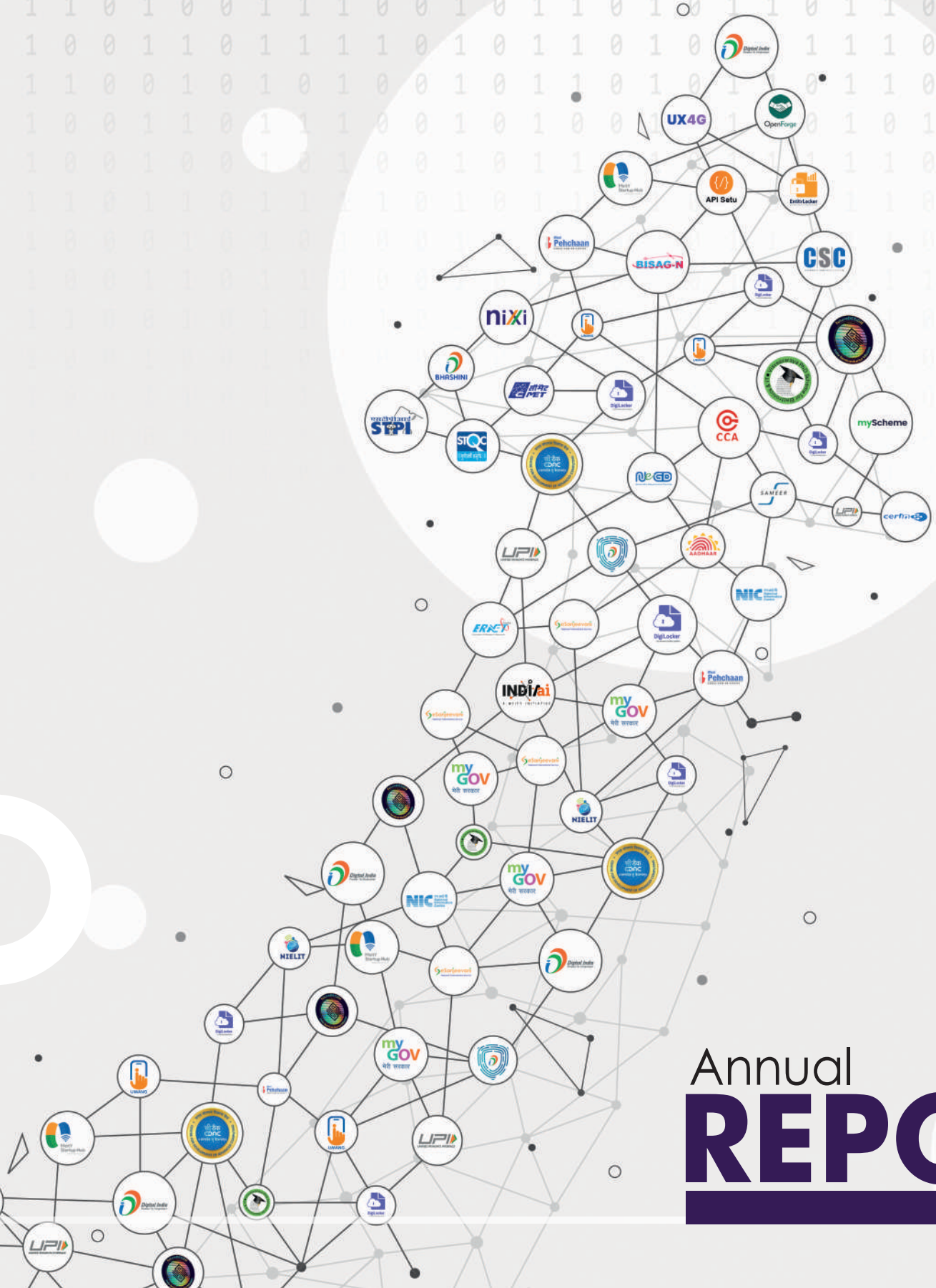
MINISTRY OF
ELECTRONICS AND INFORMATION TECHNOLOGY
GOVERNMENT OF INDIA

सत्यमेव जयते

Digital India
Power To Empower



Annual REPORT 2024–25

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MINISTRY OF ELECTRONICS & INFORMATION TECHNOLOGY
GOVERNMENT OF INDIA

सत्यमेव जयते

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Government of India

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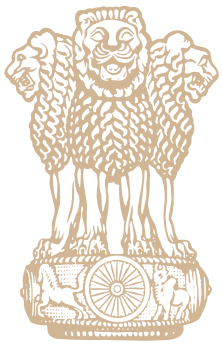


Executive Summary

India's rapid digital transformation has been groundbreaking, placing the nation prominently on the global stage. This transformation has driven substantial advancements in ease of living, ease of doing business, governance, and the expansion of the digital economy. Through its flagship Digital India initiatives, the country has ensured seamless delivery of public services, empowered industries and businesses, and enabled informed decision-making within the government. These initiatives have profoundly impacted India's potential to enhance the quality of life for its citizens, achieve self-reliance, and emerge as a global leader. Moreover, India's advancements in the electronics supply chain have strengthened its position as a trusted global partner, ensuring sustainable growth and promoting international collaborations.

The Digital India Programme seeks to provide universal digital services, bridge the digital divide, and ensure financial inclusion, and digital empowerment. Digital Public Infrastructure has been pivotal in achieving these goals. Aadhaar, the world's largest digital identity programme, has provided unique IDs to more than 130 crore individuals, enabling seamless authentication and eliminating duplicate identities. DigiLocker has facilitated paperless governance with over 32 crore registered users, reaching 22% of the population. It has also integrated with e-District services across 30 states, making government services more accessible. The Unified Mobile Application for New-Age Governance (UMANG) has transformed ease of living by offering over 1,700 services on a single platform, enabling citizens to access government services anytime, anywhere, with just a few clicks.

The Digital Infrastructure for Knowledge Sharing (DIKSHA) platform, developed by NIC, is recognized as the world's largest education platform, and has hosted over 6,800 textbooks and 20,677 capacity-building courses. To prevent duplication and fragmentation in e-governance projects, the government introduced OpenForge- a platform promoting open-source software and sharing of e-governance-related source code. OpenForge has registered 14,164 users, and 3,083 projects have been onboarded so far, enhancing transparency and collaboration in governance.

Other platforms like Government e-Marketplace (GeM) and API Setu have streamlined governance and enhanced citizen access to services. India's digital health infrastructure has revolutionized healthcare delivery through platforms such as eSanjeevani (telemedicine) and e-Hospital (hospital management). These initiatives, collectively referred to as India's "Techade," underscore the nation's leadership in digital governance, benefiting citizens and serving as a model for other countries.

To promote indigenous manufacturing, the government has introduced programmes like the Semicon India Programme (SIP), Production Linked Incentive (PLI) scheme for Large Scale Electronics Manufacturing, PLI Scheme 2.0 for IT Hardware, Scheme for Promotion of Manufacturing of Electronic Components and Semiconductors (SPECS), and Modified Electronics Manufacturing Clusters (EMC 2.0) Scheme. These initiatives aim to transform India into a hub for electronics production and semiconductor manufacturing. The electronics sector has witnessed remarkable growth, with domestic production increasing from INR 5.54 lakh crore (~USD 76 billion) in FY 2020-21 to INR 9.52 lakh crore (~USD 115 billion) in FY 2023-24, reflecting a Compound Annual Growth Rate (CAGR) of 19.78%. Projections indicate that India's electronics production will reach USD 300 billion by 2026. Semicon India Programme (SIP) aims to provide financial support to companies investing in semiconductors, display manufacturing and design ecosystem. Under SIP, five projects of private sector players has been approved for setting up facilities to develop indigenous semiconductor technologies.

India has established itself as a global IT services hub and has emerged as the World's 3rd largest start-up ecosystem with more than 1,50,000 startups operating in the country and 115 unicorns with a total valuation of more than $ 350 Bn. The Indian IT/ ITeS industry has a leading position globally and has been progressively contributing to the growth of exports and the creation of employment opportunities. India's IT-BPM industry is expected to grew by ~3.7 % to reach at USD 254 Billion, including exports of 199.5 USD Billion in FY2023-24 (E). India has positioned itself as a major hub for Global Capability Centres (GCCs), providing offshore facilities to multinational corporations (MNCs) for managing business operations. These centres are among the fast-growing segments of India's digital economy. To further accelerate its expansion, MeitY is developing a new policy framework that will provide fresh incentives for these centres. Several Centres of Excellence (CoEs) have been set up to promote startups, incubation, and innovation in these areas. Furthermore, initiatives like the Future Skills Programme are also enabling Indian IT professionals to attain world-class skills in these technologies.

India has emerged as a key player in artificial intelligence and emerging technologies. On 7th March 2024, the Government of India has approved the IndiaAI Mission, a comprehensive national-level programme to democratize and catalyze the AI innovation ecosystem in the country and ensure the global competitiveness of India's AI startups and researchers. The Government of India hosted the 'Global IndiaAI Summit' on July 3-4, 2024, in New Delhi. The summit focused on advancing AI development in areas like Compute Capacity, Foundational Models, Datasets, Application Development, Future Skills, Startup Financing, and Safe AI, which are the seven key pillars of IndiaAi Mission.

Self-reliance on advanced technologies is a key pillar for the sustainability and consistent growth of the digital economy. In this regard, MeitY has initiated the National Supercomputing Mission (NSM) to develop indigenous computing systems, encompassing HPC components such as processors, server boards, interconnects, clusters, and cooling systems. Under Phase 3, nine PARAM Rudra systems have been deployed at various locations. Operational installations include 3.0 PF systems at IUAC Delhi, IIT Madras, and IIT Mumbai; a 1 PF system at GMRT-TIFR Pune; and 838 TF systems at SN Bose NCBS Kolkata, IIT Patna, and IIT Jammu. Furthermore, C-DAC has partnered with MosChip and Socionext

to design and develop high-performance computing processors based on Arm architecture, further advancing India's technological capabilities. It has also developed systems of strategic importance to the nation's defense, space, and atomic energy programs, delivering reliability and high performance.

To drive innovation in emerging technologies, MeitY has established Centre of Excellence (CoE) in Intelligent Internet of Things (IIoT) Sensors to catalyze the development of sensors within the realm of Intelligent IoT systems. Additionally, it has also established India's first Graphene Centre, the India Innovation Centre for Graphene (IICG) to promote R&D, product innovation and capacity building in the area of Graphene and 2D material systems.

Multilateral forums like the 3rd Voice of Global South Summit emphasized leveraging Digital Public Infrastructure (DPI) for development, particularly in the Global South. Bilateral discussions, such as the 1st India-Singapore Semiconductor Policy Dialogue, highlighted collaboration in supply chains, R&D, and workforce development. India-US Information and Communications Technology Working Group (ICTWG) Meeting held on October 17, 2024, facilitated discussions on topics like IT/IT-enabled services, digital talent, cross-border data flows, data privacy, and collaboration in AI, semiconductor manufacturing, and telecommunications.

To exhibit India's prowess in the electronics and IT sectors, MeitY has initiated joint projects with various countries. India and the EU launched a joint call for proposals on HPC applications under the Intent of Cooperation (IoC) on High-Performance Computing (HPC), Weather Extremes & Climate Modeling, and Quantum Technologies. The India-Argentina Centre of Excellence in Information Technology (IA-CEIT), established by C-DAC Delhi with financial assistance from the Government of India at the University of Hurlingham, Buenos Aires, aims to foster technological advancements and collaboration.

MeitY has taken significant steps to create a trustable cyber environment which is essential for the participation of citizens in the digital economy. The Digital Personal Data Protection Act, 2023 has been enacted, which provides for the processing of digital personal data in a manner that recognizes both the rights of the individuals to protect their personal data and the need to process such personal data for lawful purposes and for matters connected therewith or incidental thereto. Building on this, the draft Digital Personal Data Protection (DPDP) Rules, 2025, introduced for stakeholder consultation balances privacy in the digital space while encouraging data-driven innovation. Also, initiatives like the Cyber Security Grand Challenge for Start-ups and the Cyber Surakshit Bharat have strengthened the country's cybersecurity framework.

MeitY has also focused on bridging human resource gaps in the electronics and IT industry through initiatives targeting both formal and informal sectors. Key programmes like the Indian Nanoelectronics Users Programme – Idea to Innovation (INUP-i2i) and the Chips to Startup (C2S) Programme aim to train professionals in advanced areas such as nanoelectronics and chip design. Additionally, the Visvesvaraya PhD Scheme aims to enhance the number of PhDs in Electronics System Design & Manufacturing (ESDM) and IT/IT Enabled Services (IT/ITES) sectors in the country. The Phase II of the scheme has received proposals from 70 institutions for the allotment of 2,142 full-time and 700 part-time PhD seats.

The Annual Report 2024-25 of MeitY highlights the ministry's achievements and its organizations, including CCA, UIDAI, CERT-In, NIC, C-DAC, SAMEER, C-MET, NeGD, NIELIT, STPI, STQC, DIC, ERNET, and NIXI. The report underscores MeitY's focus on citizen-centricity, digital governance, DPI, digital connectivity, digital skilling, emerging technologies, cybersecurity, and electronics manufacturing. Collectively, these efforts have empowered citizens, strengthened the digital economy, and fostered technological innovation. They form a robust foundation for achieving the vision of Viksit Bharat by 2047—a digitally empowered, inclusive, and self-reliant India.

CHAPTER

1 Overview of MeitY

Vision, Mission, Objectives, Structure and Functions of MeitY

1.1 Introduction

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

1.2 Vision

e-Development of India as the engine for transition into a developed nation and an empowered society.

1.3 Mission

To promote e-Governance for empowering citizens, promoting the inclusive and sustainable growth of the Electronics, IT and ITeS industries, enhancing India's role in 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 Objectives

e-Government: Providing e-infrastructure for delivery of e-services.

e-Industry: Promotion of electronics hardware manufacturing and IT-ITeS industry.

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

e-Learning: Providing support for development of e-Skills and Knowledge network.

e-Security: Securing India's cyber space.

e-Inclusion: Promoting the use of ICT for more inclusive growth.

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

1.5 Functions

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 excluding Digital Payments.

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.

5A. Matters relating to online gaming.

5B. Matters relating to Cyber Security as assigned in the Information Technology Act, 2000 (21 of 2000) (as amended from time to time) and support to other Ministries / Departments on Cyber Security.

6. Matters relating to promotion and manufacturing of Semiconductor Devices in the country.
7. Interaction in IT related matters with international agencies and bodies e.g. Internet for Business Limited (IFB), Institute for Education in Information Society (IBI) and International Code Council – on line (ICC).
8. Initiative on bridging the Digital Divide: Matters relating to Digital India Corporation.
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.
14. Unique Identification Authority of India (UIDAI).
15. Semi-Conductor Laboratory, Mohali.

1.6 WORK ALLOCATION – AS ON 31.12.2024

Sl.No.	Name & Designation	Work Allocation
1	Shri Bhuvnesh Kumar Additional Secretary	• Personnel, Societies and General Administration, I&DC [Library] • NICSI • Cyber Laws Division ***[GC-Sci.G(DG)]*** • R&D in Electronics Division ***[GC-Sci.G(SV)]*** • R&D in IT Division ***[GC-Sci.G(SV)]*** • Matters related to CMET and CDAC ***[GC-Sci.G(SV)]*** • Matters related to UIDAI ***[GC-Sci.G(DG)]***
2	Shri Abhishek Singh Additional Secretary	• Cyber Security Division ***[GC-Sci.G(SU)]*** • Matters related to ICERT ***[GC-Sci.G(SU)]*** • Artificial Intelligence & Emerging Technology ***[GC-Sci.G(KB)]*** • Work relating to Global Partnership on Artificial Intelligence (GPAI) ***[GC-Sci. G (KB)]*** • Human Centred Computing (HCC) Division ***[GC-Sci.G(KB)]*** • India AI ***[GC-Sci.G(KB)]*** • DIBD ***[GC-Sci.G(KB)]*** • HRD, NIELIT and RajBhasha Section ***[GC-Sci.G(TP)]***
3	Shri Krishan Kumar Singh, Joint Secretary	• Digital Economy Division (DED) • Software Industry Promotion Division including DIIF • Start Ups, Innovation, IPR and Entrepreneurship • STPI, MSH • Coordination Division (including SGoS) • CVO
4	Shri Rajesh Singh JS & FA	• Integrated Finance Division (IFD)
5	Shri Sushil Pal Joint Secretary	• International Cooperation Division • Electronics Hardware (PLI) • Semiconductors

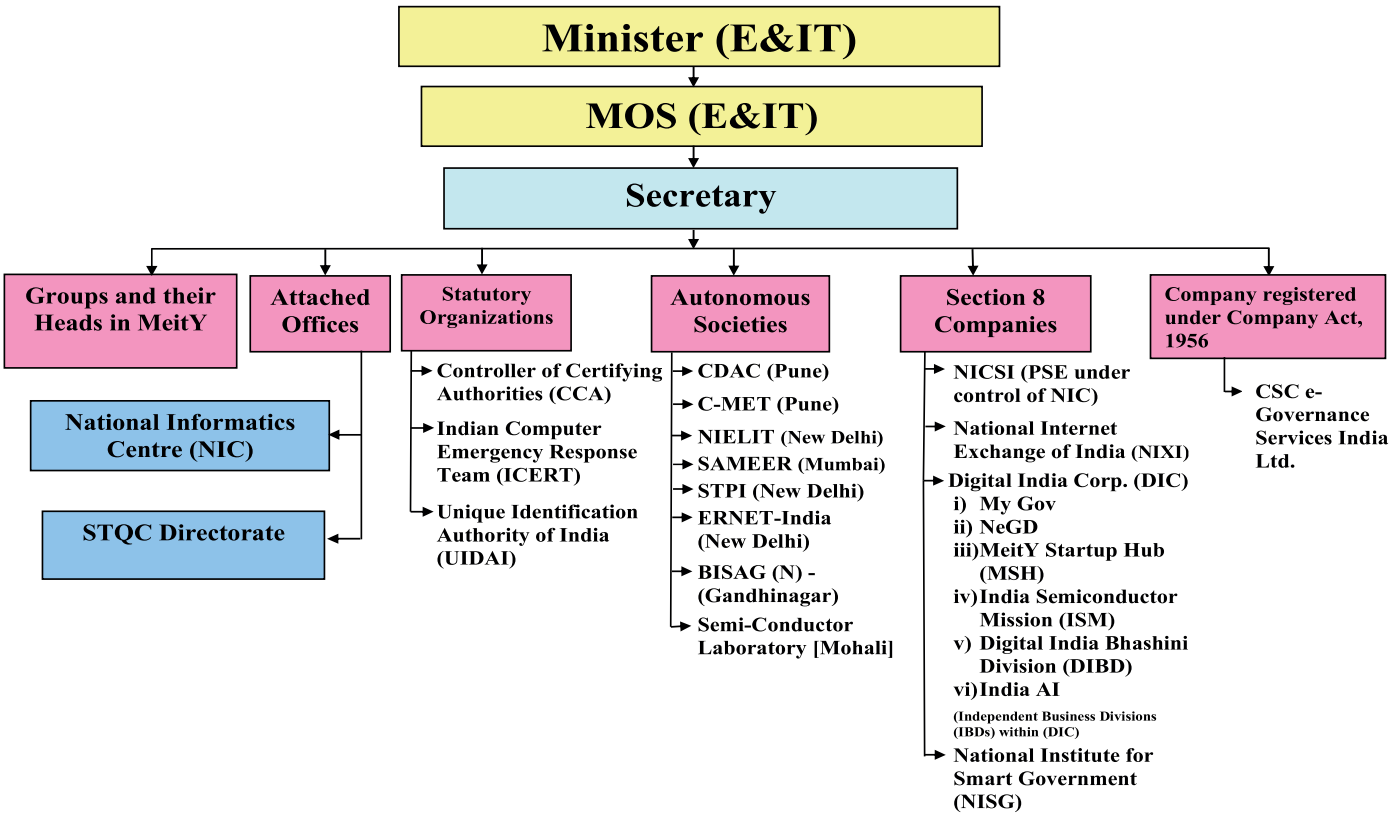
Sl.No.	Name & Designation	Work Allocation
		• SCL • Productivity & Employment Generation • Electronics Hardware (excluding PLI), CRO ***[GC-Sci.G(AN)]*** • Matters related to STQC and CCA ***[GC-Sci.G(AN)]*** • Internet Governance Division • NIXI
6	Shri Sanket S Bhondve Joint Secretary	• Digital Governance Division • Digital India Corporation (DIC), NeGD, MyGov, CSC • BISAG(N) • NIC, NISG • Designated Officer (u/s 69A)
7	Smt. Savita Utreja Scientist G & GC	• Cyber Security Division ***[through AS(AS)]*** • ICERT ***[through AS(AS)]***
8	Smt. Asha Nangia Scientist G & GC	• Electronics Hardware (excluding PLI), CRO ***[through JS(SP)]*** • Matters related to STQC and CCA ***[through JS(SP)]***
9	Shri S K Marwaha Scientist G & GC	• CC&BT Division • SAMEER, ERNET • RTI, Grievances and Parliament Section
10	Smt. Sunita Verma Scientist G & GC	• R&D in Electronics Division ***[through AS(BK)]*** • R&D in IT Division ***[through AS(BK)]*** • CMET, CDAC ***[through AS(BK)]***
11	Smt. Kavita Bhatia Scientist G & GC	• Artificial Intelligence & Emerging Technology ***[through AS(AS)]*** • Work relating to Global Partnership on Artificial Intelligence (GPAI) ***[through AS(AS)]*** • Human Centred Computing (HCC) Division ***[through AS(AS)]*** • India AI ***[through AS(AS)]*** • DIBD ***[through AS(AS)]***
12	Shri Deepak Goel Scientist G & GC	• Cyber Laws Division ***[through AS(BK)]*** • Matters related to UIDAI ***[through AS(BK)]***
13	Ms. Tulika Pandey Scientist G & GC	• HRD, NIELIT and RajBhasha Section ***[through AS(AS)]*** • Nodal Officer for responding to any queries/ clarifications sought in writing/ through email by any media companies on any issues related to MeitY. • Website and Social Media activities. • Gender Budgeting

