal benefit.

- Provide access to scarce or expensive educational and research resources around the Asia Pacific region and across the globe.

- Lead to the saving and improvement of lives and property as a result of implementing advanced communications that support the well-being of the populations.

- Catalyse and stimulate the information economy by demonstrating new network enabled services, by acting as an incubator for technology transfer to industry, and as a springboard for innovation.

- The event provided an opportunity to Indian researchers for working closely with relevant organizations, institutions, groups and individuals around the world to further enhance the adoption of and research into advanced network applications and technologies.

- A total of approximately 350 people attended the APAN43 Meeting. Out of these, there were 172 International & 107 domestic registered delegates. In addition to registered delegates, there were 75 complementary registrations.

- The event provided a forum for promoting yoga amongst the international participants in general and participants from Asia Pacific Region in particular. To promote yoga amongst the

Hosting of Asia Pacific Advanced Network (APAN) Meeting in India-

international participants, a Yoga session was organized by ERNET India in APAN43.

9.5   e-Governance Solution: NeGD

To meet an ever-growing demand of e-Governance across the nation, National e-Governance Division (NeGD) was established as an amalgamation of experts from the Private sector and the Government. NeGD has been playing a pivotal role in discharging key tasks including Programme Management and Technical Support of various components of the Digital India Programme.

Some of the major activities of NeGD include monitoring and coordination of the entire Digital India Programme; technical appraisals, assistance to MeitY and other Central Ministries/Departments on e-Governance Projects. NeGD has significantly contributed in the revamping of several existing Mission Mode/e-Governance Projects in line with State-of-the-art architecture; development of Standards, Policies and Guidelines related to e-Governance; Technical appraisals and formulation of architecture design for several e-Governance projects; consultation and coordination with Apex Committee and Mission Leaders to review the progress of Digital India and provide advisory and assistance on issues to expedite the implementation of Digital India. Several consultative workshops on Cloud, Mobile, open API, etc., have also been conducted by NeGD with Industry to arrive at the innovative solution of various components of Digital India. NeGD is instrumental in creating concept notes on International ICT cooperation, status report to PMO and several activities related to Digital India.

NeGD is a central agency for implementation of Capacity Building scheme. It has also been significantly contributing towards spreading the awareness about the Digital India Programme through Social Media, workshops and several outreach programmes.

NeGD has recently taken several new initiatives to bring paradigm shift in the entire ecosystem of e-Governance in India. These initiatives include Digital Locker, Rapid Assessment System (RAS), GIS as Decision Support System, Centralized e-Governance Competency

Framework, etc., which have already been implemented and is currently being scaled up. Some other initiatives including Unified Mobile Application for New Age Group (UMANG), etc. are being undertaken.

9.6   Government's IT infrastructure: National Informatics Centre (NIC)

NIC was established in 1976, and has been credited as the "prime builder" of e-Government / e-Governance applications in all levels of the administration. It has emerged as a promoter of digital opportunities for sustainable development. To its credit, NIC spearheaded "Informatics-Led-Development" by implementing **ICT applications in social & public administration** and facilitated **electronic delivery of services to** the Government **(G2G)**, Business **(G2B)**, Citizen **(G2C)** and Government Employee **(G2E)**. By establishing the ICT Network, called "NICNET", NIC has facilitated the institutional linkages with all the Ministries /Departments of the Central Government, 36 State Governments/Union Territories, and about 680+ District administrations of India. NIC's role has been instrumental in spearheading e-Government/e-Governance applications in government ministries/ departments at the Centre, States, Districts and Blocks, facilitating improvement in government services, wider transparency, promoting decentralized planning and management, resulting in better efficiency and accountability to the people of India.

NICNET, the nationwide Network has over **70,000 nodes** in all the Government buildings in Delhi & over **1,00,000 nodes** in State Secretariat Buildings for access to NICNET through Wi-Fi in various Central Government Offices. There are 3465 e-Services from various ministries, states/UTs and all Mission Mode Projects (MMP) with over 4700 crores eTransactions till date. Citizens across India access NIC portals every day for information and services. The data centres of NIC host more than 8000+ websites of the Government in the secured environment. The NIC National Cloud (Meghraj) is presently hosting a number of critical applications on over 12,670 virtual servers in the cloud environment supporting 480+ eGovernance projects and 670+ user departments under Digital India. A new state-of-the-

art data centre at Bhubaneshwar has been set up and another at Bhopal is being set up. These are in addition to the existing data centres at Delhi, Hyderabad and Pune. NIC has the largest e-Mail service of the country with more than **440 million** e-Mails transacted per month. It has the largest Video Conferencing network in the country facilitating around 28000 multisite conferences with over 5,00,000 site hours of VC sessions conducted. Over the National Knowledge Network (NKN), a total of 1645 links to various institutions have been commissioned and made operational. NIC continues to provide vital support to PRAGATI (Pro Active Governance and Timely Implementation of various government schemes) wherein Hon'ble Prime Minister monitors implementation of critical projects of various ministries / Departments across the country.

At the State level, NIC is providing ICT and eGovernance support to State Departments. Some of the important projects implemented are Mid-Day Meal, eHRMS (Manav Sampada), ePareeksha, Real Craft, eVidhan, eDistrict, Land records and property registration, treasuries, eHospital and many more.

9.6.1 NICNET – E- Governance Network Backbone

Core of NICNET backbone is fully upgraded to multiple 10 Gbps capacity with sufficient redundancy. States are connected through multiple 1/10 Gbps links and districts 34/100 Mbps links with redundancy built at State and District links. Last mile redundancy for NICNET has been extended to more number of districts, with primary link from BSNL and secondary links from Railtel/PGCIL. Most of the Bhawan links at Delhi which are currently on 34 Mbps are upgraded to 100 Mbps and those are on 100 Mbps are upgraded to 1Gbps. Direct peering of NICNET with BSNL, PGCIL and Railtel are completed at Delhi and Hyderabad for saving Internet Bandwidth and faster access of each other's Network and Data Centre. Peering with Google and Akamai Content Delivery Network for faster access to Google services and other important International web sites. Re-structuring of Videoconferencing network to minimize delay and capable to handle large scale important video conferencing such as PRAGATI of Hon'ble PM. Global server Load Balance setup at NDC, Shastri Park and Hyderabad provides efficient utilization

and many websites were migrated for seamless fail-over. Improvements in design change up to District PoP has been done to provide requisite SLAs to NICNET customers. The management and monitoring of various links and applications are monitored both centrally at Delhi and in distributed manner by respective State NOC. Network is configured to run completely on IPv6 along with Current IPv4. IPV6 is extended to Data Centres to make more no. of web sites available on IPv6. High speed Internet services provided to national data centres of NICNET to ensure that the applications hosted in the data centre are accessible to all the users across the globe with minimum latency. Capacity planning and upgradation of Internet Gateway at regular interval to provide smooth Internet access to all NICNET users throughout the country has been undertaken.

9.6.2 NIC IT Infrastructure

9.6.2.1 Data Centres Infrastructure

NIC is operating National Data Centres at Delhi, Hyderabad and Pune. Hosting support for e-Governance Applications and Websites is being provided on 24X7 basis. National Data Centre also provides National Cloud services for Government Projects. Besides these, mini-Data Centres are also operational in all NIC State Centres to cater to the e-Governance requirements at the State level, hosting 10-15 racks and 5-50 Tb storage. Hosting support is also being provided for various e-Governance Projects viz. e-Procurement, e-Panchayat, Aadhaar Enabled Biometric Attendance System(AEBAS) e-Pramaan, Mother and Child Tracking System(MCTS), IVFRT, NeGP Agriculture, HMIS, Public Financial Monitoring System (CPSMS), PDS, Swachh Bharat Mission, National Portal of India, Jeevan Pramaan, CCBS, NREGA and GoI Search. NDC, Delhi has Disaster Recovery setup at Hyderabad and Pune. All National Data Centres act as Disaster Recovery Centres for State Data Centres.

National Data Centre, Delhi was augmented with 1.4PB of Enterprise Class Storage with mix of high performance SSD storage, 500TB Unified Storage and 200TB Virtual Tape Library resulting in a total of 12 PB storage. Software Defined Networking was implemented for Centralized Provisioning, Monitoring & Management

of all Networking devices, IPV6 has been tested & configured in Networking & Security Devices in dual stack mode and higher throughput firewall & IPS have been deployed in Data Centre to cater higher traffic at NDC Delhi. Around 2000 virtual servers were added in the data centre through Cloud taking the total to 21000 servers.

The Project Proposal for establishment of National Data Centre at Bhubaneswar was approved at total outlay of ₹ 188.59 crore. Establishment of NDC at Bhubaneswar consists of 275 rack infrastructure under ISAT.

Land of 5 Acres for proposed National Data Centre at Bhopal has been acquired from Govt. of Madhya Pradesh, construction of boundary wall is in progress.

9.6.2.2   NIC Cloud Services:

NIC National Cloud is the first National Cloud under the umbrella of Meghraj, the Government of India Cloud Initiative of MeitY. Cloud services are being offered with the aim to provide scalable ICT infrastructure for quick deployment of e-Governance initiatives. These services support Self Service provisioning, Multi-location cloud and seamless integration of various Cloud Applications. Offerings include IaaS (Infrastructure as a Service), PaaS (Platform as a Service), etc. Currently over 630 eGovernance projects are hosted on over 11,800 Virtual Machines. Major projects hosted include MyGov, Digital India Portal, Digital Locker, National Scholarship Portal, Biometrics Aadhaar Attendance System for Govt. Employees (BAS), Prime Minister Office Portal, Transport Project, JoSSA (admission counselling), Government eMarketplace, eHospital and Online Registration System for appointments, Swachh Bharat, Cyber Swachhta Kendra, Bharat Ke Veer Portal, National Centre of Geoinformatics, OpenForge, ePrisons, Open Data, UMANG, eLearning, eNAM (National Agriculture Market) Portal, National Power Portal, eSamiksha, Pollution Control Boards etc.

9.6.2.3   eMail and SMS Services

9.6.2.3.1 eMail Services

NIC is the designated implementing agency for providing email service to the government, both at the centre and State. All services under e-mail are offered free of cost to all officials under Ministries, Departments, Statutory Bodies, Autonomous Bodies, UT. The primary setup is at Shastri Park and the primary email domain is userid@gov.in. The email service has been the backbone of the digital administration of the country. The services have a 24/7 support team. With continuous support for more than **700 virtual domains** with a count of over **1.5 million accounts,** the growth in terms of complexity has been evident. The accelerating graph indicates that in the near future the number of accounts is expected to reach about **5 million**. The **daily** email traffic (without e-sampark traffic) is **15 million**. The messaging service of NICNET provides an integrated application solution, with proactive management and maintenance in a single source solution. There are various third party applications like log app, Pass App, Id look up, profile and last login which are functional and are used to make email services more effective. NIC also provides eMail distribution list for bulk email for official purpose.

9.6.2.3.2 eSampark

The IT platform for seamless communication between the Government and Citizens being one of the early harvest programmes of Digital India is also configured under NIC Messaging service. With a database of over **3.4 crore email addresses and over 96.10 crore mobile numbers**, the platform has sent over **299.8 crore mailers across 555 campaigns** till date, since its launch in August 2014.

9.6.2.3.3 eGreetings

eGreetings, another initiative under the early harvest programmes of Digital India and configured under NIC messaging umbrella, is a green initiative for sending eco-friendly cards to each other. With 43 categories of cards for all festivals and days of national importance, the initiative supports text, audio, pre-defined quotes by Hon'ble PM, slogans and logos of each Ministry. **Over 1.6 crore cards** have been sent by the citizens since its launch.

9.6.2.3.4 SMS (Short message services)

SMS gateway service is also provided by NIC as a part of its messaging solution. The service is available to all Government applications both at the centre and State. It has various advance features like PUSH, PULL,

Block out time, scheduling, localization of content, international SMS, OBD (Outbound dialling), Missed call service, SMS analytics/visualisation etc. Currently more than 1200 eGov applications are integrated with the gateway which includes various critical projects like Mann Ki Baat, MyGov, e-Sampark, Digital India portal, eHealth, National Scholarship portal, Jeevan Pramaan, BAS, Mother and Child Tracking, Khoya Paya, Income Tax, Vahan, Sarathi, eProcurement etc. The average monthly traffic is about **40-50 Crore SMS**. The service also offers multilingual SMS options for localization in difference parts of our country.

9.6.3   NICNET - VSAT Services

NIC has been running satellite based VSAT Network for providing Data and Video application. While most of the Network connectivity has been migrated to high speed terrestrial and broadband services, there are still areas, especially in regions with difficult terrain such as North Eastern states, hilly regions of Himachal Pradesh, Uttaranchal and J&K which are dependent on the VSAT based Network services offered by NICNET. Some of these locations have VSATs as primary source of connectivity, while others utilize VSATs as backup connectivity, where terrestrial leased lines are not stable.

NIC is also providing satellite bandwidth from NICNET pool to VSATs of various projects of central/state government departments such as Rural, Taxation, Treasury, Finance, Health and Food supplies in geographically difficult locations where terrestrial connectivity is either not available or reliable for delivering e-governance services.

For running the VSAT services, NIC has leased transponder bandwidth from DoS/ISRO on the GSAT-18 satellite.

9.6.3.1   Video Conferencing (VC) Services

NIC's Videoconferencing services are being used since 1995. Videoconferencing has been one of the flagship service, which facilitates direct interaction with concerned stake holders All sections of the Government, including Hon'ble President of India, Governors, Chief Ministers, Secretaries to Govt. of India and Chief Secretaries, utilize Videoconferencing facilities through NICNET and integration with other SWANs and Internet. NIC have an estimated amount of ₹ 400 crore every year by facilitating VC services to Central and State Governments. 5,00,000 hours of usage has been recorded using over 1,400 studios with 28,000 multipoint videoconferencing sessions.

9.6.4   Cooperative Core Banking Solution, NIC, New Delhi

Cooperative Core Banking Solution (CCBS) is a comprehensive and integrated core banking solution, addressing all the banking requirements. For State Co-operative Banks (SCBs), District Central Co-operative Banks (DCCBs), State Cooperative Agriculture & Rural Development Bank, (SCARDB) & Financial Institutions (FI), it adheres to RBI/NABARD guidelines and for Primary Agricultural Co-operative Societies (PACSs), CCBS is CAS (Common Accounting System) compliant, as defined by NABARD.

All 51 branches of Meghalaya State Cooperative Apex Bank, a SCB including Head Office are operational in core banking environment with NEFT/RTGS and ATM services. Ru-Pay credit card facility has been functional for KCC account holders at Meghalaya. Implementation of CCBS for Treasury Bank, Sikkim is in progress and total 29 branches has been enabled with CCBS. Six PACS in Rajasthan is operational on CCBS. Lighter version of CCBS application is made available to branches, having only VSAT connectivity. CCBS for SCARDB has been implemented at all 89 branches of Punjab SCARDB and under implementation at Himachal Pradesh (81) & Gujarat(196). Mobile application with viewing rights for ultimate customers is ready and will be made available. CCBS for FIs has been implemented in Delhi Financial Corporation (DFC) and under implementation at National Scheduled caste Financial & Dev. Corporation (NSFDC). New initiatives have been taken for societies at Odhisa, SCARDB at Tamil Nadu, West Bengal, Karnataka, Jammu & Kashmir & Uttar Pradesh.

Achievements

- Punjab SCARDB is fully operational on 89 Branches with online NPA Monitoring, Demand generation including on time interest / penal interest application.

- NABARD and NAFCARD (Federation of SCARDB) has recognized the effort of NIC at Punjab SCARDB and recommends other SCARDBs to implement the NIC's solution.

- Maintenance of more than 2.75 Crore financial transactions.

- Maintenance of KYC details of 18 Lakhs customers.

9.6.5 e-Learning Services

NIC WebConnect E-Learning Service successfully conducted Virtual Classroom Sessions (Total Class 200 Total Participant 11000), attended from district-states across India. Major training on Central Procurement, Computer networking of consumer forum (confonet), Soil Health Card Software demo for department of Agriculture, National Animal Diseases Reporting System (NADRS), School Programme to blocks of Gridhi District of Jharkhand, Consortium for Education Communication (CEC), Integrated Disease Surveillance Programme (IDSP) etc. e-Learning services are also used for in-house technology updates programme for NIC officials and repository being created for the same.

9.6.6 NIC District Infrastructure

NIC has their centres operational in 672 districts across various states/UTs in the country. Recently, 36 new districts were created in various states, notably in Telangana and Assam. NIC has also set up its centres in the recently created districts in various states. Under the direction of Hon'ble ME&IT, NIC has undertaken the task of upgrading all its district centres in 3 phases.

The phase 1 covering 245 districts, including 36 new districts, will be upgraded completely by end of 2017. The 2nd phase would commence after the completion of phase 1. The augmentation and upgradation of infrastructure at the district level would strengthen the network infrastructure, which would facilitate the Digital India services for G2C and G2G by availing seamless internet access.

9.6.7 Open Technology Group (OTG)

NIC has established Open Technology Group (OTG) to spearhead the technology exploration and provisioning support services for adoption of OSS in various e-Governance Projects and applications under NIC and NeGP programme of MeitY. NIC-OTG is mandated to facilitate strategic control of Open Technology within NIC and spearhead the knowledge centric activities in e-Governance Projects all over India. OTG has implemented the Open Technology Centre Project (OTC) (A Grant-in-Aid Project) of MeitY, Government of India (GoI) during the period (April 2007- March 2015). During the tenure the OTG made the significant contribution for formulation of e-Governance Standards, Policy on adoption of Open Source Software for Government of India, Framework for adoption of Open Source Software in e-Governance Systems and Open API Policy. Key Technology Services supported by OTG are CMS/Portal using Drupal, Open Web Platform/ Progressive Web Application, Trouble shooting, performance configuration and data model design for PostgreSQL Database, Replication using SymmetricDS,
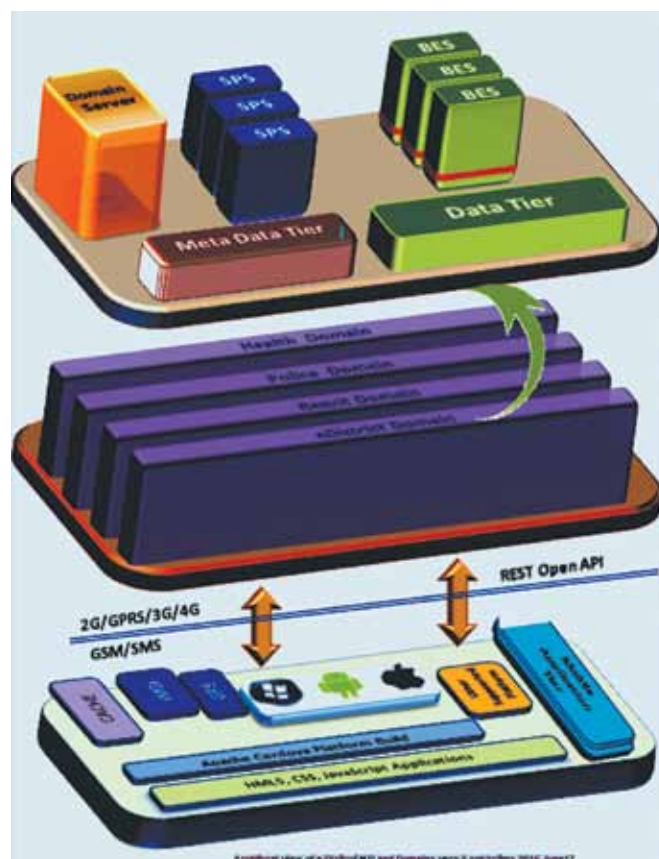
Architectural View of e-Distric MP and Domains

Database Migration to PostgreSQL, Migration from RDBMS to Document Oriented Database, Single Sign on Solution using CAS, Verification Services based on 2D Barcode, Recommendation of Open Source Stack after due exploration and evaluation, Bundled OSS Stack for Development, Staging & Deployment, CentOS templates for NIC Cloud Services, Capacity Building & Hand holding on Recommended Open Source Stack, Provisioning Support for recommended stack, Performance Tuning of Open Source Application Servers. Under Open Source related activities of NeST, Capacity Building programmes (23 awareness programmes, 9 class room based programmes) for e-Governance Practitioners for use of Open Source Software/Tools and preparation of Best Practices/ White Papers/ Case Studies/ Policies/ Framework/Guidelines were carried out.

