



सत्यमेव जयते

Ministry of Electronics and Information Technology
Government of India



Digital India
Power To Empower

**ELECTRONICS AND INFORMATION
TECHNOLOGY**

**ANNUAL REPORT
2016 - 17**





सत्यमेव जयते

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

ANNUAL REPORT
2016-17



CONTENTS

1. Overview: Vision and Mission

11-15

- 1.1 Introduction
- 1.2 Vision
- 1.3 Mission
- 1.4 Objectives
- 1.5 Functions / Activities (Allocation of Business Rules)
- 1.6 Organisation Structure
- 1.7 Citizen's/Client's Charter (CCC)

2. Digital India: Power to Empower

17-78

- 2.1 Digital Infrastructure as a Core Utility to Every Citizen
 - 2.1.1 Digital Identity: Aadhaar - An efficient and targeted service delivery platform
 - 2.1.1.1 e-Pramaan
 - 2.1.1.2 Online e-sign
 - 2.1.2 State Wide Area Network (SWAN)
 - 2.1.3 State Data Centre
 - 2.1.4 GI Cloud (MeghRaj)
 - 2.1.5 Service Delivery Gateway
 - 2.1.6 National Knowledge Network (NKN)
 - 2.1.7 National Information Infrastructure (NII)
 - 2.1.8 Mobile Seva Platform (MSP)
 - 2.1.9 Geographical Information System (GIS)
 - 2.1.10 High Speed Broadband Connectivity
 - 2.1.11 Public Internet Access Programme (Including Wifi in Universities)
 - 2.1.12 Safe and Secure Cyberspace
- 2.2 Governance and Services on Demand
 - 2.2.1 e-Kranti: Electronic Delivery of Services
 - 2.2.2 e-District
 - 2.2.3 All Services Through Online & Mobile
 - 2.2.3.1 Programme on Good Governance and Best Practices

- 2.2.3.2 World Bank Assisted “India: e-Delivery of Public Services” Project
- 2.2.3.3 National Scholarship Portal
- 2.2.3.4 Digital Locker & Other Initiatives
- 2.2.3.5 Citizen Contact Centre
- 2.2.3.6 Enabling All Schools with Virtual Classrooms
- 2.2.3.7 Open Government Data (OGD) Platform for National Data Sharing & Accessibility Policy (NDSAP)
- 2.2.3.8 Electronic Transaction Aggregation and Analysis Layer (e-Taal)
- 2.2.3.9 E- Hospital Project
- 2.2.3.10 Jeevan Pramaan
- 2.2.3.11 Biometric Attendance System (BAS) A National Roll Out
- 2.2.3.12 PRAGATI Video Conferencing
- 2.2.3.13 Digitize India Platform (DIP)
- 2.2.3.14 Swachh Bharat Mission – Gramin
- 2.2.3.15 Prime Minister Awaas Yojana
- 2.2.3.16 Web Based Counseling
- 2.2.3.17 Integrated Track Child Portal
- 2.2.3.18 Online NGO Proposal processing and Tracking System
- 2.2.3.19 Manual Scavenger Survey in Statutory Towns and Rural Area
- 2.2.3.20 Soil Health Card
- 2.2.3.21 Public Financial Management System (PFMS)
- 2.2.3.22 E-office
- 2.2.3.23 Government e-Procurement (GePNIC)
- 2.2.3.24 Vahan and Sarathi (transport)
- 2.2.3.25 E-Granthalaya
- 2.2.3.26 Immigration Visa & Foreigner Tracking System
- 2.2.3.27 CollabCAD
- 2.2.4 Financial transactions electronic & cashless
 - 2.2.4.1 Direct Benefit Transfer (DBT)
 - 2.2.4.2 National Payment Service Platform
- 2.2.5 Technical and Other Support
 - 2.2.5.1 Rapid Replication of Applications
 - 2.2.5.2 e-Gov App Store
 - 2.2.5.3 India Portal
 - 2.2.5.4 National Centre for e-Governance Standards and Technology (NeST)

- 2.2.5.5 Capacity Building Scheme 2.0
- 2.2.5.6 Digital Government Research Centre (DGRC)
- 2.2.6 Common Service Centre (CSC)
- 2.3 Digital Empowerment of Citizens
 - 2.3.1 Promoting Digital Payment Systems
 - 2.3.2 e-Learning
 - 2.3.2.1 Technology Development for Indian Language (TDIL)
 - 2.3.3 Digital Literacy
 - 2.3.4 Initiatives on Accessibility
 - 2.3.5 MyGov
 - 2.3.5.1 Major Attributes of MyGov
 - 2.3.5.2 Prominent Activities Held by MyGov
 - 2.3.5.3 MyGov's Future Programmes
 - 2.3.6 Digital India Communication
 - 2.3.7 International Conference on eGovernance (ICeGOV)

3. Make in India: Electronics Manufacturing

79-98

- 3.1 Measures/Schemes
 - 3.1.1 Large Scale Manufacturing
 - 3.1.2 Electronic Clusters
 - 3.1.3 Semiconductor Wafer Fabs
 - 3.1.4 Incentives for Fabless Design
- 3.2 Policy
 - 3.2.1 Preference to Domestic Electronic Products
 - 3.2.2 Compulsory Safety Standards for Electronics
- 3.3 Growth of Electronics Sector
 - 3.3.1 Consumer Electronics
 - 3.3.2 Industrial Electronics
 - 3.3.3 Automotive Electronics
 - 3.3.4 Computer Hardware
 - 3.3.5 Mobile Phones
 - 3.3.6 Strategic Electronics
 - 3.3.7 Medical Electronics
 - 3.3.8 Electronic Components
 - 3.3.9 Light Emitting Diodes (LEDs)

- 3.3.10 Imports (2015-16)
- 3.3.11 Imports of Electronics during 2016-17
- 3.3.12 Exports (2015-16)
- 3.3.13 Exports 2016-17 (April-December)
- 3.3.14 Rationalisation of Tarrif during 2016-17
- 3.4 Development of Indian Conditional Access System (iCAS)
- 3.5 Marketing and Attracting Investment in Electronics Sector
 - 3.5.1 Specific Verticals related National Workshops
 - 3.5.2 State Level Workshops
 - 3.5.3 Industry Conferences
 - 3.5.4 Outreach to Academia and Students
 - 3.5.5 National Conference
 - 3.5.6 Promotions to attract investment in ESDM sector
 - 3.5.7 Twitter Handle
 - 3.5.8 B2B Portal
- 3.6 Information Technology Investment Region (ITIR)

4. Make in India: Software & Service

99-108

- 4.1 Global Perspective
- 4.2 e-Commerce
- 4.3 IT Service & BPO
- 4.4 International Outreach – Showcasing India's IT talent
- 4.5 Cooperation through working groups/bilateral Interactions
 - 4.5.1 Multilateral Cooperation
 - 4.5.2 MoUs/Agreements/JDIs
 - 4.5.3 International Projects in ICT
- 4.6 Growth of Software and Services Sector
 - 4.6.1 Overall IT-ITES performance
 - 4.6.2 Domestic IT-ITES performance
 - 4.6.3 IT-ITES Employment Scenario
- 4.7 Software as a tool for Economic Growth

5. Innovate and Design in India

109-144

- 5.1 Creation of Research Eco-system
 - 5.1.1 National Supercomputing Mission (NSM)

- 5.1.2 Electronics Development Fund (EDF)
- 5.1.3 Incubators for Electronics
- 5.1.4 R&D and IP Development
- 5.1.5 Free & Open Source Software (FOSS)
- 5.2 Translation R&D
 - 5.2.1 Medical Equipment/Tools
 - 5.2.2 Micro & Nano Electronics
 - 5.2.3 Electronic Materials & Component Development
 - 5.2.4 Green Computing
 - 5.2.5 Technology Development & Demonstration for Indian Industries
- 5.3 Centres of Excellence
 - 5.3.1 Nano-Technology Centres
 - 5.3.2 Demonstration Facility of Super capacitors at C-MET, Thrissur
 - 5.3.3 RoHS Testing facility at C-MET, Hyderabad
 - 5.3.4 Centre of Excellence for Digital Preservation
 - 5.3.5 Internet of Things
 - 5.3.6 Innovation, IPR and IP Development
 - 5.3.6.1 Collaborative Research & Development through GITA
 - 5.3.6.2 Supporting research in Medical Electronics through BIRAC
- 5.4 Exploratory Blue Sky Research
 - 5.4.1 Bioinformatics
 - 5.4.2 Research on secured Cyber Space
 - 5.4.2.1 Cyber Security R&D Projects
 - 5.4.3 Design and Development of a Compact Cost effective Brix Meter
- 5.5 Societal Reach R&D
 - 5.5.1 Medical Tools, Equipments, Software
 - 5.5.2 Healthcare
 - 5.5.3 E-waste Recycling
 - 5.5.4 Agriculture
 - 5.5.5 Environmental Pollution Monitoring
 - 5.5.6 Energy Storage and Generation
 - 5.5.7 Rehabilitation of Divyang
 - 5.5.8 Language Computing
 - 5.5.9 Societal Misc.

6 Internet Governance and Secured Cyber Space

145-153

- 6.1 Internet Governance
 - 6.1.1 Achievements
 - 6.1.1.1 Engagement in International Forums/Meetings
 - 6.1.1.2 The Research, Development and awareness agenda
- 6.2 National Internet Exchange of India (NIXI)
- 6.3 Cyber Laws
- 6.4 Indian Computer Emergency Response Team (ICERT)
- 6.5 Initiatives towards Security in Digital Payments

7 Skill India: Capacity Building

155-163

- 7.1 Skill India
 - 7.1.1 Post Graduate and Doctorate Level
 - 7.1.2 Graduate Level
 - 7.1.3 Vocational, Skill Development Level
 - 7.1.4 Capacity Building in Niche Areas
 - 7.1.5 Create Skill Development Facilities in Deprived Areas Through NIELIT
 - 7.1.6 IT for Masses Programme

8 Statutory Organizations

165-179

- 8.1 Authentication Framework Under the IT Act: CCA
 - 8.1.1 eSign Online Electronic Signature Service
- 8.2 Unique Identification Authority of India (UIDAI)
 - 8.2.1 Introduction
 - 8.2.2 Value Proposition of Aadhaar
 - 8.2.3 Approach and Strategy: Enrolment Ecosystem
 - 8.2.4 Aadhaar Letter Printing and Delivery
 - 8.2.5 Authentication Ecosystem
 - 8.2.6 Aadhaar Seeding Ecosystem
 - 8.2.7 Training, Testing and Certification ecosystem
 - 8.2.8 Intranet & Knowledge Management Portal
 - 8.2.9 UIDAI Website
 - 8.2.10 Data security and privacy
 - 8.2.11 Aadhaar - A Tool for Governance Reform

- 8.2.12 Creation of requisite Technology Infrastructure
- 8.2.13 Construction of UIDAI, HQ building
- 8.2.14 Use of Rajbhasha
- 8.2.15 Details of Budget & Expenditure during 2016-17
- 8.3 Indian Computer Emergency Response Team (ICERT)
- 8.4 Cyber Appellate Tribunal (CAT)

9 Attached Offices and Societies

181-234

- 9.1 High-end Software, Systems: Centre for Development of Advanced Computing (C-DAC)
 - 9.1.1 High Performance Computing (HPC), Grid Computing and Cloud Computing
 - 9.1.2 Multilingual Computing and Heritage Computing
 - 9.1.3 Professional Electronics, Including VLSI and Embedded Systems
 - 9.1.4 Software Technologies, including FOSS
 - 9.1.5 Cyber Security and Cyber Forensics
 - 9.1.6 Health Informatics
 - 9.1.7 Education and Training
 - 9.1.8 North- East
 - 9.1.9 International Initiatives
- 9.2 Strategic Need: Society for Applied Microwave Electronics Engineering and Research (SAMEER)
 - 9.2.1 Achievements
 - 9.2.2 Centres of SAMEER: Visakhapatnam and Guwahati
 - 9.2.3 North East Initiatives
 - 9.2.4 SAMEER Projects Undertaken During the Year 2016
- 9.3 C-MET'S Laboratories and core competence
 - 9.3.1 Technical activities & progress during 2016-17
- 9.4 ERNET
 - 9.4.1 Domain Registration
 - 9.4.2 Internet of Things (IoT)
 - 9.4.3 Pilot Project of White Space TV
 - 9.4.4 Wi-Fi Campus Network in five Universities
 - 9.4.5 SMART Classrooms, ICT learning, Training etc
 - 9.4.6 Connecting the Unconnected Using VSATs
 - 9.4.7 Setting up of Digital Archival facility
 - 9.4.8 Terrestrial Operation

9.5 e-Governance Solution: NeGD

9.6 Government's IT Infrastructure: National Informatics Centre (NIC)

9.6.1 NIC IT Infrastructure

9.6.1.1 Data Centres Infrastructure

9.6.1.2 IVRS(Interactive Voice Response System)

9.6.2 eMail and SMS Services

9.6.2.1 eMail Services

9.6.2.2 eSampark

9.6.2.3 eGreetings

9.6.2.4 SMS (Short message services) Services

9.6.3 NICNET – E- Governance Network Backbone

9.6.4 NICNET - VSAT Services

9.6.5 Video Conferencing (VC) Services

9.6.6 Open Technology Group (OTG)

9.6.7 Software Development Unit (SDU), Pune

9.6.8 Software Development Unit (SDU) & Training Centre Kochi

9.6.9 ServicePlus

9.6.10 Development of North Eastern Region (DoNER)

9.6.11 Defence Informatics Division

9.6.12 Food Processing Industries Informatics Division

9.6.13 NIC State Units and UTs

9.6.14 National Informatics Centre Services Inc. (NICSI)

9.7 Standardization, Testing and Quality Certification (STQC) Directorate

9.7.1 Achievements during FY 2016-17

9.7.2 Common Criteria (CC) Test Laboratory

9.7.3 National facility for Quality Assessment of Biometric Devices

9.7.4 Website Quality Certification Services

9.7.5 Test and Calibration Services offered by ERTLs/ETDCs in the field of Electronics

9.7.6 Continuing participation in Space Programmes through Components Screening, Packages & Modules testing and Environmental testing

9.7.7 National Accreditations of Test and Calibration facilities

9.7.8 Training services

9.7.9 Activities in North-East Region (NER)

9.7.10 Administrative matters (STQC)

- 9.8 National Institute of Electronics and Information Technology (NIELIT)
 - 9.8.1 Introduction
 - 9.8.2 Some Notable Achievements
 - 9.8.3 R&D, Innovation & Design
 - 9.8.4 Capacity Building projects
- 9.9 Software Technology Parks of India (STPI)
 - 9.9.1 Introduction
 - 9.9.2 STPI Centres
 - 9.9.3 Services
 - 9.9.4 India BPO Promotion Scheme/North East BPO Promotion Scheme
 - 9.9.5 Promotion of Small and Medium Entrepreneurs by creating a conducive environment in the field of Information Technology
- 9.10 MEDIA LAB ASIA
 - 9.10.1 Introduction
 - 9.10.2 ICT Based Integrated development program for women empowerment
 - 9.10.3 Development of Open Source Computer Aided Designing (CAD) tool for the Weaving of Banarasi Sarees
 - 9.10.4 Interactive Information Dissemination System (IIDS)
 - 9.10.5 Mobile based Agro Advisory System for North-East India (M4agriNEI)
 - 9.10.6 Software and Portal for PwDs
 - 9.10.7 ITRA and Visvesvaraya Phd Scheme initiatives

10 Other Matters

235-238

- 10.1 Use of Hindi in official work and expected technology development
- 10.2 RTI
- 10.3 Public Grievances Redressal Mechanism
- 10.4 Information & Documentation Centre (Library)
- 10.5 Parliament Matters
- 10.6 Gender Empowerment/Prevention of sexual harassment of Women at work place
- 10.7 Activities undertaken for the benefit of differently abled persons

11. Appendices (I to III)

239-243

- App.I (Summary of Important Audit Observations)
- App.II (Annual Plan 2017-18)
- App.III (Employees Structure)



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 The Vision :

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

1.3 The 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 multipronged 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 The Objectives are as follows:

- Providing e-infrastructure for delivery of e-services
- Promotion of electronics hardware

manufacturing and IT-ITeS industry

- Enabling creation of Innovation in emerging areas of ICT&E
- Enabling creation of / R&D Infrastructure
- 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 / Activities (allocation of business rules)

(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 Media Lab Asia.
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

Note :

- 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 & Information Technology (MeitY)

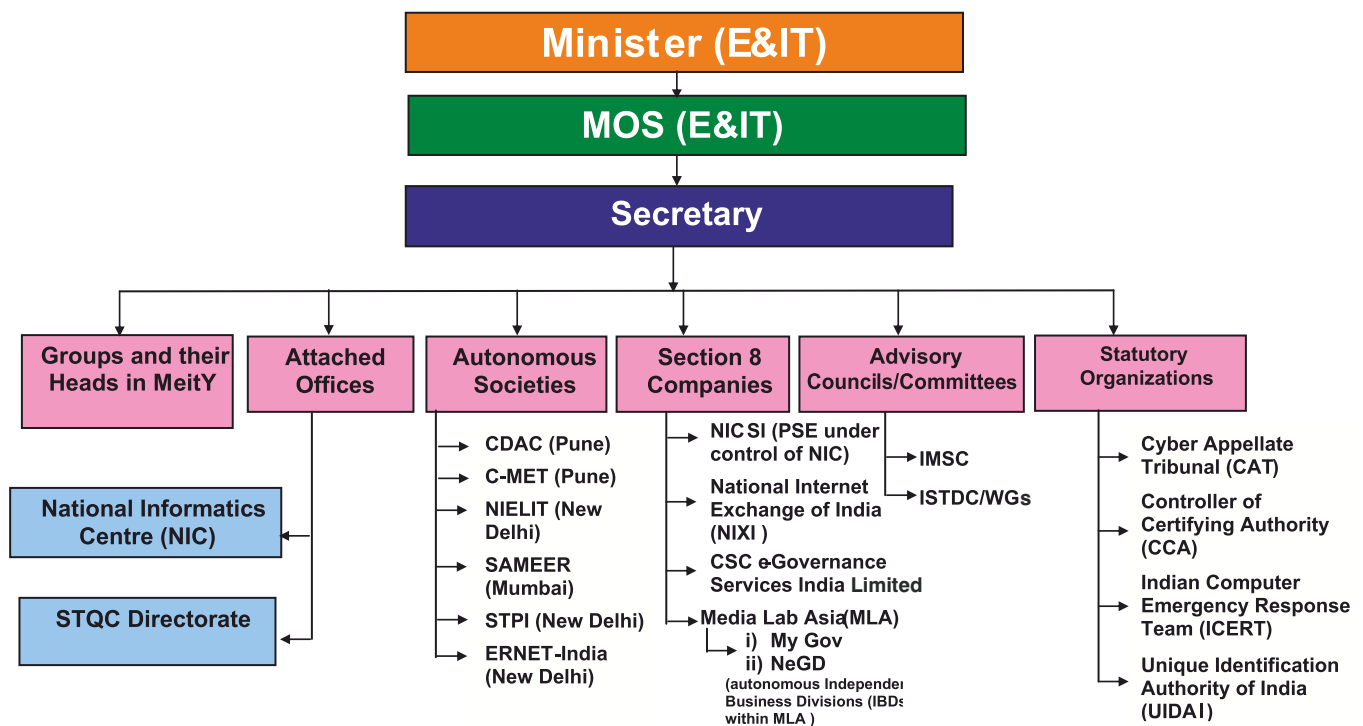
1.6 Organization Structure:

The Secretariat of the Ministry of Electronics and Information Technology is headed by Secretary who is assisted by one Additional Secretary, AS

& FA, Group Coordinators and Heads of Organisations under the administrative charge of Meity. The organisational chart is given below:-

As on 08.03.2017

MINISTRY OF ELECTRONICS AND INFORMATION TECHNOLOGY (MeitY) ORGANISATION STRUCTURE



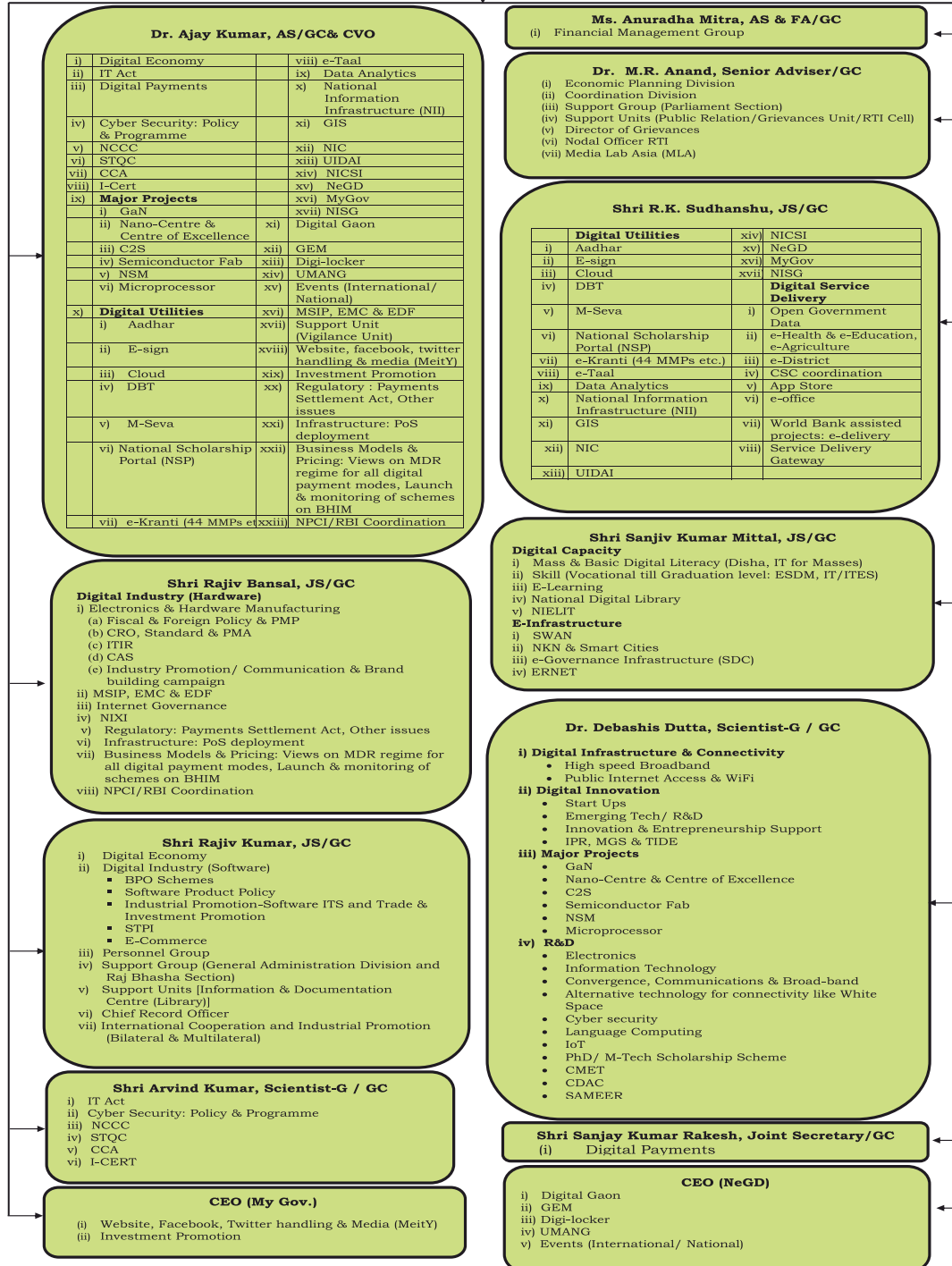
In order to operationalise the objectives of MeitY, schemes are formulated and implemented, either directly or through its Responsibility Centers (Organizations / Institutions) under its jurisdiction. To make the technology robust and state-of-the-art, collaborations with the academia and the private / public sector is also sought. MeitY has two Attached Offices (viz., NIC, STQC), six Autonomous

Societies (viz., CDAC, CMET, NIELIT, SAMEER, STPI and ERNET), Four Statutory Organizations (viz., UIDAI, ICERT, CCA and CAT) and four Section 8 companies (viz., NICSINIC, NIXI, CSC e-Governance Services India Limited and MLA) supported by two Advisory Councils (viz., IMSC & ISTDC / WGs), under its charge to carry out the business allocated to the Ministry.

Smt. Aruna Sundararajan
Secretary

Date : 08.03.2017

Group Coordinators (GCs) and their respective Groups



1.7 Citizen's/Client's Charter (CCC): For more details on CCC of MeitY please refer to our website, url: meity.gov.in/contents/citizens_charter (which is a part of **About MeitY**).

CHAPTER 2

DIGITAL INDIA: POWER TO EMPOWER



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 is on making technology central to enabling 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 program is centered 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
- 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 and
- 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 and
- 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 to build and sustain all associated layers required for a digital empowerment of the people and building digital economy.

To ensure focus on each of these layers, following nine pillars of growth areas have been indentified 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 and
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 the 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. 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 program, 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 had already implemented a digital platform named as “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 26.11.2014, 28.02.2015, 15.10.2015

and 16.06.2016.

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) is a transformational e-governance initiative that involves establishing an identity infrastructure for providing unique digital identity to residents. The digital IDs are verifiable online as a tool to enhance the quality of service delivery mechanisms, improve governance, aid financial inclusion and promote fiscal prudence.

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.

Once the enrolment takes place, the data undergoes various stages of screening and validations in Central Identities Data Repository (CIDR). This ensures that the source of data is authentic besides ensuring that no duplicate exists. Quality checks are done on demographic and biometric data collected from residents. After passing the data quality checks and other validations, the packet goes for de-duplication and Aadhaar gets generated.

Key features of Aadhaar:

- 12-digit random unique number obtained through de-duplication involving biometrics.
- Only a number and not a card.

- 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 the e-Pramaan framework (notified in the Gazette of India in Dec 2012) for e-Authentication for public services 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. The "e-Pramaan: Framework for e-Authentication" was notified by MeitY in December 2012.

The objective is to setup a National e-Authentication service called e-Pramaan along with Aadhaar based authentication, for the government departments. The implementing agency for e-Pramaan is C-DAC, Mumbai. The overall objective

is to provide a trusted electronic environment where the individual users can transact easily and securely with the Government. Moreover, e-Pramaan provides a uniform approach to manage identified authentications of all citizens for the delivery of various public services over internet and mobile platforms.

Major steps towards achieving the desired outcome are:

- (i) Notification of e-Pramaan Framework.
- (ii) Development of e-Authentication standards.
- (iii) Two phased approach in implementation.

a. Phase I: Development of pluggable authentication components/modules for government applications and related APIs for integration. It will help departments to implement e-authentication as defined in the e-Pramaan framework and as per the standards, keeping e-authentication mechanisms robust, uniform and consistent.

b. Phase II: Offer e-Pramaan as an authentication service to departments with all levels of authentication as defined in e-Pramaan framework and facilitate on-boarding of government departments by providing integration APIs, guideline documents and technical support.



Achievements

- Four levels of authentication (Login-Password, OTP, Digital Certificate, Fingerprint Biometric using Aadhaar) are available in production set-up on cloud at NIC.
- Image Password introduced as a factor for authentication which is a new feature.
- Provided a solution compatible with all the browsers without applets.
- A new improved version of e-Pramaan with better performance launched.
- A mobile app is developed for e-Pramaan.
- Three region wise workshops organized to spread awareness about e-Pramaan.
- 35 Services registered
- Services/ departments integrated - 30

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.

For creating electronic signatures, the signer is required to obtain a Digital Signature Certificate (DSC) from a Certifying Authority (CA) licensed by the Controller of Certifying Authorities (CCA) under the Information Technology (IT) Act, 2000. Before a CA issues a DSC, the identity and address of the signer must be verified. The private key used for creating the electronic signature is stored in hardware cryptographic token which is secured with a password/pin. This current scheme of in-person physical presence, paper document based identity & address verification and issuance of

hardware cryptographic tokens does not scale to a billion people. For offering fully paperless citizen services, mass adoption of digital signature is necessary. A simple to use online service is required to allow everyone to have the ability to digitally sign electronic documents.

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 eSign Online Service introduced which allows everyone to have the ability to digitally sign electronic documents. EMudhra and C-DAC (govt. ESP) are empanelled to offer e-Sign Services.

Achievements

- C-DAC's eSign Service enables instant signing of documents online by citizens in a legally acceptable form. The service was launched by Shri Ravi Shankar Prasad, Hon'ble Minister for Law & Justice and Electronics & IT, Government of India on Sept 3, 2016. The service enables an Aadhaar holder, with registered mobile number and Aadhaar, to electronically sign a form/document anytime and anywhere using a device.
- C-DAC has enabled 10 agencies to leverage e-Hastakshar for eSign purposes
- Total Signatures offered : 60,304

2.1.2 State Wide Area Network (SWAN):

The Government had 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.

At present, SWANs are operational in 34 States namely Andhra Pradesh, Chandigarh, Chhattisgarh, Delhi, Gujarat, Goa, Haryana, Himachal Pradesh, Jharkhand, Kerala, Karnataka, Lakshadweep, Maharashtra, Orissa, Punjab, Puducherry, Sikkim, Tamil Nadu, Tripura, Uttar Pradesh, West Bengal, Assam, Bihar, Madhya Pradesh, Uttarakhand, Manipur, Arunachal Pradesh, Mizoram, Nagaland, Meghalaya Rajasthan Dadar & 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 State/UTs. These offices access their applications through SWAN in secured 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 are utilizing 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. 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:

State Data Centre (SDC) is one of the three core infrastructure components. Under the SDC Scheme, a Data Centre is provided 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 States through common service delivery platforms seamlessly supported by core connectivity infrastructure such as SWAN and CSC 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.

Till now 26 SDCs are operational. These are Tamil Nadu, Puducherry, West Bengal, Andhra Pradesh, Meghalaya, 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.

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. Eleven States (Maharashtra, Haryana, Madhya Pradesh, Chhattisgarh, Rajasthan, West Bengal, Kerala, Meghalaya, Tamil

Nadu, Himachal Pradesh, Jharkhand) 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 are DR enabled

MeitY is providing continuous support and guidance to States/UTs to ensure smooth implementation of the project. Policy guidelines, roles and responsibilities of agencies and stakeholders and issues and concerns to be addressed in planning, implementation, operation & maintenance of the Data Centres have been formulated. Guidelines are updated from time to time and are communicated to all concerned.

Achievements

- In FY 2016-17, Himachal Pradesh & Jharkhand SDC got operational.
- Implementation of 2 SDCs (Punjab & Goa) is in progress.
- In 2 States (Assam & Uttarakhand) bid process is in advance stage.
- Percentage of rack space utilization in 24 States is more than 50%
- 8 State Data Centers(Gujarat, Tripura, West Bengal, Rajasthan, Tamil Nadu, Andhra Pradesh Odisha, Kerala) completed 5 years of operation during the 2016-2017 financial year.

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 the 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 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 be evaluated to assess whether they should migrate to the GI Cloud”.

The GI Cloud “MeghRaj” will provide services to government departments, citizens and businesses through internet as well as mobile connectivity. In addition to accelerating the delivery of e-services to citizens and businesses, the government’s cloud-based service delivery platform will also support a number of other objectives including increased standardization, interoperability and integration, a move towards an OPEX model, the pooling of scarce, under-utilized resources and the spread of best practices. It will also support on-going cost effectiveness and manageability.

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

- Drive cost efficiencies with increased utilization of IT Infrastructure through cloud.
- Enable conversion of CAPEX to OPEX paving way for consumption based billing
- Faster procurement of IT Infrastructure services.
- Rapid development, deployment and re-use of ICT applications.
- On demand scalability of infrastructure to meet long term capacity requirements

- Flexibility to cater to the peak load and off-peak load requirements.
- Central GI Cloud “MeghRaj” services directory for publishing single instances of applications on cloud.

Major components of MeghRaj include:

- Setting up of State and National Clouds
- Set up an e-Gov Appstore
- Empanelment of Cloud Service Providers
- Empanelment of Cloud Auditors
- Setting up of Cloud Management Office
- Setting up an eco-system for Cloud proliferation (Policies, Guidelines, templates, security norms, certification, business models for applications, tariff & revenue models for private sector Cloud services)
- Awareness workshops, training programs and migration support for cloud adoption by departments
- MeghRaj (GI-Cloud) service Directory
- Setting up of Clouds by other Government entities

Achievements: The first National Cloud implemented by NIC was launched on February’ 2014 wherein more than 400 departments are already using cloud services, which may be accessed using the link - <https://cloud.gov.in/>. The Initiatives under Digital India Programme hosted on National Cloud include:

- Digital India Portal
- Digital Locker
- Digitize India
- Make-in-India



- Skill Development
- Smart Cities
- Online Registration System (e-Hospital)
- Aadhaar based Biometric Attendance of government employees
- Jeevan Pramaan - service for pensioners
- 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 provisionally empanelled 11 Cloud Service Providers 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 provisionally empanelled CSPs are Microsoft Corporation (India) Private Limited, Hewlett Packard Enterprise 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 and Web Werks India Private Limited. The contact details of the empanelled CSPs can be accessed using the link http://meity.gov.in/content/gi-cloud_meghraj.

Activities in progress

- Finalizing Audit criteria documents and empanelling Cloud Auditors for empanelled CSPs.
- Setting up of CMO (Cloud Management Office) to facilitate an ecosystem for GI Cloud leading to

faster implementation of the cloud policy.

2.1.5 Service Delivery Gateway:

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. This is a part of the vision to make all Government services accessible to the common man in the 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 are 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. 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 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 Centers (CSCs) along with the common infrastructure (SWAN, 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 their by 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.

Guidelines have been formulated to provide technical and financial assistance to the States/UTs for setting up State Portals, SSDGs and electronic forms. In order to facilitate the quick implementation and roll out of the project, MeitY has empanelled 5 consultants who will assist the states/UTs in preparation of the proposals and in the bidding and selection process of implementing agencies. MeitY has also empanelled 6 implementing agencies which can bid for the state projects. DPRs and funding have been approved for 34 States/UTs in the country. Out of these states/UTs, 31 States/UTs have already floated RFPs for selection of the implementing agency (IA) for the project.

Achievements:

- At present, 25 states/UTs have gone live with 734 services and 579,81,583 transactions have been reported as on 31.12.2016.
- 3 States/UTs (Gujarat, Daman Diu and Jharkhand) have completed implementation and waiting for Go-Live.
- 3 States/UTs are in process of IA selection.

eSangam (NSDG) is a middleware infrastructure 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 NSDG is being implemented by CDAC and is live since August 2008. 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)

Achievements

- 145 Services were registered in the production environment of eSangam
- Infrastructure enhancement (DC and DR) of eSangam Infrastructure
- Functionality enhancement of eSangam Product completed in Staging environment, Security and Performance testing under progress.

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 has been 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 of 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 1638 such institutions including links migrated to NKN from National Mission for Education through Information and Communications Technology (NMEICT). 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.
- g) Link to Global Networks to collaborate with the research communities across the globe.

Also, at the 18th SAARC summit in November 2014, the Hon'ble Prime Minister of India shared his vision 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, Bangladesh, Afghanistan and Maldives in the near future.

After detailed consultations with all stakeholders the final concept note on: "Extending NKN to SAARC Countries" was forwarded to MEA on 11.05.2016. The Mode of connectivity proposed in the concept Note are as follows: (i) Nepal, Bhutan, and Bangladesh by using South Asia Sub-regional

Economic Cooperation (SASEC) fiber or by procuring bandwidth of 1Gbps; (ii) Sri Lanka and Maldives by submarine optical links; (iii) Afghanistan by satellite link or through TEIN network (TEIN4). The total estimated expenditure for five years is Rs. 69 cr. MEA has informed that Bhutan, Sri Lanka and Afghanistan have expressed the interest for NKN connectivity and talks are in final stages. Response from Bangladesh, Nepal and Maldives is awaited. NIC/NKN has also proposed to initiate a tendering process for 6 countries (Bhutan, Sri Lanka, Bangladesh, Nepal, Maldives and Afghanistan) for price discovery.

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 (as on 31st January, 2017):

- 1638 links to institutions commissioned and made operational.
- This includes 389 links to institutions under National Mission on Education through Information and Communications Technology which migrated to NKN.
- 8 NKN links have been upgraded to 10G based on their usage i.e. TIFR, IIT Roorkee, IIT Delhi, IIT Kharagpur, Delhi Univ. Banaras Hindu Univ. IIT Bombay & Gujarat Data Centre.
- NKN connectivity extended to 486 NIC district centers.
- 66 Virtual Classrooms have been set up.
- 94 nos. of Core Links have been commissioned and made operational.
- NKN connectivity extended to SWAN in 26

States/UTs and SDC in 26 States/UTs.

- 14 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 of NKN One is underway.
- President and Prime Ministers video conferencing (VC) are being regularly conducted over NKN. Further, approximately 18000+ hours of VCs have been conducted over NKN till now in the calendar year 2016.
- The Fourth NKN Annual Workshop was organized at JNTU Hyderabad on 21st & 22nd January 2016 jointly by the National Informatics Centre (NIC) and Jawaharlal Nehru Technical University (JNTU) Hyderabad. The theme of this year's workshop was "NKN at the Core of Cyber Space". The workshop was attended by over 1000 delegates including high level government officials
- NKN has commissioned its international PoP's at Amsterdam and Singapore with 2 x 10 G links each in 2016 . The links have been operationalized between NKN Mumbai-NKN Amsterdam and NKN Chennai-NKN Singapore respectively.
- International NKN PoPs at Geneva and New York are likely to be commissioned in 2017 extending NKN's reach farther in the research and collaboration space.

2.1.7 National Information Infrastructure (NII):

A pilot project on NII covering one district each in 5 States and 2 UTs has been approved at a total outlay of Rs. 45.84Cr. The States/UTs covered under the pilot are Karnataka (Mysore district), Kerala (Trivandrum), Gujarat (Anand), Uttarakhand (Haridwar), Nagaland (Paren) and UTs of Chandigarh and Puducherry.

It is proposed to integrate the existing networks and infrastructure of SWAN, NKN, SDC, NDC, NICNET, and NOFN and leverage it to enhance its potential and utility and thereby ensure economy in expenditure. It will facilitate to identify the challenges and address them effectively while providing various e-Governance services upto Gram Panchayat level. The pilot is fully funded by MeitY for expenditure towards CAPEX, OPEX & Bandwidth charges for a period of one year.

The project in paren district of Nagaland has been implemented and has recently commenced operations whereas, it is in advanced stage of implementation in remaining 6 States/UTs

2.1.8 Mobile Seva Platform (MSP) :

MeitY has initiated a massive countrywide initiative on mobile governance 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. The national rollout of Mobile Seva project was approved in November 2012.

Achievements

- 1451 additional Government departments and agencies integrated with MSP.
- No. of push SMS transactions -1244 crores.
- Total number of services available to citizens & businesses has reached 681.
- On Mobile Seva AppStore, 979 live m-apps have been developed and hosted.
- The apps have been downloaded over 37.8 lakh times.
- IVRS Services 52 lakh transactions. USSD Service 7.17 lakh transactions.
- Developed 4 Nos Mobile application Agri-maket, Crop-Insurance, Kisan Suvidha, Pusa Krishi launched by PM.
- Mobile Seva got Award of Appreciation (Runner up) in CSI Nihilent e-Governance Awards 2016
- Mobile Seva are Finalist in Express IT Awards 2016 (final result not declared)
- Mobile Seva are finalists in Mobile for Good 2016 by Vodafone Foundation and Nasscom Foundation
- Consultation Workshop for finalizing our business model on 21 Nov. 2016 at MeitY.

- Capacity Building for implementation of mGovernance (Roll out of services)
- Team Visit to Tanzania (15 Days) Knowledge Sharing with Govt. of Tanzania from 11 - 31 Oct, 2016 at Dar es Salaam.
- One day Training for availing Mobile Seva services on 24th June 2016 at Mumbai.
- Mobile Application Development training to delegation from ECB, Bhutan 25-29 April, 2016, Delhi.

To strengthen MeitY's mission to m-enable government departments and agencies across the nation, another project –“m-Enablement of Government Departments through Mobile Seva”, was approved in June 2014 for 36 months.

2.1.9 Geographical Information System (GIS):

Under the Up-scaling of multi layered GIS project, RS & GIS Division, NIC has developed voluminous geospatial repository of heterogeneous datasets from SOI, ISRO, FSI and various other government agencies along with in-house data development efforts on WGS84 datum with compliance to National Map Policy as well as global standards. NICMAPS-NIC GIS platform was successful in establishing common platform for all the ministries to harmonize data and overlay their information both in spatial and non-spatial formats for web based access. Some of the salient features of this NICMAPS – GIS platform established by NIC include are base map service consisting of pre-composed maps with scales ranging from 1: 40 Million to 1:4000, NIC satellite imagery service using IRS satellite images of varying resolutions like AWiFS (56 m), LISS-III (23.5 m) and PAN (5.80 m) and Cartosat (2.50m) and Terrain Base Map service features shaded relief imagery to provide a neutral background for other data layers.

Utility Mapping Division, NIC has developed large Scale 1:1K 3D Digital basemap of seven metro cities and hosted in the Cloud to access via secured G2G environment.

Bharat Maps : NIC/MeitY has created Multi-Layer GIS Platform named "Bharat Maps" which depicts core foundation data as "NICMAPS", an integrated base map service using 1:50,000 scale reference data from Survey of India, ISRO, FSI, RGI and so on. This encompass 23 layers containing administrative boundaries, transport layers such as roads & railways, forest layer, settlement locations etc., including terrain map services.

GIS Integration of Department of Post : A web based application for Department of Post is developed and audited in NIC. <http://postoffice.umd.nic.in:8080/nicutility/> portal is hosting the application along with the 1:10K scale map. User can locate of Pin Code boundaries, Post offices, letter boxes, Beat boundaries, Beat routes in six cities in various methods.

GIS Integration of Slum Cluster and Schemes for SLUM Rehabilitation Authority (SRA), Mumbai : Approx. 1400 Slum Cluster and 300 Slum Schemes for SRA along with fact sheet information, name of the society, city survey number, name of the builder, status of the scheme etc., will digitised as components of SRAs assets data. This will integrate SRS-MIS data on basemap of Mumbai. GIS is included in the daily routine of the SRA work.

Mobile App for DBT : developed a GIS based Mobile App for DBT showing Locations and details of Banks, ATMs, post offices, Bank Mitra and Community services.

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, 148,814 kms of Optical fiber cable has been laid reaching 64,995 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 Universities)-

Wi-Fi in 5 Universities

One of the Early Harvest Programmes under Digital India is Setting up 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-any-where basis.

ERNET India is deploying Wi-Fi in these five universities. The Wi-Fi connectivity at Allahabad University is operational since 31.01.2016 and more than 6700 users accounts for Wi-Fi access have been created. Total 1058 Wireless Access Points have been installed in various buildings/



departments. The backbone of the campus network has been upgraded to 10 Gbps and new core and distribution switches have been installed. In Pune University, the Wi-Fi deployment is completed, and is in use since 24.05.2016. Total 53 buildings/departments/ hostels have been covered. For Wi-Fi at Osmania, Utkal and NEHU University, the deployment is in progress. As per the proposal, approximate 122 Nos., 60 Nos; 55 Nos. buildings will be covered under the Wi-Fi project at Osmania University, Utkal University and NEHU University respectively. Optical Fiber Cable is being laid with the approval by each university. Active components have been delivered and installation of active components is going on.

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 seamless Internet connectivity across campuses while 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 150 institutes in India like IITs, IIMs, NITs and various other renowned institutions.

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 which do not have any form of Internet connectivity. The project is being implemented by ERNET India.

List of 60 institutes has been finalised. VSAT hub of ERNET India has been upgraded and process of installation of VSAT in 60 institutes is going on.

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 400 staff of the Central and State Governments have been provided hands-on training and skilled in IPv6 network and Infrastructure.

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 will be a multi stakeholder body and will be implemented by Indian Computer Emergency Response Team (CERT-In) at Ministry of Electronics and Information Technology (MeitY). The centre will work with various organizations in the country to counter and mitigate attacks and cyber incidents on near real time basis. Phase 1 of the project for setting up of test bed is under implementation.

Botnet Cleaning and Malware Analysis Centre (Cyber Swachhta Kendra): Botnet Cleaning and

Malware Analysis Centre has been established by CERT-In for detection of compromised systems in India and to notify, enable cleaning and securing systems of end users to prevent further malware infections. The centre is working in close coordination and collaboration with Internet Service Providers and Industry. Website of the centre is operationalised in December 2016. The centre is providing detection of malicious programs and free tools to remove the same for common users. Further, the centre is working with Banks to detect malware infections in their networks and enable remedial actions.

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 & 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 following:

- (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

The following 13 new MMPs were added under e-Kranti:

- (i) e-Sansad
- (ii) e-Vidhaan
- (iii) Financial Inclusion
- (iv) Roads and Highways Information System (RAHI)
- (v) Agriculture 2.0

- (vi) NGIS
- (vii) Rural Development
- (viii) Social Benefits
- (ix) Women and Child Development
- (x) Common IT Roadmap for Paramilitary Forces (CAPF)
- (xi) e-Bhasha
- (xii) NMEICT
- (xiii) Urban Governance

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

Achievements

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



- 225 e-Governance services are being rendered under the said MMPs.
- More than 64 crore electronic transactions per month are taking place at both national and state level e-governance projects including MMPs.

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 Rs 1663.08 Crores, 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, providing easy, anywhere and anytime access to Government services.

Intended Benefits / Outcomes: e-District MMP

The project intends to achieve below mentioned benefits / outcomes:

- (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 fulfillment 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 555 districts (including 40 pilot districts) across 26 States / UTs. The status is indicated in the table below:

e-District Services Launched/Covered in 100% Districts

1. Andhra Pradesh (13/13)
2. Assam (27/27)
3. Chandigarh (1/1)
4. Chhattisgarh (27/27)
5. Dadra & Nagar Haveli (1/1)
6. Delhi (11/11)
7. Gujarat (33/33)
8. Haryana (21/21)
9. Himachal Pradesh (12/12)
10. Jharkhand (24/24)
11. Kerala (14/14)
12. Madhya Pradesh (51/51)
13. Maharashtra (35/35)
14. Manipur (9/9)
15. Meghalaya (11/11)
16. Mizoram (8/8)
17. Nagaland (11/11)
18. Odisha (30/30)
19. Punjab (22/22)

20. Rajasthan (33/33)
21. Tamil Nadu (32/32)
22. Telangana (10/10)
23. Tripura (8/8)
24. Uttar Pradesh (75/75)
25. Uttarakhand (13/13)
26. West Bengal (18/18)

Progress e-District

- 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)
- Implementation under progress – 27 States / UTs have selected SI for implementation
- 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 518 districts across 27 States. (FY12-13: 102 districts; FY 13-14:196 districts; FY 14-15: 116 districts, FY 15-16: 99 districts, FY 16-17: 05 districts)



- 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- 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.

e-KYC- Based on industry inputs, which was looking for digital KYC solution coming directly from the issuer of KYC, UIDAI developed another service called e-KYC. While developing this, UIDAI maintained the privacy of the individual, by sharing demographic data of an individual only after receiving explicit authorization (consent) from the concerned individual. UIDAI has established an ecosystem which ensures that a resident can digitally share the KYC with a registered service provider by authorizing UIDAI whenever he/she wanted to share his/her KYC with the service provider to avail a service.

With the explicit consent / authorization by the resident, the Aadhaar e-KYC service provides an instant, electronic, non-repudiable proof of identity and proof of address along with date of birth and gender. In addition, it also provides the resident’s mobile number and email address to the service provider, which helps in further streamlining the process of service delivery.

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 from central / State /UTs Govt. departments have been asked and same

will be funded after due assessment and 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. Out of these 5 projects have been approved and 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 million (about Rs 700 crore) from the World Bank for programme management and financial support for National e-Governance Plan (NeGP), MeitY has been utilising 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.

Rapid Replication Projects funded under World Bank: MeitY has approved 6 projects under rapid replication initiative, namely:

- 2 projects of ePASS
- XLN
- eHospital
- eHRMS
- Mee Seva

As on 31.12.2016, a total of 41 projects amounting to ₹492.31 crore have been approved. Funds for 40 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

- 10 projects amounting to ₹93.45 crore have been launched/ implemented and funds amounting to ₹255.68 crore have been released for various projects funded under this scheme.

2.2.3.3 National Scholarships Portal

National Scholarships Portal is one-stop solution through which various services starting from student application, application receipt, processing, sanction and disbursement of various scholarships to Students are enabled. National Scholarships Portal is taken as Mission Mode Project under National e-Governance Plan (NeGP). It aims at providing a Simplified, Mission-oriented, Accountable, Responsive & Transparent 'SMART' System for faster & 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 & norms
- Application of Direct Benefit Transfer

Benefits

- Simplified process for the students



- All scholarships information available under one umbrella
- Single integrated application for all scholarships
- Improved transparency
 - System suggests the schemes for which a student is eligible
 - Duplicates can be reduced to the maximum extent
- Helps in standardisation
 - Master data for Institutions and courses at all India level
 - 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

- No. of Ministries/Departments on-boarded on NSP (2.0) -7
- No. of schemes on-boarded on NSP(2.0) -23
- No. of students submitted their applications (Fresh) -12948097
- No. of students submitted their applications (Renewal)- 867198
- No. of students submitted their applications (Total-Fresh + Renewal)- 13815295

National Scholarship Portal 2.0

National Scholarship Portal (NSP 2.0) has been launched and operational from 1st July 2016, by

Government of India as a single stop solution for disbursement of Scholarship directly to the Accounts of the Students. Central Sponsored Scholarship Schemes have been covered under Direct Benefits Transfer where beneficiaries are verified on Aadhaar Number or in absence of Aadhaar number either enrolment id (EID) or their respective Bank/Postal A/c number and payment to the students is made.

The Schemes covers 16 line Ministries/ Departments covering almost 77 Central Schemes. Currently 7 line Ministries/Departments covering 23 schemes are on-boarded in the NSP2.0 portal. The Rest of the schemes of the 16 Ministries/ Departments are being integrated into the portal through API i.e through backward integration with NSP 2.0 to have a holistic view of all schemes at one place.

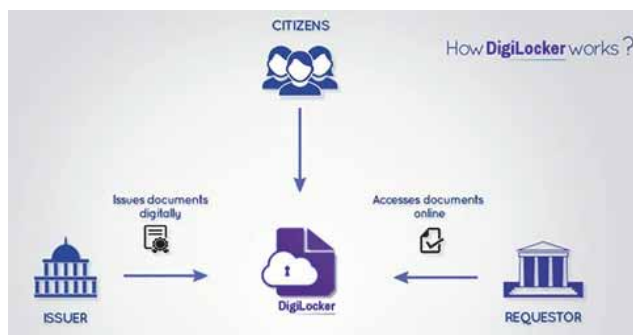
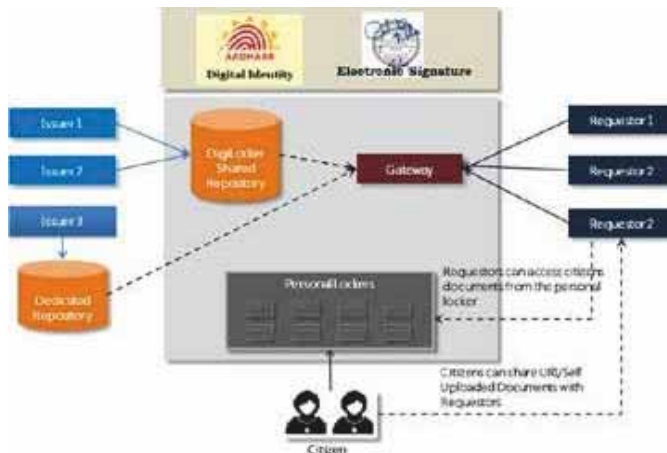
2.2.3.4 Digital Locker & other initiatives

Digital Locker

DigiLocker is a key initiative under Digital India, the Indian Government's flagship programme aimed at transforming India into a digitally empowered society and knowledge economy.

Targeted at the idea of paperless governance, DigiLocker is a platform for issuance and verification of documents & 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, Voter ID, 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 DigiLocker system:

- **Issuer:** Entity issuing e-documents to individuals in a standard format and making them electronically available e.g. CBSE, Registrar Office, Income Tax department, 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 anytime, anywhere 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 issuers.
- **eSign:** Self-uploaded documents can be digitally signed using the eSign facility (which is similar to the process of self-attestation).

Achievements

- 41.39 lakh Registered Users
- 54.90 crore Issued Documents
- 57.91 lakh Uploaded Documents
- 3.4 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 citizen in accessing government services are done away with.

The project envisages to use Automatic Speech Recognition (ASR), automatic query identification and customer relationship systems to enhance the effectiveness and responsiveness. It is currently being implemented in four pilot States Tamil Nadu, J&K, Jharkhand and Chhattisgarh for the State level non-emergency services and also 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

- Total 30 services hosted for the states of Chhattisgarh, Jharkhand and as well as for the Central Government Service “Digital Locker” in the pilot setup.
- Total 10 services integrated with Automatic Speech Recognition (ASR) in the CCC pilot setup 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 Suit 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 Jharkhand, Chhattisgarh and Tamilnadu states), 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 empowered 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 state will be picked for implementation of project.

- Achievements
- Delivery of lectures/services has been started in Tamil Nadu, Gujarat, Rajasthan & Andhra Pradesh.
- A total of 3,540 no. of teacher trained.
- Approximately 50,000 no. of students have so far been benefitted.
- Teachers are able to teach remote students with animated video clips in the field of life science, environmental studies, Physics, etc.
- The Smart Class infra are also being leveraged for launching the digital payment campaign.
- 25 numbers of sessions have been conducted on digital payment campaign.
- 18, 000 Students & Teachers have attended the digital payment campaign.

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) 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

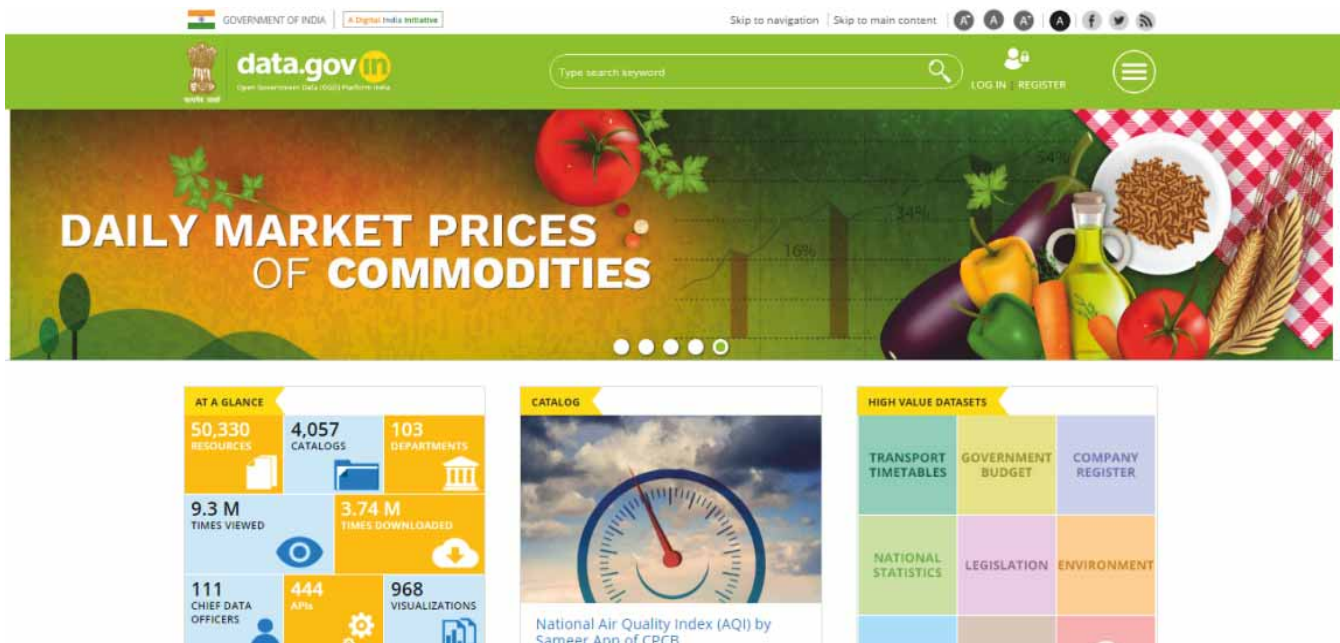


country, in a periodically updated manner, within the framework of various related policies, rules, and acts of the Government. Developed using Open Source Stack, the project is one of the initiatives under Pillar 6 (Information for All) of the Digital India initiative.

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 & 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 date OGD India has 50,269 open data resources, 4,055 catalogs, 111 Chief Data Officers. These dataset resources are 9.17 million times viewed have been downloaded 3.63 million times. 444 datasets APIs are provided, which are being availed through 18336 API key users. OGD is strongly promoted through Newsletters, Social media, Workshops, Challenges and participation in Data-meets etc.





Achievements

- From 1st April 2016 to 29th December 2016 more than 27328 resources contributed in 337 Catalogs with 207 Visualizations created.
- Government Open Data Use License – India has been formulated by high level committee
- Two workshops have also been organized for the CDOs.
- Based on Open Government Data case study a book on Data Driven Decision Making has also been launched in June 2016.
- It is being planned to organize a National level Open Government Data Hackathon during December 2016 to March 2017.
- Launch of Community portal <https://community.data.gov.in> and event portal <https://event.data.gov.in>
- Launch of Open Government Data Portal by Government of Sikkim (<https://sikkim.data.gov.in>) and Surat Municipal Corporation (<https://surat.data.gov.in>) using OGD Software as a Service (SaaS) model.

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 'QUANTITY', 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.