1.7 Organisation Structure

The Secretariat of MeitY headed by Secretary is assisted by Financial Advisor, and Group Coordinators and Heads of Organisations under the administrative control of MeitY. The organisation chart is as follows:-

MINISTRY OF ELECTRONICS AND INFORMATION TECHNOLOGY (MeitY)

ORGANISATION STRUCTURE



CHAPTER

2 Digital India

Power to Empower

2.1 Introduction

Digital India, a flagship programme of the Government of India, aims to transform India into a digitally empowered society and knowledge economy. 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 the Digital India Programme **(DIP)** is on being transformative to realize - IT (Indian Talent) + IT (Information Technology) = IT (India Tomorrow) and making technology central to enable change. The programme targets to provide digital services, digital access, bridge the digital divide, language divide and thereby, ensure digital inclusion, financial inclusion, and digital empowerment. The targets are sought to be achieved with the power of technology that is affordable, developmental, sustainable, and inclusive. The vision is centred on three key areas, namely Infrastructure as Utility to Every Citizen, Governance & Services on Demand and Digital Empowerment of Citizens.

2.1.1 Extension of Digital India Programme

The Government, in August 2023, approved the extension of the 'DIP' with a total outlay of Rs. 14,903.25 Crore during the period of the 15th Finance Commission i.e., 2021-22 to 2025-26. The details are given at **Annexure-I.**

2.1.2 Vision of Digital India

To transform India into a digitally empowered society and knowledge economy.

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

- High-speed internet as a core utility
- Cradle to grave digital identity - unique, lifelong, online, authenticable
- Mobile phone & Bank account enabling participation in digital & financial space
- Easy access to a Common Service Centre
- Shareable private space on a public cloud
- Safe and secure Cyber-space

Vision Area 2: Governance & Services on Demand includes

- Seamlessly integrated across departments or jurisdictions
- Services available in real-time from online & mobile platforms
- All citizen entitlements to be available on the cloud
- Services digitally transformed for improving Ease of Doing Business
- Making financial transactions electronic & cashless
- Leveraging GIS for decision support systems & development

Vision Area 3: Digital Empowerment of Citizens includes:

- Universal Digital Literacy
- Universally accessible digital resources
- All documents/ certificates to be available on the cloud

2.2 Digital Infrastructure

2.2.1 Digital Identity

2.2.1.1 Aadhaar Data Vault (ADV) as a service

- While using Aadhaar services of UIDAI, if any service/application requires to store Aadhaar number in their application, the same should be stored in encrypted format in a separate system 'Aadhaar Data Vault (ADV)'. In order to facilitate

the same, this project has been initiated. Aadhaar Data Vault as a service is used by major entities, including the Election Commission of India (ECI), Oil Marketing Companies (OMC), All India Council for Technical Education (AICTE), Life Insurance Corporation (LIC), Small Industries Development Bank of India (SIDBI), Central Registrar of Cooperative Societies (CRCS), and the National Bank for Agriculture and Rural Development (NABARD), among others. ADV is also offered as a solution with extended capabilities to interested entities for securely storing and managing other Personally Identifiable Information (PII) data.

- Currently, 50 departments are utilizing this service. Total number of transactions are 272.33 Crore.

Projections for January – March 2025 of ADV

5 services more will be utilizing this service. Targeting a total of 300 crore transactions.

2.2.1.2 MeriPehchaan [National Single Sign-On (NSSO) platform]

National Single Sign On (MeriPehchaan) is a platform that authenticates citizens easily and securely. It aims at eliminating the need to repeatedly prove user identity to different applications and hold different credentials for each application. It is an extensive collaboration of the three mainstream SSO platforms e-Pramaan, Jan Parichay and DigiLocker. MeriPehchaan enables standardized registration which means users need to provide information once for accessing different services. MeriPehchaan authenticates the user based on multiple authentication parameters like username, mobile number, Aadhaar, PAN, etc.

Achievements

- Currently 12,309 services of various Ministries/ States have been integrated with NSSO. Key services include COWIN, DigiLocker, eShram, Mizoram DICT, Service Plus, mSevanam, MyGov, S3Waas, Bihar State Services, Rajasthan SSO, Assam Sewasetu, Digishakti, ISRO, Jansugam, MP Single Sign On, Kerala Excise etc
- Over 133.97 Crore transactions have taken place on the MeriPehchaan platform.

Projections for January – March 2025 of NSSO.

- Number of services – approx. 400
- Number of transactions – approx. 15 cr

2.2.1.3 Online e-Sign (e-Hastakshar)

e-Hastakshar, a cutting-edge eSign service that allows citizens to digitally sign documents online in real-time, providing a legally acceptable form and convenient alternative to physical signatures. Over the past year, C-DAC integrated this service with various departments, ministries, and agencies at the Central and State Government levels, as well as Union Territories. C-DAC utilizes service of Unique Identification Authority of India (UIDAI) for on-line authentication and Aadhaar eKYC service. e-Hastakshar service supports Online Aadhaar Authentication Modes-One-time password (OTP), TOTP, Fingerprint, IRIS, Face (Mobile Apps only) based modes of authentication for leveraging eKYC service of UIDAI.

Achievements

- Total 87.25 Crore e-Sign issued by all ESPs. Out of these, 21.20 Crore e-Sign issued by CDAC (i.e. under e-Hastakshar project).
- eHastakshar APK is available on Google play store and GOV.IN AppStore.
- Currently more than 260 agencies are leveraging eSign 2.1 Production service. Key agencies such as Tamil Nadu e-Governance Agency (TNeGA), National Crime Records Bureau (NCRB), Employees' Provident Fund Organisation (EPFO), National Informatics Centre, Centre for eGovernance, Karnataka, Digilocker, National Highways Authority of India (NHAI), Ministry of Agriculture and Farmer Welfare are using eSign 2.1 on production level.
- 15 outreach programs have been conducted by C-DAC for e-Sign proliferation in the year 2024 with various Central/State Government organizations.

Projections for January – March 2025 of eSign

- Total e-Sign will be issued by all ESPs: 20.00 Cr.
- Out of these, e-Sign issued by CDAC (i.e. under e-Hastakshara project): 4.00 Cr. 15 more agencies will be leveraging eSign 2.1 Production service.

2.2.2 Enhancement of National Informatics Centre (NIC) National Cloud Services

National Informatics Centre (NIC) has been providing Data Centre/ Cloud services to the Government at Central and State level to ensure Government services internally and for citizens. Under NIC cloud services, more than 21,000 virtual servers have been allocated for various e-Governance applications to more than 1470 Ministries/ users and over 5000 websites of the Government are being served through NIC cloud. For rapid deployment of new services and strengthen the existing services to citizens from the Government, MeitY has approved a proposal of NIC for enhancement of ongoing NIC National Cloud Services being offered from National Data Centres over a period of 3 years. The project is being implemented by NICSI.

The project has the following key features:-

i. Cloud Infrastructure Capacity: This will enable the provision of around 14,000 medium/small sized virtual servers over the period of three years. This infrastructure will provide additional Block/ Unified/ Object/ Software defined raw storage of over 36 Petabytes.

ii. Cloud Management solution: It will ensure increase automations of function to enhance quality of services, which will result in better adoption of Cloud services and reduce the overall manpower requirement

iii. Improvement in Cyber Security Posture: It would help NIC to manage various cybersecurity aspects of the cloud infrastructure.

iv. Workshop/Training of Cloud Services: Workshops/ trainings of core teams of Government Ministries/ Departments which enables the users for utilization/ managing and monitoring of cloud services

2.2.3 National Data Centre in North-East Region (NDC-NER)

To strengthen the digital transformation and service delivery in the North-Eastern Region, Ministry of Electronics and IT has approved the project for setting up of "National Data Centre in North-East Region (NDC-NER)" at Guwahati, Assam on 19th September 2020. This project is in line with "Vision Document for Digital North-East by 2020". This Project is being implemented by National Informatics Centre (NIC) through NICSI over a period of five and a half years.

The NDC-NER is proposed with the following key features:

i. NDC-NER building with Ground plus 5 floors with a facility of 200 racks (G+3) for Data Centre and Cloud infrastructure (IT and Non-IT). 4th and 5th floor shall be built and reserved for future expansion.

ii. It would provide a robust, highly available & significantly scalable infrastructure with adequate redundancy to enable Government to render efficient delivery of citizen services.

iii. It will have Security Operation Centre (SOC), Network Operation Centre (NOC) and Centre of Excellence (CoE) for Application Security. It will act as Disaster Recovery site for various applications hosted in other Data Centre in the region.

2.2.4 GI Cloud (MeghRaj)

To deliver ICT services over Cloud to all the Ministries/ Departments at Centre/State/UTs level and utilize the benefits of Cloud computing, Government of India has initiated an ambitious initiative- "GI Cloud", also named as 'MeghRaj'. It is designed to promote the use of Cloud technology to enhance the efficiency, scalability, and cost-effectiveness of IT services within the Government. The vision of this initiative is to accelerate delivery of e-Services in the country, while optimizing ICT spending of the Government.

This will ensure optimum utilization of the infrastructure and speed up the development and deployment of eGov applications. The architectural vision of GI Cloud encompasses a set of discrete cloud computing environments spread across multiple locations, built on existing or new (augmented) infrastructure, following a set of common protocols, guidelines and standards issued by the Government of India.

The major components of MeghRaj include:

- Setting up of State and National Clouds.
- Empanelment of Cloud Service Providers.

- Setting up of Cloud Management Office (Policies, Guidelines, templates, security norms, certification, etc.).
- Awareness workshops, training programmes and migration support for cloud adoption by Departments.
- Setting up of Clouds by other Government entities.
- Rapid development, deployment, and re-use of ICT applications.
- Enable conversion of CAPEX to OPEX paving the way for consumption based billing and faster procurement of IT Infrastructure services.

Achievements

The first National Cloud implemented by NIC is already being used by more than 1,895 applications of Government Departments. NIC Cloud can be accessed using the following link: https://cloud.gov.in/

MeitY has empanelled 23 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). The status of the audit and the contact details of the empanelled CSPs can be assessed using the link https://www.meity.gov.in/content/gi-cloud-meghraj

2.2.5 Bhaskaracharya National Institute for Space Applications and Geo-informatics (BISAG-N)

Bhaskaracharya National Institute for Space Applications and Geo-informatics (BISAG-N) is an Autonomous Scientific Society registered under the Societies Registration Act, 1860 under the Ministry of Electronics and Information Technology (MeitY), Government of India to undertake Technology Development & Management, Research & Development, Facilitate National & International Cooperation and Capacity Building, Support Technology Transfer & Entrepreneurship Development in area of Geo-spatial Technology/Field.

Some of the key achievements and the activities performed by BISAG-N are as follows:

I. SATELLITE COMMUNICATION / DISTANCE EDUCATION / EDUCATIONAL TV

Government has established a state-of-the-art telecast facility through MeitY at BISAG-N. At present, 300+ educational DTH TV channels (SWAYAM Prabha, PM eVidya, DigiShala, VANDE Gujarat) are being telecast on 24x7 basis using this facility.

BISAG-N has utilized satellite communication infrastructure to create a nationwide distance education platform, focusing on inclusivity and accessibility. The PM eVIDYA initiative, one of BISAG-N's prominent projects, provides DTH television channels dedicated to school education, helping bridge educational disparities, particularly in rural and remote areas where internet access may be limited. This project involves collaboration with several ministries, including Education, Information and Broadcasting, and Space, making it possible to reach millions of households. BISAG-N's satellite communication services have also been deployed for training programs in agriculture, healthcare, and skill development, thus broadening its impact on social welfare.

II. SPACE AND GEO-SPATIAL TECHNOLOGY - BASED APPLICATIONS DEVELOPMENT

BISAG-N has built extensive, high-resolution geospatial databases and analytical tools to serve multiple sectors, including agriculture, water resources, urban planning, and disaster management. BISAG-N also provides data and analysis on aspects like disaster risk, resource allocation, and development planning.

III. PM GATISHAKTI: NATIONAL MASTER PLAN FOR MULTIMODAL CONNECTIVITY

BISAG-N has developed Geo-spatial and other emerging technologies based platform to support National Master Plan for Multi-modal Connectivity under the guidance of Department for Promotion of Industry and Internal Trade (DPIIT), Ministry of Commerce and Industry, GoI. All the technologies used are developed in-house/ Customized open source, under the R&D Programme of MeitY. The main objectives of the National Master Plan are to support infrastructure planning, optimize Logistics process, measure, monitor and report the Performance of states, various government

bodies, ministries and comparison with global benchmarks. Under PM GatiShakti National Master Plan, BISAG-N has developed portals for more than 46 Ministries and State Governments and more than 1600 data layers are integrated under the PM Gatishakti Portal.

IV. AYUSH GRID PROJECT

The Ministry of AYUSH, under Government of India, has envisioned the AYUSH Grid Project with the aim of digitizing healthcare services in the AYUSH sector comprehensively. BISAG-N is the technical support partner for Ministry of AYUSH in the implementation of AYUSH Grid Project. This project intends to serve as fundamental IT infrastructure for the entire AYUSH sector, encompassing various healthcare systems like Ayurveda, Yoga & Naturopathy, Unani, Siddha, Sowa Rigpa, and Homoeopathy across their respective functional domains, including health services, education, research, drug administration, medicinal plants, Ministry of AYUSH oversight, capacity building, and media outreach. Through AYUSH Grid project access is provided to citizens through a dedicated portal and Mobile application.

V. DEFENCE PROJECTS

BISAG-N has been developing Space, Geo-spatial and other emerging technologies based applications under the guidance of various agencies of the Ministry of Defence, Government of India. All the technologies used are developed in-house/ Customized open source.

Ongoing projects: Apart from the above some ongoing projects like *PM Daksh, PM UDAY, Government Land Management System (GLMS), Heritage Atlas, India Industrial Land Bank (IILB), Haj Suvidha, Purvottar Vikas Setu etc. are under various phases of development and implementation.*

VI. STANDARDIZATION, QUALITY AND INFORMATION SECURITY DIRECTORATE AT BISAG-N

BISAG-N ensures quality and data integrity through adherence to international standards such as ISO 9001 for Quality Management, ISO 27001 for Information Security, and CMMI Level 5 certification for software development. Its Standardization Directorate develops and implements best practices for geospatial data management, promoting data consistency and interoperability across governmental systems. Capacity building efforts include training for government officials, students, and professionals through the Academy of Geo-Informatics & Sustainable Development.

VII. ACADEMY OF GEO-INFORMATICS

BISAG-N has established an Academy of Geo-Informatics to promote and carry out applied research, provide education and training to students and professionals to encourage the development of advanced Geo informatics technology and applications. In the past year BISAG-N trained approx. 200 students in different technical languages such as Python, Java, PHP, JAVA Script, ML, GIS, Android etc.

VIII. FINISHING SCHOOL

BISAG-N continued it six-month training with stipend of ₹ 10000/month for SC/ST graduates to improve their employability. During the six months, the participants are assessed for their skills vis-à-vis industry needs. Based on the assessment, extensive guidance is provided along with opportunity to participate in GIS projects. Soft skills and interview practice are integral part of this programme. Interviews are arranged at BISAG-N for relevant companies to support career opportunities and placement.

IX. INTERNATIONAL CO-OPERATION

The Government through Ministry of External Affairs (MEA) desires to use the SAARC satellite (designated GSAT-9), among other things, for DTH applications in neighborhood countries. For this purpose, MEA engaged with neighborhood countries to appraise them of the features of the collaborative program being offered by India for education and skill development through satellite communication. 50 DTH TV Channels are dedicated to the telecast of educational & skill Development

videos. These 50 DTH TV channels will operate in 24x7 mode. The channels will be uplinked from BISAG-N, Gandhinagar SATCOM infrastructure.

X. OUTREACH PROGRAMMES

BISAG-N conducted various outreach programmes for school students/professionals and Government officials highlighting the activities undertaken by BISAG-N. These activities majorly highlight the use of GIS and Geospatial technologies in Government for effective planning and implementation of various Government projects and Programmes.

2.2.6 Public Internet Access Programme including Wi-Fi in Universities

Wi-Fi has become a universal expectation among universities / institutions for students, faculty and staff as well as visitors / guests. Wi-Fi connectivity is a high-speed wireless access to Internet / Intranet resources on any-time any-where basis across the campus.

Wi-Fi at Patna University

A model Wi-Fi-enabled campus network has been set up by ERNET India at Patna University with Tier-3 architecture, upgraded to a 10-Gigabit fiber optic redundant backbone. It is a controller-based secure Wi-Fi network with a centralized monitoring and management system. This network provides high-speed wireless access to Internet and Intranet resources for campus employees, staff, faculty, teachers, students, official visitors, and guests on a seamless, any-time, anywhere basis across the campus. The establishment of the Wi-Fi network has significantly enhanced the delivery of student-centric services, improved employee performance and operational efficiency, and ensured real-time access to critical information. It has driven substantial progress in both academic and administrative functions by providing a reliable and high-speed internet infrastructure across the campus. This enables students and faculty to efficiently engage in online learning, conduct research, and access digital resources, fostering personal development, skill enhancement, and the adoption of innovative teaching practices. The Wi-Fi campus network has been deployed across all three zones and has been operational since 5th March 2024. Approximately 700 to 1,000 users, including professors, students, and staff, are accessing the network daily. The Eduroam facility has also been enabled for Patna University by ERNET India.