9.6.8 IVRS (Interactive Voice Response System)

IVRS is used as the cheapest mode to collect/disseminate data across the world. It provides a 24x7 support-contact mode for people on the move and for those with just the basic phone facility. NIC IVRS has been doing the same for more than a decade. It is seen as a major mode to disseminate information in the e-Gov era, to touch base with the grass roots level through the basic phone at the cheapest mode.

Applications hosted on the central IVRS, all developed in-house using the ASR & TTS features, are:

Hon'ble Prime Minister's 'Mann Ki Baat' data collection programme, Application for collection of survey data for the "Rate My Govt." Kailash Mansarovar Yatra (KMY) IVRS with Help Desk. Tourist Visa on Arrival of the IVFRT, Application status of the voter details of the CEO Delhi, National Health Protection Scheme (NHPS) POC done with integration of Aadhaar for verification of Insurance beneficiaries, Missing Child reporting and sighting data collection IVRS under Min. of Women & Child, Mid-day meal distribution data collection from all over India, Committee setup for further expansion of IVRS for different applications.

9.6.9   Software Development Unit (SDU), Pune

SDU, NIC, Pune is developing software applications for Finance, Agriculture, Registration, Land Records &

Education mainly for Maharashtra & few other states. The eCourts (Case Information System-CIS) for District & Taluka (National Core) is implemented nationally in 28 states at 4784 locations. The web enabled version of CIS was released for pilot implementation in 13 states and tested & operationalized at 364 establishments. The Online Clinical Trials Application Monitoring System which is web application & cloud enabled has been developed & released for Central Drugs Standard Control Organisation. The Web enabled Marriage Registration software was launched in October 2015 for citizens on IGR website for 3 districts & is shortlisted nationally to be redeveloped as a product for all the states. The applications for Right to Education (RTE) 25 admissions & Sanch Manyata are developed & released. Application Sevaarth which is the rule based integrated web enabled general education databases(School, Student & Teachers database) as a payroll package is developed by SDU, Pune & was shortlisted by CAG to be used for all central govt. offices nationally which will be made part of PFMS.

9.6.10 Software Development Unit (SDU) & Training Centre Kochi

The application support and implementation has been done for following: e-Coir (Coir Sector MSME Benefit Management System), Fisheries Marketing and Production Management System (FMPMS) for NIFPHATT, Common Admission Test (CAT) 2015 for Cochin University of Science & Technology for real-time counselling and admissions, Web Portal for Kerala State Mediation Centre, Web Portal for Employee State Insurance, KOMPAS - Mines and Geology Movement and Permit Management System, BAS Implementation in Central Organizations, Payroll, Personnel and Budget Management Systems for NIFPHATT, NOC or POP for 47 Locations including Airport, few districts, CBI, NIC Lakshadweep etc., Web Services and Security Audit Support and Training Services for Central Organizations, eOffice implementation in Spices Board and Coir Board, HAWALA database for Enforcement Directorate Web Portal for CIFNET etc.

9.6.11 ServicePlus

ServicePlus is a metadata-based eService Delivery framework using which you can rapidly rollout eServices

without developing a new software for each service. It is a configurable, multi-tenancy framework with built-in interfaces to NSDG/SSDG, CSC 2.0, DigiLocker, RAS, Payment Gateways (NDML and SBI ePay), Aadhaar and DSC (Dongle-based as well as eSign). Integration with PFMS is under way which will enable it to be used to deliver payment services as well. It is also integrated with eTreasury of Kerala. The services can be operationalized (i.e., defined and managed) by service-owner department by using a definer wizard available as part of ServicePlus. The defining of a service may take, at best, 2-3 days provided all forms, documents to be generated and business logic are available clearly beforehand.

The framework is domain agnostic and can be used to configure and operationalize services of any department at any level of Government (Central, State or Local) without any architectural changes to the framework. It is based on open source tools and technologies and the forms used by the applicants or officials and the documents generated by the system can be defined in all UNICODE compliant languages. It is fully compliant with Local Government Directory (http://lgdirectory.gov.in) which has been declared by Cabinet Secretariat, Government of India as the standard platform for providing standard location and local government codes.

It has a built-in form designer, process-flow designer, notification designer and document designer. It can be integrated with any application through web services either at form level or as a task. It also provides facilities for plugging-in small pieces of code to customize ServicePlus to meet the needs of a specific service.

At present, it is being used to deliver 129 services by 13 States (Arunachal Pradesh, Assam, Chhattisgarh, Himachal Pradesh, Jharkhand, Kerala, Maharashtra, Meghalaya, Odisha, Sikkim and Tripura) and 2 Central Departments and more than 62 lakh applications have been processed so far.

9.6.12 Defence Informatics Division

Major activities/projects handled are upgradation of MPLS VPN network and desktop VC setup for Directorate General of Defence Estates, Gallantry Awards portal

implementation, separate eProcurement portal for entire Defence sector, MoD LAN planning, mobile app Kendriya Sainik Board, implementation of e-Office/e-Procurement/SPARROW/e-mail remote admin/Biometric Attendance System(BAS)/Direct Benefit Transfer(DBT)/CMF enabled websites of Ministry of Defence and Dept. of Defence/Cloud hosting/Cloud shifting for entire Defence sector, e-Governance project of e-Billing system for Principal Controller of Defence Accounts (PCDA) etc.

9.6.13 Food Processing Industries Informatics Division

Major activities/projects include improvement of Scheme Management System by providing additional functionalities like online submission of proposals for grants under Agro Processing Cluster, Backward & Forward Linkages and Food Processing & Preservation Capacities schemes by the applicants and capturing the subsequent work flow from applicant's end to Project Management Agency and the Ministry's; Development and Launch of a GIS application to map Food Processing Infrastructure with Production clusters for decision support; strengthening of Networking Infrastructure by increasing the bandwidth of Optical Fiber Channel from 33 Mbps to 100 Mbps, migrating to new centralized Anti-Virus Solution and implementation of more comprehensive security policies deployed through a Centralized Firewall.

9.6.14 Lal Bahadur Shastri National Academy of Administration

NIC Training Unit, Lal Bahadur Shastri National Academy of Administration, Mussoorie provides Information and Communication Technology related training to the officers of All India Services during all the training programmes conducted at the Academy. During the training calendar of 2017-18, the courses and activities conducted were - IAS Professional Course Phase-I (2016-18 Batch), Phase-III Mid-Career Training Programme, 92nd Foundation Course, 119th Induction Training Programme for IAS Officers and Software Development. Successfully conducted an online entry level test for participants of MCTP Phase-III Course of Academy. Successfully conducted an online entry level test for 382 probationers of 92nd Foundation

Course of Academy. Successfully conducted online examination for the participants of 119th Induction training programmes. Successfully conducted online examination for the participants of IAS Professional Course Phase-I (Batch 2016) for Public Administration, Law, Management, Economics and Political Concepts & Constitution of India. The questions bank for all the online examinations was prepared as per the requirement of Controller of Examination.

9.6.15 e-Granthalaya

A Digital Agenda for Library Automation and Networking is a Web-Based Integrated Library Management Software useful for library computerization. The current version of the software is Version 4.0 – web based, Enterprise Edition with a centralized database option for many libraries under one organization. The Software is a multi-tenant application hosted in NIC Cloud and being used by Government Libraries for Online Data Entry and Member Services. The current version uses PostgreSQL – an open source database management System. (http://egranthalaya.nic.in). The software provides facility to automate the In-house activities of the libraries as well as to provide online member services. The software helps in converting manual library to e-Library and integrates access of books catalog, e-books and other documents over the web. e-Granthalaya has been implemented in 542 number of libraries from January 2017 to February 2018, thus total implementation reached up to 4335 libraries. 822 libraries are hosted in NIC Cloud where 44 lakh of books holdings have been generated. As many as 15 training
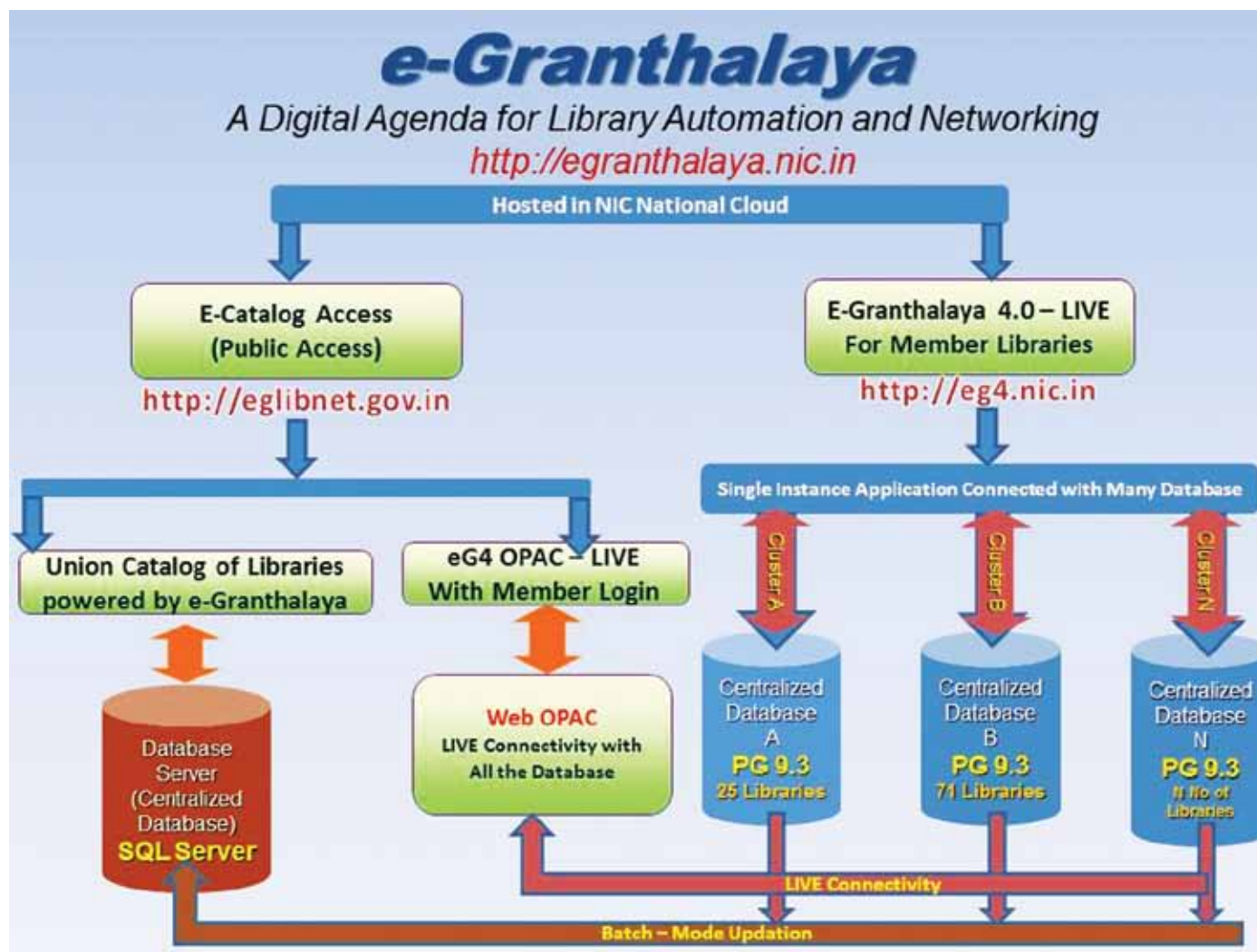
e-Granthalaya Architecture

programmes were conducted on e-Granthalaya during the year 2017-18.

9.6.16 Aadhaar Authentication Services

NIC has setup Aadhaar Authentication Services for E-governance Application of NIC. These services are setup at Shastri Park, Pune and Hyderabad data centres. NIC has redundant leased line connectivity with Unique Identification Authority of India (UIDAI) Data centre at Hebbal Bangalore and Manesar. Aadhaar Authentication services also been extended to the applications hosted in the NIC data Centres. The Dept. has to sign MoU with NIC for Aadhaar Authentication services. Using the Aadhaar Authentication services of NIC, many real time projects are being executed like Biometric Attendance System, PDS for Various states, Scholarship etc. Basically two types of Aadhaar services are being offered for applications: Aadhaar Authentication - Demographic Authentication, Biometric Authentication, OTP Authentication and eKYC based on Biometric, OTP. Average response time for authentication is around 1 second and 95% transactions are served within 1 second. NIC is one of the leading transaction requestor for Aadhaar services of UIDAI. NIC has also launched Aadhaar service based on the new framework of UIDAI i.e. Registered Device Concept. The Division is involved in helping the application developers to migrate to new RD service environment. NIC has signed agreement with UIDAI to provide AUA/ASA platform for NIC's e-Governance projects. Aadhaar Enabled Authentication Division, NIC has established redundant links with UIDAI Data Centre to provide authentication services which can be used by the e-Governance applications. At present more than 100 State/Central Projects are on board at AUA/ASA services of NIC. More than 12 crore transactions were held in the month of February '2018 using AUA/ASA services of NIC.

9.6.17 Technical Development Programme (TDP) – Training Division

To perform the technical activities in the fast changing scenario of Information Technology, Training Programmes are essential for NIC Officials for capacity building in various IT discipline. TDP-Training Division has initiated various steps to conduct the continuous training Programmes/Sessions on emerging technologies like Data Analysis/Analytics, Data base Administration, Big data, Mobile Apps Development, Cloud Computing, HTML and CIS Technologies, PMP Software interaction Design, System administration, Python, Tomcat, Drupal, life ray, Open Source Technology, Networks, Security, Data Centre, VC Technology, Cyber security large scale project-MyGov., email/sms services, e-Sign Technologies, Aadhaar Act and its implication on S/W, Orientation and sharing on Block Chain, Red Hat collaborative Solution, CRG Tableau/Data visualization, GIS Services, Source code repository, NOSQL Big Data Analysis using Apache, Internet of Things (IOT), BHIM/UPI & Bharat QR Code integration, Secure Software Programming, Optimization for Mobiles, Search Engine Optimization, Public Finance Management (PFMS) Android Mobile App Development, Linux Sys. Adm. and PostgreSQL etc., Total Technical Awareness programmes is 63 and Total No. of Participants is 12086.

9.6.18 Digital Governance Research Centre

Hon'ble Minister, MeitY, inaugurated NIC Digital Governance Research Centre (DGRC) in collaboration with STPI Patna on 2nd March 2017. DGRC will work with Academia and institutes of excellence in doing ground breaking research to develop solutions which can make the life of a common man easier. DGRC is in the process of identifying areas where use of latest technology can have a pronounced and positive impact on service delivery channels.

9.6.19 Open Source Technology Development

Open Source Technology Development of Bharat Ke Veer Portal was achieved. Khoya-Paya Portal Support and Maintenance Consultancy for various NIC Projects/ Divisions. Web-Enabling of CollabLand, Enhancement of CollabLand (Client-Server Version). Roll-out support for States like Andhra Pradesh, Maharashtra, Tamil Nadu, and Puducherry was also achieved.

9.6.20 Mobile App Store

The nodal centre for mobile application development brought out guidelines for development of mobile app associated with drafting of Guidelines for Indian

Government Website (GIGW) guidelines for mobile apps drafting of security guidelines for mobile apps managing NIC's account in Google Play Store and Apple app store. Managing and maintenance of NIC's eGov mobile app store. Coordination of activities of various competency centres for mobile app development. Coordination of mobile app development for various ministries and departments. Coordination of training programmes organising workshops and events.

225 apps in NIC eGov mobile app store, 111 apps in NIC account in google store, 9 apps in NIC account in Apple app store, 4 competency centres developing mobile apps for eGov activities, Bharat Ke Veer portal ver 2 developed in a short period of time.

9.6.21 Development of North Eastern Region (DoNER)

The Union Minister of State (Independent Charge) for Development of North Eastern Region (DoNER), Dr. Jitendra Singh has launched a new online e-Portal, which has been designed, developed and customised by National Informatics Centre, for submission, surveillance and follow-ups of development projects relating to Northeast falling under the category of Non-Lapsable Central Pool of Resource (NLCPR). In order to bring in transparency, the portal has been programmed to send automatic computerised reminders through SMS & e-mail to the State Governments and others concerned which will help in keeping surveillance on financial, physical and visual progress for timely completion of projects. The Dashboard enables State Government to exchange requisite information with DoNER. Secondly, it also enables public at large to access information about ongoing NLCPR projects as well as new projects

proposals i.e. priority List, submitted by respective north east states. One can also send visual input of ongoing NLCPR projects to ministry through smart phone or tablet, etc. The android as well as iOS version of the MyDoNER APP have been developed and published which has been utilised as one of the front-end interface of NLCPR (Non Lapsable Central Pool of Resources).

9.6.22 NIC State Units and UTs

NIC State Units and NIC district Units provide ICT and eGovernance support to State govt., District administration and local govt. bodies. NIC units in state and districts help to roll out the Central project and Policies in local bodies. Many central projects comes under Digital India Initiatives have been rolled out successfully such as Transport Project, Land Record Computerisation (Bhunaksha), ICAR Experts SMS Services To Farmers, GST and development of Back-end System, e-hospital , e-Granthalaya, Soil Health Card, National Knowledge Network (NKN), Targeted PDS, e-Procurement, Mother and Child Tracking System (MCTS), National Social Assistance Programme (NSAP), TREASURYNET, Pension Payment System, IVFRT, AEBAS, National Scholarship Portal, PRAGATI, Jeevan Pramaan, ePrison, ePanchayat, Immigration Control System, mobile Apps eChallan and mParivahan, eVidhan, eOffice, eTaal etc.

A number of states have also developed and released citizen centric mobile apps in the area of e-Governance. States of Himachal Pradesh, Madhya Pradesh, Karnataka, Andhra Pradesh, Chhattisgarh, Meghalaya are actively involved in mobile app development.