Achievements:

- No. of services integrated as on date: 3,290
- No. of Central Ministries/Departments: 21
- Total no. of e-Transactions: 26,39,97,43,45
- Total no. of e-Transactions since 1st April 2016: 10,71,68,56,288

2.2.3.9 E-Hospital Project

Hon'ble Prime Minister of India launched Online Registration System (ORS) under e-Hospital project during Digital India Week. 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
- 61 hospitals onboarded the Online Registration System (ORS)
- 43.41 lakhs appointments have been taken through ORS.

2.2.3.10 Jeevan Pramaan

In a big relief to over a crore retired employees of Central Government, State Government, PSUs etc. under 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 accepted by the pensioners. Now the pensioners may submit Aadhaar Enabled Biometric Digital Life Certificates (DLC) even from home also. Guidelines for on boarding of Pension Sanctioning Authority and Pension Disbursing Authority Agencies have been approved and available on the portal.

“Jeevan Pramaan” portal has been inaugurated by the Hon'ble Prime Minister on 10th November, 2014. Since November 2016, 4261397 pensioners have availed the Jeevan Pramaan service, about 22 Lakhs DLCs have been processed successfully for continuity of pension and remaining are under processing. The Pension Sanctioning Authority

already on boarded on the system includes Central Government, Railway, defence, EPFO, CMPFO, ONGC, Port Trust, more than 20 states Governments etc and major Pension Disbursing Agencies are Banks, Treasuries, Post Office, EPFO, ONGC etc.

2.2.3.11 Biometric Attendance System (BAS) – A National Rollout

As part of the “Digital India” program of Government of India, MeitY/NIC/UIDAI implemented Aadhaar enabled Biometric Attendance System (BAS) in all Central Government Offices in Delhi and is now being extended to offices of all state governments.

The system enables an employee to register attendance by simply presenting his/her biometric (Finger Print / Iris) and is authenticated online with their bio-metric attributes stored with UIDAI. The system allows anyone authenticated to track the employee attendance details in government organisations that is visible on attendance.gov.in

The Cloud-based software is installed and operated from NIC National Data Centre and UIDAI.

Achievements

- Biometric Attendance has been implemented in 7329 organisations covering 618195 lakh employees (includes both Central and States) as on 8th March 2017.



- 22 State Government have started using the system.
- Ministry of Skill Development and Telangana State has requested for Implementation and monitoring of attendance of trainees students.

2.2.3.12 PRAGATI Video Conferencing

As a part of Digital India program, e-Governance: Reforming Government through Technology, Hon'ble Prime Minister of India launched his ambitious multi-purpose and multi-modal platform PRAGATI (Pro-Active Governance and Timely Implementation) on 25th March, 2015. PRAGATI is a unique integrating and interactive platform through which Hon'ble Prime Minister clear hurdles in implementation of various government schemes, grievances, state and central related projects & programmes by directly interacting with all stake holders through Videoconferencing on a single platform.

PRAGATI is a tool through which Prime Minister is able to discuss the issues with the concerned Central and State officials with full information and latest visuals of the ground level situation. Such an effort has never been made in India. It is also an innovative project in e-governance and good governance. Prime Minister was equally keen to see that programmes and projects launched by the Central and State Government(s) are monitored properly for timely implementation and desired outcome. With that spirit and for holistic development of the country, it was also felt necessary to facilitate from the Union Government level the projects of the States.

Under PRAGATI, Hon'ble Prime Minister hold videoconference meeting with Secretaries of Government of India, Chief Secretaries of various states/UTs and other stake holders at national & International level on fourth Wednesday of every

month to discuss progress of important national projects. NIC has been organising PRAGATI Videoconferencing sessions for Hon'ble Prime Ministers of India. An average of around 130 to 150 locations participate in the PRAGATI VC sessions.

This programme has proved effective in addressing and resolving issues by bringing down the inter-departmental communication gap and thus minimizing the time taken for implementation of projects and schemes.

Total 16 PRAGATI sessions had been chaired by Hon'ble Prime Minister till now. During 2015 total 8 PRAGATI sessions has been conducted on 25th March, 22nd April, 27th May, 24th June, 26th August, 30th September, 04th November and 30th December, 2015. During 2016 total 9 PRAGATI sessions has been conducted on 27th January, 17th February, 23rd March, 25th May, 29th June, 24th August, 28th September and 26th October, 2016, 22nd February, 2017.

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.

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





Digitize India Platform

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

- About 1.32 crores Snippets texts have been organized by the platform through crowd sourcing by 60,876 contributors.
- 5.90 lakh documents have been digitized.

2.2.3.14 Swachh Bharat Mission – Gramin

NIC has developed an online monitoring system for Swachh Bharat Mission – Gramin (SBM-G). Household level data with respect to sanitation facilities of all Gram Panchayats in the country is made available on the MIS by the States, on the basis of the Baseline Survey 2012-13. The main focus of the system is to track the toilet construction and usage through creation of Open Defecation Free (ODF) Communities. The MIS is also being upgraded to enable reporting of creation of ODF communities and their sustenance as well. The system is the only tool that enables the Centre(Mission HQs), State, District, Block and Gram Panchayats to monitor the progress of construction of toilets for Individual household and community sanitary complexes.

SBM-G MIS captures the household data of over 18.13 crore households as per the baseline survey. Individual mobile number is used to generate SMS

once the construction of toilet is reported on online system. Beneficiary can revert back / reply through SMS on whether toilet has been constructed in his/her house.

SBM-G dashboard has also been developed to monitor the programme implementation at National, State and District level progress/coverage in graphical view with various KPIs for tracking IHHL and ODF status. This also shows the progress of the program on the interactive maps since its launch on 2 October 2014. More than 2.35 crore households have received toilets since the launch of program and 85,332 villages have become ODF as on 26th Sep. 2016.

A Mobile application (SwachhApp and mobile technology in SBM-G) has been developed for tracking the current sanitation status up to village level along with details of beneficiaries. Mobile App is used for tracking real time sanitation coverage in percentage, number of open defecation free villages, and list of beneficiaries in each village. This App is also being used to rate the village based on cleanliness and SLWM index developed by the Ministry of Drinking Water and Sanitation. This mobile app is capable of running on all the mobiles (Android / Windows / iOS based devices).

SMS and email automation is also used to generate daily basis SMS alerts and sent to Ministry officials for monitoring of daily MPR reported individual household's data along with number of IHHL toilet photographs uploaded of IHHL toilet constructed through mSBM app. The system facilitates the uploading of photographs of toilets using mobile application (both online and offline mode along with latitude – longitude & usage of toilets). So far more than 60 lakhs photographs of toilets constructed have been uploaded by mobile users using mobile applications. SMS based grievance re-addressal and citizen information services are available for

citizens to lodge grievances, seek beneficiary feedback, capture data on toilet usage, and promote demand generation.

2.2.3.15 Prime Minister Awaas Yojana

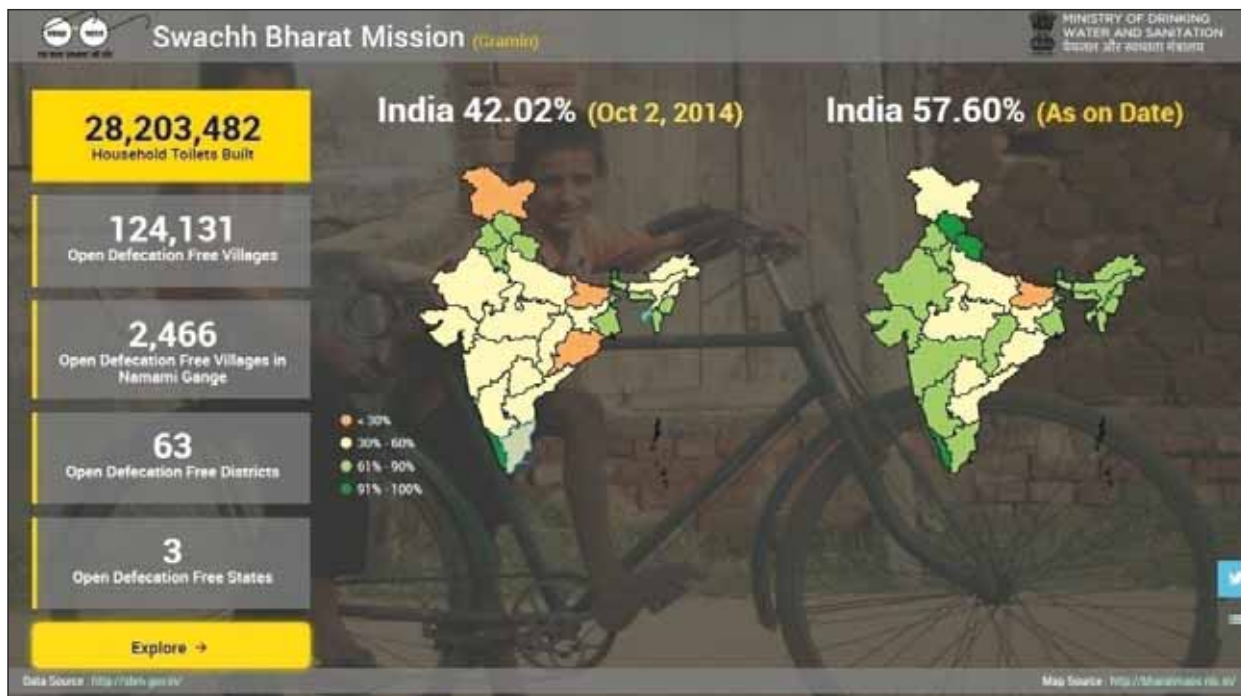
This system has been reformatted for the just launched (On 20th November, 2016) Prime Minister Awaas Yojana- Gramin, from the earlier end to end Workflow based system developed by NIC for earlier Indira Awaas Yojana. The fundamental phase shift from earlier scheme is to identify beneficiaries on the bases of Socio Economic Census (SECC-2011). On the PMAY-G e-governance platform known as AwaasSoft, Gram Panchayat wise and Social Category wise wait list is prepared from Socio-Economic census data at GP/Block level, which is verified by District level appellate committee.

All verified households eligible for assistance under PMAY-G are then registered with their personal

details, Aadhaar, MGNREGA Job Card number, SBM Number, Bank account details etc., all these details are verified by their respective source databases, i.e. UIDAI, MGNREGA, SBM, PFMS/Banks respectively.

On the PMAY-G m-governance platform known as AwaasApp, Geo-tagged photographs of old kutcha houses and new site of construction with the Beneficiary standing in front, is captured in online/offline mode, which is then verified by BDO office on AwaasSoft. Once above exercise is completed, e-sanctions are generated by District level authorities based on Priority set by Gram Sabha, once the beneficiary accounts are verified, e-payment for 1st installment is initiated by competent authorities as defined by State. All remaining installments are paid only after the inspection of the house under construction, using AwaasApp and its verification by BDO office AwaasSoft.

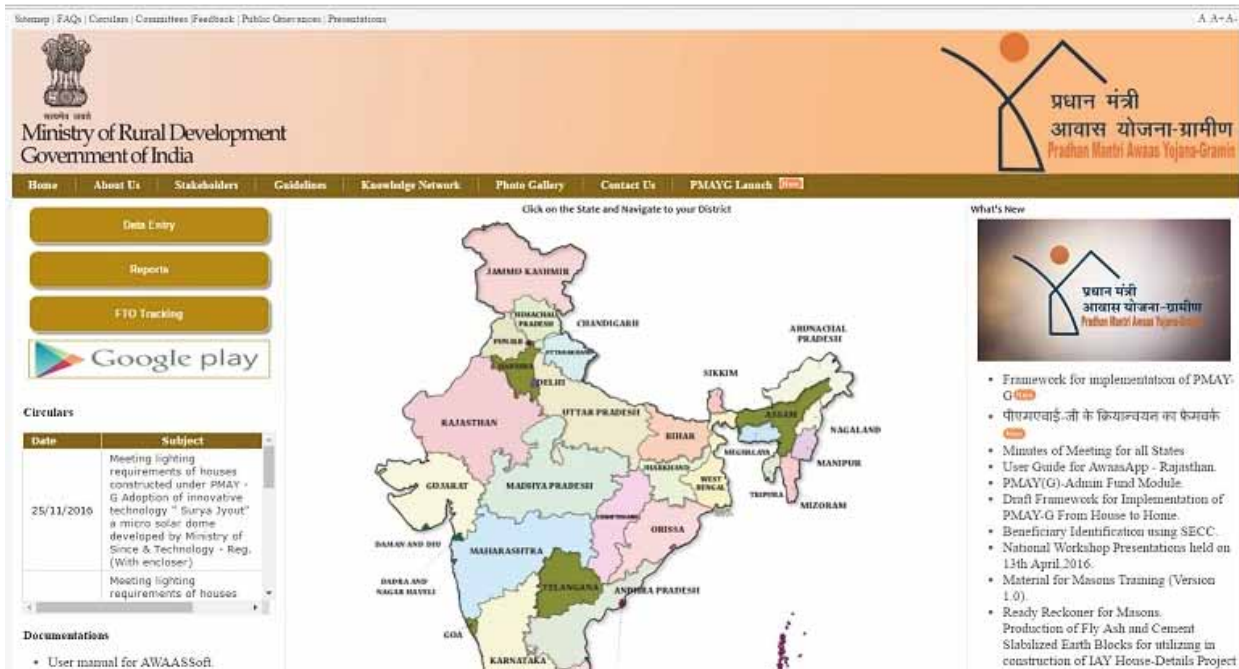
Fig:SBMDashboard



Project Highlights and awards:

- i) In financial Year 2015-16, approx 8,000 Crore rupees were transferred directly to Beneficiaries' account using AwaasSoft's electronic fund management system.
- ii) In current financial year approx 6,000 Crore rupees have been transferred till November 2016.
- iii) Apart from flagship program MoRD i.e. PMAY-G, 14 other State Rural Housing schemes use AwaasSoft and AwaasApp as their e-gov/m-gov tool for implementation.
- iv) AwaasApp is hosted on Google play store has got around 50,000 downloads in very less period of time, and it is rated as 4.5 out 5.
- v) NIC team's achievements were recognized, and they were felicitated on 13th of April 2016 by then Minister of Rural Development at Vigyan Bhavan, and AwaasApp was formally launched.





The screenshot shows the PMAY-G website interface. At the top, there is a navigation bar with links for Home, About Us, Stakeholders, Guidelines, Knowledge Network, Photo Gallery, Contact Us, and PMAYG Launch. Below this is a central map of India with state names labeled. To the left of the map are buttons for Data Entry, Reports, and FTO Tracking, along with a Google Play logo. To the right of the map is a 'What's New' section with a list of updates.

What's New

- Framework for implementation of PMAY-G
- पीएमएवाई-जी के क्रियान्वयन का फ्रेमवर्क
- Minutes of Meeting for all States
- User Guide for AwnasApp - Rajasthan
- PMAY(G)-Admin Fund Module
- Draft Framework for Implementation of PMAY-G From House to Home
- Beneficiary Identification using SECC
- National Workshop Presentations held on 13th April 2016
- Material for Masons Training (Version 1.0)
- Ready Reckoner for Masons. Production of Fly Ash and Cement Stabilized Earth Blocks for utilizing in construction of IAY House-Details Project

2.2.3.16 Web based Counselling

The idea of Web Based Counselling for admission was evolved first time in 2003 when Ministry of Human Resource Development took an innovative step and decided to implement online off-campus and on-campus counselling for admissions in NITs. These admissions were based on AIEEE examination conducted by CBSE every year.

In the year 2016-17, around 6000 institutes (offering Engineering, Medical, Hotel Management, University UG and PG course etc. and Diploma and ITI courses) participated in 37 e-counselling projects, Over 8 lakhs seats were offered under various reservation categories. A total of 25 lakh candidates appeared & registered and over 50% were allotted. In the government institutions picture was much better with approximately 80% government seats were filled. In Joint Seat Allocation for IITs and NITs etc. 38 different ranks

were used for choosing the institutes and courses and allocating the seats shows the complexity of JoSAA software.

2.2.3.17 Integrated Track Child portal

The Integrated Track Child portal provides a virtual space for all stakeholders & ICPS bodies which include Ministry, State Child Protection Authorities, District Child Protection Units, Child Welfare Institutions (CCIs), Police Stations, Child Welfare Committees (CWCs), Juvenile Justice Boards (JJBs), etc. in the 36 State/UTs. It also provides a networking system amongst all the stakeholders and citizens to facilitate tracking of a "Child in distress". It requires data entry and updating at various levels such as Police stations, Child Care Institutions (CCIs)/Homes, Shelters, Child Welfare Committees, and Juvenile Justice Boards etc.

The "TrackChild" system holds a database of 2.29



lacs of “Missing” & 1.58 lacs of “Found” Children. Around 1.34 lacs “Missing” children could be matched/traced out so far in the system. It also holds the database of 3.92 lacs of vulnerable children living at various CCIs. So far, 17,000 no of Police Stations, 5800 CCIs are uploading data in the system. (Based on Entry time and Date Range 01-01-2012 to 30-11-2016)

2.2.3.18 Online NGO Proposal processing and Tracking System:

The application for online application of all six schemes of MoSJE was designed and developed so as to facilitate the NGOs working for DoSJE and DEPWD Schemes can submit their proposal online; the proposals thus received are being processed on line at various level of governance i.e District, State Directorate, State Secretariat, Central Ministry as per their specific role in the application. Presentations and Demo to the Ministries/ Departments given. Active helpdesk support provided. Hand’s on Training though VC to State. Web-services for Integration with NGO PS Portal for NGO Unique ID verification.

2.2.3.19 Manual Scavenger Survey in statutory towns and rural Area:

Manual Scavenger Survey in statutory towns and rural Area designed and developed for camp level application and MIS application to carry out the survey in statutory towns of India was implemented. Training were provided to the master trainers from the States/UTs, web learning session created for the users in the field, in addition, audio video version of the web learning session hosted on the Website.

2.2.3.20 Soil Health Card (<http://soilhealth.dac.gov.in>)

A SHC is meant to give each farmer soil nutrient status of his holding and advice him on the dosage of fertilizers and also the needed soil amendments,

that he should apply to maintain soil health in the long run. So far total 6250441 samples are registered and 3946872 Test results are entered covering 15795668 farmers. Total 7854975 numbers of cards are issued till date.

2.2.3.21 Public Financial Management System (PFMS)

The PFMS (Public Financial Management System) which was earlier known as CPSMS (Central Plan Scheme Monitoring System), is a web-based online software application being implemented by the Office of the Controller General of Accounts(CGA) with NIC as a technology partner. The primary objective of PFMS is to facilitate sound Public Financial Management System for Govt. Of India (GoI) by establishing a comprehensive payment, receipt & accounting network. PFMS provides various stakeholders with a real time, reliable & meaningful MIS and an effective Decision support system. It is noteworthy that PFMS makes a direct & significant contribution to the Digital India initiative of GoI by enabling electronic payment and receipts for Ministries/Departments in GoI. PFMS is unique in the sense that the financial reporting and the implementation of the scheme go simultaneously due to its interface with the Banks. PFMS has secure integration with all the major banks for exchange of data both ways. Electronic payment into the accounts of agencies and beneficiaries also has been successfully implemented. Electronic payment is done for accounts holders of Banks as well as Post Offices.

Present Status

(A) Some of the major areas in which development has been done & made operational in PFMS are as under:

- i) Payment, Receipt & Accounting of all GoI transactions (Plan & Non Plan)

- ii) Fund Flow tracking of Gol schemes (Implementing Agency Registration, It's Fund Management & Accounting)
- iii) Direct Benefit Transfer (DBT)
- iv) Non-Tax Receipt Portal (NTRP)
- v) Integration with External systems viz. Banks, RBI, India Post, NPCI, UIDAI, State Treasuries, various other MIS applications e.g. NREGASoft, AwasSoft, NSP etc.
- vi) Reports, Database Administration, Master Data Management, Servers Administration, Testing, Technical documentation, User support etc.

(B) Data statistics till date

- Total Agencies Registered – 17.93 Lakhs
- Total Beneficiaries registered – 21.58 crore
- Total amount of sanctions routed thru PFMS – ₹29,03,195 Crore
- Total 150 Banks (26 Nationalised, 9 Private, 57 Regional Rural Banks, Co-op banks and RBI) Integrated with PFMS with complete automation.
- Amount of e-Payments- ₹6,01,513 Crore
- Amount of e-payments for Intra-Govt.Advices - 4,52,244 Crore
- No. of transactions flowing to Banks per day – Average 20 lakh, Max. 80 lakh

2.2.3.22 eOffice

EOffice is a Mission Mode Project (MMP) under the National e-Governance Programme of the Government. The product is developed by National Informatics Centre (NIC) and aims to usher in more efficient, effective and transparent inter-government and intra-government transactions and processes.

The product is built as single reusable system by bringing together independent functions and systems under a single framework to enhance transparency, increase accountability and transform the government work culture and ethics. It comprises of following applications:

- i) File Management System (eFile)
- ii) Knowledge Management System (KMS)
- iii) Leave Management System (eLeave)
- iv) Tour Management System (eTour) automates employee tour programmes.
- v) Personnel Information Management System (PIMS)
- vi) Collaboration and Messaging Services (CAMS)
- vii) MIS-Reports (Management Information System)
- viii) Records Management System (RMS)
- ix) CI-TRUE (Citizen Interface)
- x) Smart Performance Appraisal Report Recording Online Window (SPARROW)
- xi) Property Return Information System Management (PRISM)

As on date, eOffice has been implemented in 124 Central Government Ministries/ Departments /Attached Offices/ Autonomous Bodies/PSUs etc. and 80 State Government Secretariats/District Administrations/Other Departments.

2.2.3.23 Government eProcurement (GePNIC)

eProcurement software system, GePNIC caters to the electronic procurement/ tendering requirements of the Government departments and organizations. The system is generic in nature and can easily be adopted for all kinds of procurement activities such as Goods, Services & Works, by



Government offices. It aims at transparency and non discrimination amongst bidders, by allowing free access to tender documents, clarifications, secure on line bid submission and access to bid opening event to all, from any place on 24X7 basis, using the system through Internet, in a faster, and secure environment adopting industry standard open technologies. The system has been designed taking into account the tender rules followed in the country , the World Bank and ADB guidelines .

- i) The main functionalities covered are: Registration of Govt officials & Bidders in different roles, Tender Creation (Multiple Packets) and Publishing, Publishing of Corrigendum and decisions of Pre-bid meeting, Online Bid submission/ resubmission/ withdrawal as per the needs (which are configurable) and online Tender Opening and Decryption of Bids. eAuction Module with forward and reverse auction is also available.
- ii) Some of the salient features built into the system are Facility for online/offline Payment of Tender Fee and EMD, exemption of EMD, encryption of bids submitted by the bidder, facility of single/ two/ multi cover bid system, offline Technical Evaluation, generation of comparative charts for Financial Bids, uploading of committee recommendations / evaluation summaries at each stage of the tender process, publication of Award of Contract information, communication of 'Event Alerts' by Mail to various stake holders, status of each tender at various stages and detailed MIS report Module etc . Each document uploaded into the system is digitally signed. The system can be configured for use by an organization at it's apex level, and at multiple subordinate levels, at which tenders could independently be floated. Bidder categories / classes are also configurable.

- iii) During the month of Oct 2016 around 53,415 tenders were processed electronically worth ₹46,743 Cr.

2.2.3.24 Vahan and Sarathi (Transport)

New Centralized, web-enabled Vahan 4.0 and Sarathi 4.0 applications under Transport MMP have been developed and deployed. Already 14 RTOs of Delhi, 14 RTO of Uttarakhand, 12 in J&K, 2 in Jharkhand, Rajasthan, Maharashtra & Uttar Pradesh, and 1 RTO in each, Meghalaya, West Bengal, Sikkim have been migrated to centralize Vahan 4.0 application. Sarathi 4.0 is implemented in 71 RTOs in Himachal Pradesh, 25 in Rajasthan, 34 in Haryana, 20 in Jharkhand, 10 in Gujarat, 10 in Karnataka, 9 in Tamil Nadu , 6 in Odisha , 2 in J&K, Puducherry & in Maharashtra and 1 RTO each in, Chandigarh, Uttarakhand, and Meghalaya, Uttar Pradesh. The data available in SR and NR database is being shared through web services and APIs with various Govt. Security Agencies, IRDA, NCRB, Banks, Citizens. Homologation application for type approval of new vehicle models developed and rolled-out. Inventory of new vehicles is being uploaded by manufacturers along with Technical and financial parameters. Portal for National Permit System - For issuance of National Permit Authorization for goods vehicles developed. Development of new modules like online Fancy number auction system, Dealer Point Registrations, online tax payment. Citizen can apply online for Driving License and other services related to Transport. Adoption of SCOSTA based Smart Cards for Driving License and Vehicle Registration Certificates being issued in 22 States/UTs. Integration of SMS Gateway, ePayment Gateway, Aadhaar, Digi-locker, CCTNS, IRDA has done. eChallan - An integrated Transport Enforcement system developed for Traffic Police and Enforcement Wing. This feature-rich software

comprises mobile app cum web application. CNG Type Approval – RFC Integration application under Vahan Sewa has been launched

2.2.3.25 e-Granthalaya

e-Granthalaya is a Library Management Software which has been developed in NIC and being implemented in government libraries on request basis. The software is very useful for computerization of library activities and user services. Recently, cloud based version of the software released during 2015 which is hosted in Cloud and used online by libraries.

Union Catalog of Libraries: - A New kind of service was launched from NIC for the benefits of Indian libraries in general and users of e-Granthalaya specifically. Under the services, a Union Catalog of libraries which are using e-Granthalaya software has been hosted in NIC Server and available in public domain at <http://www.eglibnet.gov.in>. Besides, a home page is provided to each member library to host/search its own catalog with an individual web URL.

2.2.3.26 Immigration Visa & Foreigner Tracking System

Status so far till date: C-Visa has been implemented in 163 Indian Missions Abroad out of 178 Indian Missions Abroad. Biometrics has been implemented in 93 Indian Missions Abroad out of 178 Indian Missions. C-FRO has been implemented in all 13 FRROs, 582 FROs out of 674+ FROs across the country. C-FORM has been implemented in all 13 FRROs, 555 FROs out of 674+ FROs across the country. S-FORM has been implemented in all 13 FRROs, 555 FROs out of 674+ FROs across the country. E-Tourist Visa (eTV) has been introduced for 150 countries and 16 airports. Since the launch of the scheme approx 14.09 Lac Visas have been issued till now.

2.2.3.27 CollabCAD

CollabCAD is an indigenous CAD solution which provides a collaborative framework for CAD, CAE & PLM. CollabCAD released 2 major versions with emphasis on the requirements of Bhabha Atomic Research Centre, Mumbai and Vikram Sarabhai Space Centre, Trivandrum. This software is used for designing highly complicated models of the strategic sector. CollabCAD is used in the Engineering Graphics course appearing for CBSE. 500 plus students have been trained as part of PG Diploma in Tool design & CAD course at Indo-German Tool Room, Aurangabad.

CollabCRM (e-CRM) has been developed for internal use of the IPHW, Electronic System Design & Manufacturing group of DeitY and data for approximately 750 companies is now managed. CollabCAD ERP-HR module is customized for internal NIC use to manage the outsourced manpower deployed for various projects.

CollabDDS: Collaborative Digital Diagnosis System provides an integrated collaborative environment to visualise medical and dental images for diagnosis and treatment planning. Remote Health Centres can be connected to expert radiologists and doctors in Centres of Excellence. As part of the Department of Health Research project, the Pilot implementation of CollabDDS has been undertaken at 7 Government Medical/Dental colleges to evaluate the Effectiveness and Efficiency of Remote diagnosis along with the Expert Doctors/ Dentists in AIIMS, New Delhi. CollabDDS is also being implemented across 41 colleges on the National Medical College Network.

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) :

In order to achieve targeted delivery of welfare services in a transparent and efficient manner, the Government launched Direct Benefit Transfer through Aadhaar Payment Bridge (APB) and other channels in 2013. Aadhaar Payment Bridge (APB) has been established by National Payments Corporation of India (NPCI) which is approved by RBI as a valid Payment System. It helps deal with the challenges related to banking transactions with benefits to both the stakeholders, namely, the Government and the Residents. As per the directions of Government of India, all centrally sponsored and central sector schemes come under the purview of DBT which is to be implemented across India. As on 31st December 2016, around 11.11 crore transactions have been carried out over APB disbursing over ₹9801 crore. Several schemes other than DBT schemes are leveraging APB platform for efficient delivery of benefits.



Aadhaar Enabled Payment System (AEPS): A unified payment network called the Aadhaar-enabled Payment Systems (AEPS) has been designed and implemented by NPCI. The AEPS system works through a device called 'MicroATM' using a Mobile SIM card, whereby data connectivity authenticates the resident with UIDAI database basing on his/her Aadhaar and fingerprints. If it matches, the AEPS routes the transaction to the Bank for the financial transaction and the cycle gets completed. If the resident's authentication fails, appropriate message is provided to him. Aadhaar enabled Payments System (AePS) facilitates basic banking access (viz. cash withdrawal, cash deposit, balance enquiry, fund transfers) to the beneficiaries in a hassle free manner at/ near the doorsteps. Further, usage of Aadhaar authentication enables transactions in real time in an inter-operable environment. Till 31st December 2016, above Banks and Department of Post, are active on AePS platform and Banks performed 31.66 crore transactions.

Demonetization and Aadhaar: During the recent demonetization move with over 86% of the currency being demonetized, digital payments got the big push. Among the top five ways to move forward in the direction of digital payments AePS plays a very important role from the digital payments perspective. With over 42 crore accounts seeded with over 37.7 crore unique Aadhaars, very second adult in the country has linked his/her bank account with Aadhaar. AePS can be used under various platforms like BHIM APP, to promote cash less payments by directly debiting the customers' Aadhaar linked account and crediting the merchants' bank account. The AePS system is interoperable at over 81 banks and available with over 119 banks for ON-US transactions.

Direct Benefits Transfer for LPG (DBTL): The Government has launched Direct Benefit Transfer on LPG (DBTL) a scheme whereby the subsidy that

was earlier transferred as lump sum to state oil companies is now being transferred to individuals directly into their bank accounts.

DBTL Phase-II started with a consumer base of 15.29 crore. This reduced to 12.92 crore as on 31st March 2015. During this Phase, the scheme was implemented across the country. Since the time the consumer has now expanded to 19.16 crores. In the existing consumer base of 19.16 crore, about 15.96 crore consumers have given Aadhaar to OMC companies, out of which 12.62 crore have given Aadhaar to Bank. As a result, a total of 147.70 crore transactions have taken place on APB alone disbursing subsidy worth about ₹ 28,252 crore.

Mahatma Gandhi National Rural Employment Guarantee Scheme (MGNREGS): A total of 8.6 crore workers have got their Aadhaar seeded in MGNREGS data base till 31st December 2016. As on 31st December 2016, more than 8.93 crore payments have been done under MGNREGS by paying over ₹ 7135 crore through APB.

Pradhan Mantri Jan-DhanYojana (PMJDY): Pradhan Mantri Jan-DhanYojana (PMJDY) is a National Mission for Financial Inclusion to ensure access to financial services, namely, Banking/ Savings & Deposit Accounts, Remittance, Credit, Insurance, Pension in an affordable manner. The PMJDY was launched in August 2014. As on 31st December 2016, about 26.20 crore accounts have been opened under the scheme with Aadhaar seeding in 14.88 crore accounts.

2.2.4.2 National Payment Service Platform

In the financial space, MeitY has collaborated with NSDL Database Management Limited (NDML), a wholly owned subsidiary of National Securities Depository Limited (NSDL), for providing National Payment Service Platform (PayGov), a centralized platform for facilitating all government departments and services to collect online payments from citizens for public services.



PayGov offers an end-to-end transactional experience for citizens who can opt from various payment options such as Net Banking (70+ banks), debit cards, credit cards, cash cards/prepaid cards/wallets, and NEFT/RTGS, etc.

Achievements

- Another 9 (total 19) departments have gone Live during this financial year
- 19 (total 73) departments/agencies have gone live and total transaction worth ₹ 3681 crores.
- Major Leading departments are Commercial Taxes, Transport and Generic Portal (Jharkhand), CSC (Kerala), Delhi Jal Board, MahaOnline, CSC e-Governance Services India Limited, NIELIT, Centre for eGovernance (UP), M-One (Karnataka), etc.

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 program 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 Rapid Replication of Applications

The “Rapid Replication Roll-out Initiative” is a unique initiative which leverages sharing of infrastructure and rapid replication of successful applications across States. The initiative requires customization of successful applications as per the SeekerState’s requirements and then hosting this application either at the GiverState’s SDC or SeekerState’s SDC. The proposals of 5 applications

namely e-Pass of Centre for Good Governance (CGG) Andhra Pradesh, Xtended Licensing & Laboratory Node (XLN) from NIC Gujarat, e-Hospital from NIC Tripura, MeeSeva from Andhra Pradesh Technology Services (APTS) Andhra Pradesh and Human Resource Management System (HRMS) from NIC Himachal Pradesh, were approved by MeitY for replication in other States.

Achievements

The implementation status of 5 applications is as follows:

- XLN - All 6 modules of XLN have been successfully implemented in Chhattisgarh, Himachal Pradesh, Kerala and Karnataka. Application is hosted on NDC, ShastriPark, New Delhi. Food & Drugs Control Administration (FDCA) of the Seeker States are now totally online and issuing Licenses to Manufacturers & Sales Licenses to Retailers & Wholesalers of pharma & related Products online. The applications for drug licensing have no requirement of physical file movement right from taluka places to the head offices. The online applications are totally stabilized and paperless culture is around 95 percent.
- ePass-The application is customized for online disbursement of scholarships in the seeker states. The system links all welfare departments, treasury, databases of Secondary Schools Certificate (SSC), colleges and banks of the seeker States.
 - Himachal Pradesh - Currently 29 schemes (Central sponsored schemes is 14, State sponsored scheme is 12 and Technical schemes is 3) on-boarded on portal.
 - Karnataka -6 schemes of BC welfare department of Karnataka implemented successfully.
 - Tripura - 2 schemes (North Eastern States

and Post Matric Scholarship) of welfare departments of Tripura implemented successfully.

- Jharkhand - 6 schemes of Jharkhand implemented successfully.

- **eHospital:** 5 modules of eHospital application implemented in Phase - I in 3 hospitals of Karnataka (Jayanagar Hospital, KC Hospital and SanjayGandhiHospital). The application is hosted in SDC Karnataka.

Also, Online Registration System (ORS) has been developed for better crowd management and elimination of long queues in government hospitals to provide Aadhaar based online registration and appointments. The application is hosted on National cloud for global access. ORS application was launched by Hon'ble PM on 1st July 2015 during Digital India Week. ORS portal provides following functionalities.

- Online appointment for Doctors
- Online availability of Lab reports
- Online availability check for blood in blood banks

- **MeeSeva:** 2 modules i.e. MeeSeva Request Tracking System (MRSTS) and Transfer Protocol implemented in Assam on 10th Feb 2015. Application componentized into 10 components successfully. All 10 components are made available on eGov AppStore for adoption by any seekerState.

- **HRMS:** The eHRMS application was developed as the product model for providing a generalized human resource management solution for Government Departments to help them in taking right decisions at right time and for proper monitoring, manpower planning, recruitment, postings, promotion and transfer based on employee skill sets. Currently, after due customization the application has been

rolled out in Jharkhand State and hosted on NDC Shastri Park New Delhi. The data digitization has been completed and verification of data is in progress. Mobile app has been developed for leave application. At present, functionality for merging the departments is under development.

2.2.5.2 e-Gov App Store

An e-Gov Application Store (AppStore) was launched on 31st May 2013 (<https://apps.gov.in>). It is a common repository and market place of customizable & configurable applications, which can be reused by various government agencies /departments at Center and States without investing much effort in development of such applications:

- a) e-Gov AppStore will host both cloud and non-cloud enabled applications
- b) Consumers will have an option to download an application from the e-Gov AppStore or run it directly from the cloud

Following are the objectives of setting up the eGov AppStore:

- (i) Speeding up the development and deployment of eGov applications
- (ii) Easy replication of successful applications across States
- (iii) Avoid duplication of effort and cost in development of similar applications
- (iv) Ensure availability of certified application following common standards at one place

Achievements

- The new version of the eGov AppStore has been launched with better framework and new user design.
- 2 awareness workshops have been conducted across the country.
- Application development and reengineering guidelines have been developed and published on AppStore.



Ministry of Electronics & Information Technology (MeitY)

- 52 applications published in public domain out of 145 applications (including application components and web services) have been added to the AppStore contributed to the portal.
- 16 applications have been funded so far for productization. The applications funded for productization this year are Collabland, e-Pariksha, Collab ERP, CollabCAD, Collab DDS and eSaanaad.
- The Project Implementation Committee of App Store meets at regular intervals for evaluating proposal submitted, funding of contributed applications for productization, implementation and monitoring
- A state level awareness workshop was organized in State of Sikkim and West Bengal which included the nominees of various departments of Government of States offering major e –services to the citizens.

2.2.5.3 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 from citizens, to government, to business, to Indian Diaspora. It is a gateway 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

- Digital India Awards (formerly known as Web Ratna Awards) Initiative under National Portal
 - Towards the preparations of Digital India Awards 2016 the first jury meeting of the awards was held at MeitY . The meeting was chaired by Secretary, Meity.
 - Online nominations were invited under eight (08) categories of Digital India Awards.
 - Evaluation of nominations has been completed with the support of nomination processing partner IIT, Delhi.
 - Jury meeting has been scheduled on 03rd November 2016 to finalize the winners.
 - Hon'ble Minister of Electronics & Information Technology, Law and Justice, Shri Ravi Shankar Prasad felicitated the winners in the presence of Shri P. P. Chaudhary, Minister of State for Electronics & Information Technology, Law and Justice on 19th December 2016, at Vigyan Bhawan, New Delhi.
- Launch of exclusive Government Services Portal for citizens (<http://services.india.gov.in>)
 - an exclusive portal, Government Services Portal has been designed for enabling Citizens to find Government services easily
- Promotion of Government initiatives/events
 - 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>
 - Micro site for Independence Day designed, developed and maintained at <http://knowindia.gov.in/independenceday/independenceday.php>
 - Spotlights covering important Government initiatives and events like Digital India, Namami Gange Programme, Saansad Adarsh Gram Yojana, Employees' State

Insurance Scheme, Atal Pension Yojana, Income Declaration Scheme, 2016, Deen Dayal Antyodaya Yojana, Pradhan Mantri Ujjwala Yojana, Deen Dayal Upadhyaya Gram Jyoti Yojana, Maan Ki Baat by PM and Skill Up Rural India etc.

- Monthly newsletters were sent to registered user of India Portal to keep them updated with the latest happenings related to Nation.
- NIC has been awarded the 7th NCPEDP - Mphasis Universal Design Awards 2016 for its initiative "Guidelines for Indian Government Websites" (GIGW) -an initiative under India Portal Project. News article available at: <http://informatics.nic.in/news/newsdetail/newslD/853>
- Social Media Presence
 - Facebook page maintained at <https://www.facebook.com/NationalPortallIndia>
 - Twitter handle maintained at <https://twitter.com/indiagovin>

2.2.5.4 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. NeST is an institutional mechanism which has been placed to meet the objective.

Achievements

- Meta Data Standard for Drinking water and sanitation has been approved and notified in the Gazette of India
- Indian Standard on enhanced in-script for Keyboard layout has been approved and notified in the Gazette of India
- Guidelines for Adoption of Electronic Payments and Receipts have been under apex body approval.
- 9 Capacity Building Programmes and 5 Webinars on the e-Governance standards have been organized

2.2.5.5 Capacity Building Scheme 2.0

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 Rs. 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 States/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,
 - Development of competency frameworks, training guidelines, content, case studies etc for different groups of stakeholders
 - Developing a pool of certified trainers



Ministry of Electronics & Information Technology (MeitY)

- Develop Online and Web Based Training and Learning Management System
- 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 31.12.2015 in FY 2015-16:

Training Programme/Workshops	No. of Programmes	No. of Participants
SeMT Orientation		391
Thematic Workshop	6	712
CIO program	5	92
Train the Trainer(TTT)	10	147
Central Line Minsitry orientations and Specialized Training Programs	15	730

Highlights of Capacity Building Efforts

- Special focus on training the Central Line Ministry/Department
- Special focus on emerging area technologies – 9 Thematic workshops conducted , including 1 on Cashless Transactions in Government Services – 5 Regional workshop planned
- Impact Assessment Study Initiated
- Orientation on Digital India for Hon'ble MPs of both Houses on 26 July 2016. 129 Hon'ble MPs from both the houses participated
- Ensuring Institutionalization of e Gov trainings - Boarding of ATIs & CTIs:
- MOU 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.
- 20+ Embedded Trainings by ATI CTI
- Content and Faculty support started to - Postal Academy-Ghaziabad, Anna Institute-Chennai, Assam Administrative Training Institute, ATI-Goa, ATI -Kerala, Police Academy - Hyderabad , IGNTFA Deharadun
- LMS and KMS are under Testing

Certificate training programme for SC/ST Officials

The project aims to bridge the divide in capacities of officers to undertake e-Governance especially those working in the Scheduled Caste Sub Plan (SCSP) and Tribal Sub Plan (TSP) areas to mainstream of working. The project also meets one of the objectives of the plan towards human resource development of SCs and STs by providing adequate educational and health services. The project includes skill building through training and development under Digital India.

Achievements

- The project has been approved with the total outlay of Rs. 22 crores for duration of 2 years.
- The National e-Governance Division (NeGD) is the Implementing Agency for the project.
- 896 participants have been trained in 37 batches in FY 2016-17

Preparing North East for Digital India

The Hon'ble Prime Minister stated that "the Government is committed for realising potential of the NE region and accelerating its progress as India will not develop till it develops". Also, according to the survey report of National Council of Applied

Economic Research dated 12th Aug 2011, e-Readiness of North East region is below average achievers. So, the project has been conceptualized for the capacity building of NE state government officials. The project includes skill building through training and development under Digital India. The project has been approved with the total outlay of

Rs. 22.68 crores for duration of 2 years. The National e-Governance Division (NeGD) is the Implementing Agency for the project.

Achievements

- The following training programmes/workshops have been conducted under CB schemes Phase II till 31.12.2015 in FY 2016-17:

Training Programme / Workshops	No. of Programmes	No. of Participants
Consultative workshop on Preparing NE under Digital India	1	111
Train the Trainer (TTT)	3	30
Leadership Skill Enhancement Programme (LSeP) 1 week	2	114
e-Governance Skill enhancement programme	1	34

2.2.5.6 Digital Government Research Centre (DGRC) :

Sri Ravi Shankar Prasad, Hon'ble Minister Law & Justice, Electronics & Information Technology, Govt. of India inaugurated Digital Government Research Centre (DGRC) at Patna on 2nd March 2017 in a function in gracious presence of Sri Sanjeev Kumar Chaurasiya, Member (Bihar Legislative Assembly).

Hon'ble Minister addressed the gatherings including participants from academia, industry and government officials and talked about first of its kind - DGRC, a joint venture of National Informatics Centre

(NIC) and Software Technology Parks of India (STPI). He said that this centre will do innovation for delivery of government services to citizen, and assist the government for big data analytics for planning and formulation of government programme and schemes. Moreover, the centre will leverage technology for widespread citizen engagement.

MEMORANDUM OF UNDERSTANDING (MoU) was signed between NIC and Indian Institute of Technology (IIT) Patna. Under DGRC, Collaboration in the area of Research and Development in DGRC is the key objective.





The vast amount of data which is collected by the government can be utilised for socio-economic transformation of India by impacting transparency, accountability and engagement of citizens. Open data collected over a period time through a dynamic platform has increased its potential and value for further analytics with interesting results, and has potential to empower citizens, change how government works, and improve the delivery of public services.

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 program.

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. 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 one CSC over a population of 10,000 citizens. The project is a service delivery oriented model with effort towards optimum utilisation of infrastructure created in the form of SWAN, BharatNet, SSDG, e-

District, SDC, and other ICT infrastructures created by the States/UTs.

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.

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),
- 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).

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 scheme 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 and milestones achieved during the last few years under both the CSC programs

Milestone	2014	2015	2016
Operating CSCs (overall & GP level)	134,956	147,770	2,46,575
Transacting CSCs	63 thousands	1.5 lakhs	1.8 lakhs
No. of eServices (G2C) available under universal Portal of CSC	5 (Aadhaar, PAN card, Election, Passport, Pension)	46	- 46 (Central G2C services) -1277 (States/UTs integrated G2C services)
No. of eServices (B2C) under universal Portal of CSC-Digital Seva	57	132	208 as till Oct, 16

The transaction details of a few important Services offered on National CSC Portal are shown below:

SERVICE-WISE TRANSACTIONS AS RECORDED ON CSC PORTA					
Services	No. of Transactions (Vol in Lakh)				
Period	Dec.'14	Dec.'15	% Growth over Dec.'14	Oct'16	%Growth over Dec.'15
Aadhaar Printing	2.88	5.51	192%	9.40	170%
e- Recharge	2.74	5.01	183%	8.54	171%
Electricity Bill Payment	2.02	2.82	140%	4.46	158%
E-District Services	0.86	1.24	145%	3.25	261%
Election Services - EPIC Printing	0.45	0.24	53%	3.90	1634%
Swachh Bharat Abhiyan	-	-	-	0.47	-
Insurance Premium Collection	0.31	0.53	169%	0.96	182%
Aadhaar Update	-	0.26	-	3.21	1224%
PAN Card Applications	0.12	0.40	344%	1.07	271%
IRCTC Services	0.08	0.33	432%	0.54	165%
Passport Applications	0.06	0.14	233%	0.17	122%
Agriculture Service	0.02	0.00004	0%	0.04	94825%
Employment Service	0.0003	0.00	387%	0.09	7973%

The transaction details of a few important Services offered on National CSC Portal are shown below:

SERVICE-WISE TRANSACTIONS AS RECORDED ON CSC PORTA					
Services	No. of Transactions (Vol in Lakh)				
	Dec.'14	Dec.'15	% Growth over Dec.'14	Oct'16	%Growth over Dec.'15
Tour and Travels	0.002	0.02	780%	0.06	327%
Educational Service	0.02	0.02	102%	0.02	110%
Election Services - Registration	-	0.01	-	0.06	796%
University Service	-	0.002	-	0.02	1114%
Income Tax Return Filing	-	0.003	-	0.01	165%
Pension Service	0.06	0.01	12%	0.002	37%
Health care Services	0.001	0.001	154%	0.01	1199%
e-Commerce	0.002	0.002	128%	0.01	466%
Other G2C services	-	0.003	-	0.12	4004%
Other Services	0.13	0.13	105%	0.14	106%
Registration of Construction Workers	-	0.34	-	0.35	102%
TOTAL	9.74	17.03	175%	36.91	217%

2.3 Digital Empowerment of Citizens

2.3.1 Promoting Digital Payment Systems:

- i. **DigiDhan Campaign:** To promote Digital Payment methods, Government of India, in

collaboration with the State governments and district collectors has been organizing DigiDhan Melas in 100 cities in different parts of the country starting from December 25, 2016 which





will end on Babasaheb Ambedkar Jayanti on 14th April, 2017. To encourage adoption of digital payments by local residents in these 100 cities, the daylong DigiDhan Mela provides a platform/facilities by various stakeholders where local residents interact with banks and other stakeholders, get apps downloaded and learn how to do digital transactions. Two schemes, viz., **Lucky Grahak Yojana** for **consumers** and **Digi-Dhan Vyapar Yojana** for **merchants** seek to nudge people towards significantly higher usage of digital transactions through the offer of incentives. Till March 30, 2017 – Melas have been held in 90 cities across the country in 33 States/UTs and distributed the prizes of ₹ 226.45 Crore across two categories of winners, viz., consumers:

14,29,591 and merchant establishments: 77,000 by awarding prizes in 90 Lucky draws.

- ii. **Digi Shala-** Educational TV Channel to promote Digital Payments in the country. Television is one of the most preferred mediums owing to its reach and penetration across the country. Digi Shala- an educational TV channel for promoting awareness and education on Digital Payments was launched on 9th Dec 2016 and is currently being shown on DD Free Dish DTH as well as on Dish TV. The channel will be covering different facets of the Digital Payments ecosystem as well as showcasing and highlighting various Digital India initiatives. The objective of DigiShala, a free to air channel, is to impart information and education especially in rural and semi urban areas regarding the Digital

Payments tools, benefits and processes. The channel through its user friendly content is encouraging citizens to use Digital payments in their everyday life.

Promoting Aadhaar Based Payment System

- i. **Aadhaar Enabled Payment System:** A unified payment network called the Aadhaar-enabled Payment Systems (AEPS) has been designed and implemented by NPCI. The AEPS system works through a device called 'MicroATM' using a Mobile SIM card, whereby data connectivity authenticates the resident with UIDAI database based on his/her Aadhaar and fingerprints. AEPS facilitates basic banking access (viz. cash withdrawal, cash deposit, balance enquiry, fund transfers) to the beneficiaries in a hassle free manner. Usage of Aadhaar authentication enables transactions in real time in an inter-operable environment. Till 31st December 2016, 119 Banks and Department of Post, are active on AePS platform and Banks performed 31.66 crore transactions. Some concerns were raised regarding Aadhaar Enabled Payment Systems. These concerns have been resolved in consultation with RBI and NPCI.

2.3.2 e-Learning

Advancements in ICT have made possible the availability of quality education to millions of people in a cost effective manner. The use of ICT in education has opened the doors for "anytime, anywhere" learning. Supplementing the formal way of education with e-Learning tools/content and use of ICT in formal education is important to facilitate enhanced learning environment; especially when there is large gap in demand and supply of quality content and educators.

e-Learning is one of the thrust areas identified by MeitY for imparting education using educational tools, which is facilitated and supported by Information and Communication Technologies (ICT). The broad objective is to develop tools and technologies to promote e-learning. The Department has been financially supporting R&D projects in the area of e-Learning at various academic educational institutes, R&D Labs etc.

Achievements during 2016-17

During 2016-17, following R&D projects have been supported:



Inauguration of Training on Digital Payment Initiatives by Shri Ravi Shankar Prasad

(i) 'Online Assessment and Evaluation System (OAES) for National Level Certification Examinations', by 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). O-Level program of NIELIT has been proposed as the basis for creation of item banks along with a suitable software platform to conduct online examinations, which will help in online evaluation of students' performance.

The expected outcome of the project is to develop item banks (1000 items per course) for the eight O-Level courses with cumulative sum of 8000 items across all the courses. In addition, 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 is 45 months including 27 months extension with total outlay of INR 220.11 Lakhs.

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. Two mock examinations were successfully conducted by IIIT Bangalore on their servers for the students. Same is to be completed by NIELIT also on NIELIT servers for their students for which server set-up is in process.

(ii) '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 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 4 years including extension of 1 year with total outlay of INR 99.90 Lakhs.

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. Currently five courses 'Operating System', 'Data Structures', 'Theory of Computer Science', 'Illumination Engineering' and 'Introduction to Electrical Engineering' have been completed and others are in process.

(iii) 'Setting up ICT E-Learning Centres in 204 schools in Srikakulam district of Andhra Pradesh', by ERNET India

The objective is to set up e-Learning ICT centers 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 setting-up ICT Centers in schools in rural and tribal area of Srikakulam and to develop digital content of Science, Maths and English in Telgu and English language mapped with Andhra Education curriculum and make 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 INR 24.96 crores.

The installation and integration of ICT equipments have been completed in all 204 schools, which are operational and functional. In addition, e-content has also been hosted on one computer in each lab and first level training has also been completed. Work related to connectivity and advance level training of teachers is in process.

(iv) 'Deployment and management of Brihaspati-3 services over NKN for Indian Academia', by IIT, Kanpur

Major 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 INR 46.50 lakhs.

The server access at NKN data center has been received and with this, now, the installation and transfer of current user data for Brihaspati -3 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. In addition, BGAS (Brihaspati General Accounting System) has been provisioned for JNU, National Book Trust etc. on the same server. As on Nov 30, 2016, there are total 281 Institutional Accounts, 6221 Course areas and 20228 user accounts at Brihaspati. Many workshops have also been organized for user institutes in order to popularize Brihaspati-3 usage.

(v) '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. 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. About 200 participants are expected to be trained through the Training Programs conducted at C-DAC, NOIDA. Additionally, based on an average registration of about 50 participants per Module, about 400 participants will be trained using the e-learning Mode. Total duration of the project is 2 ½ years including extension of 6 months with budget outlay of INR 183.50 lakhs.

List of experiments related to Digital Logic Design has been prepared after reviewing the syllabus of some universities in a brainstorming workshop. Work related to FPGA board has been completed. One hands-on workshop on FPGA board was conducted on June 30, 2016 in which around 38 participants from various institutions participated and provided feedback. e-content for FPGA board has also been developed, which include simulative explanation of the experiments, theoretical explanation of the step by step procedure of the experiment and live video demonstration of the experiment. For DSP board, programmer to program the Complex Programmable Logic Device (CPLD) is being tested and program to access/store the data from SPI the memory location using DMA is being developed. In addition, program to set the clock of the Codec has been completed while lab manual for DSP boards is in process. Prototype of 5 DSP boards with certain modifications is being prepared and PCB is ready. For ESD boards, syllabus for 8051 boards has been prepared after reviewing syllabus of various Universities. e-learning portal and content development is in progress in order to provide complete LMS solution to the students in the above three areas.

(vi) '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 ½ years including 6 months extension with budget outlay of INR 94.32 lakhs.

As far as progress is concerned, an authentication login system for instructor and students has been prepared. After authenticated login, separate interface for instructor and student is displayed. Various panels namely, files, queries, attendance and audio also implemented. Further, a system has been developed for personalized lecture delivery in which slides are being shared by the instructor and are viewed in the students' devices instantaneously without any efforts. The system developed has applications that enable the instructor to create the content of the examination. Afterwards, a novice and basic



model of attendance collecting and monitoring system and examination system have also been developed. Two workshops on the demonstration of the developed system 'Avabodhaka' have also been conducted at St. Edmunds College, Shillong and Central Institute of Technology, Kokrajhar where the system performed without any anomaly. Users seemed to be satisfied with all the modules of the system and were interested to use the system in their institutes as evident from the feedback.

(vii) 'Rollout of OLabs', by 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.

The expected outcome of the project is to host the content related to OLabs on NKN and to provide training to 30,000 teachers in 3 years (2 teachers from each school out of total about 15000 CBSE schools). Total duration of the project is 3 years with budget outlay of INR 816.00 lakhs.

During 'Good Governance Day' on Dec 28, 2015, Hon'ble Minister of Communications & Information Technology had launched OLabs for CBSE schools.

Regarding resource material, slides covering the concept, status and how to use are available, and being used along with short video covering introduction to OLabs and bootable DVD. In addition, a helpdesk has also been established in which queries over e-mails are

being monitored regularly and responded by teams at C-DAC, Mumbai and Amrita University. Training has been provided to 8790 CBSE school teachers covering 2676 CBSE schools up to Nov 30, 2016. Process for third party (C-DAC, Hyderabad) security audit has also been initiated by the implementing agency.

2.3.2.1 Technology Development for Indian Language (TDIL)

People are more comfortable in using the ICT technology in their mother tongue. "Technology Development for Indian Language" programme of MeitY is bringing the information processing tools and modern technologies in local languages.

TDIL Programme

The major objectives of the TDIL programme are:

- To develop information processing tools to facilitate human machine interaction in Indian languages and to create and access multilingual knowledge resources/content.
- To promote the use of information processing tools for language studies and research.
- To consolidate the developed Indian language technologies into innovative user products and services.
- To promote collaborative development of futuristic technologies leading to innovative products and services.

Focus Areas

Development of technologies in multilingual computing areas involves intensive indigenous R&D efforts due to multiplicity and complexity of Indian languages. The focus areas of the TDIL programme are broadly divided into the following domains:

- Machine Translation Systems
- Text to Speech Systems

- Speech Recognition Systems
- Optical Character Recognition Systems
- Cross Lingual Information Access and Retrieval
- Development of Linguistic Resources to facilitate speedy development of Language Technologies
- Tools for Language Processing and Web Development
- Localization
- Language Technology Standardization

Achievements

- **National Roll Out Plan**

Free language CDs containing various software tools like Libre Office, Open Type Fonts, Keyboard Drivers, Firefox Web Browser, E-mailing Client, etc have been released for public use for all 22 constitutionally recognized Indian languages to facilitate common people to work in their languages.

These software tools and fonts are useful for Office productivity applications and e-content development. These software tools and CDs are being used by different PSUs, Banks, Educational Institutions, etc. The new CDs are compatible with win 8.1 and Ubuntu 11.04. As on date about 13 lakh CDs have been distributed and there has been about 1.41 crore downloads. These software tools can also be downloaded free from <http://www.ildc.in>.

- **Technology Development**

Many tools and technologies developed during the year have been released for public use. These are made available at the TDIL Data Centre portal <http://tdil-dc.in>. Some of the important tools and technologies are as follows:

- **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 11 Indian Languages namely Hindi, Bengali, Marathi, Tamil, Telugu, Malayalam, Gujarati, Odia, Assamese, Manipuri & Kannada 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 Tier-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

- 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.

- **Other Deployment Initiatives:**

- **Browser Plug-in:**

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 have been made available through TDIL Data centre <http://www.tdil-dc.in>. The Browser Plug-in has also been deployed in the following applications:

- Vikaspeda portal <http://vikaspeda.in> : 12 Indian Languages
- eShakti portal of NABARD – <http://eshakti.nabard.org> –Hindi, Tamil
- Prateek Ventures, Hyderabad <http://pratikventures.com> –Hindi, Telugu and English voices

- **Automatic Speech Recognition (ASR)**

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

Pilot deployment effort in collaboration with 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 more Indian languages/ dialects have been initiated.