2.3 Mobile based online Governance and Services on Demand

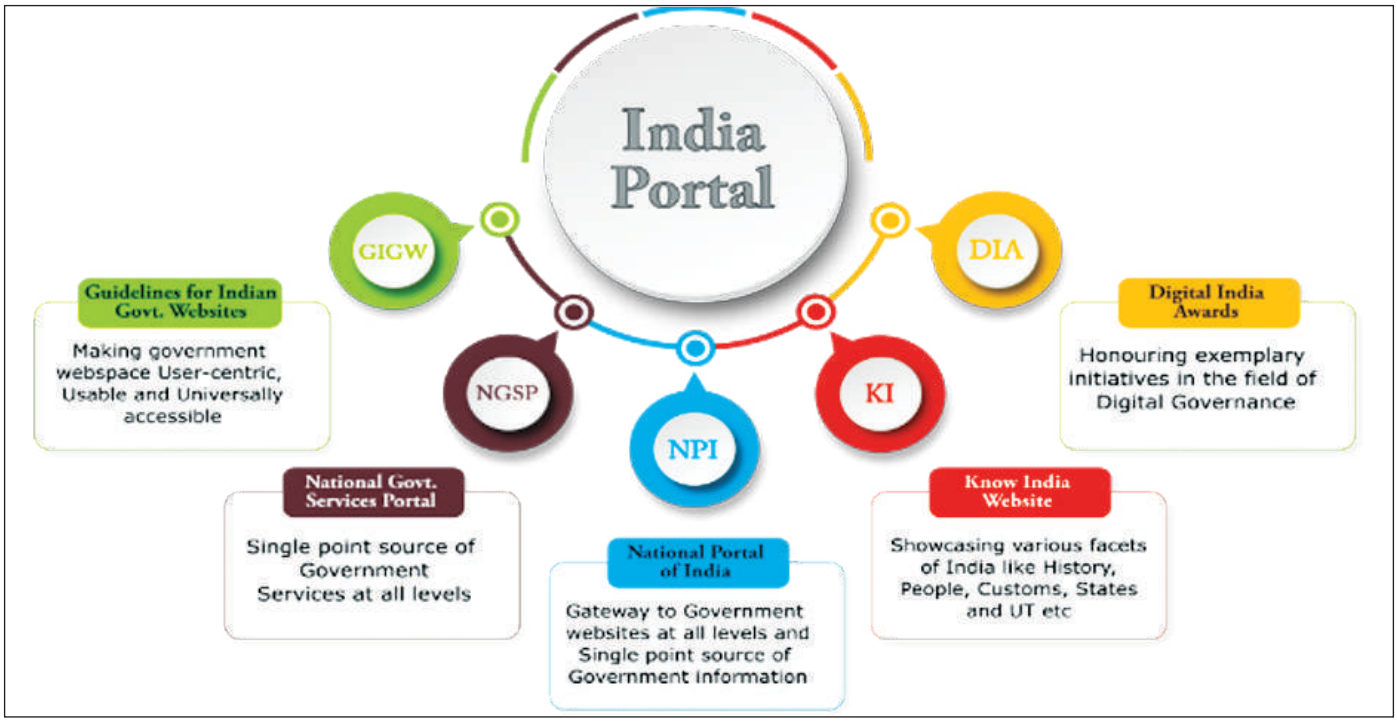
2.3.1 India Portal

India Portal provides a 'single-window access' to information and services that are electronically delivered from all Government departments, institutions, and organisations. It has been a most popular source of information to a wide range of stakeholders - from citizens, to Government, to business and to Indian diaspora. It is a gateway of Indian Government websites at Centre, State and District levels. The portal is also integrated with MyGov and Data Portal to present the citizen engagement activities and open data across various sectors.

The India Portal has over 3.3 million visitors per month (7.0 million-page views) and 10.05 lakh registered users. Till date, India Portal has published ~26,346 metadata. India Portal is also a platform for the promotion of various Government initiatives/ events such as:

- Micro site for Republic Day showcasing the Republic Day celebrations, President's speech to the nation and awardees of various awards that has been designed, developed, and maintained at https://knowindia.india.gov.in/republic-day-celebration/index.php
- Micro site for Independence Day which is maintained at https://knowindia.india.gov.in/independence-day-celebration/index.php
- Spotlights covering important Government initiatives and events like Building Atmanirbhar Bharat, Helping MSMEs Grow & Reviving Economy, Educating Young Minds & Building a Stronger Nation, PM Street Vendor's AtmaNirbhar Nidhi (PM SVANidhi), SVAMITVA - Integrated Property Validation for Rural India.
- Monthly newsletters that are sent to subscribers of India Portal to keep them updated about the latest content on the portal. The portal also has a Social Media presence through Facebook page (https://www.facebook.com/National Portal India) and Twitter handle (https://twitter.com/indiagovin).

Other initiatives/activities under the aegis of India Portal are:



2.3.2 User experience for Government (Websites & Apps) UI/UX 4G

To adapt best practices by government Departments in UI/UX (User Interface/User experience) a project named as "User Experience for Government Websites & Apps (UX4G)" also known as UI/UX4G was launched and it is mainly focussed to examine GIGW compliance of Government websites/ apps, to identify areas of improvement in UI/UX, create a framework and guidelines to help Government Departments to adopt better UI/UX, develop libraries of GIGW compliant ready to use, reusable Web Components, sensitize them and extend necessary technical hand-holding support on use of web components for improving the quality of UI/UX.

Project Objectives:

- Act as an enabler and facilitator in developing a framework and guidelines for user centric experience on Government Websites & Mobile Apps, especially the UI/UX for ease of use.
- Provide ready to use web components, tools, solutions, technical support, etc. for Government Departments so that they can provide best user experience.
- Enable Government Departments to improve their quality-of-service delivery through citizens' feedback.
- Enable Government Departments to conduct any kind of surveys for better planning.
- Build capacities within Government for better UI/UX and design thinking in order to improve ease of access and navigation of Government websites and Apps.

Achievements:

- Improved and developed the design interface for 118 websites and 58 mobile applications of Govt. Departments under the project till now.
- Framework creation and Guidelines prepared for Government Departments to adopt better UI/UX.
- To focus on identified pain areas and improve services accordingly, Government services have been integrated to collect citizen feedback. This initiative has provided a department centric advanced analytical report with service improvement indicator so that department can focus on those areas.

- Government departments has been sensitized and necessary technical hand holding support been extended on the use of web-components.
- For better UI/UX and design aspects of Government websites/apps various training programs, workshops and hackathon has been conducted in the field of UI/UX for Government departments. So far, 42 workshops have been conducted online under the UX Capacity building program.
- Repository to use design templates prepared for Government Ministries/ Departments at Centre & State level. These design templates are compliant with Government guidelines & e-Gov Standards.
- Library development of GIGW compliance.

2.3.3 National Scholarships Portal (NSP)

National Scholarships Portal (NSP) is an end-to-end integrated unified portal for all scholarship schemes offered by Central Ministries/Departments and states. NSP offers hassle-free services to all stakeholders like online scholarship application submission, tracking by student's verification by institute and final disbursement of scholarships amount directly into a student's bank account. This new unified system creates brings transparency by avoiding duplication and ensures timely disbursement.

Impact: NSP statistics for AY 2023-24

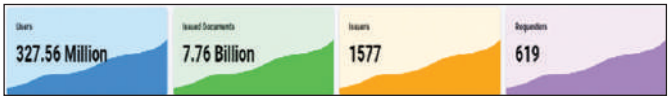
- **Central Ministries/State On-boarded:** 32
- **Schemes Onboarded:** 142
- **Beneficiaries:** 0.80 crore (approx.)
- **Scholarship Disbursement:** Rs. 6,224.40 crore (approx.)

Commutatively, in last Eight Academic years (2015-16, 16-17, 17-18, 18-19, 19-20, 20-21, 21-22, 22-23, 23-24) approximately 11.83 crore applications received and Approx. Rs. 33,889.13 crores disbursed to over 6.15 crore beneficiaries.

2.3.4 DigiLocker: Revolutionizing Paperless Governance

In the pursuit of achieving a vision for paperless governance, DigiLocker has emerged as revolutionary in the issuance and authentication of digital documents and certificates, rendering physical paperwork obsolete. The year 2024-25 so far has witnessed remarkable progress and transformative developments in the DigiLocker ecosystem with 29% growth in partner alliances and around 50% growth in user registration (April-Sept) from the previous year which signifies adaption of the services with secure and robust accessibility. Over 43 Crore registered users now and growing rapidly, DigiLocker has now reached to 31% of the total population.

Statistics



Key Achievements:

- Integrated with e-District services of 30 States, facilitating easier access to government services; Integration of services of MahaIT and 2 UTs in progress. Public Distribution System (PDS) services integrated for 30 States. Integrated with Land Records of 8 States for better access to property-related records. Integrated with Electricity Bills of 8 States, streamlining bill management for citizens. Integrated with Pension Documents of 17 states, making it easier for pensioners to access essential documents. Over 30 Urban Local Bodies from different Municipal Corporations of State/UT have been integrated to bring ease of governance.
- 36 State Boards providing X and XII marksheets; 14 Technical Boards; and 3 Central Boards including CBSE, CISCE, and NIOS have been integrated with DigiLocker.
- 2,700 Higher Educational Bodies registered with DigiLocker, the sole National Academic Depository (NAD), with over 84 crore certificates/mark sheets available.
- DigiLocker is being implemented in Academic Bank of Credits (ABC) ID and now the APAAR ID, aligning with the "One Nation, One Student ID" initiative under NEP, 2020.
- Other recent key achievements include Railway Recruitment Board for recruitment processes; CKYC: Centralized database of KYC; Fisherman

Card; RGI 2.0; Indian Airforce for AgniVeer Vayu Recruitment; Soil Health Cards and Crop Insurance Policies by Ministry of Agriculture, LinkedIn allowing for document sharing and verification; Yes Bank and Edelweiss Mutual Fund receipts for diversifying the financial sector.

Entity Locker, an integral initiative of DigiLocker, designed to empower organizations by providing a secure, cloud-based platform for storing, sharing, and verifying digital documents and certificates has been developed and being implemented.

Projections for January – March 2025:

- More than 43.40 Crore registered users with over 939 Crore Issued Documents.
- Issues documents are projected to increase by 6.5 Crore by March, 2025
- Over 1800 Registered issuers and around 2200 Crore issuers

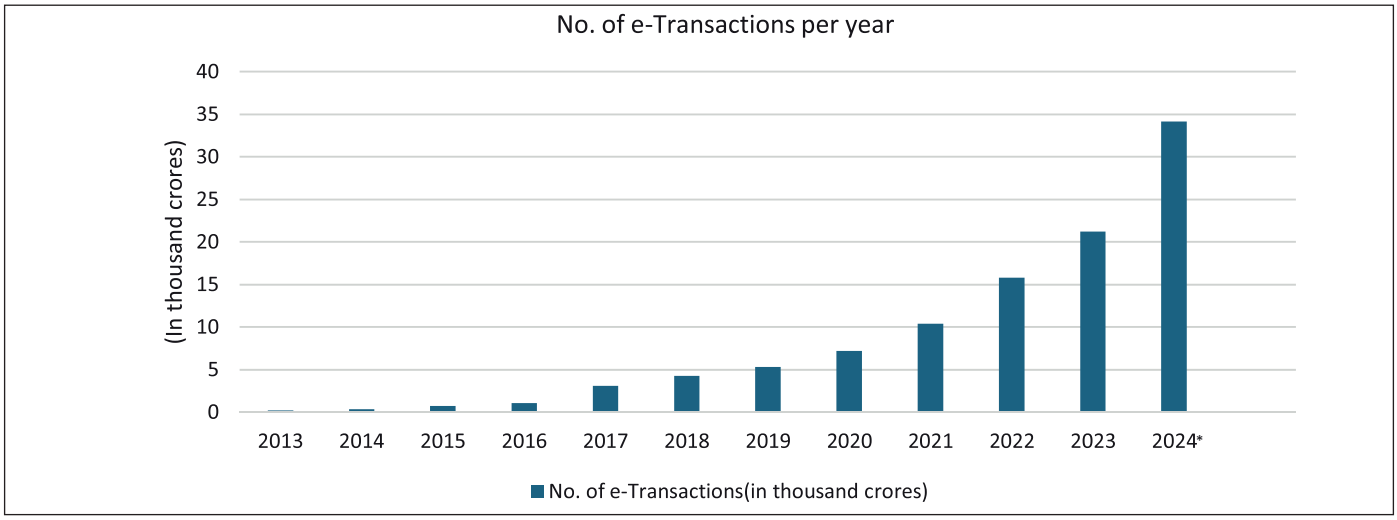
2.3.5 Electronic Transaction Aggregation and Analysis Layer 3.0 (eTaal 3.0)

As part of the Government of India's efforts to promote transparency, security and accountability across all aspects of governance, many Central and State Government Ministries, Departments and Organizations (MDOs) have adopted a digital-first approach by facilitating and recording eTransactions to enhance service delivery.

The eTaal portal (https://etaal.gov.in) was developed to provide a near real-time view of eServices, aggregating eTransaction counts from integrated applications via web API technology. Launched in April 2022, eTaal 3.0 aims to measure qualitative aspects of eService delivery, enabling performance comparisons across Central Ministries, States, Union Territories, and Smart Cities, down to the district level. It also incorporates AI-enabled chatbots, predictive analysis, and Business Intelligence (BI) dashboards for generating meaningful insights.

Achievements

- 4,381 eServices have been integrated since the launch of the eTaal portal.
- 1,623 eServices integrated with granularity up to district level.
- As total of 1,05,271 cr eTransactions have been recorded.
- Currently, a total of 93.33 cr eTransactions are being recorded on a daily basis.
- Users can access 15+ types of analytical reports on the eTaal 3.0 website.
- Qualified eServices on a 9-parameter Key Performing Indicator (KPI) framework. Each eService is evaluated and scored on parameters such as Use of Digital Signatures, ePayment integration, Implementation of Mobile Application, Local Language Interface, Application Security Audit, Accessibility etc.



**Records as of December 2024*

Benefits

The eTaal portal provides several key benefits for enhancing e-Governance services:

- Near Real-time Monitoring: Offers near real-time tracking of eTransactions, ensuring up-to-date data on service delivery.
- eService Transaction Benchmarking: Allows for qualitative and quantitative eService Transaction comparisons across Central Ministries, States and Union Territories.
- Transparency and Accountability: Aggregates data from multiple applications, promoting transparency in government services and consolidation of data in one single platform.
- Advanced Analytics: Features include AI-enabled chatbot, predictive analytics, and Business Intelligence (BI) dashboards for generating actionable insights.
- Comprehensive Reporting: Provides a unified view of all eServices and a variety of reports such as timeline analysis, transactions per 1000 population, State services reporting and more.

2.3.6 Vikaspedia 2.0

Vikaspedia an initiative by MeitY, aims to develop an AI augmented digital ecosystem that promotes the availability of e-information in regional languages to empower citizens and drive digital transformation. Its objective is to enhance the impact of ongoing government programmes by providing universally accessible digital information resources in Indian Languages. These resources are created and shared collaboratively by a dynamic, multi-stakeholder digital ecosystem, supported by technological advancements, capacity-building, and knowledge enablers.

The revamped technology framework of Vikaspedia (www.vikaspedia.in) has been rolled out. The framework is enabled with AI features such as Machine Assisted Translation (supporting 20 Indian languages), Automatic Speech Recognition (supporting 10 Indian languages), Vikaspedia AI that provides the facility to summarise content and assist content drafting, Optical Character Recognition, multilingual and voice enabled chatbot, context aware search, knowledge graphs, etc.

The vibrant community of Vikaspedia includes 2 lakh+ collaborators (individuals and institutions) offering about seven lakh knowledge resource covering key livelihood sectors such as agriculture and allied sectors, health and nutrition, energy and environment, education, social welfare, eGovernance, etc. 5 Master Trainers workshops were organized during the period. The portal records about 3 million hits.

2.3.7 Implementation of National Data Highway (NDH)/ API Setu

MeitY in 2015 had notified the 'Policy on Open Application Programming Interfaces (APIs)'. The policy intended to promote efficient sharing of data among data owners and inter-and-intra Governmental agencies to achieve the objective of interoperable systems in order to deliver services in an integrated manner. The key objective of this project is to facilitate implementation of Open API Policy and build open and interoperable digital platform to enable seamless service delivery across government. Under the project, a platform namely, 'API Setu' has been developed.

Achievements

- Number of published APIs: 6000+
- Number of publishers: 1700+
- Number of Consumers: 634+
- More than 312.01 crore transactions
- Key publishers: PAN, Driving License, Registration of Vehicles, COVID Vaccination Certificate, CBSE etc.
- Key consumers: eSanad, NABARD, Centre for e-Governance, Karnataka, Department of Higher Education, Haryana etc.

Notable use cases of the platform

- Paperless admission process such as University of Delhi uses API Setu to check the academic credentials of CBSE students applying to the University on real time basis.
- Karnataka State Police utilizes API Setu to check candidates' class X and XII marks while applying for a job. With this step, the overall recruitment period has been cut in half.

- e-Sanad is an application of Ministry of External Affairs used to verify the educational qualifications of students asking for admission to overseas universities. e-Sanad now has access to over 18 school boards via a single application. API Setu has removed the need for duplicate integrations with each board, saving a significant amount of money and effort.

Projections for January – March 2025 of API Setu

- Number of published APIs: 500
- Number of Consumers: 15
- More than 50 crore transactions.

2.3.8 Pragati VC 2.0

PRAGATI is a distinctive and interactive platform through which Hon'ble Prime Minister monitors the implementation of various government schemes, addresses grievances and monitors state and central projects and programs, by facilitating direct interacting with all stakeholders, including Secretaries to Government of India and Chief Secretaries of States, via videoconferencing on a unified platform. PRAGATI has effectively enhanced communication, significantly reducing inter-departmental gaps and expediting the implementation of projects and schemes. PRAGATI 2.0 was approved with an outlay of Rs. 47.09 cr for the 5 years.

Using the PRAGATI video conferencing infrastructure, Government of India has reviewed 348 (Central/ States) Projects worth around Rs 17.36 Lakhs crores, 59 programmers/Schemes of various Ministries/ Departments and 18 Sector Grievances. Hon'ble Prime Minister has chaired 44 PRAGATI videoconferencing sessions till date.

In addition to defined objectives, Hon'ble Prime Minister also used the PRAGATI videoconferencing infrastructure for various Inaugurations, Flagging off, Melas, Launches and international conferences. Hon'ble Prime Minister also used the PRAGATI videoconferencing infrastructure for various international events, including the Voice of Global South Summit (VoGSS) and the G20 Programme, launches of projects under bilateral agreements with many countries. NIC also participated in the G20 program, connecting over 20 Countries and Organizations through video conferencing.

2.3.9 myScheme

To meet Universal Transparent Tracking of Applications and Responses to Applications (UTTARA) project's objective of developing an online platform for schemes search and discovery, myScheme - a product for advanced and personalised search for eligible schemes was launched by Hon'ble PM on 4th July, 2022 during Digital India Week-2022 in Gandhinagar. The platform helps the citizens to find the right Government schemes for them. It also guides on how to apply for different Government schemes. The portal may be accessed at https://www.myscheme.gov.in/ and mobile App may be downloaded from https://play.google.com/store/apps/details?id=in.gov.negd.myscheme.