Some of the broad activities in States/Union Territory are summarized below:

State, UT	Project	Summary
Andhra Pradesh	e-Governance Initiatives	AePDS - Aadhaar enabled Public Distribution D-Krishi – an Aadhaar Enabled Seed Distribution System
	PUNARVAS	3 Web based Applications BRR Vamsadhara (Srikakulam District),GRR Gandikota (Kadapa) and NPCIL, Kovvada (Srikakulam)
	e-Jamabandi	Website for Online Payment of Water Tax
Assam	Assam DARPAN	Launch of CM dashboard by honorable Chief Minister
	ePrastuti	Standardisation of 203 Websites of 54 departments and its subordinate organisations
Bihar	Energy Billing Application	Implemented in 38 districts with 16 Circles, 65 Divisions, 196 sub-divisions and 604 sections to cater the need of 86 lakh rural consumers

State, UT	Project	Summary
	Data Governance Research Centre (DGRC)	A centre is developed to undertake research activities for ICT projects.
Chhattisgarh	e Awas – Chhattisgarh Housing Board Computerisation	The computerization of the Estate and Accounts module is completed and rolled out in all 8 zones, 16 divisions and head office of Housing Board.
	Vidyarthi Utkarsh Yojna	A web application to track the status and performance of SC and ST students studying under Jawahar Utkarsh Vidyarthi Yojna.
	Land Records Computerization ("Bhuiyan")	Digitally signed RoR are made available to citizens online. An interface for Banks created to record Loan status against Khasra.
Goa	Goa GST System	A complete System for Department of Commercial Taxes, Government of Goa.
	Mobile App	Mobile App is developed and provided to Tax officer for "Information in Hand ".
Gujarat	CM Dashboard	A visual display of more than 500 indicators of 18 sectors of all the state government departments
	eMilkat	An ICT based application to digitize textual urban land records data of state
	Xtended Licensing Node (XLN)	Xtended Licensing, Legal & Laboratory Node is a Generic Application floated in by the MeitY for Rapid Replication and RollOut Concept
	Digital Gujarat	An online platform which aims to provide various services provided by Government of Gujarat
	Mobile Apps	Gujarat Public Service Commission (GPSC) OJAS - Online Job Application System "SUGAM" provides a one stop interface to citizen
Himachal Pradesh	eHRMS	Software for personnel management
	The Mid Day Meal Reporting and Management System	Daily reporting of meals data from mobile phones of teachers on the toll free single SMS number
	DM Dashboard	To monitor key performance indicators, Dashboard is developed for District magistrate – Launched by Honorable Chief Minister.
	Janmanrega mobile app	
	Online permits for visiting Rohtang Pass	
Jharkhand	Gyanjyoti	For State Technical Board – Online Registration, Result tabulation- 32 Polytech
Karnataka	Samrakshane	An end-to-end state of art e-Governance solution for Agriculture and Horticulture departments to handle crop insurance activities under both PMFBY & MWBCIS
	e-AASTHI	For Property Management System for Urban Local Bodies in Karnataka.
Kerala	REALCRAFT	For registration and licensing of fishing vessels
Madhya Pradesh	eMARG	GIS system for Maintenance of Rural Roads,
	e-Uparjan	Agricultural Produce Procurement System for various crops,

State, UT	Project	Summary
Manipur	MOHSOM	A GIS based tracking of the event and activities of Handloom Schemes of Manipur
	Sericulture Development	Online GIS monitoring system of Sericulture Development
Meghalaya	Mobile App Meghalaya Votes	For the benefit of the voters catering especially to eligible electorates of Meghalaya.
	DM Dashboard	To monitor key performance indicators, Dashboard is developed for District magistrate.
Odisha	MSMEs (AIM) software	Facilitate entrepreneurs to apply for incentives and avail the benefits within defined timeframe
Puducherry	ePathiram	Connects all the sub-registrar office in a single application in merged database concept.
Punjab	Punjab Sewa Portal(PSP)	To enable the delivery of citizen-centric services of all the departments under one roof
	Integrated Solution for recruitments	Integrated Solution for Recruitments for Punjab Public Service Commission (PPSCISR) aims at integrating and computerizing the recruitment process undertaken by PPSC Punjab
Rajasthan	IFPMS	IFPMS for civil pensioners was implemented provides a complete solution including online applying Medical Diary Services, issuance of electronic Pension Payment Order (ePPO) and ECS/NEFT payment
	Gyansankalp Portal	Address the education funding gap by linking government initiatives to individual/ CSR.
	AHRMS	Animal Husbandry Record Management System Security audited and implemented
Tamil Nadu	Marks Certificate Verification System	Provide easy access to the secured verification services for government, Public and private organizations.
	Oral Pre Cancer Screening Programme	Mobile app developed for National Rural Health Mission to conduct the survey on Oral cancer prescreening.
	NPCDCS	National Programme for prevention and control of Cancer, Diabetics and Cardio vascular diseases and Stroke
Telangana	AIFSM	ALL INDIA FOREST SPORTS MEET portal was developed for the computerization of the sports events by providing a dynamic website and software application for registration of participants and to maintain event wise database for 23rd AIFSM
	GIS Enabled School monitoring System	GIS enabled school monitoring system helped the Education department to plan for the access, enrolment, retention, quality and monitoring aspects.
	WaterSoft	Automation of Rural Water Supply & Sanitation, Govt. of Telangana application monitors safe drinking water and sanitation facilities to rural sector and also integrating all 138 RWS Offices, 75 Water Quality Laboratories across the State.
Uttarakhand	Automation of Uttarakhand Public Service Commission	System of online application (SOAP), Online Admit Card/ Marks Sheet and other internal automation like Gate Pass System, Expert System, Coding decoding System, Court case monitoring System, PIS etc.
West Bengal	web based eBhuchitra	Digital ROR, Plot with QR code, plot map, land acquisition cases and lease khatian; eNathikaran for centralised registration of deeds
	iBudget	For workflow based online budget mgmt.

9.6.23 National Informatics Centre Services Inc. (NICSI)

National Informatics Centre Services Inc. (NICSI), a section 8 company (Erstwhile Section 25 Company) under NIC, provides total ICT solutions comprising of consulting, technical resources, hardware, software, design & development, quality check, operations & management, as well as end-to-end ICT solutions & services to Central/State Government Departments and Organisations including state-of-the-art solutions in all ICT related domains. During FY 2017-18, NICSI has continued these activities.

Department of Public Enterprises evaluates actual performance of PSUs against targets set in the MOU with their administrative ministries and declares grading. NICSI has been awarded Excellent Grading for the year 2015-16.

Some of the major projects under implementation includes National Knowledge Network (NKN), e-Vidhan — a Green Governance Tool, Government of Himachal Pradesh, KV 'Shaala Darpan' - Kendriya Vidyalaya Sanganthan Ministry of HRD, Government of India, Enhancement and upgradation of NIC Cloud Services at National Data Centres at Delhi, Pune and Hyderabad, NICSI Development Centre, Establishing Wi-Fi Campus LAN in various colleges across Jharkhand State, implementation of hotspot/ Wi-Fi campus connectivity at Banaras Hindu University, providing space for implementation of its e-Tourist Visa Scheme for various countries to set up visa process limit support centre and sitting arrangements for other administrative activities, Ministry of Home Affairs, Government of India, Implementation / IT Manpower Support to SWAN PoPs in the Districts in UP, Ministry of Health & Family Welfare and Ministry of Women & Child Development, Government of India etc.

By the end of the financial year, NICSI would be involved in implementation of around 3200 new projects. NICSI has also added number of new clients, products and services to its list.

9.7 Standardization, Testing and Quality Certification (STQC) Directorate

9.7.1 Introduction

A network of 16 Testing and Calibration laboratories has been established by STQC Directorate in the country including North-East region. These laboratories are equipped with state of the art standards and equipment. It provides Testing, Calibration, Training and Certification services to industry in the field of Electronics and Information Technology. Many national and international accreditations/ recognitions have made these services widely acceptable not only in India but at international level also. Currently, STQC services are being utilized by large number of organizations representing the entire segment of industry, Government departments, R&D organizations etc..

The locations of Laboratories / Centres and Services offered are indicated below -

Laboratories/ Centres	Locations	Services offered
Electronics Regional Test Labs (ERTL)	Delhi, Kolkata, Mumbai, Thiruvananthapuram	Testing and Calibration
Electronics Test & Development Centres (ETDC)	Bengaluru, Hyderabad, Mohali, Pune, Guwahati, Chennai, Goa, Agartala, Jaipur, Solan, Ajmer	Testing and Calibration
Information Technology (IT) Centres (Co-located with respective Labs except Amaravati)	Delhi, Bengaluru, Hyderabad, Kolkata, Chennai, Mohali, Guwahati, Thiruvananthapuram, Pune, Agartala, Amaravati	Testing of IT solutions for Functional and Non-functional (Performance, Usability, Security etc.) parameters
IT Centre; Common Criteria Test Lab (Co-located with respective Labs)	Kolkata, Bengaluru and Delhi Labs being established	Testing of IT products for Security

Laboratories/ Centres	Locations	Services offered
IT Centre; Bio-metric Devices Test Lab (Co-located with respective Lab)	Mohali	Testing and Certification of Finger Print Scanners, Camera and Iris Scanners
Centre for Reliability (Co-located with respective Lab)	Chennai	Reliability testing
Indian Institute of Quality Management (IIQM) (Co-located with respective Lab)	Jaipur	Training courses on Quality Management, Information Security, Website Quality etc.
Regional Certification Centres (Co-located with respective Labs)	Delhi, Kolkata, Mumbai, Bengaluru	Certification services for Quality Management and Product Safety

STQC Directorate also supports Government policies, initiatives and programmes concerning Standardization, Quality Assurance and Management besides providing above services to the industry on commercial basis. Number of projects sponsored by the Ministry in the area of Standardization, Software Quality Assurance, Information Security Management, Quality Assurance of Indian Language Technology & Products have been executed.

Achievements during FY 2017-18

Services rendered in the field of Information Technology

STQC IT Centres have provided the following services:

STQC IT Services, ERTL (East), Kolkata

➢ Conformity Assessment of e-Procurement system of Government of Chhattisgarh.

➢ Quality evaluation of various important applications which include e-Governance solutions like e-GPF, Annadarpan SMART etc.

➢ Functional testing of Core Banking solution (SUVIKAS) for Odisha State Cooperative Bank (OSCB) used by rural citizens.

➢ Third Party Audit (TPA) for various State Data Centre for North-East states (Tripura, Meghalaya), and other States (West Bengal, Bihar, Chhattisgarh and Odisha). The audit is carried out to ensure that the audits conducted by respective TPAs on Infrastructure, Utilization, Security, Service Level Agreements, Operation & Management are adequate in terms of audit methodology, findings & their follow up.

➢ Periodic annual Third Party Audit of Passport Seva Project of MEA to assess functionality, security and IT service delivery of the project and also conducted verification/ validation of change control notes raised by MEA in respect of Passport Seva application.

➢ Security Vulnerability Assessment for the websites of Embassy of India at different countries like Germany, Switzerland, Sri Lanka, United Kingdom and Russia conducted and certificate issued for 'Safe to host'. About 50 Web applications/ Websites from different departments of State Government have been assessed for security vulnerabilities and cleared for 'Safe to host'.

➢ Security Vulnerability Assessment of servers and network devices for organization like IRCTC, CRIS, MSRTC, Power Grid Corporation etc. have been completed.

➢ Security Assessment of web applications of different Ministries and Department of Government of West Bengal, Odisha, Jharkhand and North–Eastern States done.

STQC IT Services, ERTL (North), Delhi

➢ Smart Card Operating System for Transport Application (SCOSTA) Certification of Smartcard used for Road Transport Application (DL-RC),

National Population Register (NPR), Rashtriya Swasthya Bima Yojana (RSBY) & e-Passport etc.

➢ e-Governance Projects of various Ministries and Departments

- Assessment of Application for CBI.

- Ministry of Finance, Department of Economic Affairs.

- Conformity Assessment of e-Procurement System of different Government organizations.

- Ministry of Railway, Centre for Railway Information Systems (CRIS).

- Goods and Services Tax (GST Network).

- Department of Post.

- Department of Income Tax.

- Ministry of Corporate Affairs (MCA 21).

- Ministry of External Affairs (MEA).

- Central Electricity Regulatory Commission.

- Ministry of Fertilizers.

- E- District, Government of NCT Delhi.

➢ Ministry of Defence

- Additional IACCS Nodes & Associated Systems for Air Force

- Integrated Quarter Master Package (IQMP) for Indian Army.

- Battlefield Surveillance System for Indian Army.

STQC IT Services, ETDC, Bengaluru

➢ Services have been provided to Chief Election Commissioner office, Karnataka, Chief Minister's Office, Karnataka, Directorate of Treasuries, Department of Commercial Tax, Department of Posts, Directorate of Electronic Delivery of Citizen Services, Centre of e-Governance, Department of Civil Supplies and Consumer Affairs, Department of Health, Department of Income Tax, Department

of Industrial Policy and Promotion, Food Corporation of India etc.

STQC IT Services, ERTL (South), Kerala

➢ Identified by the Government of Kerala as third party test centre for carrying out application security of the websites and web applications, developed for the various state Government departments which are being hosted in the State Data Centre. Actively participated in the national e-Governance Programme by testing and evaluation of projects from Cochin Municipal Administration.

STQC IT Services, ETDC, Hyderabad

➢ Web application testing carried out for e-Procurement and e-Auction modules for Information Technology, Electronics & Communications (IT&C) Department of Government of Telangana.

➢ Carried out Security testing of Contract Management System for IT&C, Department of Government of Andhra Pradesh.

STQC IT Services, ETDC, Chennai

➢ Web Application Security testing for materials database of India for Indira Gandhi Centre for Atomic Research (IGCAR), Kalpakkam, Security testing of Web Portal of Central Institute of Plastics & Engineering Technology (CIPET), Chennai and Web Site Security testing of Auroville Foundation, Puducherry.

➢ Tested the functional compliance of a web based Exam/ Testing and candidate Assessment software application, mostly used in Educational Institutions, Government organizations and Corporate entities, featuring from Application Processing to Computer Based Test and Results Processing. The non-compliant items with respect to the user Requirements were brought out in testing and the corrected software was subjected to Regression testing to confirm its Quality improvement.

STQC is one of the empanelled organisations for Information Technology Security audit with Indian Computer Emergency Response Team and Public Key Infrastructure audit with Controller of Certifying Authority. Third party Information Technology security assessment / training services are regularly provided for the e-Governance initiatives under e-Governance Conformity Assessment (e-GCA) project.

9.7.2 Common Criteria (CC) Test Laboratory

Common Criteria Test Laboratory at ETDC, Bengaluru : Common Criteria Test laboratory is being established to evaluate the security features of IT products and systems as per ISO/ IEC 15408 : Evaluation Criteria for IT Security. The CC laboratory has taken up Evaluation Assurance Level (EAL) level 2 security evaluation of Distributed Denial of Service (DDOS) protection solution developed by a startup company.

Common Criteria Security Test/ Evaluation Laboratory as well as a Certification Scheme based on Common Criteria standard have already been established in IT Centre, Kolkata under a project. The Common Criteria Test Laboratory is fully operational. The Common Criteria Testing Laboratory has successfully completed evaluation of device used in telecom sector, i.e., Network/ Element Management systems. This is a new type of product evaluated by the laboratory. There is a need in the market to evaluate this type of product. Presently, three similar products are under evaluation.

Common Criteria Security Test/ Evaluation Laboratory is also being established at IT Centre, Delhi.

9.7.3 National facility for Quality Assessment of Biometric Devices

In order to eliminate the use of stored biometrics, UIDAI has mandated the use of Registered devices for Biometric authentication. Before deployment of Registered Biometric devices in the field, Hardware and RD services of the Registered devices have to be certified by STQC. As part of certification, STQC IT Services, Bengaluru has evaluated 77 Registered Devices for 18 vendors as per UIDAI technical specifications Ver2.0. Based on the evaluation report,

38 registered devices pertaining to 18 vendors have been provided with provisional certificates.

ETDC, Chennai has also tested and evaluated Aadhar enabled Point of Sale devices for Government of Maharashtra and Government of Uttar Pradesh, as part of their efforts and plans to upgrade the State Digital Infrastructure to facilitate cashless payments for Government Services in rural areas.

9.7.4 Website Quality Certification

Under the Project 'Strengthening STQC IT Centres for Website Quality Testing to support e-Governance implementation in India' 1012 websites of various Ministries/ Departments of Government of India were evaluated as per Guidelines for Indian Government Websites (GIGW 2009). So far 151 websites have been certified under Website Quality Certification Scheme.

9.7.5 Test and Calibration Services rendered

STQC laboratories have provided test and calibration services to a large number of industry, public sector undertakings and Government organisations. Some of the major Testing and Calibration projects undertaken during the period are indicated below -

ERTL(East), Kolkata

➢ Calibration services for Electro-technical parameters including calibration of Medical Instruments of Hospitals, both at laboratory and at customer site.

➢ Calibration services for Non-electrical parameters (Temperature, Pressure, Dimension, Mass, Volume, Density & Viscosity) both at laboratory and at customer site.

➢ Safety testing of Single and Three-Phase Static Energy meters under STQC 'S' Mark scheme as per IEC 61010-1:2010, 3rd Edition.

➢ Safety testing of Driver of LED lamps as per IS: 15885 and LED Self Ballasted Lamp as per IS:16102 (Part-1).

➢ Safety testing of IT-products like Printers, Scanners, Set Top Box, Tablet, LAPTOP, Automatic Data Processing Machines, LED

TV, Microwave Oven etc. as per relevant BIS standards under Compulsory Registration Scheme (CRS)/ Surveillance scheme of BIS and MeitY.

➢ Safety testing of Tungsten lamps as per IEC:60432-1 and Electronic Fuel Dispenser as per IS:9858.

➢ Type testing of Energy Meters & Tri-Vector Meters for leading Indian Manufacturers under Product Certification (Licensing) Scheme of BIS.

➢ Battery testing as per different BIS Standard.

➢ Characterisation of various PV Modules and LED.

ERTL (North), New Delhi

➢ EMI/ EMC Testing carried out on:

- Wireless Panel as per WPC.

- Wireless Multi detector as per WPC.

- Access Point as per WPC.

- Radio Modem as per TEC.

- Data Concentrator Unit as per CISPR & IEC.

- Fiber Optic Multiplexer as per PGCIL Spec.

- Variable Frequency Drive Panel as per IEC 61000-4-5.

- Medical Products as per CE Marks (IEC60601-1-2).

- Vehicle Tracking Unit as per AIS -04.

- Home Automation System as per CISPR14 & IEC.

- Smart LED Bulb as per WPC & CISPR15.

- Finger Print Scanner as per IEC & FCC.

- IP Camera as per CISPR/ IEC.

- String Monitoring Device for Solar Panel as per IEC 60326-1.

- Medical Products (Pulse Oximeter, ECG, EMG, EEG) as per IEC60601-1-2.

➢ LCD Projector, Digital duplicator under CRS Surveillance Testing

➢ Medical air compressor for ventilator (IEC60601-1)

➢ Car air purifier (IEC60335-1)

➢ Undertaken 26 Nos. of CRS Surveillance jobs.

ETDC, Chennai

➢ Tested Sectionalizer used in Power Transmission lines by TANGEDCO, POWER GRID and power distribution companies of Government of Tamil Nadu.

➢ Tested and evaluated 'Lily Pond'- Street Light Control system and Monitoring of the pollution control in heavy traffic roads.

➢ Environmental testing of Defence Equipment for the Country – Tested Super Harvard Architecture Single-Chip Computer (SHARC) processor for target identification in Naval ships.

➢ Tested Magnetic parking sensor used in Metro cities for vehicle parking, which automatically display the vacant position in a particular area.

➢ Tested and Evaluated 11 models of SD Set Top Box for Tamil Nadu Government (ARASU) Cable TV Corporation Limited (TACTV) to provide DTH signal services through Local Cable Operators and Multi System Operators to the public at an affordable cost for rollout of Digital Addressable System across Tamil Nadu State.