- **Machine Translation Systems:** Machine Translation systems for 31 language pairs (English to Indian languages 13 pairs: English to Assamese, Bengali, Bodo, Gujarati, Hindi, Malayalam, Marathi, Nepali, Odia, Punjabi, Tamil, Telugu and Urdu) and Indian Languages to Indian Languages (18 pairs: Hindi-Bengali, Bengali-Hindi, Kannada-Hindi, Hindi-Kannada, Hindi-Punjabi, Hindi-Telugu, Hindi-Urdu, Malayalam-Tamil, Tamil-Malayalam, Marathi-Hindi, Hindi-Marathi, Punjabi-Hindi, Tamil-

Telugu, Tamil-Hindi, Hindi-Tamil, Telugu-Hindi, Telugu-Tamil and Urdu-Hindi) have been made available on tdil data centre website www.tdil-dc.in and Gol Meghraj Cloud Infrastructure for faster access.

- **Optical Character Recognition in Indian Languages**

Optical Character Recognition for 9 Indian languages namely Bengali, Devanagari, Gurumukhi, Kannada, Malayalam, Telugu, Tamil, Assamese and Urdu languages have been made available through TDIL Data Centre <http://www.tdil-dc.in>. OCRs for seven Indian Languages namely Assamese, Bangla, Gurumukhi, Devanagari, Kannada, Malayalam, Tamil have been tested for inclusion in respective language CDs and updated bi-lingual GUI has been integrated .

- **On-line Handwriting recognition system (OHWR):**

Alpha version Online Handwriting Recognition in 8 Indian Languages namely Hindi, Bengali, Tamil, Telugu, Kannada, Malayalam, Assamese and Punjabi languages have been developed. These technologies have also been packaged as “Smart Input Panels” for data entry into any active software programme without use of keyboard and made available for Android and windows through [tdil-dc.in](http://www.tdil-dc.in) portal

- **Cross Lingual Information Access (CLIA)**

Beta Version of Monolingual Search Engines for Tourism Domain for 5 Indian Languages (Sandhan) –Hindi, Bengali, Marathi, Tamil and Telugu has been released in public domain. The Cross-lingual Information Access system for 6 Indian Languages has been hosted on TDIL Data centre: <http://www.tdil-dc.in> and GOI Meghraj Cloud portal.

- Development of Language Technology

Resources

- **Annotated Text Corpora:** Development of annotated Text Corpora of 1,00,000 sentences each in Health, Tourism, Agriculture and Entertainment domain for 17 languages including English i.e. Hindi, Assamese, Bengali, Bodo, Gujarati, Kannada, Konkani, Malayalam, Manipuri, Marathi, Nepali, Oriya, Punjabi, Tamil, Telugu and Urdu languages have been developed. Annotated text corpus will facilitate development of NLP applications in Indian languages.
- Indian Language Treebank Data is a major linguistic resource for various NLP tasks. Dependency Tree Banks for Indian Languages” for five languages i.e. Hindi, Marathi, Bengali, Kannada and Malayalam have been developed.
- **Indian Languages Speech Resources:** Project 'Indian Languages Speech Resources Development for Speech Applications' for 2 Hindi and Bengali languages has been initiated. The speech data is being developed in general and tourism domain for use in developing robust speech recognition engines for Indian languages.
 - Development of Language Processing Tools
- Shallow Parsing Tools i.e. Morphological Analyzer; Automatic “Parts of Speech” Tagger; and Automatic Chunker for 12 Indian Languages viz. Dogri, Gujarati, Hindi, Kashmiri, Konkani, Maithilee, Oriya, Santhali and four NE region languages Assamese, Bodo, Manipuri & Nepali are at advanced stage of development.
 - Standardization

The development of standards is a dynamic process. MeitY is actively participating in the international standardization organizations such as Unicode, World Wide Web Consortium (W3C), and ELRA etc to represent Indian scripts/ languages in the futuristic standards for web technologies and

NLP. Internationalization of various W3C Standards CSS, X-form, Voice Browser and others are being analyzed for their adoption in Indian Languages. Some of the major achievements in the standardization activity are:

- **Indic Language Requirements for e-Pub and CSS Standards**

The W3C Internationalization Working Group has published a First Public Working Draft of Indic Layout Requirements on behalf of the Indic Layout Task Force, part of the W3C Internationalization Interest Group. This document describes the basic requirements for Indic script layout and text support on the Web and in eBooks. These requirements provide information for Web technologies such as CSS, HTML and SVG about how to support users of Indic scripts. Currently these draft recommendation have been finalized for 17 Indian languages and may be referred at <http://w3c.github.io/ilreq/>

- **Adoption of Unicode Standard**

Unicode has been adopted as the standard for development of the e-Governance applications, other multilingual applications and content development for all the 22 constitutionally recognized Indian languages. 12 Indian scripts used to write 22 official Indian languages have been represented in the global standards Unicode and ISI-10646.

- **Virtual Keyboard Layouts:**

Draft Standards of Virtual Keyboard Layouts for mobile and wireless devices are being prepared for 11 Indian languages namely, Hindi, Assamese, Bengali, Gujarati, Marathi, Tamil, Punjabi, Telugu, Malayalam, Kannada and Urdu languages.

- **Enhanced Keyboard Standard**

The Modified INSCRIPT Keyboard Layout and

Encoding Standards for Indian Languages in conformity with Unicode 6.1 has been published stage as BIS Standard IS:16350. The same has been adopted as National Standard for E-Gov applications

- **Testing Evaluation & Benchmarking of Language Technologies:**

The outcomes of the various projects being implemented under TDIL Programme are being tested by third-party testing agency. The intermediate testing feedback has helped in improving the performance of the various technologies being developed under the programme.

A draft of “standard for accepting machine translated content in Indian language to enable industry partners to provide translation of content” is also being prepared.

- **Script Behaviour for ICT Stakeholders**

Script behaviour of a language is being developed as a Best Practice for correct linguistic support of Indian Languages across platforms, applications and the internet. Script behaviour for Hindi is prepared and sent to BIS

for guidelines. Draft of Script behaviour for Marathi & Gujarati uploaded on www.tdil-dc.in for feedback. The work is in progress for other languages.

- Language Technology Information Dissemination & Repository

- **TDIL Data Centre (www.tdil-dc.in)**

This portal provides language technology services and resources developed under various TDIL projects. Approximately 427 Indian languages resources and a number of NLP tools for 22 Indian languages have been made available through TDIL Data Centre portal. Twelve 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 also been hosted on the portal. Feedbacks for various standards being evolved under the programme are also sought through this portal. The portal domain name has also been registered for Hindi. As on date, there has been 64515 downloads.



- **TDIL Web-site:**

Unicode compliant TDIL Programme's website <http://tdil.mit.gov.in> contains information about the TDIL Programme's initiatives and achievements. Web standardization initiative section focussing on Internationalization of Web standards has been added to this website.

Also this portal is integrated with other two prominent portal of TDIL Programme i.e. www.tdil-dc.in and www.ildc.in which provide linguistic and language technology solutions to common citizen and researchers.

- **Technical Journal of Indian Language Technologies:**

The VishwaBharat@tdil is a technical journal of Indian language technologies, which consolidates information about products, tools, services, activities, developments, achievements in the area of Indian Language software at one place. All the issues are accessible through the TDIL Web site. The current issue of the journal (issue-42) is based on Speech Technology & Script Behaviour. It is made available online in form of e-publication with user friendly navigational facilities.

2.3.3 Digital Literacy

Two Schemes have been floated for spreading Digital Literacy to the masses in the country whose details may be seen in Chapter 7 under Section 7.1.4.

2.3.4 Initiatives on Accessibility

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.

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.

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 NICS. 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.

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.

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, 50 websites have been certified on GIGW



as on November 30, 2016

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 eg. Accessible India Campaign (Sugamya Bharat Abhiyan).

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

- Number of websites Launched: 26
- Ready for Launch: 19
- Migration to CMF in progress: 03
- Pending UI approval: 08

2.3.5 MyGov

A platform for Citizen Engagement towards Better Governance

MyGov is a citizen engagement platform founded by the Government of India to promote the active participation of Indian citizens in their country's governance and development. MyGov was launched on 26th July 2014 by Hon. Prime Minister Shri Narendra Modi to facilitate continuous

engagement between the government and the citizens. The upgraded version of the application software (MyGov v.2.0) was launched on 27th Feb 2015.

Vision: Creating a participatory digital democracy, leveraging technology to enable every citizen to contribute ideas and efforts towards nation-building, transforming these ideas into action and recognizing individual contributions.

The current analytics show 40.2 Lakh users registered on MyGov with over 13.5 crore views of the website. There are 53 groups running on MyGov in association with 45 ministries. So far, 661 discussions, 591 tasks and 224 polls have been hosted on the platform. As a response, over 34.98 lakh comments and over 1.85 lakh task submissions have been received. In addition, 130 citizens have volunteered for MyGov till date. MyGov is very active on the social space as well, with initiation of MyGov's Facebook page over 2,61,000 followers and over one million followers on Twitter.

2.3.5.1 The major attributes of MyGov include:

Discussion- This section invites suggestions from users on various governance issues.

Do- It includes tasks and activities that encourage users to showcase their creative skills.

Talks- It is an initiative to facilitate live interaction with senior government decision makers, domain experts and eminent academicians on current governance topics and initiatives.

Polls- It is an objective method to gauge the opinion of the citizens through voting on current issues of public importance.

Blogs- Provides insight about the activities managed by MyGov

- Quiz
- Surveys

2.3.5.2 Prominent activities held by MyGov –

MyGov platform has been successful in keeping the citizens engaged on important policies, issues and governance. Some of the prominent activities on MyGov are:

- i) 'Mann Ki Baat,' radio show of Hon. PM Shri Narendra Modi commenced on 3rd October 2014 seeking citizen ideas. So far, 28 shows have been on air, receiving on an average of 50,000 calls and 15,000 comments.
- ii) On 18th May 2015, MyGov provided expert group discussion for AIM (ATAL Innovation Mission) and SETU (Self Employment and Talent Utilisation) under NITI Aayog.
- iii) Android Mobile applications for MyGov and Swachh Bharat Abhiyan were launched by Hon. PM Shri Narendra Modi on 1st July 2015 during Digital India Week, with over 6.5 lakh downloads and over 2 lakh downloads of each respectively.
- iv) MyGov hosted a competition, in collaboration with Google to design the PMO Android Application. The final application was launched during the Hon'ble PM's Townhall on 6th August, 2016. The application has seen over 1.6 lakh downloads so far.
- v) MoUD recommended MyGov as the core platform for citizen consultation for 'Smart City Mission'. MyGov offered various cities a range of consultation methods by hosting 278 discussion forums, 185 tasks, 186 online polls, 36 talks and 98 blogs, which received over 26,63,426 comments.
- vi) Swachh Bharat Abhiyan, one of the prominent GoI programmes was launched on 2nd October 2014. The logo of Swachh Bharat Abhiyan was crowdsourced on the platform of MyGov. MyGov's Swachh Bharat microsite is a collaborative network for this immense social cause, engaging users to post before and after videos and nominate friends and family members to take up cleanliness drives collectively.
- vii) The Transforming India microsite was launched by MyGov on 16th March 2016 for highlighting the progress being made under various flagship programmes of the Government of India and to put into perspective the growth of the country so far. 15 MyGov Talks under the Transforming India series were held with 15 union ministers.
- viii) For three consecutive years, MyGov has been soliciting ideas for the Railway Budget as well as the Union Budget, so far more than 50 ideas from citizens have been reflected in Budget documents.
- ix) The Ministry of Finance invited citizen-suggestions for two consecutive years. 10 ideas were reflected in Union Budget 2015 and 2016.
- x) Ek Bhaarat Shreshth Bharat was launched on Rashtriya Ekta Divas, 31st October 2015 marking the birth anniversary of Sardar Vallabh Bhai Patel. The initiative was to promote cultural infusion and fraternity through exchange of language trade, culture, travel and tourism. MyGov hosted an essay competition seeking suggestions to link states and districts. 3,000 ideas were received during the contest, and the scheme was included in the Union Budget 2016-2017. Under the programme, State and UT-specific quizzes have been started on MyGov, which have garnered immense attention and promising participation from citizens across the country.
- xi) MyGov organized the first ever Town Hall of the Hon'ble PM in India on 6th August, 2016 at Indira Gandhi Indoor Stadium, as part of celebrating its second anniversary.



- xii) MyGov has been at the helm of organizing Digi Dhan Melas(in Delhi) for NITI Aayog, as per Government of India's scheme of promoting various modes of digital payments after the demonetization exercise undertaken in November 2016. Stalls of leading nationalized banks, mobile wallet operators and co-operatives were part of the events. Over 45,000 people visited the 3 Melas organized by MyGov on behalf of MeitY. To promote and publicize various digital payment options for spreading awareness among citizen and merchants, MyGov launched a DigiDhan microsite as well.
- xiii) MyGov launched the Sandesh2Soldiers campaign in October 2016.
- xiv) MyGov was given a Platinum Award in "Most Innovative Citizen Engagement" category at Digital India Awards held in New Delhi, Gold in "Sectoral Award: Digital Transformations towards transforming India" at National Awards for e-Governance held in Vishakhapatnam, Bronze in "Digital Citizen Solution" category at Express IT Awards held in Bengaluru and Runner-up in "Innovative Smart Solution – Institutional" category at Business World Smart Cities Award held in New Delhi.
- xv) MyGov organized Smart India Hackathon, an initiative by AICTE, MHRD, in collaboration with Nasscom and UGC. The initiative has nearly 600 problem statements from 29 ministries. It has seen over 6,000 quality submissions and more than 4.25 lakh views.
- xvi) MyGov organized the National Contest for Social Innovation, a Ministry of External Affairs' initiative in collaboration with NITI Aayog. Nearly 775 entries were received and 20 social innovations were selected and showcased during the Pravasi Bharatiya Divas 2017 in Bengaluru.
- xvii) Along with above notable stories, Logos and Taglines for National Schemes were also crowdsourced on the platform of MyGov such as: Pradhan Mantri Jan Dhan Yojana, National Digital Literacy Mission, FCI Depots, Pravasi Bharatiya Divas

2.3.5.3 MyGov's Future Programmes

Expanding Scope of Current Activities:

- i) **Expanding the IVRS and SMS integration -** Creating new avenues for citizens to reach out to the government and share their suggestions, MyGov now has new features like IVRS and SMS for the citizens' convenience
- ii) **Monthly event with Ministries -** MyGov proposes to help ministries that currently have activities on MyGov, organise monthly events to supplement online activities.
- iii) **Merchandise store -** MyGov proposes to upscale its an in-house online merchandise store providing users an opportunity to get MyGov branded products and also as a token of appreciation for volunteers and other MyGov users
- iv) **Volunteer module -** MyGov intends to upscale its volunteer mobile application under which people can engage with ministry led initiatives by volunteering for physical events, activities, and field execution of tasks at hand.
- v) **Deploy analytics software -** The analysis tool of MyGov would help in internal analysis of user suggestions by the team and reporting to Ministries and Departments engaging with citizens on MyGov
- vi) **State instances of MyGov -** MyGov has already helped initiate state MyGov instances for the Government of Maharashtra and Haryana. More state instances will be launched

shortly. A request letter was circulated in this regard to all States/ UTs and positive response has been received from some States.

- vii) Single sign on & open ID- Operating a single sign-on for MyGov and then incorporating the websites under Meity, which will help in providing a seamless experience to all users.

2.3.6 Digital India Communication

In order to promote 'Digital India' as a flagship program of the Government of India, a number of activities were undertaken during the year 2016-17.

- **Vikas Parv:** - MeitY organized awareness camps at various locations across the country to mark two years of completion of the government which was graced by Hon'ble Ministers.
- **Rural Outreach Campaign (#DigitalRath) :-** Digital India Outreach program for Rural Citizens is a van based direct interface to citizen engagement program aimed to create awareness about Digital India at Digital Points of Presence (PoP) locations such as District e-Governance Societies (DeGS), Digi Sewa Centres, Panchyats etc. Through branded vans, message about Digital India services and achievements are being taken to the last mile in the country. Activities include skit shows, augmented reality games, demonstrations, registration drives for products/services, flyers, posters, tin-plates, feedback collection, etc. This component is being implemented in all 33 States with the active participation of State and District administrations. BTL agencies have been empanelled by NeGD and the work has been awarded to 3 agencies through an open RFP- Group M, Impact Communication, and Jagran. Work has been allocated to agencies zone-wise (based on bids) for better monitoring, control & geographic scale. A total of 66 vans are to be deployed to carry out this campaign at Pan India level. Currently, the campaign has been rolled out in 22 States through 66 vans and has reached out to 12 Lakh citizens. An exhaustive reporting dashboard has been created which provides updated report and information about the campaign. www.digitalindiaoutreach.in . The campaign was flagged-off by Hon'ble Minister on 30th May from New Delhi. Subsequently, the campaign was launched by Chief Ministers of Uttarakhand, Haryana, Chhattisgarh, Jharkhand & Arunachal Pradesh in their respective states.
- **Mass Media Strategy – TVCs :-** After approval from the Competent Authority, TVCs, Short Movies and Radio Jingles have been made for a number of Digital India products and services like National Scholarship Portal, e-Hospital, Bharat Broadband, Digital India Generic, IT/ITES Industry, Digital Locker, e-Sign, Digital Banking, Medical Electronics, e-Education, Vikas Parv, ICEGOV, Jeevan Praman etc. The buzz was created for at least 15-21 days in a month through Radio jingles, TV commercials and Print Ads.
- **University Workshops :-** Youth is the largest user and consumer of Digital India Services. University students can be trained and motivated to act as Digital India Brand Ambassadors, working in each and every part of the country to proliferate the product/services awareness, digital literacy and other volunteering activities. Pilot university workshops has been successfully conducted (Feb/Mar 2016) in 20 universities in association with National Service Scheme (NSS) under Ministry of Sports & Youth Affairs. In these



workshops, over 5000 students were informed about Digital India objectives and focus areas like e-waste management, IT for Jobs, National Scholarships Portal, etc. More than 400 students were registered to volunteer for Digital India, subsequent to the participation in these workshops on the NeGD portal for Volunteer Management System (VMS). In 2016-17, this project was extended to 100 universities at a pan India level with a target of training more than 30,000 students in Digital India related activities. The first batch of 25 workshops was held on 24th August, 2016. There is greater emphasis on post workshop activities this time so that attendees take away the message of Digital India and further disseminate the information in their local communities. Two attendees from each workshop would be invited to attend the ICEGOV conference scheduled in March 2017 in New Delhi. 40 workshops have been concluded as on September 19, 2016. The programme culminated into 121st workshop at Meerut with participation of more than 1200 students which was addressed by Hon'ble Minister.

- **IITF 2016:** The India International Trade Fair 2016 (IITF 2016) was organized from November 14-27, 2016 at Pragati Maidan, New Delhi. ITPO has chosen “Digital India” as the theme in this edition of IITF. The work of organizing exhibition, pavilion construction, event management, branding and other associated activities has been assigned to the National e-Governance Division (NeGD). During the event was installed on six thematic zones and four seminars, 7 panel discussions and 28 story telling events were also organized to engage visitors. The pavilion was awarded the first prize under the Thematic Category.

- **Newsletter:** Every month a Digital India Newsletter is being published to create awareness about Digital India - products, services and projects.
- **Social Media:** Communication through social media handles has been widely propagated to promote/disseminate events, announcements & achievements of the Ministry.

Support to Industry Events:- Institutional & financial support was extended to various events organized by industry and academic bodies.

2.3.7 International Conference on eGovernance (ICeGOV)

The 10th edition of the International Conference on Theory and Practice of Electronic Governance (ICEGOV) was hosted by Government of India under the aegis and patronage of Ministry of Electronics and Information Technology (MeitY), by National e-Governance Division (NeGD), and the United Nations University Operating Unit on Policy-Driven Electronic Governance (UNU-EGOV), in collaboration with UNESCO. Shri Ravi Shankar Prasad, Hon'ble Union Minister, Electronics & Information Technology and Law & Justice, chaired the conference with Ms. Maria Manuel Leitao Marques, Hon'ble Minister of Presidency & Administrative Modernization, Portugal, as co-chair. ICEGOV2017 took place at Hotel Ashok, New Delhi, from 7-9 March 2017, with a doctoral colloquium on 10 March. The conference theme was “Building Knowledge Societies: from Digital Government to Digital Empowerment”.

The ICEGOV series focuses on the intersection of technology, governance and development. Previous conferences took place in Macao in 2007, Cairo in 2008, Bogota in 2009, Beijing in 2010, Tallinn in 2011, Albany in 2012, Seoul in 2013,



Inauguration of ICEGOV - March 2017

Guimaraes in 2014 and Montevideo in 2016. The series has become a source of significant research and policy insight, able to reach national and global policy and research audiences.

ICEGOV2017 brought in 1200+ participants from over 50 countries including large government participation from India. The 2017 edition received a record number of paper submissions (560, which is more than 3 times the previous record) by the deadline of 3-October-2016. These papers were written by authors from over 40 different nationalities. Based on multiple reviews by an international team, 71 papers across 12 different tracks (themes), and 40 posters were selected for presentation at the conference. Over the core 3 days, ICEGOV2017 traversed a rich association of 6 keynote lectures and 4 plenary discussions, flanked

by simultaneous parallel breakaway sessions including paper presentations on 12 thematic tracks, 12 invited sessions and 6 special events. The poster exhibition, an industry exhibition and cultural evenings enhanced the experience for both presenters and audience.

Another hallmark was the significant number of institutional partnerships that brought immense enrichment in the run-up to the conference as also the actual 4 days of the conference. As many as 8 academic partners were on board!

The conference began on a high note, sustained the tempo across all days, and ended also on a high note. Details can be seen online on Digital India and ICEGOV portals at digitalindia.gov.in/ and icegov.org respectively.

CHAPTER 3

MAKE IN INDIA: ELECTRONICS MANUFACTURING



Overview: The Government attaches high priority to electronics & IT hardware manufacturing so as to reach net zero Imports. Electronics manufacturing also has the potential to generate domestic employment, apart from enabling cyber-secure ecosystem. Accordingly, the promotion of electronics manufacturing is one of the pillars of the Digital India programme.

India is now a fast growing market for electronic goods. It is estimated that demand of electronics products and systems in India will grow to about USD 400 Billion by 2020. This feature of the

economy provides ample scope, in terms of market demand, for manufacturing electronics products in India. At the same time, it is well recognized that the electronics sector is open to external competition. India is a signatory to the Information Technology Agreement (ITA-1) which resulted in a zero duty regime on import of the goods covered under that Agreement. India also has Free Trade Agreements (FTAs) and Preferential Trade Agreements (PTA) with several countries/ trading blocks, which has enabled zero duty import of items not covered under ITA.

Keeping the foregoing factors in view, the current strategy is to put in place a more holistic, investor friendly and market driven eco-system that is conducive to investment. As such, foreign direct investment is already permitted to the extent of 100% under automatic route. There is no Industrial license requirement and payment of technical know-how fee and royalty for technology transfer is under the automatic route.

The measures being implemented at present aim to incentivize investment, encourage R&D, innovations and startups and provide an appropriate framework for product standards. Further, the efforts are to ensure that the tariff/tax regime is aligned to encouraging manufacturing and to meeting the needs of the Indian economy. These efforts are expected to enable India to increasingly meet the growth demand for electronics products and become more competitive internationally in electronics manufacturing. Some specific measures / schemes in the area of manufacturing are outlined as follows.

3.1 Measures/ Schemes

3.1.1 Large Scale Manufacturing:

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 provides subsidy for investments in capital expenditure-20% for investments in Special Economic Zones (SEZs) and 25% in non-SEZs. It also provides for reimbursements of CVD/ excise for capital equipment for the non-SEZ units. For select very high technology and high capital investment units like fabs, reimbursement of central taxes and duties which include Customs duty, Service Tax and

Excise Duties is also provided. 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 approved the extension of M-SIPS for five years and also approved amendment of M-SIPS in order to simplify the procedure and enhancement of scope.

Further, the Union Cabinet in its meeting held on 18-01-2017, approved certain amendments in the M-SIPS policy which were notified on 30-01-2017, as per which, 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. A separate committee will be set up for mega projects, envisaging more than ₹ 6850 crore investments. These amendments are expected to expedite investments in electronics

The status of M-SIPS applications as on 31st December 2016: So far, total 250 applications, with investments amounting to ₹ 1,27,890 crore have been received under M-SIPS, of which, 75 applications with investment of approximately ₹17997 crore have been approved. 23 applications with investments of approximately ₹2727 crore have been recommended by the Appraisal Committee. 33 applications with investments of approximately ₹10,980 crore have been closed due to incomplete applications or not meeting the eligibility criteria under the scheme and 119 applications involving investments of ₹96186 crore are under process.



Ministry of Electronics & Information Technology (MeitY)

Disbursement of incentives was 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 lakhs 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, to M/s. Genus Power Infrastructure Pvt. Limited, Jaipur of ₹2.80 crore and to M/s. Bosch Automotives Electronics, Bangalore of ₹11.16 crore.

3.1.2 Electronic Clusters:

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 manufacturing. The Scheme is open for receiving applications for a period of five years from the date of notification.

Further period of 5 years is available for disbursement of funds for the approved applicants. 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.

Till March, 2017, MeitY has received 49 applications under EMC scheme 45 applications for setting up of Greenfield EMCs and 4 applications for setting up of Common Facility Centres (CFC) in Brownfield Clusters, out of which Ministry has accorded final approval to thirteen (13) Greenfield EMCs and two (2) CFCs in Brownfield Cluster and In- Principle approval to twelve (12) Greenfield EMCs and two (2) CFCs in Brownfield Clusters. The details are as follows:

Final Approved Greenfield EMCs

S.No.	State	Location/City
1	Andhra Pradesh	Chilamathur, Anantapur District
2		Village-Cherivi, Satyavedu Mandal, Chittoor District
3	Chhattisgarh	Village-Tuta, Tehsil-Abhanpur, Naya Raipur
4	Gujarat	Village-Tunda, Taluka- Mundra, District-Kutch
5	Goa	Village-ztuern, Taluka Pernern, North Goa District
6	Jharkhand	Adityapur, Saraikela-Kharsawan District
7	Kerala	Kakkanad Village, Kanayannur Taluk, Ernakulam District
8	Madhya Pradesh	Badwai-Bhopal
9		Purva-Jabalpur
10	Odisha	Infovalley, Bhubaneswar Industrial Area, Khurda District
11	Rajasthan	SPL-1, Salarpur, Khushkera, Bhiwadi
12	West Bengal	Sector-IV & V, Falta Industrial Centre P.S Ramnagar, South 24 Paraganas Dist
13	West Bengal	Naihati town, North 24 Parganas district

Final Approved Common Facility Centres (CFC) in Brownfield EMC

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.

Hon'ble Prime Minister laid the foundation stone for setting up of Greenfield Electronics Manufacturing Cluster at Tuem, Taluka- Pernem North Goa District on 13th November 2016. Foundation Stone for setting up of Greenfield Electronics Manufacturing Cluster at Chilamathur Anantapur District, Andhra Pradesh was laid on 21.04.2016.

First installment of Government of India Grant amounting to ₹ 23.50 crore has been released to M/s. Mundra Solar Technopark Private Limited for implementation of the Greenfield EMC at Mundra Taluk, Kutch District, Gujarat in FY2016-17. Till now, an amount of ₹41.86 crore has been released to five projects under the EMC scheme.

List of Greenfield EMCs accorded In-Principle approval

S.No.	State	Location/City
1	Andhra Pradesh	Village-Gurramapalem, Pendurthi Mandal, Visakhapatnam
2	Andhra Pradesh	Vikruthamala Village, Yerpadu Mandal, Chittoor
3	Andhra Pradesh	Tirupati, Renigunta Mandal, Chittoor
4	Bihar	Abgilla village, Gaurichak District, Patna
5	Gujarat	Village-Khoraj, Taluk-Sanand, District-Ahmadabad
6	Rajasthan	Karoli Industrial Area, Bhiwadi, District-Alwar
7	Tamil Nadu	Annur Taluk, Coimbatore
8	Telangana	Fab-city Hyderabad
9	Telangana	Ravirayal. Maheshwaram, Rangareddy District
10	Uttar Pradesh	Plot No. 6/A, Sector-24, Yamuna Expressway, Greater Noida
11	Uttar Pradesh	Ecotech (VI & VII) Industrial area Greater Noida
12	Uttar Pradesh	Plot No. 3/A, Sector 24, Yamuna Expressway

List of Common Facility Centres accorded In-Principle approval

S.No.	State	Location/City
1	Karnataka	Electronic City, Bangalore
2	Maharashtra	Pimpri Industrial Area, Pune



3.1.3 Semi-conductor Wafer Fabs:

The Union Cabinet, in its decision dated 20.04.2011 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 the nature and quantum of Government support. The EC was subsequently reconstituted by the Cabinet vide its decision dated 28.01.2015.

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). Both the consortia were required to take certain actions and submit the requisite documents as enunciated in the Letter of Intent (LoI) for demonstration of commitment.

Both the consortia sought extensions on multiple occasions for submission of requisite documents for demonstration of commitment, which was provided to them by EC. The consortium led by M/s. Jaiprakash Associates Ltd. withdrew from the project on 02nd March, 2016. The consortium led by M/s. HSMC Technologies India Pvt.Ltd. was given a final extension until 28th February, 2017 for submission of all the documents for demonstration of commitment.

3.1.4 Incentives for Fabless Design:

Semiconductors, also known as chips or ICs, are at the heart of any electronics product and constitute around 30% of the total value of the Bill of Material (BOM) and in case of high-end equipment and mobile handsets; this content goes as high as 60%. Semiconductor chip manufacturing is characterized by two type of companies: Integrated Device Manufacturers (IDMs) and Fabless Manufacturers. The IDMs (such as Intel, Texas Instruments) designs, manufactures and sells its own chips while fabless companies (like Qualcomm, Broadcom) designs and sells its chips but gets the chip manufactured by a third-party. Presently, most of the major chip innovations have come from fabless design companies. A Policy for Promotion of Fabless Design Industry is under consideration in this Ministry.

3.2 Policy

3.2.1 Preference to Domestic Electronic Products:

The Ministry of Electronics and Information Technology (MeitY) notified the policy for providing preference to domestically manufactured electronic products in Government procurement for its own use and not with a view to commercial resale or with a view to use in the production of goods for commercial sale on 23.12.2013.

The DMEPs are products manufactured by companies registered in India and engaged in Manufacture in India and including Contract Manufacturers, but excluding traders. All companies registered in India engaged in manufacturing of electronic products in India and the sole selling agents/ authorised distributors/ authorised dealers/ authorised supply houses of the domestic manufacturers of electronic products are eligible for consideration under the Policy. The

electronic products to be notified under this policy should meet the minimum 25% domestic value-addition in terms of Bill of Material (BoM) from domestic manufacturers. The percentage of procurement to be made from DMEP(s) shall not be less than 30% of the total procurement value of that electronic product(s).

The policy is applicable to all Ministries / Departments (except Ministry of Defence) and their agencies for electronic products purchased for Governmental purposes and with a view to commercial resale or with a view to use in goods for commercial sale. This is also applicable for procurement of electronic products made under all Centrally Sponsored Schemes and grants made by Central Government.

Nine generic electronic products, which are procured across sectors, viz., Desktop PCs, Laptop PCs, Tablet PCs, Dot Matrix Printers, Smart Cards, LED Products, Biometric Access Control/ Authentication Devices, Biometric Finger Print Sensors and Biometric Iris Sensors have been notified by the MeitY and 23 Telecommunications Products have been notified by the Department of Telecommunications (DoT), in furtherance of the policy. DGS&D has issued guidelines for implementing the policy in their rate contract process. An Online Monitoring System “www.deity-pma.gov.in” has become operational w.e.f. 27.01.2015 for reporting by Ministries / Departments about the compliance of Policy. As on 07.12.2016, Eighty Five (85) Ministries/ Departments/Agencies have been provided the access credentials (User Ids and Passwords) for submitting the compliance reports on the PMA online monitoring system (www.deity-pma.gov.in).

Revised Policy Guidelines for providing preference to domestically manufactured electronic products in Government procurement have been issued on 16.11.2015 by the Ministry.

3.2.2 Compulsory Safety Standards for Electronics:

Keeping in view the safety of Indian consumers and to curb inflow of substandard electronic products, the “Electronics and Information Technology Goods (Requirements for Compulsory Registration) Order, 2012” was notified on 03rd Oct. 2012 by MeitY under the provision of Compulsory Registration Scheme of the Bureau of Indian Standards (BIS) Act, 1986. This Order came into effect from 3rd July 2013. The Order calls for prohibition to manufacturer/sell unless these goods have been tested to Indian Safety Standards, registered with BIS and display registration logo (Standard Mark).



The initiative is for:

- Upgrading quality of domestic products and bringing in global competitiveness.
- Providing Indian consumers the right to enjoy good quality products.
- Projecting India as a country with high quality of Electronics & IT products
- Stopping dumping of non-compliant goods.
- Protecting legitimate interests of businesses in International trade agreements.

Thirty (30) categories of electronic products have been notified under the Order.



Ministry of Electronics & Information Technology (MeitY)

List of Items Notified under Compulsory Registration Order – Phase I

S.No.	Notified Items	Date of coming into effect
1	Electronic Games (Video)	03rd July, 2013
2	Laptop/Notebook/Tablets	03rd July, 2013
3	Plasma/LCD/LED Television of screen size 32" or above	03rd July, 2013
4	Optical disc players with built in amplifiers or input power 200w & above	03rd July, 2013
5	Microwave Ovens	03rd July, 2013
6	Visual Display Units, Video Monitors of screen size 32" and above	03rd July, 2013
7	Printers, Plotters	03rd July, 2013
8	Scanners	03rd July, 2013
9	Wireless Keyboards	03rd July, 2013
10	Telephone Answering Machine	03rd July, 2013
11	Amplifiers with input power 2000w and above	03rd July, 2013
12	Electronic Musical Systems with input power 200w and above	03rd July, 2013
13	Electronics clocks with Mains powers	03rd July, 2013
14	Set Top Box	03rd July, 2013
15	Automatic Data Processing Machine	03rd July, 2013

List of Items Notified under Compulsory Registration Order – Phase II

S.No.	Notified Items	Date of coming into effect
16	Power Adaptors for IT Equipments	01st Dec, 2015
17	Power Adaptors for Audio, Video & Similar Electronic Apparatus	01st Dec, 2015
18	UPS/Invertors of rating \leq 5kVA	01st Mar, 2016
19	DC or AC Supplied Electronic Control gear for LED Modules	01st Dec, 2015
20	Sealed Secondary Cells / Batteries containing Alkaline or other non-acid Electrolytes for use in portable applications	01st Jun, 2016
21	Fixed General Purpose LED Luminaires	01st March, 2016
22	Self-Ballasted LED Lamps for General Lighting Services	13th Sept, 2015
23	Mobile Phones	13th Sept, 2015
24	Cash Registers	13th May, 2015
25	Point of Sale Terminals	13th May, 2015
26	Copying Machines / Duplicators	13th May, 2015
27	Smart Card Readers	13th May, 2015
28	Mail Processing Machines / Postage Machines / Franking Machines	13th May, 2015
29	Passport Reader	13th May, 2015
30	Power Banks for use in Portable Applications	13th May, 2015

The Indian Language support for Mobile Phones as per IS 16333 (Part 3) has been added to the schedule of this Order vide notification dated 24.10.2016. The standard provides for inputting of text in English, Hindi and at least one additional Indian official language along with facility of readability in the phones for all 22 Indian official languages and script supporting these languages. The Order is set to come into effect from 01st July, 2017.

As per the Order, manufactures seeking registration of goods have to get their products tested at any of the BIS recognised labs and register with BIS by applying based on a self-declaration accompanied with a copy of test report. Testing is also performed on selected samples during the surveillance subsequent to Registration.

- To test the notified products, BIS has recognized various Govt., Private and Multinational labs all over the country. To develop conformity assessment infrastructure in the country, a “Scheme for Financial Support for Test Labs” has also been operational with MeitY.
- Over 8,000 manufacturing units (covering around 40,000 product models approx.) have been registered during last around 4 years, 1580 orders have been issued under surveillance. State Governments have been asked to nominate nodal officers to view compliance to the Order in respective states
- A portal to bring transparency & make information easily available to stakeholders is functional facilitating online registration process, surveillance process, access to database of Registered Manufacturing Units and details of products covered. Regular stakeholder consultations and Technical consultations are held for the purpose.

- The Standard Mark for compliance of Electronics & IT Goods to Indian Safety Standards notified under Compulsory Registration Order has come into effect from 01st July, 2016.

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

To strengthen the conformity assessment infrastructure, MeitY notified a “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 scheme for Grant-in-Aid is open for setting up / up-gradation of upto 15 labs. The total GIA available under the scheme is ₹150 (lacs) subject to the following:

- For laboratory equipment is ₹120 Lacs (maximum).
- 25% cost of basic supporting testing infrastructure (₹ 20 Lacs - maximum).
- Professional Fee/ Expert fee for setting up / up-gradation of laboratories and cost of obtaining recognition/ accreditation / calibration charges thereof, cost for follow up action and interim assessments by MeitY - ₹10 Lakh (maximum).

Who is eligible?

- Central Government and its organizations
- State Government and its organizations
- Universities (including deemed universities)

The following project proposals have been approved and status of GIA is as under:

1. CEC, IIT Madras, Chennai for total GIA of ₹140 Lakh and amount of ₹56.00 lakh released as 1st



Ministry of Electronics & Information Technology (MeitY)

installment and ₹50.03 lakh released as 2nd instalment.

2. CSIR -Central Institute of Mining and Research (CIMFR), Dhanbad for total GIA of ₹142.75 Lacs and amount of ₹57.10 lakh released as 1st instalment.
3. MPSEDC, Bhopal for total GIA of ₹ 127.50 lakh and amount of ₹ 51 lakhs released as 1st instalment.
4. NRTC-Parwanoo for total GIA of ₹ 140.27 lakh

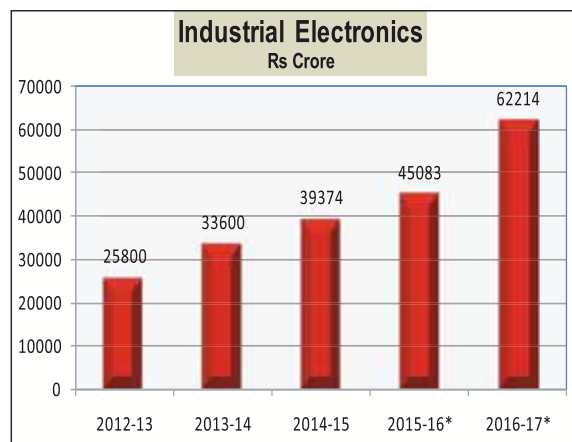
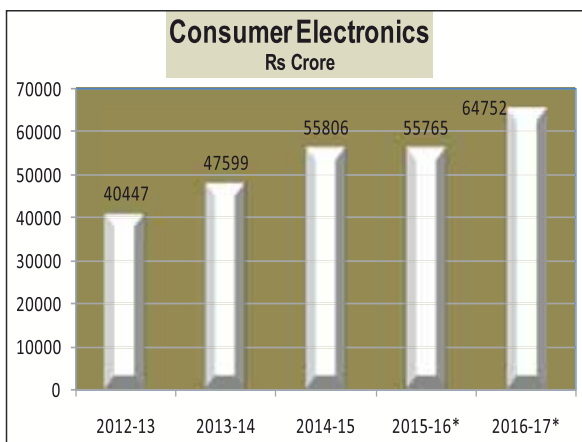
and amount of ₹56.10 lakh released as 1st instalment and ₹56.10 lakh released as 2nd instalment.

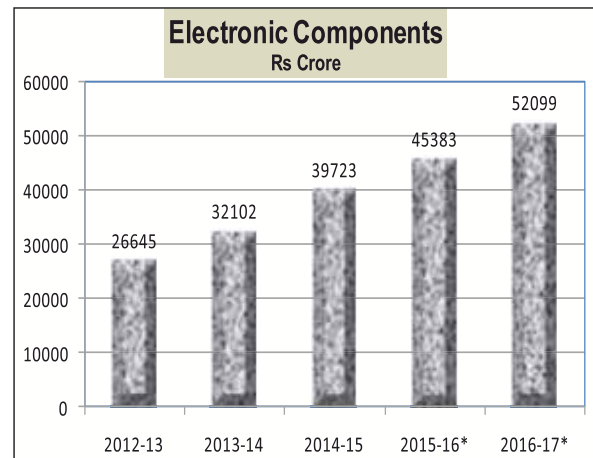
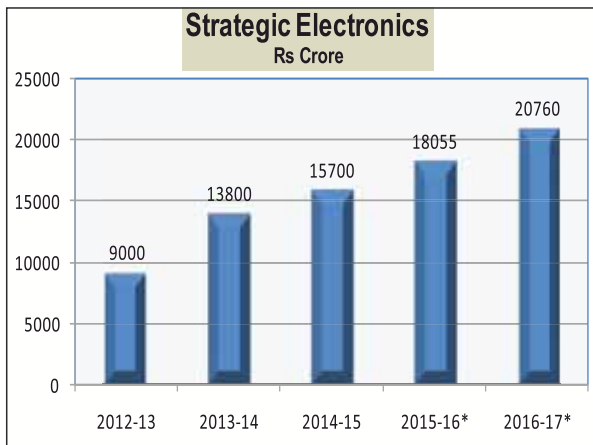
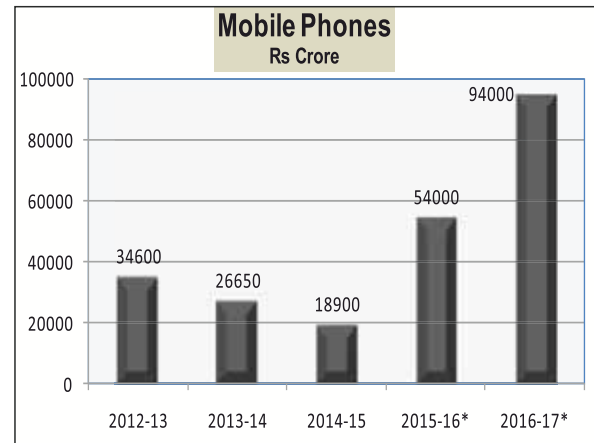
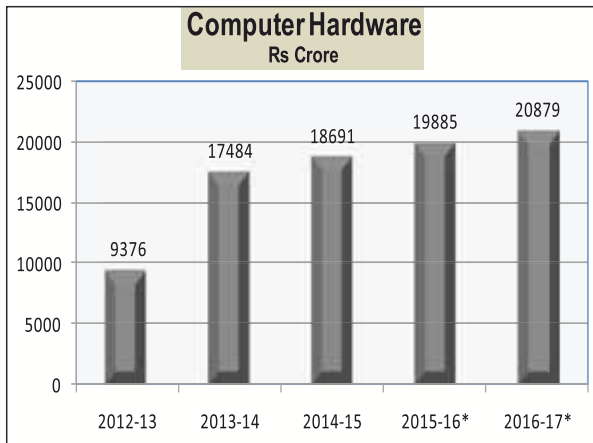
3.3 Growth of Electronics Sector:

The Electronics sector has several verticals in terms of its main constituents. At present the availability of data on the production from 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 in Electronics Sector						
Figures (Rupees Crore)						
S. No	Item	2012-13	2013-14	2014-15	2015-16*	2016-17*
1	Consumer Electronics@	40447	47599	55806	55765	64752
2	Industrial Electronics	25800	33600	39374	45083	62214
3	Automotive Electronics	5629	7278	NA	NA	NA
4	Computer Hardware	9376	17484	18691	19885	20879
5	Mobile phones	34600	26650	18900	54000	94000
6	Strategic Electronics	9000	13800	15700	18055	20760
7	Electronic Components	26645	32102	39723	45383	52099
8	Light Emitting Diodes (LED)	1275	1941	2172	5092	7134

Notes: Data above is as provided by the Industry Associations.
 Source: 1 - CEAMA; 2, 6, 7 & 8 - ELCINA; 3 GARTNER; 4 MAIT; 5- ICA;
 @- Includes Home Appliances, viz., Refrigerator, Washing Machine, Air Conditioner & Microwave.
 *- estimates - as provided by respective Industry Associations.





3.3.1 Consumer Electronics:

As per estimates of CEAMA, the overall production of this segment of electronic industry was ₹ 64752 Crore in 2016-17 compared to ₹ 55,765 crore in 2015-16 and exhibited a growth of 16.1%. A notable feature of growth in Consumer Electronics in the earlier years was the rise in imports over the years in respect of certain items like LCD/ LED TVs. The government stopped duty free import of such items as baggage and imposed a 36.5% duty on the same in 2013-14. Subsequently, the production of

LCD/LED TVs increased to 12.0 million nos valued at ₹ 21,000 crore in 2015-16, from 8.75 million Nos valued at ₹16,200 crore in 2014-15 exhibiting a growth rate of 37% and 30% in quantity and value terms respectively (as per estimates from the industry association (CEAMA). While separate figures for Growth of TVs are not yet available for 2016-17, however, IIP data shows that Group 32 ie. 'Radio, TV and communication equipment' grew at 12.8 per cent (during Apr-Nov 2016), which suggests, that the production of TV sets may also



have been healthy. As far as prices go, the TV segment has witnessed a declining trend over the last few years in terms the wholesale price index. During 2016-17 (Apr-Dec), there was no significant change in whole sale price levels. On the other hand, the consumer price levels as per CPI have been showing a steady upward trend over the 3 years for TV sets in the range of 2-3 per cent per annum perhaps due to market and quality related factors. In contrast to the LCD/ LED segment, conventional TV (with Picture Tube) has continued to register negative growth in production. Similarly, production of DVD players has continued to decline due to growth of DTH sector, digitalization of TV network and use of set Top Boxes.

3.3.2 Industrial Electronics:

Industrial electronics sector is closely linked to the investment in industry and infrastructure. Process Control Equipment, industrial control systems, Test & measurement devices, Power Electronics, Automated / automation equipments and Analytical Instruments, agriculture electronic instruments, environment monitoring instruments etc. are some of the key segments of this industry. As per estimates of ELCINA, the overall production of Industrial Electronics was ₹ 45083 crore in 2015-16 and grew to about over ₹ 62214 Crore in 2016-17 (by 38%).

The emerging trends in Industrial electronics are slated to change the landscape not only in the areas of electronics manufacturing but also the rest of the manufacturing sector. Artificial intelligence and 3D technologies and printing is increasingly helping industry to be more efficient, improve quality control and reduce manual supervision costs. The introduction of newer software for Integration of production and business operations can help companies to integrate their production and

business operations to maximize production and reduce overheads. The electronics sector is witnessing a wave of new technologies including internet of things (IoT), decision analysis, 3D coordinate systems, smart Image processing, nanotechnology, nanoscale assemblies, distributed control systems and robotics to manage process and equipments in a range of industries.

Most of the domestic demand is catered to by local manufacturing, whereas, about 10% of the sophisticated products are imported. Power electronics is an important segment of Industrial Electronics which has been dominated by unorganized regional players. However, over the last few years large players in this area have emerged with global tie-ups and have brought in newer technologies into the Indian markets.

3.3.3 Automotive Electronics:

With the growth in the Automobile industry and the increasing digitisation of automobile controls, Automotive Electronics has come to occupy an important segment of the industry. Automotive Component Manufacturing Association (ACMA) has provided the projection of Indian Automotive Electronics Sector will be approximately at ₹ 36500 crore till 2020. The global market for automotive electronics is set to account for 230 Billion USD in 2020 from 140 Billion USD in 2010. Name of few of the key technologies to be used in automotive electronics are as Antilock Breaking System (ABS), Body Control Module (BCM), Tyre Pressure Monitoring System (TPMS), Electric Power Steering (EPS) etc. while parking, cam, crank and oxygen sensors are the key sensors to be focused.

3.3.4 Computer Hardware:

As per estimates of MAIT, the overall production of this segment of computer hardware was ₹19885

crore in 2015-16 and grew to about over ₹ 20879 Crore in 2016-17 (by 5 %). While new mobile and hand held devices are becoming popular, however due to the increasing need for computers in commercial, industrial and personal use, the demand for computers is expected to grow in India at a steady pace.

3.3.5 Mobile Phones:

India has the second largest wireless network in the world. The country has witnessed a rise in manufacture of mobile handsets during the past decade. Today, the value share of mobile handset industry over the total ESDM (Electronics System Design and Manufacturing) segment in India is estimated at about 30%, which makes mobile handsets' industry as the largest ESDM vertical.

Several initiatives have been taken during the year leading to significant investments in new manufacturing operations. Some of the important initiatives like enhancing of the differential excise duty benefit on mobile handsets have played a key role to transform the manufacturing space. As per ICA, the total production of mobile handsets in India jumped to ₹ 54,000 crore by value during 2015-16, registering a growth of about 185%. In volume terms manufacturing of mobile handsets reached 110 million units thereby registering a growth of approximately 90%. Around 40 new manufacturing plants to manufacture mobile handsets have been set up during the past about 18 months generating direct and indirect employment opportunities for 1,20,000 persons. Manufacturing of mobile handsets is further estimated to grow by about 74 % during 2016-17 to reach the manufacturing value of about ₹94,000 crore.

Apart from mobile handsets, manufacturing of

various components of mobile handsets like battery packs, chargers / adapters and wired headsets have also kick started in India during the past about 8 months. As per Indian Cellular Association, approximately 30 new manufacturing plants for these components have already been established during this period generating direct employment for approximately 20,000 persons. Institution of the differential excise duty structure on battery packs, chargers / adapters and wired headsets vide Budget 2016-17 has led to manufacturing transformation in the components eco-system as mentioned above.

3.3.6 Strategic Electronics:

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 based detection and ranging system, disaster management system, internal security system etc. 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 production of Strategic Electronics was ₹20,760 Crore during 2016-17 as compared to ₹18055 Crore in 2015-16. 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 expanding with the new focus on cyber security.

The Indian strategic electronic industry has been dominated by BEL and also has defence PSU's



such as HAL, ECIL and BDL into manufacturing. More recently a few domestic small and medium scale companies have emerged with 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 MNC's as well as DPSU's. Larger Indian business groups are also foraying into Defence Sector and these companies have resources to take up big offset projects and collaborate with global leaders.

Indian defence electronics industry has been growing at an average rate of about 13.4% per year. The role of IT in defence is expanding with the new focus on cyber security. The next decade is likely to see advancement in technological programs including Tactical Communication System (TCS), Network Centric Warfare (NCW) Systems, Electronic Warfare (EW) Systems, Future Infantry Soldier as a System (FINSAS), tank electronics, air defence systems etc.

3.3.7 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 Deloitte report on Medical Devices, the global medical devices and technology market is expected to grow to USD 520 billion by 2020 from an estimated USD 3.7 billion in 2014 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 which is around 75%. The Government has also taken various steps in this

sector that include the following:

- 100% FDI in medical devices under automatic route
- Introducing Draft Medical Device Rule 2017
- 'Make in India' initiative for promoting indigenous manufacturing
- 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 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 Program 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. Under this program support is provided at Seed, Early transition and transitions to scale stages. Currently, 14 projects are being funded under this program and 5 more have been selected for funding.

3.3.8 Electronic Components:

As per estimates of ELCINA, the overall production of this segment of electronic industry was ₹45,383 crore in 2015-16 and grew to about over ₹52,099 Crore in 2016-17 (by 14.8%).

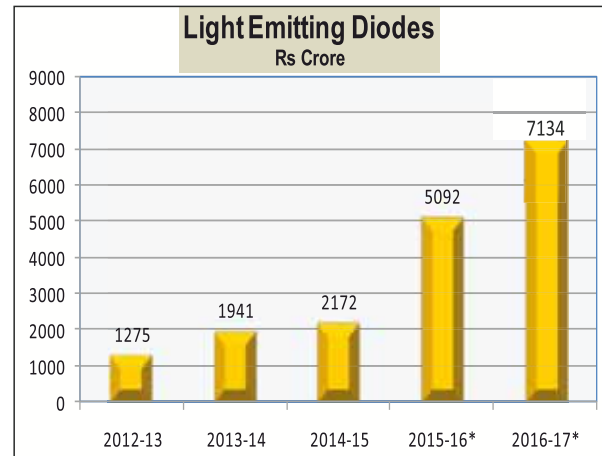
It is however noteworthy that a significant share (~70%) of component production is exported leaving only about 25% for domestic consumption,

which is used in local equipment production. Rapid growth in domestic manufacturing of electronic components is vital and the only way in which overall electronics manufacturing will grow. The emerging high growth areas for domestic manufacturing are LED Lighting, Automotive electronics, energy meters, solar energy and IT products such as Tablets. These products are now driving the growth of electronic component manufacturing. These products are an addition to existing segments such as telecommunications, consumer electronics and industrial electronics. The Indian electronic component market is dominated by electro-mechanical components (like printed circuit boards, connectors, etc.) with 29% share, passive components (like wound components, capacitors, resistors, etc.) have about 24% share. Further Active components (like ICs, Diodes, Transistors, Picture Tubes, etc.) and the Associate Components (like optical disc, magnets, RF Tuners etc.) constituted 18% and 29% share of the components respectively.

3.3.9 Light Emitting Diodes (LEDs):

One of the driving forces for growth in electronics manufacturing is the Indian Lighting market. The demand for energy efficiency has brought forward an immediate need for more energy efficient products and also has pushed market towards more efficient products such as Light Emitting Diodes (LEDs). LEDs are the choice for energy efficient lighting and as per ELCOMA, LED manufacturing in India has grown by about 59% to reach ₹ 5092 Crore in 2015-16 and is estimated to reach a production value of about ₹7134 crore in 2016-17.

The opportunities for Light Emitting Diodes (LEDs) in Indian lighting markets 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 has also emerged and expanding very rapidly.

3.3.10 Imports 2015-16:

Total import of Electronics into India in 2015-16 was US\$ 40,022 million. The overall import of electronics exceeds domestic production thus making India dependent on imports. Import of electronics accounts for over 10.5% of total imports by India. Import of electronics showed strong growth of 8.59 per cent in 2015-16 driven largely by growth in Electronic Components (32.2%) followed by Electronic instruments, (8.88%) telecom equipment (4.8%) and computer hardware & peripherals (3.6%) with consumer electronics growth remaining stagnant (-0.38%).

3.3.11 Imports of Electronics during 2016-17 (April-Dec)

declined as compared the corresponding period of the previous year with a growth rate of (-) 0.83 per cent. This marks a reversal of the strong growth in imports witnessed in 2014-15 and 2015-16. Except for electronic components whose imports grew by over 17 per



cent during this period, all other product groups witnessed negative growth. Computer hardware imports declined by (-) 14 %, Telecom instruments by (-) 2.2 %, consumer electronics by (-)1.41 per cent and electronic instruments at (-) 1 % during Apr.-Dec. of 2016-17.

3.3.12 Export (2015-16):

The total export of electronics from India in 2015-16 was of the order to US\$ 5690 million. Electronics exports account for a small proportion (about 2.17%) of total exports from India. Electronic exports showed a decline in 2015-16 with a growth rate of (-) 5.2 per cent with the sharpest decline being in telecom instruments. In terms of composition, export of electronics in 2015-16 comprised of electronics instruments (34.5 %) and electronic components (32.4 %) with the balance accounted for by Telecom instruments (15.4 %) consumer electronics (11.4 %) and computer hardware (6.3%).

3.3.13 Exports 2016-17 (April-December) have shown a revival and grew at 1.5 per cent on the overall thereby reversing the declining trend witnessed in 2014-15 when electronics exports shrank by (-) 9.9 per cent. A noteworthy development during the year (Apr-Dec 2016) was the robust increase in growth in telecom instruments by 27 per cent. Export of electronic instruments was about 4.4 per cent. However, negative growth was witnessed in respect of export of computer hardware (- 31%), consumer electronics (-7.3%) and electronic components (-2.5%).

3.3.14 Rationalisation of Tariff during 2016-17

Rationalization of tariff structure in electronics hardware manufacturing sector is an on-going exercise. To promote indigenous manufacturing of

electronic goods, following steps were taken to rationalize the tariff structure in the Union Budget 2016-17:

i. Differential excise duty dispensation made available to mobile handsets/ tablet computers was extended to the following electronic equipment. However, these are to be charged excise duty of 4% (without input tax credit) or 12.5% (with input tax credit), while Countervailing Duty (CVD) on imports is to be 12.5%. To enable domestic manufacturers to clear these equipment at excise duty of 4%, all inputs (except populated PCBs) of following equipment have been exempted from Basic Customs Duty (BCD), Excise Duty/ CVD and Special Additional Duty of Customs (SAD).

- (i) Routers
- (ii) Broadband modems
- (iii) Set-top boxes for gaining access to internet
- (iv) Set-top boxes for TV
- (v) Digital Video Recorder (DVR) / Network Video Recorder (NVR)
- (vi) CCTV Camera/ IP Camera
- (vii) Lithium-ion batteries (other than for mobile handsets incl. cellular phones)

ii. Mobile Handsets: To promote domestic value addition in mobile handsets, CVD/Excise duty exemption was withdrawn on charger or adapter, battery, and wired headsets for manufacture of mobile handsets while excise duty structure on these items for supply to mobile handset manufacturers has been changed. These will be charged excise duty of 2% (without input tax credit) or 12.5% (with input tax credit), while CVD on imports was put at 12.5%. To enable domestic manufacturers to

clear these goods at excise duty of 2%, inputs, parts and sub-parts for the manufacture of these goods have also been exempted from BCD, CVD/Excise duty and SAD.

- iii. Semiconductor wafer fabrication/ LCD fabrication and ATMP units:** BCD and SAD have been exempted on machinery, electrical equipment, other instruments and their parts (except populated Printed Circuit Boards) for use in semiconductor wafer fabrication/LCD fabrication and Assembly, Test, Marking and Packaging of semiconductor chips (ATMP) units.
- iv. Capacitor grade polypropylene granules:** BCD on capacitor grade polypropylene granules or resins for the manufacture of capacitor grade plastic film has been exempted.
- v. e-Readers:** BCD at the rate of 7.5% has been imposed on e-Readers. BCD on raw materials or parts for use in manufacture of e-Readers has been reduced to 5%.
- vi. Magnetron for microwave ovens:** BCD has been exempted on magnetron of up to 1.5KW used for the manufacture of domestic microwave ovens.
- vii. Sub-miniature fuses, micro fuses, resettable fuses and thermal fuses:** BCD has been exempted on specified raw materials and capital goods for use in manufacture of sub-miniature fuses, micro fuses, resettable fuses and thermal fuses.
- viii. BLDC motors:** BCD on Neodymium Magnet (before Magnetization) [85051190] and Magnet Resin (Strontium Ferrite compound/before formed, before magnetization) [38249032] for use in manufacture of Brushless Direct Current

(BLDC) motors has been reduced from 7.5% / 10% to 2.5%.