Features available for Beneficiaries:

- User Sign-in & Sign-up via MeriPehchaan, DigiLocker.
- Personalized Search allows users to Search and Discover schemes using their demographic details.
- Check Eligibility Questionnaire allows users to check their eligibility for a particular scheme by answering a set of simple Yes/No type scheme-specific questions.
- Easily apply for multiple schemes and fetch verified documents from DigiLocker.
- Transparent tracking of applied applications through the profile section.
- Bookmark favourite schemes for quick access to apply later.
- Save profiles of self or relatives which will ease the search process.
- Stay in the know with real-time updates.

- Get Central ministry-wise and State government-wise scheme count.
- Real-time Notifications service to send real-time updates via email and in-app notifications.

Features available for Government Officials

- GovForms allows departments to create forms using DigiLocker integrated application to minimize the need for manual & repetitive verification of documents.
- User management – role-based permissions/rights to the officials of the respective departments may be granted.
- Application/response management- Officials can manage scheme-wise application forms and assign officials to receive them.
- Provision to add scheme-wise news and updates.
- User Sign-in & Sign-up via MeriPehchaan.
- Authorities can modify the status of received applications, thereby improving the transparent tracking of these applications.
- Real-time Notifications service to send real-time updates via email and in-app notifications.

Achievements: So far, there are a total of 2,646 schemes published, out of which Central government schemes are 522 whereas State/UT government schemes are 2,124. There are approximately 2,300+ schemes of which the Check Eligibility Questionnaire is updated on the mySchemе platform.

2.3.10 eGOVMMCASES

Development of Multimedia Cases with teaching notes on e-Governance Initiatives of Government of India:

Case-based learning is an established approach used across disciplines where students apply their knowledge to real-world scenarios, promoting higher levels of cognition. Accordingly, this project has been initiated wherein the key is to develop 20 multimedia cases on different e-governance initiatives of Government of India by providing a comprehensive summary of the project's background and its current status & make it available on a web-based platform. Out of these 20 cases, at least 8 cases would be targeted to publish at Harvard Business Publishing.

- Drafting and Peer review of all 21 cases completed.
- Six cases (Passport Seva, GeM, eSign, eNAM, BHIM, and API Setu) have been submitted to HBSP for review. Based on the review, the next set of cases is to be submitted.
- Four cases, along with teaching notes (Digital India, Parivahan, Jeevan Pramaan, and Income Tax Portal), were presented at the XIX International Conference on Public Policy & Management at IIM Bangalore on 27 to 29 August 2024.
- The Aadhaar case was presented at the Higher Education Planning in Asia Forum 2024, hosted by the University of Auckland on April 10th and 11th, 2024. It was part of discussions on the strategic integration of Aadhaar, DigiLocker, and ABC.

2.3.11 To set-up India Enterprise Architecture (IndEA) at NeGD

In order to facilitate better governance to citizens and enable whole-of-government approach, policy integration and use of big data analytics is required. These trends require breaking of sectoral barriers and silos and re-architecting the Government as a single enterprise. Keeping in view the above facts, MeitY formulated India Enterprise Architecture (IndEA) Framework along with its Adoption Guide. The vision of IndEA is "to establish best-in-class architectural governance, processes and practices with optimal utilization of ICT infrastructure and applications to offer ONE Government experience to the citizens and businesses".

For pilot implementation of IndEA, a project titled 'To set-up India Enterprise Architecture (IndEA) Division at NeGD' was initiated with the target to support two central Ministries/ Departments and 2 States/UTs have been targeted. Major objective of the project is to raise maturity of existing e-Services to Level IV i.e. Connected Services (reference to United Nations e-Service Maturity Model), simplify processes, enhance enterprise security, make use of latest technology, facilitate information-based decision making while driving efficiency, cost benefits, sharing and reuse. Role of MeitY is to provide technical and advisory support and concerned Ministry/ State would be the owner of their respective platform.

Some of the major achievements are as follows:

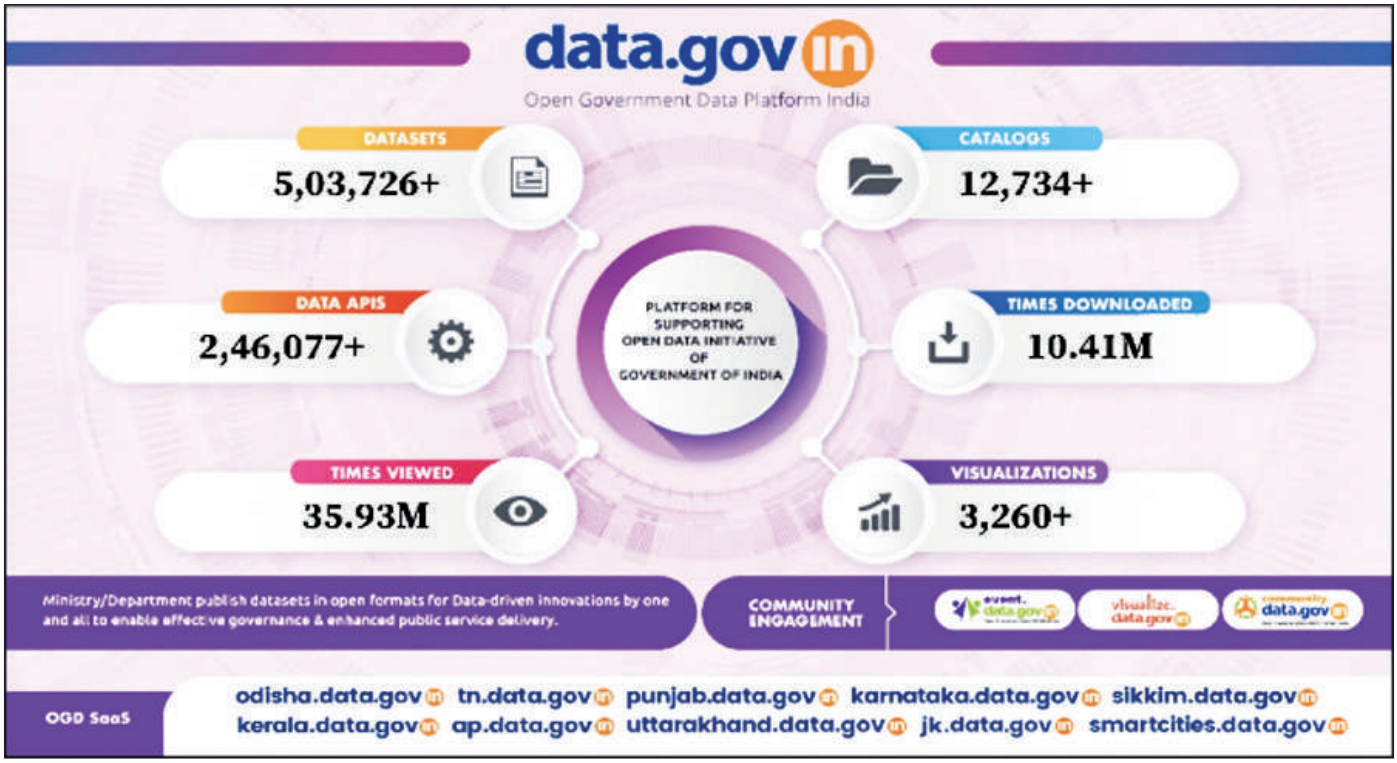
1. **Meghalaya Enterprise Architecture (MeghEA)–** Based on IndEA the blueprinting exercise for the State of Meghalaya was done. 4 State level sensitization workshop and 36 district level sensitization workshops and Finance Solution Architecture trainings have been completed. Meghalya State unit launched Phase I of the Solution Architecture Blueprint for the Finance Department. E-Proposal System (Managing all schemes and planning– Admin Approval, Sanction, etc). The Meghalaya government key initiative of e-proposal system, part of Meghalaya Enterprise Architect has won a coveted UN Award- World Summit on the Information Society Forum (WSIS) prize at Geneva in Switzerland.
2. State of Jharkhand has worked out InDEA based architecture for Universities (UEAF).
3. 14 State level workshops and one regional workshop especially designed for all North Eastern States have been organised.
4. **Ayushman Bharat Digital Mission (ABDM)–** MeitY/NeGD provided technical support to Ministry of Health and Family Welfare in the preparation of National Digital Health Blueprint and in onboarding of PMU team. It has enrolled 67+ Crore beneficiaries through ABHA and 43 crore ABHA linked electronic health records have been created.
5. **National Digital Education Architecture (NDEAR) for DoSEL and DoHE –** NDEAR blueprint document has been prepared by Ministry of Education with the support from NeGD, MeitY and it has been launched by the Hon'ble PM. It has resulted in creation of lifelong student ID called APAAR. 34 crore APAAR ID has been registered.
6. **AgriStack and India Digital Ecosystem for Agriculture (IDEA) –** The blueprint document on IDEA has been prepared with support from NeGD, MeitY and it has been launched by the Union Minister of Agriculture. It has resulted into the design and development of AgriStack, which is in rollout stage.
7. **National Urban Digital Mission –** The National Urban Innovation Stack has been prepared & resultant mission with key building blocks (IUDX, CGHS) has been launched. Feedback regarding standards is being provided.
8. **National Digital Tourism Mission –** The support to formulation of National Tourism Policy based on IndEA was provided and also, RFP support for PMU was provided.
9. Poshan Tracker for M/o Women and Child Development has been designed and rolled out. It has been integrated with applications of M/o Health and Family Welfare.

2.3.12 OGD 2.0 (Open Government Data 2.0: Micro Service Based Architecture Leveraging Cloud Technology)

MeitY under the aegis of National Data Sharing and Accessibility Policy (NDSAP) initiated Open Government Data (OGD) Platform India, to share government data with its citizens. The Platform has been set-up and managed by the National Informatics Centre (NIC).

OGD 2.0 - Micro Services Based Architecture Leveraging Cloud Technology has been initiated from May 2020. The Platform provides Government to Government (G2G) service by allowing Ministries/Departments/ States/ Organizations to publish and manage their datasets on the Platform through a Chief Data Officer (CDO). The datasets are available to all free of cost.

As of 9th October, 2024 OGD India has 5,03,726 dataset/ resources, 12,734 catalogs, 3,260 Visualizations created, and 2,46,077 Application Programming Interfaces (APIs) created. OGD India has 35.93 million times viewed and 10.41 million times datasets have been downloaded (as shown in fig.) All these datasets are updated with their respective granularity. Some of them are being updated multiple times during a day (real-time) e.g., Real time Air Quality Index (AQI), eShram, PINCODE, Rainfall, Patent, Kisan Call Center, Current Daily Price of Various Commodities from Various Markets (Mandi), etc. Many training sessions were organized for CDOs/Data Contributors.



**Records as of September 2024*

Launched DARPG and GSTN Hackathon on https://event.data.gov.in platform: The purpose of the hackathons is to engage Indian students, researchers, and innovators in developing advanced, data-driven AI and ML solutions based on given dataset.

Organized Stakeholders' meet for Government Data Ecosystem: The event brought together a diverse spectrum of stakeholders, including government officials, data scientists, researchers, policymakers, industry experts, journalists, and civil society representatives, to foster collaboration within the open government data ecosystem. The workshop is aimed to facilitate a comprehensive exchange of perspectives, challenges, and opportunities related to open data.

2.3.13 e-Governance Standards and Guidelines

MeitY had set-up an institutional mechanism under Digital India to evolve/adopt standards in e-Governance under the project titled 'e-Governance Standards and Guidelines'. Key objective of this project is to develop/adopt ICT standards/guidelines/frameworks for effective and efficient implementation of e-Governance projects. This will ensure sharing of information and seamless interoperability of data across e-Governance applications

C-DAC, Pune and Standardisation Testing and Quality Certification (STQC) Directorate have been entrusted to develop/review ICT standards, guidelines and/or frameworks for e-Governance projects along with proliferation of MeitY notified standards and guidelines so far.

Achievements

- 3rd brainstorming session was conducted to finalize the topics for formulation of standards, guidelines or frameworks under the chairmanship of, Joint Secretary, MeitY on June 12, 2024 where following topics were finalised:
    - Governance, Risk & Compliance Management
    - Enterprise Risk Management
    - Microservices
    - Sandbox Testing
    - Two Factor or Multi Factor Authentication

- Digital Preservation guidelines (revision) and
- Interoperability Framework for e-Governance (revision)

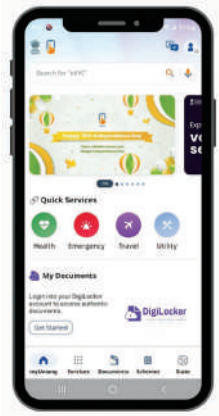
- Various Working Groups were constituted during the period for the formulation of guidelines. The draft guidelines documents on 2nd year topics namely Cloud Interoperability & Portability, Enterprise Architecture Security and MDDS-Education were reviewed by the Closed Group and submitted for further process, while the guidelines documents on Mobile Security, Zero Trust Architecture and IoT Security were revised during the period.
- 05 (two days) physical– State level Awareness workshops were conducted to facilitate the proliferation, understanding and awareness of MeitY notified standards, guidelines, frameworks and technologies.

Projections for January – March 2025:

- Two draft documents namely (i) MDDS-Agriculture and (ii) OLES shall be submitted to MeitY for further process.
- A total of 03 (three) physical State-Level Awareness Workshop & CBT on e-Governance Standards & Guidelines shall be conducted.

2.3.14 Unified Mobile Application for New-Age Governance (UMANG)

Launched by Hon'ble Prime Minister on 23rd November 2017, UMANG has been conceptualized by the Government of India with an objective to improve ease-of-living by putting the power in the hands of citizens for availing major government services anytime, anywhere with just few clicks on a single unified mobile application integrated with DigiLocker, mySchemе, NSSO, etc. It enables the citizens of India to access e-Government services of various sectors such as Agriculture, Education, Health, Housing, Employees, Pensioners, Students, Ration Card, Railways, and many more services from the Central and State Governments.



Achievements

- UMANG is available in 23 multi-lingual languages (for top 100 services), including English & Hindi and has been hosted on cloud. UMANG aims to bring power to the fingertips of citizens.
- Till 31st December 2024, UMANG has about 2101 – Central and State Govt. services (including 864 DBT services) from 207 departments of Central and State Government of 32 States/UTs and many more are continuously being on-boarded. It is projected to increase by 40 services by March, 2025.
- Over 7.34 Crore users are registered and benefiting from services on UMANG.
- Revamp of UMANG Android and iOS app was launched with a new UI/UX providing more personalized and secure experience. UMANG has been successfully integrated with DigiLocker and now the users of DigiLocker can seamlessly access the services of UMANG.
- UMANG app is now more secure with biometric (fingerprint) authentication. Voice-based search was implemented to enhance the user experience.
- OTP based login in EPFO service has been removed to make seamless login for the user which will also reduce cost for the project. Now users having same registered mobile number in UMANG and EPFO can login directly.
- UMANG app services are also made available in assisted mode through Common Service Centres (CSCs) and 15 private partners to extend the reach to the users.

2.3.15 A Virtual Reality-Based Assistive System for Learning and Assessment of Persons with Intellectual Disabilities

This project is to integrate various curricula across the country in the area of intellectual disability to identify the list of the subjects, concepts, and topics to be taught at the various degrees of severity for the holistic development of persons with intellectual disabilities. Under the project, a web/mobile based system and content/topics will be developed along with trainings at different levels across India.

Objectives:

i. To identify the list of the subjects, concepts, and topics to be taught for the holistic development of persons with intellectual disabilities.

ii. To develop a comprehensive framework that makes the assessment, learning, and evaluation processes more accessible and effective.

iii. To design and produce inclusive content that caters to different age groups of individuals with intellectual disabilities,

iv. To conduct pilot studies and to expand system deployment across the Indian landscape.

Achievements:

- Topic/Sub-Topics Identification and Validation: 200 Topics have been identified and validated and are now ready for scripting and video production. Around 200 topics have been identified and validated under the 'Activities of Daily Living' and the 'Domestic' domains.
- No. of Videos prepared: 20 High-quality videos have been prepared, following the appropriate teaching strategy for each ID person. Each video is 10-17 minutes long. The topics for the videos include brushing teeth, washing and wiping hands, wearing clothes,
- No. of AR/VR content: 10 Self-help AR/VR content has been created. AR content can be played on mobile phones, tablets, laptops, and PCs, while VR content is compatible with VR headsets. AR simulations for topics such as purchasing goods, setting the dining table, etc., have been made. VR content has been developed for topics such as identifying animals in the jungle, traffic lights, and finding the washroom. 3D games such as Dressing Adventure have been developed.
- No. of Schools visited: 50 special schools have been visited for their registration and to gather feedback on the content being developed. States such as Uttarakhand, Jammu & Kashmir, Himachal Pradesh, Uttar Pradesh and Tamil Nadu have been visited for collaboration with schools.
- Number of workshops/brainstorming sessions/ meetings: 44 Workshops with various stakeholders, such as special educators and experts, have been conducted to brainstorm ideas for content development and ideation of the portal. The project idea was presented at a National Parents meeting at NIEPID, at which many parents appreciated the initiative and were ready to support the cause.
- As a result of these workshops and ideation sessions, a QA process has been formulated and validated for content development, which begins at Topic Selection and proceeds till media development; the Media Experts finally sign off the developed content.

Projections for January – March 2025:

- Number of 2D Animation-Based Videos (each covering 25 topics/sub-topics) will be 50;
- the number of AR/VR-Based Content (each covering 25 topics/sub-topics)will be 10 and lastly the Sensor-Based Games (each covering 25 topics/sub-topics)will be 4

2.3.16 iMedDesk - AI Assisted Medical Services Framework by C-DAC Noida

In order to make healthcare services accessible to the masses, it is essential to provide easy-to-use interfaces to end users (doctors and patients) to be able to effortlessly use the system. iMedDesk - AI Assisted Healthcare Services Framework aims to develop a mechanism for helping patients seeking information regarding medical or healthcare services at hospitals and aiding doctors to enable them to cater a greater volume of patients in healthcare.

Achievements

- Core modules of the system like Natural Language Understanding, Query Parsing, SQL query generation and Query execution has been successfully completed and tested.
- Speech recognition, Speech synthesis for English and Hindi languages and bi-directional machine translation services for English to Hindi have been customized and fine-tuned.

- Patient enquiries Chabot is integrated in AIIMS Gorakhpur App for both English and Hindi languages. Real patient queries are being collected and logged, with continuous monitoring in place to evolve the system further. App can be downloaded from Google Play store.
- iMedDesk as service has been built for Sarvodaya Hospital and is in testing phase.
- Design and development of Doctor Desk which includes investigation, encounter, diagnosis and medication module have been completed. Latest Gen-AI is being experimented for answer generation.
- Development of a voice-based IPD discharge summary preparation system is currently in progress, featuring dictation capabilities for creating summaries. It also includes speech synthesis for reviewing the summaries, highlighting of SNOMED-CT terms for standardization, and expanding medical acronyms to provide more descriptive content.

2.3.17 CollabFiles (https://collabfiles.nic.in)

The objective of the project was to provide a centralized platform for Government officials and employees to create and manage office documentation such as documents, spreadsheets etc. and to facilitate portability of documents in standard formats such as xml, txt, docx, xlsx, odt etc, Logs for sharing of documents.

Approved on : 30th December, 2022 for 3 years

Outlay: Rs. 11.687 Cr

Achievements:

As on December 2024, there are 31,000+ users, working on 43,000+ files. 120+ Department including major ministries / departments are Department of Telecom, Census of India, Railway Board, Director General Defence Estates, Enforcement Directorate, Ministry of Home Affairs, Delhi Metro Rail Corporation, National Institute of Rural Development, Directorate of Mines & Geology, Govt of Telangana, Central Power Research Institute, NIC etc are using the project.