➢ The Government of Tamil Nadu is implementing the scheme of distribution of Laptop computers to the students studying in Government and Government-aided schools and colleges especially in the rural and semi urban areas of the state to facilitate them in acquiring state of the art computer and digital skills. ETDC Chennai tested Laptops with reference to IS:14896 to avoid influx of spurious Laptops from unorganized sources thereby facilitating the Electronics Corporation of Tamil Nadu (ELCOT) in Evaluation of Laptops.

CFR, Chennai - R&D, Innovation & Design

➢ Carried out Reliability Prediction Analysis and Reliability Block Diagram evaluation of

Integrated Submarine SONAR Suite **(USHUS-2 project) for NPOL, DRDO, Kochi**. The Reliability Prediction Analysis results provided details on the components/ blocks significantly contributing to overall system Reliability. Reliability Block diagram study provided the MTBF, Mission Reliability and Failure Rate for six different missions.

➤ Carried out Reliability Assessment for **Amplifier Units used in INVAR Missiles for Bharat Dynamics Ltd. (BDL)**, Ministry of Defence, through Centum Electronics, Bengaluru. Accelerated Reliability Testing was also conducted on these Amplifier Units, for demonstrating 20 years of storage life and 5 years of Military operation conditions.

ERTL (West), Mumbai

➤ Environmental testing of Multi-section Digital Axel Counter, Launcher Junction Box, Pin Assembly, Auxiliary Relays and Petrol Pumping Dispensation having applications in Railways, Defense, Aerospace, Power Feeder Safety System & Petroleum sector.

➤ Safety testing of products as per International Standard such as Solar Pump Controller (IEC60950-1), Hematology Analyzer Precount (IEC 61010-1), Directional Over Current Relays/ Non Directional Over Current & Earth Fault Protection Relay, High Impedance Protection Relay/ Transformer Protection Relay (IEC60255-27), Horizontal & Vertical Form Fill Seal Machine (IEC 60204-1).

➤ EMI/EMC testing of products; Automated Immunoassay Analyzer / Merilyzer Autoquant (IEC 61326-1 & IEC 61326-2-6), Constant Current Rectifier unit-20kW (IEC 61000-6-2 & IEC 61000-6-4), Twin Tower of Vertical Form Fill Seal ((IEC 61000-6-2 & IEC 61000-6-4), Twin Beam LED Head Light (IEC 61326-1), Solar Pump Controller AC 3.7kW (IEC 61000-6-2/6-4) having application in Medical, Airport Navigation, Packaging, Railways & Irrigation sector respectively.

ETDC, Bengaluru

➤ **EMI/ EMC Testing Services:** Development assistance and Compliance testing facilities are extended to industries to ensure developed product meets National / International standards like IEC, CISPR, FCC and IS standard. Following major products are tested -

- Solar Inverter & module as CISPR 11 and IEC 61000-4 series (Immunity testing).
- Mass flow Transducer as CISPR 11.
- Media Convertor as per CISPR 22 and CISPR 24.
- Automatic transmission system CISPR 22 and CISPR 24.
- Night vision equipment as per CISPR 11 and IEC 61000-4 Series (Immunity testing).
- Smart Energy meter as per IS 1554.
- RFID trans receiver Controller as per CISPR 22.
- Spectrophotometer as per CISPR 11 and IEC 61000-4 (standard for immunity).
- Data logger as per CISPR 11 and IEC 61000-4 (standard for immunity).
- High speed data & communication Network as per CISPR 22 and CISPR 24.

➤ **Safety Testing Services under CRS :** Following major products are tested for Safety Compliance under CRS scheme :

- Smart Station, as per IS 13252 (Part-1):2010.
- Multifunction Printer, as per IS 13252 (Part-1):2010.
- Set Top Box, as per IS 13252 (Part-1):2010.
- Mobile Phones, as per IS 13252 (Part-1):2010.
- POS System, as per IS 13252 (Part-1):2010.
- PC Stick, as per IS 13252 (Part-1):2010.

- AC/ DC Adapter as per IS 616:2010.

- UPS up to 880VA/520W as per IS 16242 (Part-1):2014.

- Built-In Microwave Oven as per IS 302-2-25:2014.

➢ **Environmental Testing :** The following unique products were tested -

- Vibration & Endurance testing of "Angle of attack test set" as per JSS-55555.

- Testing of GPON as per QM 333 Cat B2 for C-DOT.

- Testing of STN-IB Multi add drop multiplexer as per QM 333 Cat B2 for DOT.

- Testing of Electronic Interlocking system as per IS 9000 part 2,3,5,14.

- Testing of Control panel of size 2.2m x 1.1 m x 1.5 m as per IEC 60068 -2 2 & IEC 60068-2-30.

9.7.6 Acceptance Testing of VVPATs

VVPAT Machine Acceptance Testing : STQC has been recognized by Election Commission of India as third party testing agency for Acceptance Testing of Voter's Verified Paper Audit Trail (VVPAT) machines.

ETDC Bengaluru and ETDC Hyderabad have taken up the Acceptance testing of VVPAT machines for Election Commission of India as per ECI's Acceptance sampling criteria and Test procedure covering functional, electrical, mechanical, environmental and RF Compliance requirements.

9.7.7 Solar Photo-Voltaic Panel and Products Test Facilities

Number of Solar Photo-voltaic Modules and products have tested as per international standard using test facility established at ERTL(East), Kolkata. The facility includes Sun Simulator for Opto-electronic testing of Solar Photo-voltaic Modules. The test facilities cover the electrical and optical performance of the products under a variety of environmental conditions, mechanical loading etc, as per applicable standards. The test schedules establish the quality and reliability of the products for a wide range of application environments.

Testing infrastructure is being upgraded to test Solar Photo-voltaic Modules and products at ETDC, Bengaluru also.

9.7.8 Continuing participation in Space Programmes at ERTL (South), Kerala

Components: Carried out Screening of more than seventy five thousand of components which includes LCR devices, Discrete devices, ICs- digital & Linear of different packages, Leaded as well as SMDs for Tata Institute of Fundamental Research (TIFR) and Indian Space Research organizations, viz., Vikram Sarabhai Space Centre (VSSC), Liquid Propulsion Systems Centre (LPSC), Sir M Visvesvaraya Institute of Technology (MVIT) and ISRO Inertial Systems Unit (IISU). Qualification tests are being carried out regularly for different types of components for space application. Carried out screening of RTD sensors and new types of Transient Absorption Zeners. Identified by VSSC as major test centre for screening of SMD devices. Developed test facility for screening of Low Voltage Integrated Circuits.

Environmental: Screening of isolators used for mounting various Electronic packages used in GSLV/ PSLV launch vehicles. Environmental Stress Screening (ESS) for various PCBs for Defense related projects. Our Vibration Test facility is regularly utilized by VSSC and its ancillary units for testing their packages and modules as per space specification.

Equipment: Testing and evaluation of Navigation, Guidance and Control (NGC) packages of launch vehicles has been started. Command Execution Modules (CEM) and Selection Logic Relay Unit (SLRU) have been evaluated. Continuing Test & Evaluation of ATS Stack, Power Modules and Data Acquisition units, used in GSLV/ PSLV.

9.7.9 National Accreditations of Test & Calibration facilities and BIS Recognitions

It is the constant endeavor of STQC to obtain Accreditation or Recognition of their services from national or international bodies. Details of major assessments are indicated below -

➢ **BIS Recognition of ETDC, Bengaluru:** After successful BIS assessment of Safety Testing laboratory under CRS scheme, the following 5 new products added to the BIS scope in addition to existing 26 products -

- Visual display units, Video monitors of screen size 32" as per IS 13252 (Part-1): 2010.

- CCTV Cameras/ CCTV Recorders as per IS 13252 (Part-1): 2010.

- USB driven Barcode recorders, Barcode scanners, Iris scanners, Optical finger print Scanners as per IS 13252 (Part-1): 2010.

- Smart watches as per IS 13252 (Part-1): 2010.

- Plasma LCD/ LED Television of screen size upto 32" as per IS 616:2010.

➢ **ERTL** (West), Mumbai has enhanced its Calibration Measurement Capability (CMC) for electrical parameters such as DC Voltage source measurement {0.00025% @ 1V & 0.0001% @10V}, DC & AC High voltage {source/ measure mode; DC 1kV to 50kV (0.01% to 0. 5 %) and AC 1kV to 33kV (0.2%)}, Frequency parameter {source/ measure mode; from 1mHz to 18GHz (1E-10)}, CT/PT calibration facility {1A to 3200A/1A, 5A & 220V to 33kV/110V (0.2%)}.

➢ ERTL (West) Mumbai has received NABL (National Accreditation Board for Testing & Calibration Laboratories) renewal accreditation certificate for Testing & Calibration services. The discipline in the testing field is Electronic / Electrical testing covers EMI/EMC, Safety, Environmental Testing & Electrical Testing parameters. In the Calibration area, the discipline is Electro-Technical, Mechanical & Thermal.

➢ ERTL (West) Mumbai has been granted renewal of recognition from BIS for the further period of three years for testing of products including safety testing of products covered under 'Compulsory Registration Scheme (Electronics & Information Technology Goods Order, 2012) of MeitY.

9.7.10 Training Services

a) Centre For Reliability (CFR, Chennai), conducted two National level training programmes on Certified Reliability Professional (CRP) confirming to the body of knowledge of American Society for Quality (ASQ), USA. Over 30 participants from various organizations all over India and also delegates from Middle East countries were trained and awarded certificates.

b) CFR, Chennai conducted specialized Three Day In-house Reliability Engineering Training programme at Larsen and Toubro (L&T), Mysore. 15 engineers were trained and awarded certificates.

c) Under the "Enterprise Architecture" project, which will provide robust structure for development of various software applications/ e-Government projects, ERTL(W), Mumbai has conducted training in western zone of India to sensitize the employees and IT professionals of Government departments who are involved actively in the development & maintenance of IT infrastructure.

d) Indian Institute of Quality Management, Jaipur provides training to industries and organizations in the area of Quality Management System (ISO:9001), Laboratory Quality Management System (ISO:17025 and ISO:15189), Information Security Management system (ISO:27001), IT Service Management (ISO:20000) and also functions as an approved Training Organization.

e) Training programmes arranged for ERTL, Delhi officials:

- 45 man-days training was arranged (in-house and external) on different topics like National conference on Advance in

Metrology, LED Devices, Standardization in Smart Energy Ecosystem.

- 11 training programmes were conducted where in 127 officials from 82 organizations were imparted training.

f) ERTL (East), Kolkata conducted various knowledge-based and skill oriented training programmes for industries, laboratories, Students & individuals in different Areas of Technology such as, Industrial Automation, Bio-medical Instrumentation, Repair & Maintenance, Electronic Manufacturing Technology, Test & Measurement and Quality Assurance & Management Standards (ISO 9001: 2015, ISO/IEC 17025:2005, ISO 27001:2013).

g) ETDC, Hyderabad conducted five batches of job-oriented long term training on "Industrial Automation Programmable Logic Controllers & Supervisory Control and Data Acquisition (SCADA))" exclusively for SC/ ST/ Minority youth & Women Category students under MeitY sponsorship. Around 62 students are trained.

9.7.11 Activities in North-East Region

ETDC, Guwahati and **ETDC, Agartala** are the two laboratories under the STQC Directorate, operating in the N-E Region and extending the following services.

- Test & Calibration services to the Industries, Technology users & Service providers.

- Testing of e-Governance Software as well as State portals/ websites etc.

- Audit of IT Infrastructure / Third Party Auditors for the e-Governance projects like State Data Centres (SDC)/ State Service Delivery Gateway (SSDG)/ State Wide Area Network (SWAN) etc.

- Training services in the field of Electronics & Information Technology/ Quality & Reliability.

Test & Calibration Services:

Test & Calibration services of **ETDC Guwahati** & **ETDC Agartala** are extended to the organizations located throughout the NE Region towards improvement of Quality of their products and services. The services

are received by most of the Small, Medium and Large Scale Industries covering the Industrial sectors like–Oil & Natural Gas, Refineries, Exploration units, Railways, Power - Generation, Transmission & Distribution, Paper, Cement & Building material, Food & Beverages, Cosmetics, Cable & Conductors, Fertilizer, Plywood, Carbon Products, Steel, and Service sectors like–Aviation, Engineering & Construction, Telecommunications, Automobile, Service & Maintenance units, R&D and Test Labs, Hospitals, Pharmaceuticals & Pathological Laboratories etc

IT Test & Assessment Services:

Initiatives have been taken towards facilitating services in the field of **Testing/Assessment** of Software Applications, Website/ Web Applications, IT Infrastructure under various e-Governance projects like– Website Quality, e-District, SSDG/ SP/ e-Forms, SDC, SWAN etc. being implemented in the states of NE Region. ETDC Guwahati & ETDC Agartala together have tested number of Websites corresponding to Govt. / Semi Govt. organizations of the country for their **Functionality & Quality** in compliance to the **"Guidelines For Indian Government Websites (GIGW)"**. ETDC, Guwahati in association with ERTL, Kolkata also initiated Security Test/ Assessment of Web Application from time to time in compliance to security requirements of OWASP international guidelines. Beneficiaries are the Govt./ PSU/ Autonomous/ Society/ Educational Institution/ Research Centres & other organization of the country.

ETDC Guwahati & ETDC Agartala carried out SDC-TPA assessments/ audits of the State Data Centre projects implemented by the North-Eastern states like Tripura, Manipur and Meghalaya SDCs to assess the various requirements of Audit frameworks & procedures, Infrastructural, Operations & Maintenance (O&M) process and control, Service level agreement, Usage, Security, Functionality & Qualitative parameters towards improvement of quality of SDC services.

Training Services in the fields of Electronics & IT / Quality & Reliability:

ETDC, Agartala conducted number of training courses in the fields of Information Technology at Agartala and 66 nos. of local participants attended the courses. One

Training course on "Computer Fundamental" organized by ETDC, Guwahati & ETDC, Agartala for the SC/ ST/ OBC/ Economically backward community at Guwahati.

9.7.12 Promotional Matters:

With the help of STQC HQs., during Swachhta Pakhwada, a Nukkad Natak programme was organised in ERTL(North) on 28/09/2017.

9.8 National Institute of Electronics and Information Technology (NIELIT)

9.8.1 Introduction:

National Institute of Electronics and Information Technology (NIELIT), is an autonomous scientific society under the administrative control of Ministry of Electronics and Information Technology (MeitY), Government of India. NIELIT is actively engaged in Capacity Building and Skill Development in the areas of Information Technology (IT); Electronics; Communication Technologies; Hardware; Cyber Law; Cyber Security; IPR; GIS; Cloud Computing; ESDM; e-Waste; IoT; e-Governance and related verticals.

It offers courses in the Formal Sector in association with State Universities/Technical Board such as ME/ M.Tech, BE/B.Tech, MCA, BCA programmes; Aurangabad Centre is also conducting PhD Programme in the area of Electronics.

Courses in the Non Formal Sector in IT, Hardware under four levels, namely 'O' (Foundation); 'A' (Advance Diploma); 'B' (MCA equivalent); and 'C' (M.Tech equivalent); (c) Short Term Courses in niche areas; and (d) IT Literacy Programmes for the proliferation

National Institute of Electronics and Information Technology (NIELIT) Head Quarters at Dwarka, New Delhi

17th Meeting of NIELIT Management Board held on 4th December, 2017 under the Chairmanship of Secretary, MeitY

of Digital Literacy in the country; besides specialized programmes in e-Governance targeted towards empowering the employees of the State Governments. In addition, NIELIT has also created expertise for the roll out of customized skill development programmes, as per specific needs of public and private sector firms.

NIELIT is also one of the National Examination Bodies which accredits institutes/ organizations for the conduct of courses in the Non-Formal Sector. NIELIT is also the preferred agency for many State Governments for rolling out IT Literacy Programmes for its employees and the masses. The NIELIT courses have also been recognized by many State Governments for recruitment/ promotion of employees. The NIELIT courses are revised on regular intervals taking into account the needs of the industry and technological trends and are also retrofitted with soft skills components, leading to enhanced employment opportunities.

NIELIT has established itself as a premier organization having pan-India presence through a network of **41 own Centres** at Agartala, Aizwal, Ajmer (Kekri), Alawalpur, Aurangabad, Bhubaneshwar, Calicut, Chandigarh, Chuchuyimlang, Churachandpur, Chennai, Delhi, Dibrugarh, Gangtok, Gorakhpur, Guwahati, Haridwar,

Imphal, Itanagar, Jammu, Jorhat, Kohima, Kokrajhar, Kolkata, Kurukshetra, Leh, Lucknow, Lunglei, Pali, Pasighat, Patna, Ranchi, Ropar, Senapati, Shillong, Shimla, Silchar, Srinagar, Tezpur, Tezu and Tura, with its Head quarters at New Delhi.

It is also well networked throughout and a network of about **747+ accredited training institutions** for training of O/A/B/C level courses, besides a network of about **9444+ facilitation centres** engaged in training of digital literacy courses. NIELIT courses have already been aligned with the National Skill Qualification Framework (NSQF).

Since inception, NIELIT has trained about 50+ lakh candidates. Examinations of Digital Literacy programmes are conducted in the Online mode and digitally signed e-Certificates are issued to successful candidates. About 15,48,913 digitally signed e-certificates have been pushed to digital locker of the students and NIELIT is among the foremost educational institute in the country to institutionalize the mechanism i.e., linking of e-Certificates with Digital Locker.

NIELIT has also made efforts to diversify its repertoire of Capacity building & Skill Development activities

besides embracing latest trends and technologies such as IoT, Cyber Forensics, e-Waste management, Mobile Applications Development (Android), etc.

9.8.2 Digital Literacy:

Digital Literacy is one of the vital components that every citizen needs to be equipped with to participate in a digitally enabled and progressive environment. The ambit of digital literacy comprise of numerous interrelated skills that range from basic awareness and training to highly sophisticated and more complex creative and critical literacy. Besides, employers also expect the prospective workforce to possess the skills to be productive straight away in a new role and believe that digital skills improve employee's efficiency and productivity. Taking into cognizance the need of hour, NIELIT has taken a holistic approach and the bouquet of Digital Literacy courses has been enhanced with 03 more courses and now the Digital Literacy courses of NIELIT comprise of courses of duration ranging from 36 hours to 200 hours. These courses have also been retrofitted with about 1.5 hrs module on Financial Inclusion (developed by Department of Financial Services, MoF, GoI). The digital literacy courses of NIELIT, especially, BCC/CCC are accepted by the various State Governments/Government Departments such as Arunachal Pradesh, Bihar, Chandigarh, Daman & Diu, Gujarat, Maharashtra, Mizoram, Rajasthan, Sikkim, Tripura, Uttar Pradesh, O/o the CGA, DGE&T etc. for recruitment/in-service promotions/incentives etc.

To enable 24×7 learning, the e-Content of CCC course in 25 languages has been developed and made available at the website of NIELIT free of cost. As far as Classroom teaching is concerned the course is being delivered by about 9444+ Facilitation Centres throughout the Country. Besides, every month examination cycles of the courses are being held at more than 150 examination centres across the country. The course is governed by a complete online system i.e. registration of candidate for examination, receipt of examination fee, conduct of digitally proctored online examination, declaration of results and issue of digitally signed e-Certificates. On an average more than 80,000 candidates appear for online examination cycle of digital literacy courses that are conducted on monthly basis.

In order to ensure that NIELIT Courses are up to date and aligned with industry requirements, pro-active measures are being taken to align these courses with government regulations and framework. The O and A level courses have been aligned with the National Vocational Educational Qualification Framework (NVEQF) promulgated by AICTE and subsequent to subsuming of NVEQF with National Skills Qualifications Framework (NSQF), NIELIT is amongst the front-runners that has aligned 75 courses with NSQF.