- ix. Simplification of Customs Rules:** Customs (Import of Goods at Concessional Rate of Duty for Manufacture of Excisable Goods) Rules, 1996 was substituted with Customs (Import of Goods at Concessional Rate of Duty for Manufacture of Excisable Goods) Rules, 2016 to simplify rules, including allowing duty exemptions to importer/manufacturer based on self-declaration instead of obtaining permissions from the Central Excise authorities. Need for additional registration has also been done away with.

To promote indigenous manufacturing of electronic goods, following steps have been taken to rationalize the tariff structure in the Union Budget 2017-18:

- **Promotion of POS and other digital payment devices:** BCD, Excise/CVD and SAD have been exempted on (i) miniaturised POS card reader for m-POS, (ii) micro ATM standards version 1.5.1, (iii) Finger Print Readers/Scanners and (iv) Iris Scanners. All duties (BCD, CVD, SAD) on parts and inputs of aforesaid devices have also been reduced to zero.
- **Promotion of LED lights manufacturing:** The BCD on all parts for use in the manufacture of LED lights or fixtures, including LED lamps, has been reduced from 10% to 5% and CVD has been reduced from 12.5% to 6%, subject to actual user condition.
- **Promotion of solar cells and modules:** BCD on solar tempered glass for use in solar photovoltaic cells/modules, solar power generating equipment or systems, flat plate



solar collector, solar photovoltaic module and panel for water pumping and other applications has been reduced from 5% to NIL. CVD on parts/raw materials for use in the manufacture of solar tempered glass for aforesaid uses has also been reduced from 12.5% to 6%.

3.4 Development of Indian Conditional Access System (iCAS)

MeitY, through a novel PPP model, had funded a unique project for the development and implementation of Indian Conditional Access System (iCAS) for Set Top Boxes (STBs). M/s. By Design India Pvt. Ltd., Bangalore, in association with C-DAC has successfully developed the iCAS. The development of iCAS has enabled India to enter a niche market hitherto dominated by few big global companies.

More than 3,00,000 Set Top Boxes with iCAS have already been deployed across the country in the last one year. More than 60 Multi-System Operators have installed iCAS enabled head-ends. The iCAS is beneficial to domestic Set Top Box manufacturers and Operators because it is available to them at a price of USD 0.5/ license for a period of three years, as against market price of USD 4-5/ license for other competing products, thus saving significant foreign exchange. As a result, the prices of competing CAS products have also shown a declining trend. The iCAS enabled STBs have been deployed even in remote regions of the country.

3.5 Marketing and attracting investment in electronics sector

Under the aegis of Communication & Brand Building Campaign, MeitY has engaged with the stakeholders of the Electronics System Design & Manufacturing (ESDM) sector through various levels of Below The Level (BTL) events such as

conferences, seminars and workshop.

3.5.1 Specific Verticals related National Workshops:

MeitY has supported eight Workshops to target the needs of specific verticals in the electronics hardware manufacturing space conducted through Electronics Industry Associations covering sectors such as Computers and peripherals; Mobile handsets, parts and accessories; Colour TV Sets and Set Top Boxes; Telecom Equipment; Industrial Electronics; Semiconductors, Memories and ATMP; Electronic Components; Liquid Crystal Displays (LCDs); Light Emitting Diodes (LEDs), LED Packaging and LED Lights; defence electronics; Solid State Memory Products - Memory Cards, USB Drives and Electronics Manufacturing Services.

3.5.2 State Level Workshops:

The effort to make India as a global destination for ESDM can only be possible with the proactive role of State Governments. They have a crucial role in attracting the ESDM industry to their respective States. Development of world class infrastructure, sector specific incentives, streamlining of procedures and appropriate labour reforms, among others are the steps needed in this direction. Therefore, in order to take the States on board in this endeavour, 16 State-level Workshops have been organised till December 2016.

3.5.3 Industry Conferences:

Department has also supported 39 Industry Conferences by providing Grant-in-aid to Electronics Industry Associations/ Industry Chambers/Organisations.

3.5.4 Outreach to Academia and Students:

The outreach programme is meant to make academia, students and citizens aware of this

sector and its importance for economic growth of the country and to attract greater talent to the sector for meeting its intellectual and human resource requirements. This programme is available for academia (Government Institutions/ Non-Govt Institutions/ Polytechnics in the North East States - 4 UGC/ AICTE-recognized Universities/Colleges per State per year).

3.5.5 National Conference:

The Ministry has organised National level “Medical Electronics Innovation Summit 2016” to promote development and manufacturing of Medical Electronics within the country at IIT Bombay in Mumbai on 22-23 September, 2016. To understand the crucial role of Electronics in Medical application, Medical Electronics Innovation Summit is one of the key initiatives in the series of proactive measures taken by MeitY. The emphasis of the summit was towards innovation in the field of Medical Electronics, Health Informatics & Telemedicine applications. The event was powered by Hannover Milano Fairs India (CeBIT) in association with Software Technology Parks of India (STPI) and SAMEER. Apart from focussed discussions, selected sessions also provided an opportunity for the Start-ups to present their innovations and gather feedback and suggestions from Incubators and industry members. The exhibition showcase was anchored around the central pavilion of Innovation display by MeitY which had the latest products and services of Medical Electronics by associated organisations. Additional participation of industry members helped create a special Innovation Exhibit zone. The Medical Electronics – Start Up zone was set up with few start-up companies highlighting unique products and services.

3.5.6 Promotions to attract investment in ESDM sector:

A Government Industry Indian delegation led by Secretary, MeitY visited CeBIT Germany during the period March 14-18, 2016 to attract investment in ESDM sector. The Indian delegation had several one-to-one meetings with CEOs/Senior representatives of the prospective investors in India. MeitY also discussed collaboration in research & innovation with technology experts from Fraunhofer Institute for the possible collaboration between MeitY's R&D labs and Fraunhofer in Germany for transforming the successful model of research of Fraunhofer Institutes. During this event, MeitY also conducted three Seminars for German companies: “Make-In-India CEOs Perspective”; “Investment opportunities in Indian states” and “Start-up India-Advancing Innovation: How to usher in an era of tech start-up in country”.

A Government-Industry delegation visited Russia during 10- 14 July, 2016 to attract investment in electronics sector and participate in INNOPROM-2016. MeitY team conducted various one-to one meetings with CEOs/Senior representatives of the prospective investors from leading ESDM companies of Russia including M/s Argos-Trade, GLONASS Union, Angstrom, Baikal Electronics, St. Petersburg State University, Institute of Innovations at ITMO University and T-Platforms at Moscow University for possible collaboration.

A Government Industry India delegation led by Secretary, MeitY visited Taiwan during the period May - June, 2016 to attract investment in ESDM sector. The Indian delegation had several one-to-one meetings with leading ESDM companies of Taiwan including Foxconn Technology Group,



Ministry of Electronics & Information Technology (MeitY)

COMPUTEX, D-Link Corporation, Delta Electronics, TECO Group, Taipei Computer Association, AU Optronics, MediaTek, Pegatron Corporation, Wistron Corporation, etc.

A Government-Industry delegation visited Taiwan during October, 2016 to attract investment in electronics sector and participate in TAITRONICS 2016. The delegation also included representatives from State Governments of Karnataka, Odisha, Chhattisgarh, Jharkhand, Gujarat, and Maharashtra. There was a large participation from industry. The delegation was well represented by the industry across various sub-sectors like consumer electronics, automobile electronics, semiconductors, components etc. All the major industry associations, namely IESA, ELCINA, ICA, CMAI participated in the show.

A Government Industry Delegation visited Japan for participating in the 4th India-Japan Joint Working Group meeting. Industry to Industry Session, Government to Industry Session and Government to Government Session with participants from India Japan were successfully conducted at Ministry of Economy Trade and Industry (METI) at Tokyo, Japan.

Besides, participating in the Joint Working Group Meeting delegation also undertook the promotional activities under the 'Make in India' and 'Digital India' campaign included organizing a road show in Kyoto. The road show was attended by 100 people and three leading Japanese Companies namely Murata, Nidec and Shimadzu Corporation presented their plans, in India to promote investment in the ESDM Sector. On the sidelines of JWG, one to one meetings were also arranged with the Senior Executives of Electronics Manufacturing Companies which included Murata, Japan Display

(JDI), Asahi Glass Corporation (AGC), Hitachi Hi-Technologies Corporation, etc.

MeitY participated in SEMICON Japan, an event hosted by Semiconductor Equipment Association of Japan (SEAJ). SEMICON (December 14-16, 2017) is one of the largest events for microelectronics in Japan with more than 700 exhibitors and 35,000 attendees, its exposition in Japan covers entire semiconductor supply chain, front-end and back-end. Event was co-located with the world of IoT, a "show-within-a-show" dedicated to Internet of Things applications that are driving the next wave of microelectronics innovation. India's perspective on promotion and growth strategies for the semiconductor industry were presented during the event.

During the 36th edition of India International Trade Fair (IITF), a seminar on "Digital India: Investment and Business opportunity" has been organized on November 17th, 2016 at Pragati Maidan, New Delhi.

To promote investment for mobile manufacturing, practical hands-on program for mobile handset design engineers have been launched by Hon'ble Minister of Electronics and Information Technology (MeitY). The program aims to improve their skills and provide them opportunity to be able to compete with the global players. Under the program, a batch of mobile handset design engineers is being trained in India and Taiwan.

3.5.7 Handholding and facilitation for Investors

An Investment Facilitation Cell has been established for MeitY to handhold and help investors during 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, Help-Desk within the Ministry also specifically exists for Japan and Israel respectively.

3.5.8 Twitter Handle:

Social media has emerged as a preferred medium by the decision makers and general public at large to communicate, interact and engage with each other. Taking this into account, MeitY is having a Twitter account “@Electronics Gol”, which is appreciated by various ESDM stakeholders and is turning out to be a preferred medium of engagement by the people. The Twitter account has already has a followership of around 30,000.

3.5.9 B2B Portal:

In order to attract investment into ESDM sector and create opportunities to introduce latest technologies to Indian industry, a common platform is available on MeitY’s website, where the technology providers, technology seekers and JV seekers could come together to explore possibilities of tie up and possible collaboration. In

this endeavour, the Ministry helps various technology players to explore potential partners for technology transfer and joint ventures for electronics manufacturing in India. The platform has been utilized by 38 multinational and domestic companies to display their intent to seek suitable partners. Link for the Portal is: <http://www.deity.gov.in/esdm/offers>.

3.6 Information Technology Investment Region (ITIR)

ITIR Policy Resolution 2008 was notified by MeitY to promote investment in IT, ITeS and Electronic Hardware Manufacturing (EHM). Based on the proposals received from Government of Karnataka and Government of Andhra Pradesh, MeitY had notified setting up of ITIRs near Bengaluru on 26.06.2013 and Hyderabad on 13.11.2013 after taking approval of Cabinet Committee on Economic Affairs (CCEA). A note for Amendment in ITIR Policy Resolution 2008 was submitted to Cabinet Secretariat on 16.06.2016 for consideration of CCEA.



CHAPTER 4

MAKE IN INDIA: SOFTWARE & SERVICES



4.1 Global Perspective

The Indian Information Technology / Information Technology Enabled Services (IT/ITES) industry is a global powerhouse today, and its impact on India has been incomparable. In the last decade, the industry has grown six fold in revenue terms, and relative share to India's GDP has increased to > 9.3 percent. India is the topmost off-shoring destination for IT companies across the world. Having proven its capabilities in delivering both on-shore and off-shore services to global clients, emerging technologies now offer an entire new gamut of opportunities for top IT firms in India. The country's cost competitiveness in providing IT services, which is approximately 3-4 times cheaper than the US, continues to be its Unique Selling Proposition (USP) in the global sourcing market.

Indian IT-ITES industry offers cost-effectiveness, great quality, high reliability, speedy deliveries and, above all, the use of state-of-the-art technologies globally.

This year the global technology industry saw fairly modest, yet commendable growth, about 4%, after a couple of years of remaining flat. The global IT-BPM market stood at US\$1.2 trillion in 2016 (excl hardware). As per NASSCOM reports, growth was experienced in IT Services sector at 7% (due to cloud), BPM sector at 4%, packaged software at 6.2% and global R&D at little over 1%. Further, global sourcing market growth continues to outperform IT-BPM industry growth. In 2016, global sourcing grew 1.7 times to reach US \$ 173-178 billion. India continued as the world's No. 1 sourcing destination with a healthy and significant

share of 55%.

It is estimated as per NASSCOM that FY 2017 will see industry revenue touching US \$ 154 billion, up from US \$ 141 billion in FY 2016 and showing a growth of over 8%. In addition, e-Commerce will have revenues of about US \$ 33 billion. In its contribution to the national exchequer, IT-BPM continues to fare favourably on several parameters-share in total service exports is estimated at 49%, and it contributes 7.7% to India's GDP. Overall, the industry is estimated to employ nearly 3.9 million people, an addition of 170,000 people (approx) over FY 2016. IT-BPM exports from India are expected to reach US \$ 117 billion during FY 2016-17, a 7.6% Y-o-Y growth. The trend and the factors contributing to growth are similar to global markets, and encouragingly, at a faster rate. India's domestic IT-BPM market is likely to grow 8.5% Y-o-Y to reach US \$ 38 billion (excluding e-Commerce) during FY 2016-17. Rapid digitization is expected to further catalyse growth. India has the 2nd largest user base after China with its >375 million Internet subscribers. It is most aggressive in global market shares across segments, be it the number of internet users, smartphone users, app downloads and online payments. There is significant push from the government to go digital and recognised by the global technology giants. The year saw a significant boost to digital payments- leading to a cashless, paperless economy.

In the current information era, enormous amounts of data have become available on hand to decision makers. Big data and analytics have climbed to top of corporate agenda. Furthermore, decision makers need to be able to gain valuable insights from such varied and rapidly changing data, ranging from daily transactions to customer interactions and social network data.

4.2 e-Commerce

India has also emerged as a fast growing e-commerce destination. This is reflected through the fact that FTAs being signed have a specific chapter on e-commerce.

The Ministry has also spearheaded the negotiations on e-commerce chapter under various forums/Free Trade Agreements (FTAs) such as Regional Comprehensive Economic Partnership (RCEP), WTO, BRICS, and EU-India Bilateral Trade etc. A White Paper on e-commerce negotiations was also evolved with inter-ministerial consultation.

4.3 IT Services & BPO

(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 capital 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. Till now about 70 companies have been declared successful to setup BPO/ITES operations for ~15,000 seats distributed

around 60 locations covering 19 States and 2 UTs. Further, 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, 1460 seats have been allocated to successful bidders to setup BPO/ITES operations under NEBPS covering 5 States of NER (Assam, Nagaland, Meghalaya, Manipur and Arunachal Pradesh). Further details of the scheme are available at www.meity.gov.in/nebps

4.4 International Outreach – showcasing India’s IT talent

With the Government’s new outlook on economic diplomacy, Digital India, Make-In-India, Start-up India, the International Cooperation (IC) Division of MeitY has synergized its efforts to further Software and Service Sector Trade globally including diversification of to geographies other than USA and UK. Efforts have also been made to evolve strategic cooperation with potential partners in emerging and frontier areas of information technology under bilateral and regional framework of cooperation. IC Division’s interactions with countries, international bodies, academia institutions for forging partnerships for mutual progress, also provide an opportunity for sharing of knowledge and experience. The IC Division has been involved in the following tasks:



Google CEO Sundar Pichai meets Sh. Ravi Shankar Prasad, M(E&IT) discussing collaborative efforts towards building systems and infrastructures for Digital India

- Aligning foreign collaboration activities in India's 'Digital India program' and 'Make in India' initiatives of the Government of India.
- Strengthen India's position on Multilateral forums.
- 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 ICT strength across the globe by organizing, sponsoring and participating in trade fairs, symposiums, exhibitions etc.

The IC Division has been pursuing the above objectives through Joint Working Groups (JWG) meetings, signing Memorandum of Understandings (MoUs), executing projects in developing economies to showcase India's strength and showcasing them in major IT fairs and symposiums. Also, issues faced in regard to India's IT exports have been handled at various forums and platforms from time to time.

India has also actively participated in the G20 where deliberations on Digital Economy are going on. MeitY shared its comments regarding Digital Inclusion, mobility of IT professionals, market access, Promote e-commerce cooperation within

the regulations of member states, Promote open source technologies etc. to address India's stance on the Digital Economy.

4.5 Cooperation through Working Groups/ Bilateral Interactions:

A meeting of India-US ICT Working Group (ICTWG) was held on 27th September, 2016 in Electronics Niketan MeitY New Delhi. After the meeting, a Joint Statement was signed. The Joint Statement covered the issues related to mobility of skilled professionals, Internet Governance, Internet of Things, e-Commerce, Cyber Security, ICTE equipment standards, security and safety in ICTE products etc. Further both the side further agreed to set-up the sub working groups on (i) Internet Governance, (ii) Internet of Things and (iii) IT equipment standards and ESDM. In addition, Joint Working Group (JWGs) meetings with USA, European Union, and Azerbaijan were held during the year to further our Software and Service Sector 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 number of bilateral high level meetings with delegations from Canada, Germany, Serbia, South Korea, Nigeria, United States, etc. were also held to further ICT cooperation.

Under the framework of India-China Strategic Economic Dialogue, a meeting on High-Tech Working Group on 6th Oct, 2016, in New Delhi, India was held between the Ministry of Electronics and Information Technology of India and National Development and Reform Commission of China in October, 2016. During the meeting an Action Plan on "Digital India" and "Internet Plus" was signed between two sides.

4.5.1 Multilateral Cooperation:

Under the Chinese Presidency in 2016, a proposal on Digital Economy was initiated by China and a Digital Economy Task Force (DETF) was set up to take up the matter forward. After several round of negotiations the Digital Economy Development and Cooperation Initiative was finalised. MeitY shared its views regarding Digital Inclusion, mobility of IT professionals, market access, Promote e-commerce cooperation, Promote open source technologies etc. to use ICT as a tool for social and economic conclusion. Consequently, during the Leaders Summit in September, 2016 at Hangzhou, China, following documents have been finalised:

- a) G20 Leaders' Communique Hangzhou Summit
- b) G20 Blueprint on Innovative Growth
- c) G20 Digital Economy Development and Cooperation Initiative

4.5.2 MoUs/Agreements/JDIs:

To further cooperation with other emerging economies the MoUs/Agreements in the field of Information Technology and Electronics were signed with Serbia, South Africa, Tunisia, and Vietnam. 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 Uzbekistan and Vietnam.

4.5.3 International Projects in ICT:

To showcase India's prowess in Software and Service Sector, MeitY has been assisting the Ministry of External Affairs to execute a number of strategic projects in developing and least developed countries. Under such initiatives, more than 40 Centers of Excellence on IT, IT Parks, Capacity Building Institutes, tele-medicine and tele-education facilities, e-network have been



established till date. Also following projects were initiated/are under execution during the year:

COMPLETED PROJECTS FY 2016-17

- Up-gradation of Jawaharlal Nehru India – Uzbekistan Centre for IT at Tashkent
- Training of 10 Trainers from Turkmenistan
- Tele-medicine Network in Armenia
- Project Management & Consultancy for setting up of Language Laboratories & E-Resource Centre at Yangon and Nay Pyi Taw in Myanmar
- Telemedicine Network in Kyrgyzstan under Central Asia e-Network
- Centre of Excellence in HPC at HUST in Hanoi, Vietnam
- Up-gradation of Centre of Excellence in Panama City - Panama

ON GOING PROJECTS

- India – Kazakhstan Centre of Excellence in ICT at Astana
- Strengthening of India – Myanmar Centre of Excellence in ICT at Yangon
- Project Manager cum Consultant for setting up of Central Asia e-Network to connect India for Tele-medicine & Tele-education
- IT Centre in Quito, Ecuador
- IT Centre in Lima, Peru
- Setting up of computer labs in 50 schools under Vayots Dzor region in Armenia
- Setting up of India – Palestine Centre of Excellence in ICT and Digital Learning & Innovation Centre in Ramallah
- Setting up of Centre of Excellence in San Jose – Costa Rica

- Setting up of Centre of Excellence in Roseau – Commonwealth of Dominica
- Setting up of a sustainable IT Infrastructure for Advanced IT Training using conventional, virtual classroom & e-Learning technologies in Cambodia
- ICT Resource Centre at Nelson Mandela African Institute of Science & Technology at Arusha, Tanzania
- Setting up of a sustainable IT Infrastructure for Advanced IT Training using conventional, virtual classroom & e-Learning technologies in Myanmar
- Setting up of a sustainable IT Infrastructure for Advanced IT Training using conventional, virtual classroom & e-Learning technologies in Lao PDR
- Setting up of Computer Labs at 37 Schools in Tajikistan

4.6 Growth of Software and Services Sector

IT-ITES industry has emerged as one of the most dynamic sectors in India's economy and is responsible for the global recognition of India as a "soft" power. The contribution being made by the IT industry towards the country's GDP has led to a steady growth of the Indian economy. India's IT industry is regarded as a hub of innovators providing world class technology solutions across the globe. The consistent growth of the IT segment has created phenomenal wealth, employment, exports and a significantly large reservoir of highly competent technocrats and knowledge workers. Today, among various sectors of the economy IT-ITES sector is the one whose services are needed for rapid growth of the economy and also for modernization of various connected sectors.



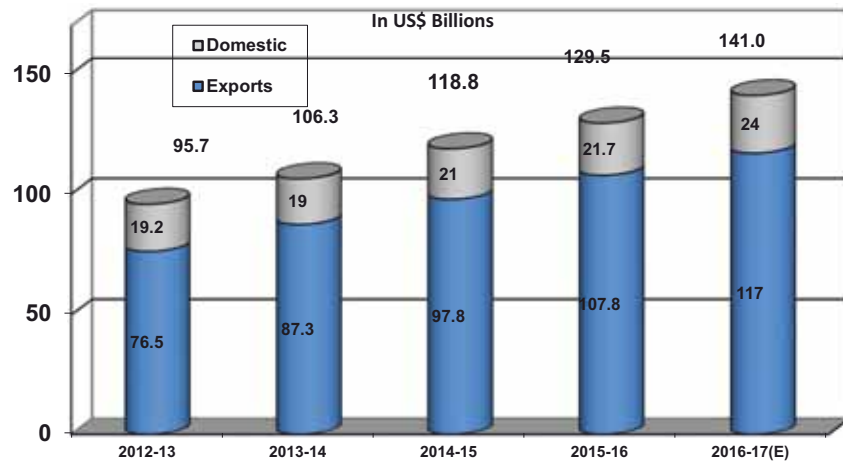
The Ministry of Electronics and Information Technology (MeitY) is making sustained efforts to promote domestic IT-ITES industry as well as continue to increase exports. MeitY is coordinating strategic activities, promoting skill development programmes, enhancing infrastructure capabilities and supporting R&D for India's leadership position in IT-ITES sector. The Indian government is emphasising on better technology enabled delivery mechanism for a multitude of government projects. With the 'Digital India' initiative, the domestic market for IT-ITES looks forward to a bright future. India has the 2nd largest user base after China with its >375 million Internet subscribers. It is most aggressive in global market shares across segments, be it the number of internet users, smartphone users, app downloads and online payments. There is significant push from the government to go digital and recognised by the global technology giants.

IT sector has helped the domestic economy to integrate with the world economy. It has made significant impact on the lives of many people. It has

also helped people settled in far flung topographies to connect with the rest of the world. It has given birth to e-governance practices, as a result of which people get an easy access via e-health, e-education, e-ticketing etc. to the various governmental services.

4.7 Overall IT-ITES Performance

Indian IT-ITES industry has continued to perform its role as the consistent growth driver for the economy. As per NASSCOM Strategic Review, FY 2017 will see industry revenue touching US\$ 154 Billion with a growth of over 8%. In addition, e-Commerce will have revenues of about US \$ 33 Billion. In its contribution to national exchequer, IT-BPM continues to fare favourably on several parameters- share in total service exports is estimated at 49% and it contributes 7.7% to India's GDP. The Indian IT-ITES industry revenue aggregate (Exports + Domestic) witnessed a growth of about 8.5% and reached ~US \$141.0 billion (~ ₹940,000 Crores) in FY 2016 as compared to US \$130 billion in FY2015. The IT-ITES industry revenue over the past 5 years is as under:



Source : NASSCOM SR 2017

Overall IT-ITES Growth (Y-o-Y)

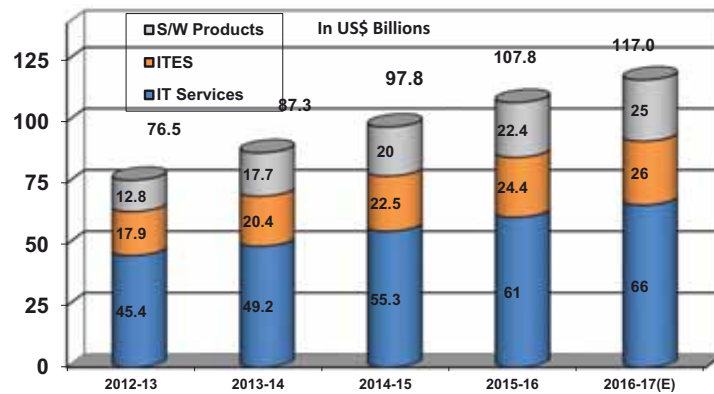
Exports Revenue

In FY 2017, IT-BPM exports from India are expected to reach US \$ 117 billion, a 7.6% Y-o-Y growth. ER&D continues to be the fastest growing segment at 10.5%, driven by global OEMs increasingly embedding software & services into their products. IT services growing at 7% is driven by cloud and BPM exports at 7.5% Y-o-Y growth is being driven by cloud, mobility and advanced analytics as per NASSCOM.

- **IT Services** is the fastest growing segment within the Indian IT-ITES sector. This segment is estimated to generate exports revenues of the

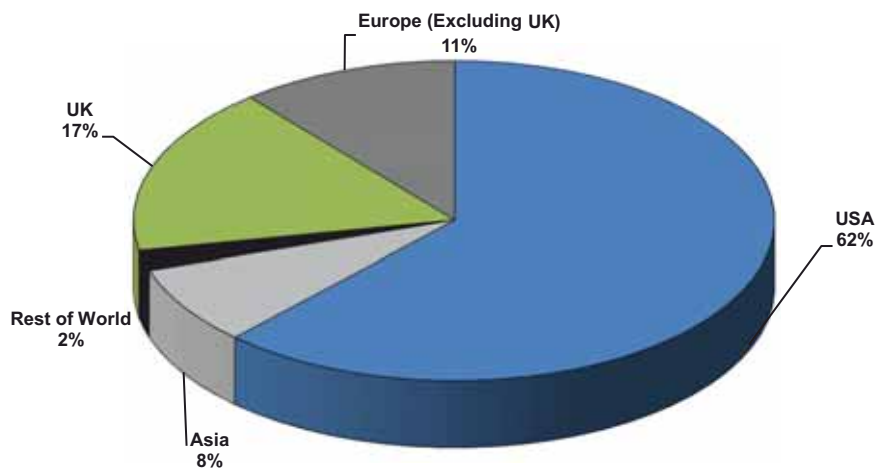
order of US\$ 66.0 billion in year 2016-17 as compared to US\$ 61.0 billion in year 2015-16.

- **ITES/BPO segment** has been reinventing itself in the past few years and is expected to generate export revenue of the order of ~US \$ 26.0 billion in year 2016-17 as compared to US\$ 24.4 billion in year 2015-16.
- **Engineering R&D and Product Development** has registered a growth of about 11.6 % in the exports of, which is estimated to reach US\$ 25.0 billion in year 2016-17 from the level of US\$ 22.4 billion in year 2015-16.
- The IT-ITES industry export growth trend over the past 5 years is as under:



Source : NASSCOM SR 2017

Pattern of IT-ITES Exports across Geographies (2016E)



USA, UK and EU account for ~ 90% of the total IT-ITES exports.



Geographical Market Share of Indian IT-ITES Exports(In %)

	FY-12	FY-13	FY-14	FY-15	FY-16(E)
USA	61.6%	61.5%	61%	62%	62%
UK	17.0%	17.10%	17%	17%	17%
EU (excl. UK)	11.50%	11.40%	12%	11%	11%
Asia	7.7%	7.8%	8%	8%	8%
Rest of the World	2.30%	2.20%	2%	2%	2%

Source: NASSCOM, e- estimate

US and UK are the leading customer markets with a combined share of nearly 80%. However there is growing demand from APAC, Latin America and Middle East Asia.

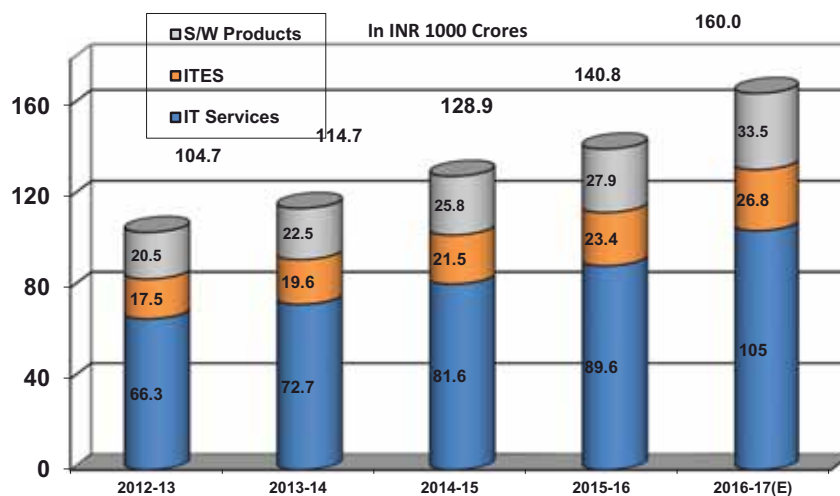
Domestic IT-ITES Performance

Though the IT-ITES sector is largely export driven, the size of the domestic market is also significant. In FY 2017, India's domestic IT-BPM market is likely to grow 8.5% Y-o-Y to reach US \$ 38 billion (~₹253500 crore), excluding e-Commerce as compared to US \$22 billion in 2015-16. Rapid digitization is expected to further catalyse growth.

- **Domestic IT Services sector** is the largest segment with close to 40.5% share, expected to reach ₹100500 crores in year 2016-17 as

compared to ₹ 89562 crores in year 2015-16 with a estimated growth of about 12.21 % in INR terms.

- **Domestic ITES** revenue is estimated to reach ~ ₹ 26800 crore in year 2016-17 from ₹ 23364 crore in year 2015-16, a growth of 14.71 % in INR terms.
- **Domestic Engineering R&D and Product Development**, which is estimated to reach ₹33500 crore in year 2016-17 from the level of ₹27907 crore in year 2015-16 with a YoY growth of 20.04 % in INR terms.
- The IT-ITES industry domestic revenue growth trend over the past 5 years is as under:



Source : NASSCOM SR 2017

The growing economy, rapid adoption of IT across SMBs and consumer segments, emergence of digital technology, consumer-centric services, new business and pricing models tailored to meet specific needs of customers are some of the factors driving adoption of IT in India.

4.8 IT-ITES Employment Scenario

India is the seventh largest country in the world. The IT/ITES workforce is becoming increasingly diverse in terms of socio-economic, linguistic, multinational

and regional backgrounds. Direct employment in the IT services and BPO/ITeS segment is estimated to grow by about 5.0 % reaching 3.86 million in 2016-17, adding around 170,000 employees during the year. Being one of the organized private sector employers in the country, this sector is also playing a key role in enabling higher levels of employment in adjacent verticals like, transportation, real estate and hospitality, Security services, Housekeeping etc. Indirect employment generated by the sector is estimated at 10.0 million.

Direct employment in the IT-ITES segment (In Millions)

	2012-13	2013-14	2014-15	2015-16	2016-17(E)
Direct Employment	2.966	3.267	3.485	3.688	3.863
Net Addition	0.191	0.301	0.218	0.203	0.172

Source : NASSCOM

IT-ITeS/BPO industry provides employment to people with various skill levels i.e. Engineers, Lawyers, Arts/Science/Commerce/ Literature etc. graduates; High School Pass outs etc. This sector is the largest employment provider of women and has about 30% of its workforce comprising women. The Indian IT-ITES industry has seen the number of women employed increase to over 1.7 million, which is more than a third of the total workforce. Women constitute more than half of the current entry-level hires. Over the last few years, the industry has also been actively pursuing inclusion of persons with disabilities (PwDs) as well as encouraging an overall inclusive work culture.

While 80% of Indian IT-BPM industry personnel are engaged is addressing the needs of global clients, the rest cater to the domestic India market. 46% of the employees are technical (engineering and post graduates), 9% are specialists and the rest are non-technical. However, the skills profile is set to

undergo a rapid change as demand for skills around digital technologies grows exponentially in wake of Digital India initiative of the government as well as moving towards "less-cash economy". As per NASSCOM, many firms have established dedicated programs to re-skill their existing employees and currently there are 300,000 such experts in India.

4.9 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 synergise 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, open

Ministry of Electronics & Information Technology (MeitY)

up multitude of opportunities of access to capital and helps build and improve the domestic demand.

During the year to provide further impetus to Indian IT industry and more value addition in the Industry with in 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.

The Ministry of Electronics and Information Technology (MeitY) is coordinating strategic activities, promoting skill development programmes, enhancing infrastructure capabilities and supporting R & D for India's leadership position in IT- ITES sector. The Indian government is emphasising on better technology enabled delivery mechanism for a multitude of government projects. Further, with the 'Digital India' initiative, the domestic market for IT- ITES looks forward to a bright future.



Microsoft CEO Satya Nadella meeting with Shri Ravi Shankar Prasad discussing rural Digital India Initiatives



CHAPTER 5

INNOVATE AND DESIGN IN INDIA



5.1 Creation of Research Eco-System

5.1.1 National Supercomputing Mission (NSM)

High Performance Computing (HPC) or Supercomputing has emerged as the Fourth Paradigm for cutting edge S&T research, and Technology and accordingly special thrust has been provided to the capacity and capability building in the Supercomputing in the 12 Five Year Plan (2012- 17). In pursuance of this objective, the "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 DST over a period of 7 years. The programme is being implemented by C-DAC and 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.

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 is on Build approach to implement HPC systems under this mission. Under Build approach, it is envisaged to design and manufacture the sub-systems of HPC system locally in India.

During the year, preparatory activities started for the mission such as identification of project

implementation teams for various activities, preparation of project proposals on various application developments and R&D on HPC system components and system software. On recommendation of Technical Advisory Committee of NSM, a document has been prepared on proposed design and project implementation strategy covering proposed Build approach, activities covered under supercomputing infrastructure, R&D, application developments and human resource developments. Also, preliminary design document has been prepared for various system configurations, as recommended by Technical Advisory Committee of NSM.

5.1.2 Electronics Development Fund

As part of Digital India, with focus on “Design in India”, the Cabinet has approved setting up of





Electronics Development Fund (EDF). EDF is a Fund of Funds and will participate in Daughter Funds, including Early Stage, Angel Funds and Venture Funds in the area of Electronics, Nano-electronics and Information Technology. The supported Daughter Funds will promote innovation, R&D and product development within the country. Government has appointed CANBANK Venture Capital Funds Ltd. (CVCFL) as Fund Manager of the Electronics Development Fund, The EDF is now receiving requests from Venture Funds, Angel Funds and Seed Funds in areas of electronics, IT and nano-electronics, which in-turn will provide risk capital to electronics industry. Based on EDF Management Board's recommendation, as on date MeitY has approved 4 Daughter Funds for final commitment of ₹ 179 Cr with total corpus of ₹ 1296 Cr. MeitY has also approved 12 Daughter Funds for in-principle commitment of ₹ 510 Cr with a total corpus of ₹ 5535 Cr.

5.1.3 Incubators for Electronics

Incubation Centre in Delhi-NCR:

Ministry has approved a project for setting up of an Incubator by Software Technology Parks of India (STPI), New Delhi in association with India Electronics & Semiconductor Association (IESA) and Delhi University (DU) with Grant-in-aid of ₹ 21.17 crore. The Electropreneur Park is being set in area of over 10,000 sq. ft. constructed space with state of the art facilities at South Campus, Delhi University. The total project duration to set up the Electropreneur Park is 5 years. MeitY will be providing the funding support required to set up and manage the centre over the initial 5 years. Thereafter the project will be run by the implementing agencies in a self-sustaining mode. The project will support 50 start-ups over a period of 5 Years.

The civil work and infrastructure set up of the Incubation Centre at South Campus, Delhi University has been completed to cater 10-12 startups at a time. A full time CEO has been appointed for looking after the day to day operations of the Electropreneur Park. Electropreneur Park has received around 203 proposals from various researchers / start-ups for initiation of their developmental activities. After evaluation of the proposals, 8 start-ups are on board as the first batch of incubates and 2 incubates will join shortly. The 1st instalment of Grant-in-aid of ₹. 3.58 Crore was released on 25th June 2014 and 2nd installment of ₹. 5.24 crore was released to Electropreneur Park in February 2016. The project was inaugurated by Hon'ble Minister of Electronics and Information Technology on 27th August 2016.

Incubation Centre with focus on Medical Electronics at IIT Patna:

Incubation Centre at IIT- Patna is being set up in joint collaboration of IIT Patna, State Government of Bihar and MeitY with the objective to promote innovation and entrepreneurship. The aim of the Incubation Centre is to identify, nurture and translate technological ideas and innovation in the broad area of ESDM sector with a focus in Medical Electronics. The overall financial outlay of the project is ₹ 47.10 crore to be funded from MeitY (₹. 22.10 crore) and Government of Bihar (₹. 25 crore) as matching Grant. This incubation centre is being set up in area of 3000 sq meters constructed space with state of the art facilities designated for ESDM incubation. The total project duration to set up the Incubation Centre is 5 years with the aim to incubate 50 startups over a period of 5 years. The installments of ₹ 34 lakh was released on 26th March, 2015 and ₹. 5.12 crore on 23rd July, 2015.

As on date the Incubation Centre has a strength of 7 executives. Equipment related to PCB fabrication facility has been received by the Incubation Centre. During the first call for proposals, Incubation Centre has selected one startup (Robo Bionics) for the incubation. Two more startups selected during second call have joined the Incubation Center.

Electronics Incubator by IIITM-Kerala and Start-up Village at Cochin, Kerala:

The project for setting up of Consumer Electronics Incubator at Cochin, Kerala by Indian Institute of Information Technology and Management, Kerala (IIITMK) and M/s Start-up Village has been approved on 24th April, 2015. Total outlay of the project is ₹49.91 crore and MeitY Grant-In-Aid is ₹22.78 crore . The 1st instalment of ₹5 crore was released on 19th June 2015. The main objectives of the Electronics Incubator is creation of new enterprises focused on Consumer Electronics, providing entrepreneurs access to infrastructure that facilitates manufacture of electronic hardware in a cost effective and sophisticated manner, providing mentorship to mitigate the risk that start-ups face while manufacturing electronics hardware, bridge the time delay taken to absorb new technologies etc. This Incubator will incubate 40 Start-ups over a period of 4 years. Infrastructure set up of the incubator centre has been completed, while other amenities are in progress. The testing and equipment / IOT lab, robotics Lab and prototyping room for SMT assembly line has been installed in the centre. State of the art facility with workstations, conference rooms and fully operational RF & power Lab have been established in April 2016. One incubate has already joined in the centre and 4 incubates are expected to be on board shortly.

Fabless Chip Design Incubator at IIT Hyderabad:

Ministry of Electronics & IT (MeitY) has approved a project proposal submitted by IIT Hyderabad for setting up of fabless chip design incubator centre at IIT Hyderabad with a total outlay of ₹. 23.73 crore including ₹.17.8 crore as a grant-in-aid from MeitY on 06th September 2016. The contribution of IIT Hyderabad is of ₹.5.925 crore for setting up of the chip design incubator. The duration of the project is 5 years.

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. In this regard, Memorandum of Understanding (MoU) between MeitY and IIT Hyderabad for undertaking the project by IIT Hyderabad has been signed on 30.12.2016. The first instalment of Grant-in-Aid amounting ₹4.09 crores has been approved on 13.1.2017 and ₹4.53 Lakhs have been released on 20.1.2017 as partial instalment.

5.1.4 R&D and IP development

1. Commercialization and Deployment of TARANG - Digital Programmable Hearing Aid:

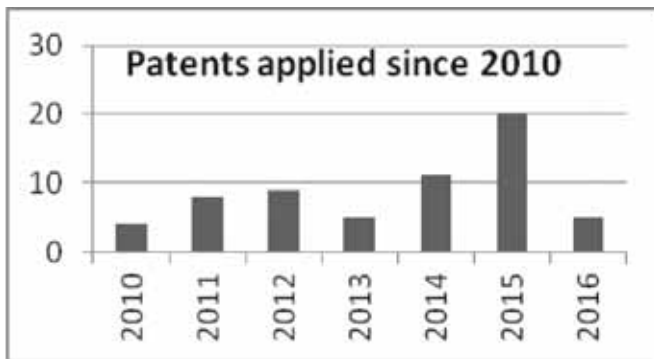
C-DAC has developed Tarang - Digital Programmable Hearing Aid (DPHA), a feature rich, affordable and easily maintainable digital programmable hearing aid. It uses advanced digital signal processing techniques and is based on indigenously developed application specific integrated circuit known as NAADA. Transfer of Technology (ToT) of the above solution was carried to industry partners, M/s KELTRON, Thiruvananthapuram and M/s Best Hearing Solution, New Delhi. C-DAC has supplied Tarang under various government

schemes, including Rajiv Vidya Mission (SSA), ADIP Scheme (Assistance to Disabled Persons for Purchase/Fitting of Aids/Appliances, Department of Empowerment of Persons with Disabilities), and RBSK Scheme (Rashtriya Bal Swasthya Karyakram, National Health Mission, Ministry of Health & Family Welfare, Govt. of India).

2. IP development under various R&D Programs

(i) Electronics Materials and Component Development Program:

EMCD has filed a total of 62 patents, including national and international applications since 2010. This year the tally is five new applications and in addition international applications have been filed for previous year’s national level patent applications. Patents were filed in the areas of breast cancer detection, cost effective process for production of pseudoboehmite, piezoresistor compositions for flexible substrates and lead free glass as microwave material (u-LTCC).



(ii) Five patents (Indian) have been filed in the year 2016-17 and thirteen Papers have been published in Journals/conference proceedings in the microelectronics area.

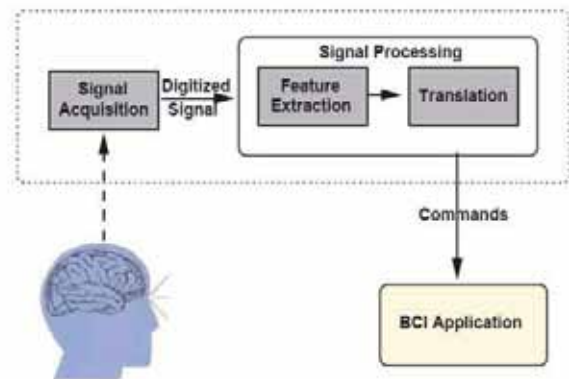
(iii) Eleven patents (International/Indian) have been filed in the year 2016-17 whereas more than 100

research papers have been published in National and International journals under Nanotechnology area.

3. Perception Engineering Initiatives

Brain-Machine Interface Systems (BMIS):

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, development of brain-machine interface is being undertaken 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.



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 (AD): National Brain Research Center, Manesar has developed a reliable biomarkers for Alzheimer Disease (AD) that allow early detection of Alzheimer, so that it may be cured arrested at an early stage Different stages of cognitive impairment can be given as,

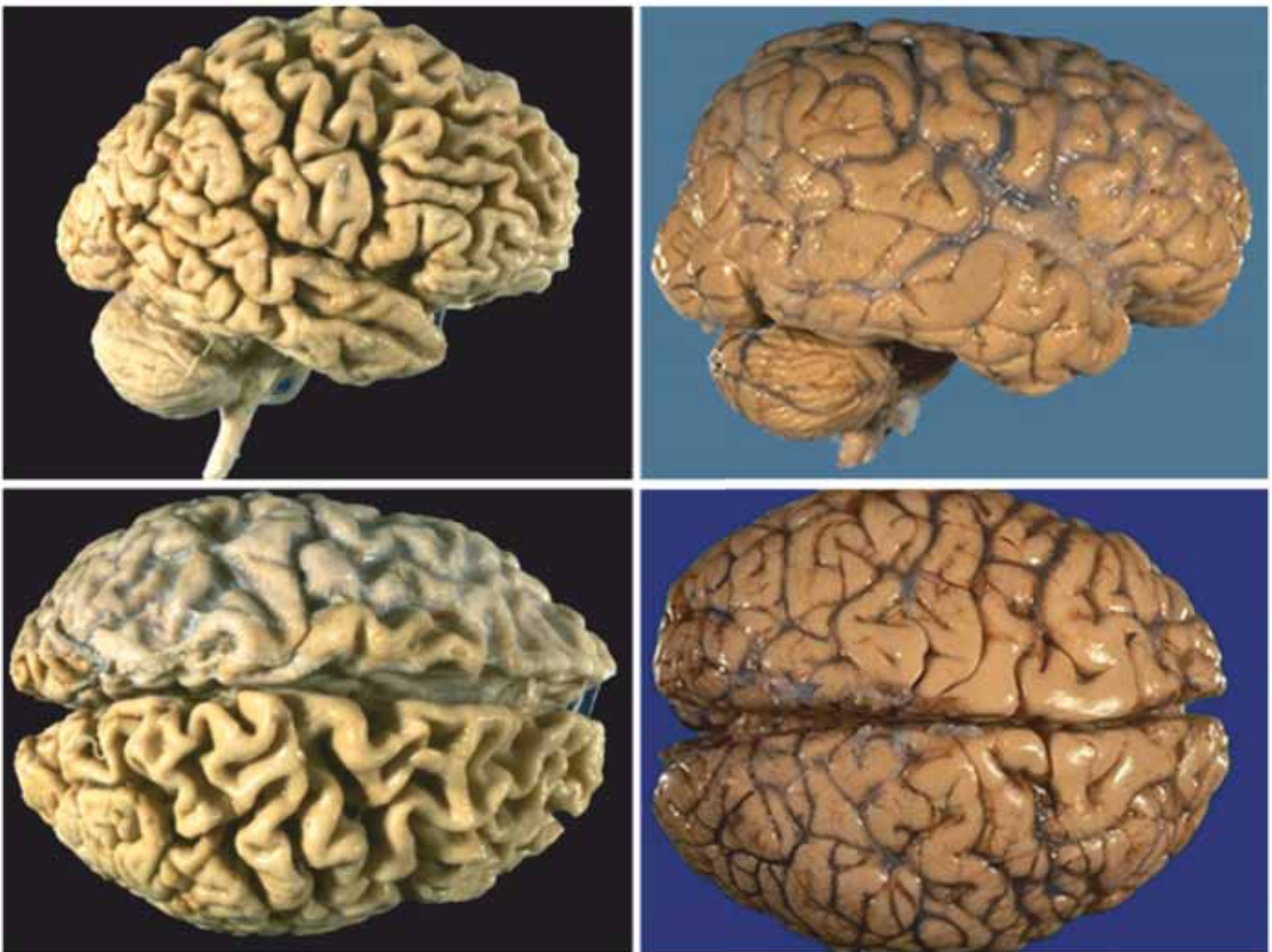
**No disease → Neurochemical Changes in Brain
→ Mild Memory Loss → Severe Cognitive
Impairment (AD)**

Studies have shown that AD is associated with reduction in Brain Antioxidant levels, Glutathione (GSH) which is an essential brain antioxidant.

1) Brain Glutathione (GSH) level is measured

using Magnetic Resonance Spectroscopy.

- 2) Cognitive performance of the subject is measured using Neuro physiological evaluation
- 3) Statistical analysis is performed to access whether antioxidant level can diagnose MCI or AD.



AD brain

Normal brain



Novel Biomarker, designed as, estimation of the brain antioxidant GSH with MRS is crucial noninvasive measure of MCI onset and progression to AD and has tremendous potential as a clinical biomarker with high diagnostic accuracy for MCI and AD.

Development of Serious Games for physical and neurohab therapy for stroke/injury/arthritis patients (IIIT Hyderabad):-Serious Games for physical and neurohab therapy are devised for stroke/injury/arthritis patients, which can be used as an alternative to traditional physiotherapy exercises. The Serious Games so developed use biofeedback control system to provide an immersive virtual environment for therapy. The recording of the exercise movements collected by sensors is provided to the doctors/therapists co-located or in remote locations.

A game is designed for stroke/hand arthritis patients for sensorimeter simulation on hand/arm functions wherein virtual dropping objects i.e. apples are collected in a virtual basket and by visual illusion movement is caused in affected hand. This causes hand exercise and is helpful for stroke/hand arthritis patients.

“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.

While the involvement of a speech therapist is crucial for speech acquisition, computer based speech training (CBST) systems have been found to motivate children in practicing by providing feedback of their progress.

A software as Vocal Tract Display is 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.

4. Convergence, Communications & Broadband Technologies and Alternate Technologies for Connectivity :

R&D initiatives in Convergence Communications, Broadband Technologies, Strategic Electronics and Alternate Technologies for Connectivity are aimed at developing indigenous capability in the thrust areas, which include - Next Generation Communication & Convergence technologies (Software Defined Radio, Cellular, Cognitive Radio including white spaces, Heterogeneous Wireless Networks); Green Communication and Scavenging energy from ambient EM radiation; 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); Massive MIMO for Next Generation Wireless systems; Development of IP based products/services; Green Communication; Wireless Technology deployments for rural connectivity (LTE-A, Wi-Fi, Wi-Max); IP based products/services & Low Cost Broadband Internet access devices; Electro-magnetic wave

applications; High power RF/microwave technologies; Microwave & Millimeter wave Sensors & Systems; Terahertz (THz) wireless systems; Radar systems; development of Strategic Components, Alternate Technologies for Connectivity etc.

Achievements

A number of technology development projects supported at various institutions across the country in the thrust areas were successfully completed during 2016-17. Initiatives in Next Generation Communications and Convergence have yielded notable achievements in the year, which include transfer of LTE based designs and Broadband Simulator (BWSIM) technology developed under the project Next Generation (4G Advanced) Wireless Technology Research by CEWIT Chennai to industry. Last year, “5G Research and Building Next Gen Solutions” project was initiated with a consortium of premier academia institutions collaborating to undertake advanced research for 5G and develop advanced simulation and technology prototypes for 5G. 18 patents have already been filed in the projects, which include both national and international patents. The project will contribute towards 5G standardization particularly addressing the aspects of heterogeneous networks, distributed connectivity and computing.

Notable achievements in IoT based projects during 2016-17 have yielded transforming systems to Smart Systems in various domains, which include Safe Mining, Strata & Gas monitoring Systems in mines, Water Quality monitoring using WSN, etc. A tracking System for controlling illegal mining and coal transportation has been developed. Two patents for the technologies have been filed in India. Another system for temperature, humidity and methane gas concentration monitoring system for

mines has been developed. The technologies have been patented in India. A WSN based Real Time Water quality monitoring system has also been developed.

The on-going projects supported in the identified thrust areas include - Innovation hub on Cyber-Physical Systems, Dual- Connectivity LTE- Wifi Solution for Broadband Wireless Networks, Self-Powered wireless chipset for building-to-building communication, Energy efficient radio access technologies for 4G LTE, Decision Support System for integrated hydro geological modelling, Low Power Terabit for Broadband Communication Links, Converged Cloud Communication technologies, Small Cell Wi-Fi Networks for the enterprise, Distributed Bayesian learning for Big Data, Mobile Ad Hoc Networks, Autonomic Energy Aware Management of Network & Cloud, QoS Provisioning in Internet of Things (IoT), Safety Alert System using dedicated Short Range Communication, Feasibility assessment model for adaptation of underground coal gasification technology etc.

Under Indo-Dutch collaboration for collaborative research in Pervasive Communications & computing 5 projects have been initiated: Code self-verification for IoT devices, Big imaging data approach for Oncology, Data mining & prediction in airlines operations and privacy aware smart public buildings.

The promotion of R&D in the area of applied microwave electronics & engineering is being further strengthened by establishing two new centres of SAMEER. New centre at IIT Guwahati, specializing in high power microwave tubes/components, has been established 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) has been 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 National facility at Guwahati for NE States is being established. The indigenous development of ST Radar will help in research and monitoring of the weather patterns and climatic conditions, particularly in NE region, which change rapidly.

Alternate Technologies for Connectivity: Under Bharat Net - National Optical Fibre Network (NOFN), it is proposed to link 2.5 lakh Gram Panchayats of the country through Broadband Optical Fibre Network. Optical Fibre Network is being set up in phases. There is, therefore, a need for alternate technologies to connect Gram Panchayats. The alternate technologies include - RF wireless connectivity, Connectivity using TV White Space, Connectivity using Cable Network, Broadband over power lines; Connectivity using VSAT etc. Convergence, Communications & Broadband Technologies Group had earlier implemented projects in the area of alternate connectivity - TV White Space trials by IIT Hyderabad & IIT Delhi and Broadband communication through underground and overhead power lines by Bengal Engineering and Science University. Projects are being evolved in the emerging alternate technologies like Light Fidelity (Li-Fi).

5.1.5 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://bosslinux.in>. Pan-India Support Centres have been established for hand-holding support to users. Research & development of secured, service-oriented component based operating system and multi-core architectural simulator are also being addressed. Development of BOSS Mool, Dhara and Bharti Sim are notable outcome of these efforts. For promotion of usage of FOSS, MeitY 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 processes execution time on multicore environment. The kernel is expected to optimize the execution time by 25% to 30% on multicore systems by scheduling the processes on different cores efficiently. Piggybacking the read latency to resource Manager, customizing Hadoop Block Placement Strategy and Integration of customized policy with Dhara has been carried out.

ii. In BOSS-MOOL (Minimalistic Object Oriented Linux) project

The existing Linux kernel has been re-designed 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 program 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 in their product. CDAC has signed an MOU with Fujitsu for bundling 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.

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) <http://bosslinux.in>. BOSS has been widely deployed in education and government sectors in various States/ UTs across the country. Indian Navy & Army have adopted BOSS for their office applications. BOSS has also been deployed in Tamil Nadu, Chhattisgarh, Orissa, Kerala, Maharashtra Tripura, Puducherry, Andaman & Nicobar Islands and Haryana in various applications. Government of Tamil Nadu has mandated the use of BOSS Linux as one of the Operating Systems in all Government Departments. BOSS Linux has been deployed under the free laptop scheme in Tamil Nadu. BOSS preloaded HCL desktops are being deployed by Govt of Orissa and CHiPS Chhattisgarh. EduBOSS is being deployed in schools under EDUSAT project of Govt. of Punjab and schools of Puducherry and

Maharashtra; BOSS deployments have resulted in indirect savings of over 300 crore by 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. It is now fully functional and has been used to publish numerous research papers in the areas of computer architecture and compiler design with 32 bit and 64 bit architectures supported. The simulator has been integrated into the teaching curricula of various universities worldwide and has been downloaded by users from 17 countries with 582 downloads. At IIT, Delhi, Tejas is being used to teach “Architecture of high performance computers” and to conduct experiments in a 90+ student course on advanced computer architecture. Various institutions, like IITs, IIITs and NITs and Private Universities like Amity, Sharda University are using Tejas. It is also being used to teach courses at IIT Delhi, IIIT Allahabad and ISI Kolkata and is being actively considered in many European Universities as well.

Future Initiatives:

Deploying Meghdoot Openstack cloud suite on BOSS-MOOL at Government scientific and research organizations. Architectural Simulation of Node using Heterogenous computers as a spin-off from Bharti Sim Project.



5.2 Translation R&D

5.2.1 Medical Equipments/Tools:

Deployment of 6 MeV Linear Accelerator (LINAC) for cancer treatment: LINAC Machine at Indian Institute of Head and Neck Oncology, Indore is being used for patient treatment. On an average 30, patients are being treated per day. The installation and handing over of second LINAC machine at Amravati Hospital (Maharashtra) has been completed, alongwith necessary AERB clearance. The deployment of third LINAC Machine at BKL Walawalkar Hospital, Chiplun, Maharashtra is in progress and radiation testing has been accomplished. For the remaining machine, basic civil work is yet to be completed by Kidwai Hospital, Bangalore before the dispatch of the LINAC machine.

5.2.2 Micro & Nano Electronics

1. Microelectronics

1. Design of 20 GHz Low Noise Amplifier:

Under a MeitY supported project, entitled, "Design and Characterization of CMOS based Millimeter-wave Components for 60-GHz Integrated Broadband Transceivers", IISc Bangalore has designed, fabricated and demonstrated a Low Noise Amplifier (LNA). This LNA amplifies weak RF signals and is operational upto 20 GHz. An agreement has been signed between IISc, Bangalore and BEL, Bangalore for transfer of this technology.