2.3.18 GovDrive – Storage as a Service (https://drive.gov.in)

The objective of the project was to provide Storage as a Service for the Government of India via cloud-based multi-tenant platform to Government officials for sharing documents. The project aims to deploy a service that includes user agents for all devices and will enable Government officials to store, share, access, delete and /or modify the documents /files /folders online.

Approved on : 6th January, 2023 for 3 years

Outlay: Rs. 55.91 Cr

Achievements:

As on December 2024, the platform is running to store documents and/or folders securely for current user base of 10 lakhs catering functionalities like uploading/ downloading single and multiple files/directories. creating/sharing/moving/copying/replacing folder/ directory, deleting/restoring files/folders, external platform integration with CollabFiles and ZoHo, edit/rename file/ folder, mark file/folder as favorite, comprehensive search of files/folders/emails and mail preview.

2.3.19 Kisan Sarathi 2.0: Enhancement, Operations Maintenance and Support

The objective of the project is to provide multi lingual support to farmers in seeking the advisories in the domains of agriculture, horticulture, fishery and animal husbandry directly from the Agricultural Scientists. Kisan Sarathi 2.0 an integrated national ICT platform will be built to cater agriculture extension related activities and services. The platform would also provide seamless, multi-channel (audio-video consultation, App, IVR, Chatbot, Web Portal, Whatsapp, email, etc.) support to farmers to connect with the knowledge base & pool of large number of the subject matter experts spread across all 740+ KVKs/DAATTC and 100+ ICAR institutions in all the States and UTs. Development/Customization of multi-lingual, multi-media ICT platform for supporting multi-ways communications among farmers, researchers, extension personnel etc. Development of Agriculture Advisory Management System (AAMS) to support the Agricultural Experts and ultimately farmers and integration with Kisan Sarathi 2.0.

Establishment of a framework for seem less operation and maintenance

Approved on: 22nd Feb, 2024 for 3 years

Outlay: Rs 29.76 Crore (MeitY contribution to DIC- Rs. 9.92 crore and ICAR contribution- Rs. 19.84 crore)

Achievements:

- Developed Farmer Mobile App (through UMANG), and pilot testing is in progress.
- 2.48+ Crore Farmer registered onto Kisan Sarathi Portal
- 740+ KVKs and DAATTC on boarded onto Kisan Sarathi Portal
- 3054+ Experts registered.

2.3.20 Design and Development of School Management System, office ERP and Integrated Content Management Portal for Eklavya Model Residential Schools under the National Education Society for Tribal Students (NESTS)

Eklavya Schools setup by National Education Society for Tribal Students (NESTS) are model residential schools that are spread all over the country with the aim to provide quality modern education to the talented tribal children. This project envisages to computerise/automate its manual system of processes. The main objectives are as follows:

(I) Development and Implementation of following for the 405 operational Eklavya Schools, 28 state societies and 1 Head Quarter.

- (a) School Management System,
- (b) Hostel & Mess Management System,
- (c) Office ERP, Payroll, and
- (d) Integrated Content Management Portal

(II) Development of Mobile App

(III) Roll-out of the developed system in the schools and its support & maintenance.

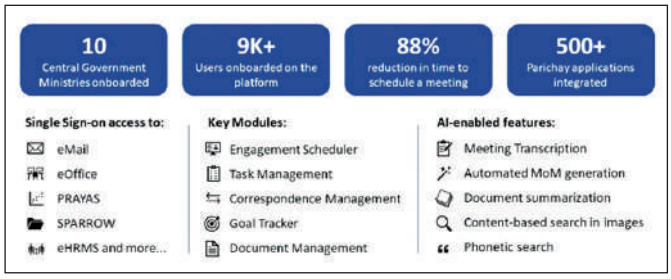
This is new project to be implemented jointly by CDAC, Noida & NESTS approved on 22.10.2024 with a total budget outlay of Rs. 1,156.63 lakh for a duration of 36 months.

2.3.21 Gov.in Secure Intranet Portal

A state of the art platform 'Gov.in Secure Intranet' has been developed by National Informatics Centre (NIC) under the guidance of Ministry of Electronics and Information Technology (MeitY) to streamline the day to day operations of Government officials. This platform offers a unified Single Sign On (SSO) through Parichay, providing access to various Government-to-Employee (G2E) applications such as eMail, eOffice, Sparrow, Prayas and others.

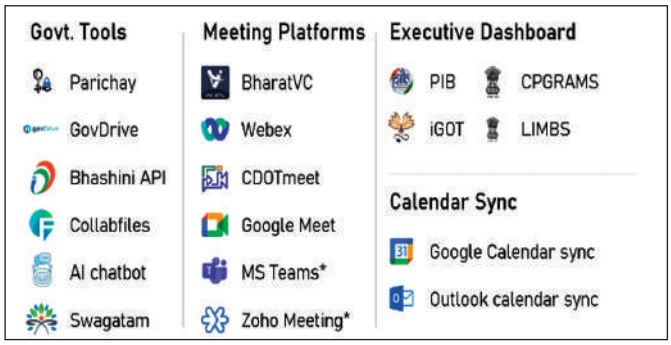
The platform, designed with advanced UI/UX principles inspired by global best practices, facilitates efficient Calendar Management, Task Tracking, Goal Tracking and more, accessible through both desktop or mobile application. Its meeting scheduling tools, integrated with platforms such as Swagatam and BharatVC automate visitor pass issuance and offer virtual meeting options, significantly enhancing productivity.

Executive Dashboard provides bird eye view to senior officers about the status of grievances, court cases, VIP references, Media coverage, RTI Application etc. pertaining to respective Ministry.



**Records as of September 2024*

API Integrations



**Integration in Process*

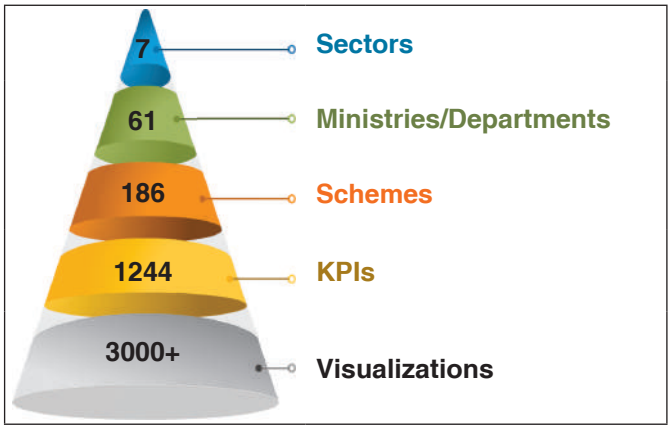
2.3.22 Prayas 2.0

1. **PRAYAS–** "Dashboard of Dashboards" (https://prayas.nic.in) pursuing excellence in governance has been developed under the direction of the PMO with collaborative efforts of Data Analytics Informatics Division, NIC and Centre of Excellence for Data Analytics (CEDA), NICSI to present a comprehensive and consolidated view of schemes of various Ministries/Departments in one single platform for improved monitoring and decision-making.
2. This platform offers interactive visualizations, robust analytics, and actionable insights to support data-driven governance, ensuring alignment between policy making and program implementation. Prayas integrates data electronically via APIs directly from the MIS/IT systems of the concerned Ministries and Departments. The platform was demonstrated to the Hon'ble Prime Minister on September 4, 2020, and subsequently to all Union Cabinet Ministers and Ministers of State during October-November 2021.

Key Features –

i. Unified platform with a comprehensive view of schemes across Ministries and sectors
ii. Create and save custom reports by selecting specific parameters and saving them as favorites
iii. API integration for electronic data collection from Ministry/Department MIS systems
iv. Integration of DGQI scores for schemes by NITI Aayog.
v. Role based Access to schemes and KPIs for Hon'ble Ministers and Secretary-level officers.

Key Achievements –



2.4 Digital Empowerment

2.4.1 Collaboration Application Development Platform by opening the Source Code of Government Applications (Open Forge)

OpenForge (https://openforge.gov.in) is a collaboration platform similar to Github that provides industry standard tools and features for version control, release management, code repository, requirements/bugs trackers and document repository. It is the Government of India's platform for the open collaborative development of e-Governance applications. This platform provides strategic control to government departments over their software source code. In 2015, MeitY rolled out the "Policy on Collaborative Application Development by Opening the source code of Government Applications" which provides a framework for archiving government custom-developed source code in repositories and opening these repositories for promoting reuse, sharing and remixing.

Project Objectives:

- Provide a platform for maintaining code repositories and version control for government source code.
- Promote a culture of open collaborative application development between public agencies and private organizations, citizens and institutions.
- Reduce development cycles and fasten the rollout of e-governance applications in the country.
- Deliver e-governance services and solutions of higher quality and security through increased transparency and mass peer review.
- Reduce e-governance project cost and bring down total cost of ownership through a system of reuse, remixing and sharing.

Achievements:

- Currently, OpenForge has 14,164 registered users.
- So far, 3,083 projects have been onboarded.
- Till now 8,35,851 GIT push has been made.
- Many projects of national importance such as CoWIN, Poshan Tracker, GeM, UMANG, DigiLocker, Smart City, API Setu, iGOT Karamyogi,

Ayushman Bharat CPHC-NCD, etc are on this platform for day-to-day development activities.

- 410 NIC users are onboarded on OpenForge platform and a total of 200+ NIC projects registered.
- Source code of some projects such as Smart City, Digilocker issuer App, Aarogya Setu etc made public

2.4.2 National Knowledge Network (NKN)

NKN is an innovative, cutting-edge, robust, and secured network, which provides a centralized multi-gigabit high-speed digital connectivity backbone for research & educational institutions and Government Organisations spread across India.

NKN was approved in March 2010 by Cabinet Committee of Infrastructure (CCI) to be implemented by National Informatics Centre (NIC) over a period of 10 years at a total outlay of Rs. 5,990 Crore, which has been enhanced to Rs. 6956.88 Crore. Subsequently, duration of NKN has been extended year-on-year with the current extension being till 31st March 2025. The approval for the next phase of NKN [i.e. National Knowledge Network Phase II] is under process. NKN has been playing a vital role in enhancing digital capabilities and implementing the digital initiatives of the Government of India. NKN addressed the challenging task of providing a robust, and secured network which enabled the government to implement Government to Government (G2G) and Government to Citizen (G2C) services seamlessly and in time bound manner for implementing the services.

NKN is the only network globally, that carries R&E, Internet, and e-Governance traffic as three independent verticals under one umbrella.

NKN Status: National Reach (as on December 2024)

- Under NKN, 1,808 links have been extended to institutions, comprising almost all the major IITs, Central Universities, State Universities, NITs, IIITs, IIMs, hospitals in tertiary care such as AIIMS, PGIs, State Government hospitals, national laboratories under DAE & DST, DRDO, MHRD, ICAR, ICMR and a host of other government institutions / departments.
- The outreach includes 639 district links under NKN covering 534 districts across India
- Today NKN has 31 Points of Presence (PoPs) in various State Capitals (including 7 Super Core PoPs).
- The network strength of NKN comprises of high speed (10G) core backbone with uniformly spread 96 core links across the country comprising of 88 core links with 10G bandwidth, 7 core links with 2.5G bandwidth and 1 core link with 1G bandwidth.
- In its progressive outreach, NKN has provided 10G bandwidth to 81 Edge links covering 61 Institutes, 1G bandwidth to 1,007 Edge links covering 982 Institutes and 100M bandwidth to 751 Edge links covering 750 Institutes.
- The network has a peak traffic flow of 23 Petabytes and average traffic flow of 1.9 Tera Bytes in a day.

NKN Status: International Reach

- NKN has been significantly expanding its global reach by establishing 3 International PoPs at Singapore, Amsterdam, and Geneva (CERN).
- For increasing its Global outreach, NKN has peered with other National Research and Education Networks (NRENs) such as Asi@connect in Asia Pacific, CERN and GEANT in Europe, SingAREN in Singapore, Internet2 in USA, LEARN in Sri Lanka, BdREN in Bangladesh, DrukREN in Bhutan and NORDUnet for Nordic countries.
- NKN has established direct links with Singapore (1×10 Gbps), Netherlands-Amsterdam (2×10 Gbps), Switzerland-Geneva (2×10 Gbps), Bangladesh (1×1 Gbps), Bhutan (1×5 Gbps), Sri Lanka (1×1 Gbps) and Maldives (1×1 Gbps).
- As per the vision of Hon'ble Prime Minister of India, to bolster sub-regional collaboration among SAARC and BIMSTEC countries, NKN has already expanded its connectivity to Bangladesh, Bhutan, Sri Lanka, and Maldives.

2.4.3 Integrated Citizen Engagement Platform (INCEP)/MyGov

MyGov is a Government of India's Citizen Engagement Platform which collaborates with multiple Government bodies/ Ministries to engage people in policy formulation and seeks the opinion of people on issues/ topics of public interest and welfare.

Approved on : 1st July, 2021 for 5 years i.e. till 30th June 2026

Outlay: Rs. 245.7 Cr

Achievements:

Since inception in 2014, MyGov has engaged 4.85 cr.+ citizens in participative governance as MyGov Sathis and from July 2021, InCEP came into force and till 31 December 2024 it has achieved over 2.48+ Crore user registration, currently average growth of 40,000 registration per day, 589 tasks with over 6.14 lakhs submissions, 129 discussions hosted with 7.27 lakh submissions, 909 quizzes having 206.55 Lakh participations, 43 polls and surveys receiving 181.2 lakh votes and 101 innovate activities with 151.58 lakh submissions.

2.4.4 Digital India Common Services Centre

Setting-up of 4,740 CSCs, with enhanced scope and facilities, at the Gram Panchayat / Village level, has been envisaged under the subject project proposal, to cover 10 districts viz Gandhinagar, Chamba, Puducherry, Chhatrapati Sambhaji Nagar (Aurangabad), Mamit, Jodhpur, Khammam, Pilibhit, Gorakhpur, Leh (Ladakh).

Under the project, these 4,740 CSCs will be upgraded with new common national branding without any other private branding. New service applications will be developed as and when required by the State Government / Union Government. Further, Information, Education and Communication (IEC) would be provisioned under the project to spread awareness about the Government schemes / services etc.

This is new project being implemented by CSC e-Governance Services India Limited approved on 27.09.2024 with a total budget outlay of Rs. 3160.88 Lakh for a duration of 6 months plus extendable by 3 months

2.4.5 Digital India Bhashini

The Ministry of Electronics and Information Technology (MeitY), has formulated the National Language Translation Mission (NLTM), namely, Mission BHASHINI [BHASHa INterface for India] to transcend the language barrier for digital access.

The National Language Translation Mission has started in March 2022 as a three-year mission with the vision of harnessing natural language technologies to create a diverse ecosystem of contributors, partnering entities and citizens for the purpose of transcending language barriers, thereby ensuring digital inclusion and digital empowerment in an AatmaNirbhar Bharat.

To this end, the Mission aims to develop a public digital platform for enabling an easy and responsive ecosystem for translation among various Indian languages and English using Artificial Intelligence (AI) and Natural Language Processing (NLP). The platform will bring together multiple efforts towards Indic Language Technologies to build an Indian Language Technologies Ecosystem for Speech to Speech Machine Translation and evolve a Unified Language Interface (ULI) of Indian Languages.

In line with the above aim, the said public digital platform on Indian language technologies viz. Bhashini has recently gone live on https://bhashini.gov.in, following launch of the Mission as 'Digital India Bhashini on 4.7.2022 by Hon'ble Prime Minister.

The Bhashini platform currently offers more than 350 functional artificial intelligence (AI) models in 11 Indian languages and English for various purposes, such as text-to-text translation, speech-to-text conversion, text-to-speech conversion, transliteration and optical character recognition. The said models are available as an open source repository, along with open Application Programming Interfaces (APIs).

Deployment of language technology using AI models will entail creation of solutions using these models to enable various services as well as customisation for specific applications.

Further, the technology will generate machine translation output which will also require human curation for many

purposes, for which both technological capabilities and implementation capacities will have to be augmented across the mission. The Mission, therefore, also aims to create and nurture an ecosystem involving startups and government agencies working together to develop and deploy innovative products and services in Indian languages. Currently, Mission Bhashini has onboarded more than 60 academic institutions/universities as partners for research and development activities.

Mission Bhashini aims to make the lives of Indian citizens better by connecting them to the Digital Initiatives of the country in their own language. The Bhashini Platform is interoperable and will catalyze the entire Digital Ecosystem thus enhancing the outreach of e-gov services. It is a giant step to realize our goal of Digital Government.

To attain the desired outcomes, Mission Bhashini would engage all stakeholders in the ecosystem, especially State Governments and their agencies, Citizens, Startups, Industry, Academia, Civil Society, Publishers, On-line Media Companies, Industry Associations, and MSMEs. Thus, it is a pioneering Pan-India effort to unify the Nation by connecting people across India, bridging the linguistic barriers.

To achieve the vision of maximizing Digital Technology for societal benefit, this mission aims to deliver innovative solutions for realizing the dream of Digitally Inclusive India.

A close collaboration with the State Government(s) has been conceptualized in the form of State Language Missions that are a critical pillar of the Mission. The State Language Mission will drive various State specific language(s) initiatives and programmes, including crowdsourcing, startup engagement via challenge rounds and hackathons in partnership with the nodal institution(s)/ universities nominated by State Governments, development of local language technology ecosystem including local media and publishers and State-Specific instances on Bhashini Platform, wherein language-specific tools and technologies will be made available for further use for all, including State Governments and their agencies.

Development and improvement of AI models is directly related to the size and quality of the available datasets of speech, text etc. in the language concerned. To give an impetus for rapid and sustained growth of Indian language datasets for the creation of better-performing models, a crowdsourcing initiative has also been launched simultaneously through BhashaDaan portal on Bhashini platform (https://bhashini.gov.in/bhashadaan) for public participation, wherein citizens can contribute their speech and text data for the Indian language(s) in order to enhance the accuracy of AI translation models for Indian languages. Mission Bhashini will enable massive citizen engagement, evoking the spirit of volunteering in the people of India to build this data for their own language through crowdsourcing initiative “Bhasha Daan”.

Achievements:

1. Department of Administrative Reforms and Public Grievances (DARPG) for Centralized Public Grievance Redress and Monitoring System (CPGRAM) : For translating the regional language based grievance into the concerned officer’s specific language and then making the official reply available in the regional language.
2. Department of Health- e-Sanjeevani: To enable Speech to Speech translation between the Doctor and Patients using the BHASHINI’s ULCA Models.
3. NeGD- UMANG: Enabling the Chatbot service in different Indian Languages
4. NeGD - APISetu: For listing ULCA APIs on the APISetu platform for wider visibility of the Indic Language based models.
5. National Payments Corporation of India (NPCI)-Gas Booking: Making Phone based Gas booking system more intelligent, by automatically understanding the user’s speech using the BHASHINI’s ULCA Models and then processing the booking.

The transformative impact of the mission will be that the citizens of the country will be able to access various content and services (both government and private) in their own language. Some of the examples of the same include,

- Ability to access educational and news content in their own language
- Ability to do financial transactions in their own language
- Ability to access government services and policies in their own language.

1. An Independent Business Division (IBD), Digital India Bhashini Division (DIBD) has also been set up under Digital India Corporation (DIC) to anchor the Mission Bhashini activities and to nurture the language technology ecosystem especially involving startups.