9.8.3 Digital Payment Initiatives:

NIELIT has developed institutionalized mechanism by putting technology into use for making payments in the Digital Mode in respect of its activities connected with Payments and Receipts. Post demonetization NIELIT through its own Centres and Training Partners is imparting training on digital payments to students, citizens and merchants. Since demonetization, NIELIT has imparted training to about 1.4 lakh citizens on usage of digital payments. At the national level, NIELIT has organized Workshops and Camps (DigiDhan Mela) at more than 80 locations in India to train and on-board small and medium enterprises / traders on digital payment initiatives. Through these initiatives about 9,000 traders were trained. NIELIT is actively promoting Government of India's initiative of moving towards a less-cash economy through its Social Media accounts. NIELIT has endeavored to convert legacy system of receipts and payments in cash to an Online transparent and accountable system through digital means which is in place since 2014. As a result, the organization has also reaped its benefits in terms of - cost reductions; minimization of overdue payments; simplification of dispute management; increase in compliance; enhancement in security; and improvement in workflow efficiencies.

9.8.4 Some Notable Achievements:

1. In line with the vision of Hon'ble Minister (E&IT), courses on Basic Literacy in Cyber Security ranging from 20 to 200 hours duration was launched in the 20th NIELIT Directors Meet at Jaipur by Hon'ble MoS (E&IT) in the august

presence of Secretary, MeitY and JS & GC (HRD), MeitY.

2. In line with the guidelines issued by MeitY for promotion of mobile governance (m-Governance), NIELIT has launched 70 Mobile Apps on various topics of CCC course in 11 languages, so that the reach can be enhanced especially in rural areas, allowing rural students to access NIELIT courses through Smart Phones.

3. In line with NIELIT's initiative to simplify procedures through process re-engineering, an Online Expert Empanelment System, for empanelment of experts in a transparent manner, was launched by Secretary, MeitY and Chairperson, Management Board, NIELIT.

4. To enhance the employability of NIELIT students non financial and non-exclusive MoUs have been signed with Industries/ Agencies such as Monster. Com; Amazon Web Services (AWS). Under the MoU with Amazon, 25,000 NIELIT students and NIELIT faculty would be provided free access to more than 50 services.

5. NIELIT Centres/ Accredited Centres/ Facilitation Centres have conducted Digi Dhan Melas/ Awareness Programmes on Digital Payments and have trained/ sensitised about 1.4 lakh students, citizens and merchants.

6. e-Contents have been developed in English for various NIELIT courses and the same are also being converted into Hindi and regional languages such as Tamil, Telugu, Bangla, Gujarati, Malayalam, Kannada, etc.

7. In a unique initiative, a Study Centre has been established at Baramullah, J&K by NIELIT jointly with the Indian Army, from its own resources to mainstream local youth and women through skill development.

8. At NIELIT, internal capacities are being augmented through training of Master Trainers in niche areas such as Mobile Application Development, Cloud Computing, IoT, e-Waste, Cyber Security, Mobile Handset Design, etc. in synergy with industry leaders like Amazon, Google, Intel, Microsoft, etc.

9. As a part of capacity building project funded by MeitY, NIELIT had sent a team of 05 Officers to Taiwan for a 45-day Practical Hands-on training for Mobile Handset Design Engineers to promote 'Make-in-India'. The training was conducted at International Trade Institute, Ministry of Economic Affairs, Hsinchu, Taiwan in collaboration with Ministry of Electronics & IT(MeitY), India Cellular Association(ICA) and Mediatek.

10. NIELIT has released scholarship to around 450 candidates from own resources on completion of O/A/B/C level IT Courses under the NIELIT's Scholarship Scheme for SC/ST/EWS/PH/ Female candidates. Scholarship payments are being made through Aadhar Based Direct Benefit Transfer (DBT).

11. An Internet of Things (IoT) Lab has been established at NIELIT Calicut, which is equipped with Intel Galileo Boards and ARM Cortex Microcontroller Boards with the support of Intel India. The Post Graduate Diploma in IoT (6 Months) is presently being offered by NIELIT.

12. Registrations in NIELIT O/A/B/C Level IT Courses have been increased significantly compared to the previous year. Since inception, more than 10.17 lakh students have registered for these courses. The growth in new registration in the last 7 examination cycle is as under:-

New Student Registrations under NIELIT 'O', 'A', 'B' & 'C' Level Courses in IT (exam-cycle wise)
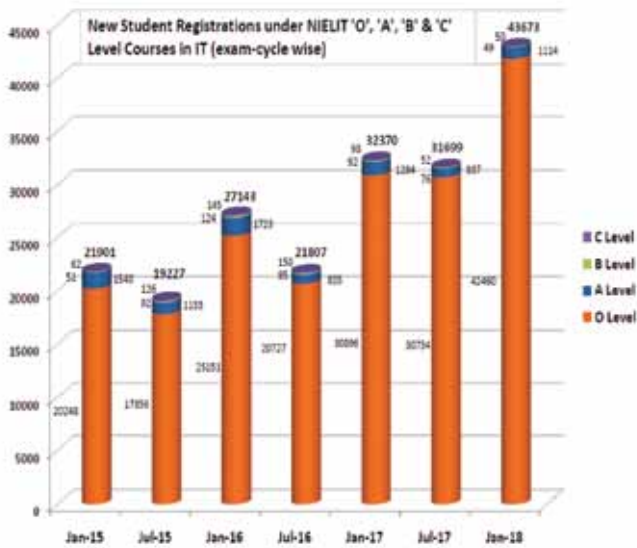
13. Considering the manpower and infrastructure requirement in ESDM sector, NIELIT Calicut has launched All India Post Graduate Diploma programme in various verticals such as VLSI and Embedded Hardware Design, One ASIC Design and Verification, and Embedded–Real Time Systems. These courses are being offered at NIELIT Centres, and are also being extended to Institutions/ Deemed Universities/ Organizations, who are meeting the criteria on required infrastructure.

14. NIELIT Aurangabad conducted a training programme on cyber security and digital forensics for State Crime Record Bureau Bhopal, Madhya Pradesh. The training was inaugurated by Shri Rishi Kumar Shukla, IPS, Director General of Police (DGP), Madhya Pradesh and Shri Adarsh Katiyar, ADGP, Madhya Pradesh. 100 Police Personnel attended the training programme.

15. NIELIT Centre Agartala has launched formal engineering courses namely Diploma in Engineering in Computer Science & Technology and Diploma in Engineering in Electronics and Telecommunication Engineering in association with Tripura University. In this regard, All India Council for Technical Education (AICTE) has granted its approval after carrying out due inspection of the necessary infrastructure and

expertise required to conduct such courses. The youth of the state will greatly benefit as both the courses has an intake capacity of 60 candidates for the academic year 2017-18.

16. NIELIT Calicut organized a National Conference on VLSI, Computing, Signal and Image Processing Applications on June 15, 2017. Eminent authors across India presented Technical Papers on VLSI, Cloud Computing and Signal and Image Processing. The Conference provided a platform for researchers and academicians to share and exchange ideas and present their latest findings as it was a suitable forum for the transfer and dissemination of new ideas and technology among all those concerned in the field of VLSI, Computing, signal and image processing.

17. A team of young energetic students of NIELIT Calicut have developed a Product Findo.in to track stolen Mobile Phones. The beta version of the same has been launched and it is available in the link http://findo.in/ They have developed it as part of their Project in the Advanced Diploma in .NET Technologies course. It is dedicated to help people access information about a lost phone and has been planned and engineered as an intelligent search assistant.

18. Utilizing the excellent infrastructure and the guidance of the faculty, students of NIELIT Calicut Centre of the course Post Graduate Diploma in Embedded Systems and IoT have developed several resourceful tools, some of which are:

The Embedded Medical Sample Sorting System that sorts the samples placed on the conveyor belt according to the information database.

Embedded Medical Sample Sorting System

I-Tank which is implemented with Microcontroller and a number of sensors like Turbidity sensor and Ultra-sonic sensor where Water level and level of sedimentation in water tank is detected.

I-Tank

The Embedded Waste Segregator that aims at segregating the waste at the disposal level itself.

Embedded Waste Segregator

Smart Ride System

Smart Ride which is a system that could perform real time traffic density monitoring and congestion alert using IoT.
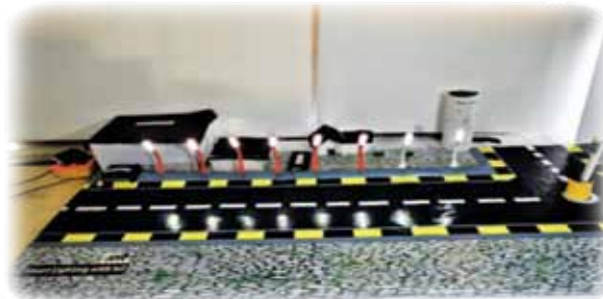
Smart Lighting with IoT

Smart Lighting with IoT which is an automatic street lights maintenance system to reduce power consumption.

Green Sense with WSN

Green sense with WSN which is an environment monitoring system, monitoring various factors such as temperature, pressure, humidity air quality along with other factors based on wireless sensor nodes, including the hardware and the software of the gateway node and the sensor node.

I-Freight System

I-Freight System which displays the number of parcels to be unloaded to a particular station when the train reaches to the station. The information is also available on cloud.

e-Parking (Intelligent Parking System)

e-parking involves an automated intelligent parking system using embedded devices with sensors like ultrasonic sensors used for the detection of vehicles.

MosKill(Mosquito repellent System)

MosKill is an echo friendly mosquito prevention system called MosKill (mosquito repellent system), which will prevent and kill amount of mosquitoes in the surroundings.

Spot-on-This project is used for person identification in a

confined area where GPS is weak or not available. The person locating system process involves use of Radio frequency technology.

Server based Fault Recognition in Street Lights (A Smart City Project). This project involves intelligent illumination control of street lights to optimize the problem of power consumption and illumination of the streets late in the night.

Server based Fault Recognition in Street Lights

Wireless weighing -Industrial IoT application is a system which is proposed to minimize the losses as well as monitoring the entire systems and connecting it with internet for the proper analysis of the data obtained.

Wireless weighing

CarIoT is an IoT dash board for vehicle's activity monitoring in real time, self - diagnostic and location based mode. The IoT dash board is portable and available across different devices like Desktop, Android devices and palm held Raspberry Pi Mini Computers.

Development of Indigenous Colour Doppler Ultrasound Scanner with PNDT Compliance

Car IoT

19. Utilizing the excellent infrastructure and the guidance of the faculty, some of the innovative technical projects undertaken by students of NIELIT Delhi Centre are:

1. Security Access Control of Students Entering in an Institute Using RC522 RFID: The project explains how only authorized persons enter the system by interfacing his/her card at the entrance, which actuates motor and opens the door.

2. Radar using Arduino: The project continuously scan the area for traffic, population etc. and as well as protection of the vehicles to prevent accidents or minor scratches to the vehicles.

3. Arduino Based Smart Irrigation System: With the system, if the value of moisture in soil falls below threshold the water pump gets initiated. The pump is connected to servo motor which is mounted on the pump and sprinkles the water on the field at an angle of 180 degree.

4. Controlling Devices using Bluetooth Module and Arduino: The project makes use of android mobile phone for controlling devices. The user needs to turn on Bluetooth in the mobile. User can use various commands to control connected devices with the app.

9.8.5 R&D, Innovation & Design:

9.8.5.1 "Establishment of an Anti-Spam Coordination Centre"

NIELIT Imphal and Guwahati are implementing a project entitled "Establishment of an Anti-Spam Coordination Centre" with financial support of MeitY with an objective to establish an anti-spam facility and develop a framework for collection, analysis and exchange of information about spam mails.

9.8.5.2 "Indigenous Colour Doppler Ultrasound Scanner with PNDT Compliance"

NIELIT Calicut is implementing the project entitled "Indigenous Colour Doppler Ultrasound Scanner with PNDT Compliance" with financial support of 274.38 lakh by MeitY over a period of three years with an objective to design and development of indigenous colour Doppler Ultrasound Scanner Prototype with PNDT compliance.

9.8.6 Capacity Building Projects:

9.8.6.1 "Empowering underprivileged (ST) youths and women of four backward districts of Nagaland through ICT skills training"

The project is being implemented by NIELIT Kohima with financial support of MeitY with an objective to uplift the overall quality of life of strategic target groups of Backward Tribes of Mon, Longleng, Tuensang and Kiphire in Nagaland. As per the outcome of the project, 1280 Tribal youths will be trained in 150 hours ICT courses.

9.8.6.2 "Setting up of Medical Electronics Laboratory"

NIELIT is implementing a project entitled "Setting up of Medical Electronics Laboratory" at Kohima, Shilong and Silchar with financial support of MeitY with an objective to set up Medical Electronics R&D laboratory for repairing and maintenance of Medical Electronics Equipment of various Hospitals. The facilities are used for testing, calibration and also to provide training to medical staff of Government and private hospitals.

9.8.6.3 "Enhancement of Cyber Forensic Lab for advanced training to law enforcement agencies to

handle emerging cyber crimes and capacity building of youths in the area of cyber security in NE States"

NIELIT Kohima is implementing a project entitled "Enhancement of Cyber Forensic Lab for advanced training to law enforcement agencies to handle emerging cyber crimes and capacity building of youths in the area of cyber security in NE States" with financial support of MeitY.

9.8.6.4 "IT Skills and e-Inclusion through low cost access device based awareness programmes for Scheduled Tribes of Kerala"

NIELIT Calicut is implementing a project entitled "IT Skills and e-Inclusion through low cost access device based awareness programmes for Scheduled Tribes of Kerala" jointly with Amrita Vishwa Peetham, Kollam with financial support of MeitY with an objective to provide free training in DCA to 500 deserving candidates belonging to rural ST population so as to improve their employability for Govt and Private jobs and to devise a suitable model and methodology for effective learning for Social Awareness and ACC training to 1000 adults and children in Malayalam and pilot it in tribal hamlets of Kerala where even connectivity is not available.

9.8.6.5 "Capacity Building in the areas of Electronic Product Design and Production Technology"

The project is being implemented by NIELIT Aurangabad and Chennai with financial support of MeitY over a period of five years with an objective to Develop Human Resource at various levels including Certificate, Diploma, Post Graduate, and Research Professionals with adequate competence levels.

9.8.6.6 Create Skill Development facilities in deprived areas through strengthening NIELIT:

A project on Development of North-Eastern Region by enhancing the Training/Education capacity in the Information, Electronics and Communication Technology (IECT) Area" is being implemented. It has the objective of upgrading the six existing Centre of the NIELIT in the North-Eastern Region at Guwahati, Imphal, Shillong, Itanagar,Gangtok and Aizawl; and of setting up of ten new Extension Centres and upgrading two Extension Centres.

All Eighteen (18) Centres/Extension Centres are operational as on date. Nine Extension Centres are imparting training from built-up space at Silchar, Dibrugarh, Jorhat and Kokrajhar in Assam; Pasighat and Tezu in Arunachal Pradesh; Senapati & Churachandpur in Manipur; Tura in Meghalaya and Lunglei in Mizoram. Tezu Extension Centre (Arunachal Pradesh) has been made operational from built-up space and inaugurated by the Hon'ble MEIT. Process of handing-over and taking of possession of land in Tezu is in progress.

About 35042 students have been trained so far under the project. Possession of land for construction of permanent campuses has been obtained at 15 locations (out of 18) in Pasighat, Guwahati, Kokrajhar, Jorhat, Tezpur, Dibrugarh, Imphal, Senapati, Churachandpur, Aizawl, Lunglei, Gangtok, Shillong, Tura and Chuchuyimlang. Posession of and is yet to be obtained at Tezu and land is to be identified at Itanagar in Arunachal Pradesh. Possession of land at Silchar is yet to be obtained. Three Central PSUs have been appointed as Project Management Consultants (PMCs) for construction of permanent NIELIT Centre & Extension Centres. Construction activities are in progress at 15 locations i.e. Guwahati, Imphal, Shillong, Gangtok, Aizawl, Jorhat, Tezpur, Dibrugarh, Kokrajhar, Chuchuyimlang, Pasighat, Senapati, Churachandpur, Tura and Lunglei.

NIELIT is presently offering training courses from 19 locations in all eight (8) NE States covering two additional locations at Agartala and Kohima under other funded projects by the MeitY. NIELIT has started Centre at Ropar from its own permanent Campus.

Construction of permanent campuses of NIELIT Patna, Agartala, Ajmer and Kolkata is complete.

9.8.6.7 Skill Development in ESDM Sector

(i) 'Scheme for Financial Assistance to select States/UTs for Skill Development in Electronics System Design and Manufacturing (ESDM) sectors' and 'Service support' functions, a 'Scheme for Financial Assistance to select States/UTs for Skill Development in Electronics System Design and Manufacturing (ESDM) sector' was approved by DeitY in November, 2013. A total of 90,000 persons are to be supported under the scheme in the selected 8 States in 5 levels of vocational skill

development courses. The total outlay of the Scheme is ₹ 113.77 crore with Grant-in-Aid of ₹ 100 crore (approx.).

(ii) Scheme for 'Skill Development in ESDM for Digital India'

Under the aegis of 'Digital India' programme launched by Hon'ble Prime Minister, the department has approved a Scheme for **"Skill Development in ESDM for Digital India"** on 09.12.2014 to cover all the States/UTs of the country in order to facilitate creation of an eco-system for development of ESDM sector in the entire country for facilitating skill development for 3, 28,000 persons in ESDM sector at an outlay of ₹ 411 crore (approx.) in a period of 4 years. This is in continuation of the above mentioned 'Scheme for Financial Assistance to select States/UTs for Skill Development in Electronics System Design and Manufacturing (ESDM) sector' approved earlier which is being implemented in 8 states. Both the Schemes are to be implemented concurrently.

These schemes provides for 75 % of training fee as assistance for training courses identified by Electronics Sector Skills Council, Telecom Sector Skills Council and NIELIT. The scheme also provides for 100% fee reimbursement to 40% of the seats which would be reserved for the candidates belonging to SC/ST/ Economically weaker sections. Further, Registration-cum-Certification fee per candidate (for the first attempt only) would also be reimbursed to assessing/certifying agencies.

NIELIT is implementing both these schemes on behalf of MeitY and an ESDM-Programme Management Unit (ESDM-PMU) is set-up by MeitY under administrative control of NIELIT to monitor the project at ground level.

Under these ESDM Schemes skill development training in electronic sector is provided to students and unemployed youths through Training Partners which are registered under the three key implementing agencies viz. Electronics Sector Skills Council, Telecom Sector Skills Council and NIELIT.

So far cumulatively in both the schemes 2,83,629 no. of candidates are enrolled and trained out of which 1,76,942 no. of candidates are certified and 7684 no. of candidates are placed.

Signing of MoU between NIELIT Calicut and DIAT, Pune

Signing of MoU between NIELIT Aurangabad and Chamber of Marathwada Industries and Agriculture (CMIA)

9.8.6.8 Training of Government Officials on e-Waste Management under 'Digital India'

The project being implemented by NIELIT HQs through NIELIT Centres with financial support of MeitY and NIELIT. The objective of the training was to encourage to take steps ensuring e-waste in their respective departments and are treated in proper manner which shall protect environment as well as human health from toxic materials contained in them.