- MEMS based hand held sensor for Carbon Monoxide and Ammonia: Under a MeitY supported project, CEERI Pilani has developed sensor for Carbon-monoxide and Ammonia gases. The Ammonia Gas Sensor has been tested for 20 ppm sensitivity, while Carbon Monoxide sensor has been tested for 150 ppm sensitivity. Companies i.e. M/s Macwin India, New Delhi and M/s Chemicot Scientific Gases,

Noida signed Non-Disclosure Agreements (NDA) for Transfer of this Technology

- Low Temperature and Low Pressure Cu-Cu Fine Pitch Bonding for Vertical (3-D) Integration: Under a MeitY supported project, entitled, "Low Temperature and Low Pressure Cu-Cu Fine Pitch Bonding for Vertical (3-D) Integration" technology is being developed by IIT Hyderabad for fine pitch/blanket Cu-Cu bonding at 140 centigrade temperature and 2.5 bar pressure for Vertical integration (3D IC applications).
- Analog, Mixed-signal and RF IC Development and Test for biomedical applications: Under MeitY supported project, entitled, "Analog, Mixed-signal and RF IC Development and Test for biomedical applications", IIT Bombay developed and demonstrated the prototype for Pulse oximeter, ECG/EMG and Wireless Transmitter & Receiver for short range communication. Graphical User Interface and Application software for reconstruction of ECG/EMG and Pulse oximeter have also been developed. IPs created under this project has provided a platform for the development of next generation of biomedical ASICs.

2. Nanotechnology Initiatives

Some of the devices developed under the Centres of Excellence for Nanotechnology established by Nanotechnology Initiatives Division are:

- Fully Packaged gas sensor array for CO, CO₂, NO₂ and SO₂ has been developed by IISc, Bangalore.
- Soil moisture sensors has been developed jointly by IIT Bombay and IISc Bangalore.
- GaN RF-HEMT devices has been prototyped and tested at IIT-B.

- (iv) Detection using Cantilevers of Cholera toxin, IFN- as a biomarker for tuberculosis and nM levels of Urea and Triglyceride at IIT Bombay.
- (v) A device for visual detection of Bilirubin for Hepatitis patients has been developed at IIT Guwahati.
- (vi) Fabrication of micro fuel cells and demonstrated performance in laboratory has been developed jointly by IIT Bombay and IISc Bangalore.
- (vii) Nano devices for water purification have been developed at IIT Delhi.
- (viii) Interference Lithography has been used at IIT Delhi to fabricate few complex photonic structures in submicron size.
- (ix) CFO/ferroelectric nanocomposite has been successfully synthesized and its application for photocatalysis has been demonstrated by IIT Delhi.
- (x) Flow studies of the fuel and the oxidant has been carried out through the PDMS microchannels at IIT Delhi.
- (xi) One technology transfer to Purius, a start-up company for developing a bio-sensor platform by IIT Madras.
- (xii) Few of the devices, such as paper based sensors, developed at IIT Guwahati have attracted media's attention.

5.2.3 Electronics Materials and Component Development (EMCD)

EMCD is ready to transfer six technologies in the areas of microwave substrates, microphotosensors for industrial applications, Lead free X-ray Apron, Cristobalite powder, Nano-ZnO material and Quick rechargeable lamp using graphene..

(i) Microwave substrates: C-MET has developed a patented SMECH process, which comprises Sigma Mixing, Extrusion, Calendaring followed by Hot pressing, for making microwave substrates. Using this process, microwave substrates with dielectric constant values 6.15 and 3.00 have been developed indigenously for the first time, which are superior in properties compared to imported counterparts in terms of ultra low loss tangent (0.0018 at 10 GHz) and temperature stable properties for outdoor wireless communication applications.

(ii) Microphotosensors for industrial applications: C-MET, has made important breakthrough in manufacturing of microphotosensors through simple process at potentially very low cost. The technology allows selective transfer and accurate registration. Prototypes have been developed based on the photo patternable CdS thick film paste useful in the area of automatic car light control, high speed digital film paste and high speed digital object counters.

(iii) Lead free X-ray Apron for Medical Applications: C-MET have developed lead free X-ray shielding material and have developed prototype medical apron using these materials, which is lighter than commercial products. Also, it has further potential in reduction of weight. The developed aprons have been tested at BARC, Mumbai. This technology is now under process for transfer to interested industries on non-exclusive basis.

(iv) Cristobalite Powder for space applications: ISRO requires regular supply of cristobalite for their Relaunchable Vehicle (RLV) applications. C-MET has developed a technology for the



production of space qualified phase pure cristobalite in pilot plant scale. Till date, C-MET has supplied 440kg of cristobalite to ISRO.

(v) Nano-ZnO powder for electronics application:

C-MET has developed technology for production of nano-ZnO powder for electronics applications. The powder has enhanced catalytic activity. The technology is at Pilot Plant Stage.

(vi) Quick rechargeable lamp: A quickly recharge lamp has been developed by C-MET using graphene based supercapacitor. Prototype lamp can be charged under two minutes which then can power the lamp for up to an hour.

5.2.4 Green computing

Green computing or IT sustainability is the study and practice of environmentally sustainable IT or computing. This can include "designing, manufacturing, using, and disposing of computers, servers, and associated subsystems efficiently and effectively with minimal or no impact on the environment. Besides IT itself being green, it can support, assist, and leverage other environmental initiatives to achieve energy efficiency and reduce carbon footprint in every walk of life by offering innovative solutions. In addition to moving itself in a greener direction and leveraging other environmental initiatives, ICT could also help create green awareness by assisting in building communities, engaging groups and supporting education and green advocacy campaigns.

Under the program, MeitY has already developed (through CDAC Bengaluru and Chennai centers) deployable ICT technologies for Smart buildings with low carbon emissions. The technologies primarily are for Lighting control, HVAC control and Air quality monitoring in buildings. The technologies/products developed are deployed in

CDAC buildings at Pune and Hyderabad and at MeitY for demonstration. Transfer of Technology (ToT) of these technologies/products has been done with ECIL on 12th July 2016 at MeitY for large scale production.

MeitY has now initiated development of technologies and solutions for Smart Cities using Internet of Things (IOT). Four centers of CDAC (Bengaluru, Chennai, Hyderabad and Thiruvananthapuram) are entrusted with the development work.

The object of the project includes:

- a) Design and Development of a Secure Network Architecture for Smart Cities using Internet of Things and Software Defined Networks which address the needs of various domains like
 - **Smart Utilities:** Smart Electrical Distribution Systems, Smart Water Distribution Networks, Solid Waste Management,
 - **Smart Mobility:** Smart Transportation Management Systems, Emergency Services.
 - **Smart Environment:** Pollution Control, City wide Surveillance
 - **Smart Citizen:** Mobile Crowd Sourcing
- b) Design and Development of a unified cloud framework for standardized data aggregation, storage and analytics for the above services.
- c) Prototype demonstration of developed Smart City applications

5.2.5 Technology Development & Demonstration for Indian Industries

National Mission on Power Electronics Technology (NAMPET) Phase-II

A Solar Charge Controller Unit (CCU) for Telecom

applications has been developed and installed at site of BSNL in Kerala. Advanced Metering Infrastructure (AMI) in the form of single phase and three phase smart meters with advanced AMI features have been developed and tested. Wide Area Monitoring using Phasor Measurement Units (PMUs) is being experimented at five Kerala State Electricity Board (KSEB) sub-stations. The concept

of Net Zero Energy building and Low Voltage Direct Current (LVDC) has been developed and demonstrated.

The technology of Solar Charge Controller Unit (CCU) for Telecom applications has been transferred to ITI Limited for commercialization.



Solar Charge Controller Unit (CCU) for Telecom Applications

Technology of Single Phase and Three Phase Smart Energy Meter has been transferred to M/s.

ITI Limited, Palakkad, and M/s. Powertec Energy Pvt. Limited, Delhi.



NaMPET Smart Meter



SM Inside view

Smart Energy Meter



Technology transfer agreement for Vehicle Control Unit (VCU) and Train Communication Network (TCN) technology has been signed with M/s Bharat Heavy Electricals Limited (BHEL) and M/s ABB Ltd, Bangalore. A patent on “An improved squirrel cage induction motor with enhanced efficiency and wide range of operating speed for application in electric vehicle” has been filed.

Universal Analog input module and HART Compatible input-output modules

Technology of Universal Analog input module (UAIM) hardware & its integration with iROSE software and HART Analog input-output modules has been developed and tested. iROSE software has been made HART compatible and tested with iCON controller.

Advanced Automation & Process Optimisation System for Cement Factory

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 quantification of benefits in terms of productivity, savings in energy, quality etc. is in progress. The benefits of these technologies will be propagated to cement industry through a workshop.

Automation of the Sugar Plant using Indigenous Technology

The technologies/systems developed under ASTeC programme are being deployed at Thandava Co-operative Sugar Factory (TCSL), Visakhapatnam for improving the productivity and energy efficiency

of the plant. Control room has been established and ASTeC systems are being deployed. The project is progressing in its final stage of implementation.

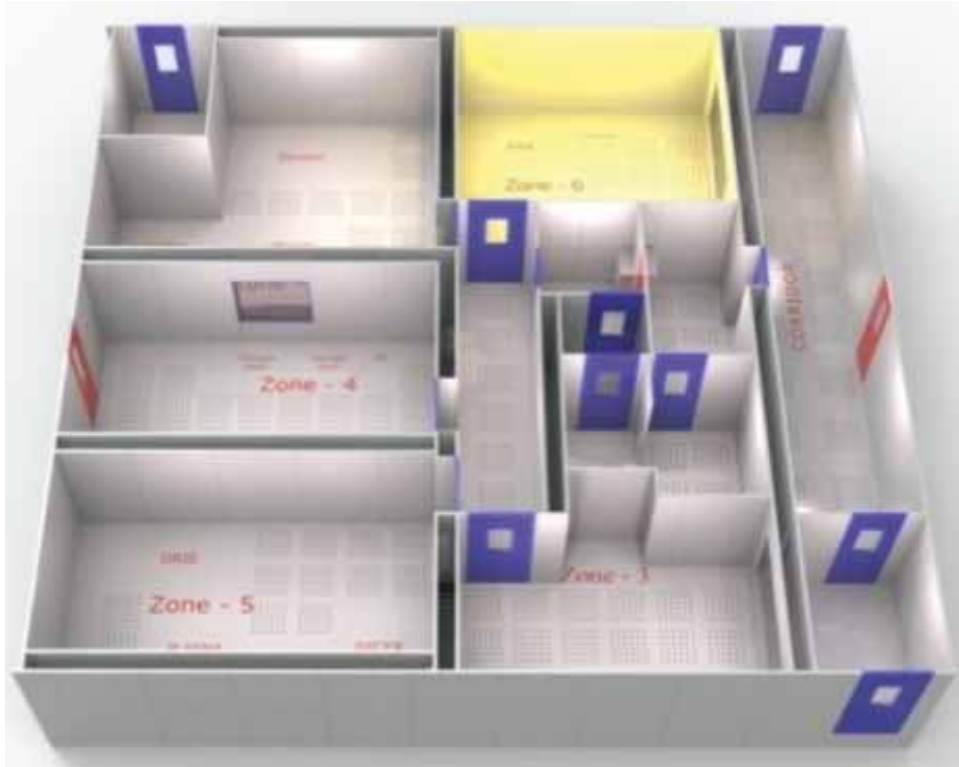
5.3 Centres of Excellence

5.3.1 Nanotechnology Centres

Main focus of Nanotechnology Initiatives is to develop an eco-system for semiconductor manufacturing through cutting edge research in Nanoelectronics and to develop products/ devices meeting the societal and strategic requirements of the country. In this direction, several Centre of Excellence in Nanotechnology as given below have been established to bridge the gap between basic R&D and manufacturing Nano devices, subsystems, systems for the social benefits.

(i) 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 has been initiated to accelerate research and development activities in new areas of nanoelectronics, nano-materials, nano-structures and integrated sensor systems, as well as to generate a critical mass of highly trained manpower to propel these areas. Facilities (Growth and Characterization) such as ion beam sputtering, Deep Reactive Ion Etching and Plasma Enhanced Chemical Vapor Deposition established at these centres are widely utilized by the faculties and researches of these institutes for carrying out the world class R&D in the Nanotechnology. A large no of Nano devices have been designed and fabricated at these institutes.



(ii) Nano Fabrication Prototyping Facility for SMEs and Start-ups in the area of Micro Electromechanical Systems (MEMS) & Nano Electromechanical Systems (NEMS) at IIT Bombay

The Nanofabrication prototyping facility consists of clean-rooms of Class 100 and Class 1000, has been commissioned to provide an accessible platform to bring technologies from Technology Readiness Level TRL 4 to TRL 9. The primary objective of this facility is to enable researchers and industrial partners/ incubator companies to fabricate and manufacture nanoscale devices.

(iii) Centre of Excellence in R&D in Theranostics Devices at IIT Guwahati

Centre for Nanotechnology at IIT Guwahati targets to take a lead for the scientific and technological developments in the NE region of the country. Main aims of the centre are to develop interdisciplinary experimental facilities in the NE region for the fabrication and characterization of micro/nano electronic devices and to form a competent group of academic leaders who would utilize the facility and develop efficient chemical, biological, and environmental sensors, transistors, and MEMS/ NEMS devices.



(iv) Centre for Nano Electromechanical Systems (NEMS) and Nanophotonics at IIT Madras:

A Nanoelectro Mechanical Systems (NEMS) and Nanophotonics Centres have been created at IIT Madras. The project is expected to be completed in March 2017. Under the project, R&D has been undertaken in wide areas such as NEMS resonators, Nano resonator based biomolecular detection system, development of

Lammellar Grating for Fourier Transform Spectroscopy Systems and Near Field Ultrasonic Nanoscopy.

(v) Research initiatives on Non-Silicon based Technologies for Nanofabrication and Nanoscale Devices at IIT Delhi

A Centre for Nanofabrication and Nanoscale devices based on non Si technologies has been established at IIT Delhi. R&D has been continued at this centre in the following areas:

No.	Research Area	Device Prototype / Deliverable
1.	Nanomagnetics	Nanomagnet arrays as magnonic crystals
2.	Nanophotonics	Holographic photonic bandgap crystals
3.	Nanophotonics	Self-assembled nano/meso-porous structures
4.	Nanophotovoltaics	Inorganic and semiconducting nanorods for energy conservation
5.	Nanoelectronics	Organic solar cell
6.	Nanoelectronics	GaN nanowires and nanodevices
7.	Nanomechanics	Nanosprings as nanomechanical sensors
8.	Biosensors	Encapsulated nanoparticles in biodegradable polymers
9.	Mesoscale Devices	Microfluidic fuel cell
10.	Mesoscale Devices	Core-shell nanostructures for trapping pollutants

5.3.2 Demonstration Facility of Super Capacitors at C-MET, Thrissur

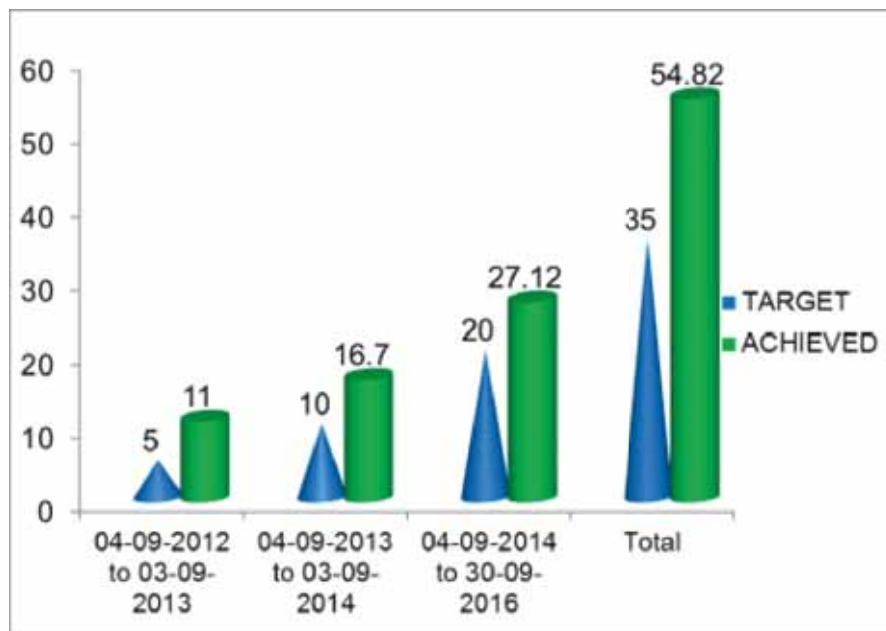
C-MET has developed complete indigenous technology for making supercapacitors. These supercapacitors are carbon aerogel based. The performances of aerogel supercapacitors, developed by C-MET were found to be superior as compared to that of the commercially available supercapacitors, made with conventional activated carbon. The indigenous Aerogel supercapacitors have passed stringent quality testing by several

industrial end users and showed the capability of withstanding high powers under applied electronic loads. During initial trials, it has shown significant improvement in performance in VVPAT equipment that is attached with Electronic Voting Machines. A pilot-scale demonstration plant for production of aerogel supercapacitor has, therefore, been undertaken for the first time in the country to facilitate the transfer of technology for commercialization. Aerogel Pilot plant part has been successfully completed.



5.3.3 RoHS Testing facility at C-MET, Hyderabad: MeitY has created world class, first government testing laboratory facilities for hazardous substances presence in electronics and electrical equipments at C-MET Hyderabad. The laboratory is capable of certifying and issue internationally valid certificate as per ISO 17025. It is also raising

awareness on hazardous substance using various industrial and academic conferences. The laboratory is slated to be become reference laboratory as per E-waste Rule 2016 guidelines released by Ministry of Environment, Forests & Climate Change.





5.3.4 Centre of Excellence for Digital Preservation

Digital Preservation addresses the long term preservation and access of digital data (born digital as well as reformatted digital) in the midst of technological obsolescence in terms of storage, file formats, operating systems, software etc.

Government has initiated Centre of Excellence for Digital Preservation at CDAC, Pune and CDAC, NOIDA with the following objectives:

- Continuing R & D in Digital Preservation for development of tools in various domains.
- Develop pilot Digital Preservation repositories.
- Define the Digital Preservation Standards and Best Practices.
- Spread awareness about the potential threats

and risks due to digital obsolescence.

The development of pilot digital repositories, initiated at the following domain institutions, reached advance levels of implementation by creating digital preservation infrastructure at these institutions:

- Stamps & Registration Department, Government of Andhra Pradesh
 - Computerization of Registration Documents (CARD) project
- National Archives of India, New Delhi
 - Government Archives
- Indira Gandhi National Centre for Arts (IGNCA), New Delhi
 - Cultural Data

- Delhi District Court
 - Court case records

The infrastructure includes various software tools (electronic record management and archival system, e-records extraction system, pre-archival processing system etc.) developed by the Centre of Excellence, digital repository portals along with storage, backup and server hardware. The digital archival and technical processes are designed to comply with the requirements of ISO 16363 Audit and Certification of Trustworthy Digital Repositories.

The digital repository of National Archive of India developed through this project is made online and can be accessed from www.digitalarchive.gov.in, which includes various software tools such as DIGIT LAYA: Open Archival Information System, e-RUPANTAR: data processing solution before archival, Repository Portal, Online Records Reporting System and necessary hardware and remote backup facility. It facilitates to search and

retrieve through 22 Lakh catalogues and around 10,000 public records, private archives and cartographic maps. It provides a complete digital preservation workflow to NAI, starting from digitization, pre-archival processing, preservation and public access through online repository portal.

e-Goshwara aims at long term and trustworthy digital preservation of disposed cases for Indian Judiciary. During the year, various enhancements have been carried out pertaining to customization of Disposed Case Portfolio Manager (DCPM) for Supreme Court of India as per the requirements of Supreme Court. Also, integration with their existing Content management system, operationalization of Data Processing Centre, design and implementation of preservation environment for Delhi district courts as per the OAIS (Open Archival Information System) framework, Design and Development of web based dissemination services, e-Goshwara portal, self-audit and certification for trusted digital repository, have been done.





5.3.5 Internet of Things

MeitY in association with ERNET India and NASSCOM has established Centre of Excellence (CoE) for Internet of Things (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 ₹2195.22 Lakhs, with MeitY contribution of ₹1077.72 lakh 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.

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 program support.

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 proposal is to establish 5 such CoE such over a period of time across multiple centres. 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.

The physical laboratory infrastructure is already operational. The Centre has defined guidelines for enrolling of Start-ups. 5 Start-ups have been

selected for incubation. Regular meetings/workshops are being conducted with start-ups and Entrepreneurs. CoE for IoT is focusing on Agriculture, Water, Health, Transportation, Security & Safety and Energy as vertical segments.

Government of Karnataka has joined the initiative as a State partner through grant of space as well as program execution support in the State.

5.3.6 Innovation, IPR and IP Development

5.3.6.1 Collaborative Research & Development through GITA

To provide funding and support to industry and academic institutions for undertaking collaborative research, MeitY has approved a proposal submitted by Global Innovation and Technology Alliance (GITA). The project aims to promote Innovation, IP, R&D and commercialization of products, etc. in the ESDM sector by providing funding support to Industry in reimbursable mode, for Bilateral collaborative research in the priority areas with a timeline of not more than two years. A maximum of 9 R&D projects will be funded under the scheme. The bilateral programme will be conducted initially in Canada, Finland, Israel, Japan, South Korea, Spain, Sweden, Taiwan and the UK. The areas in which MeitY is initially focusing are Large Area Flexible Electronics, Internet of Things (IOT) and Technology for Internal Security. In this regard, administrative approval has been issued on 14th August, 2014 and MoU was signed on 22nd May 2015.

Three priority areas, viz., medical electronics, strategic electronics, MEMS have been additionally included for funding under the program. Three additional country, namely, Germany, France and Belgium have been included for extending the projects in these countries as well. One proposal each was approved for funding under India-Finland

and India-UK call for proposals. Recently, two proposals were approved for funding from MeitY under India-Canada call for proposals. The next round of India-UK RFP launched on 8th November 2016 in the India-UK Tech Summit.

5.3.6.2 Supporting research in Medical Electronics through BIRAC

To promote scientific and technological research in Medical Electronics sector in India, MeitY, in association with Biotechnology Industry Research Assistance Council (BIRAC), is implementing Industry Innovation Program 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 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. Under this program, support is provided at Seed, Early transition and transitions to scale stages of R&D and Innovation cycle. Currently, 14 projects are being funded under this program and 5 more have been selected for funding.

5.4 Exploratory Blue sky research

5.4.1 Bioinformatics

Bioinformatics Resources and Applications Facility (BRAf)-CDAC Pune:

The Bioinformatics group at C-DAC have made pioneering efforts towards bridging the gap between biologists and High Performance Computing technology. The Bioinformatics Resources and Applications Facility or BRAf is infrastructural set up for national use.

RAF 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 PARAMBiobank. 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

BRAF Hardware: PARAM Biogene





bioinformatics national community.

5.4.2 Research on secured Cyberspace

Cyber Security R&D is one of the key components of creating cyber security eco-system in the country. It is aimed at development and 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 organizations.

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 towards nurturing institutions and capacity enhancement in the entire North East Region.

During 2016-17, efforts in the on-going projects have progressed and new projects were formulated in the identified thrust areas.

5.4.2.1 Cyber Security R&D Projects

(i) Detection of XML based injection vulnerabilities: The objective of the project is to develop a tool for detection of XML based injection vulnerability in web applications. A tool was developed for identifying the vulnerable injection points that can be exploited using

various XQuery injection attacks, such as, Tautology injection, Comment injection, CDATA injection, XML Meta-characters injection, XML Tag injection and Blind injection and also using various logic attacks, such as, parameter manipulation, workflow violation and access control violation.

(ii) Honeynet system for broadband networks:

A honeynet system for broadband networks was developed with (a) USB bootable nodes having support for multiple honeypot sensors (Passive Honeypot, Active Honeypot with multi browser support, Router Honeypot, Web Honeypot, Honeypot application, (b) framework for botnet tracking and (c) dashboard for the visualization of attack data from multiple sensors. The Prototype solution has been implemented with 27 nodes in the network of four broadband service providers and analysis data is being shared with user agency.

(iii) Cyber forensics tools: Cyber forensics tools developed earlier viz. CyberCheck V6.0, MobileCheck V3.1, Advik CDR Analyser V3.2, PhotoExaminer V2.0 and Multilingual Search Tool 2.0 have been enhanced with new features. New tools: CyberCheckLite V 1.0 and Portable Forensics Solution VI.O (Laptop Solution) have been developed and provided to user agencies for their use.

(iv) System for detecting digitized document frauds: A system has been developed to detect and analyze the genuine and counterfeit currency using 16 identified features in terms of their physical observation and computation model.

(v) Multi-Model broadcast analytics: Development of an integrated multi-mode

broadcast analytics system consisting of multi-mode content analysis of news websites and television news channel broadcast by text mining, video analytics and speech/audio-video segments related to identified events is in process.

(vi) Digital forensic tools for cloud IaaS (Infrastructure as a Service):

A tool is being developed to perform acquisition and analysis of digital forensic evidence from IaaS private cloud computing environment.

(vii) Multimodal context switching:

Development of a system with face, periocular and iris recognition algorithms to recognize images captured in both visible and near infrared domain is in progress. The system will have capability for combining information obtained from face, periocular and iris depending on the quality of images using a context switching algorithm.

(viii) Intelligent adaptive video monitoring and recording system:

A smart digital video monitoring and recording system is being developed, which is capable of extracting, displaying, and storing the faces of people in high resolution and display and store video in low resolution.

(ix) Multimedia forgery detection system:

The system is being developed, which is capable of (a) classifying single and double compressed images/videos with the detection accuracy of about 90% over particular image/video database and (b) tracing the origin of images/video with the detection accuracy of about 80%.

(x) Detecting security vulnerabilities in android applications:

The objective of the project is to develop new static analysis

techniques to analyse the executable code of Android applications to detect different types of vulnerabilities.

(xi) Security analysis framework for android platform:

The project aims to develop an investigation framework for application analysis and modeling propagation of malicious application within network of interconnected android devices.

(xii) Person identification system:

The system is being developed using online handwriting for Indian languages, namely, Assamese and Hindi.

(xiii) Security testing and validation methodologies for cryptographic modules:

A project is being implemented to establish hardware and software test platforms, reference implementations, processes and procedures for validation and certification of cryptographic algorithms and cryptographic modules used in hardware / software products.

(xiv) Matching near-infrared facial images to visible light images:

The project aims to develop algorithms for matching near-infrared (NIR) to visible light facial images for person identification across pose, illumination and resolution.

(xv) Solution to defend collaborative attacks in peer to peer networks:

The objective of the project is to develop a security solution to resist collaborative attacks by collaborative efforts of neighboring nodes using both trust and cryptographic mechanisms.

(xvi) Defence against attacks in virtualization and hypervisor technologies:

The objective of the project is to develop hypervisor security components to provide defenses against the identified runtime attacks to ensure



confidentiality in the virtualization and hypervisor layers of cloud computing infrastructures.

(xvii) Detecting malware in embedded system:

The objective of the project is to carry out research and develop a solution for (a) detecting malware already present (back door) in firmware and (b) malware that enters at runtime by exploiting the vulnerabilities. The solution is proposed to be demonstrated on SOHO (Small Office / Home Office) Wi-Fi routers.

(xviii) Early warning framework solution:

Development of an enhanced network situational awareness platform using Netflow, DNS (Domain Name System) and BGP (Border Gateway Protocol) analysis for cross correlation and network forensic for detection of malware is in process.

(xix) Opinion mining and sentiment analysis of social media content:

The objective of the project is to build a sentiment analysis framework, which will grade sentiment level of social media content, for assessing security issues.

(xx) Anti-Spam Coordination Centre:

The centre aims to develop a framework for collection, analysis and exchange of information about spam mails. Spam mails collected will be analysed to find out the origin of such mails and classified into categories.

Proposed efforts during 2017-18

The R&D activities in the program will be carried forward during 2017-18 to promote research and development of indigenous cyber security solutions, proof of concepts and prototypes in the thrust areas of cyber security especially in areas of cloud security, IoT security, mobile device security,

malware collection, analysis and prevention, leveraging big data analytics for security, video and image forensics tools & technique and social media analytics.

5.4.3 Design and Development of a Compact Cost effective Brix Meter

Technology development in the form of a proof of concept for measurement of sucrose concentration in the syrup for application in sugar industries has been completed. Prototypes of Brix meter based on the microwave technology as well as on Boiling Point Elevation method have been developed and tested.

5.5 Societal Reach R&D

5.5.1 Medical Tools, Equipments & Software

(i) Repair of 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 91 candidates (NIELIT, Shillong – 49, NIELIT, Kohima- 32 and Para medical Staff-10) has been completed. By virtue of the training some of the participants have got employment.

(ii) Computer Aided Detection System for Mammograms:

The system development have been completed and tried on patients for screening of breast cancer. System has been deployed at Regional Cancer Centre, Trivandrum. Technology transfer activities have been initiated by inviting expression of interest.

(iii) Diabetic Retinopathy Identification Software:

System development has been completed. The developed system was field

tested through 1867 retina images of 1486 patients. The technology transfer activity has been initiated by inviting expression of interest.

(iv) Leukoanalyser: A prototype Graphical User Interface (GUI) for an automated tool has been developed. Database for dataset of 4500 normal and 6000 malignant cells have been developed and extraction of features from these datasets is progressing. Preliminary Random Forest Classifier has been developed for classification of cells.

(v) Design and Development of 1.5 Tesla Magnetic Resonance Imaging (MRI) Systems: For Medical Imaging, the Technical Design Report with the specification of superconducting magnet and required associated components has been drafted and is under the review by the expert for implementation. The Graphical User Interface (GUI - version 2.0) has been developed and Image construction algorithms are being developed. Successful integration of various sub system i.e. Signal Generation System, 100 W Transmitter, Linear Feed Transmit Birdcage head Coil, Receive Surface Coil, Receiver Front End and Digital Receiver with truthful reproduction of the fed Free Induction Decay (FID) signal has been completed.

(vi) High energy 30 MeV linear accelerator (LINAC): The existing LINAC tube has been provided with accelerating structure. 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 systems have been designed, fabricated and are being tested.

(vii) Design & Development of Indigenous Colour Doppler Ultrasound Scanner with centralised PNDD database compliance: Indigenous Color Doppler Ultrasound Scanner is targeted for development. Specifications for ultrasound research platform has been reviewed and finalised by experts and schematic for Ultrasound transmitter and receiver electronics printed circuit board have been completed. PCB design has been completed for ultrasound probe.

(viii) Studies on detection of cancer, processing infrared images and developing appropriate Instrumentation system for initial deployment in N.E. States: Database for thermal images with low resolution camera has been created. Basic algorithm for detection of cancer cells has been developed and tested. An awareness programme in the form of Breast Cancer Screening camp was organised at Cancer Hospital, Silchar. Local residents participated in the programme.

(ix) 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. CDAC, Pune has completed training and demonstration of deployed DHS system at AIIMS, JPNATC, New Delhi.

(x) Certification Schemes for Compliance with EHR Standards: This project will 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 procured 28 ISO Standards and development of Standards Compliance Assessment methodologies have been completed for 13 standards.

(xi) 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 an individual. Users can store reports, diagnostics which are accessible by individual/doctor for online consultation and prescription. The system has been developed, tested and deployed on cloud.

The following new projects have been initiated during the current year:

(i) Design & Development of “Olfactory Sensing System for Biomedical Application – study and prototype development”: Olfactory system will be a Non-invasive method for early detection of diabetes. Data collection from Medical College has been completed and Experimentation has been started. Design document for Hardware/Software required has been prepared. Necessary sensors have been identified and procured. Initial prototype system has been developed, laboratory tested and it is being tested with the patient data record from Calcutta Medical College. Initial results are

showing good correlation with the hospital data.

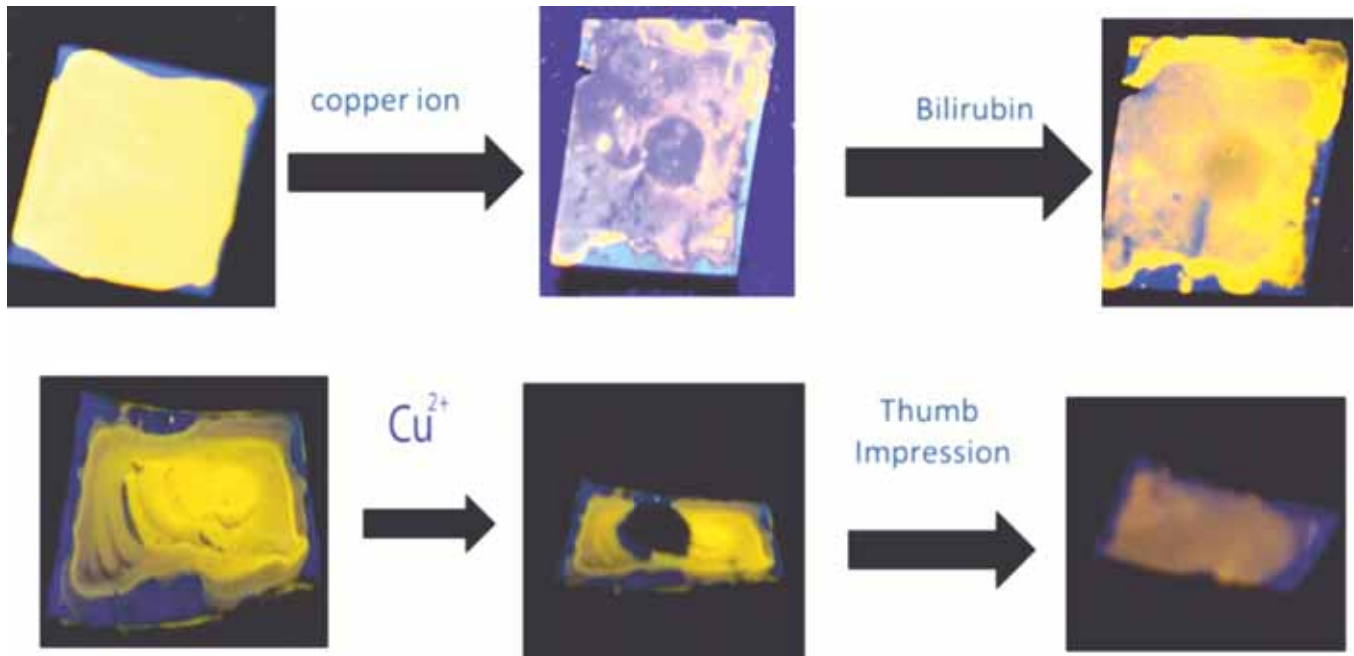
(ii) Repair of Maintenance of Medical Electronics Equipment: A Medical Electronics Laboratory for repair and maintenance of Medical Electronic Equipment has been established at NIELIT, Silchar, Assam for undertaking repair and maintenance of Medical Electronics equipments of various hospitals in Assam. Procurement of capital equipment has been initiated.

(iii) Maxillo-Facial Surgery Planning and Simulation System, a reliable & cost effective planning and simulation system for maxillo-facial surgery, which enables precise 2D cephalometric analysis and interactive manipulations of three dimensional reconstruction of the facial tissues in order to visualize the patients postoperative appearance. The software system will also archive each patient case in systematic database, which will serve as future reference and also educational purposes. The project has just been initiated.

5.5.2 Healthcare

(i) Device for visual detection of Bilirubin for Hepatitis patients developed at IIT, Guwahati

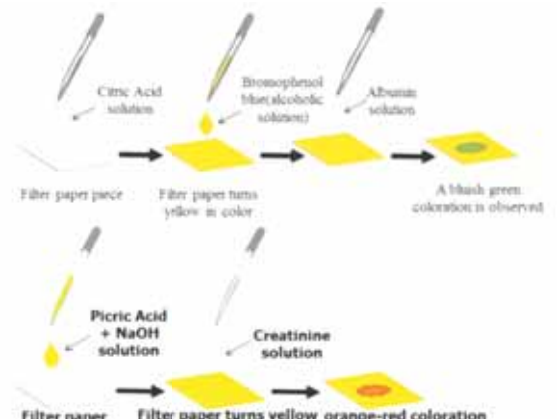
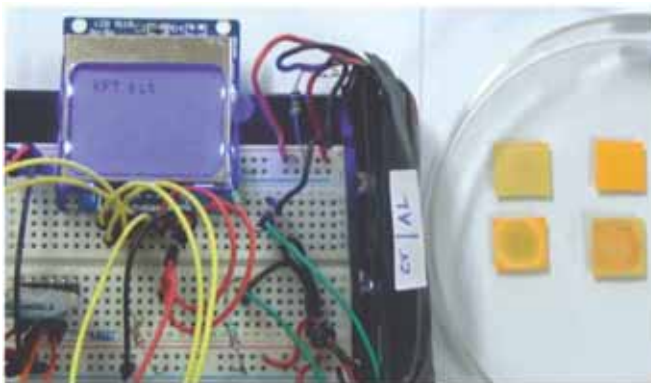
The nanoparticle based point-of-care testing device is capable of detecting the biomarker bilirubin for the detection of Hepatitis syndrome of a patient. The device is capable of detecting the meagre amount of bilirubin present on the skin during the diseased state through a colorimetric change in the signal when the thumb impressions are taken.



(ii) A kidney-function-test kit to identify the albumin to creatinine ratio for the diabetic patients developed at IIT, Guwahati

The kit has been developed for the point-of-care quantification of albumin to creatinine ratio (ACR) in the urine of optical transmittance units and a signal processing unit. The device is composed of a pair of stages supporting a detection unit, a pair of sample stages integrated with the light sources.

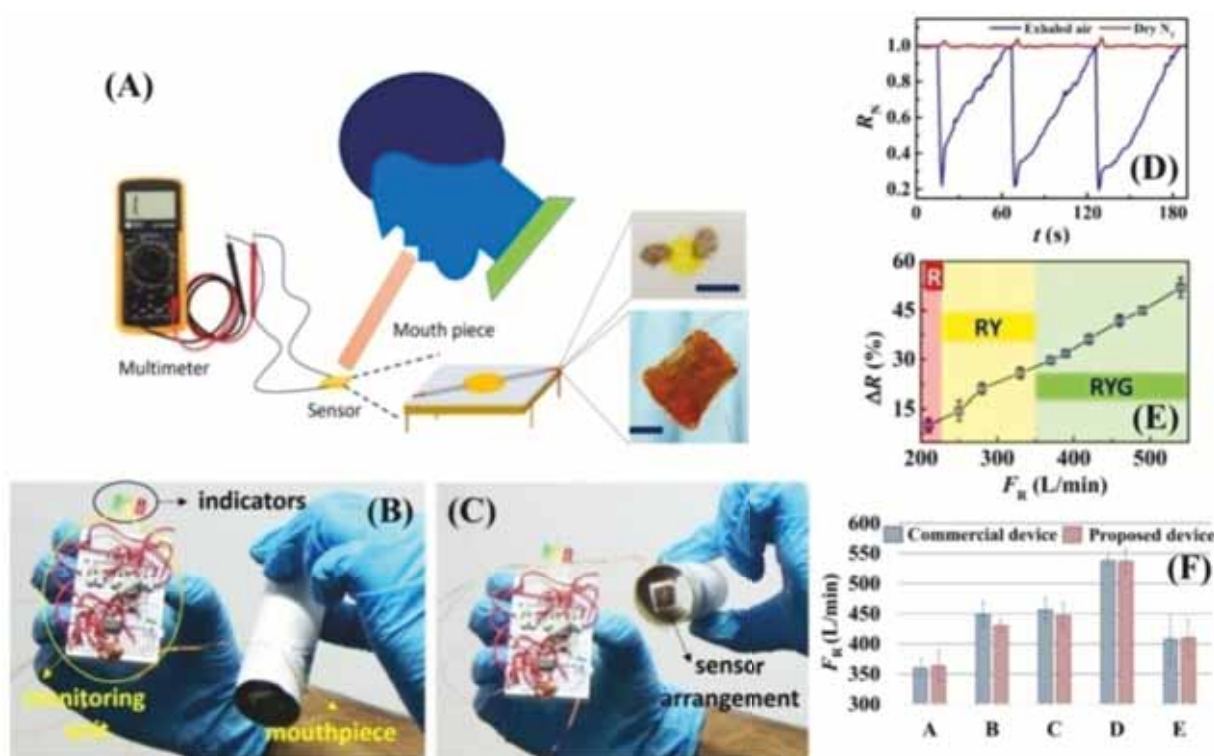
Photodetectors convert the quantifiable optical signal transmitted through the reagent coated substrate detection unit placed in the sample stage to electrical signals. A signal processing unit connected to the said optical transmittance unit transduces the analogue electrical signal into the digital display signal. The simple, single step, cost-effective easily disposable system/kit is useful for point-of-care detection of ACR in urine sample.



(iii) A lung-function monitoring device for asthma patients developed at IIT Guwahati.

The invention relates to lung function/status/condition monitoring. More specifically, the present invention is directed to develop a Lung condition monitoring device with nanoparticle based humidity sensor configured for performing ultrafast detection

of humidity level in the exhaled air of a human while breathing out and there from detect condition of the human lungs in real time. The present Lung condition monitoring device is portable and advantageously adapted to operate as point-of care testing gadgets or devices for checking fitness of the lungs of a person.



The present Lung condition monitoring device is also capable of wireless data transfer to a peripheral computing device like smart mobile phone via 'Bluetooth' connectivity for showing test results on the mobile phone display with the help of an application developed for the open standard operating system.

Under the project "Development of Multifunctional

magnetic nanoparticulates for cancer" at IIT Bombay, thermo- and pH-sensitive lipids, dendrimers, biodegradable polymers and hydrogels functionalized magnetic nanoparticles and their suspensions have been developed for combined therapy involving chemotherapy and hyperthermia. These multifunctional formulations allowed conjugation of multiple drugs and achieved enhanced specificity in targeted therapeutics along

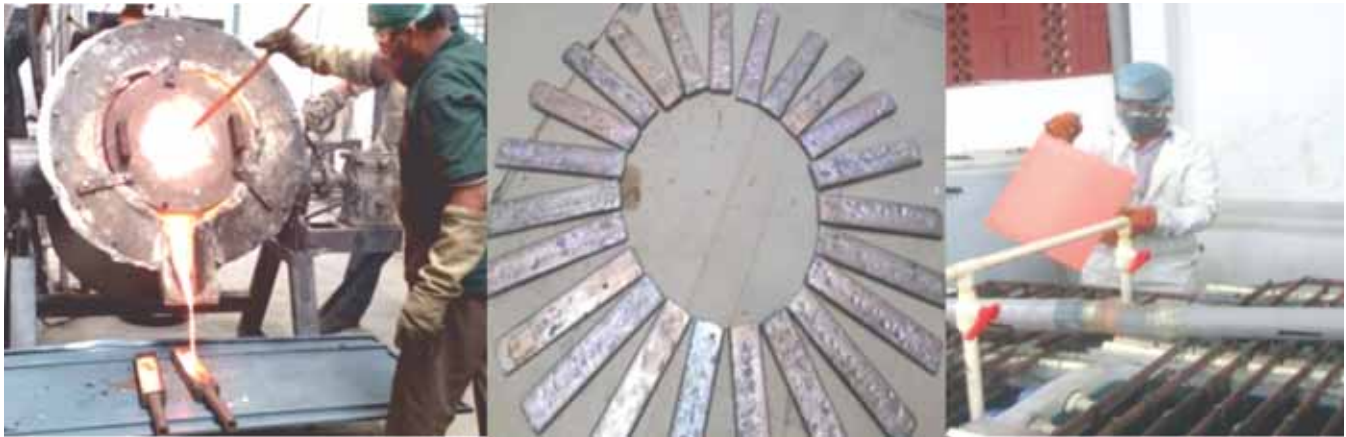
with thermal therapy towards cancer treatment and minimize the drug resistance in target site.

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.

5.5.3. E-waste Recycling

(i) Pilot Demonstration of E-waste Recycling Facility at E-Parisara, Bangalore: Electronics waste (e-waste) comprises the end of life product of

a wide range of electrical and electronic devices. E-waste contains both toxic and valuable materials. The toxic materials create health hazards and environmental issues. To address this issue of national importance, recovery of precious metals through environmentally friendly from PCB had been successfully achieved through pyrolysis process by Centre for Materials for Electronics Technology (C-MET), Hyderabad and M/s E-Parisara Pvt. Ltd., Bangalore. Currently, cost effective indigenous technology is being developed for copper recycling and refining.



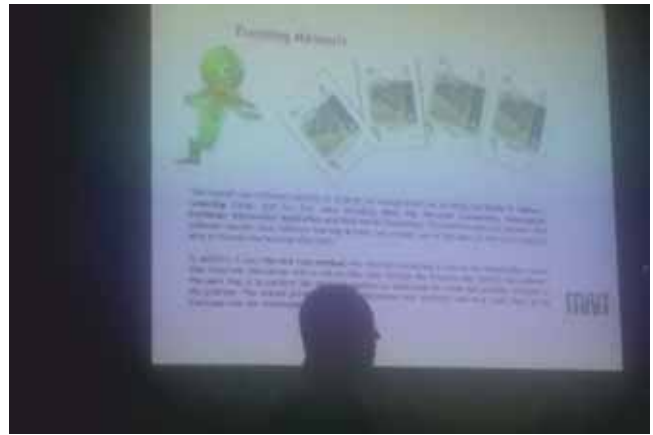
Demonstration of the prototype for PCBs recycling facility at C-MET, Hyderabad and E-Parisara, Bangalore

(ii) 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. During the entire project duration of 5 years, a city each in the 10 identified States would be covered in pilot stage. The stakeholders involved are schools/ Colleges/ Residents’ Welfare Associations/ Bulk Consumers/ Regulatory Bodies, media engagement etc. Course

content for various stakeholders, designing of e-waste mascot called "Greene", and website creation (<http://greene.net.in/>) has been completed

while mobile app creation, stake holder's consultation and inventorization study is running.



5.5.4 Agriculture

(i) Utilizing the prototyping facility established at IIT Bombay, one of the macronutrients with complete instrumentation for PSS (proximal soil sensing) and NPK system based on spectroscopy using discrete components are planned to be demonstrated.

(ii) Green Technology based Electronic Milk Analyser

For measurement of fat, solid non-fats, protein, lactose, water and density in raw milk, the industrial grade prototype of an affordable, portable Milk Analyser have been developed and tested in field. The instrument was exhibited at India International Trade Fair (IITF) 2016. This technology may find application in village level milk collection centres and milk chilling centres. The technology is ready for commercialization.



Milk analyser

(iii) Smart Warehouses with Application of Frontier EM & Electronics based Technology:

Draft Detailed Project report identifying various sensors/controller has been prepared for implementation in a FCI warehouse. The

prototype of moisture meter has been developed and tested. An image processing based system is being upgraded to detect various characteristics of rice.

(iv) Design & Development of continuous Flow Hydroponic System:

Automatic continuous flow Hydroponics system with continuous monitoring and programmable control of pH and Electrical Conductivity (EC) of solution, along with Micro and Macro nutrient dispensing system, has been developed. The developed system has been deployed at the Dr. Yashwant Singh Parmar University of Horticulture & Forestry for a year on multiple



crops like tomato, capsicum, broccoli, cauliflower and strawberry. The technology has been propagated to farmers/Scientists through a National Workshop organised at the proposed site.

5.5.5 Environmental Pollution Monitoring

- (i) 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 25°C to 400°C and power consumption of less than 1 watt has been deployed at 20 locations in Bengaluru city using EnviroMote wireless sensing platform.
- (ii) Nano size ZnO and SnO₂ have been developed using the herbal route for sensing the NH₃, NO₂ and H₂S at Srimaharishi Institute of Vedic Technology, Guntur, A.P.
- (iii) Under the project, “Cost effective synthesis of graphene and metal-incorporated graphene: their application as sensors of environmental gases” at SMIT, Sikkim, high quality graphene and metal (In₂O₃, SnO₂ and ZnO) incorporated graphene using lotus flower petals has been prepared for sensing applications. Lab level prototype sensors have been successfully fabricated for NH₃, NO₂ and CO gases.



5.5.6 Energy Storage and Generation

Intensive R&D is being carried out on development of energy storage and generation devices. In this area, projects on lithium-ion battery, supercapacitors, fuel cells and energy harvesting from secondary sources, such as, harnessing of vibration energy using piezo materials are currently running. Some technologies of supercapacitor have already reached technology transfer stage and details are available in sections 5.2 and 5.3. A laboratory has been setup at C-MET Pune for development of Li-ion battery. The laboratory is capable of producing button cell and pouch packs of Li-ion batteries and subsequently test them. In addition, C-MET has initiated basic R&D programme to recycle Li from e-waste to counter the lack of this critical mineral in India. Cost effective nano-particle based Fuel Cell technology is being developed jointly by CMET and NIT, Warangal



5.5.7 Rehabilitation of Divyang

ICT Centre of Excellence on Tactile Graphics: The project has application for social development of Divyang. Grade-IX NCERT textbook for Mathematics & Science have been converted into tactile form for visually challenged Divyang. Similar work for Grade-X NCERT book is in progress.

5.5.8 Language Computing

(i) 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 11 Indian Languages, namely, Hindi, Bengali, Marathi, Tamil, Telugu, Malayalam, Gujarati, Odia, Assamese, Manipuri & Kannada has been developed using fully Open Source engines.

- Technology Transfer and TTS integration with Mobile devices :
 - Integration of TTS in Mobile Devices will enable a large section of the society particularly rural and Tier-2 & Tier-3 Cities to have voice 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.
 - TTS has been successfully integrated with INDUS OS and has currently been 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.

(ii) Optical Character Recognition in Indian Languages

Optical Character Recognition for 9 Indian languages, namely, Bengali, Devanagari, Gurumukhi, Kannada, Malayalam, Telugu, Tamil, Assamese and Urdu languages have been made available through TDIL Data Centre <http://www.tdil-dc.in>. OCRs for seven Indian Languages, namely, Assamese, Bangla, Gurumukhi, Devanagari, Kannada, Malayalam, Tamil are being made available in CDs/ PenDrive with bi-lingual GUI.

(iii) On-line Handwriting recognition system (OHWR):

Alpha version Online Handwriting Recognition in 8 Indian Languages, namely, Hindi, Bengali, Tamil, Telugu, Kannada, Malayalam, Assamese and Punjabi languages have been developed. These technologies have also been packaged as "Smart Input Panels" for data entry into any active software programme without use of keyboard and made available for Android and windows through tdil-dc.in portal.

(iv) Automatic Speech Recognition (ASR)

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

Pilot deployment effort in collaboration with Ministry of Agriculture has been initiated for ASR system in



Marathi and Tamil languages for Maharashtra and Tamil Nadu. Speech Recognition Systems for agricultural commodity prices and weather information system for 11 more Indian languages/ dialects have been initiated.

(v) Multi-Lingual Basic Information Processing Tools

Lack of content and content creation tools in Indian languages is a big challenge. 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 have been released for free public use for all 22 constitutionally recognized Indian languages. Various 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 have been about 1.41 Crore downloads. These software tools can also be downloaded freely from <http://www.ildc.in>.

(vi) 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. Linguistic resources, such as, annotated text and speech corpora for Indian languages in tourism domain 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.

5.5.8 Societal Misc.

(i) Development and Field Testing of Panic Switch Based Safety Device for Cars for aiding women's safety

The project, undertaken under Nirbhaya fund, is to develop a safety device, in the form of a panic button, which when invoked would transmit an SOS signal to predefined locations, including Police using 112 dialling service, for the passengers travelling through public transport like Cabs and Taxis. The system will be compatible to draft specifications prepared by DIMTS for MoRTH or draft AIS 140 (Automotive Industry Standards). Project has been initiated and first level of prototype as Proof of Concept has been developed and being tested in laboratory.

(ii) Open source Computer Aided Design (CAD) Tools for weaving of Banarasi Sarees

A low cost ICT tool version-I has been developed, tested in laboratory and being deployed at 5 locations in Weaver Service Centre/ Community Service Centre, Varanasi for field test. Later, it may be used by the local weavers/artisans.

(iii) Enhanced, user-friendly Advanced Traveller Information System (ATIS)

The earlier developed technology of Advanced Travelers' Information System (ATIS) has been enhanced and auto-diagnostic tool for GPS & Cameras have been developed. The communication link between IIT, Madras and Chennai Police Commissioner office has been

established and tested. The complete system is being handed over to user agency, the Chennai Traffic Police for their regular operation. This is a generic technology, which could be replicated in other cities.

(iv) Development of Intelligent Transportation System (ITS) Solution for Pedestrian Safety Enhancement and Emergency Service Vehicle Priority at Signalized Traffic Junctions

System Requirement Specifications have been

drafted and design document has been reviewed. Prototype of Emergency Vehicle Pre-emption (EVP) system using active Radio-Frequency Identification (RFID) reader has been developed and field trial was carried out for one arm with CDAC Traffic signal controller at Thiruvananthapuram. Interfaces for Smart cane, push button, visual indicators for Pedestrian Safety Enhancement system have also been developed. Its prototype development is in progress.

CHAPTER 6

INTERNET GOVERNANCE AND SECURED 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 programs that shape the evolution and use of the Internet. It covers activities, such as, development and coordination of technical standards, operation of critical infrastructure and public policy issues.

Conceptually, Internet Governance includes layers relating to Physical Infrastructure, Code or Logical layer, Content layer and Security.

Internet Governance involves Internet Protocol Addressing

(IP Addressing), Domain Name System (DNS), Routing, Technical Innovations, Standardization, Security, Public Policy, Privacy, Legal Issues, Cyber Norms, 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 and 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. **ICANN 57 Meeting:** India hosted, the 57th meeting of Internet Corporation of Assigned Name and Numbers (ICANN) in Hyderabad, Telangana from November 3-9, 2016. ICANN57 meeting at Hyderabad is the first public meeting after US Government has transferred its stewardship over ICANN's IANA functions to a multistakeholder community on October 1, 2016. ICANN57 had a record attendance of 3,182 participants, of which about two-thirds were from Asia, and a third was Indian participation. The meeting was also significant as India has the second largest user base of Internet and reflects the country's desire to deepen its engagement in the global internet policy making process.
- ii. **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. GAC's key role is to provide advice to 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. **A Workshop on "Engaging with ICANN" was held during May 2016 in New Delhi.** The comments of

India on various international forums/ discussions can be accessed at www.indiaig.in

- iii. **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 is no negotiated outcome, the IGF informs and inspires those with policy-making power in both the public and private sectors. 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 arise.
- iv. **Multistakeholder Consultations:** India has supported the multi-stakeholder model of Internet Governance, which involves all stakeholders and helps to preserve the character of the Internet as a unified, dynamic engine for innovation and encourages equity and inclusion.

6.1.1.2 The Research, Development and awareness agenda that have been undertaken in the area of Internet Governance include:

a) **Capacity Development Program for Increased India's Participation in IETF by Internet Society, Kolkata Chapter :**

The objective of the capacity development is to expose and encourage participation in the



Internet Engineering Task Force (IETF) processes across India and to create connections between new and established open Internet standards developers. Awareness camps and seminars are conducted to provide awareness and opportunities for fellows to participate in the global Internet ecosystem and also to interact and engage with the broader Internet engineering community. The link <http://www.iicb.org/> provides the details of the activities.

b) Wireless Internet Protocol enabled time slotted and channel hopping Sensor 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 Hopping (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 focuses on 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 Working Group members, end users comprising of industry, R&D groups and academic community, and to evaluate their functionality and performance on the testbed.

- Conducting 6TiSCH workshops to highlight the various activities of the IETF Working Group and demonstrate the working implementation of related IETF standards to enhance adoption of the same.

c) An Ecosystem for Active Participation in Internet Standard Organizations implementing 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 and to propose and 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, encourage direct participation in the meetings of the Internet organizations, engage with academic community (students and faculty), industry and civil society in order to promote their participation in Internet organizations and to provide scholarships and fellowships for deserving candidates to encourage participation in IETF activities and to prepare for hosting IETF or similar such meetings, in India, in future.

d) 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. The UNCSTD carried out a mapping and gap analysis of international public policy issues pertaining to the Internet. The mapping document included clusters relating to international Internet public policy issues on Infrastructure and standardization, Security, Human Rights, Legal, Economic, Development and Sociocultural issues.

In this regard, policy papers are being prepared on the above issues as well as on the following:

- 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 gILD 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 CCTVs 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. 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

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 then 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: Seven Internet Exchange Nodes are functional at Delhi (Noida), Mumbai, Chennai, Kolkata, Bengaluru, Hyderabad and Ahmedabad. 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, 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 65 Gbps.

All functional NIXI nodes are IPv6 ready. NIXI also undertakes training and workshops 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, 117 Registrars (including two government registrars namely NIC and ERNET) 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 2.2 million .IN Domain names have been registered till December 2016. IDN's in Hindi, Bodo, Dogri, Konkani, Maithili, Marathi, Nepali Sindhi, Bengali, Gujarati, Manipuri, Punjabi, Tamil, Telugu and Urdu languages were launched during the year 2014-15 and over 22000 IDNs domain names have been registered till date. In August, 2016, NIXI has got delegation of the remaining official languages (Assamese, Kannada, Malayalam, Oriya, Sanskrit, Santhali 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 AS Numbers within the country. As on December 2016 over 2048 affiliates have joined IRINN. Out of 2048 Affiliates, 1745 have taken IPV4, 4 have taken IPV6 and 299 affiliates have taken both IPv6 as well as IPv4.

6.3 Cyber Law

Comprehensive legal framework in terms of IT Act 2000 and its amendment provides for:

- 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 (sections 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 confidentiality and privacy, breach of lawful contract etc.

6.4 Indian Computer Emergency Response Team (CERT-In)

CERT-In is a functional organisation of Ministry of Electronics and Information Technology, Government of India. CERT-In 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.

CERT-In creates awareness on security issues through dissemination of information on its website ([http:// www. cert-in.org.in](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 2016-17 comprised of the following:

Activities	Numbers 2016 (April-Dec)
Incidents handled	35418
Security Alerts/ Incident Notes	7
Advisories	78
Vulnerability Notes	231
Trainings	12
Indian Website Defacement tracked	23987
Bot Infected systems tracked	8843069
Security Drills	2

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 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 countries such as USA, United Kingdom, Japan, South Korea, Australia, Malaysia, Singapore, Canada, Vietnam and Uzbekistan. 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 preventive measures.