2. Crowd Sourcing Of Large Speech Data Sets to Enable Indian Language Speech – Speech Solutions (NLTM Pilot Project)

The recent advancements in the field of deep learning have allowed us to build speech-based solutions which are robust to language, speaker, and environmental variations. However, building good-quality speech systems is still a challenging task. One of the primitive blocks in building speech-based products is the Automatic Speech Recognition (ASR) system. To build an ASR system, it is needed to have a database that covers large amounts of training data from different speakers, different environments, and high-end computational resources. Over the last decade, there have been many attempts to create corpora for English speech recognition tasks from academia and industry. The performance of a speech recognition system mainly depends on the quality and size of the training corpora. It is observed that the amount of data available for languages like English is in the magnitude of a hundred thousand hours. Due to this, some of the studies claim that English ASR for a generic domain has achieved human parity (4%).

However, India is a land of language diversity, wherein it has around 1500 languages being spoken as a medium of communication. Out of which, 22 languages are recognized as scheduled languages by the Government of India. According to a recent census, 30 Indian languages have more than a million speakers. Among those languages, except for Hindi, all others are considered to be low-resourced. Due to the lack of a large, annotated speech corpus, many low-resource Indian languages struggle to utilize recent advancements in deep neural network architectures for Automatic Speech Recognition (ASR) tasks. Collecting large-scale databases is an expensive and time-consuming task. Current approaches lack extensive traditional expert-based data acquisition guidelines as they are tedious and complex. International Institute of Information Technology (IIIT) -Hyderabad has collected a Telugu speech corpus through a crowd-sourcing approach through a project funded by MeitY. The main objective was to mitigate the low-resource problem for the Telugu language and open source the database for Indian startups and research purposes. As a part of this project, IIIT Hyderabad has built its own crowd-sourcing pipeline by incorporating certain protocols while collecting the database. By using this approach, IIIT Hyderabad has collected 2000.8 hours of transcribed data covering different regional variations of the Telugu language in three different speaking styles i.e., read, conversational and spontaneous on different topics like politics, sports, arts, science, etc. On this database, a challenge is running on building an automatic speech recognition system.

3. Enriching Telugu Language Wikipedia and other Indian Languages:

In Enriching Telugu Language Wikipedia and other Indian Languages project, IIIT Hyderabad (https://indicwiki.iiit.ac.in), till date has achieved the set goal (400,000 lakh pages) and created 6 lakh pages (600,000) in various domains such as Biological Sciences, Medical Sciences, Astrology, Technology, Travel, Culture/Art, Sports, and Infotainment in Telugu. It is continued to explore even more domains. The unique contribution of the project is creating a system consisting of processes, platform and technology which enables human-bot interaction resulting in generating high-quality encyclopaedic content.

IIIT Hyderabad has created encyclopedic content using technology-assisted language and domain-specific bots, currently trained in publishing in Telugu and Hindi languages. IIIT Hyderabad has also developed cutting-edge technology solutions and platforms to enable human-bot collaboration in creating encyclopedic knowledge articles. This platform and tools are being used to enhance the productivity of human volunteers and content creators for editing and enhancing the wiki

pages. At present working on reviewing the developed content in the last two years and making it available in a few other Indian languages

The URLs for the IIITH Sandbox –

a. Telugu - https://tewiki.iiit.ac.in/.

b. Hindi - https://hiwiki.iiit.ac.in/

4. Web Standardization Initiative:

The vision of Web Standardization Initiative (WSI) is to enable Indian language requirements in Web technologies Standards of World Wide Web Consortium (W3C), Unicode, Bureau of Indian Standards (BIS) etc. through the formulation of Draft Recommendations, Guidelines, and Gap reports in consultation with stakeholders, Language and Technology experts. These are being implemented through time bound and technologically focused projects by academia/ industry/ R&D institutions/Industry bodies. The physical progress of the verticals under the activity is shown below:

- **Submission of Locale Data in Unicode Common Locale Data Repository (CLDR):** The Unicode Common Locale Data Repository (CLDR) provides key building blocks for software to support the world's languages, with the largest and most extensive standard repository of locale data available. Although, the main categories for 22 scheduled Indian languages were submitted earlier and identified some missing data for Kashmiri, Dogri, Odia languages, which have also been submitted for inclusion.
- **Text segmentation requirements in Cascading Style Sheet:** The recommendations of text layout requirements in areas such as Letter spacing, Line breaking, Vertical alignment, Initial styling letter, Counter styles(Alphabetic Bulleting) etc. has been submitted in W3C for proper and seamless access of text on the Web. The Draft Standards on the same has also been published in W3C.
- **Character Model:** World Wide Web: The complete requirement document for 6 languages namely Hindi, Bengali, Malayalam, Odia, Marathi and Gujarati has been developed with the consultation of Language Experts for string manipulation and searching on WWW and the same has also been submitted to W3C for further necessary action.
- **Speech Standards:** A document has been developed and submitted to IEEE that covers Hindi language requirements in Speech Synthesis Markup language (SSML), Speech Recognition Grammar Specification (SRGS) & Pronunciation Lexicon Specification (PLS) standards, which are used for speech recognition & synthesis systems.
- **Publication POSTagSet Standard for Indian languages:** Part-of-Speech (POS) Tagset were developed and submitted to BIS, which has also been published as Standard: ISO 17627 : 2021 Linguistic Resources – Unified POS Tag Set for such as Bengali, Gujarati, Hindi, Kashmiri, Konkani, Maithili, Marathi, Punjabi, Urdu, Telugu, Kannada, Malayalam and Tamil.

2.4.6 Capacity Building Scheme

Capacity Building scheme under Digital India programme was initially approved in 2008 and Capacity Building under phase II was approved in 2015. The objective of the project is to provide professional resources to States and provide training to political and policy level decision makers, managers and implementors of all States/UTs and Central Line Ministries to build the in-house capacity for implementation of various e-Governance initiatives. Under CB Phase-II programme, more than 20,000 Government Officials have been trained.

Capacity Building Scheme Phase III(CB Phase-III)

The new Capacity Building Project is approved for the next 3 years to address the augmentation of the competency requirements of the Government officers of Central line Ministries & State/UT, which will help for the speedy implementation of the Digital India transformative initiatives.

The capacity building reform components include:

a) Training & skilling with specialized training programmes & workshops.

b) Deployment of professional resources to State/UT

c) Advanced learning platform with experiential learning (LXP)

d) Content development & management focussing on emerging technologies and needs

e) Collaboration and partnerships with national and international institutions

f) Continuous engagement and participation of cohort via Centers of Excellence and Communities of Practice.

The Capacity Building Scheme Phase III is crucial for several reasons:

- Digital Transformation: It supports the Digital India initiative by building a workforce capable of managing and implementing digital projects.
- Sustainable Development: By enhancing the capacity of government employees, the scheme contributes to achieving Sustainable Development Goals (SDGs) through improved governance and service delivery.
- Innovation and Efficiency: Training in emerging technologies fosters innovation and improves the efficiency of government operations.
- Inclusivity: The scheme promotes inclusivity by ensuring that all levels of government employees, including those in remote and undeserved areas, have access to training and development opportunities.

Implementation Status: (As on Sept, 2024):

(i) 31 training programmes and webinars are conducted with 3979 participation across all Ministries and Dept. (including international bureaucrats/youth)

(ii) 3 induction modules of UMANG, myScheme and Visvesvaraya PhDscheme have been developed and uploaded on NeGD LMS.

(iii) State Capacity Building Workshops were conceptualized in the F.Y. 2023-24 with a focus on emerging technologies such as AI in digital transformation, Data driven decision making for Government, Cloud computing, Generative AI, where requests from Manipur and Arunachal Pradesh have been received to conduct such workshops. In State specific CISOs, 4 State CISO's workshops with 149 participation are conducted in MP, UP and Uttarakhand.

(iv) Future readiness series on Digital Governance are being conducted in collaboration with Government practitioners and industry partners with exposure to build digital readiness amongst them for adoption of emerging technologies such as Artificial Intelligence, Cyber Security, IoT etc. to catalyse public service delivery more efficiently and effectively. 2 masterclasses have been conducted till date with 373 participation. A new set of series is planned in this year.

(v) Development of 8 national case studies is in process. The first 2 are identified as case study on DigiLocker and UMANG.

(vi) State e-Mission Team (SeMT) is a team of professionals attached to State IT department to provide technical/professional support to the State decision and policy-making bodies (State Apex Committee). In this project, along with dedicated techno-programme management resources in State/UT, a pool of specialised resources will also be deployed centrally on specific emerging technologies.

(vii) A dedicated portal was deployed for SeMTs for managing them. The portal is going to be closed and tea is working on bringing unified.

2.4.7 E-Greeting Portal and Sampark 2.0

Enabling bi-directional Government and citizen engagement in governance leveraging various e-channels (like emails, SMS, Miss-Call, OBD (Out Bound Dialing)) along with enhanced services and offerings of the project.

Approved on: 23rd April, 2020 for a period of 5 years i.e. till 31st Mar, 2025

Outlay: Rs. 54.042 Cr.

Achievements:

As on 31st December 2024 the following is achieved

- 278.02 Cr Bulk SMS pushed
- 226.83 Cr second of OBD
- 3807.43 Cr emails
- 17.83 Cr. OTT services
- 7074 Templates designed through crowd sourcing
- 8.06 Lakh e-greeting shared

2.4.8 Awareness and Communication plan for Digital India

Awareness and Communication (A&C) is an integral component of the Digital India Programme. A&C performs the crucial role of generating and raising the level of awareness about Digital India, its schemes, initiatives and services amongst diverse stakeholders across the country. The main objectives of A&C activities are:

(a) Expand visibility of Digital India

(b) Help citizens understand the benefits of Digital India.

(c) Facilitate demand creation for various services leading to more adoption of services

(d) Create Awareness and wide publicity including event based publicity etc., through various media- social media, radio, TV, print, outdoor media & activities around Government of India Schemes and Digital India services.

(e) Inform, Educate, Communicate & Sensitize citizens about usage & benefits of services & schemes.

(f) Expand reach of Digital India programme globally

(g) Establish the brand "Digital India" by way of effective branding exercise across various platforms- Mass Media, Social Media, Rural Outreach etc.

Some of the major events organised by A&C Team , NeGD are

(i) Semicon India 2024 Conference – (September 11 – 13, 2024), at India Expo Mart in Greater Noida, Uttar Pradesh. The three-day conference from 11 to 13th September showcased India's semiconductor strategy and policy which envisions making India a global hub for semiconductors.

(ii) India AI Mission: Roundtable Discussion on AI Innovate: Empowering Tomorrow's Startups (August 27, 2024) held at the Vigyan Bhawan Annexe Building (Committee Room A), on August 27, 2024. The roundtable was held to discuss challenges faced by AI start-ups and formulated effective policies.

(iii) State Consultation Workshop on Creating Enabling Eco-System for Services in Tier 2 & 3 Cities (August 31, 2024) hosted at Mayfair Lagoon, Bhubaneswar. The workshop was participated by Shri Manoj Ahuja, Chief Secretary, Odisha; Shri S Krishnan, Secretary, MeitY, Shri Abhishek Singh, Additional Secretary, MeitY, Ms. Anu Garg, Development Commissioner-cum-ACS, Government of Odisha; Shri Vishal Dev, Principal Secretary, Electronics and Information Technology Department, Government of Odisha; and senior government officials from 24 States and Union Territories across India.

(iv) RBI@90 (August 26 – 27, 2024) commemorating 90 years of the Reserve Bank of India (RBI), 'Global Conference on Digital Public Infrastructure and Emerging Technologies' was organized by RBI in Bangalore from August 26 – 27, 2024. NeGD on behalf of MeitY participated in the exhibition and set up stalls showcasing DigiLocker, Entity Locker and UMANG.

(v) Various Social meida Coverages

2.4.9 Modernization/Digitalisation of Nagaland Fire & Emergency-Management System (NFES-MS)

A pilot project being implemented by Directorate of Fire & Emergency Services, Govt. of Nagaland, with estimated outlay of Rs. 3.88 crore for a period of 30 months, has been sanctioned by MeitY in June, 2023. The objective of the project is to develop a centralized management system for the Nagaland Fire & Emergency Service (NF&ES) for creating a cost effective environment, faster and better service delivery to the department and stake

holders, ushering and thus increasing overall efficiency and effectiveness in the Government processes. The project is under implementation. The Command & Control Centre is ready for go-live. Modules of Nagaland Fire & Emergency Services-Management System (NFES-MS) are at various stages of development. The project is currently being implemented as pilot project in 3 districts of Nagaland namely, Kohima, Dimapur and Mokokchung.

2.4.10 GOV.IN Appstore

'GOV.IN Appstore', India's indigenous Appstore developed under 'AatmaNirbhar Bharat Mission', which is aimed at mainstreaming the mobile app industry in the country. The 'GOV.IN AppStore' platform (https://apps.mgov.gov.in) streamlines access to government services across sectors viz. health, education, agriculture, financial, online payments, electoral services, social welfare, food, transport, energy, etc. Accessible through both its website and mobile app, GOV.IN AppStore empowers developers and enhances service delivery for citizens nationwide.

Uploading apps is convenient and free of cost. Only verified and signed apps (APK/APKS/AAB files) can be hosted on the AppStore. Before hosting, every app goes through rigorous security tests and only secure apps are hosted on this Appstore. This transparency fosters trust between App developers and the government.

Achievements:

- Total 2,279 mobile apps from different domains with most popular apps like UMANG, Aarogya Setu, BHIM, DigiLocker, and many more are available on GOV.IN AppStore.
- More than 9.08 Crore+ apps downloaded till now. Recently, 1,46,789 new users were onboarded on GOV.IN Appstore.

2.5 Digital India Initiatives by NIC

National Informatics Centre (NIC) offers various platforms and services in key sectors such as Agriculture, Education, Health and Family Welfare, Transport, Finance, Law and Justice, Social Welfare & Skill Development, Home Affairs, and Food & Public Distribution. These services are accessible through multiple channels, promoting the advantages of enterprise mobility and easy access for the benefit of all.

2.5.1 Agriculture & Food Processing

2.5.1.1 PM KISAN- Pradhan Mantri Kisan SAmman Nidhi (https://pmkisan.gov.in/)

Pradhan Mantri Kisan Samman Nidhi (PM-KISAN) portal developed and managed by NIC provides an end-to-end technology solution for transferring the funds directly into the accounts of the farmers identified by States/UTs. Under the PM-KISAN Scheme, eligible landholding farmer families receive ₹ 6,000 annually through three installments of ₹ 2,000 each, disbursed every four months directly into their bank accounts via the PM-KISAN portal. With the 18th installment release, the total disbursement under the scheme exceeded ₹ 3.45 lakh crore, supporting more than 11 crore farmers nationwide and further reaffirming the government's commitment to rural development and agricultural prosperity.

PM KISAN Mobile App

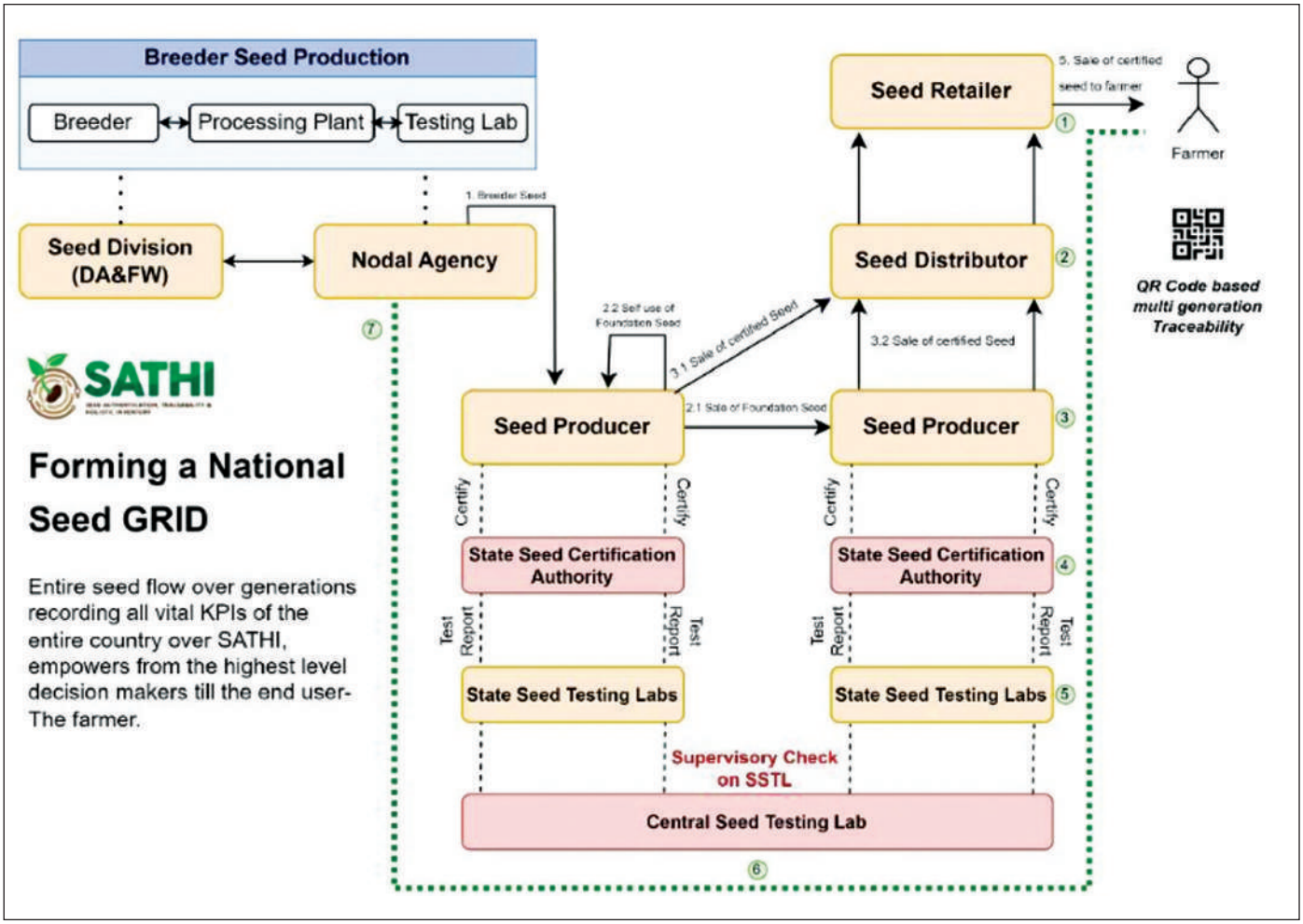
(URL:-https://play.google.com/store/apps/details?id=com.nic.project.pmkisan)

The PM-KISAN mobile app enhances transparency and expands farmer outreach, serving as a simple and efficient extension of the PM-KISAN web portal.

2.5.1.2 Seed Authentication, Traceability and Holistic Inventory (SATHI) (https://seedtrace.gov.in)

SATHI is a national platform implemented by the collaborative efforts of the Ministry of Agriculture and Farmers' Welfare, Government of India, and the National Informatics Centre (NIC). It is an integrated digital ecosystem for seeds including Breeder seed production centers, Indenters, Seed certification agencies, Seed Producers, processing plants, State Seed Testing Labs, Central Seed Testing Lab, Enforcement agencies of states etc. and Seed Supply Chain across the nation.

The SATHI may be considered as tools to achieve the vision of formation of a National Seed Grid where all the stakeholders can be integrated seamlessly to create a market ecosystem based on quality seed, connecting supply to demand, traceability of seed, predictable market, competitive pricing.



2.5.1.3 FARMAP 2.0 (Farm Analysis Package) (https://farmap.dac.gov.in)

FARMAP is a web-based system developed by NIC to facilitate capturing of data from 9,720 sample farmers from 19 states, 810 Tehsils, 1620 Villages, 9720 farmers in 22 Record Types, validation of data through a workflow-based system and processing of data to generate Crop wise state level cost estimates.