9.8.7 Synergy through Collaborations & MoUs:

The futuristic vision has resulted in expansion of activities and creation of synergy with leading agencies. Efforts to create a "win-win" situation where collaborations have been made purely on non-exclusive and non-financial basis has provided an enabling framework for embracing specialized technology and better employment opportunities for NIELIT students. Some of the major collaborations and MoUs in the last 1 year are as follows:

Collaborative M.Tech programme with Defence Institute of Advanced Technology (DIAT), Pune - NIELIT Calicut

has signed an agreement with the Defense Institute of Advanced Technology (DIAT), Pune for conduction of M. Tech. course in VLSI & Embedded Systems from this academic year. The joint programme envisages attracting top GATE Scholars, Augmenting NIELIT Brand image among defence organizations, Public Sector Undertakings and GATE Scholars, Expanding NIELIT research capabilities through joint research projects, Enhancing the utilization of VLSI Lab facility at NIELIT Calicut, to generate skilled manpower in Electronic System Design and Manufacturing, which will enable indigenous electronic product development.

With an aim to impart quality education to more students in the field of Embedded Design and VLSI, an MoU was signed by NIELIT Calicut and Vellore Institute of Technology (VIT) University. The MoU would enable students to enroll into Post Graduate Diploma programmes in VLSI, Embedded Hardware Design, Embedded Real time systems, and ASIC Design and Verification courses at VIT Vellore Campus from August 2017. Also, the students can take up these courses at VIT Chennai Campus from 2018.

NIELIT Aurangabad has signed a MoU with Chamber of Marathwada Industries and Agriculture (CMIA) for adoption of eligible Business Startup ideas emerging from the Undergraduate, Post-Graduate and Ph.D Projects of the students of NIELIT Aurangabad as per the criteria mutually set out by both CMIA and NIELIT for incubation and acceleration at MAGIC facilities.

NIELIT has signed a MoU with AICTE under Employability Enhancement Training Programme (EETP). The MoU is aimed to produce engineering graduates adequately equipped with required skills to achieve the highest personal and professional standards by means of intensive hands-on training to ensure that their technical skills are globally acceptable. (June 22, 2017).

Indian Institute of Public Administration (IIPA) - to synergize common efforts through training programme in eGovernance. (April 3, 2017).

Google Inc. – master training of NIELIT trainers on Android (May 19, 2017).

Hon'ble MEIT, Govt. of India, Sri Ravi Shankar Prasad took a Review Meeting of the organisations of MeitY operational in Assam on 2-2-2018. Sri Ajay Prakash Sawhney, IAS, Secretary, MeitY; Sri Rajiv Kumar, Joint Secretary, MeitY & DG Nielit; Dr. Omkar Rai, DG STPI were also present in the meeting.

The meeting was attended by local Directors/ Centre Heads of the following MeitY organizations.

(1) NIELIT; (2) STPI; (3) NIC; (4) STQC/ ETDC; (5) UIDAI; (6) SAMEER; (7) CSC SPV;

The local Heads of all the organisations one by one apprised the Hon'ble MoE&IT, of their current activities in the state of Assam.

Further, Hon'ble MoE&IT specifically desired to know from NIC, STPI & NIELIT Officials about the status of the commitments made by him before the Hon'ble Chief Minister, Assam in Guwahati on 30-7-2017.

- The SIO, NIC Assam apprised Hon'ble MeE&IT about the status of connectivity to the various district courts in Assam.

- DG STPI and Director STPI apprised about the new and upcoming STPI supported units in

various places like Diphu, Kokrajhar, Nagaon & Majuli.

- Director NIELIT Guwahati apprised Hon'ble MEIT of the status of the proposed NIELIT Study Centres at Majuli & Kaliabor in Assam.

- Sri Piyush Chetiya, Addl. Director General, UIDAI apprised Hon'ble MoE&IT about the status of AADHAR enrollment in Assam.

- Sri BR Madhi, Director, STQC apprised Hon'ble MoE&IT about the various activities undertaken by the office in Guwahati.

- SAMEER officials apprised Hon'ble MoE&IT about the launching of a few new products developed by them.

9.9 Software Technology Parks of India (STPI)

Introduction:

Software Technology Parks of India was set up in 1991 as an autonomous society under the MeitY. STPI's main objective has been the promotion of software exports from the country. STPI acts as 'single-window' in providing services to the software exporters. The services rendered by STPI for the software exporting community have been statutory services, data communication services, incubation facilities, training and value added services. STPI has played a key developmental role in the promotion of software exports with a special focus on SMEs and start up units.

STPI has been implementing the Software Technology Parks (STP) scheme and the Electronics Hardware Technology Parks (EHTP) scheme for the promotion of IT/ITeS industry. The phenomenal success of the IT/ITeS industry has been possible, inter-alia, due to pivotal role played by the STP Scheme. STP Scheme is a unique scheme, designed to promote the software industry and growth of Start-Ups and SMEs without any locational constraints. As on 28th February 2018, more than 4,000 units are registered with STPI.

During the FY 2017-18 (till 28th February 2018), estimated IT/-ITeS export made by STPI registered

units are ₹ 2,90,309 crore (tentative) and Electronics Hardware export of ₹ 4,413 crore (tentative) under EHTP scheme.

STPI Centres

To provide statutory and incubation services to industry, major thrust was given on the establishment of new centres as well as revamping of existing centres. As on 28th February 2018, a total of 57 STPI centres / Sub-centres are operational across the country, out of which 49 centres are in Tier II and Tier III cities.

STPI is working closely with the respective State Governments / local authorities for creation of more space, equipped with state-of–the-art infrastructure facilities, for development of the software industry and increasing exports.

Services:

The main services rendered by STPI for the software exporting community are incubation facilities, data communication services which inter-alia are as under:

- **Statutory Services**

   STPI provides Single Window Clearance to Software exporters under the STP Scheme. STP Scheme provides these units with various fiscal incentives making it a phenomenal success.

- **Incubation Facilities**

   Business and technology incubation stimulates the growth of startups. STPI is offering ultra-modern office facilities to small units and entrepreneurs. Plug-n-Play facilities for startups enable short gestation period. This has encouraged many entrepreneurs to start their own operations and grow in a competitive environment.

- **Datacom Services**

   One of the STPI's remarkable contributions to the software-exporting sector is provision of High-Speed Data Communication (HSDC) services. STPI has designed and developed state-of-the-art HSDC network called SoftNET for software exporters. Local access to international gateways is provided through point-to-point and point-to-multipoint microwave radios which has overcome the last mile problem and enabled STPI to maintain an uptime more than 99%.

- **Consultancy Services**

   STPI provides consultancy and Project Management Services and turnkey solution to various national and International organizations in the areas of Communication Networks, Network Operation Centres, Network Management Systems, Computerization, e-Governance networks etc. The technology capability coupled with process strengths has enabled STPI to secure a number of projects from time to time.

India BPO Promotion Scheme / North East BPO Promotion Scheme

STPI is the nodal agency for implementation of India BPO Promotion Scheme (IBPS) and North East BPO Promotion scheme (NEBPS) under Digital India Initiative. The objectives of the schemes are to create around 1.5 lakhs job opportunities for the local youths of smaller / muffasil towns and also to attract investments in the respective regions for all round development. These schemes will help in creating right ecosystem required for the growth of smaller/muffasil towns and bring prosperity to those locations.

The schemes provide financial support along with several special incentives like encouraging employment to women and physically disabled persons, setting up operations at other than State Capitals, promoting local entrepreneurs etc. upto 1 lakh / seat in the form of Viability Gap Funding (VGF). The selection of eligible companies to set up BPO / ITeS operations under IBPS is through online bidding process. Around 48,300 BPO/ITeS seats have been distributed across State(s) / UT(s) under IBPS and 5,000 seats for BPO/ITeS Operations in North East Region under NEBPS.

Under IBPS, till 28th February 2018, 127 companies have been declared successful to setup BPO / ITeS operations for 31732 seats distributed around 91 locations covering 20 States and 2 UTs.

Under NEBPS, till 28th February 2018, 2060 seats have been allocated to successful bidders to setup BPO/ITeS operations covering 5 States of NER (Assam, Nagaland, Meghalaya, Manipur and Arunachal Pradesh).

Electropreneur Park

Electronic System Design and Manufacturing (ESDM) is one of the fastest growing sectors of the Indian economy. In order to support the new entrepreneurs of this industry, STPI in association with University of Delhi and Indian Electronics and Semiconductor Association (IESA) has set up an Electropreneur Park in the Delhi University campus.

The initiative will support 50 startups in ESDM space and aims to create at least 5 global companies over a period of five years. The park will focus on local IP creation and indigenous product development resulting in increased domestic value addition and will witness a unique integration of academia, industry, government and other incubative supportive elements. The initiative is first of its kind in the industry and it is likely to set a role model, which may go a long way in the annals of incubation centre.

Till 28th February 2018, three seasons of invitation for proposals and selection of startups have been completed with the onboarding of 12 startups. There has been a significant achievement by the startups during this period where they were able to take the product to the next step by filing national patents. 9 patents were filed by the startups and many of the startups have received funding support. As EP enters its fourth season, the startups at EP continue to scale new heights and have carved a niche for themselves in the country's ESDM landscape.

Promotion of Small and Medium Entrepreneurs (SMEs) by creating a conducive environment in the field of Information Technology

STPI has been promoting SMEs and their cause by offering incubation services, organizing events, sponsoring/co-sponsoring events, participation in events and export promotion efforts. Some of the major events in which STPI participated/sponsored includes:

- Connect 2017 on 06th–07th November, 2017 at Chennai
- Bengaluru Technology Summit including Bangalore ITE.Biz 2017 from 16th-18th November, 2017 at Bengaluru
- INFOCOM 2017 from 7th-9th December, 2017 at Kolkata
- Soft Wave 2017 from 14th–16th September, 2017 at Seoul, South Korea
- Japan IT Week 2017 from 08th-10th November 2017 at Tokyo, Japan
- India International Science Festival (IISF) 2017 from 13th-16th October 2017, 2017 at Chennai
- SANOG XXX from 10th-18th July, 2017 at Gurgaon
- TiEcon Delhi 2017 from 15th – 16th December 2017 at Delhi
- IESA Vision Summit 2018 from 27-28 February, 2018 at Bengaluru
- 21st National Conference on e-Governance from 26-27 February, 2018 at Hyderabad
- TiE Global Summit 2018 from 21-22 February 2018 at Mumbai

9.10 Digital India Corporation (DIC) (Formerly Media Lab Asia)

9.10.1 Introduction

Digital India Corporation (Formerly Media Lab Asia) is a not-for-profit Company set up under Section 25 of the Companies Act, 1956 (now Section 8 under Companies Act, 2013) by MeitY, with an aim to bring the benefits of Information and Communication Technologies (ICT) to the common man and the needy. 'Innovation for Digital Inclusion' is its vision.

The Board of the Company is chaired by Hon'ble Minister for Electronics & IT and with other Directors being Hon'ble MoS for MeitY; Secretary, MeitY; AS & FA, MeitY; Director, IIT-B; President, NASSCOM and other eminent members from Industry & Academia.

The Company is engaged in the areas of Livelihood Enhancement (Agriculture, CAD tools for artisans, ERP for SMEs etc.), Healthcare, Empowerment of Persons with Disabilities (PwDs) and Education. In this endeavor

it is working with Govt. (User Departments / Ministries), R&D Institutions, Academia, Industry, NGOs & other organizations / industries.

National e-Governance Division (NeGD) is a business division within Digital India Corporation(DIC) to take up Programme Management of the National e-Governance Plan (NeGP) of MeitY. MyGov (A platform for citizen engagement towards good governance in India) is another business division within DIC.

The Company focuses on 'Lab to Land' and 'early harvest' projects useful for the masses.

9.10.2 Achievements during 2017 - 2018

9.10.2.1 ICT Based Integrated development programme for women empowerment in Lallapura Craft cluster of Varanasi

The second phase of the project is being implemented with the support of MeitY (under IT for Masses scheme) for skill improvement, livelihood enhancement and health awareness to women / girls in cluster. The project comprises providing training to women on digital designs using Computer Aided Design (CAD) software, e-Commerce, online marketing, brand value of the products, retail management and entrepreneurship development of Lallapura craft cluster at Varanasi, Uttar Pradesh. 984 Women / Girls have been benefited from the training provided under the second phase of the project as follows:

- Chic™ (CAD Tool for Craft) - 185
- e-Commerce - 119
- Enterprise Development Programme (EDP) - 100
- Health Awareness Programmes - 580

The target is to reach up to 3500 girls/women under current phase. In addition, 23 Awareness Building / Sensitization programs have been conducted and 240 khaka patterns have been prepared.

Training Session at the Centre
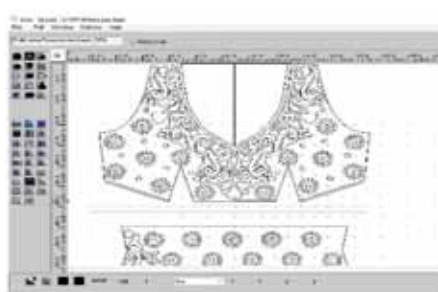
Design on Cloth

Digital Design created with Chic™

Centre visit by a socialist workr "Anna Maria De Witte" from Belgium

9.10.2.2 Skill Enhancement & Health Awareness via Knowledge Transformation using ICTs for Women Empowerment in Bithoor Cluster of Kanpur – Bithoor Shakti

DIC in collaboration with ADHAR (an NGO) and with the support of MeitY, is implementing this project to enhance the skills, productivity & livelihood of identified women artisans (engaged in Zari & Zardozi work) of Bithoor Cluster in

Awareness Program on Health & Hygiene
Issues for Adolescent Girls

Health Awareness Program for Women

Kanpur using Computer Aided Design (CAD) software viz. Chic™ CAD. The project also aims to empower the adolescent girls and women in & around Bithoor by providing awareness and counseling on issues viz. Health & Hygiene, Education, Career and Social Security etc.

Artisan learning operation of CHIC CAD
software to create digital designs

Premises have been hired to train the artisans. Capital equipment have been procured and installed at the Centre. A web portal and application development have been taken-up to monitor the activities of the Centre. The portal has modules: User Creation Module, Registration Module (Artisans, Healthcare & Adolescent), Batch Creation, Student Allotment, Student Approval, Workshop Creation and Dashboards – Admin etc. The portal & application will contain the details of activities

& events at the Centre. Details of participating women & artisans will also be recorded.

So far, 325 women have been trained in 6 batches on Chic™ CAD for making digital designs. More than 1800 designs have been created by women trainees. 8 Health awareness camps have been organized for 670+ Women. 8 awareness camps to give information on health & hygiene were organized and attended by 580+ adolescent girls.

9.10.2.3 DigiBunai™ - "An Open Source CAD Tool for Weaving of Banarasi Sarees"

DigiBunai™ is an open source CAD tool to create designs, generate graph, and punching the jacquard cards to help the weavers in their pre loom loading processes. It is first of its kind Open Source multi lingual software in India for Jacquard and dobby weaving; customized for Banarasi Saree. The users can see the complete cloth (Saree) digitally to experiment with different parameters of design. The software is customizable (local language and library of local designs) and can also integrate 3rd party design tool of the user's choice. Card punching services helps the weaver avail the services of a punch card vendor enlisted on the platform. The application has been developed under the guidance of WSC-Delhi (including NCTD), Department of Textile Technology, IIT-Delhi and Amity school of Fashion Technology. Copyrights of the software have been reserved.

Experts and Users in the First Users' Workshop at WSC, Varanasi

Dashboard of Application

Pilot Testing

With the support from O/o DC-Handloom (Ministry of Textile, Government of India), the application and services are being pilot tested at Weavers Service Centre (WSC) and its 4 Common Facility Centre (CFCs) in Varanasi with active engagement of weaving community from Varanasi cluster. 8 fabric samples (cutwork, kadhua, butidar, jaal pattern) and more than 50 digital designs have been created using the application. Below are the different stages of fabric generation:

Discussion on DigiBunai™ at WSC, Varanasi

Sketch of Design	Graph of Design	Real Fabric

Web Portal (bunai.medialabasia.in)

- For designers to avail card punching services from various vendors through our CPS (Card Punching Services) facility

- To Promote the designs and fabric (digital cloth) shared by the user

- To provide information on various government resources

- To download the most recent version of the application

Web Portal (bunai.medialabasia.in)

i) **The first users' group workshop** on DigiBunai™ was held on 6th - 7th Nov 2017 at WSC, Varanasi. More than 90 users (Experts from WSC, CFCs, Clusters, IIHT, NIFT & community, young Weaver/Designer and Students of NIFT and IIHT) participated in the workshop. The results were very encouraging. The users showed their interest in the application and gave their feedbacks & suggestions

ii) **The Second users' workshop** was conducted on 22nd Dec 2017 at WSC, Varanasi after

incorporating the feedback / suggestions of the users as a follow-up of first Users' workshop. The usability of the software was found satisfactory by the users, who found the application with many unique features that are not available in other commercial tools viz.:

- User interface in local Language.

- Local color catalogue.

- Library of location specific weaves & designs.

- Garment viewer as play area for designers

- Customized graphs of the designs (color segregated, superimposed).

- Synchronization of weaves, designs & fabric with the central server.

Besides the above users liked the feature of visualizing the fabric with the interlacing of yarns, assigning the weaves to designs, changing the density of the fabric, front and back view of the fabric, provision for repeat patterns of designs, creating weaves, colorways and dobby fabric.

> **"Uniqueness"**
> - Developed as per Indian handloom weaving sector catering local languages, weaves, designs, clothes & color catalogs
> - Play-area for garments' layout
> - 3 level data security

Further Development:

During the users' workshops, it was suggested that the functionality of the application should be explored for other intricate Banarasi designs (Tanchoi, Ektara-Tanchoi, Jamwar). To increase the user base, the users recommended to incorporate some advanced features into the application viz. extra warp and weft for dobby designs, extra warp for jacquard designs, multi-layer cloth, fabric simulation and draping, application the multi form factor devices (tablet/mobile).

9.10.2.4 Setting up of Rural Women Technology Park at Basani, Varanasi

Science for Equity Empowerment and Development (SEED) Division, Department of Science & Technology (DST), Government of India has awarded DIC this project at total cost of 49,75,061/- for 3 years. The objective of

the project is women empowerment in Basani, Varanasi through training on following:

- Embroidery design training for Varanasi crafts - Chic™ CAD tool: 550 women artisans.

- Healthcare awareness & training: 5000 girls / women.

- Retail management training: 375 girls / women.

- Food processing training: 750 girls / women.

9.10.2.5 'Interactive Information Dissemination System (IIDS)'

IIDS is a pull & push based system currently being used for delivery of agro-advisories. It is a combination of Smart Phone Application, Interactive Portal and Interactive Voice Response System. There is a mobile interface at front end and web interface at back end. Data is transmitted through voice, text, images and videos from both ends (farmers to experts & back).

IIDS has become a useful tool in enhancing the outreach of Agriculture Universities. It enables farmers to interact directly with local Agro-Scientists in their native languages (currently Telugu in AP & Telanagana and Khasi & Garo in Meghalaya). The experts, using IIDS, has an access to knowledge & farmer database. It enables them to understand the farmer and appreciate his field problems in a better way - Know Your Farmer (KYF).

DIC has integrated IIDS with the push based 'Text & Voice' message services under National Mobile Governance Initiative from MeitY. So far, 2240 text messages and 309 voice messages in local languages (Telugu, Khasi & Garo) have been pushed on various need based issues to the registered farmers.