Cyber Security Assurance

Under Security Assurance Framework, CERT-In has empanelled 32 auditors to carry out information security audit, including the vulnerability assessment and penetration test of the networked infrastructure of government and critical sector organizations for the block period 2016-2019. 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. Services of CERT-In empanelled IT security auditors are being used to verify compliance.

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, several guideline documents and templates have been published to assist development and implementation of sectoral Crisis Management Plans. Cyber Crisis Management Plan (CCMP) for countering Cyber-Attacks and Cyber Terrorism is updated periodically to take into account changing scenario of cyber threat landscape. CERT-In has conducted 6 workshop since April- 2016 to appraise various organizations under the Central Ministries/ States/UTs about the CMP implementation and all necessary assistance is being provided to them with regard to implementation of CMP. Till date 44 CMP enabling workshops have been conducted

Cyber Security Drills

Cyber Security Mock Drills are being conducted by the Government 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 11 Cyber security drills of different complexities with participation from more than 200 organizations covering various sectors of Indian economy i.e. Defence, Paramilitary forces, Space, Atomic Energy, Telecommunications (ISPs), Finance, Power, Oil & Natural Gas, Transportation (Railways & Civil Aviation), IT/ ITeS/ BPO sectors and Data Centres from Government/Public/ Private. Joint Cyber Security Drill by CERT-In & RBI was successfully conducted on September 30, 2016 for various commercial banks to enable them to assess their emergency incident response preparedness.

Parallel Test bed facility established at IISc, Bangalore for CERT-In is being used to provide support in conducting cyber security exercises.

ASEAN CERTs Incident Response Drill (ACID), 2016 was conducted with the objectives of Strengthening cyber security preparedness of ASEAN member states and Dialogue partners in handling cyber incidents and reinforce regional coordination drills to test incident response capabilities. This year the theme of the drill was handling incidents of Ransomware.

Security awareness, skill development and training

CERT-In is regularly conducting 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 2016-17, CERT-In has conducted 12 trainings (including a separate training programme for women IT officers) on various specialized topics of cyber security (Till December). 370 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.

Upgrading of the technical Infrastructure

Bandwidth pool has been enhanced with links from multiple services providers, in order to minimize the chance of downtimes and thwart attempts of DDoS attacks on the infrastructure. Mail servers have been upgraded with additional security and features. Application Firewalls have been deployed in order to optimize response time of the Web Site and provide additional security. Intrusion prevention systems have been added with advanced features of auto detection and blocking behavioural attacks. Frequency of replicating Critical data such as web, mail and Incident Tracking has been increased in order to minimize data loss in case of a disaster. Bandwidth links at the disaster recovery site have been upgraded with dedicated point-to-point connectivity being configured with the main site. Data archival has been achieved by the deployment of LTO (Linear Tape Open) magnetic storage at the main site and Disaster recovery site.

Botnet Cleaning and Malware Analysis Centre (Cyber Swachhta Kendra)



Botnet Cleaning and Malware Analysis Centre has been established by CERT-In for detection of compromised systems in India and to notify, enable cleaning and securing systems of end users to prevent further malware infections. The centre is working in close coordination and collaboration with Internet Service Providers and Industry. Website of the centre is operationalised in December 2016. The centre is providing detection of malicious programs and free tools to remove the same for common users. Further, the centre is working with Banks to detect malware infections in their networks and enable remedial actions.

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 will be a multi stakeholder body and will be 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 the project for setting up of test bed is under



implementation.

Cyber Forensics

Cert-In is equipped with computer forensics and mobile device forensic analysis facility to retrieve and analyse the data from the digital devices. CERT-In's facility for Digital Forensics data retrieval and analysis of the digital devices is being utilised in investigation of the cyber security incidents and cyber crimes. Cert-In imparts training on computer forensics and mobile device forensics through lectures' demonstrations and hands on practical sessions during the training workshops, which covers seizing, preservation, imaging and analysis of the digital devices. CERT-In also provides support to the other training institutes in imparting training on investigations of cyber crimes cyber security incidents using cyber forensics techniques.

6.5 Initiatives towards Security in Digital Payments

- i) 17 advisories have been published by CERT-In since Nov 27, 2016 for security safeguards covering POS, Micro ATMs, electronic Wallets, online banking, smart phones, unified payment interface, USSD, RuPay, SIM cards, wireless access points / routers, mobile banking, cloud and AEPS. Advisory has also been sent by CERT-In to RBI, NPCI, Payment Card Industry Organizations covering precautions to be taken to avoid similar attacks as those that occurred recently with credit / debit cards. 9 advisories were for service providers and 2 each for Device Security, Data Security, Browser/OS Security & Network Security for Users.
- ii) Recording awareness sessions with respect to cyber security under the Digishala Awareness Campaign have been carried out for creating awareness among citizens to securely and safely use digital payments.
- iii) Department of Payment and Settlement Systems, RBI has been requested for carrying out audits by empanelled auditors for all digital wallets.
- iv) CERT-In has informed all Payment Banks, PPIs and DFA for mandatory reporting of Incidents to CERT-In and to nominate CISOs. Advertisement in English and Hindi Newspaper were also given for reporting of cyber security incidents to CERT-In.
- v) In order to build a secure and robust ecosystem, CERT-In is conducting a series of workshops. Two workshops on "Digital Payments Security in India" has been conducted on 26.12.2016 & 31.01.2017 inviting CISOs from PPIs, Banks, ISPs, RBI along with participation banking technology providers and consultants.
- vi) Cyber Crisis Management Workshop and exercises have been carried out for banks and IDRBT. Series of meetings are being held with Chief Information Security Officers (CISOs) of various Ministries/ Departments to assess the security practices.
- vii) Botnet Analysis and Malware Cleaning Centre is functioning which will identify infected IP addresses for banks.
- viii) Cert-In is working with National Payments Corporation of India (NPCI) to assess their security posture.



CHAPTER 7

SKILL INDIA: CAPACITY BUILDING



7.1 Skill India

HRD 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, Media Lab Asia, 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

Scheme to give a thrust to Research in areas of Electronic System Design and Manufacturing (ESDM) and IT/IT Enabled Services (ITES) [“Visvesvaraya PhD Scheme for Electronics and IT”]:

The objective of the above scheme is to generate 1500 PhDs for each of ESDM and IT/ITES sectors over a period of 5 years, in order to promote innovation and development of new products in IT/ITES and ESDM sectors, out of which 500 PhDs for each of ESDM and IT/ITES sectors over a period of 5 years would have fellowship support and the other 1000 enrolled/ registered over the period of the Scheme would receive one time incentive for each of ESDM and IT/ITES sectors to encourage working professionals and non PhD faculty members to pursue PhD in the ESDM or IT/ITES sectors. 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 the areas of ESDM and IT/ITES to retain as well as attract young faculty in academia.

The duration of scheme would be for five years for the purpose of selecting PhD candidates for support under the scheme. However, the funding would be continued till 9th year for the commitments already made during the scheme period.

Government has approved implementation of the PhD Scheme at a total estimated cost of ₹ 401 crore

(now revised to ₹ 466 crore w.e.f. 01.09.2015) over a period of nine years in February 2014.

The Scheme was launched in the academic-year 2014-15. The total number of support (for PhD candidates) approved is 1086 full-time and 350 part-time. Academic Committee also approved support for 64 Young Faculty Research Fellowships (YFRF) from 25 institutions under the PhD Scheme.

As on 31st December, 2016, a total of 1160 PhD (970 Full Time + 190 Part Time) candidates have been enrolled at the institutes.

7.1.2 Graduate level

Scheme of Financial Assistance for setting up of Electronics and ICT Academies

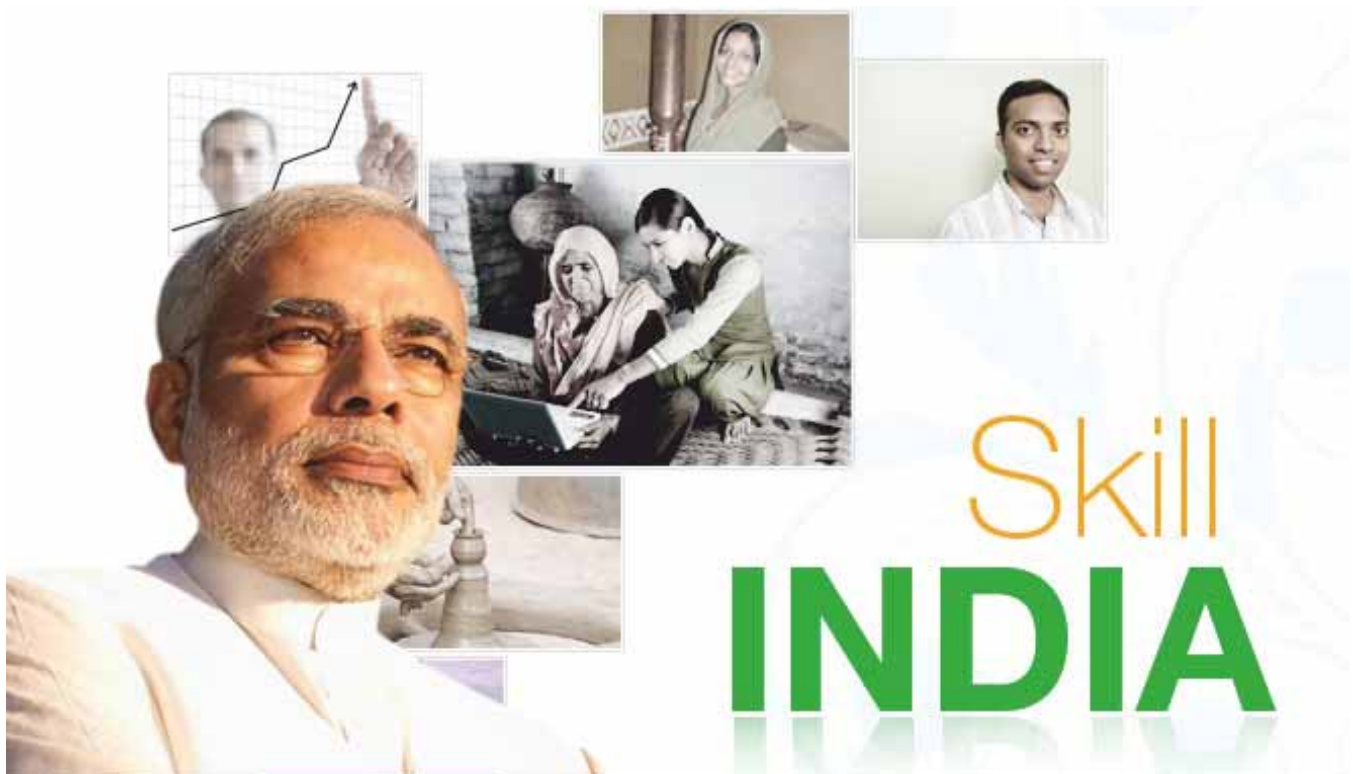
The objective of the above scheme is to set up seven (07) Electronics and ICT Academies as a unit in IITs, IIITs, NITs, etc., for faculty/mentor development/up gradation to improve the employability of the graduates/diploma holders in various streams, through active collaboration of States/UTs with financial assistance from the Central Government. Electronics and ICT Academies are aimed at 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.

The Academy at IIT Guwahati was inaugurated by Hon'ble Prime Minister on 19th January, 2016. As on 31st December, 2016, a total of 104 faculty Development Programmes (FDPs) covering 3,932 participants, have been conducted by 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) at a total outlay of ₹ 113.77 crore with Grant-in-Aid support of ₹100 crore (approx.) in a period of 4 years. 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 at a total outlay of ₹411 crore in a period of 4 years for implementation in 32 States/UTs.

Under the above two Schemes, an Expert Committee has approved a basket of 80 courses to be covered under both the schemes. As on 31st December, 2016, under both the above Schemes, a total of 1,99,444 candidates have been enrolled for training in various States/UTs, out of which 82,176 candidates have 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 31st December, 2016, around 9,000 candidates have been enrolled under the programme.

(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.

7.1.4 Capacity Building in Niche Areas

(i) Information Security Education and Awareness (ISEA) Project Phase-II

Under the ISEA Project Phase-II, 1.14 lakh persons are proposed to be trained under formal and non-formal courses, 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 31st December, 2016, 13,868 candidates’ under-going training/trained in various formal/non-formal programs, 2,730 Government officials have been trained and 406 awareness workshops are conducted covering 46,366 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 31st December, 2016, a total of 6,687 candidates have been trained/undergoing training in various formal/non-formal courses launched at CDAC-Hyderabad and NEILIT Centres at Aurangabad & Chennai.

(iii) Special Manpower Development Programme in Chips to System Design (SMDP-C2SD)

A programme entitled 'Special Manpower Development Programme for Chips to System Design' was initiated by the Department under 'Digital India Programme' in December 2014. The objective of the programme is to broaden the VLSI Design base in the country, generate specialized manpower in the area of VLSI and system level design, as well as to bring in a culture of System-on-Chip / System Designing which will ensure moving up in the value chain in the "System Design Space". The program is being implemented at 60 institutions spread across the country including IITs, NITs, etc. These institutions have been divided in two categories – Resource Centres (10) and Participating Institutions (50). The Resource Centres will be the Mentoring Institutions in the program. The project has an outlay of ₹ 99.72 Crore with duration of 5 years.

The programme will result in generation of over 50 ,000 specialized manpower in the area of VLSI and system level design at PhD, Post Graduate and Graduate level along with development of working prototype of systems / sub-systems / Applications Specific Integrated Circuits (ASICs)/ Field Programmable Gate Array (FPGA) based designs, generation of Intellectual Property Cores, publication of papers, broadening the base of quality research in the country by supporting 'Networked PhD programme' etc.

Ten clusters project proposals have been initiated for development of working prototype of Systems/sub-systems/ SoCs, development of Application Specific Integrated Circuits (ASICs) and Field Programmable Gate Array (FPGA) based board level design. 7561 students (B.Tech/M.Tech/PhD) trained in the VLSI Design and related area. 4 IEPs were organised at different Resource Centre in the area of Mixed Signal SOC, Deep Sub-Micron Technologies, System Level Design and RF System Design. To make available industry ready specialized manpower in VLSI design and related areas and to get exposure to practical aspects of Chip designing, 40 students (20 PhDs, 18 M. Tech & 2 B.Tech) from 22, SMDP-C2SD institutes were selected by Intel, Bangalore for internship of six month to one year. Second ZOPP workshop was organized at IIT Bombay attended by all RCs & PIs to work out the Project Planning Matrix (PPM) & review the overall progress of the project.

(iv) Indian Nanoelectronics Users Program (INUP)

INUP Phase II program 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 2016-17, 6 familiarization workshops on Nanoelectronics have been organized at IIT Bombay, IISc Bangalore, MNIT Jaipur and NIT Agartala University. Also, 10 hands-on-training in various categories such as Fabrication of cantilevers and MEMS based sensors, 2D material characterization and device fabrication 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. The small and medium term projects being executed under INUP Phase II have resulted in around 50 research publications and 8 patents by the researchers from all over the country during the past one year.

(v) Information Technology Research Academy (ITRA)

ITRA is an enabling programme initiated by Ministry of Electronics and Information Technology (MeitY), Government of India in the year 2010, to help build a national resource for advancing the quality and quantity of R&D in Information and Communications Technologies (ICT) and Electronics and its applications in IT and related institutions across India. ITRA is operating as a division of Media Lab Asia.

ITRA-Mobile: ITRA in the research area 'Mobile Computing, Networking & Application (ITRA-Mobile)' targets applications of IT in Healthcare, Transport and Disaster Management. ITRA-Mobile projects are running in 33 institutions, involving 66 faculties and 95 Ph.D. students. During FY 2016-17, ITRA-Mobile research community has published more than 110 research papers in ITRA listed conferences/journals of international repute and 105 more papers were published in other

conferences/journals; ITRA-Water:ITRA in the research area 'IT based Innovations in Sustainability of Water Resources (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 38 faculties and 37 Ph.D. students. During FY 2016-17, ITRA-Water research community has published more than 55 research papers in ITRA listed conferences/journals of international repute and 52 more papers were published in other conferences/journals;

ITRA-Ag&Food: ITRA has taken up the research area 'IT based Transformations in Indian Agriculture and Food (ITRA-Ag&Food)' to create collaborative, multi-institutional, inter-disciplinary teams to catapult the state of Agriculture & Food in India. India using IT, into a new orbit of productivity

(vi) Simulation Centre for Power Electronics Applications

A Simulation Centre established at IIT-Bombay to simulate Power Electronics applications has trained about 620 candidates so far including students, faculty members and industry personals. A repository of 120 simulation examples has been developed.

As a part of awareness programs, five short term courses on various themes of Power Electronics like Power Electronics Applications in Micro-grids enabling Green Energy, Application of Power Electronics to Renewable Energy, Applications of custom Power devices for Power Quality Improvement, Advances in power Electronics for Machine drives and Sustainable Development and Advances in Power Electronics have been organized at different geographical locations in the country



Grass root level

Two Schemes for spreading Digital Literacy to the masses in the Country

(i) IT Mass Literacy (National Digital Literacy Mission)

In line with the objective of the National Policy on IT, 2012 to make one person e-literate in every household in the country, a scheme for IT Mass Literacy (renamed as National Digital Literacy Mission) was launched with an objective to provide IT training, relevant to the need of the trainee to enable the beneficiaries to use IT and related applications for their livelihood earning and employability with an outlay of ₹ 97.02 crore (Grant-in-aid from MeitY: ₹ 89.71 crore). The training target of 10 lakh persons under this scheme has been achieved in June 2016.

(ii) Scheme for 'Digital Saksharta Abhiyan' (DISHA)

This expanded scheme was approved by Government on 9th December, 2014 under 'Digital India Programme' with the objective to make additional 42.5 lakh persons digitally literate in a period of four years.

As on 31st December, 2016, under both the above Schemes, around 82.74 lakh persons have been trained and 53.37 lakh candidates have been certified.

As a follow-up to the above two schemes, a new scheme entitled "Digital Literacy Mission on Rural India" to cover 6 crore beneficiaries in rural India has been announced by Hon'ble Finance Minister in Budget 2016-17. The new scheme is under submission for obtaining approvals.

(iii) Digital Finance for Rural India: Creating Awareness and Access through CSCs'

Government approved a sub component named 'Digital Finance for Rural India: Creating Awareness and Access

through CSCs' under the Digital Saksharta Abhiyan (DISHA) in November 2016 for conducting awareness sessions on digital finance options available for rural citizens as well as enabling various mechanisms of digital financial services such as Unstructured Supplementary Service Data (USSD), Unified Payment Interface (UPI), Cards/Point of Sales (PoS), Aadhaar Enabled Payment System (AEPS) and eWallet etc. As on 31st December, 2016, around 1.75 crore beneficiaries and around 5.44 lakh Merchants have been trained/enabled under this programme

7.1.5 Create skill development facilities in deprived areas through strengthening of National Institute of Electronics and Information Technology (NIELIT)

(a) Upgrading the six existing centres of the NIELIT in the North-Eastern Region at Guwahati, Imphal, Shillong, Itanagar, Gangtok and Aizawl.; and

(b) Setting up of ten new Extension centres and upgrading two existing Extension centres

Sixteen (16) out of proposed Eighteen (18) Centres/Extension Centres are operational as on date. The new seven Extension Centres are imparting training from rented built-up space at Silchar, Jorhat and Kokrajhar in Assam, Pasighat in Arunachal Pradesh, Senapati & Churachandpur in Manipur, Lunglei in Mizoram and Tura in Meghalaya. Efforts are being made for allotment/hiring of built-up space for remaining 2 Extension Centres at Dibrugarh (Assam) and Tezu in Arunachal Pradesh. A total of 23,869 students were trained so far under the project. Possession of land for construction of permanent campuses has been obtained at 16 locations in Pasighat, Guwahati, Kokrajhar, Jorhat, Tezpur, Dibrugarh, Silchar, Imphal, Senapati, Churachandpur, Aizawl, Lunglei, Gangtok and Chuchuyimlang; land is yet to be obtained at Tezu, Tura, Shillong and Itanagar. Three Central PSUs have been appointed as Project Management Consultants (PMCs) for construction of permanent NIELIT Centres & Extension Centres. NIELIT is presently offering trainings courses from 18 locations in all eight (08) NE States covering two additional locations at Agartala and Kohima under other funded projects by the MeitY.

Setting up/ upgradation of NIELIT Centres at Srikakulam, Patna, Ranchi, and Ropar is underway

7.1.6 IT for Masses Programme

Development of Weaker Sections

As a part of its inclusive development strategy, the Government is committed to the welfare and development of weaker sections. Accordingly, MeitY has been implementing number of ICT training / capacity building projects in different States / UTs, targeted at these sections, to improve IT literacy, skill enhancement and to promote the use of ICT tools.

The following projects were initiated / on-going:

Projects covering Scheduled Caste (SC) beneficiaries

- Capacity building for empowerment of SC candidates on ICT at Cooch Behar district of West Bengal - West Bengal
- IT training for Scheduled Caste (SC) candidates - Punjab
- ICT training to SC / ST / Women - Jammu & Kashmir
- Capacity building of SC & ST students of North Orissa University & its affiliated colleges in IT tools – Odisha
- Training and Certification of Scheduled Caste (SC) students in job oriented courses in Information Technology – Kerala

Projects covering Scheduled Tribe (ST) beneficiaries

- IT skills & e-Inclusion through low cost access devices based awareness program for Scheduled Tribes – Kerala
- ICT training to SC / ST / Women - Jammu & Kashmir
- Capacity building in IT skills of Scheduled Tribes (ST) candidates - Chhattisgarh
- Capacity building in IT skills of Scheduled Tribes (ST) candidates - Andaman & Nicobar
- Capacity building for the upliftment of 2000 Scheduled Tribes (ST) candidates - Union Territory of Lakshadweep

- Capacity building of SC & ST students of North Orissa University & its affiliated colleges in IT tools – Odisha
- 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.

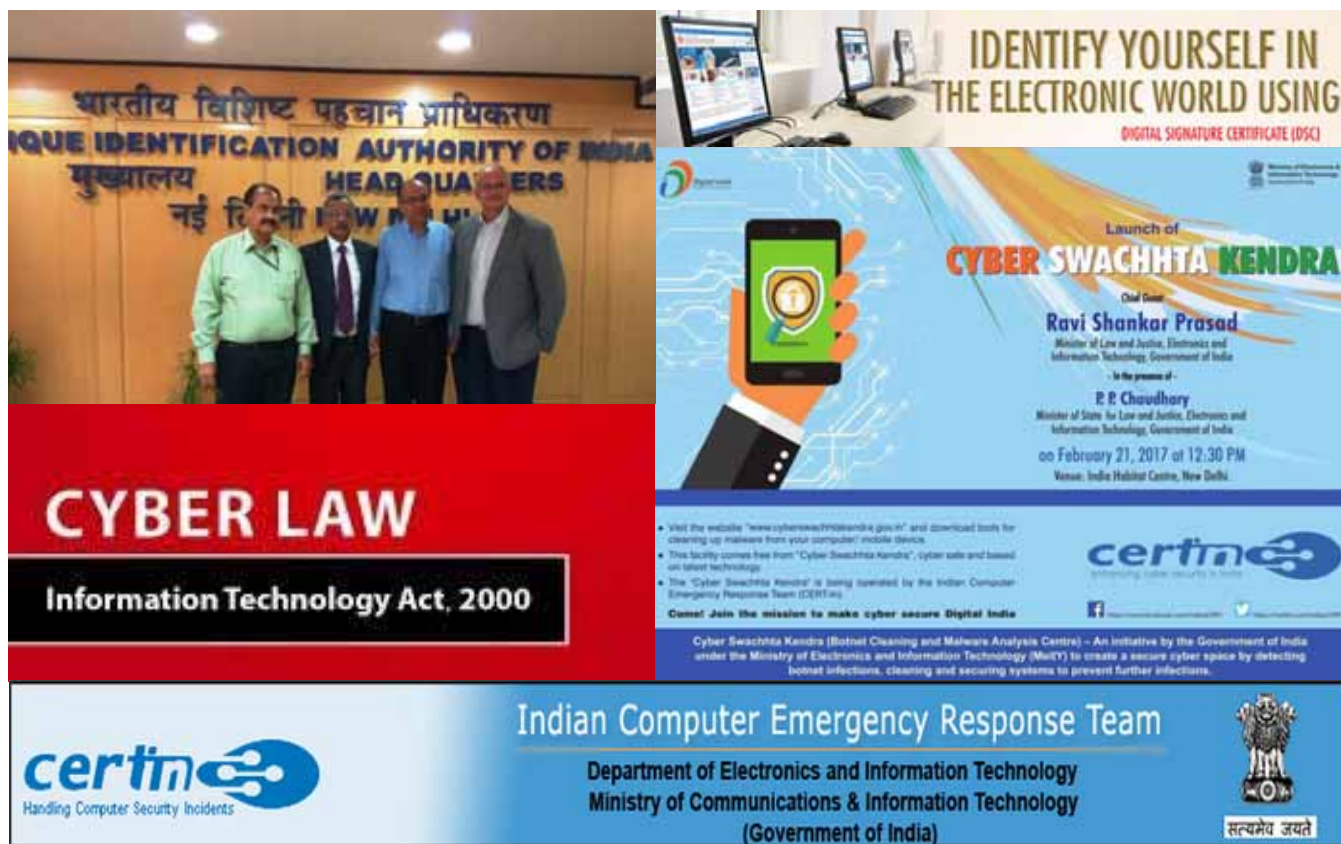
The following projects were initiated / on-going:

Projects covering Gender (Women) beneficiaries

- IT oriented Handloom Sector Development Program for creative design, development & deployment by Artisans / Weavers of Jharkhand & Odisha State – Jharkhand, Odisha
- Project for the benefit of Girls/Women - Haryana
- ICT training to SC / ST / Women - Jammu & Kashmir
- ICT based integrated development program for women empowerment in Lallapura craft cluster of Varanasi – Uttar Pradesh
- Training of Women in Delhi for creating women entrepreneurs / data entry operators, to promote awareness and to enhance vocational skill in IT – Delhi
- Skill- Enhancement & Health Awareness via Knowledge Transformation using ICTs for Women Empowerment in Bithoor Cluster of Kanpur – Uttar Pradesh

CHAPTER 8

STATUTORY ORGANISATIONS



8.1 Authentication framework under the IT Act: Controller of Certifying Authorities (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. Ten Certifying Authorities (CA) are operational currently and the total number of Electronic Signature Certificates issued in the

country grew to more than 20 million by January 2017 and continues to grow rapidly and is expected to increase significantly with the launch of various e-governance/e-commerce programmes as well as initiatives, such as, Aadhar based Digital Signature Certificate (DSC) issuance and framework for eSign to facilitate online electronic signatures.

For ensuring continued trust in this authentication framework, the 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 Check Audits were also carried out

for ensuring compliance to the Identity Verification Guidelines (IVG) issued by CCA to be followed in the Digital Signature Certificate (DSC) issuance process.

8.1.1 eSign online electronic signature Service

There are 4 licensed CAs (viz. eMudhra, (n)Code, CDAC & NSDL) who are providing eSign service in the country and total number of eSign certificates issued by these CAs is 5 million by January 2017. Initiatives are being taken in this respect through coordinated interactions between the e-governance/ e-commerce application service providers and these Certifying Authorities 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. 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 is also fully operational. Migration of Root CA physical infrastructure (Biometric device, Camera, DVR etc.) and Servers/workstations at primary site-Delhi from existing/obsolete systems to new systems are planned and process has been initiated.

Enhancing trust

CCA's Root certificate(s) & special purpose certificates have been installed in Microsoft IE Browser and in Adobe products. Process has been initiated for Pre-installation of Root Certificate in Mozilla Firefox Browser.

To further enhance the level of trust in digital signatures, the process of Operationalisation of Online Certificate Status Protocol (OCSP) service for certificates issued by the Root CA of CCA, has commenced.

Digital Locker

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. This 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.

In order to implement Digital Locker System in the country, the Notification "Information Technology (Preservation and Retention of Information by intermediaries providing Digital Locker facilities) Rules, 2016" No. G.S.R. 711 (E) dated 21st July, 2016 has been issued by the Government of India. By Office Order No. 3(42)/2014-EG-II (Part-II) dated 21.10.2016, the Controller of Certifying Authorities has been given additional charge to function as 'Controller of Digital Locker Authority (CDLA)'. Hence, Office of CCA has been involved in preparing the process for licensing of Digital Locker Service Providers. This includes finalization of application form, financial eligibility criteria, technical specifications, Digital Locker Practice Statement and the undertaking to be given by the DLSP, among others. This will facilitate in implementation of Digital Locker System in the country.

International Cooperation

Memorandum of Understanding with various Public Key Infrastructure (PKI) regulators of other countries



for Mutual Recognition of Certifying Authorities are being pursued. For promotion of PKI, discussions/meetings were held with the officials from Republic of Kazakhstan. An MoU, which had been signed between Korea Information Security Agency (KISA) & CCA to recognize Certifying Authorities for accepting digital signature certificates of each other was followed up for implementation.

Training / Awareness Generation & Promotion of Digital Signatures

PKI Body of Knowledge: Development & Dissemination programs on Digital Signatures, PKI & eSign have been conducted at Mumbai, Thiruvananthapuram, Kolkata, Ranchi, Jaipur and Raipur (Chhattisgarh) and interactions are going on with other States and UTs for organising such workshops. Also, the content is made available on social media channels like YouTube, Face book & Twitter.

Newspaper advertisements for generating awareness about eSign have been published and more are in the pipeline. Web advertisement generating awareness of do's & dont's and other emerging issues relating to Digital Signatures have been published.

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 ("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 dated 28th January, 2009 with a vision, "To empower residents of India with a unique identity and a digital platform to authenticate anytime, anywhere". Later, on 12th September 2015, the Government revised the Allocation of Business Rules to attach the UIDAI to the Ministry of Electronics & Information Technology (MeitY) of the then Ministry of Communications and Information Technology.

The Aadhaar (Targeted Delivery of Financial and Other Subsidies, Benefits and Services) Act, 2016

The Government had introduced the Aadhaar (Targeted Delivery of Financial and Other Subsidies, Benefits and Services) Bill, 2016 in the Parliament on 03-03-2016, which was discussed and passed by the Parliament on 16-03-2016. The Act has since received the assent of the President on 25-03-2016 and has been published in the Official Gazette of India Extraordinary, Part-II, Section 1 dated 26-03-2016, as Aadhaar (Targeted Delivery of Financial and Other Subsidies, Benefits and Services) Act, 2016 (Act No. 18 of 2016) ("Aadhaar Act"), and has come into force from 12.09.2016, the date of notification of the same.

The Act provides 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)

A key objective of Aadhaar program is to provide an identity infrastructure for delivery of various social welfare programs 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 an Additional 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.

Aadhaar as Financial Address

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.

Authentication

One of the other 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 Sector Banks, Registrar General of India (RGI), etc. All the Registrars in the ecosystem are signatories to MoUs with UIDAI.

As on date, UIDAI has partnered with 131 Registrars, wherein 65 Registrars are from State/UTs, 32 are PSUs/PSBs and 34 are Central Ministries/Departments.

Enrolment Philosophy

One of the key considerations is to keep the Aadhaar system purely focused on identity. The Aadhaar system only collects minimal data to provide unique identity, issue the Aadhaar after biometric de-duplication, manage lifecycle changes of that identity record.

As recommended by the Demographic Data Standards and Verification Committee Report (DDSV) and Biometric Standards Committee, the UIDAI is collecting bare minimum demographic information from the residents such as Name, Age, Gender, Address, Biometric (photograph, ten fingerprints and two iris) and Relationship details in case of minors.

While the above fields are mandatory for every

enrolment, there are other optional fields, such as e-Mail and Mobile Number. In case of children below 5 years age, biometric information is not collected and their Aadhaar is linked to parent's/guardian's Aadhaar.

Enrolment Statistics

Enrolment Status as of **31st Dec 2016** (%age as per projected population 2015)

1. Total Enrolments – **131 crore**
2. Total Aadhaar generation – **110.01 crore (86.1%)**
3. 18+ Aadhaar generation – **80.58 crore (100.2%)**

The current average of Aadhaar generation is approximate 5.17 lakhs per day.

Updation

In order to maintain the data 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 31st Dec 2016, over 28 thousand Permanent Enrolment Centres (PECs) existed across the country, which in addition to Aadhaar enrolments facilitated Updation services. Total 5.5 crore Demographic updates, 1.5 crore Bio-metric

updates and 15 lakh mobile updates processed since inception.

Enrolment Drive of Children below 5

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 Enrolment 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 approximately 7.85 crore children in FY2016-17, UIDAI intends to leverage the Aaganwadi worker network 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 Department or department handling birth registration as UIDAI registrar and do the Aadhaar linked birth registration.

Enrolment Challenge Scheme

Special enrolment drive by the name "enrolment challenge scheme" has been launched in states/UTs having attained 100% Aadhaar saturation in respect of adult populations. The scheme is for residual adult populations of these states/UT who have not been able to avail themselves of the enrolment facility due to some reasons. The scheme has been launched in two phases during the year.

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 biometric and demographics and comparing it against the UID database in order to locate the UID number of the resident. This service has been institutionalized through its Permanent Enrolment Centers.

As a special measure, Advance Search and e-Aadhaar download facilities can be used to find out Aadhaar details and download the Aadhaar by the resident. 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

Each Aadhaar letter comprises a printed, laminated, four-colour document with a photograph, date of birth, demographic information of the person, the Aadhaar number, barcodes and a 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 Posts is the partner for delivery of the Aadhaar letters to the residents at the address they have provided at the time of enrolment. Since inception and until 31st December 2016, a total of 106.53 Cr Aadhaar letters (this includes letters sent by Speed Post) have been printed 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).



As per Clause 4(1) of Chapter-II (Enrolment) of 'The Aadhaar (Targeted Delivery of Financial and Other Subsidies, Benefits and Services) Act 2016', An Aadhaar number, issued to an individual shall not be re-assigned to any other individual. (2) An Aadhaar number shall be a random number and bear no relation to the attributes or identity of the Aadhaar number holder. (3) 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 campaigns have also been undertaken for wide publicity to the validity of e-Aadhaar.

The total e-Aadhaar downloads till 31st December, 2016 are approx. 55 Cr.

Aadhaar Support Services – Aadhaar Sampark Kendra

UIDAI has established a centralized Contact Centre and helpdesk services which are operating from Pune, Jamshedpur, Chandigarh, Kakinada, Baroda, Guwahati, Ambara and Munnar to serve as a helpline to the residents and other stakeholders for interaction on UID related issues, including grievance redressal. The details of the services are:-

- Email: "help@uidai.gov.in"
- Contact Number (Toll Free): 1947 (Monday-Saturday, 7 am to 11 pm) (Sunday 8 am to 5 pm)

At present, Interactive Voice Response System (IVRS) and inbound agent phone support is provided in 12 languages (Hindi, English, Assamese, Bengali, Gujarati, Kannada, Marathi, Malayalam, Odia, Punjabi, Tamil and Telugu). E-mail support is provided in English only.

Currently, UIDAI's Contact Centre daily receives approximately 1.65 lakh calls on Toll Free Number and 1480 e-mails on daily basis. Out of the total calls received at the Contact Center approximately 64% of the calls are being handled and resolved at the IVRS level and rest 36% are being transferred to the Aadhaar Sampark Kendra agent.

8.2.5 Authentication Ecosystem

Aadhaar Authentication

Aadhaar Authentication means the process by which the Aadhaar number along with demographic information or biometric information of an individual is submitted to the Central Identities Data Repository 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), Authentication Service Agency (ASA) and e-KYC User Agency (KUA).

Authentication User Agency (AUA)

AUA is any government/ public/private legal agency registered in India that seeks to use Aadhaar Authentication for providing access to its services. An AUA is the principal agency that sends Authentication requests to enable its services/ business functions. An AUA connects to the UIDAI data centre/ Central Identity Data Repository (CIDR)

through an ASA) either by becoming ASA on its own or contracting services of an existing ASA) using a secured protocol. As on 31.12.2016, 313 (live) entities have been on boarded by UIDAI as AUAs and as on 31.12.2016, 402.02 crore Authentication transactions have been performed.

Authentication Service Agency (ASA)

ASAs are entities that transmit authentication requests to the CIDR on behalf of one or more AUAs. They play the role of enabling intermediaries through secure connection established with the CIDR. ASAs receive CIDR's response and transmit the same back to the AUAs. As on 31.12.2016, 26 ASAs (live) are on-boarded with UIDAI.

KYC User Agency (KUA)

KYC User Agency (KUA) shall mean a requesting entity which, in addition to being an AUA, uses e-KYC authentication facility provided by the Authority. As on 31.12.2016, 233 KUA (live) entities are on-boarded on Aadhaar platform, and as on 31.12.2016, 65.57 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 31st Dec 2016, a total of 15.96 crore Aadhaars were seeded in LPG database, 8.60 crores in MGNREGS, 16.50 crore in PDS (Ration Card) and 37.72 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 program, 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 Agencies.

UIDAI engages Certified Operators, Supervisors and Child Enrolment Lite Client Operators in Aadhaar enrolment process. Various training methodologies including Mega Training and Certification Camps, Refresher/orientation Training and DLO/PRI Training Program 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 100% enrolment in most of the States. Also, to increase the usage of Aadhaar across various Govt. organizations in delivery of service, Master Training on Aadhaar Seeding, Authentication and e-KYC were organized for Govt. officials.

- Seeding, Authentication and e-KYC: The training content covers all the major processes involved in Aadhaar Seeding, Authentication & e-KYC. So far UIDAI have conducted 24 training programs in which 3726 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 76 Mega camps were organized by the various Regional Offices of UIDAI in which 6733 candidates were trained.
- Refresher Program: To make certified enrolment staff understand the changes involved in

Aadhaar processes, many Refresher programs and Training of Trainer program were conducted by UIDAI Regional Offices. From 01.04.16 to 31.12.16 a total of 59 such programs were organized which was attended by 4202 participants

- PRI/DLO Program: UIDAI also provides training to the members of Panchayati Raj Institutions and District level officers to make them understand their role in Aadhaar enrolment. Till December 2016, 11 such workshops have been conducted in which 502 candidates participated.

As of 31.12.2016, UIDAI in partnership with the Testing and Certification agencies has certified over 5 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. Following are the functionalities developed under Phase-I & Phase-II:

KM Portal:

- AD integration (including Regional Office, TDU)
- Enhanced version of KM Portal
- Contact Management
- Enterprise Search
- Integration with DMS/HRMS/Assets

- Unit work space
- Communities of Practices
- Media and Communication
- Training and Testing
- Rich Site Summary (RSS) feeds
- Stats and Audit trail
- Transparency Portal

Intranet:

- Office Management System (File Management System)
- Asset Management System
- Human Resource Management(HRM) Module
- E-Procurement

Features of Phase-II including additional work as allocated from time to time have already been implemented:

- Analytics Integration on the UIDAI website
- Development of separate pages in KM Portal for various HQ Divisions and ROs
- Enterprise search Implementation
- UIDAI website redesigned and deployed in English & Hindi
- Standardized File Cabinet Document Upload process
- Updated lists/groups for office order email notifications
- Deployed HR Snapshot section on KM Portal
- DSC integration with FMS
- KM Portal Training conducted at RO, Chandigarh, Hyderabad and Mumbai.

Ongoing/pending features of Phase III to be

implemented after requirement gathering (to be initiated in the coming quarter):

- SMS integration
- E-mail integration (with all the remaining modules)
- Payment Gateway integration for e-procurement solution
- KM integration for CRM
- MS EPM 2010 integration with the KM Portal

Operations, maintenance & support of KM Portal:

- Planning and managing deployment of application patches
- Resolving bugs identify during application maintenance
- Resolving application issues raised by user w/o deviating functionality
- Technical support to users on parameter configuration setting, back office configuration,
- Technical support to user/content manager for performing document storage, retrieval and archival operations of CDR
- Content upload, new user creation

8.2.9 UIDAI Website:

UIDAI provides up to date information about Aadhaar in its web site: www.uidai.gov.in. This web site has information that is needed for all the key stakeholders including the Resident and various Ecosystem Partners. Besides English & Hindi, the web site is available in 10 other regional languages in order to reach out better. One of the key takeaways of the web site besides providing general information of Aadhaar and the process of partnering with Aadhaar is, the array of services it



provides for the convenience of the Resident that range from knowing the nearest enrolment center, where one can book an appointment online - to knowing the status of Aadhaar and also to download the e-Aadhaar. This year the UIDAI website has been revamped with a more resident-focused, informative and user-friendly design. The revamped website is live in English and Hindi. Revamping in all remaining languages is under process.

Besides www.uidai.gov.in, UIDAI also maintains the following web sites that provide online services:

- <https://developer.uidai.gov.in> - which provides an online platform for all partners developer community who are interested in building Aadhaar enabled applications and
- <https://resident.uidai.net.in> – which provides information on various services that the Resident would like to know on Aadhaar enrolment and generation and also to get the grievances addressed.

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 with the recently notified 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 NCIIPC

Security of UIDAI-CIDR information is of paramount importance for safeguarding resident data Confidentiality, Integrity and Availability of the information 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 “Critical Information Infrastructure” 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 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.

Fraud Management System at UIDAI

The fraud management system has been consolidated further over the course of last one year. UIDAI has a well-designed, multi-layer approach and robust fraud management system in place. With the establishment of Forensic lab, the fraud investigation capacity of UIDAI has increased manifolds.

8.2.11 Aadhaar- A Tool for Governance Reform

Aadhaar Payment Bridge (APB)

APB implementation helps deal with the challenges related to banking transactions with benefits to both the stakeholders, namely, the Government and the Residents.

At ecosystem level, APB has already achieved wide acceptance, and is presently an approved payment system by RBI. As on 31st December 2016

- 863 banks including all nationalized banks, RRBs and many co-operative banks are live on the APB platform.
- Over 163.59 crore APB transactions have successfully been carried out over APB, amounting to Rs. 43,856 crore.

Aadhaar Enabled Payment System (AEPS)

The Government payments are being credited directly into the accounts of the targeted Beneficiaries using APB platform. However, access to these funds encounters a number of last mile servicing issues. Aadhaar enabled Payments System (AePS) facilitates basic banking access (viz. cash withdrawal, cash deposit, balance enquiry, fund transfers) to the beneficiaries in a hassle free manner at/ near the doorsteps. Further, usage of Aadhaar authentication enables

transactions in real time in an interoperable environment.

Till 31st December 2016, 119 Banks and Department of Post, are active on AePS platform and Banks alone performed 31.66 crore transactions.

MicroATM Incentive Scheme

The scheme was initially launched on 1st October, 2012 with objective of promotion of deployment of MicroATMs to roll out Aadhaar based payments. UIDAI is willing to subsidize upto ₹15,000 per microATM. The scheme is applicable for all scheduled banks, Post Office Savings banks, and applicable to other banks based on need. The bank can claim the funds by carrying out 2,000 successful Aadhaar based transactions subject to fulfilling certain criteria. Till 31st December 2016, over ₹26 crores have been paid to various institutions.

Public Distribution System (PDS)

The PDS network consists of more than 5.5 lakh Fair Price Shops (FPS) and is estimated to distribute essential commodities to more than 25 crore families. So far, states such as Andhra Pradesh & Telangana, Jharkhand, Delhi, etc have already or are in the process of implementing Aadhaar-enabled PDS (AePDS). PDS has already undertaken a massive exercise to deploy AePDS devices across all the FPS shops in the country except for 3 UTs where food grain distribution will be replaced by “Cash for Food” scheme.

Jeevan Pramaan– Digital life Certificate for Pensioners scheme known as “Jeevan Pramaan” based on Aadhaar bio-metric authentication was introduced. A successful authentication generates Digital Life Certificate which gets stored in Life



Certificate Repository. Pension Disbursing Authority can access the certificate online. Presently, the service is available for Central Government, Defense, EPFO, Postal, Railway and Telecom pensioners as an additional facility. As on 31st December, 2016 more than 47.1 lakh pensioners have already registered for Jeevan Pramaan.

ITR Filing – The Central Board of Direct Taxes (CBDT) has introduced Aadhaar based electronic verification for filing the Income Tax Returns (ITR) as an option to send ITR-5 directly to the department. This initiative makes the filing of income tax completely Electronic (Paperless) and simplifies the process of ITR Filing. Over 93 lakh individuals used Aadhaar based electronic verification for filing ITR for the AY 2016-17.

e-KYC based SIM Issuance

Department of Telecommunications in a recent circular in August 2016, allowed e-KYC (based on bio-metric authentication) to be used for issuance of new SIM cards. The new process will dramatically reduce the time for entire verification process and remove the possibility of production of fake documents for acquiring new SIM cards.

Aadhaar linkage with UAN (EPFO) – Employee Provident Fund Organisation (EPFO) intends to leverage Aadhaar e-KYC for deploying a homogeneous method of subscriber authentication. Such a deployment will help in hastening claims settlements and delivery of other services which have so far been delayed on account of employer driven employee verification processes. As on date more than 86 crore accounts have been linked with Aadhaars.

8.2.12 Creation of requisite Technology Infrastructure

UIDAI has commissioned technology infrastructure to cater to about 120 crore enrolments. In line with the target of time bound universal enrolment and future needs of online authentication and other services, the IT infrastructure is being adequately augmented and upgraded. UIDAI has appointed HCL Info Systems Limited as Manage Service Provider (MSP) for its CIDR for development and maintenance of applications, operation and maintenance of CIDR, biometric de-duplication, etc.

Both the data centers located each at Bengaluru and Greater Noida have been migrated to the respective captive Data centers of UIDAI viz Hebbal Data Centre at Bengaluru and Manesar Data Centre in Haryana respectively.

8.2.13 Construction of UIDAI, HQ building

The construction of UIDAI HQ building is in full swing and more than 60 % work/activities have been completed.

8.2.14 Use of Rajbhasha

UIDAI is implementing Official Language Policy of Govt. of India in its Head Quarter as well as its all 8 Regional Offices. Hindi Division at Head Quarter is ensuring compliance of Official Language as per Policy of the Union as enshrined in the Constitution of India, 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 in this regard.

During the year 2016-17, three meetings of Departmental Official Language Implementation Committee were held under the chairmanship of DDG (Estt.). During the meetings progressive use of Hindi at Head Quarter and Regional Offices were discussed and decisions were taken to increase

use of Hindi in official work.

During the year 2016-2017 UIDAI organized 04 Hindi workshops for sensitizing the officials with the Official Language Policy. About 100 officers and staff participated in these workshops. As a help literature Hindi book “Karyalaya Deepika” was distributed among the participants in one of the Workshops.

Progressive Use of Hindi in Head Quarter and all 8 Regional Offices of UIDAI was discussed and reviewed as a first Item in all monthly Internal Review Meetings held under the Chairmanship of CEO, UIDAI.

Hindi Pakhwara was celebrated from 14th September, 2016 to 28th Sept., 2016 in UIDAI Headquarter. Four competitions were organized during this occasion. Eighty Eight Officers/employees of UIDAI Headquarter actively participated in these Competitions. On 7th November, 2016 Prize Distribution Function was organized at UIDAI Headquarter wherein CEO, UIDAI awarded 29 winner Officers/Employees of Head Quarter with Cash Prizes.

During the year UIDAI Headquarter has started “Running Shield Scheme” for doing maximum official work in Hindi in the Divisions. The First Shield was awarded to Establishment Division by CEO in the Prize Distribution Function.

As per the directives of Deptt. of Official Language, Ministry of Home Affairs, UIDAI Regional Offices at Mumbai and New Delhi were inspected during the year 2016-17 to assess the status of compliance of Official Language Policy.

As per the directives of Ministry of Home Affairs every year UIDAI carries out an incentive scheme for Noting and Drafting in Hindi at its Head Quarter as

well in all the Regional Offices. Last year two Officers, one from Head Quarter Delhi and another from Mumbai Regional Office, were awarded Cash Prizes under the above Scheme.

8.2.15 Details of Budget & Expenditure during 2016-17

During 2016-17 (upto December, 2016), an expenditure of ₹744.93 crore (provisional) has been incurred against Budget Estimate of ₹985.26 crore. The total expenditure incurred so far is ₹8404.60 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.

8.4 Cyber Appellate Tribunal (CAT)

In accordance with the provision contained under Section 48(1) of the IT Act 2000, the Cyber Regulations Appellate Tribunal (CRAT) has been established in October, 2006. As per the IT Act, any person aggrieved by an order made by the Controller of Certifying Authorities or by an Adjudicating Officer under the Act can prefer an appeal before the Cyber Appellate Tribunal (CAT). This Tribunal is headed by a Chairperson who is appointed by the Central Government by notification as provided under Section 49 of the IT Act 2000.

Before the amendment of the IT Act in the year 2009, the Tribunal was known as CRAT and the Chairperson was known as the Presiding Officer. Provision has been made in the amended Act for the

Tribunal to comprise a Chairperson and such number of other members as the Central Government may notify/appoint. The name of CRAT has also been changed to CAT.

At present the CAT is functioning at Jeevan Bharti (LIC) Building, New Delhi. The former Chairperson demitted the charge on 30.06.2011. Two posts: Member (Judicial) and Member (Technical) were created and both the posts are filled in. Member (Judicial) is functioning as Head of the Department.

During the year 2015-16, 6 fresh appeals have been filed by the parties which are awaiting admission hearing, in addition to 58 appeals from the previous years. The same will be disposed off on joining of Chairperson, CAT, who is the Competent Authority for the disposal of the appeals.





Digital India
Power To Empower



EaseSocial People Perspective on Digital India

ATTACHED OFFICES AND SOCIETIES



In order to operationalise the programmes of Ministry of Electronics and Information Technology, the MeitY has 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.

9.1 High-end Software, Systems: Centre for Development of Advanced Computing (C-DAC)

Centre for Development of Advanced Computing (C-DAC) is a premier R&D organization of MeitY for

carrying out R&D in IT, Electronics and associated areas. Established to carryout research and to develop High Performance Computers, the R&D of C-DAC has expanded to various other areas such as grid and cloud computing, multilingual computing, heritage computing, professional electronics including VLSI and embedded systems, cyber security and cyber forensics, health informatics, software technologies and education related to these technologies.

During the year 2016-17, C-DAC made significant advancements in developing and deploying various

solutions, organizing events, providing training and collaborating with organizations of repute both at national and international level. Key achievements of C-DAC are outlined below.

9.1.1 High Performance Computing (HPC), Grid Computing and Cloud Computing Progress in National Supercomputing Mission (NSM):

National Supercomputing Mission (NSM) is jointly implemented by MeitY and the Department of Science and Technology with C-DAC and the Indian Institute of Science Bangalore being the executing agencies. It is planned to establish several supercomputing systems in various academic and R&D institutions in India. These systems will be deployed using both Build approach and Buy approach. C-DAC is focusing

on Build approach to implement HPC systems under this mission. Application areas identified for development include Bio-informatics, integrated weather, seismic imaging and Biodiversity.

Deployments of PARAM Shavak, a “Supercomputer-in-a-Box” solution PARAM Shavak, a “Supercomputer-in-a-Box” solution is a table top model of supercomputer developed by C-DAC equipped with 2 to 3 Tera-Flop computing power and 8 TB of storage. It comes bundled with C-DAC's indigenously developed CHReME and ONAMA software packages as well as several open source tools and applications. It is pre-loaded with Accelerator (GPGPU/MIC) enabled parallel applications and development tools and provides support for C-DAC's Reconfigurable Computing System technology to speed up applications through hardware. PARAM Shavak enables





academic institutions to be equipped with supercomputing primarily for education purposes at affordable cost. PARAM Shavak is being installed at various academic and engineering institutions across the country and C-DAC has deployed 35 such systems till date.

Exploitation of PARAM Yuva-II -C-DAC's National Supercomputing Facility: C-DAC's supercomputer PARAM Yuva II has executed about 2,14,438 supercomputing jobs as of November, 2016 from various users across the country. The system has 909 registered users from various R&D organizations and premier academic institutes. The current utilization of PARAM Yuva II is above 90%. C-DAC uses Dedicated Slot Booking Facility (DSBF) for users to offer better quality of service. The resources on PARAM Yuva II are grouped with effective use of partitioning so as to reduce queue wait time. Several HPC applications from various science and engineering domain were ported and optimized for PARAM Yuva II.

Launch of PARAM Ishan at IIT Guwahati: C-DAC has established supercomputer named PARAM Ishan at IIT Guwahati campus with a peak computing power of 250 Teraflops. PARAM Ishan is the fastest and the most powerful supercomputer deployed in NE region.

860 TF facility at IIT Delhi: C-DAC has setup 860 TF

supercomputing facility at IIT, Delhi and providing support for the same.

Algorithm developed for H-Bond Bigdata

Analysis: H-bond Bigdata Analysis (H-BAT) tool - Molecular Dynamics (MD) is a computational technique that utilizes Newton's equations of motion to study dynamics of biomolecules and is commonly used by structural biologists. There is a need for advanced analytics platforms and algorithms which can analyze data faster and efficiently. C-DAC implemented an algorithm within the map and reduce paradigm to calculate hydrogen bonding (including water-water interactions) in large trajectories.

Development of UrbAirIndia – Air Quality

Analysis Tool: C-DAC has developed and presently maintains the **UrbAirIndia expert system that deals with various components of air quality management viz. air quality monitoring, emission inventory, dispersion and receptor modelling and multiple scenario analysis. This web-based GIS enabled system developed in collaboration with Central Pollution Control Board (CPCB), provides useful inputs to policy makers, environmental researchers and general public. The system is being used by IIT Bombay, Maharashtra Pollution Control Board and Central Pollution Control Board.**

9.1.2 Multilingual Computing and Heritage Computing:

• **Bharat** (भारत) is a top-level Internationalized Domain Name (IDN) which enables registration and ownership of domain names in Indian languages. Presently it supports eight languages viz., Hindi, Marathi, Sindhi, Nepali, Maithili, Bodo, Dogri, and Konkani. During the year, Country Code Top Level Domain support (ccTLD) has been enabled for a total of 20 languages.

Localization of Government Portals:

Localization Project Management Framework (LPMF) has been developed by C-DAC on Cloud platform using crowd sourced approach in which citizen can contribute / improve the translations voluntarily to dissolve the language barriers. LPMF enables crowd sourced application localization and it has enabled localization of about 40 government portals in 6 to 10 Indian languages including the Digital India and the Farmer's portal.

Solutions for Election Commission of India: C-DAC has developed three important solutions listed below for the Election Commission of India,

- National Voters Services Portal (NVSP) - A one-stop solution developed to assist voters and providing information related to elections, polling booths and electoral rolls.
- National Electoral Roll Purification and Authentication programme (NERPAP) -for authenticating, purifying and linking Aadhar with electoral rolls was launched on July 18, 2016 with an objective of making electoral roll error free and multiple entries free.
- Electronically Transmitted Postal Ballot System (ETPBS) - First time used in for service voters in the bye-election at Puducherry.

Unicode Typing Tool with Prediction with support for 10 Languages: This software tool developed by C-DAC enables typing of Indian Languages in editors of Windows based applications with Unicode compliant font. C-DAC has enhanced the tool to support iWriting – a Predictive typing feature with INSCRIPT Keyboard which currently supports 10 Indian languages.

Deployment of JATAN: JATAN, the Virtual Museum Builder software developed by C-DAC, is used to develop and transfer digital collections for preservation in the digital repository. JATAN software has been deployed across 19 national museums across India, as standardized by Ministry

of Culture, Government of India.

Tools and Technologies for Sindhi Language and Modi Script:

C-DAC has developed various language tools that include solutions for Sindhi Language including Sindhi Language Learning App, Sakal Sindhi Font and Sindhi Trilingual Dictionary App and solutions for Modi script including Modi script learning app and digital annotation and archiving system.

9.1.3 Professional Electronics, including VLSI and Embedded Systems:

Transfer of Technology (ToT) of the following innovative products /solutions developed by C-DAC was carried out during the year.

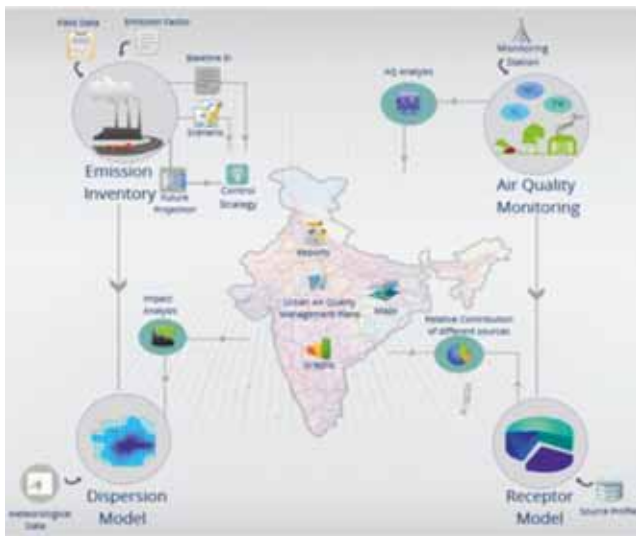
- TraMM - Traffic Signal Monitoring and remote Management Software on September 26, 2016
- Single-Phase / Three-Phase Smart Energy Meters for Indian Power Network on September 05, 2016
- Internet of Things (IoT) products - generic sensor board (Ubisense), wireless sensor nodes (Motes) namely Ubimote, BLE-Mote, Wi-Fi Mote and multi-protocol gateway (Wingz) at MeitY, Delhi on July 12, 2016.
- Augmented Reality (AR) products at MeitY, New Delhi on July 12, 2016. The AR products considered for TOT are for learning environments namely AR Board and AR Book
- Handheld Electronic Nose (HEN) on April 29, 2016
- eSafeT - an object tracking system for environment sensitive items in transit on April 13, 2015

Commercialization and Deployment of Traffic Control solutions:

Traffic Control solutions developed by C-DAC with funding from MeitY have been deployed in several cities. Technology Transfer has been done to around 10 agencies who

are deploying these solutions all over the country.