CCS-mTracker mobile app has been hosted on Google play store to track the visits of Field man & Field Supervisors to improve the quality of data.

Benefits of FARMAP 2.0

- Data collection, compilation and validation are made more efficient
- Data is transparent.
- Data Processing time reduced.
- Reduced Time lag in providing Cost estimates to CACP.
- Better monitoring of Implementing Agencies & Field Officials.

2.5.1.4 DBT in Fertilizers /e-Urvarak/ Integrated Fertilizer Management System (https://dbtfert.nic.in/ - IFMS, https://urvarak.nic.in/ - IFMS Dashboard)

e-Urvarak or iFMS (Integrated Fertilizer Management System) represents an advancement in supply chain governance and subsidy claim processing in the country. Boasting a user base exceeding 3.5 lakh (Govt. and Private) and facilitating transactions for more than 13 crore fertilizer buyers nationwide, e-Urvarak has emerged as a cornerstone of efficiency and transparency in the critical sector. The system regulates the nationwide production, movement and e-PoS sale of over 640 LMT fertilizer in over 18 crore transactions while processing

the subsidy claims on a weekly basis which amounted to Rs. 2.0 Lakh Crore in 2023-24.

NIC has been the technological partner of the Department of Fertilizers in providing extensive strategic control over the entire fertilizer supply chain, including:

A. Transactional Data Collection

B. Real-Time Data Dashboard/ MIS Reports

C. Comprehensive Subsidy Management

2.5.1.5 SAMPADA Suite (https://sampada-mofpi.gov.in)

NIC has developed a web-based application suite named "Sampada Portal" for various schemes under which the Ministry of Food Processing Industries (MoFPI) provides grants to various promoters desirous of setting up different types of Food Processing Facilities. The different modules of the suite, based on different schemes of the Ministry provide an online system for submitting application for setting up food processing facilities, evaluation of the same by the different divisions of the Ministry and Project Management Agencies engaged by the ministry, approval/rejection of applications, monitoring of grant release installments and final closure of a project.

The Scheme has so far generated direct employment to the tune of about 83000 and processing and preservation capacity to the tune of about 226 lakh Metric Tonne and 72 Lakh Metric Tonne respectively.

2.5.1.6 PMFME Portal (https://pmfme.mofpi.gov.in)

A national level portal has been developed for the Ministry of Food Processing Industries (MoFPI) under NIC's supervision which has automated the complete workflow starting from registration, generating a DPR and submission of application for grant by various micro food processing enterprises, evaluation of the applications by the District Level Committee/Ministry, forwarding application to bank for sanction of loan, sanction of loan by bank, sanction of grant by the Ministry, providing training and handholding support for upgradation of skills and technical knowhow, providing branding and marketing support, getting financial support from other such schemes of the Central/State Government etc. In addition, the portal also generates MIS reports of various kinds for all these activities, maintains accounting and budget information, integrates with a Learning Management System and a GIS based system showing One District One Product data on the geographical map of India and individual districts.

The scheme has so far received application to the tune of about 321311 and total loan and grant sanctioned to 104697 beneficiaries.

2.5.1.7 Farmer Registration and Unified beneficiary Information System (FRUITS) (http://fruits.karnataka.gov.in)

FRUITS is an e-Governance project for managing and maintaining farmer registry which can be used by all agriculture and allied departments for providing benefits under various governments schemes to eligible farmers. FRUITS is evolving as a soft infrastructure project in the agriculture sector acting as an inventory of farmers, land owned by them, and benefits extended.

CURRENT STATISTICS:

- **Farmer Registered:** 99 Lakh
- **Scheme Covered:** 49
- **No Of Farmers Availed Benefits:** 81 Lakh
- **Amount Assistance Provided:** 31,083.29 Crores (from January 2019)
- **No Of DBT Transactions:** 8.9 Crores (from January 2019)

2.5.2 Health & Family Welfare

2.5.2.1 e-Hospital and NextGen e-Hospital (https://nextgen.ehospital.gov.in/)

The **e-Hospital application** is being offered as an as-is product to the government hospitals across the country through SaaS (Software as a service) model. The modules of e-Hospital application which are currently available on cloud are Patient Registration (OPD & Casualty), IPD (Admission, Discharge & Transfer), Billing, Lab Information System, Radiology Information System, Clinic, Dietary, Laundry, Store & Pharmacy and OT Management.

Online Registration System (ORS) is an online patient portal for citizens to book online appointments for the hospitals and for providing patient centric services like

viewing lab reports, checking blood availability status, and making online payment. Citizen can now use the ORS portal in English, Hindi, and 14 other languages. These include Assamese, Bengali, Gujarati, Kannada, Kashmiri, Malayalam, Nepali, Odia, Punjabi, Sanskrit, Sindhi, Tamil, Telugu, and Urdu.

The **NextGen e-Hospital application** has been developed based on the National Digital Health Blueprint and is compliant with various standards like EHR Standards, Meta Data & Data Standards – Health etc. It has been developed using Master Code Directories and Registries to ensure standardization of data across the system. New modules developed are Ambulance, Allied Services (Passes and Certificate), MRD, Hospital Admin (Admission Cancellation Approval, Patient Updation Report, User Assigned Report) and Feedback System. NextGen eHospital was implemented in the Kingdom of Saudi Arabia for Haj Pilgrims in 2023 and 2024. 330734 e-prescription were generated in Haj Pilgrimage in 2024. OPD, IPD, Clinic, Laboratory, Store, Pharmacy and Ambulance modules were utilized.

NextGen eHospital has also been implemented in 42 Central Armed Police Forces hospitals of the Ministry of Home Affairs across the country.

2.5.2.2 Collaborative Digital Diagnosis System

eCollabDDS is a web based comprehensive Teleradiology solution which enables the transmission of images such as X-rays, CTs and MRIs from one geographical location to another which can be viewed and interpreted by the Radiologist for diagnosis or consultation purposes. eCollabDDS has been customized for Telepathology consultation also with the inputs from PGI Chandigarh. Through eSanjeevani, cases were uploaded from various health facilities in Haryana and PGI Chandigarh reported back the cases for Telepathology consultation.

eCollabDDS has been integrated with eSanjeevani and NextGen e-Hospital for TeleRadiology consultation for better reach. eCollabDDS has been enabled with Artificial Intelligence for Chest X-Ray images. The AI will predict the presence/ absence of 7 Radiological Detection features for Tuberculosis which will aid the Radiologist for reaching a better diagnosis.

Currently eCollabDDS is being used by FHQ, BSF Hospital through NextGen platform for uploading X-rays in DICOM format and the images are viewed and reports are being prepared by the Radiologists at BSF Hospital in Srinagar and Shillong.

2.5.2.3 Central Government Health Scheme (https://cghs.nic.in)

Central Government Health Scheme caters to the healthcare needs of eligible beneficiaries enrolled under the scheme). Almost 47.23 lakh beneficiaries are enrolled for CGHS health services. 470 Wellness Centers (Dispensaries) across 74 cities cater health and wellness services under supervision of 24 Additional Director Offices in Allopathic and AYUSH (Ayurvedik, Yoga, Unani, Siddha, Homeopathic) systems. The beneficiaries can book appointments, download CGHS Card, search Dispensaries, empaneled Hospital/ Labs through Mobile App. DigiLocker may also be used to download CGHS plastic card.

2.5.2.4 Reproductive & Child Health (RCH)

Reproductive and Child Health (RCH) is an innovative name-based system to capture information on all RCH related services including family planning, maternal health, Child health and immunization and to monitor performance at all levels (National, State, District, Block, PHC and Sub Centre level).

ANMOL (ANM online) is a tablet based android application for RCH, which allows ANMs to enter and update service records of beneficiaries (Eligible Couple, Pregnant Women and Children).

RCH/ANMOL have been integrated with Ayushman Bharat Digital Health Mission (ABDM).

More than 28.14 Lakh beneficiaries registered in RCH/ ANMOL have been linked with ABHA. Out of this, more than 10 Lakh ABHA have been created using RCH/ ANMOL platform.

2.5.2.5 NHM-PMS (National Health Mission - Progress Monitoring System) (https://nhmpms.gov.in)

National Health Mission Progress Monitoring System (NHM PMS) is an application developed for allocating, managing, monitoring, and updating the physical and

financial progress for various health schemes from top to grassroot level. It is a Single Sign On (SSO), two factor Authentication, user friendly and 24*7 available portal with inbuilt informative dashboard, various reporting format and user-based query reporting tool. Through this umbrella structured application, currently four schemes are onboarded and running smoothly PAN India. These schemes have 365 sub components.

2.5.2.6 Sickle Cell Anaemia Elimination Mission

The National Sickle Cell Anaemia Elimination Mission was announced in the Union Budget 2023 and the program is currently being implemented in 17 identified states, including Gujarat, Maharashtra, Rajasthan, Madhya Pradesh, Jharkhand, Chhattisgarh, West Bengal, Odisha, Tamil Nadu, Telangana, Andhra Pradesh, Karnataka, Assam, Uttar Pradesh, Kerala, Bihar, and Uttarakhand. Sickle Cell Disease is a group of blood disorders genetically inherited and specially found in the tribal population of India. Government of India has launched a mission mode project for enrolment, testing, identification, and maintenance of electronics health records of citizens screened for Sickle cell disease, Thalassemia disease & other blood disorders.

2.5.2.7 Indian Public Health Standards (IPHS) Dashboard

IPHS (Indian Public Health Standards) are a set of uniform standards envisaged to improve the quality of health care delivery in the country. Standards have been revised as IPHS 2022. The IPHS Dashboard is a digital platform for monitoring IPHS compliance status of public health facilities. Dashboard Provides a comprehensive overview of the assessment status and compliance status. Health Facilities include District Hospitals, Sub-District Hospitals, Community Health Centers, Primary Health Centers. The Ministry aims to ensure that all healthcare institutions adhere to the IPHS 2022 (latest IPHS), thereby guaranteeing the delivery of quality health services to every citizen.

2.5.3 Finance

2.5.3.1 Public Financial Management System (PFMS)

PFMS aims to establish an integrated digital finance network for payments, receipts, accounting and to provide a Management Information System for the Government of India, Ministries/Departments of Central and State Governments. It provides a financial management platform for all plan schemes, a database of all recipient agencies and integration with core banking solutions of banks handling plan funds, integration with State Treasuries and efficient and effective tracking of fund flow to the lowest level of implementation for plan schemes of the Government.

2.5.3.2 e-Way Bill (https://ewaybillgst.gov.in; https://ewaybill2.gst.gov.in)

The GST e-Way Bill mechanism is put in place to ensure that goods are transported in accordance with GST laws and tax is paid for the supply of goods. e-Way Bill is an electronic document which gives details regarding the movement of goods and needs to be carried by transporters for any consignment exceeding Rs.50,000. e-Way bill has been interfaced with Fastag-RFID and Vahan system to verify/monitor the movement of vehicles updated in e-Way Bill. RFID based EWB reports have helped the department officers in conducting effective vigilance on the roads. The Comprehensive Analytics on e-Way Bill system for officers has helped in identifying fraudulent transactions by taxpayers.

2.5.3.3 GST Prime

GST Prime is an analytical tool, developed by NIC, Karnataka for the GST officers. This has played an important role in improving the indirect tax collection of the State as well as of the Central GST. The GST officers have been dependent on the application for their day-to-day activities in terms of monitoring the tax compliance, to identify and initiate appropriate actions against the non-filers of returns, identifying and highlighting the possible fraudulent activities carried out by taxpayers in order to evade taxes, establishing relations / possible links with other stakeholders in case of frauds, identifying and reversal of ineligible Input Tax Credit claims and having complete information on the taxpayers through the taxpayer profile etc.

GST Prime is now rolled out for all the States and Central GST formations across the country from a common infrastructure. GST Prime 4 with new features has been rolled out and GST Prime Lite - a mobile app is going to be released shortly.

For ease of use, Single Sign On (GSTSSO) facility has been introduced which enables the GST officers to access all the NIC developed GST applications such as GST Prime, E Way Bill MIS, E Way Bill Analytics, E Way Bill Dashboard and e-Invoice Analytics using single URL and single set of credentials.

2.5.3.4 e-Invoicing System (https://einvoice1.gst.gov.in , https://einvoice2.gst.gov.in)

GST e-invoicing system is a system of reporting the invoices being issued by the taxpayers to their customers, on the Government portal on a near real time basis and obtaining a unique Invoice Reference Number (IRN). E-invoice system was launched on 1st Oct 2020 for the taxpayers in a phased manner based on the Annual Aggregate Turn Over (AATO) and is now mandatory for all the taxpayers above Rs 5 Crore.

It has many advantages for businesses such as standardized & digitally verifiable e-Invoices, enhanced interoperability between various stakeholders- suppliers, recipients, transporters, Government and financial institutions, auto-population of invoice details in GST returns and e-way bill. It has also controlled the issuance of fake invoices or claiming excess input tax credit and at the same time facilitating quick ITC credit to the genuine recipients.

In the last 4 years, 700 Crore of e-invoices have been generated involving 16 lakh total suppliers and 140 lakh total recipients.

2.5.3.5 e-Abgari

e-Abgari project is an end-to-end supply chain management system of Beverage Alcohol, Medicinal Alcohol, Industrial Alcohol & Life Saving Narcotic Drugs in state excise sector enabling better regulation to minimize the social and public health import while safeguarding the revenue collection from excisable articles.

Presently, 72 e-Services are being rendered in workflow-based manner for Grant & Renewal of Licenses, Packaged Liquor Brand Registration, Issuance of NOC/ Permit/Passes for Import/Export/Transport, Real-time management of Spirit/Packaged Liquor Inventory and Excise Revenue, e-Chemical Examination Laboratory and management of Excise Offender Cases, Enforcement Activity. All Distilleries, Manufactories, Distributors, Retail Shops and Hospitals, Educational Institutes & Industrial Units connect eAbgari for Production / Procurement / Sell of alcohol.

Process / Scenario	Pre-eAbgari period	Now
Issuance of Permits / Passes	15-30 days	3-48 hours
Label Registration of Packaged Liquor	20 - 45 days	3-72 hours
Permission for importing life-saving drugs	20 - 30 days	3-48 hours
Payment of duties and fees	Cumbersome & during office hours	Instant and 24 × 7
Status of Service Requests by stakeholders	Lack of transparency	Instant - both online and through SMS, Email
Tracking & Tracing of a bottle/case	Not available	Instant & 24×7
Refund Option of wrong payment	Not available	Instant & 24×7

2.5.3.6 Indian Customs Electronic Data Interchange System (ICES)

ICES Application covers around 99 percent of India's International Trade taking in its ambit 560 locations (including SEZ sites) spread across the country.

Major benefits of ICES include-data consolidation for National Level Management Information Systems (MIS) to support future trade policy, standardization of customs clearance methodologies, and the implementation of contactless, paperless, and faceless procedures. It provides real-time duty rate updates and expedites customs clearances, reducing processing times and enhancing overall efficiency. ICES transforms customs operations into a more streamlined and user-friendly experience.

2.5.3.7 e-Auction India (https://coaleauction.co.in)

eAuction India is a platform to conduct online auctions for lease, sale and purchase of commodities by Govt Departments/Organisations. Facilitates Forward / Reverse, Multi / Single Lot Auction.

Implemented by 23 States/ UTs and 37 Central Government organizations. Since 2013, 56,405 auctions worth 17,700.23 Crore have been processed till 31st December 2024

6th Round of eAuction of PM Mementos:

The mementos gifted to the Hon'ble PM Shri Narendra Modi were auctioned for the Sixth consecutive year during 17th Sept 2024 to 31st Oct 2024 using eAuction India platform developed by NIC. Over 8000 Mementos were auctioned till sixth rounds and more than 25000 people participated. The platform has the composite feature of image as well as video display of various items which can be used as per need. It also has sections for highlighted items, Be the first to Bid, Most Participated Auction etc

2.5.3.8 TRADESTAT – India's Foreign Trade Statistics (https://tradestat.commerce.gov.in)

The system offers monthly and annual time series analysis of India's foreign trade for the past 25 years. It provides insights into country-wise, commodity-wise, and region-wise trade, utilizing an enhanced classification system based on the 8-digit ITC code, exceeding the World Customs Organization's (WCO) 6-digit HS code. With over 12,500 commodities classified, the system, maintained by DGCI&S, Kolkata, presents data in both Rupees and US Dollars. Accessible to the public it facilitates analysis on a financial and calendar year basis.

2.5.4 Education

2.5.4.1 School Learning and Management Platforms

NIC's School Education Solutions have a broad-reaching impact, ensuring that basic education is accessible to students from diverse backgrounds and all corners of society, thus benefiting a wide range of individuals.

PM SHRI application (https://pmshri.education.gov.in)

The objective is to select and manage over 14,500 model schools, ensuring a nurturing environment for more than 20 lakh students. The scheme utilizes the Prabandh Portal (https://prabandh.education.gov.in/pmshri) to streamline financial activities, ensuring data accuracy and providing real-time dashboards for effective monitoring. and enhance data accuracy.

Vidyanjali (https://vidyanjali.education.gov.in)

The Vidyanjali connects volunteers with government schools across India, enabling contributions of knowledge, assets, and materials. The platform features real-time dashboards and streamlines project modules for effective participation.

Online Teaching, Learning and Assessment System (OTLAS) (https://ullas.education.gov.in)

The Online Teaching, Learning and Assessment System (OTLAS) empowers over 5 crore adults under the ULLAS initiative, offering literacy through digital tools. Developed by NIC, the portal enables learner registration, assessment, and certification, integrating with NIOS.

Integrated ShalaDarpan Portal (https://rajshaladarpan.nic.in/)

The Integrated ShalaDarpan Portal, developed by NIC Rajasthan, is a comprehensive tool supporting over 66,000 government schools, tracking the academic progress of 95+ lakh students and 4.3+ lakh staff members. It streamlines daily operations like admissions, attendance, and exams, while efficiently managing staff recruitment, posting, and beneficiary schemes. The portal disburses ₹1,500 crore in Direct Benefit Transfer (DBT) scholarships, ensuring financial aid for 50+ lakh students

RAJPSP Portal (https://rajpsp.nic.in)

The RAJPSP Portal, developed by NIC Rajasthan, efficiently manages 42,000 private schools and over 90 lakh student admissions. It streamlines processes like RTE admissions, reimbursements, and school recognition (Manyta), ensuring transparency and accountability. With ₹3000 crore processed for 12 lakh RTE students, it supports online applications, fee determinations, and school verifications. This bilingual portal revolutionizes Rajasthan's education system, fostering transparency and efficient school management.

SSPortal (https://ssportal.kerala.gov.in)

The **SSPortal** grades 304 special schools in Kerala, serving 15,000 students, and allocates packages based on grades. The **hsTransfer** (https://dhsetransfer.kerala.gov.in) manages transfers for 13,000 higher secondary teachers in 847 government schools. The **vhsTransfer** (https://vhseportal.kerala.gov.in) handles 2,500 vocational teachers across 262 schools. Developed, maintained, and supported by NIC Kerala for efficient education administration.

School Education Portal Uttarakhand

The NIC Uttarakhand's School Education Portal Uttarakhand, launched in January 2016, provides a comprehensive eGovernance platform for the state's educational sector. It digitally houses profiles for approximately **61,000 teachers**, **20,000 schools**, and over **800,000 students**, streamlining processes like teacher transfers, document verification, and guest teacher recruitment. With features like the DAKSH dashboard for performance monitoring and e-Service books, it enhances transparency and efficiency in managing educational resources.