AKPS & M4agriNEI Mobile Apps have been developed and deployed under UMANG platform of MeitY.

Deployments of IIDS: A brief on the deployment of IIDS during the year 2017-18 is as follows:

A. Annapurna Krishi Prasaar Seva (AKPS):

IIDS deployed as Annapurna Krishi Prasaar Seva (AKPS) along with Acharya N G Ranga Agricultural

AKPS PRSG Review Meeting at PJTSAU under the Chairmanship of Director ATARI, ICAR

Farmer showing UMANG AKPS Mobile App

Farmer capturing image of his crop to send to agro-experts via UMANG AKPS Mobile App

University (ANGRAU) and Prof Jayashankar Telangana State Agricultural University (PJTSAU) in 22 districts of Andhra Pradesh (AP) & Telangana.

Progress made during FY 2017-18 is as follows:

On the requests from ANGRAU and PJTSAU, technical support for AKPS services continued for F.Y. 2017-18. So far 5747 new farmers have been registered for AKPS services from AP & Telangana and the total number of farmers registered have reached 36,840. 4530 queries received from farmers on Agriculture, Animal Husbandry & Fisheries have been resolved by different KVKs / DAATTCs Scientists / Experts through toll free number. Need based 1712 text & 242 voice messages were sent by Krishi Vigyan Kendras (KVKs) and District Agricultural Advisory and Transfer of Technology Centres (DAATTCs) to their respective farmers consuming 121.54 lakh SMSes and 3.57 lakh Voice Calls. Assistant Director of Extension, PJTSAU and IIDS team presented IIDS model to the extension professionals from various parts of the country during a training programme on New Media Technological Tools for Agriculture and Allied sectors" at Extension Education Institute (EEI), Rajendranagar, Hyderabad.

B. Mobile based Agro Advisory System for North-East India (m4agriNEI)

DIC undertook the project in the year 2012 in Meghalaya on Mobile Based Agro Advisory System (m4agriNEI) along with CAU, Imphal with the objective to empower farmers by providing right information at right time. The software platform being used for m4agriNEI is IIDS. Two multimedia agro-advisory labs were established at College of Post Graduate Studies (CPGS), Barapani, Meghalaya and College of Home Sciences (CHSc), Tura, Meghalaya of CAU to cater the farmers' queries in local dialects – Khasi & Garo.

> w.e.f. Jan 1, 2018, Meghalaya Govt. has taken over m4agriNEI project under the banner '1917iteams' to extend services to entire state covering 40,000 farmers (ultimately target is to reach 200 thousand farmers)

During 2017-18, 1455 new farmers from Ri-Bhoi, East Khasi Hills, West Jaintia Hills, West Khasi Hills and Garo Hills districts were registered under the project and with

this total registered farmers has reached 13126. 3549 queries of the farmers were resolved by m4agriNEI labs at CPGS Barapani and CoHSC Tura. 1500+ farmers were contacted by project team to get their feed-back regarding the advisory provided under the project. Need based 528 text & 67 voice messages were sent by both the colleges to their respective farmers in Khasi & Garo dialects Consuming 11.71 Lakh SMSes and 1.21 Lakh Voice Calls.

Distribution of Ginger Rhizomes to Farmers of Ri-bhoi

A training programme on 'Disease and Pest Management of Kharif Rice Cultivation' was organized at Govt. Girls School, Koinadhubi under Dalu Block. 105 farmers (including 91 females) participated. The level-I and level-II experts made 11 field visits to inspect crop fields, animal husbandry farms and others.

The m4agriNEI has been integrated with the Govt of Meghalaya's integrated programme namely 1917iTEAMS – Connecting Farmers to Market. Department of Agriculture, GoM has established 45 seater Agriculture

Farmer showing UMANG AKPS Mobile App

Response Centre (ARC) at Shillong using DIC's IIDS2.0 platform. The existing communication infrastructure of DIC established at its Mumbai office is being used for the implementation of the programme. The programme was launched by the Chief Minister of Meghalaya on 29th Dec 2017.

Farmer capturing image of his crop to send to agro-experts via UMANG AKPS Mobile App

IIDS demonstration to CM Meghalaya during launch of 1917iTEAMS

9.10.2.6 "Punarbhava™" (www.punarbhava.in) - Web Portal for 'Divyangjan'

The web portal facilitates all the information related to different disability issues at one place for persons with disabilities (Divyangjans), NGOs, professionals, policy makers, students, parents, community workers, parents and other stakeholders in the field of disability. The portal is accessible as per W3C guidelines. It also has a font resizer and color switcher options for accessibility. The information on portal is segregated under different sections such as Disability Register, Legal Instruments, Resources, Careers, Assistive Devices, Blogs,

Accessible Content, Latest News, Events, Employment Opportunities, Publications, Useful Links, National Institutes, and feedback etc. The portal is regularly updated and average daily hits have increased from around 8000 to 12,000 during the year.

9.10.2.7 "Punarjjani™" (www.punarjjani.in)– Web based bilingual (Hindi & English) tool to assist special teachers in assessment of children with mental retardation (MR)

Three standard methods widely used manually for regular assessment of children with MR in the age group 6-18 years viz. FACP (Functional Assessment Checklist Programming), BASIC-MR (Behavioral Assessment Scale for Indian Children with Mental Retardation), MDPS (Madras Development Programming System) have been digitalized & integrated. The tool assists special teachers in easy & quick assessment of children with MR in structured way and hence saves their time. Teachers can devote more time with children in developing their skills.

Training Workshop on Punarjjani™ at Jaipur

846 special teachers representing 501 special schools & 122 Sarva Shiksha Abhiyan (SSA) blocks from around 150 cities/towns of 33 States/UTs throughout the country have been trained and provided access to the tool. Requests have been sent to all State Education Secretaries and Social Welfare Secretaries in Hindi belt to consider deployment of the tool (Hindi version) in their respective States. A training workshop was conducted at Jaipur, Rajasthan with the support of Directorate for Welfare of Persons with Disabilities, Govt. of Rajasthan. The tool is being enhanced as per feedback.

9.10.2.8 Centralized System for Heart Rate Variability (cHRV) Analysis System

The project is being executed in collaboration with All India Institute of Medical Science (AIIMS), New Delhi to make HRVA technology available at remote places and to provide the HRV tool in a more advanced way so that the doctors, researchers, health professionals, people and communities have easy access for their specific needs.

HRV is an important human body performance indicator to assess the role of autonomic nervous system fluctuations in healthy individuals and patients. It offers prognostic information independent of and beyond that provided by traditional risk factors.

Centralized HRV empowers medical community through reproducible and collaborative research platform developed using Open CPU and R. The system creates database on HRV & associated health for benchmarking, clinical utility and policy making.

During the year, the system has been customised with additional features viz. User specific statistical display, URL based publication management, Email notifications, Benchmarking of HRV analysis, Data import/export, HRV analysis report & referral management etc. The cHRV application is running on a server at DIC (formerly MLAsia) Mumbai office. 16 medical organizations are registered across the country. 65 users from these organizations are using the system for HRV analysis and provides feedback. A concept note on 'Establishment of a Centralized Facility for Autonomic Tone Quantification and Formulation of a National Database for Preventive

User Interface of VSTS

Field Visit of Project Team at MR School for the Deaf, Pune

and Curative Care' has been prepared jointly with AIIMS, Delhi and submitted to Department of Science and Technology (DST) and Indian Council of Medical Research (ICMR), Government of India. The same was presented by Digital India Corporation and AIIMS, Delhi to the Secretary, DST on 13th Sept., 2017.
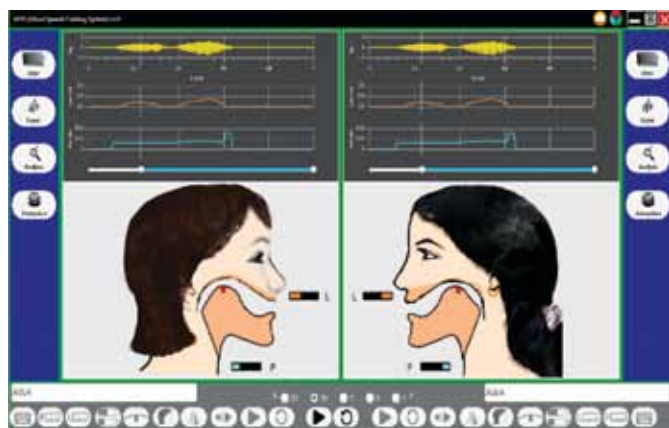
The cHRV system was presented at "First World Non-communicable Disease Congress 2017" held on 4th - 6th November 2017 at PGIMER Chandigarh and at "Telemedicon 2017" held on 9th–11th Nov. 2017 in Pune.

9.10.2.9 Visual Speech Training Software (VSTS) for Hearing Impaired

VSTS is a computer-based speech training system which uses information obtained by speech signal analysis to provide a visual feedback of efforts involved in speech production. It is an application software which runs on a PC with sound card, without needing any additional hardware. It has been developed for use as an analysis and diagnostic tool by speech therapists and speech training professionals and as a speech training aid to assist in acquisition of correct articulatory efforts by children with hearing impairments and second language learners. The software has been developed in collaboration with IIT Bombay with support of an R&D grant from Ministry of Electronics and Information Technology (MeitY), Government of India.

The main features of the system are as follow:

i) Signal acquisition: recording of speech signal as an audio clip of up to 10 s and loading of pre-recorded sounds;

ii) Signal analysis and display: signal waveform, pitch, energy, spectrogram (2D plot of time-varying magnitude spectrum), and areagram (2D plot of time-varying vocal tract shape);

iii) Animation of articulatory efforts: display of time-varying vocal tract shape (as obtained from the analysis and displayed in the areagram) with adjustable animation speed along with optional indicators for frame energy, pitch, and place of articulation.
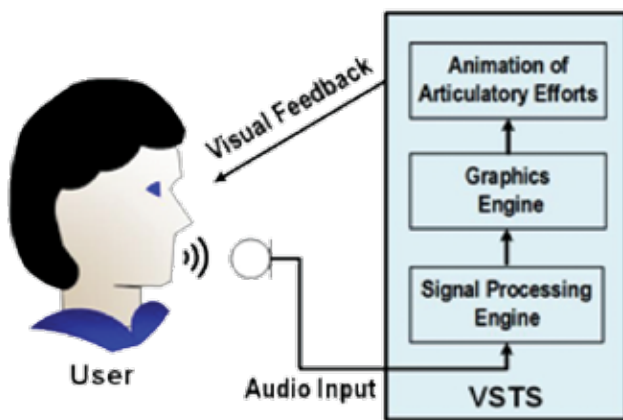
Schematic of VSTS

VSTS in use at YMCA School for the Deaf, Pune

In order to provide corrective feedback with reference to a model speech utterance, the system has two side-by-side display panels which can be used for acquisition and processing of two speech signals. For example, one signal can be from the learner and the other signal can be from the teacher or a reference speaker. It is also possible to use the same signal in both the panels with analysis result in one panel and animation in the second panel. The animation is reconfigurable. In each panel, the face can be selected as that of a man, woman, boy, or girl, and its orientation can be selected as left or right facing. The color scheme of the overall display can be modified and saved for subsequent use. The present version of the system can be used for speech segments containing vowels, semivowels, and diphthongs.

9.10.2.10 Information Technology Research Academy (ITRA)

ITRA is an enabling programme initiated by Ministry of Electronics and Information Technology (MeitY), Government of India, to help build a national resource for advancing the quality & quantity of R&D in Information and Communications Technologies (ICT) and Electronics and its applications in IT and related institutions across India.

ITRA is designed to produce a large numbers of IT researchers who are well equipped with the latest IT knowledge, educated in relating classroom knowledge to developing solutions, trained to spot problems amenable to IT solutions, motivated to identify societal problems in IT and other domains, and exposed to mechanisms for converting lab solutions to working prototypes. ITRA activities are aimed at a major increase in the national capacity of producing PhDs who could become faculty in academic institutions and address the needs of the industry and society at large.

ITRA–Mobile:

ITRA in the research area ITRA-Mobile targets applications of IT in Healthcare, Transport and Disaster Management. ITRA-Mobile projects are running in 33 institutions, involving 64 faculties and 98 Ph.D. students.

During FY 2017-18, ITRA-Mobile research community has published 46 research papers in conferences and journals of international repute; number of courses were developed/modified and several workshops were conducted at associated institutions.

As system for communication among fishing boats and with shore

Areal time information service to guide offsh ore fishing and disseminate offshore (market) information to boats
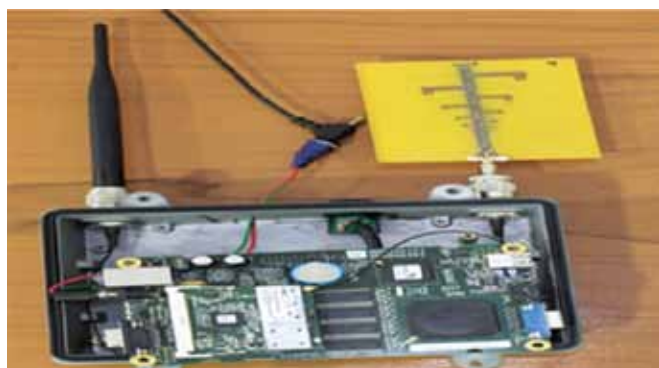
Adirectional antenna for low power communication from offshore boats

A smartphone based cough analyser

ITRA-Mobile Evaluation Meeting July 13-14, 2017

ITRA-Mobile teams are working on 11 proof of concept (PoC) prototypes and technologies having potential for commercialization (start-ups or ToT). A technology, "Cough and Wheeze Analyzer" developed under ITRA-Mobile Project Virtual Assistant has also registered a startup company named as SALCIT Technologies Pvt Ltd.

2018 being the final year of the projects, the teams consolidated the work they have done over the entire project period. Focus on Work Plan for the final Year :

i) Conversion of the lab prototypes of the various technologies / solutions into field prototypes.

ii) Dissemination of the scientific information produced.

A smart phone based system for real time bus information accident detection and accident forensics

A system to sense analyze and enhance home energy usage

A smart phone accessory kit for continuously monitoring ECG, Breadth and Wheezing/Cough

A smart phone kit enabled environment for teaching CS/CE courses

ITRA-Water:

ITRA in the research area ITRA-Water is focusing on the multifaceted challenge of sustainable access to water for all sectors ITRA-Water projects are running in 23 institutions, involving 33 faculties and 38 Ph.D. students.

During FY 2017-18, ITRA-Water research community has published 10 research papers in conferences / journals of international repute; a number of courses were developed / modified and several workshops were conducted at associated institutions. A monsoon school was conducted successfully at IISc Bangalore during July 2017 where eminent experts from India and abroad and other participants from SAARC countries participated. Based on the recommendations of the Governing Council of ITRA, projects have been extended till Dec 2018.

ITRA-Water teams are working on 5 proof of concept (PoC) prototypes and technologies having potential for commercialization (start-ups or ToT). A weather / rainfall forecasting technology developed by IIT Gandhinagar under ITRA-Water project 'Measurement to Management' is being successfully used by India Meteorological Department (IMD), Govt. of India.

2018 being the final year of the projects, the teams consolidated the work they have done over the entire project period.

Focus on Work Plan for the final Year :

i)   Conversion of the lab prototypes of the various technologies / solutions into field prototypes.

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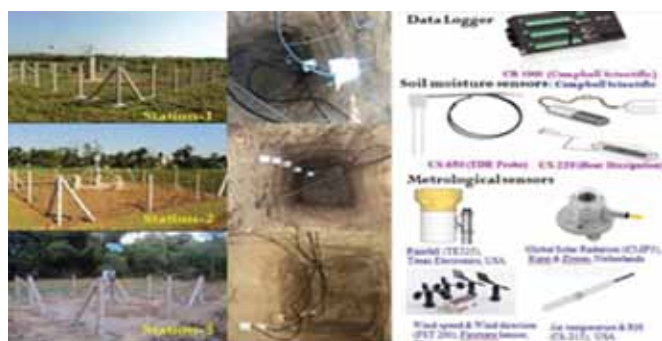
A service to optimally locate water recharge sites and tube wells
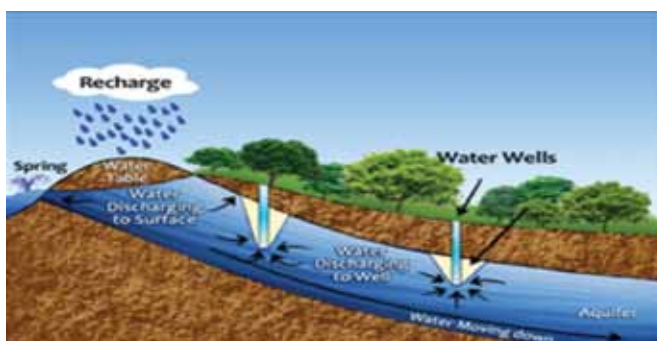
A system for detecting and destimating the size of ground water resources in hard rock aquifers of India

A system for sensing and wirelessly disseminating consumer water quality (contamination) and flow (leakage, the ft) information in a warer distribution network

A service to forecast, analyse the effect of and manage urban floods and to design water drain age networks

A hardware/software platform to integrate sensors (humiddity, soil temperature, wind speed...), humanprovided information, computational models and wireless communications to man age crop resources

A system to make 2-3 week forecast maps for field level drought/ rain fall

ITRA-Ag&Food:

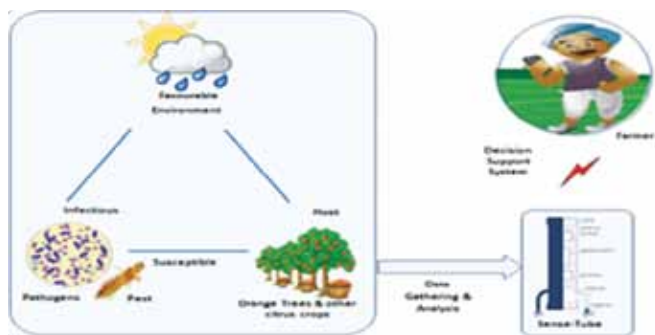ITRA, in its third research area ITRA-Ag&Food, is aiming to create collaborative, multi-institutional, inter-disciplinary teams to catapult the state of Agriculture & Food in India using IT, into a new orbit of productivity. Two R&D team projects on various aspects of Pigs and Goats in North East India, were initiated at 14 institutions comprising 45 researchers.

9.10.2.11 VIsvesvaraya PhD Scheme for Electronic System Design & Manufacturing [ESDM] and IT/ IT Enabled Services [IT/ITES]

The objective of the Visvesvaraya PhD Scheme is to generate 1500 PhDs for each of ESDM & and IT/ITES sectors over a period of five years. This would promote innovation and development of new products in these areas. 500 PhD scholars for each ESDM and IT/ITES sectors would receive fellowship support over a period of 5 years and other 1000 enrolled/registered

candidates for each ESDM and IT/ITES would receive one time incentive. This would encourage working professional and non PhDs faculty members to pursue PhD in these technology areas. IN addition, 200 Young Faculty research Fellowships would be provided to encourage and recognize the eligible Young Faculty involved in research and technology development in ESDM and IT/ITES areas to retain as well attract young faculty in academia. The scheme is initiated for a period of five years for selecting the PhD candidates for support under the scheme. However the funding would be continued till 9th year for the commitments made during the scheme period. The scheme is being implemented with a total estimated budget of ₹466 Crores.