Deployment of Energy market services for Assam and Meghalaya: Energy market services are Intra State Bilateral Short Term Open Access (STOA) and Energy Scheduling. STOA supports to maintain GRID discipline for smart load management. Energy scheduling helps to generate and maintain the entire workflow of the schedule process. These services are deployed in cloud environment at North East Regional Despatch centre (NERLDC) for use by State Load Despatch Centre (SLDC) of NE states. This provides a standardised, cost effective solution for all SLDCs. In the initial phase, these services are provided to both Assam and Meghalaya SLDCs.



Deployment of HARITA PReclsion Technology for Agriculture (HARITA PRIYA): HARITA PRIYA provides micro-climate information from agriculture fields using Wireless Sensor Networks (WSN). It enables dissemination of location specific advisories to farmers on pest, disease forewarning and optimal irrigation schedules. WSN gathers real time micro-climate data at crop canopy from farmer fields and is used by decision support models to provide location specific personalized agro advisories through a web-based Graphical User

Interface (GUI). System is deployed with 100 WSN nodes and 5 Gateways for groundnut crop at 5 villages of Anantapur District, in Andhra Pradesh.

Commercialization and Deployment Digital Programmable Hearing Aid: C-DAC has developed Tarang - Digital Programmable Hearing Aid (DPHA), a feature rich, affordable and easily maintainable digital programmable hearing aid. It uses advanced digital signal processing techniques and is based on indigenously developed application specific integrated circuit known as NAADA. Transfer of Technology (ToT) was carried out to industry partners, M/s KELTRON, Thiruvananthapuram and M/s Best Hearing Solution, New Delhi. C-DAC has supplied Tarang under government schemes including Rajiv Vidya Mission (SSA), ADIP Scheme (Assistance to Disabled Persons for Purchase/Fitting of Aids/Appliances, Department of Empowerment of Persons with Disabilities), and RBSK Scheme (Rashtriya Bal Swasthya Karyakram, National Health Mission, Ministry of Health & Family Welfare, Govt. of India.

9.1.4 Software Technologies, including FOSS

Deployment and Proliferation of BOSS: During the year, C-DAC carried out several deployments of BOSS 6.1 and its variants for many agencies including Defence Research and Development Laboratory (DRDL), Indian Army, Indian Navy, government departments and educational institutes of Tamil Nadu and Andaman and Nicobar. There were around 15000 deployments of BOSS Linux in laptops in Government of Odisha. Several BOSS awareness workshops and training programs were conducted in colleges of Tamil Nadu as phase 1. C-DAC is developing service oriented component based Operating System on the basis of research work of IIT Madras. Development of a BOSS light weight OS with

minimal packages and more fine grained control over services is also under development

Enhancement and Deployment of e-Pramaan:

During the year, C-DAC carried out enhancements related to better performance and image processing in e-Pramaan, the national authentication framework to provide standard based uniform authentication mechanism for various government services. 33 services have been integrated with e-Pramaan Authentication server and 29 services are using the Aadhaar ecosystem provided by C-DAC. A mobile App for e-Pramaan has also been developed and made available for public. IVRS based Aadhaar authentication was introduced and more than one crore transactions are completed using this system.

Through Mobile Seva Platform Integration of departments:

C-DAC through its Mobile Seva platform, integrated 3414 Government departments across the country, which provides services to the citizens through mobile phones and tablets.

E-Hastakshar - C-DAC's Digital Signature for public use:

E-Hastakshar - C-DAC's eSign Service enables instant signing of documents online by citizens in a legally acceptable form. The service was launched by Shri Ravi Shankar Prasad, Hon'ble Minister for Law & Justice and Electronics & IT, Government of India on September 3, 2016 and 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 10 agencies to leverage e-Hastakshar for eSign purposes and offered 60,304 signatures as on November 30, 2016.

Usage of Vikaspedia - Collaborative knowledge sharing portal:

Vikaspedia is a multilingual, multi-sectoral collaborative knowledge sharing platform portal developed by C-DAC that seeks to empower

under-served communities through provision of information, products and services in regional languages. The platform is available in all 22 scheduled languages, besides English and attracts about 43 million hits / month. Information based mobile apps in local languages and related to the livelihood sectors were available in the portal.

E-CHARAK – an e-Channel for Herbs, Aromatic, Raw material and Knowledge has been developed for the National Medicinal Plants Board, Ministry of AYUSH to provide a virtual platform for information exchange between stakeholders in the medicinal plants sector. The service was formally launched on August 20, 2016 at Jaipur, Rajasthan. Outreach workshops on Vikaspedia (115) were organized at various block/district across 16 states.

eBasta – Enablement of school books as e-books:

In line with government's Digital India initiative, eBasta provides a framework to make school books accessible in digital form as e-books. 1314 books (1281 pdf, 8 ePub and 25 mp4) have been published on the portal by CBSE, 9 State Boards and a few private publishers. About 45 school workshops have been conducted training more than 1400 teachers and 580 schools on technologies including eBasta. Windows version of eBasta App has been hosted on Windows store and desktop version of eBasta App is in the final stages of completion.

Deployment of solutions under DISC Project:

As part of Digital India initiative, C-DAC is developing and deploying solutions for various sectors such as Health, Education, and Agriculture.

- Deployed Overhead scanner based Annadarpan Smart System at Singur Tapashi Malik Krishak Bazar (STMKB), Singur, Hooghly
- Deployed Annadarpan Dynamic System for quality analysis of moong, tur, Bengal gram and kabuli channa at A.P.M.C, Gadag, Karnataka.



- Deployed CT-VIEW System for quality Analysis of Chilli at A.P.M.C., Hubli, Karnataka.
- Enhanced Mother and Child Tracking System application to facilitate Ministry of Health & Family Welfare to digitize the current manual process of tracking eligible couples, pregnant women and newly born children by replacing the huge registers with light weight easy to carry tablets.
- Enhancements are being carried out in eSanjeevani Telemedicine Software to provide better services

9.1.5 Cyber Security and Cyber Forensics

Enhancement, deployments of solutions and Training in Cyber Security

C-DAC carried out design, development and upgradation of following products related to cyber security and cyber forensics during the year:

- M-Kavach is a comprehensive mobile device security solution for Android devices to secure mobile resources from various threats like data compromise, malicious applications, physical thefts and mis-utilization of hardware resources etc.
- Cyber Threat Analyzer is empowered with capabilities for dynamically configuring various sensors in terms of network domains, contents and configurations and supports large scale attack data collection, threat monitoring and determination of latest attack trends.
- DARPAN is a network management system used for managing mission critical networks of our nation and designed to manage small enterprise networks to huge country-wide networks. It is empowered with network monitoring and management facilities like fault management, configuration management,

performance management and security management.

- During the year, C-DAC deployed various Cyber Forensics Tools at several law enforcement agencies (LEAs) and conducted advanced level training programs for officers of Army, Navy, Police, Forensic laboratories, NIC, BEL, BSNL, Intelligence bureau, Income Tax departments and academia.
- As part of Information Security Education and Awareness (ISEA) Phase - II initiative, 337 workshops were conducted across many states covering about 42379 participants and around 87 trainings were conducted for around 2148 government officials in collaboration with NIELIT.

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 solution that facilitates purchase, inventory management and distribution of various drugs, sutures and surgical items to various District Drug Warehouses, Medical Colleges, District Hospitals, Community Health Centres, Primary Health Centres and Drug Distribution Centres in an entire state. The solution is being deployed in 15 states as part of nation-wide roll-out and about 2 lakh transactions per day are being recorded for this system.

Deployment of e-Sushrut , Hospital Management and Information Solution:

C-DAC's e-Sushrut system is a web based Hospital Management Information System (HMIS) and is being implemented in Government hospitals in Rajasthan, Maharashtra, Odisha, Telangana, Punjab and Andhra Pradesh.

Deployment of Telemedicine Solutions: C-DAC has developed and deployed Telemedicine

solutions at various states of India including Punjab, Himachal Pradesh, Kerala and Assam in India. In addition, C-DAC's telemedicine solutions are deployed at other countries including Myanmar, Tanzania, Armenia and Kyrgyzstan.

Development of Big Data Analytics solutions for healthcare: C-DAC is developing Big Data Analytics solutions for healthcare analysis to help in deriving valuable knowledge from large amount of data:

- Big Data framework for Healthcare Analytics with generic web application for better healthcare management. The framework facilitates statistical analysis on consolidated healthcare data for analyzing diseases to track outbreak of diseases and provide quicker response
- Big Data technology based decision support systems for cancer treatments in collaboration with academic, industrial and clinical leaders in India and Netherlands

9.1.7 Education and Training

Post Graduate Diploma programs in advanced ICTE areas: C-DAC is conducting Post Graduate Diploma programs 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. A total of around 6000 students will be trained by March 2017 through C-DAC training centres and Authorized Training Centres (ATCs). C-DAC also offers Master Programs in collaboration with different universities in advanced areas of ICT.

Support towards conduction of GATE and JAM examinations: C-DAC, for the fourth consecutive

year has supported the IITs in conducting the annual GATE examination. The examination typically sees over 1 million candidates registering every year. C-DAC has built the applicant portal and admin portal supporting functionalities for students and administrators. JAM was also conducted for the third consecutive year using C-DAC's software solution.

Capacity building in Electronic Product Design and Production Technology: As part of Capacity building in Electronic Product Design and Production Technology (EPDPT), C-DAC initiated industry relevant formal and non-formal training programs to generate skilled manpower, which includes Short-term Certificate Courses for Engineering students, Skill Development Programs targeted towards students and faculty of Polytechnic/ITI Colleges, PG Diploma courses, Faculty Page. During the year, more than 1058 candidates were trained / undergoing training as part of the updation Programs and M.Tech Programs.

9.1.8 North-East

Deployment of Supercomputing solutions

- C-DAC- IIT Guwahati Supercomputing Facility, PARAM Ishan with a peak computing power of 250 Teraflop was inaugurated by Hon'ble Minister for HRD Shri Prakash Javadekar on September 19, 2016 at IIT Guwahati.
- PARAM-TEZ, a High Performance Computing Centre was inaugurated on August 9, 2016 at Tezpur University, Assam.
- C-DAC & NIT Sikkim PARAM Kanchenjunga Supercomputing Facility was inaugurated by Shri Srinivas Patil, Hon'ble Governor of Sikkim on April 14, 2016 at NIT Sikkim located at Ravangla.

Launch of Online Auction System: "NE-Fresh Online



Auction System” developed by C-DAC was launched on August 10, 2016 at Gangtok by Shri Somnath Poudyal, Hon’ble Minister for Food Security and Agriculture Development Department, Govt. of Sikkim.

Workshops and Training in NE: C-DAC Conducted around 40 workshops/trainings in the NE region on various technical areas including Cyber Security, HPC, IoT, BOSS, e-Learning etc.

9.1.9 International Initiatives

Vietnam: Sustainable IT Infrastructure for Advanced IT Training using conventional, virtual classroom and e-Learning Technologies in Vietnam under ASEAN : In the presence of Hon’ble Prime Minister of India’s visit during September 3-6, 2016 to Vietnam.

Ghana: Five years additional support to India – Ghana Kofi Annan Centre of Excellence in ICT at Accra, Ghana - Hon’ble President of India, Dr. Pranab Mukherjee visited India – Ghana Kofi Annan Centre of Excellence in ICT during June 12 – 14, 2016.

Vanuatu: Centre of Excellence in IT in Vanuatu - Sh. Piyush Goel, Minister of State for Power, Coal, New and Renewable Energy and Mines, Government of India and H.E. Mr. Bruno Leingkone Tau, Minister for Foreign Affairs, Republic of Vanuatu signed a Memorandum of Understanding on Oct. 26, 2016 for Establishing India-Vanuatu Centre of Excellence in IT to be setup by C-DAC.

Papua New Guinea: Centre of Excellence in IT in Papua New Guinea - MoU was signed on November 16, 2016 for setting up of ‘India – Papua New Guinea Centre of Excellence in IT’ at Papua New Guinea.

Bhutan: INDO-Bhutan e-Library Project - The INDO-Bhutan e-Library Project setup by C-DAC was inaugurated on September 5, 2016 at

Motithang Higher Secondary School, Thimphu, Bhutan by Lyonpo Norbu Wangchuk, Minister of Education, Royal Government of Bhutan and H.E. Jaideep Sarkar, Ambassador of India to Bhutan.

Tanzania: ICT Resource Centre at NM-AIST in Arusha, Tanzania- The ICT Resource Centre at NM-AIST in Arusha, Tanzania was inaugurated on July 18, 2016 by Hon. Dr. Joyce Ndalichako, Education Minister of United Republic of Tanzania in the presence of H.E. Sh. Sandeep Arya, High Commissioner of India to Tanzania.

Guyana: Upgradation of IT Infrastructure & deployment of C-DAC Web Based Integrated Office Automation System and Portal at CARICOM Secretariat in Guyana - Signing of Agreement between MEA & C-DAC on September 16, 2016 for setting up of ‘Upgradation of IT Infrastructure & deployment of C-DAC Web Based Integrated Office Automation System and Portal at CARICOM Secretariat in Guyana.

Tajikistan: Computer Laboratories in 37 Schools in Tajikistan - Ministry of External Affairs (MEA) and C-DAC have signed an Agreement on October 05, 2015 for setting up of “Computer Labs in 37 Schools of Tajikistan”. The IT infrastructure has been setup & the labs have been operationalized / handed over to the Tajik side on August 4, 2016.

Proposed new Initiatives: The following two proposals have been evolved for consideration:

- **Microprocessor Development Initiative (MDI) :** C-DAC has evolved a proposal to design and develop a high-performance 64-bit RISC architecture-based Quad-core Microprocessor as a System on Chip (SoC).
- **National e-Bhasha MMP:** C-DAC has evolved a proposal for e-Bhasha with where the main thrust is to help accelerate the implementation of localized e-governance by making

government services accessible to common man. The key principles of e-Bhasha include, transformation of ICT Based Public Services through Localisation; standards and guidelines adoption, shared unified multilingual citizen data repository accessible to all e-Gov MMPs; cloud based localization tools and localised mobile based delivery.

9.2 Strategic Need: Society for Applied Microwave Electronics Engineering and Research (SAMEER)

Society for Applied Microwave Electronics Engineering & Research (SAMEER) is an autonomous R & D institute under Ministry of Electronics and Information Technology (MeitY), Govt. of India since 1984. It was created with the objective of pursuing research and development in the field of RF & microwaves. SAMEER is involved in development of RF and microwave based systems and products required by various government agencies like Defence, Space, Earth Sciences and Indian Meteorology Department.

The other two Centers of SAMEER are located at Chennai and Kolkata respectively known as Centre for Electromagnetics and Centre for Millimeter Wave Research. Two additional centres SAMEER Visakhapatnam and SAMEER Guwahati have been created and soon would be operational from their respective places. SAMEER Visakhapatnam is known as- Electromagnetic Environmental Effects (E3) and SAMEER Guwahati for development of Microwave Tubes and High Power Components.

SAMEER undertakes and executes research work for various Government agencies, public sector undertakings and industries in its expert areas of RF/Microwave/Millimeter wave systems and subsystems, High Power RF amplifiers, RF communication systems, Atmospheric Radar Instrumentation, Linear Accelerators,

Electromagnetic Interference/compatibility (EMI/EMC), Thermal Engineering of electronic hardware, antennas, Photonic devices, Microwave components/modules and Industrial RF/Microwave application products.

9.2.1 Achievements:

Some of the major programmes of SAMEER are

- Medical Linear Accelerator Programme for Cancer Therapy
- Non Destructive Testing (NDT) using linear Accelerator Technology for strategic national programmes
- Atmospheric Instrumentation programme for weather monitoring
- High Power Microwave & RF components & subsystems
- Photonics programme including Terahertz Technology
- EMI/EMC Programme
- Radar & Antennas for various airborne & ground applications
- Mm-wave Technology

ST Radar

The project envisions design, development and installation of ST Radar national facility at Guwahati University for north east states with emphasis on cost effective indigenization of this sophisticated technology. ST radar provides vertical profiles of horizontal winds in the Troposphere and Stratosphere Region of atmosphere. It is a ground based clear air coherent Doppler radar. It transmits uncoded and suitably coded pulse to get the higher range. Wind profiling measurements are carried in five orthogonal directions using five independent beams.



ST Radar Installation work at site is in progress

Development of Ka Band Polarimetric Doppler Radar for Cloud Profiling:

This project is funded by Ministry of Earth Sciences (MOES). Clouds play a critical role in earth's climate through the reflection, absorption and emission of radiation, the vertical transport of heat and moisture and the generation of precipitation and its associated latent heat release and evaporation. The poor representation of cloud processes continues to be one of the major sources of uncertainty in numerical simulations of climate and weather. In order to adequately understand the role of clouds and improve their parameterization in numerical model; fundamental studies i.e. process studies on all scales important to clouds formation, evolution and dissipation are required. These studies are possible with the help of Ka Band Polarimetric Doppler Radar. All the sub-systems have been tested and the system level integration is being done. Radar consists of 1.8 m dia Cassegrain antenna mounted on a trailer and has scanning capability in azimuth and elevation for hemispherical coverage of clouds. System has many state-of-the-art features.

Design & Development of Quantum Cascade Laser (QCL) absorption based toxic -chemical Detector for Homeland Security

SAMEER Mumbai has developed a Lab prototype trace gas sensor, which can detect the harmful gases from the atmosphere at sub ppm level. This

instrument uses a Tunable Infrared Laser source, which absorbs the gas molecule inside a Gas cell. The detection is done using IR detector / MEMs and signals are acquired with high speed electronics using Wavelength Modulation technique.



The instrument can be used to detect multiple toxic gases such as Ammonia, Methane, Carbon Monoxide, **Nox and Sox, Ozone etc. for Pollution monitoring**

Development of High Resolution Imaging System using Spectral Domain-Optical Coherence Tomography (SD-OCT)

A 1310 nm source based high resolution imaging system using SDOCT is developed. This OCT technique finds application in many biomedical and non-medical areas such as ophthalmology, dermatology, food and agro industry and packaging etc. The SDOCT system designed and developed has been used to obtain images of samples like cover slip, glass slide, foam sheet and onion cells

6 MV Medical Linac "SIDDHARTH" under the national Jai-Vigyan mission

Installation and Commissioning of 6 MV Medical Linac at Amravati Cancer Foundation (ACF), Amravati is under progress and will be commissioned soon.

Development of High energy Electron Linear Accelerator for medical applications

SAMEER has undertaken to develop the 30 MeV linear accelerator system for irradiation of Molybdenum 100 to convert it to Molybdenum 99 from which Technetium 99 will be extracted and used for medical diagnosis and imaging applications. INMAS will develop a procedure for extraction of the Tc-99 from the Moly-99 and carry out the quality assurance, clinical trials etc.

The project is being implemented in two phases. In the first phase the photon energy of about 18MV and electron beam power of about 3kW will be demonstrated. This will be used to irradiate the enriched molybdenum 100 material and measure the actual activity obtained. In the second phase the 30 MV and 8 kW electron beam power linac will be developed and demonstrated.

The design of the subsystems for the first phase is completed and procurement, fabrication etc is in progress. Major design works for the second phase subsystems like resonant cavity, electron gun, etc is in advanced stage of evaluation.

Indigenous Magnetic Resonance Imaging system

SAMEER is developing low cost indigenous MRI system for medical diagnostics. This is an multi institutional project with SAMEER being nodal agency for integration of the system. The first level integration of the system is under progress.

Smart warehouses with Application of frontier EM & Electronics based Technology (S.A.F.E².T.Y)

SAMEER has undertaken a project on Application of electronics and electromagnetic based instrumentation technologies for effective

monitoring and safe management of stored paddy in ware houses.

Application of EM Wave Based Technology for Disinfection of Grains, Pulses and Seeds for Safe Storage

SAMEER has initiated a project Development of innovative electronics and electromagnetic based disinfestations for safe management of grains, pulses and seeds

Design and Development of Switched beam array antenna for 5G technologies

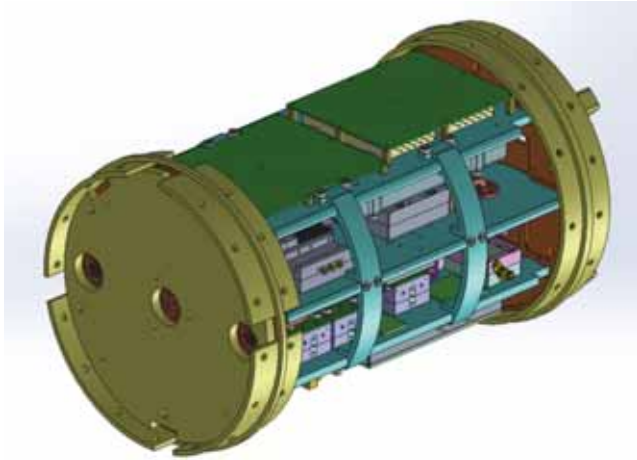
An indigenous development of switched beam antenna array at mm wave frequencies is being developed by SAMEER-CEM for next generation mobile applications 5G. The antenna is capable of switching the beam in 16 predefined angular positions in azimuth. This concept improved the signal to Noise ratio and hence the channel capacity for the next generation 5G systems. The bandwidth provided by the antenna is well suited for the high data rates of the order of >10Gbps an important feature of 5G systems.

Magneto-Dielectric (MD) substrates for miniaturized antenna applications

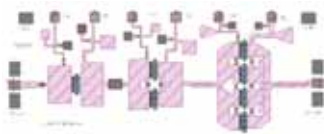
Magneto-dielectric substrates with control over the specific dielectric and magnetic properties are being developed jointly by SAMEER and C-Met. These substrates are a novel solution to antenna miniaturization especially at low frequencies. The antennas at low frequency can be made conformal by exploiting the MD substrate configurations. Novel strategies will be followed in creating an MD substrate to maintain frequency stability and low loss characteristics.

W band three channel Coherent Transmitter Receiver for airborne RADAR

SAMEER is currently developing and W band coherent Transmitter Receiver for Airborne RADAR system to be used for strategic applications.



W band Power Amplifier and Multiplier MMIC



SAMEER has initiated design and development of W band Power Amplifier and W band Active Multiplier MMIC

using the foundry service of United Monolithic Semiconductor, France. The design has been completed and sent for fabrication

Airborne Antennas for Next generation Anti Radiation Data Link System

The Data Link RF Transceiver is used for Communication application operating in full duplex mode. It has got two different units, one fitted inside airborne launcher and other on airborne platform. The unit fitted inside launcher has transmitting antenna and receiving antenna. Also, the unit fitted inside the missile has transmitting antenna and receiving antenna.

9.2.2 Centre for Electromagnetic Environmental Effects at Visakhapatnam

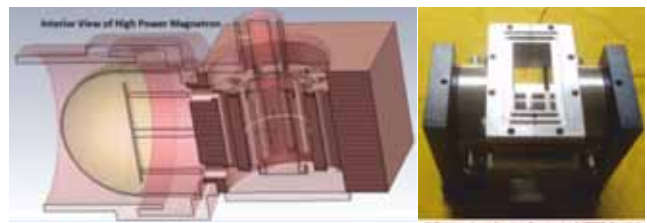
SAMEER-Centre for Electromagnetic Environmental

Effects (E3) has been established at Visakhapatnam for highly specialized state-of-the-art EMI/EMC test facilities including Electromagnetic Pulse (EMP), Ultra Wide Band (UWB) Test system and Pulse Current Injection (PCI) set up to meet the requirements as per International EMC Standards to cater strategic departments.

Some of the Major progress milestones Completed are the global tendering process and Placing of purchase orders for procurement of specialized test facilities viz., EMP, PCI and UWB Test systems. Procurement of RF shielded Semi-Anechoic Chamber, MIL EMI/EMC Test facilities as per MIL STD 461F/G and Establishment of 3D-EM Modeling and Simulation laboratory with state-of-art softwares and high-end computational resources is under progress.

Centre of High Power Microwave Tube and Component Technology (CHMTCT), SAMEER, IIT Guwahati

CHMTCT is working in the area of conventional high power microwave tube/component as well as futuristic tube such as high power mm wave and THz sources. The upcoming centre at IIT Guwahati campus has established design facilities and design and high power circulator and magnetron is in progress.



9.2.3 North East Initiatives

Microwave heating systems for the application of drying of tea powder are being developed for Guwahati University and Tezpur University. The

system comprises of a 10 kW, 2.45 GHz microwave source with conveyorised applicator. Individual system with applicator, stabilizer and chiller unit will be commissioned,

Development of Lightning Detection Network

SAMEER has undertaken development of Lightning Detection Network (LDN) for installation in NE region in collaboration with Tripura University. The LDN comprises of LF/VLF sensor nodes and Centralised Server to determine the location, intensity, and movement of thunderstorms in real time. This can help locate lightning-caused damage to resources and infrastructure.

Lightning is always associated with severe weather like. thunderstorms, tornados, hailstorms etc Weather radars are less effective in tracking and monitoring of severe weather conditions over longer distances. The LDN is able to track location, intensity, and movement of severe weather conditions in real time where radars are not effective.

Development and Installation of Ionosonde Radar at Dibrugarh University

The Ionosonde uses HF radar technique to probe the Ionosphere. This system radiates pulsed electromagnetic radiation with carrier frequency in the range 1 – 20 MHz towards the sky. The received echo is subjected to the measurement of parameters like the amplitude, phase, Doppler frequency shift and polarization,

SAMEER has developed and installed Ionosonde at Dibrugarh University campus. The system is undergoing field trials.

9.2.4 SAMEER has also undertaken following projects during the year 2016:

Development of Conformal Antennas

Lt-GaAs material growth using Molecular Beam Epitaxy system (MBE) for THz antenna fabrication.

Near infrared spectrometer based on line scan camera is being developed for high speed scan rate image processing for agricultural and food product inspection

Microwave Technology Based Tea processing system for NE States

Metamaterial (Negative refraction) based radio frequency FLAT lens for magnetic resonance imaging (MRI)

Building end-end 5G Test bed

Low Sidelobe Level Series-Fed Microstrip Array Antennas

Design and Evaluation of Multi-Band, Muti-polarization Shared Aperture Antenna (SAA)

Establishment Of Mil Std EMC Test Laboratory

EMI/EMC testing and consultancy services to electronic industry

Airborne Antennas for Quick Response Surface to Air (QRSAM) Data Link System

S/Ka band Tracking Antenna :

RPF Antennas for airborne applications

Radar level probe

RF based proximity sensors for airborne applications

Design and Development of IR Laser Absorption based compact sensor to Detect Toxic Chemical Agents for Integration in EWAR System

Mid IR Optical waveguide device fabrication.

Development of FCS systems variants

V-Sushrut (Robotic Radio Surgery Systems).

Self Contained X-Ray Blood Irradiator Systems.

CEMILAC certified Radar Altimeter

Development of Laser absorption based Non-Invasive breath Analyser for Healthcare Application.



9.3 C-MET'S Laboratories and core competence

C-MET's R & D activities have been implemented in three laboratories at Pune, Hyderabad and Thrissur. The laboratory at Pune functions as headquarters and extends central coordination support. Each of these laboratories has its own area of specialization with requisite infrastructure and expertise.

LAB	Area
Pune	<ul style="list-style-type: none"> ➤ Materials for Electronic Packaging, ➤ Materials for Renewable Energy, ➤ Nano-materials and their composites
Hyderabad	<ul style="list-style-type: none"> ➤ Compound Semiconductors, ➤ Refractory Metals, Alloys, RoHS ➤ E-Waste & RoHS
Thrissur	<ul style="list-style-type: none"> ➤ Microwave Dielectrics, Multilayer ➤ Ceramics, Actuators and Sensors ➤ Nanomaterials and Thin Films

9.3.1 Technical activities & progress during 2016-17:

During the year 2016-2017, the main technical activities of C-MET covered the following:

- Implementation projects from MeitY and various government funding agencies like DST, ISRO, BARC, BRNS, DRDO, etc.
- Technical services
- Materials characterization services

Progress of Novel Ongoing Projects at C-MET

Development of Li-Ion Batteries: Active Materials Synthesis, Fabrication and Testing of Prototype Cells (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 with a production of the order of billions of units per year.

During the year 2016-17, Hafnium process technology demonstrated to quality control team of VSSC and an MoU signed with VSSC for supply of 20 Kg Hf sponge. 22 Kgs of hafnium sponge shredded to small pieces for the Electron Beam (EB) melting refining. 30 kg material handed over to VSSC/MIDHANI. Indian Chemical Council Award for Excellence in Chemical Plant Design and Engineering, presented to VSSC for Establishment of Hafnium Plant in association with C-MET, Hyderabad.

Silicon Carbide (SiC) Semi-insulating Single Crystal for High Temperature, High Voltage and High Frequency Electronic Applications

(C-MET, Hyderabad): In view of strategic and commercial uses of SiC in electronic industry, C-MET, Hyderabad, in collaboration with DMRL & SSPL, Delhi, with funding from DRDO, has undertaken SiC single crystal growth process to develop SiC wafers required for substrates to be used in GaN technology at SSPL. This is India's first ever initiative to develop SiC based electronic devices. Process technology demonstrated to grow 6H and 4H SiC Single Crystals. During the year, 2" diameter SiC single crystal grown at C-MET Hyderabad was sent to SSPL (DRDO) for further processing. SiC phase-II project MoU was signed between C-MET and DMRL in June 2016 with a project outlay of nearly ₹ 998.78 lakhs.

Recovery of Precious Metals from Electronic Waste: PCBs (C-MET, Hyderabad):

The recycling of waste PCB scraps presents both challenges and opportunities not only to the original equipment manufacturers (OEMs), but also to recyclers. The PCBs constitute to about 10-13% of

the total electronic waste by weight. The PCB contains most of the elements found in the periodic

table, including precious metals, rare metals, base metals and some toxic elements such as Cr (VI), Pb, Hg, Cd, Br.



Process flow diagram of recovery of precious metals from electronic waste

In order to develop a cost-effective environment-friendly solution for e-waste recycling technology, MeitY initiated various R&D efforts. One such successful initiative was to implement the project “Environmentally Sound Methods for Recovery of Metals from Printed Circuit Boards” jointly by C-MET, Hyderabad and E-parisara, Bangalore. In this project, laboratory scale process know-how was developed.

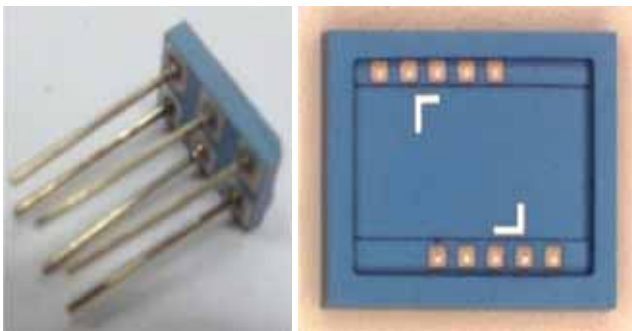
Flow sheets for the recovery of various metals were developed. Prior to the commercial exploitation of

the processes, technological and economic feasibility have to be ascertained. A second phase of the project was sanctioned for establishment of pilot plant operations and demonstration of the efficient processes for the recovery of valuable metals and, also, to extend the facilities for unorganized sectors. During the 2016-17, an electro-refining system was designed and fabricated for copper extraction and produced ~30 Kg copper from anode bars and a LPG based smelting system fabricated and being commissioned.

First Government owned Restriction of Hazardous Substances (RoHS) test Laboratory: Service to Industry (C-MET, Hyderabad):

Restriction of Hazardous Substances (RoHS) impacts the entire electronics industry and many electrical products as well. RoHS specifies maximum levels for the following six restricted materials: Lead (Pb): < 1000 ppm, Mercury (Hg): < 100 ppm, Cadmium (Cd): < 100 ppm, Hexavalent Chromium: (Cr VI) < 1000 ppm, Polybrominated Biphenyls (PBB): < 1000 ppm and Polybrominated Diphenyl Ethers (PBDE): < 1000 ppm.

In order to test the said above six elements, C-MET has created a unique RoHS testing facility with the financial support from MeitY. It is NABL accredited laboratory with certificate 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.



From L to R): Integrated gas sensor substrate with heater and temperature sensor, LTCC package for MEMS devices and micro cryo-cooler developed by C-MET

Development, testing and supply of LTCC based induction coil magnetic sensor are in progress. The Mark – Sensors were tested by user agency (BARC) for application and other parameters. C-MET has taken up this R&D activity and developed LTCC green tapes using doctor blade technique.

Low Temperature Co-fired Ceramic (LTCC) Packaging Technology (C-MET, Pune) and Development of Indigenous LTCC Tapes (C-MET, Thrissur):

The Low Temperature Co-fired Ceramic (LTCC) is a multilayer circuit technology made up of a glass-ceramic dielectric and silver or gold based conductors. Further, most passive components of the circuits consisting of inductors (L), capacitors (C) and Resistors (R) can be integrated in the layers and the dielectric is good enough for building multilayer microwave circuits up to 40 GHz. Today, C-MET possesses full-fledged LTCC fabrication laboratory, set-up through major financial support from National Programme on Smart Materials (NPSM). The facility is housed in a modest 150 m² of class 10000 clean room. In past, C-MET has worked closely with more than 20 institutional users from research laboratories, academic institutions and private sector companies across the country to develop various microwave communication circuits, packages for MEMS devices, thin film sensors, integrated gas sensor substrates, microfluidic valves etc.



Thermal Sensor Based Monitoring System for the Early Detection and Screening of Breast Cancer (C-MET, Thrissur): Breast Cancer is now the most common cancer in India and accounts for approximately 27% of all cancers in women. In India, a stigma towards regular screening for cancer

exists due to fear and ignorance. Reliance on Western guidelines employing regular mammography is impractical in India due to the large population of young patients with more dense breasts along with the high cost of machines and trained manpower and staff requirements. Thermography is a non-invasive, skin surface temperature measurement method for screening of breast cancer; it is economical, fast and do not inflict any pain to the women.

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. This device can be operated with minimum training, portable and low cost. This is a joint project between C-MET, Centre for Development of Advanced Computing (C-DAC) and Malabar Cancer Centre (MCC). Some more R&D work on data acquisition and data



The wearable device developed by C-MET for Screening of breast cancer

transmission devices, reproducibility, repeatability, robustness, etc., are in progress for successful completion of the project. During the year 2016-17, 10 numbers of wearable devices with different sizes were made. First phase clinical trials were completed with 22 patients and 52 volunteers. The results obtained using C-MET developed wearable devices are in line with standard diagnostic tools namely Mammography.

Cristobalite (High pure Silicon Oxide):

Cristobalite is a high temperature crystalline polymorph of silica. Cristobalite is used as reinforcement filler in the adhesive used for bonding E-glass, strain isolation pads and ceramic tiles to space vehicles. 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. ISRO requires regular supply of cristobalite for their Relaunchable Vehicle (RLV) applications. C-MET has so far supplied 440 Kgs of cristobalite to ISRO. The technology is now ready for transfer to interested industries on non-exclusive basis.

Rechargeable Emergency Lamp using Graphene based Supercapacitors:

Under MeitY sponsored project "Development of Graphene supercapacitors for power electronics" C-MET has developed graphene based supercapacitors. As a spin off, C-MET designed and developed an emergency lamp using graphene supercapacitors. C-MET has filed an Indian patent application (No. 265/DEL/2015) for this technology.

The technology is now ready for transfer to interested industries on non-exclusive. The salient features of the quickly rechargeable emergency lamp are

- It can charge in less than 2 minutes
- It can give power continuously upto 0.5-1 hour

- It can also charge from renewable energy sources
- Ideal for rural India where there is no regular power supply.
- The lamp is handy, light weight and can be sold at affordable price.



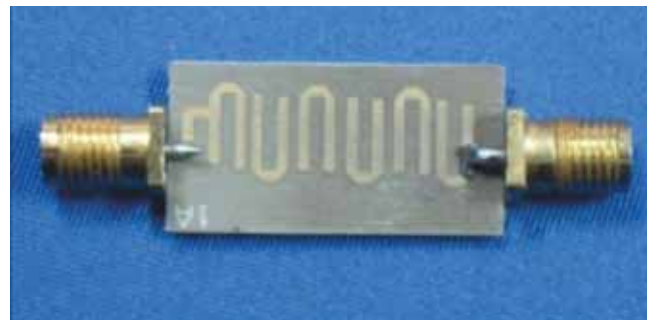
9.1 Quickly rechargeable emergency lamp

Microwave substrates having dielectric constant values 6.15 and 3.0: Flexible microwave substrates are extensively used for variety of high end microwave circuit applications such as high power solid state amplifiers, patch antennas, missile guidance, mobile base stations etc. Currently the requirements of high frequency circuit boards are fully met through imports and world over only handful of industries are manufacturing these technologically and commercially important class of materials.

More than 70% of the cost of any microwave device accounts for the base microwave circuit board and the availability of such circuit boards in the country are going to make phenomenal changes in the overall performance of microwave PCB industries. In order to produce economically viable microwave substrates, C-MET has developed a patented SMECH process, which comprises of Sigma Mixing, Extrusion, Calendering followed by Hot pressing. Microwave substrates with dielectric constant values 6.15 and 3.00 are developed indigenously for the first time, which are superior in properties compared to imported counterparts in terms of ultra low loss tangent ($\tan \delta = 0.0018$ at 10 GHz) and temperature stable properties for outdoor wireless communication applications. C-MET has already obtained one US patent and filed two more patent applications to protect the intellectual property rights of this innovation. The technology is now ready for transfer to interested industries on non-exclusive basis.



Ultra low loss MW substrates developed at C-MET through SMECH process



Band pass filter fabricated using indigenously developed MW substrates

Nano-Zinc Oxide for electronics and enhanced catalytic applications: Semi pilot production of nano-ZnO is ready for commercialization. The unique features of Nano ZnO powders are given below:-

- Ave. particle size = 30 nm.
- Average surface area = 50 m²/gm.
- Enhanced catalytic activity

The figures of Pilot production facility for Nano-ZnO at 5 Kg batch level and nano-ZnO powder and devices made out of it for strategic applications are shown below. The technology is now ready for transfer to interested industries on non-exclusive basis.

9.4 ERNET:

ERNET is an Autonomous Scientific Society of MeitY in the area of networking and providing connectivity. In addition, ERNET has been meeting the needs of academic and research institutions by providing IT consultancy, project management and training.

9.4.1 Domain Registration:

ERNET India has been designated as an exclusive domain registrar for registering domains under विद्या.भारत besides edu.in,ac.in and res.in for the education and research sector of the country. The domain registration process has been fully automated having facility of filling online registration forms, online renewal of domain name through online payment. ERNET has started registering domain for 10 years as well.

Setting up the eduroam services in India

eduroam stands for education roaming. It is the secure, world-wide roaming service developed for international research and education community. It allows students, researchers and staff from participating institutions to obtain Internet

connectivity across campus and when visiting other participating institutions by simply opening their laptop and working on local Wi-Fi network. eduroam Project is funded by MeitY. In India, ERNET is providing free services and support for enabling eduroam services in institutes. The project was formally launched in India in Sept. 2013, Institutions like IITs & IIMs have already hooked on to eduroam. It is expected that about 170 institutions in India would be on eduroam network next year.

IPv6 based Future networks Hands-on Skill Development Program:

All Government / Ministries apart from Institutions need to migrate to IPv6 by December 2017 as per the DoT roadmap which will help India get prepared and secure in the new Technology on which the future Internet including the Digital India programs will run. Government institutions mostly run their own IT infrastructure and require the skill sets to transform India into an IPv6 enabled country and keep the country on the forefront of network technologies.

The ERNET infrastructure has the distinction of being accessible from anywhere over the IPv4 present Internet and provide live hands on training on IPv6, the future technology of Internet. This helps in reaching the door steps of the Institutions for providing training in their locations apart from classrooms available in ERNET premises. More than 300 Government staff have been trained till date in this high technology area under the MeitY funded program in year.

Yeti - IPv6 only Root Domain Name Service

Testbed: ERNET is participating in the world wide effort of experimenting on a IPv6 only root DNS servers. 25 root servers have been deployed the 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.



9.4.2 Internet of Things:

MeitY in association with ERNET India and NASSCOM has established Center of Excellence (CoE) for Internet of Things (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 ₹2195.22 Lakhs, with MeitY contribution of ₹1077.7 lakh for 5 years. The CoE for IoT was launched by Hon’ble Prime Minister in July 2015 and the Centre was inaugurated by Hon’ble Minister of Electronics and Information Technology in July 2016

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 program support. The CoE will create an innovation platform for start-ups/entrepreneurs, enterprises in the space of IoT with ‘Democratisation of Innovation’. The CoE will energise research mind-set and reduce cost in research and development and can help promote indigenization.

The physical laboratory infrastructure of the first Centre of Excellence at Bangalore is already operational. The Centre has defined guidelines for enrolling of Start-ups. 5 Start-ups have been selected for incubation. CoE for IoT is focusing on Agriculture, Water, Health, Transportation, Security & Safety and Energy as vertical segments. Government of Karnataka has joined the initiative as a State partner through grant of space as well as program execution support in the State.

9.4.3 Pilot Project on connectivity using TV White Space:

ERNET India had created a test bed to carry out 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 tested the connectivity successfully from 6Km to 16 Km range and found that implementation of TV white spaces is simple, sustainable & appropriate to establish/extend the Internet connectivity to remote & rural areas. ERNET participated in creation of the White Paper on TV white space technology.

9.4.4 Wi-Fi Campus Network in five Universities

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.

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.

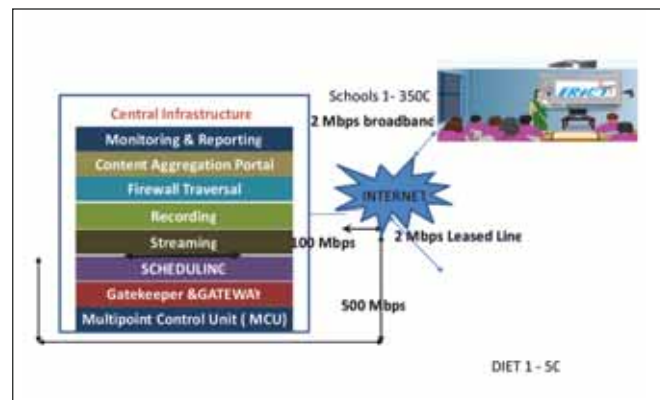
Setting up Wi-Fi enabled Campus Network at Osmania University, Hyderabad, Utkal University, Bhubaneswar & North-Eastern Hill University, Shillong: The Wi-Fi project is being implemented at Osmania, NEHU & Utkal University. Approximate 122 buildings will be covered under the Wi-Fi project at OU and similarly, 60 Nos. in Utkal & 55 Nos. in NEHU by Connecting all these Departments/Faculty/Buildings & Hostels spread across the campus over a high speed Fiber network. The project enables Wi-Fi Internet & Intranet access across the campus on any-time any-where basis.

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 will be setup. Backbone of the network would be on high speed fiber optic. 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.

9.4.5 SMART Classrooms, ICT learning, Training etc:

Set-up Smart Virtual Classroom Facilities
ERNET is implementing a project titled “Enabling Schools with Smart Virtual Class Room Facility – Phase - I” with a total project outlay of ₹94.07 Cr. 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 3500 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. The facility also offers offline access of classroom sessions rounder 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.



E-Learning ICT Centers in 204 schools of Srikakulam, Andhra Pradesh : ERNET India 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. 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 ICT Centers are commissioned and now functional and are being used by school students and teachers for computer literacy and enhancing education through use of ICT labs. ERNET India also conducted basic level training for more than 400 nos. of teachers on ICT.

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 state-of-the-art ICT infrastructure in their schools. Under the MoU, 64 ICT labs (39 in DNH & 25 in DD) will be setup in both the UTs. Materials have been delivered in all 39 Labs/schools under DoE, DNH and in 25 Labs/schools under DoE, DD including manpower. Total 19 Labs are installed & functional and remaining is under process.

ISEA Training: ERNET India under Information Security Education and Awareness (ISEA) Project Phase II, has been conducting training on security awareness to government officials. ERNET being one of the implementing agency, three 2-day basics training programs was conducted at Bangalore and Chennai regions. Total of 72 Government officials participated from various government organizations i.e., ELCOT, TNPL, ARCI, IGCAR, NIOT, Chennai Municipal office, Tamilnadu/ Puducherry Electricity Board, STPI, NIC, KPTCL, Power Grid, Bangalore Electricity board & CPRI.

9.4.6 Connecting the Unconnected Using VSATs:

ERNET India provides VSAT connectivity in C-Band using INSAT satellite for Internet & Intranet access in remote areas all over the country including North-Eastern region, Andaman & Nicobar &

Lakshadweep Islands. Its VSAT network is being upgraded to the latest and state-of-the-art technology. ERNET VSAT network is capable to provide VSAT types ranging from 64Kbps to 40Mbps data rates to the users.

ERNET is presently establishing (i) VSAT based Internet connectivity at 60 institutes/ schools located in remote parts of North East states of the country under MeitY project; and (ii) a high capacity SCPC VSAT link at Kavaratti, the U.T. of Lakshadweep Islands under NKN project. The upgradation of the VSAT network and establishment of the links will be completed by end of this year.

9.4.7 Setting up of Digital Archival facility for outcomes of the various languages Technology projects along with dependencies:

ERNET India has successfully implemented the above said project of TDIL, MeitY. ERNET India has developed a web based portal which enables archiving, storing, modifying, uploading and retrieving of Outcomes of the various Language Technology projects including executable files, source code, various functional modules, tools, documentation and research papers along with its dependencies developed by various organizations under funding from Govt. of India. This portal has been developed to securely distribute the code as and when required in future to researchers for further or new research along with dependencies. Modules of these resources can be utilized for Technology transfer. Uploading of contents can be done through dual authentication – username password and digital signature authentication.

9.4.8 Terrestrial Operation:

Upgradation of ERNET Delhi PoP including commissioning and installation of high end Firewalls and Intrusion Detection Protection System (IPS).

- Using the upgraded Infrastructure, ERNET is able to provide safe and secure Internet services to its users.
- With the upgradation, ERNET is offering network security as a service to its existing and new users.

Various Activities under operations

- Upgradation of the MPLS user links

ERNET India has been able to increase the Internet bandwidth for each link to thrice of its existing bandwidths, without actually increasing the cost for the link and falling in of revenues for the links.

- Connectivity of ERNET's users to South Asian

Countries, Europe and USA through TEIN4.

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.

9.5 e-Governance Solution: NeGD:-

To meet ever growing demand of e-Governance across the nation, National e-Governance Division was established as amalgamation of experts from the Private sector and the Government. NeGD has been playing a pivotal role in discharging the 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 & coordination of the entire Digital India Programme; technical appraisal, 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 to make them State-of-the-art architecture; development of Standards, Policies and Guidelines related to e-Governance; Technical appraisal 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 eco system of e-Governance in India. These initiatives include Digital Locker System, Rapid Assessment System (RAS), GIS as Decision Support System, Centralized e-Governance Competency Framework, etc. have already been implemented and currently being scaled up. Some other initiatives including Unified Mobile Application for New Age Group (UMANG), India Language Support on all Mobile phone, etc. have been conceptualized.

9.6 Government's IT infrastructure: National Informatics Centre (NIC)

The National Informatics Centre (NIC) was established in 1976, and has emerged as a "prime builder" of e-Government / e-Governance applications up to the grassroots level as well as a promoter of digital opportunities for sustainable development. NIC has 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).

NIC, through its ICT Network, "NICNET", has institutional linkages with all Ministries/ Departments of Central Government, 36 State Governments/Union Territories, and about 680+ District administrations of India. NIC has been instrumental in steering 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 Delhi Govt buildings & over **1,00,000 nodes** in State Secretariat Buildings. Access to NICNET through WiFi in various Central Government Offices have **13,500 users** and 1200 GB daily data usage. There are 3290 e-Services from various Ministries, states/UTs and all Mission Mode Projects (MMP) with over 2635 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 7700 virtual servers in cloud environment supporting 480+ eGovernance projects under Digital India. A new state-of-the-art data centre at Bhubaneswar and Bhopal is being set up. NIC has the largest e Mail service in the country with more than 240 million e-Mails transacted per month. It has the largest Video Conferencing network in India facilitating around 28000 multisite conferences and

over 4,60,000 site hours of VC sessions conducted.

On the National Knowledge Network (NKN), a total of 1638 links to various institutions have been commissioned and 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 many more.

9.6.1 NIC IT Infrastructure

9.6.1.1 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 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 Gol 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 1.4 PB of Enterprise Class Storage with mix of high performance SSD storage, 500TB Unified Storage and 200TB Virtual Tape Library. 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.

The Project for establishing a National Data Centre at Bhubaneswar was approved at an outlay of Rs.188.59 Crores. Establishment of NDC at Bhubaneswar is in progress building structure has been completed, Land of 5 Acres for proposed National Data Centre at Bhopal has been acquired and construction of boundary wall is in progress.

National Cloud Services (under the Umbrella of Meghraj) are being provided at national level with the aim to provide scalable ICT infrastructure for quick deployment of e-Governance initiatives of government users including ministries/ department, state governments, etc. The service has been designed to support Self Service provisioning, multi-location and seamless integration of various state-of-art Cloud solutions. Currently over 480 eGovernance projects are hosted including MyGov, Digital India Portal, Digital Locker, Prime Minister Office Portal, eNAM (National Agriculture Market) Portal, National Scholarship Portal, Biometrics Aadhaar Attendance system for Govt. Employees (BAS) projects etc. are hosted using allocations of over 7700 Virtual Machines.

.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 Program to blocks of Gridhi District of Jharkhand, Consortium for Education Communication (CEC), Integrated Disease surveillance programme (IDSP) etc. e-Learning services also used for in-house technology updates programme for NIC officials and repository being created for the same.

9.6.1.2 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. Prime Minister's 'Mann Ki Baat data collection program, 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 Aadhar 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.

9.6.2. eMail and SMS Services

9.6.2.1 eMail Services

NIC has been designated as the implementing agency for providing eMail service to the government, both at the centre and State.. 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 services has a 24/7 support team. The email accounts are growing in terms of complexity as NIC supports more than 700 virtual domains with a count of over **1.5 million** accounts. The accelerating graph indicates that in the near future the expected number of accounts will reach about **5 million**. The **daily** email traffic (without sampark traffic) is **5.6 million** (incoming) and **2.4 million** (outgoing) mails. 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.

9.6.2.2 eSampark:

The IT platform for seamless communication between the Government and Citizens and one of the early harvest programmes of Digital India is also configured under NIC Messaging service . With a database of over 1.4 crore email addresses and over 82 crore mobile numbers, the platform has sent over 171 crore Mailers across 328 campaigns till date, since its launch in August 2014.

9.6.2.3 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 .

9.6.2.4 SMS (Short message services) 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, Blockout 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, Sampark, Digital India portal, eHealth, National Scholarship portal, Jeevan Pramaan, BAS, Mother and Child Tracking , Khoya Paya, Income Tax, Vahan, Sarthi, 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– E-Governance Network Backbone

Core of NICNET backbone is fully upgraded to multiple 10 Gbps capacity with sufficient redundancy. States are connected through multiple 1/10Gbps 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 other Network/Data centres.

9.6.4 NICNET - VSAT Services

NIC VSAT Network NICNET has been offering redundant DVB Broadband and SCPC DAMA/PAMA network services from Delhi and Hyderabad over Ku-band to districts in difficult terrains such as North Eastern states, hilly regions of Himachal Pradesh, Uttarakhand and J&K for running Data, Voice & Video applications. 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 VSAT services, NIC has leased transponder bandwidth from ISRO on INSAT- 4CR satellite. NIC has successfully established satellite based reliable communication network for National Disaster Response Force (NDRF) Battalions through NICS I using Fixed and transportable/quick deployable VSATs (non motorized) which can be carried to disaster sites by NDRF personnel for setting up Emergency Operation Centers during a crisis situation and facilitating relief and rescue.

NIC has established a Satellite based VSAT network through NICS I for a MeitY project, to connect 2500 Common Service Centers (CSC), located in geographically difficult areas of North Eastern States and other part of the country for providing broadband type internet enabled connectivity for delivering e-Governance services.

9.6.5 Video Conferencing (VC) Services

NIC's Videoconferencing services are being used since 1995. Videoconferencing activities has been one of the flagship service, which facilitates direct interaction with concerned stake holders. All sections of Government including Hon'ble President of India, Governors, Chief Ministers, Secretaries to Govt. of India and Chief Secretaries utilise Videoconferencing through NICNET. An annual usage of Videoconferencing 4,60,000 hours of VC has been recorded with over 1,400 studios and 28,000 multipoint videoconferencing sessions.

9.6.6 Open Technology Group (OTG):

Open Technology Group continued to support project teams to understand and adopt the Open Source Software solutions.

implementation in 13 states and tested & operationalized at 364 establishments.

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 s/w was launched in October 2015 for citizens on IGR website for 3 districts & is shortlisted to be redeveloped as a product for all the states.

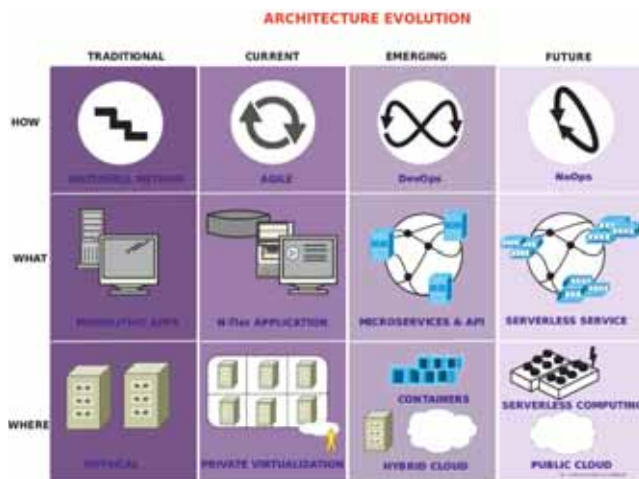
The applications for Right to Education (RTE) 25 admissions & Sanch Manyata are developed & released. Application Sevaarth which is a rule based integrated web enabled general education databases(School, Student & Teachers database) as a payroll package is developed by SDU, Pune & was shortlisted by CAG for use in all central govt. offices nationally and made part of PFMS.

9.6.8 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 counseling 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.

9.6.7 Software Development Unit (SDU), Pune:

SDU, NIC, Pune is developing s/w 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



9.6.9 ServicePlus:

ServicePlus is a metadata-based eService Delivery framework using which one 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 and managed by service-owner department by using a definer wizard available as part of ServicePlus. 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 and can be integrated with any application through web services

At present, it is being used to deliver 83 services by 11 States (Arunachal Pradesh, Assam, Chhattisgarh, Himachal Pradesh, Jharkhand, Kerala, Maharashtra, Meghalaya, Odisha, Sikkim and Tripura) and more than 41 lakh applications have been processed so far.

9.6.10 Development of North Eastern Region (DoNER):

The Union Minister of State (Independent Charge) for Development of North Eastern Region (DoNER), Dr. Jitendra Singh launched a new online e-Portal designed, developed and customised by NIC, for submission, surveillance and follow up of development projects relating to Northeast falling under the Non-Lapsable Central Pool of Resource. The portal has frameworks for Project Management and a Dashboard. It has been developed on Open Source Platform. The Dashboard enables State Government to exchange requisite information with DoNER and the public at large can access information about NLCPR projects

9.6.11 Defence Informatics Division:

Major activities/projects handled are establishment of MPLS VPN network of Directorate General of Defence Estates, development and hosting of Central Airmen Selection Board (CASB) portal, Preparation of DPR for Armed Forces Tribunal for case computerisation, MoD LAN set up, implementation of e-Office/e-Procurement/SPARROW/e-mail remote admin/Direct Benefit Transfer/CMF websites of Department of Defence Production and Ministry of Defence/Cloud hosting for entire sector, e-Governance projects for pan India management of NCC, e-Billing system for Principal Controller of Defence Accounts (PCDA) etc.

9.6.12 Food Processing Industries Informatics Division:

Major activities/projects are development and launch of Scheme Management System for Online requests, release of grants for setting up of Mega Food Parks/Cold Chains, implementation of e-Office/e-Procurement/SPARROW, PRAGATI coordination and development and launch of



Website based on Content Management Framework (CMF) for MoFPI using Open Source Technology.

9.6.13 NIC State Units and UTs:

NIC has a vast presence in the States in the form of NIC state units and district unit, which provide ICT support to State govt., District administration and local govt. bodies. State units have also successfully rolled out central projects such as eProcurement, PDS, Transport, eCourts, Jeevan

Pramaan, eCounselling, ePanchayat eDistrict, Mother and Child Tracking System, National Animal Disease Reporting System, Immigration Control System, National Knowledge Network, eOffice and SPARROW etc.. A number of states have also developed and released citizen centric mobile apps in the area of e-Governance. States of Himachal Pradesh, Kerala, Tamil Nadu, Chattisgarh, Meghalaya are actively involved in mobile app development.

Key initiatives / projects by State units of NIC		
States / UTs	Project	Summary
Andhra Pradesh	Judgments Electronic Management System	The first paperless court at Hyderabad
	Mobile based Digital - Panchayat	Digital panchayats revenue rose from Rs.220 Cr to 400 Cr per annum.
	DKrishi	Mobile and Aadhaar based DBT solution for distribution of subsidized inputs to the farmers.
Bihar	PACS	PACS is a Mobile based solution to monitor procurement of Paddy from Farmers
	Energy Billing for Rural Areas	RACE for generating Electricity Bills and Mobile App for Spot Energy Billing.
Chhattisgarh	Computerised Paddy Procurement	Paddy Procurement for KMS 2015-16 has been completed through Computerised system successfully
	Fair Price Shop automation	Fair Price Shop automation in Chhattisgarh has been rolled out to 11,000 FPSs out of 12,500 FPSs in the State
Delhi	Sub-Registrar office Computerisation	Sub-Registrar office Computerisation (DORIS): e-Search module launched for citizens
Goa	The e-Challan Payment Gateway	Government Receipts with a difference (https://egov.goa.nic.in/echallanpg) is a portal for receiving all kinds of government receipts.

Haryana	InvestHaryana	Ease of Doing Business (EoDB) Portal for Investors in Haryana
	CMWindow	Redressal of public Grievances System. E-Panchayat, CM announcements and Public Demands,
Himachal Pradesh	Mid Day Meals Automated Reporting and Management System	(MDM-ARMS) has been developed as a product for collecting information from all schools of any State who is on board and to improve the quality of food.
	HimKoshsoftware	This solution for the finance sector has enabled the online preparation and submission of all types of bills.
	ManavSampada	eHRMs solution for human resource management is under replication in 8 States.
Kerala	OpenPEARL	Web based property registration
	e-Treasury	Government receipt management platform
	RELIS	Revenue Land Information System is Record of Rights for Properties,
Madhya Pradesh	SAMAGRA	facilitate effective implementation Social Security Programs and DBT.
	VIDYA	Video Interactive Didactics for your Awareness has been launched in 100 colleges and 313 schools
Maharashtra	Personnel Information System for IAS officers (mahaias)	http://mahaias.nic.in enables the State Government to transact electronically with Department of Personnel and Training,
	Status Information Management system (SIMNIC)	http://mahasim.nic.in , enables the concerned department to create the formats for collection of data on desired frequency.
Meghalaya	National Cadet Corps (NCC)	NCC application caters online enrolment of student, online processing by the ANO, UNIT, Groups, etc.,
Punjab	One stop clearing system OSCS	One stop clearing system OSCS has been applauded by Parliament Committee, Cabinet Secretariat and many states.



Ministry of Electronics & Information Technology (MeitY)

	Punjab Sewa Portal (PSP)	Punjab Sewa Portal (PSP) for Sewa Kendras has launched in the first phase 322 urban SewaKendras
Rajasthan	Pehchaan	100% reach out to citizen for Pehchaan through portal & App.Land registration process automated with banks for agricultural loans.
Tamil Nadu	TamilNILAM	Tamil Nadu Information system on Land Administration and Management application are aimed to management of Land Records, land/property disputes, Land Records maintenance system.
	Tamil Nadu Geographical Information System(TNGIS)	Establishment of Tamil Nadu State Spatial Data Infrastructure(TNSSDI) as Web based GIS for Tamil Nadu.
	Chief Minister's Public Relief Fund (CMPRF)	Contribution to Chief Minister's Public Relief Fund (CMPRF) plays a vital role in providing Relief measures to the distressed.
Tripura	eHospital@NIC Ver. 4.0	eHospital@NIC Ver. 4.0 has been made multi-tenant-cloud ready and So far replicated in 50+ hospitals across the country.
Uttarakhand	Education Portal for Secondary education Department,	Design, development and implementation of Education Portal for Secondary education Department, addition, payment gateway.

9.6.14 National Informatics Centre Services Inc. (NICS I):

National Informatics Centre Services Inc. (NICS I), a section 8 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 2016-17, NICS I has continued these activities. The turnover of the company in F. Y. 2015-16 is ₹930 crores. The Department of Public Enterprises

evaluates actual performance of PSUs against targets set in the MOU with their administrative ministries and declares grading. NICS I has been awarded Excellent Grading for the year 2014-15.

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 Sangathan Ministry of HRD, Government of India, National Data Centre (NDC), NICS I Development Centre, Food Corporation of India, Networking of IIT, Delhi, Unique ID Authority of India, Delhi, Ministry of Health & Family Welfare, Government of India, Kerala Land Information

Mission (KLIM), Government of Kerala, Employees Provident Fund Organisation, New Delhi, STQC Directorate, of Electronics and IT, Government of India ETC.

By the end of the financial year, NICS I would be involved in implementation of around 3300 new projects. NICS I has also added number of new clients, products and services to its list.

9.7 Standardization, Testing and Quality Certification (STQC) Directorate

Standardization, Testing and Quality Certification (STQC) Directorate is an attached office of Ministry of Electronics and Information Technology (MeitY), Government of India. A network of 15 Testing and Calibration laboratories has been established by

STQC Directorate across the country including North East region. STQC laboratories offer quality assurance services in the field of electronics and information technology including eGovernance applications following global best practices and obtained many national and international accreditations/recognitions.

Further, for enforcing standardization in eGovernance (developing and adopting ICT standards for effective implementation of eGovernance projects in the country), STQC Directorate has established a National Centre for e-Governance Standards and Technology. Services offered and locations of Laboratories / Centres are indicated in the Table:-

Laboratories/Centres	Locations	Services offered
Electronics Regional Test Labs (ERTLs)	Delhi, Kolkata, Mumbai, Thiruvananthapuram	Testing and Calibration
Electronics Test & Development Centres (ETDCs)	Bengaluru, Mohali, Hyderabad, Chennai, Guwahati, Pune, Goa, Agartala, Jaipur, Solan, Ajmer	Testing and Calibration
IT Centres	Delhi, Bengaluru, Hyderabad, Kolkata, Chennai, Pune, Mohali, Thiruvananthapuram, Guwahati, Agartala (Co-located with respective ERTLs/ETDCs)	Testing of IT solutions for Functional and Non-functional (Performance, Usability, Security, etc.) parameters
IT Centres; Common Criteria Test Lab	Kolkata (Co-located with respective ERTL)	Testing of IT products for Security
IT Centres; Bio-metrics Devices Test Lab	Mohali (Co-located with respective ETDC)	Testing and Certification of Finger Print Scanners, Camera and Iris Scanners
Centre for Reliability	Chennai (Co-located with respective ETDC)	Reliability testing
Indian Institute of Quality Management (IIQM)	Jaipur (Co-located with respective ETDC))Training courses on Quality Management, Information Security, Website Quality etc.



Ministry of Electronics & Information Technology (MeitY)

Laboratories/Centres	Locations	Services offered
Centre for Electronic Test Engineers (CETE)	Bengaluru, Kolkata, Hyderabad, Pune, Noida (Co-located with respective ERTLs/ETDCs except Noida)	Practice oriented skill based Training programs
Regional Certification Centres	Delhi, Kolkata, Mumbai, Bengaluru (Co-located with respective ERTLs/ETDCs)	Certification services for Quality Management and Product Safety
National Centre for eGovernance Standards and Technology (NeST)	Delhi	Developing and adopting ICT standards for effective implementation of eGovernance projects

9.7.1 Achievements during FY 2016-17

Information Technology (IT) Services offered by STQC IT Centres: STQC IT Centres have

successfully executed Testing and Assessment of the number of e-Governance, Defence, Space and major IT Projects of Central and State Governments. Some of typical projects are indicated below -

Services offered	Name of the Project
Conformity Assessment Services	<ul style="list-style-type: none"> Functionality, security and Performance testing of e- Procurement and e-Auction Web application for various organizations/ ministries. Conducted Third Party audit for various State Data Centres for North-East states of Tripura, Meghalaya and other states namely West Bengal, Bihar, Odisha and Chhattisgarh. Annual Third Party Audit of Passport Seva Project of Ministry of External Affairs to assess functionality, security and IT service delivery of the project. Conformity Assessment of Spectrum Auction System for Department of telecom in time bound manner. The system was successfully used in recent DoT e-Auction exercise of the spectrum bands.

Some of the major e-Security Testing jobs undertaken are indicated below -

Services offered	Name of the Project
IT Security Testing	<ul style="list-style-type: none"> e-Security Testing and Assessment: Application and IT Infrastructure security vulnerability Testing/Assessment services provided to various Government and semi government Departments namely Karnataka Biotechnology & IT, Karnataka Pollution Control board, Directorate of Treasuries, Directorate of Electronic Delivery of Citizen Services and Center of e- Governance.

- Security Vulnerability Assessment for the websites of Embassy of India at different countries like Germany, Romania, SriLanka, Tajikistan, Vietnam, United Kingdom and Russia and cleared for safe hosting
- Security testing of Biometric based client login application, BIONIX, used to authenticate users in critical and sensitive applications viz. Banking Sector, developed by Biometric Precision, Chennai.

ERTL(S) has been identified by the Government of Kerala as the 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. Further, 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 Security Test / Evaluation Laboratory as well as a Certification Scheme based on Common Criteria standard were established in IT Centre, Kolkata under a project. The Common Criteria Test Laboratory is fully operational and has recently undergone assessment for their capabilities by an international team.

The Common Criteria Testing laboratory of ERTL(E) has extended the scope of evaluation to the devices used in Telecom sector and successfully evaluated the Network/Element Management Systems (NMS-EMS) used in the Telecom networks.

9.7.3 National facility for Quality Assessment of Biometric Devices:

For the purpose of enrolment to issue Unique Identification, a large number of biometric devices (cameras, scanners and iris cameras) are being used extensively across the country in varied climatic conditions. UIDAI has signed an MoU with STQC for establishing national facility to ensure quality of these devices as per international standards. Two laboratories with state-of-art testing infrastructure have been established at Delhi and Mohali. 27 suppliers have been certified so far under the Bio-metric Devices certification scheme.

9.7.4 Website Quality Certification Services:

Under the Project 'Strengthening of STQC IT Centers for Website Quality Testing to support e-Governance implementation in India' nearly 800 more websites of various Ministries /Departments of Govt. of India were evaluated as per Guidelines for Indian Government Websites (GIGW). Considering the earlier project also, nearly 2000 websites have been evaluated as per GIGW in totality. The test reports have also been forwarded to the respective Ministries/Departments. A series of meetings with Web Information Managers and Website designers & developers have also been done as a part of handholding. Further, 73 websites have been certified as per GIGW so far.

9.7.5 Test and Calibration Services offered by ERTLs/ETDCs in the field of Electronics

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-

Testing Services

- Under Compulsory Registration Scheme (Electronics and Information Technology Goods Order, 2012) of MeitY, carried out safety testing of samples picked up for surveillance namely LCD - Panels / VDU Studio projector as per IS 13252:2010, Thin client server as per IS 13252:2010, 85" Video display unit as per IS 13252:2010, LED TV as per IS 616:2010, Microwave oven as per IS 335-2-25:2014 and Banner printer as per IS 13252:2010 etc.
- Safety testing of Energy meters under STQC 'S' Marking scheme as per IEC 61010-1:2010,3rd Edition.
- Safety testing of Driver of LED lamps as per IS: 15885, Self-Ballasted LED Lamp as per IS:16102 (Pt.1), Power Bank as per IS:13252
- Safety testing of Environmental chamber as per IEC 61010-1:2010
- EMI EMC testing for Level Indicators and Switch as per relevant parts of IEC 61000, CFL as per IS:15111(Pt.2), Electronic regulator Unit as per IEC:60571
- Type testing of Static Prepayment Meters as per IS 15884 for Bureau of Indian Standards and for Energy Meter manufacturers.
- Testing of Unmanned Aerial Vehicle, Infra-red Night vision camera for strategic applications.



Fig: Testing in progress

Reliability Testing

- Accelerated Reliability Testing of 24 modules of Complex Programmable Logic Devices (CPLD) and their associated bias test circuits used in long term Reactor Control systems for IGCAR, Dept. of Atomic Energy, Kalpakkam.
- Reliability Prediction Analysis of Stabilized Optronic Pedestal for Indigenous Aircraft Carrier deployed for surveillance, observation and effective engagement of stationery and moving targets with ability to process image and enhancement to improve performance at night and limited visibility conditions. This analysis was carried out for Bharat Electronics, Ministry of Defence, Nandambakkam, Chennai.

Development Assistance

Development assistance and compliance testing facilities are extended to industries to ensure developed products meets National/International standards like IEC, CISPR & FCC, Product committee and Government regulations. The following major products are tested:

- Photo voltaic grid tie inverter as per CISPR 22 Class A used in Residence & Business establishments to sell their Energy to the Utility grid.
- Control panel for Nuclear reactor as per CISPR 11 Class A
- Defibrillator, Pulse Oxy meter and ICU Bed as per CISPR 11 & IEC 61000-4- series
- Long range Solar Wi Fi system as per TEC standard used to provide connectivity in Rural areas, hilly Terrain, Tunnels etc.
- **Calibration Services**
- Calibration and Testing of over 300 numbers of Electronic Energy Meters for the Tamil Nadu

Power Generation and Distribution Company (TANGEDCO), Wind Farms, Bio-Mass Energy producing Companies and Co-Generation plants in Tamil Nadu in their mission to proliferate usage of electronic meters for accurate metering and also to curtail losses on the part of the generation as well as consumer Public and industries.

- Calibration of navigational / communication instruments used for testing ILS, VOR, Marker Beacon and VHF/UHF communications avionics systems.

Medical Safety Test Facility

Medical Electronics lab of ERTL(S) is the lead lab in the country for testing medical electrical equipments . It has got accreditation for testing medical electrical equipments as per IEC 60601-1 3rd edition and provided services for defibrillator , Electro cardiograph , Bed side monitors and High Frequency Surgical diathermy of different hospitals in and outside Kerala .

Solar Photo-Voltaic Panel and Products Test Facilities

Number of Solar Photo-voltaic Modules and products has been 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. A similar test facility has also been established at ETDC(Bengaluru). In order to extend the facility a new ETDC (Ajmer) has been established in Palra Industrial Area to support the



industry in this sunrise sector. Building is ready, manpower has been deployed and the laboratory is striving to procure the requisite testing infrastructure.

9.7.6 Continuing participation in Space Programmes through Components Screening, Packages & Modules testing and Environmental testing

- Screening of Components :Carried out Screening of more than seventy five thousand components which includes LCR devices, Discrete devices, ICs- digital & Linear of different packages, leaded as well as SMDs, for TIFR and Indian Space Research organizations viz VSSC, LPSC, MVIT and IISU . Qualification tests are being carried out regularly for different types of components for space application. Screening of RTD sensors and new types of Transient Absorption Zeners has also been carried out. ERTL(Thiruvananthapuram) has been identified by VSSC as major test centre for screening of SMD Devices.
- Equipment Testing: Stack level testing of Advanced Telemetry System used in PSLV/GSLV Launch Vehicles has been initiated and more than 28 stacks have been evaluated. Continuing Test & Evaluation of power modules (50 nos) and Data Acquisition units (30nos) used in GSLV/PSLV. Accredited for evaluation of Navigation, Guidance and Control (NGC) packages of launch vehicles.
- Environmental Testing: Screening of Isolators used for mounting various Electronic packages in GSLV/PSLV launch vehicles.

9.7.7 National Accreditations of Test and Calibration facilities

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 -

- Calibration services of ETDC, Guwahati has been assessed for accreditation for renewal by the National Accreditation Board for Testing and Calibration Laboratories (NABL) in conformance to ISO/IEC 17025 international standard for accreditation in the fields of Electro-Technical, Thermal, Mechanical & Optical calibration services. The lab has also participated in Inter Laboratory Comparisons (ILC) programme periodically achieving satisfactory qualitative performance level. Also, Calibration (Electro-technical) and Environmental test facility have been accredited by NABL for a period of another two years.

9.7.8 Training services:

Indian Institute of Quality Management provides training to industries and organizations in the area of Quality Management System (ISO 9001), Laboratory Quality Management System (ISO 17025), Information Security Management System (ISMS) (ISO 27001) and also functions as an approved Training Organization recognized by IRCA, UK.

- Centre for Reliability, Chennai has conducted two National level Reliability Engineering open training programs named “Certified Reliability Professional (CRP) Program” during this year. The program has been designed with latest tools and techniques practiced in Reliability Engineering worldwide. Non-resident Indians who work in Middle East and Europe have been regularly participating in this program.
- ETDC (Hyderabad) has also provided ISMS best practices training at M/s BHEL for participants from all the southern BHEL units. Also, a training program was conducted for Certified Software Test Manager from software organizations.

9.7.9 Activities in North-East Region (NER):

ETDC (Guwahati) and ETDC (Agartala) are the two STQC laboratories operating in the North East Region and extending the various to states of the region. These include Test & Calibration services to 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, Telecommunication, Automobile, Service & Maintenance units, R&D and Test Labs, Hospitals, Pharmaceutical & Pathological Laboratories etc.

Information Technology Test & Assessment Services in NER:

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/eForms, SDC, SWAN etc. being implemented in the States of NE Region. ETDC Guwahati & ETDC Agartala together have tested about 216 - nos. of Websites corresponding to Govt. / Semi Govt. organisation of the country for their Functionality & Quality in compliance to the “(GIGW) Guidelines For Indian Government Websites”. ETDC, Guwahati also initiated Security Test/ Assessment of Web Application 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 has also carried out Third Party Assessments/audits of the State

Data Centres (SDC) projects implemented by the North Eastern states to assess the various requirements of Audit frameworks & procedures, Infrastructural, O&M process and control, Service level agreement, Usage, Security, Functionality & Qualitative parameters towards improvement of quality of SDC services. ETDC, Guwahati also conducted assessment of SWAN project of Meghalaya.

9.7.10 Administrative matters (STQC)

Development of SC / STs and Weaker sections: ETDC (Hyderabad) has conducted seven batches of job-oriented long term training on “Industrial Automation (Programmable logic controllers & SCADA)” exclusively for SC/ST/Minority Youth & Women Category students under MeitY sponsorship.

Implementation of Raj Bhasha: ETDC (Mohali) has received Third Prize from Ministry of Home Affairs (DOL) in Oct, 2016, for implementation of official language in Region ‘ख’ category office of North India.

9.8 National Institute of Electronics and Information Technology (NIELIT)

9.8.1 Introduction:

NIELIT, a body under the administrative control of MeitY, 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. NIELIT offers courses both in the Formal as well as the Non-Formal sectors and 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

Ministry of Electronics & Information Technology (MeitY)

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 36 own Centres/ Extension centres located at Agartala, Aizawl, Ajmer, Aurangabad, Calicut, Chandigarh, Chennai, Delhi, Gangtok, Gorakhpur, Guwahati, Tezpur, Imphal, Itanagar, Jammu, Kohima, Chuchuyimlang, Kolkata, Kokrajhar, Lucknow, Patna, Shimla, Shillong, Srinagar, Lunglei, Jorhat, Ropar, Silchar, Tura, Pasighat, Churachandpur, Ranchi, Senapati, Leh, Kurukshetra and Aadharsh Computer Saksharta Kendra at Alawalpur with its Headquarters at New Delhi. It is also well networked through 700+ accredited training institutions for conduct of O/A/B/C Levels of courses, besides a network of about 9000+ facilitation centres for roll out of digital literacy programs.

At present, NIELIT is skilling about 6+ lakh

candidates per annum, which includes women, rural youth and under-privileged sections of the society. Since inception, NIELIT has trained about 50+ lakh candidates. Examinations of Digital Literacy programs are conducted in the Online mode and digitally signed e-Certificates are issued to successful candidates. Till 31.12.2016, 22,88,234 candidates have been issued digitally signed e-Certificates. The e-Certificates are also linked with Digital Locker in respect of candidates assessed under NDLM scheme. As on 31.12.2016, about 12,70,431 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 achieved **high growth rate** in the last 4-5 years, which can be measured from the fact that the income of NIELIT has increased from ₹120.47 Cr

(2011-12) to ₹ 290.66 Cr (2015-16). The surplus of NIELIT has also increased from ₹11.77 Cr (2011-12) to ₹ 56.23 Cr. (2015-16).

9.8.2 Some Notable Achievements:

- In line with 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 to allow rural students access NIELIT courses through Smart Phones.
- 30 Skill Oriented courses of NIELIT have been aligned with NSQF at different levels ranging from Level 3 to 8. Another 64 Skill Oriented Courses are in pipeline for alignment with NSQF.
- In line with the vision of Hon'ble Minister (E&IT, L&J), courses on Basic Literacy in Cyber Security ranging from 20 to 200 hours duration have been launched
- 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.
- e-Contents 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.
- the foundation stone of the new Academic Block at NIELIT Imphal was laid on April 22, 2016, followed by inauguration of Model Career Centre.
- To enhance the employability of NIELIT students a 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.
- Model Career Centres have been established in Imhal, Leh and Kolkata with funding from Directorate General of Employment, Ministry of Labour & Employment, Gol, under National Career Services Scheme of Government of India. Job Fairs have been organised by Model Career Centres already established at Calicut, Gorakhpur, Aurangabad & Srinagar. In the last one year more than 15000 candidates have mobilized through 5 job fairs, out of which about 3000 candidates have been shortlisted for employment by more than 50 employers, who had also participated in the job fairs.
- NIELIT Centres/ Accredited Centres/ Facilitation Centres are conducting Digi Dhan Melas/ Awareness Programmes on Digital Payments and so far have trained/ sensitised more than 1.3lakh students, citizens and merchants.
- NIELIT has conducted recruitment examination for the post of Scientist 'B' for MeitY/ STQC/ CERT-In. NIELIT has also processed recruitment for filling up of 94 posts of S&T and Non-S&T cadre for its Centres.
- Smart Classroom Project has been implemented by NIELIT Srinagar in about 640 schools under SSA/ RMSA Schemes of Government of J&K.
- Smart Virtual Classroom facility has been extended in additional 17 NIELIT Centres and thus the facility now exist almost all NIELIT Centres. The facility is being used extensively for conducting video conferencing for better coordination among NIELIT Centres and HQ and has resulted in saving of travelling time,



Ministry of Electronics & Information Technology (MeitY)

money and also in efficient and faster decision making. The set up is also being used by the NIELIT Centres for conducting their training sessions in more professional effective way

- To broaden the reach of NIELIT with the objective of at least one centre in each State, new NIELIT Centre has been established at Ropar & Kurukshetra. More Centres are proposed to be set-up at Ayodhya, Bhubaneshwar, Pali, Haridwar, Almora, Jalandhar., Srikakulam & Tirupati.
- 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.
- NIELIT has made its foray in the domain of Social Media and in this regard the official twitter handle @NIELITIndia has been made operational with effect from May 24, 2016. Tweets are posted on daily basis and the official twitter handle of NIELIT is being followed by more than 3300 users. The tweets posted at the handle have also been retweeted by senior Government Officers, PIB, Cabinet Ministers and Hon'ble PM.
- NIELIT has been awarded a project on e-Waste management for Government Officials under Digital India by MeitY. In this regard, training of NIELIT Master Trainers has also been completed and training of Government Officers in 10 identified States is in progress.
- NIELIT as one of the authorized examination agency under NDLM (DISHA) is conducting examinations in the Online mode with biometric enabled Aadhaar authentication of candidates. So far, it has conducted examinations of about 8,35,932 candidates under the NDLM/DISHA scheme. On successful of examinations, candidates are also issued digitally signed certificates in the Online mode, which bears a QR code, so that the online certificates can also be verified in the Online mode.
- NIELIT has actively participated in the Vikas Parv Celebrations at 6 locations, namely Mumbai, Mathura, Jodhpur, Kakinada, Chindwara and Jamshedpur, led by Hon'ble MoE&IT and L&J to showcase Digital India initiatives and the achievements of the Government of India.
- 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.
- Under the MeitY's Scheme on Skill Development in ESDM about 140268 candidates have been enrolled between 01.04.2016 and 31.12.2016 out of which 60261 candidates have been certified and 2936 candidates have been placed. Besides, four (4) Workshops have been conducted and four (4) MoUs have also been established with States.
- 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 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.
- NIELIT in collaboration with CAIT is exploring the

possibility of creating synergy to onboard self organised small/ medium businesses/ traders on Digital Payment initiatives across India.

- NIELIT has developed an institutionalized mechanism by putting technology into use for making payments in the Digital Mode in respect of activities connected with payments and receipts. All payment to Vendors and Suppliers are being made only through NEFT/RTGS and in the last two years it has been ensured that all such payments are made only in the digital mode directly to the bank account of the beneficiary. Use of Cash as a mode for making payment to vendors/suppliers has been discontinued since 2014. About 7,000 online transactions have been processed for a value of about ₹325.08 crore in the year 2015-16.
- 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).
- 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.
- Registrations in NIELIT O/A/B Level IT Courses have been increased significantly compared to the previous year. More than 7 lakh candidates have been registered in Digital Literacy Courses.
- Considering the manpower and infrastructure requirement in ESDM sector, NIELIT Calicut 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.

- NIELIT Lucknow has conducted Digital Marketing Course for 'Chikankari' workers / local artisans etc. to empower them to market their products in the Online mode through e-Commerce portals.
- NIELIT Aurangabad started a Doctorate (PhD) Programme in Engineering and Technology. About 80 Scholars have already been registered.

9.8.3 R&D, Innovation & Design

“Establishment of an Anti-Spam Coordination Centre”: The project is being implemented by NIELIT Imphal and Guwahati with financial support of Rs. 135.00 lakh by MeitY over a period of 24 months with an objective to establish an anti-spam facility and develop a framework for collection, analysis and exchange of information about spam mails. For this purpose, distributed spam-bots emulating open relay mail servers will be set-up. The spam mails collected will be analysed to find out the origin of such mails and classified into categories. Based on the analysis, a sharable database as per the international practices and the report will be shared with stakeholders including CERT-In.

“Indigenous Colour Doppler Ultrasound Scanner with PNDT Compliance”: The project is being implemented by NIELIT Calicut 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 PNDDT compliance.

9.8.4 Capacity Building projects

1. **“Course on Computer Education in Rural India”** for Training and Certification of one lakh Common Service Centre (CSC) Operators/ Village Level Entrepreneurs (VLE) in every state of the country with financial support of ₹ 750.00 lakh by MeitY. Under the project, a total of 1,00,000 VLEs would be certified for Course on Computer Concepts (CCC). These certified VLEs may provide various educational services at their CSC, which will provide them a regular source of income apart from creating goodwill/ credibility in their community. The scheme is in line with the Government’s Policy to improve employment opportunities for the rural population. It will help in achieving the objective of making one citizen in every household digitally literate.

2. **“Empowering Women in Rural India through Digital Literacy (WDLR)”** with financial support of ₹ 287.50 lakh by MeitY, with an aim at training and empowering 25,000 rural women on the course of Basic Computer Concepts (BCC) to acquire digital literacy skills and enable them to further their education, gain employment, help start and build their own business, secure their livelihoods and become socially and politically active.

3. **“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 ₹ 111.56 lakh by MeitY over a period of 18 months with an objective to:

- To uplift the overall quality of life of target groups of Backward Tribes of Nagaland (Scheduled Tribes) in Nagaland.

- To equip school youths and women with technical skills, thereby widening the scope of employment opportunities by equipping the youth with computer and skill enhancement in the field of Information Technology.
- Bridge the gap i.e. the technology shift by giving much needed special computer education and training.
- Develop a technology-literate society by helping target groups to participate and becoming better informed and with power to communicate and interact.

4. **“Setting up of Medical Electronics Laboratory”**: The project is being implemented by NIELIT Guwahati at its Silchar Extension Centre with financial support of ₹162.20 lakh by MeitY over a period of three years with an objective to set up Medical Electronics R&D Laboratory at Silchar EC for undertaking repair and maintenance of Medical Electronics Equipment of various hospitals in Assam, so as to solve the major problems faced by the hospitals and patients due to non-operable defective hospital equipment.

5. **“Setting up of Medical Electronics Laboratory vide Administrative Approval No. 1(9)/2014-ME&HI dt. 2.12.2014”** : The project is being implemented by NIELIT Kohima with financial support of ₹ 107.00 lakh by MeitY over a period of three years with an objective to set up Medical Electronics R&D laboratory for repairing and maintenance of Medical Electronics Equipment of various Hospitals in Nagaland and also to provide training to Paramedical & Medical staff of various Government as well as Private Hospitals of Nagaland.

6. **“Creating Mass Cyber Security Awareness among schools, colleges & Government Employees through appropriate training and**

campaign mechanism in NE States of Manipur & Sikkim”: The project is being implemented by NIELIT Imphal and Gangtok with financial support of ₹154.94 lakh by MeitY over a period of 18 months with an objective to address the gaps with respect to Cyber Security awareness of 2 States in the North Eastern Region of the country.

7. “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” : The project is being implemented by NIELIT Kohima with financial support of ₹152.00 lakh by MeitY over a period of 24 months with an objective to provide advanced forensic training to the law enforcement agencies in the new emerging cyber threats and proper investigation thereof to mitigate the cyber crimes rising in the NE States and to provide training on certificate course in the area of cyber security to the Youths of NE States and implementation of the Visualization Technology in computer forensic & cyber security lab.

8. “Capacity Building for empowerment of SC candidates on ICT at Cooch Behar district of West Bengal”: The project is being implemented by NIELIT Kolkata with financial support of ₹55.44 lakh by MeitY over a period of two years (extended for six months till December, 2016) with an objective to establish smart mode IT based Resource Centre at District Welfare Department, Cooch Behar, West Bengal and to develop 300 IT skilled resource members from SC community by imparting training in NIELIT Electronic System Manufacturing ESM 1 course (NVEQF certified Electronic Production Technician Level IV).

9. “IT Skills and e-Inclusion through low cost access device based awareness programs for Scheduled Tribes of Kerala”: The project is being

implemented by NIELIT Calicut jointly with Amrita Vishwa Peetham, Kollam with financial support of ₹132.47 lakh by MeitY over a period of three years with an objective of NIELIT to provide free training and certification to deserving candidates belonging to ST population so as to increase their employability in Government and Private Sector. Objective of Amrita is to build a model and methodology for effective learning for social awareness and ACC training in Malayalam and pilot it in Tribal Hamlets where connectivity is not available.

10. “Capacity Building Programme for creating e-readiness of the ST Youth of NE State and State Government Employees” : The project implemented by NIELIT Kohima with financial support of ₹153.76 lakh by MeitY over a period of two years with an objective to spread of IT culture and bridge digital gap in using computer at basic level in order to deal with electronic services programmes and to conduct short term training/workshop in e-Governance for awareness creation about various e-Governance services among ST Youth and State Govt. officials.

11. “Training of SC&ST students in Capacity Building for e-Governance Applications”: The project is being implemented by NIELIT Imphal with financial support of ₹ 75.60 lakh by MeitY over a period of three years with an objective to train SC/ST students of Manipur in IT & e-Governance Applications in 5-locations of Manipur so that either they can be employed or start their own business to be achieved as per recommendations of 1st Working Group meeting held on 21st January, 2013.

12. “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: Certificate, Diploma, Post Graduate, and Research Professionals.
- Launch short term/ long term modular non formal courses in selected areas
- Upgrade competence of working professionals in Indian Industries.
- Upgrade knowledge and skills of faculty of technical institutions.
- Entrepreneurial Development
- Design & conduct employment /self-employment education/training–.
- Promote affordable Electronics Design & Technology for rural areas.
- Make available Design Consultancy, Product Development & Technical Support services of International standards to the Indian Industry.

13.Training Women creating women entrepreneurs/ data entry operators:

The project is implemented by NIELIT Delhi with financial support of ₹ 241.72 lakh by MeitY over two years with an objective to train Women in Delhi to make them self-reliant and e-Literate in computer technology by imparting basic IT Training, promote awareness on issues related to health, safety and various scheme benefitting women and to enhance vocational skill of under-graduate women.

14. Setting-up of Medical Electronics Laboratory: The project is being implemented by NIELIT Shillong with financial support of ₹122.00 lakh by MeitY over a period of three years with an objective to set up Medical Electronics Laboratory at NIELIT Shillong for Testing, Calibration, Repairing and Maintenance of Medical Electronics Equipment of various hospitals in Meghalaya and to undertake

course in Medical Electronics Equipment Maintenance with intake capacity of 75 nos. in 3 years.

15.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 & Communications Technology (IECT) Area” is being implemented. It has the objective of upgrading the six existing Centres of the NIELIT in the North-Eastern Region at Guwahati, Imphal, Shillong, Itanagar, Gangtok and Aizwal; and of setting up of ten new Extension Centres and upgrading two Extension Centres.

Sixteen (16) out of proposed Eighteen (18) Centres/Extension Centres are operational as on date. The new eight Extension Centres are imparting training from built-up space at Silchar, Jorhat and Kokrajhar in Assam; Pasighat in Arunachal Pradesh; Senapati & Churachandpur in Manipur; Tura in Meghalaya and Lunglei in Mizoram. Remaining two Extension Centres at Tezu (Arunachal Pradesh) and Dibrugarh (Assam) are likely to be started shortly as the possession of built-up space in Tezu is in progress and built-up space in Dibrugarh has been identified.

About 24,000 students have been trained so far under the project. Possession of land for construction of permanent campuses has been obtained at 16 locations (out of 18) in Pasighat, Guwahati, Kokrajhar, Jorhat, Tezpur, Dibrugarh, Silchar, Imphal, Senapati, Churachandpur, Aizawl, Lunglei, Gangtok, Shillong, Tura and Chuchuyimlang. Land is yet to be obtained at Tezu and Itanagar in Arunachal Pradesh. 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 18 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 in built-up space. Construction of permanent campus is in advanced stage.

Construction of permanent campuses of NIELIT Agartala, Ajmer and Kolkata is complete. Construction of permanent campus of NIELIT Patna is in progress at Bihata, Patna.

16. Skill Development in ESDM Sector

- **Scheme for Financial Assistance to select States/UTs for Skill Development in ESDM Sector:** The total budget outlay of this Scheme is ₹113.77 crore (Approx) out of which the Grant-in-aid is ₹100crore (approx). The Scheme is being implemented in eight states with a skilling target 90,000 candidates over a period of four years. Under this scheme, the total number of registered candidates till date are 32,800 and trained candidates are 28,670.
- **Scheme for Skill Development in ESDM for Digital India:** The total budget outlay of this Scheme is ₹410.94crore (approx) out of which the Grant-in-aid is ₹354.85crore (approx). This scheme is being implemented across India with a skilling target of 3,28,000 candidates over a period of four years. Under this scheme, the total number of registered candidates till date are 1,47,696 and trained candidates are 1,05,431.

9.9 Software Technology Parks of India (STPI)

9.9.1 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 communications 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 is responsible for implementation of the Software Technology Parks (STP) scheme and the Electronics Hardware Technology Parks (EHTP) scheme. 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 including innovations and growth of Start-Ups and SMEs without any locational constraints. As on 30.09.2016, more than 2,500 units are exporting under STP scheme and more than 70 units were exporting under EHTP.

During the FY 2016-17 (till September 2016), estimated IT-ITeS export earnings from STP units are ₹61,725 crore and Electronics Hardware export of ₹3210 crore under EHTP scheme.

9.9.2 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 of now, a total of 56 STPI centres/Sub-centres are operational across the



country, out of which 48 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.

9.9.3 Services:

The main services rendered by STPI for the software exporting community are incubation facilities, data communications 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.
- **Creation of Incubation Space and Infrastructure:** STPI has created basic infrastructural support in the form of Business Incubators with state of art facilities with Plug & Play facilities for start-up companies. These incubation services enable small and medium enterprises to set up operations at minimal fixed costs with low start-up investment, thereby encouraging entrepreneurship and creating jobs. STPI is in process of creating additional incubation space at Allahabad, Bhilai, Bhubaneswar, Hyderabad, Shillong, Patna, Ranchi, Bhilai, Vijayawada, Jaipur etc
- **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 Centers, 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. Consultancy for enablement of Bhubaneswar as a Wi-Fi city. The city Wi-Fi system is expected to bring revolutionary change in city's IT & communication infrastructure and services with all citizen centric services are envisaged to be integrated with the network.

9.9.4 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.

9.9.5 Promotion of Small and Medium Entrepreneurs 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 the participation was organized by STPI includes:

- TiEcon 2015 from 6th- 7th May, 2016 Santa Clara, USA
- Connect 2016 on 27th- 28th September, 2016 at Chennai
- Bangalore ITE.Biz 2016 from 28th–30th November, 2016 at Bengaluru
- INFOCOM 2015 from 1st-3rd December, 2016 at Kolkata
- CeBIT India 2016 from 8th-10th December, 2016 at Bengaluru
- 1st BRICS Trade fair on ICT exhibition from 12th-14th Oct, New Delhi
- IITFF Fair 2016 from 14th-27th November, 2016 at New Delhi
- 6th National Summit from 8th December, 2016 at New Delhi.
- STPI also sponsored/co-sponsored the following major events:
 - Srishti 2016 from 6th -8th May, 2016 at Bengaluru
 - SANOG XXVII from 5th-9th August, 2016 at Mumbai

- TiE Global Submit from 16th - 17th December, 2016 at Delhi

9.10 MEDIA LAB ASIA

9.10.1 Introduction

Media Lab Asia (MLAsia) is a not-for-profit organization set up under Section 25 of the Companies Act, 1956 (now Section 8 under Companies Act, 2013) by MeitY, for bringing benefits of information and communication technologies (ICT) to common man and the needy by focusing on 'Lab to Land' and "early harvest" projects. 'Innovation for Digital Inclusion' is its vision. The Company is engaged in the areas of Livelihood Enhancement, Agriculture, CAD tools for artisans, ERP for SMEs, Healthcare, Empowerment of PwDs and Education. It works with R&D Institutions, Academia, Industry, NGOs & user organizations. The projects under implementation and the achievements during 2016-2017 are as follows.

9.10.2 ICT Based Integrated development program for women empowerment - Lallapura Craft cluster, Varanasi is aimed at empowering

Women in Lallapura craft cluster by deployment of various ICT based solutions / technologies including Chic™ CAD (a software tool for artisans to create 2D designs), 'Basic Computer Training' and health awareness. During the year more than 162 women / girls were trained on Basic Computer Concept and 376 trained on Chic™ (CAD tool for Crafts). 241 Khaka patterns were created by artisans using the tool. More than 50 women / girls attended healthcare awareness programs. Total 2836 women have benefited from the project.



Hon'ble Minister for Electronics & IT Sh. Ravi Shankar Prasad and Hon'ble Minister of State for Electronics & IT Sh. P.P. Chaudhary interacting with beneficiaries of Chic CAD at IITF, Delhi

9.10.3 Development of Open Source Computer Aided Designing (CAD) tool for the Weaving of Banarasi Sarees

Under the aegis of R&D in IT MLAsia embarked on building 'Open Source' weaving software to aid handloom weaving community of Banarasi Sarees. The software will aid weavers to create digital artwork and translate saree design to be loaded to looms. The software is Open Source, multi lingual

(Hindi & English) for Jacquard and dobby weaving, customizable to local language and library of local designs and can integrate design tools of user's choice. It facilitates unique digital cloth and can be integrated with 3rd party design tools. The pilot version of the software is ready with features viz. creating Varanasi designs / artworks, weaving patterns, converting artwork into graph, filling patterns to the color specific portion of artwork and visualizing the design on fabric.



Pilot testing of the software in field

9.10.4 Interactive Information Dissemination System (IIDS):

IIDS is a pull & push based system used for agriculture related 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 extension outreach of Universities and enabled farmers to interact directly with Scientists in their native languages (currently in Telugu in AP & Telanagana and in Khasi & Garo in Meghalaya). Experts using IIDS has an access to knowledge & farmer database.

been deployed as Annapurna Krishi Prasaar Seva (AKPS) along with ANGRAU and PJTSAU in states of Andhra Pradesh (AP) and Telangana. During the year, 9046 new farmers were registered. With this a total of around 27400+ farmers are now registered under AKPS services. The KVKs delivered advisories for more than 7700 queries raised by the

Annapurna Krishi Prasaar Seva (AKPS): IIDS has



ANGRAU team along with officials from State Agriculture Department with AKPS farmers at Kadapa AP

farmers. Apart from the queries, KVKs & DAATTCs have sent SMS (45,79,560) and Voice based messages (2,16,920) in Telugu to all registered farmers on Agriculture & Fisheries.

9.10.5 Mobile based Agro Advisory System for North-East India (M4agriNEI)

MLAsia undertook the project in 2012 in Meghalaya on Mobile Based Agro Advisory System (m4agriNEI) along with CAU, Imphal with objective to empower farmers by providing right information at right time. The software platform being used for m4agriNEI is IIDS. 2 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.

The total no. of farmers registered under the project, has reached 11600. More than 3800 agri-advisories were delivered during the year. With this, total no. of queries resolved has reached to 9100. Apart from the queries, SMS (8,64,920) and Voice based messages (71,636) were sent to registered farmers on Agriculture & fisheries. During 2016-17 (Nov), an MoU was signed between Meghalaya Basin Development Authority (MBDA) and MLAsia for expansion of m4agriNEI in all districts of Meghalaya



Union Minister of State, Home Affairs,
Gol Sh. Kiren Rijiju interacting with project farmers during
"Destination North East" at Pragati Maidan

9.10.6 Software and Portal for PwDs

"Punarbhava™" (www.punarbhava.in) – is a Web portal in disability field for dissemination of information related to different disability issues at one place. It is benefitting persons with disabilities, NGOs, professionals, policy makers, students, parents, community workers and other stakeholders in the field of disability. The portal is accessible as per W3C guidelines. The information on portal covers a 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 updated and has 4000 to 4500 hits per day.

"Punarjjani™" (www.punarjjani.in) – is a web based tool to assist special teachers in assessment of children with mental retardation (MR) and helps them save time by digitization & integration of standard methods used manually for assessment of children with Mental Retardation in age group 6-18 years. 820 special teachers representing 485 special schools and 122 Sarva Shiksha Abhiyan (SSA) blocks from around 150 cities/towns of 28 States/UTs have been trained and provided access to the tool. Hindi version has been developed and under testing.

Visual Speech Training Software (VSTS) for Hearing Impaired: MLAsia, in partnership with IIT Bombay, initiated the project 'Visual Speech Training Software (VSTS) for Hearing Impaired' with the support of MeitY. The VSTS provides live visual feedback for Speech & language development (Speech Processing Engine as a Back End) to show efforts actually made by a person with reference to the target efforts.

9.10.7 ITRA and Visvesvaraya Phd Scheme initiatives

Information Technology Research Academy (ITRA):

ITRA is an enabling programme entrusted by MeitY to Media Lab Asia to help build a national resource for advancing quality and quantity of R&D in Information & Communications Technologies and Electronics (ICTE). It operates as a division of MLAsia and is designed to produce a large numbers of IT researchers motivated to identify societal problems in IT and other domains, and exposed to mechanisms for converting lab solutions to working prototypes and work in interrelated groups and network of researchers.

Mobile Computing, Networking & Application (ITRA-Mobile):

ITRA in its research area 'ITRA-Mobile' targets applications of IT in Healthcare, Transport and Disaster Management. The projects are running in 33 institutions, involving 66 faculties and 95 Ph.D. students. During FY 2016-17, ITRA-Mobile research community published 72 research papers in ITRA listed conferences / journals of international repute and 76 more papers in other conferences / journals; 35 courses were developed / modified and 55 workshops were conducted at associated institutions. 9 researchers were deputed abroad for various interactions & collaborations. Out of 11 possible startups teams, emerging out of ITRA-Mobile projects, 6 were invited at NASSCOM Product Conclave - 2016 at Bengaluru, to showcase their technology to domestic & international investors and other potential stakeholders. 2 startups teams on a 'Healthcare Device' and 'Smartphone Based Traffic Analysis Solution' were offered on the spot VC funding.

IT based Innovations in Sustainability of Water Resources (ITRA-Water):

ITRA in its research area 'ITRA-Water' is focusing on multifaceted challenge of sustainable access to water for all sectors. The projects are running in 23 institutions, involving 38 faculties and 37 Ph.D. students. During

FY 2016-17, ITRA-Water research community published 14+ research papers in ITRA listed conferences / journals of international repute and 15 more papers in other conferences / journals; 9 workshops were conducted at associated institutions. 4 ITRA researchers were deputed abroad for various interactions & collaborations. Out of 6 possible startups teams, emerging out of ITRA-Water projects, 2 were invited at NPC 2016 at Bengaluru, to showcase their technologies.

Visvesvaraya PhD Scheme for Electronics & IT

MeitY has entrusted MLAsia the implementation of Visvesvaraya PhD Scheme to enhance the number of PhDs in Electronic Design & Manufacturing (ESDM) and IT / IT enabled Services (ITES) sector. The objective is to support 3000 additional PhDs students (1000 full time + 2000 part time) in ESDM and IT / ITES and to support 200 Young Faculty to encourage & recognize their work in research & technology development.

The scheme now covers 96 institutions (16 IITs, 22 NITs, 9 Central university, 6 Deemed Universities, 7 Institution of National importance, 26 State Universities, 10 Private institutions). Total 1086 full-time & 350 part-time fellowships have been allocated so far out of which total 924 full-time & 180 part-time candidates have been enrolled. Young Faculty Fellowships have been awarded to 64 faculty members from 25 Institutions. 44 more applications from 16 Institutions are under process.

A "Research Workshop including Presentation & Evaluation was held on 13th -14th Oct 2016 at IIT Mumbai and was attended by the 160 PhD candidates of the 2014-15 batch. The proceedings of the workshop were broadcast to rest of the candidates under scheme. Web Portal for the Scheme: A web portal has been setup on scheme for information dissemination, processing of the proposals received, monitoring of the scheme etc. Details about the scheme are available at <http://phd.medialabasia.in>

CHAPTER 10

OTHER MATTERS



10.1 Use of Hindi in Government work and Expected Technology Development

A Meeting of the reconstituted Hindi Advisory Committee of Meity was held on 21-Oct-2016 under the Chairmanship of Shri P.P. Chaudhary, Hon'ble Minister of State for Ministry of Electronics and Information Technology. During the meeting, Hon'ble Minister of State released the fourth issue of this Ministry's Hindi Patrika 'Spandan'. 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, five prizes of ₹500 / - per head have been fixed and during the month, officers/ employees

writing at least 2,000 words in Hindi can participate in this Incentive Scheme.

Hindi Pakhwada was organised by the Ministry during September 2016. During this period many competitions were held and winners were awarded. The prize money of the awards has been enhanced substantially to encourage participation.

To ensure the implementation of official language policy, an official inspection pertaining to official language implementation was done at NIELIT, Jammu, an office under the administrative control of this Ministry.

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 pertaining to various subjects were translated in 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 Central Public Information Officers (CPIOs)/ Appellate Authorities (AAs). For any information relating to these organisations, applications need to

be submitted to the concerned CPIOs 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.

10.3 Public Grievances Redressal Mechanism

The number of grievances received online as well as physically by RTI/PG Cell till 31st December, 2016 is as given below :

Source of Grievance	No. of Grievances received	No. of Grievances redressed
Online	5001	4759(95.16%)
Physically	133	127 (95.49%)

Additionally we have received following grievances upto 31st January, 2017

Source of Grievance	No. of Grievances received	No. of Grievances redressed
Online	357	344(96.36%)
Physically	12	08(66.66%)

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 latest books and journals. It uses RFID based Library Management System to manage issue & returns of 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 30,030 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 60 Journals per annum. Currently, e-books service (Books 24x7) 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 Information



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, IEE Journals/ Proceeding, ACM digital library and ISO Standards to its users through MCIT Library Consortium.

10.5 Parliament Matters

1. During the year, a number of Parliament Questions were received and handled by the Parliament Section. These were mainly related to Cyber Security, National e-Governance Plan, Electronics Manufacturing, Digital India Programme, Misuse of Social Media, Making AADHAR Card, Internet of Things, Data Protection and Privacy, BPO's in Small Towns, Cyber Crime, Hacking incidents of Government Websites, National Policy on Electronics, National Knowledge Network, Open Source Software, e-Translation, Employment to Youth, Paperless Sarkar, e-Kranti, Cloud Technology, Proposals for 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 Violation of Privacy on Internet, National Policy on Information Technology, Internet Related Polices, E-Governance at Grass root Level.

2. The Department Related Parliamentary Standing Committee on Information Technology (DRPSC on IT) discussed and considered the Demands for Grants 2016-17 of the Ministry of Electronics and Information Technology and laid its 26th Report on the Table of the Lok Sabha on 16th December, 2016.

3. The Standing Committee on Information Technology have selected the following subjects for discussion during the year 2016-2017.

- Digital India Programme
- Promotion of Electronics/IT Hardware Manufacturing Sector
- Expansion of Rural BPOs and Challenges faced by them
- Start-up Companies in the IT Sector – Problems and Challenges
- Review of National Digital Literacy Mission (NDLM) – Problems and Challenges
- Role and functioning of Common Service Centres (CSCs)
- Digital/Online Privacy: Problems and Challenges
- Cloud Computing
- MNCs operating in the field of IT in India

4. The Annual Reports 2015-16 and Audited Accounts of Societies, (except ERNET India, STPI) under the Administrative Control of the Ministry of Electronics and Information Technology have been laid on the Table of both the Houses of Parliament during the Budget Session, 2017 of Parliament.

10.6 Gender Empowerment / Prevention of sexual harassment of women at work place

No cases of sexual harassment have been reported in MeitY during the year.

10.7 Activities undertaken for the benefit of differently abled persons “Punarbhava™” (www.punarbhava.in) - Web portal in disability field

The objective is dissemination of information related to different disability issues at one place. It is benefitting 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 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 4000 to 4500 during the year.

“Punarjjani™” (www.punarjjani.in) – Web based tool to assist special teachers in assessment of children with mental retardation (MR)

Punarjjani™ tool helps special teachers in saving their time by digitization & integration of 3 standard methods widely used manually for regular assessment of children with MR in 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). 820 special teachers representing 485 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. Hindi version of the tool has been developed and under testing.

Initiatives on Accessibility

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.

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.

Commercialization and Deployment of TARANG - Digital Programmable Hearing Aid

C-DAC has developed Tarang - Digital Programmable Hearing Aid (DPHA), a feature rich, affordable and easily maintainable digital programmable hearing aid. It uses advanced digital signal processing techniques and is based on indigenously developed application specific integrated circuit known as NAADA. Transfer of Technology (ToT) of the above solution was carried to industry partners, M/s KELTRON, Thiruvananthapuram and M/s Best Hearing Solution, New Delhi. C-DAC has supplied Tarang under various government schemes including Rajiv Vidya Mission (SSA), ADIP Scheme (Assistance to Disabled Persons for Purchase/Fitting of Aids/Appliances, Department of Empowerment of Persons with Disabilities), and RBSK Scheme (Rashtriya Bal Swasthya Karyakram, National Health Mission, Ministry of Health & Family Welfare, Govt. of India).



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	-	Nil
14.	2015-16	Nil	Nil	3	Nil

Status of ATN on Para No.4.2 of Report No.17 of 2014 regarding Project management in Society for Applied Microwave Electronics Engineering and Research (SAMEER):

ATN on Para No.4.2 duly vetted by O/o DGA, P&T vide their communication No.DGA (P&T) U.O.No.Report/DeitY/ATN/Para 4.2/SAMEER/32 dated 12.05.2016 has already been sent to DoE, O/o CGA, Monitoring Cell vide OM No.3(17)/2014-Budget(Audit) dated 28.06.2016.

Appendix – I (Contd...)

Audit Paras to be included in Annual Report (2016-17) as per directions of Ministry of Finance

Sl. No.	Report No.& Year	Audit Para No.	Subject	Action Taken/Status Note
1.	55/2015	4.1	<p>Expenditure incurred on the base mapping of the data for Computer Aided Digital Mapping project at a cost of ₹14.25 crore remained unfruitful due to improper planning. Lack of proper monitoring and delays at various stages resulted in hardware and software worth ₹12.10 crore becoming obsolete. NIC also incurred wasteful expenditure of ₹3.74 crore on rent and maintenance charges apart from idle investment of ₹35.20 crore on procurement of the hardware and software which remain unutilised in National Population Project.</p> <p>Further, NIC failed to forfeit the bank guarantee worth ₹ 2 crore on failure of the vendor to execute the work under e-Court Project due to lack of Co-ordination among the concerned user groups. NIC also failed to take advantage of the declining rates by not floating the tenders in time for providing internet bandwidth to NICNET resulting in extra expenditure of ₹15.00 crore.</p> <p>NIC had hosted 3158 website without security audit. There were many deficiencies in development of websites and web applications of various projects.</p>	<p>The ATN was sent to O/o DGA, P&T vide letter dated 24.08.2016 for vetting. Draft ATN has also been uploaded on APMS portal. O/o DGA, P&T vide letter dated 04.11.2016 has returned the ATN with remarks seeking further information/reasons. The same has been communicated to NIC for furnishing further information vide letter dated 08.11.2016 and subsequent letter dated 20.12.2016. NIC vide letter dated 31.01.2017 has furnished the reply. The same is being sent to O/o DGA, P&T for consideration/settlement</p>
2.	55/2015	4.2	<p>Defective planning and imprudent decision by C-DAC Pune not only resulted in delay of more than six years in completion of building, but also led to escalation of cost by ₹ 66.39 crore and blocking up of funds of ₹47.62 crore. In addition, C-DAC Delhi, took possession of a plot in September 2001 by paying ₹1.52 crore to DDA. However, no work was commenced on the plot even after 14 years from the date of possession and a payment of ₹6.08 crore was made to DDA for seeking extensions from time to time.</p>	<p>ATN duly vetted by O/o DGA, P&T vide their U.O. No. Rep-DeitY/ATN/C-DAC Delhi/125 dated 19.09.2016 & U.O. No. Rep-DeitY/ATN/C-DAC Pune /179 dated 03.11.2016 has been sent to MoF, Deptt. of Expenditure, O/o CGA, Monitoring Cell vide this Deptt. OM dated 13.12.2016.</p>



Ministry of Electronics & Information Technology (MeitY)

Sl. No.	Report No.& Year	Audit Para No.	Subject	Action Taken/Status Note
3.	55/2015	4.5	Failure of C-DAC management to take steps to avail the eligible concessional electrical tariff as per Maharashtra IT/ITES policy 2009 resulted in avoidable expenditure of ₹ 4.78 crore towards electricity charges during the period 2010-11 to 2014-15.	The Reply has been sent to O/o DGA, P&T vide letter dated 09.08.2016 for vetting. Draft ATN has also been uploaded on APMS portal. No further remarks received from O/o DGA, P&T.
4.	55/2015	4.6	ERNET could not utilize the hired space even after more than four years from the date of signing of the lease agreement. This omission on the part of ERNET resulted in unfruitful and avoidable expenditure of ₹7.17 crore.	The reply has been sent to O/o DGA, P&T vide letter dated 15.07.2016 for vetting. Draft ATN has also been uploaded on APMS portal. O/o DGA, P&T vide letter dated 10.08.2016 returned the ATN for furnishing further information/documents. The reply on Audit Remarks has been sent to O/o DGA, P&T for settlement vide O.M. dated 02.01.2017. O/o DGA, P&T vide letter dated 20.01.2017 has returned the ATN with the remarks seeking information/documents and further progress report. The same has been sought from ERNET vide letter dated 25.01.2017.
5.	29/2016	4.3	Imprudent Bidding and Contracting on the part of C-DAC, Noida led to delay in execution of the project "Computerization of PGIMER Chandigarh" at various stages for which PGIMER withheld payment of ₹4.28 crore. Besides, C-DAC quoted "lump sum" cost of ₹ 24.20 lakh in the bid for electrical cabling work without properly assessing the quantum of work. This resulted in acceptance of claim by PGIMER for ₹ 24.20 lakh only against the total work done worth ₹3.18 crore, which resulted into blocking of funds by ₹ 2.94 crore.	Para has been sent to C-DAC vide letter dated 14.12.2016 for furnishing the reply. Reply has been received and sent to O/o DGA, P&T for vetting vide letter dated 26.12.2016. O/o DGA, P&T vide letter dated 24.01.2017 has returned the ATN with remarks. The same has been sought from C-DAC vide letter dated 31.01.2017.

Appendix – II

Annual Plan 2017-18

Sl. No.	Scheme/Non-Schemes	Budgetary Support (₹ in crore)
Non-Schemes		
1	MeitY Secretariat	105.00
2	National Informatics Centre	1040.00
3	Regulatory Authorities	167.48
3.1	Standardisation Testing and Quality Certification (STQC)	120.00
3.2	Cyber Security (CERT-In & CAT)	40.48
3.3	CCA	7.00
4	Assistance to Autonomous & Other Bodies	1053.76
4.1	Centre for Development of Advanced Computing (C-DAC)	92.00
4.2	Society for Applied Microwave Electronics Engineering and Research (SAMEER)	42.00
4.3	Centre for Materials for Electronics Technology (C-MET)	14.00
4.4	Media Lab Asia (MLA)	5.76
4.5	Unique Identification Authority of India (UIDAI)	900.00
Sub-Total (Non-Scheme)		2366.24
Scheme		
5	Digital India	1672.76
5.1	Manpower Development	306.76
5.2	Electronic Governance	240.00
5.3	Externally Aided Project (e-Governance)	21.00
5.4	National Knowledge Network	150.00
5.5	Promotion of Electronics & IT Hardware Mfg (MSIPS, EDF & Manufacturing Clusters)	745.00
5.6	Promotion of IT/ITeS Industries	6.00
5.7	R&D in IT/Electronics/CCBT	101.00
5.8	Cyber Security Projects (NCCC & Others)	100.00
5.9	Foreign Trade & Export Promotion	3.00
Sub-Total (Scheme)		1672.76
TOTAL (SCHEME & NON-SCHEME)		4039.00



Employees' structure
Total Employees structure (Total and SCs/STs/PWDs as on 01.01.2017)

Group 'A'	Permanent							
	(i) Other than lowest rung of class-I	140	22	15.71%	08	5.71%	02	1.43%
	(ii) Lowest rung of Class-I	27	02	7.41%	02	7.41%	01	3.70%
	Temporary							
	(i) Other than lowest rung of Class-I	15	03	20%	01	6.67%	00	00
	Lowest rung of Class-I	01	00	00	00	00	00	00
Group 'B' (Gazetted)	Permanent	51	07	13.73%	03	5.88%	02	3.92%
	Temporary	00	00	00	00	00	00	00
Group 'B' (Non-Gazetted)	Permanent	112	26	23.00%	07	6.00%	04	3.00%
	Temporary	06	02	33.00%	00	00%	--	--
Group 'C' Multi-Tasking Staff, Group 'C' (Erstwhile Group 'D')	Permanent	158	48	30.37%	13	8.22%	05	3.16%
	Temporary	19	02	10.52%	01	5.26%	00	0.00%
Total		529	112	21.17%	35	6.61%	14	2.64%







सत्यमेव जयते

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

Electronics Niketan, 6, CGO Complex, Lodi Road, New Delhi 110003, India

Tel.: 91-11-24361733

Website: <http://meity.gov.in>