As on 31st December 2017, a total of 1160 PhD (970 Full Time and 190 Part Time) scholars are pursuing PhD at various academic institutions of the country. The academic committee also approved Young Faculty research Fellowships to 128 young faculties at 44 academic institutions across the country.
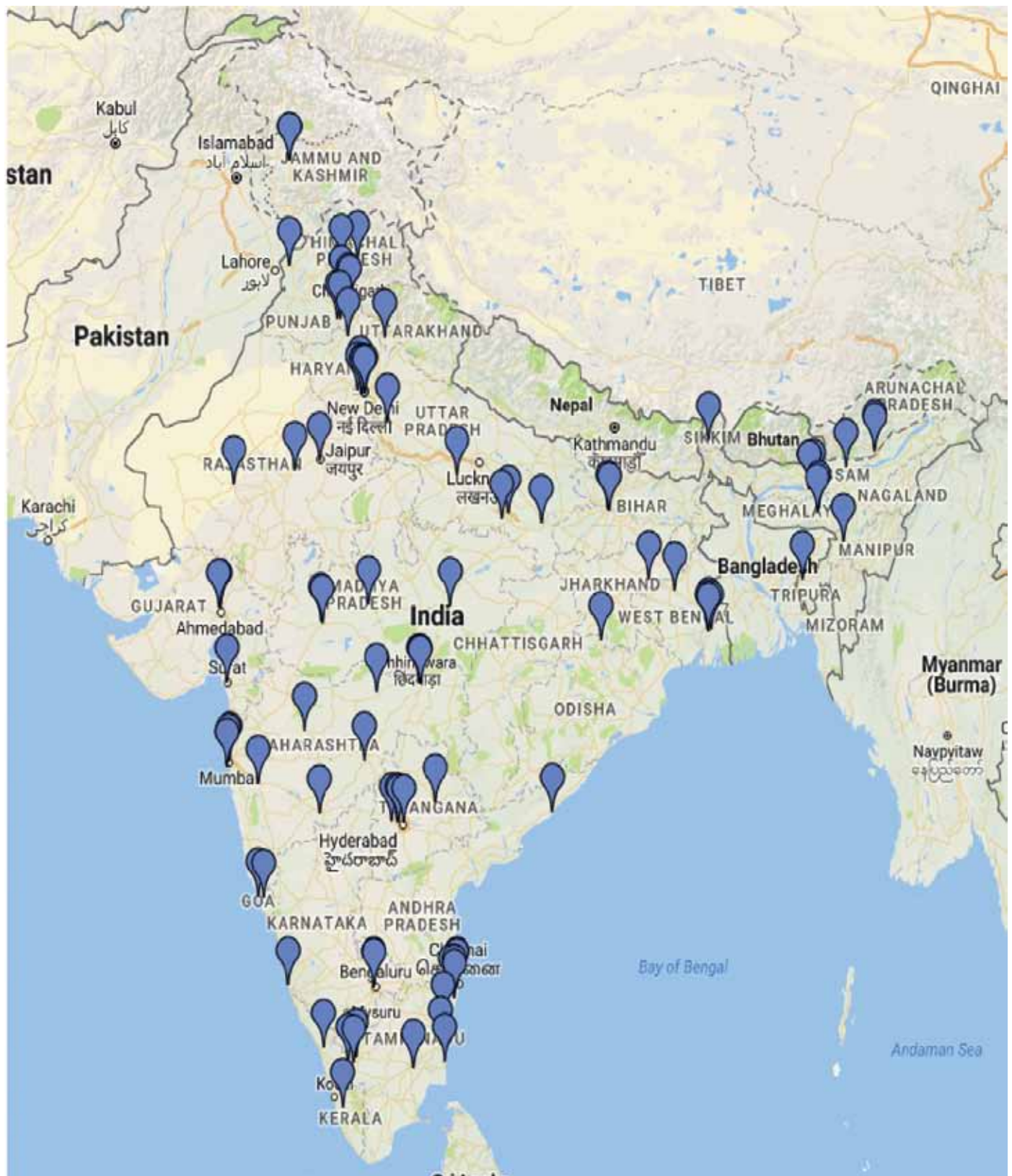
Map showing Coverage of the Scheme

Chapter 10 — Other Matters

10.1 Use of Official Language Hindi in official work

In order to promote the use of Hindi in official work in the Ministry, a Monthly Incentive Scheme has also been started in addition to Annual Incentive Scheme for Noting & Drafting in Hindi. Under this Incentive Scheme, there are five prizes of ₹ 500/- each and officers/employees writing at least 2,000 words in Hindi during the month can participate in this Incentive Scheme.

Hindi Pakhwada was organised by the Ministry during September 2017. During this period many competitions were held and winners were awarded. Prize money of the awards has been enhanced substantially to encourage participation.

Committee of Parliament on Official Language visited C-DAC, Noida and C-DAC, Thiruvanantpuram to carry out the inspection regarding implementation of official language policy and use of Hindi in official work in these offices.

To ensure the implementation of official language policy in the offices under the administrative control of this Ministry, official language inspection was done at C-MET, Pune; C-DAC, Pune; SAMEER, Mumbai; STPI, Bangaluru; C-DAC, Bangaluru and C-DAC, Noida.

During the period under report, various important Ministerial documents like Annual Report, Performance Budget, Outcome Budget , various cabinet notes, notes for Parliamentary Standing Committee, Parliamentary Question-Answers, Demand for Grants, follow-up action reports, monthly report for Cabinet and miscellaneous documents were translated from English to Hindi.

10.2 RTI

MeitY and its Attached/Subordinate Offices/Societies are separate Public Authorities in terms of Section 2(h) of RTI Act, 2005. They have their own websites and each of these Public Authorities has its own Nodal Officer, Central Public Information Officers (CPIOs) / Appellate Authorities (AAs). For any information relating to these

organisations, applications need to be submitted to the concerned Public Authorities as per provisions of RTI Act, 2005. There is an RTI Cell in the Ministry, which is the receiving point for RTI applications and also coordinates matters relating to RTI. All Public Authorities have also hosted relevant inputs / documents on their respective websites, as required under Section 4 of the RTI Act. The relevant contents are reviewed and updated periodically by the concerned Public Authorities.

The number of applications/appeal received online as well as physically by RTI/PG Cell from 01st January 2017 to 28th February 2018 is as given below:

No. of RTI Applications received	No. of Applications disposed
1742 (Online)	1675 (96.15%)
288 (Physical)	258 (89.58%)
No. of RTI Appeals received	**No. of Appeals disposed**
94 (Online)	81 (86.17%)
11 (Physical)	09 (81.82%)

10.3 Public Grievances

The number of grievances received online as well as physically by RTI/PG Cell from 01st January 2017 to 28th February 2018 is as given below :

Source of Grievance	No. of Grievances received	No. of Grievances redressed
Online	7494	7208 (96.18%)
Physically	177	149 (84.18%)

10.4 Information & Documentation Centre (Library)

This Ministry has a spacious well planned Library viz Information and Documentation Centre (I&DC),with an inventory of books and journals. It uses RFID based Library Management System to manage issue & return of Books/Journals. I&DC also provides various other services like inter-Library loan facility to the officials of the Ministry through DELNET (Developing Library Network) and also arranges books from libraries of various other Organizations. Services are also provided to the retired officials of the Ministry and trainees who undertake projects in the Ministry.

The Information & Documentation Centre possesses approximately 30,050 books on various subjects including Electronics, Computer, IT, Computer Languages, Fiction. Also has some books on Hindi and English literature. I&DC procures on an average 50 books and approximately 50 Journals per annum. Currently, e-books service (Books 24×7) is also made available to the authorized users.

The Ministry is spearheading an Intra-Ministerial initiative viz the Library Consortium, Ministry of Communication & Information Technology(MCIT). Consortium of the MInistry (MCIT Consortium) comprises the users from the National Informatics Centre (NIC), C-DAC, NIELIT, SAMEER, C-MET, STQC Directorate, STPI, CCA ERNET India, C-DOT. The Ministry provides on-line access to various e-resources i.e. IEEE Journals/Transactions/Proceedings, IEEE Journals/ Proceedings, ACM digital library and ISO Standards to its users through MCIT Library Consortium.

10.5 Parliament Matters

During the year, a number of Parliament Questions were received and handled by the Parliament Section. These were mainly related to Aadhaar, Cyber Security, Digital Payments, Digital Economy, National e-Governance Plan, Electronics Manufacturing, Digital India Programme, Misuse of Social Media, Internet of Things, Data Protection and Privacy, Cyber Security, Hacking incidents of Government Websites, National Policy on Electronics, National Knowledge Network, Employment to Youth, Cloud echnology, Investment in IT Sector, Tide Scheme, Development of e-Skills, e-Literacy, Internationalized Domain Name, Encouragement to Small and Medium Sized IT companies, Super Computers, National Policy on Information Technology, Internet Related Polices and E-Governance at Grass root Level.

The Department Related Parliamentary Standing Committee on Information Technology (DRPSC on IT) discussed and considered the Demands for Grants, 2017-18 of the Ministry of Electronics and Information

Technology and laid its 36th Report on the Table of the Lok Sabha on 17th March, 2017.

The Standing Committee on Information Technology has selected the following subjects for discussion during the year 2017-2018.

(i)   Digital India Programme

(ii)   Expansion of Rural BPOs and Challenges faced by them

(iii)   Review of National Digital Literacy Mission (NDLM) – Problems and Challenges

(iv)   Social Media – Norms and Regulations

(v)   Citizens' data security and privacy

(vi)   Digital Payment and Online Security measures for data Protection

(vii)   Review of functioning of Unique Identification Authority of India (UIDAI)

(viii) e-Market platform for farmers – Problems and Challenges

10.6 Gender Empowerment / Prevention of sexual harassment of women at work place

No case of sexual harassment has been reported in Personnel Division as well as by the ICC MeitY.

10.7 Activities undertaken for the benefit of differently abled persons "Punarbhava™" (www.punarbhava.in) - Web portal in disability field

The web portal facilitates all the information related to different disability issues at one place for persons with disabilities (Divyangjans), NGOs, professionals, policy makers, students, parents, community workers, and other stakeholders in the field of disability. The portal is accessible as per W3C guidelines. It also has a font resizer and color switcher options for accessibility. The information on portal is segregated under different sections such as Disability Register, Legal Instruments, Resources, Careers, Assistive Devices, Blogs, Accessible Content, Latest News, Events, Employment Opportunities, Publications, Useful Links, National

Institutes, and feedback etc. The portal is regularly updated and average daily hits have increased from around 8000 to 12,000 during the year.

"Punarjjani™" (www.punarjjani.in) – Web based bilingual (Hindi & English) tool to assist special teachers in assessment of children with mental retardation (MR)

Three standard methods widely used manually for regular assessment of children with MR in the age group 6-18 years viz. FACP (Functional Assessment Checklist Programming), BASIC-MR (Behavioral Assessment Scale for Indian Children with Mental Retardation), MDPS (Madras Development Programming System) have been digitalized & integrated. The tool assists special teachers in easy & quick assessment of children with MR in structured way and hence saves their time. Teachers can devote more time with children in developing their skills. 846 special teachers representing 501 special schools & 122 Sarva Shiksha Abhiyan (SSA) blocks from around 150 cities/towns of 28 States/UTs throughout the country have been trained and provided access to the tool. Requests have been sent to all State Education Secretaries and Social Welfare Secretaries in Hindi belt to consider deployment of the tool (Hindi version) in their respective States. A training workshop was conducted at Jaipur, Rajasthan with the support of Directorate or Welfare of Persons with Disabilities, Govt. of Rajasthan. The tool is being enhanced as per feedback.

Development/renovation of Government/State Govt. websites accessible for Persons with Disabilities (PwD) as per GIGW /WCAG. 2.0 (A, AA level)

[For details may please see 9.4.4 of Chapter 9.]

Visual Speech Training Software for the Hearing Impaired:

Hearing loss (HL) and deafness are global issues which affect at least 278 million persons worldwide and two-thirds of them live in developing countries. In India, persons using hearing aids have been treated as persons with disability (PwD) in the Census 2011 and their number is 50,71,007 (26,77,544 males, 23,93,463 females). For the children with hearing disability to acquire speech, there is a need to provide a visual feedback of articulatory efforts involved in speech

production to assist in the acquisition of speech and language despite a lack of auditory feedback. For details, may please see 5.1.3.1 of Chapter 5.

Development of Intelligent Transportation System (ITS) Solution for Pedestrian Safety Enhancement and Emergency Service Vehicle Priority at Signalized Traffic Junctions.

The project envisages development and implementation of ITS solution for Pedestrian Safety Enhancement and Emergency Service Vehicle Priority System at Signalized Traffic Junctions. For details, may please see 5.5.7.3 of Chapter 5.

Initiatives on Accessibility

A National Policy on Universal Electronic Accessibility was formulated by Ministry of Electronics and Information Technology (MeitY) which has been notified on October 25, 2013. The policy facilitates equal and unhindered access of Electronics and ICTs products and services by differently-abled persons. For details, may please see 2.4.3 of Chapter 2.

1.8 Details related to the Vigilance cases

During the year 2017-18 (as on 28th February, 2018), seven (7) vigilance cases pertaining to MeitY and its attached offices have been disposed off. At present three (3) vigilance cases are under progress, which are mainly related to ignoring of LTC Rules and instructions, while claiming LTC, submitting forged documents to the Government and fabrication of pay slip for taking a loan.

Summary of Important Audit Observations

Sl. No.	Year	No. of Paras/ PAC reports on which ATNs have been submitted to PAC after vetting by Audit	Details of the Paras/PA reports on which ATNs are pending		
			No. of ATNs not sent by the Ministry even for the first time	No. of ATNs sent but returned with observations and Audit is awaiting their resubmission by the Ministry	No. of ATNs which have been finally vetted by audit but have not been submitted by the Ministry to PAC
1.	2002-03	-	Nil	-	Nil
2.	2003-04	-	Nil	-	Nil
3.	2004-05	-	Nil	-	Nil
4.	2005-06	-	Nil	-	Nil
5.	2006-07	-	Nil	-	Nil
6.	2007-08	-	Nil	-	Nil
7.	2008-09	-	Nil	-	Nil
8.	2009-10	-	Nil	-	Nil
9.	2010-11	-	Nil	-	Nil
10.	2011-12	-	Nil	-	Nil
11.	2012-13	-	Nil	-	Nil
12.	2013-14	-	Nil	-	Nil
13.	2014-15	-	Nil	-	Nil
14.	2015-16	-	Nil	-	Nil
15.	2016-17		Nil	1	1

Audit Paras to be included in Annual Report (2017-2018) as per directions of Ministry of Finance.

S. No.	Report No. & Year	Audit Para No.	Subject	Action Taken/Status/Note
1.	**21 of 2017**	3.1	Non-compliance with provisions of General Financial Rules while releasing Grant-in-Aid of '53.91 crore to Kerala Medical Services Corporation Limited and Geo Spatial Delhi Limited coupled with inadequate monitoring of the projects resulted in delay in completion of the projects, blocking of funds and unfruitful foreign exchange outgo towards interest and commitment fee to the tune of ₹ 2.62 crore	The reply was sent to O/o DGA vide letter dated 10.10.17 for vetting and also uploaded on APMS Portal. O/o DGA, P&T returned the ATN vide letter dated 03.11.17 seeking clarification/comments on some points. The same was communicated to Programme Division vide letter dated 13.11.2017 and subsequent reminders dated 05.12.17 & 15.12.2017. The reply has not yet been received. Another reminder has been issued on 31.01.2018 to expedite the reply.
2.	**21 of 2017**	3.2	C-DAC failed to properly measure the area taken for rent in connection with hiring of office space at Pune, resulting into overpayment of rent by ₹ 2.59 crore	The reply was sent to O/o DGA vide letter dated 26.09.17 for vetting and also uploaded on APMS Portal. O/o DGA, P&T returned the ATN seeking further clarification vide letter dated 10.10.2017 returned the ATN with remarks. The reply on audit observations was sent to O/o DGA vide letter dated 25.10.2017. O/o DGA vide letter dated 16.11.2017 returned the ATN seeking more clarification/information. The reply has been sent to O/o DGA vide letter dated 08.12.2017. O/o DGA, P&T vide letter dated 12.01.2018 has informed that the ATN received on the para is vetted with remarks that audit has no further remarks to offer, Ministry may send its reply to PAC directly. The vetted ATN is being sent to DoE, Monitoring Cell as well as remarks of audit sent to PAC.

Slno	Scheme/Non-Schemes	Budgetary Support (Rupees in crore)	
Annual Plan 2018-19			
(I)	**Non-Schemes**		
1	**MeitY Secretariat**		100.00
2	**National Informatics Centre**		1100.00
3	**Regulatory Authorities**		157.00
3.1	Standardisation Testing and Quality Certification (STQC)	110.00	
3.2	Cyber Security (CERT-In & CAT)	40.00	
3.3	CCA	7.00	
4	**Assistance to Autonomous & Other Bodies**		1570.00
4.1	Centre for Development of Advanced Computing (C-DAC)	100.00	
4.2	Society for Applied Microwave Electronics Engineering and Research (SAMEER)	70.00	
4.3	Centre for Materials for Electronics Technology (C-MET)	20.00	
4.4	Media Lab Asia (MLA)	5.00	
4.5	Unique Identification Authority of India (UIDAI)	1375.00	
	Sub-Total (Non-Schemes)		**2927.00**
(II)	**Schemes**		
5	**Digital India**		3073.00
5.1	Manpower Development	300.00	
5.2	Electronic Governance (incl. EAP)	425.00	
5.3	National Knowledge Network	150.00	
5.4	Promotion of Electronics & IT Hardware Mfg (MSIPS, EDF & Manufacturing Clusters)	864.22	
5.5	Promotion of IT/ITeS Industries	50.00	
5.6	R&D in IT/Electronics/ CCBT	178.00	
5.7	Cyber Security Projects (NCCC & Others)	110.00	
5.8	Promotion of Digital Payments	595.78	
5.9	Pradhan Mantri Digital Saksharta Abhiyan	400.00	
	Sub-Total (Schemes)		**3073.00**
	TOTAL (SCHEMES & NON-SCHEMES)		**6000.00**

Appendix – III

Employees' Structure

Total Employees structure (Total and SCs/STs/PWDs as on 01.03.2018)

Group	Permanent/ Temporary	Total No. of Emplo-yees	SC	% of SC emplo-yees	ST	% of ST emplo-yees	Persons With Disabilities (PWD)	% of PWDs
Group 'A'	Permanent							
	(i) Other than lowest rung of class-I	160	28	17.50%	10	6.25%	01	0.63%
	(ii) Lowest rung of Class-I	14	–	–	01	7.14%	01	7.14%
	Temporary							
	(i) Other than lowest rung of Class-I	–	–	–	–	–	–	–
	(ii) Lowest rung of Class-I	07	01	14.29%	00	00	01	14.29%
Group 'B' (Gazetted)	Permanent	46	07	15.22%	03	6.52%	02	4.35%
	Temporary	00	00	00	00	00	00	00
Group 'B' (Non-Gazetted)	Permanent	106	25	23.58%	07	6.60%	04	3.77%
	Temporary	09	03	33.33%	00	00%	–	–
Group 'C' Multi-Tasking Staff .. Group 'C' (Erstwhile Group 'D')	Permanent	135	41	30.37%	11	8.15%	05	3.70%
	Temporary	32	03	9.38%	02	6.25%	00	0.00%
Total		509	108	21.22%	34	6.68%	14	2.75%

Ministry of Electronics and Information Technology (MeitY)

Government of India

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