Chandigarh Online Admission Portal

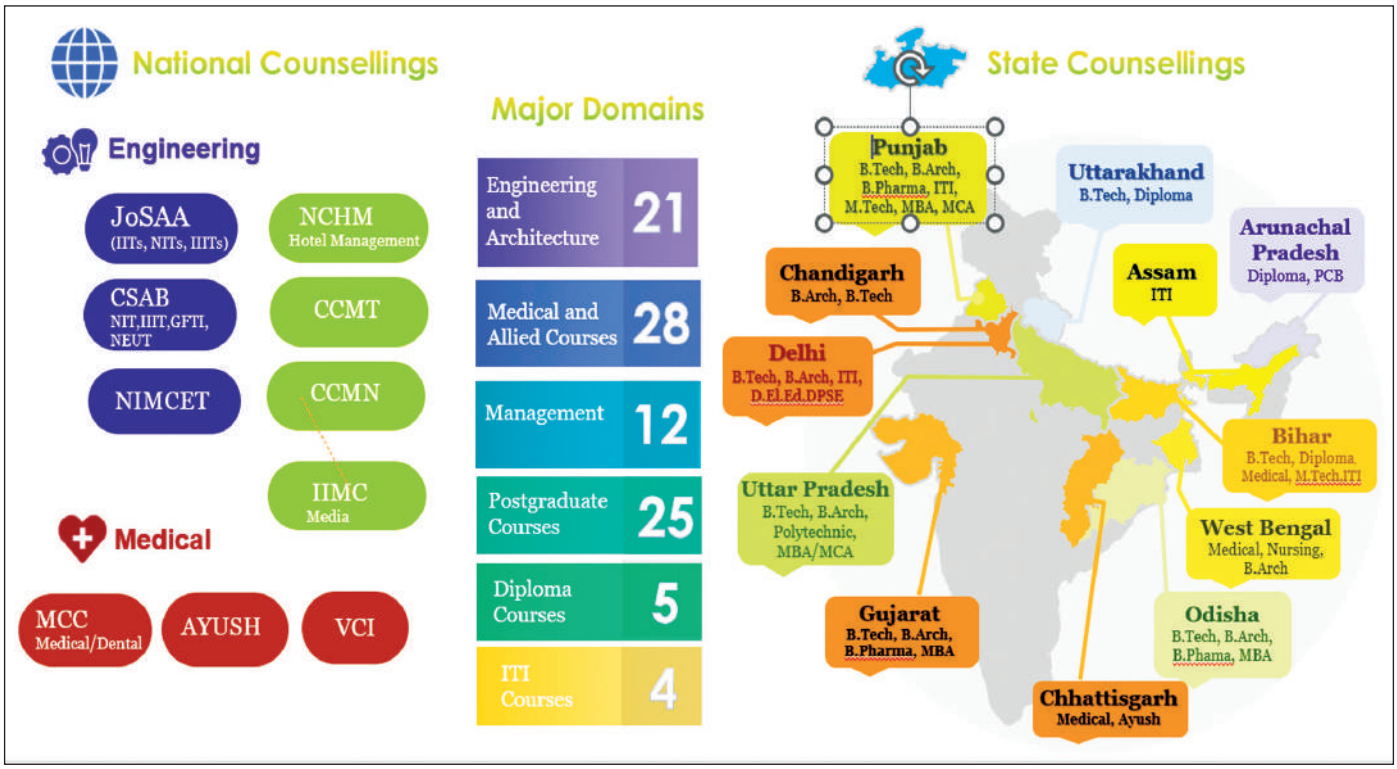
The Chandigarh Online Admission Portal revolutionizes the admission process for **112 government** and **57 recognized private schools** for the **2024-25 academic session**. With **2,820** total applicants, **2,721** were eligible, resulting in **836** successful placements via a transparent online lottery system. This centralized platform ensures fair access and simplifies applications for parents.

SARAL (Systematic administrative reforms for achieving learning by students) Education Project

The SARAL Education Project by NIC Maharashtra integrates platforms like the **RET Portal** for RTE admissions, **SanchManyta Portal** for staff approvals, **School Portal** for school data, and the **Sanstha Portal** for institutional mapping. SARAL supports over **117,000 schools**, **2.14 crore students**, and **5.70 lakh teachers**. The **Mid-Day Meal (MDM) Portal** benefits **86,000+ schools**, while the **eMarksheet Portal** offers online verification of **6.1 crore** 10th and **4.23 crore** 12th records.

2.5.4.2 Examination and Admission Services

The e-Counselling system offers comprehensive admission and counselling services, encompassing everything from registration to college and course selection, and finally, the generation of admission letters. It caters to both candidates and admission providers by facilitating a wide range of essential services throughout the admission process. These services include registration, choice filling, fee payments, and admission letter issuance. For admission providers, the system efficiently manages seat matrices and master data, while offering tools to monitor registrations, fee payments, and choices filled, ensuring an accurate assessment of the admissions processed.



This year, the Medical Counselling Committee (MCC) introduced a **Common Admission Data Sharing Portal** for medical counselling. This portal enables authorities at both the national (All India) and state levels to access and cross-check medical admission data across the country.

This year the e-counselling solution won the **Gems of Digital India- Jury's Choice Award.**

2.5.4.3 National Scholarship Portal

The National Scholarship Portal (NSP) serves as a comprehensive, end-to-end solution for streamlining scholarship disbursement. The key features like the One-Time Registration (OTR) process, which allows students to register once and use the credentials throughout their academic career. Aadhaar-based Face Authentication (FaceAuth) ensures the authenticity of applicants and aids in deduplication with other scholarship portals. NSP provides a Common Standard Application Form for all schemes, simplifying the submission process. Through the Student Dashboard, students can track their application status and receive SMS updates, while the Grievance Redressal System and Helpdesk enhance user support. Integration with Common Service Centres (CSCs) enables students to complete OTR and form submissions at nominal charges.

As of now, NSP has supported over 6.31 crore recipients, with the total scholarship disbursal exceeding ₹35,194 crore.

2.5.4.4 Schemes and Welfare Program Management

The **PM POSHAN Portal (https://pmposhan.education.gov.in**) built for the **PM POSHAN** (Pradhan Mantri Poshan Shakti Nirman) scheme which aims to provide hot cooked meals to **11.80 crore children** in **11.20 lakh** government and government-aided schools from **2021-2026**. With an investment exceeding ₹24,400 crore, this centrally sponsored initiative fights hunger and promotes school attendance. Key digital platforms **https://pmposhan-ams.education.gov.in**, and **https://pmposhan-mis.education.gov.in**, ensure real-time monitoring of meal distribution, data visualization, and reporting across schools and UTs.

2.5.4.5 Educational Institutes Information Management

Effective information management in educational institutes is paramount for facilitating data-driven decision-making, ensuring the security and accessibility of valuable educational data.

UDISE+ (https://udiseplus.gov.in/) is India's largest school education database, covering 14.89 lakh schools, 26.52 crore students, and 95 lakh teachers.

The **Performance Grading Index (PGI) (https://pgi.udiseplus.gov.in/)** evaluates India's expansive education system, which comprises over 1.5 million schools, 9.5 million teachers, and 265 million students.

The **All-India Survey on Higher Education (AISHE)** is the primary source for comprehensive statistics on India's higher education landscape, encompassing 70,000+ institutions, including universities and colleges. Through the dedicated portal (**https://aishe.gov.in**), AISHE collects data on critical parameters such as student enrollment, foreign students, and educational infrastructure.

The **PM-USHA Portal (https://pmusha.education.gov.in**) serves as a comprehensive Management Information System (MIS) for the Pradhan Mantri Uchchatar Shiksha Abhiyan, aimed at enhancing higher education under NEP 2020

2.5.4.6 Educational Products and Solutions

CollabGEO (https://collabgeo.nic.in) is an indigenous web-based collaborative 2D geometry tool that enriches the teaching and learning of geometry concepts in Indian schools, aligning with NCERT curricula for classes 6th to 10th, with features like geometry creation, annotations, measurements, real-time collaboration, and more, aiming to improve math education. This application has been onboarded to DIKSHA Portal.

CollabCAD (https://collabcad.gov.in) is a 3D/2D Engineering Drawing Software system, for the education sector available on desktop and collaborative network enabled systems benefiting CBSE affiliated schools'

students studying engineering graphics in class XI-XII. A web-based 3D viewer platform is also available for students and academicians to visualize 3D digital models directly over modern web-browsers without installing any software or plugins.

2.5.5 e-Transport

2.5.5.1 About eTransport MMP

One of the key IT initiatives by the Ministry of Road Transport and Highways (MoRTH) to modernize transport sector management and operations is the eTransport Mission Mode Project. This comprehensive digital platform, developed with technical support from NIC, enables all transport-related services through a centralized, web-based system that operates nationwide.

2.5.5.2 eTransport Ecosystem

The project integrates the entire vehicle life cycle—including manufacturing, sales, registration, insurance, financing, testing and fitness, and scrapping. Data and services have been interconnected with stakeholders across allied sectors, such as vehicle manufacturers, dealers, banks, FASTag, eWay Bill, Smart Cities, Pollution Checking Centers, Fitness Centers, Driving Schools, GST, and police and security agencies (NATGRID, NCRB, CCTNS), among others.

2.5.5.3 Integration of e-CHALLAN with Intelligent Traffic Management System (ITMS)

e-Challan or electronic Challans, is a "One Nation One Challan" traffic enforcement solution, consisting of an android-based mobile app and a web interface. It has been developed for the purpose of providing a comprehensive solution for Transport Enforcement Officers and Traffic Policemen. The solution has digital interfaces for all the stakeholders in ecosystem viz. MoRTH, State Departments, Police, Citizen, Court, etc. This application is integrated with Vahan and Sarathi applications and provides a number of user-friendly features while covering all major functionalities of the Traffic Enforcement System. As of 31st December 2024, the total number of eChallans generated through the ITMS system stands at 4,85,14,307, and the revenue generated through ITMS amounts to Rs. 688,46,74,603.

2.5.5.4 Integrated Road Accident Database (iRAD)

The iRAD (Integrated Road Accident Database) project of MoRTH has been envisioned to work in the direction of promoting and enhancing Road Safety. The project is being executed by NIC, in association with NICSI.

The project operates in an integrated ecosystem of various stakeholders – comprising data producers/ data consumers viz. Police, Hospitals, Ambulance Services (particularly the 108 ambulances), Blood Banks, Medical Records, State and National Transport departments, Insurance companies, Courts, etc. and facilitate timely exchange of information among them for timely and effective response/ support.

The project is now expanded in new areas like – a) Facilitating the cashless treatment of Road accident victims in association with TMS application of NHA, b) Early claim settlement of Road accident victims in association with eCourts application, and c) Providing accident data layer to PM-GatiShakti project.

2.5.5.5 NextGen mParivahan App

NextGen mParivahan mobile app is a citizen-centric transport solution. It is available in both Android and iOS versions. It is one of the most popular Government applications with more than 10 Crore downloads. Transport services like Virtual RC/DL creation, Real time Insurance and PUCC validity details, online payment of tax, reporting of traffic violation, Citizen Sentinel etc. have also been incorporated in the app for state-specific implementation. 75 online services can be availed through this App.

2.5.5.6 Sale and Purchase of Pre-Owned Vehicles (Dealer Authorization Certificate (DAUC))

The Dealer Authorization Certificate is issued to vehicle dealers in India. This certificate serves as proof that a dealer is authorized by the Regional Transport Office (RTO) to sell vehicles.

2.5.5.7 National Permit and All India Tourist Permit (AITP)

The "All India Tourist Permit" (AITP) is a permit issued by the Transport Authority, authorizing tourist vehicle operators or owners to transport tourists, either

individually or in groups, along with their personal luggage throughout India, upon payment of the permit fee.

2.5.5.8 Pollution Under Control Certificate (PUCC)

PUCC is a web application that allows Pollution Under Control Centres to issue PUC Certificate for any vehicle across the country.

Mobile application for PUCC has also been developed. The Mobile Application uses GeoFencing feature, allowing it to be functional only within a predefined radius of 30-40 meters of the PUC centre.

2.5.5.9 Registered Vehicle Scrapping Facility (RVSF) application.

As per GSR 653(E), Registered Vehicle Scrapping Facility (RVSF) application has been developed, which enables motor vehicle owners to easily phase out old and unfit vehicles that have high emissions and deteriorate air quality. The primary objective of this application is to remove polluting vehicles from running on the roads and subsequently lower the country's carbon footprint.

2.5.5.10 mVahan mobile App

mVahan is designed as a convenient mobile solution tailored for Departmental Officers at RTOs and internal stakeholders such as Dealers in India. Currently available on the Android platform, it streamlines a range of Vahan Services, including automating Vehicle Inspection and Fitness processes. The app also facilitates seamless document uploads by Dealers and RTOs during vehicle registration, enhancing efficiency and reducing paperwork. Additionally, mVahan supports services like processing requests for Change of Address, further simplifying administrative tasks within the transport sector

2.5.5.11 Automatic Fitness Management System (AFMS)

The Automatic Fitness Management System (AFMS) is a pioneering initiative launched 2022, governed by the MoRTH Gazette notification GSR 652 (E), to modernize vehicle fit management in India. Vehicle owners can now book appointments for fitness check online at any ATS, whether within their state of anywhere else in India. This convenience allows them to access fitness services without geographical constraints, view fitness reports, and apply for re-tests if necessary.

2.5.5.12 Vehicle Location Tracking Device (VLTD)

The Vehicle Location Tracking Device (VLTD) application simplifies the approval and installation process for tracking devices and panic buttons in public service vehicles.

2.5.5.13 Homologation

The Homologation application streamlines the process of obtaining Type Approval for vehicles before they enter the market, ensuring a smooth execution.

2.5.6 Inclusive Development

2.5.6.1 Mahatma Gandhi National Rural Employment Guarantee Act (MGNREGA)

To ensure more transparency in the implementation of MGNREGA in the States/UTs, a provision for capturing of worker's attendance at worksite through National Mobile Monitoring System (NMMS) App with geo-tagged, real-time stamped photographs of the worker twice in a day has become mandatory from January 2023. This app operates in both online and offline modes and eliminates connectivity issues at village. This has also enabled faster processing of payments for workers. NMMS app is being used by Gram Rojgar Sahayak (GRS) and MATE/ Group Leader, responsible for capturing demand and submit to Panchayats in group for work allocation.

2.5.6.2 Jal Jeevan Mission (JJM)

The Jal Jeevan Mission (JJM) aims to provide every rural household with a regular and long-term supply of drinking water in adequate quantity and prescribed quality, at affordable service delivery charges, improving the living standards of rural communities. Key ICT initiatives taken this year include:

JJM IMIS: A comprehensive effort has been undertaken to authenticate over 6,38,548 rural water supply schemes. Information about all schemes has been verified at the division and state levels, and a signed, authenticated form (in PDF) for each scheme, is uploaded to the portal.

JJM Dashboard: A new **citizen portal** was launched by the Honorable Minister of Jal Shakti at an event in

Lucknow. This portal allows citizens to view the water quality status of water being supplied to their villages, as well as other relevant information, such as a list of beneficiaries receiving water from taps in their villages.

JJM WQMIS: Under the guidance of Secretary Department of Drinking Water and Sanitation, the process of onboarding water testing labs from other departments to the JJM WQMIS has begun. Currently, urban labs from the Ministry of Housing and Urban Affairs are being integrated, and their staff have been trained to use WQMIS through various capacity-building sessions.

JJM Web-API Portal: The JJM Web API Portal is a digital platform enabling the integration of services and applications with the Jal Jeevan Mission's database. Various APIs have been published to share JJM data as per departmental instructions. State user departments, other ministries, and institutions are utilizing this data seamlessly. The portal is a vital tool for integrating, monitoring, ensuring transparency, and providing analytics for efficient water supply management across rural India.

JJM Mobile App: A user-friendly mobile app has been designed, developed, and rolled out for geo-tagging assets of water supply schemes, including water sources, storage structures, treatment plants, pump houses, etc.

2.5.6.3 Swachh Bharat Mission-Grameen (SBM-G)

SBM-G Dashboard displays all the monitoring parameters of achievement and progress related to ODF Plus villages (Aspiring, Rising, Model), villages having arrangement of solid and liquid waste management arrangements, visual cleanliness, SLWM assets reported (like community compost pits, soak pits, segregation sheds, HH assets etc.), community sanitary complexes up to village level. It also displays the state wise / district wise progress of relevant parameters. Also, village report card is visible to view the ODF Plus status of the village.

SBM Portal: Portal is updated for documents / circulars / guidelines / Press releases and enhanced for Swachhata Samachar published by SBM G on regular basis.

SBM-G MIS: Used for Data entry in relevant modules (declaration of ODF Plus villages, marking of Solid and liquid waste management arrangement, functionality assessment) and displays all the reports related to captured information in MIS through mobile apps and web-based modules.

2.5.7 Consumer Affairs and Food & Public Distribution

2.5.7.1 CONFONET

The scheme of 'Computerization and Computer Networking of Consumer Fora in the country, (CONFONET)' aims to digitalize the functioning of the Consumer Commissions at all the three tiers throughout the country. The registration of complaints, recording of court proceedings, issue of notices, generation of cause lists, recording of judgements, record-keeping, and generation of statistical reports etc. are carried out through Online Case Monitoring application software.

2.5.7.2 eDaakhil (https:// edaakhil.nic.in)"

As an initiative of Department of Consumer Affairs, a web- based application software named "eDaakhil has been developed by NIC. The portal empowers the consumers who has any grievance w.r.t any deficiency in services or quality of Goods.

2.5.7.3 Targeted Public Distribution System

The Government of India launched the scheme "End-to-End Computerization of Targeted Public Distribution System (TPDS) Operations" in 2013 to modernize the TPDS operations and to bring transparency in the distribution of highly subsidized food grains across the country. The System is operated under the shared responsibility of the Central and the State Governments. NIC is the Technical Partner for the key initiatives and outcomes of TPDS.

Key Achievements

- Digitization of ration cards/beneficiary database for correct identification of beneficiaries; removal of bogus cards and better targeting of food subsidies.
- Online allocation of food grains for system-generated allocation orders to bring transparency in allocation of food grains, up to the Fair Price Shops level.

- Computerization of Supply Chain Management to ensure timely availability of food grains at all FPSs for delivery to the targeted beneficiaries and to check leakage/diversion of food grains.
- Online Grievance Redressal / Toll-Free Helplines and Transparency Portals to introduce transparency and public accountability in the implementation of TPDS.
- Aadhaar seeding of about 99.8% ration cards and almost 97.4% beneficiaries at the national level have been achieved so far.
- Almost 5.41 (99.6%) lakh of the total 5.43 Lakh FPSs in the country are automated by installing electronic Point of Sale (ePoS) devices.
- About approx. 98 % average foodgrains are distributed through Aadhaar-authenticated electronic transactions on a monthly basis.
- RCMS applications have been integrated with DIGILOCKER, UMANG App, NHA – PMJAY, CSC, States Citizen Services Portals, etc.

2.5.7.4 One Nation One Ration Card (ONORC)

To address various challenges such as leakages and diversion of food grains and create a Smart Public Distribution System, IM-PDS scheme was launched in 2018. The Key components of the IMPDS scheme are National Portability, Deduplication, creation of Central Repository and Data Analytics. Starting with inter-state portability in just 4 States in August 2019, the ONORC plan has been enabled in all 36 States/UTs (across the country) covering around 80 Crore NFSA beneficiaries, *i.e.,* almost 100% NFSA population in the country.

2.5.7.5 Common Registration Facility of Ration Cards (CRF) "Mera Ration Mera Adhikar" (https://nfsa.gov.in)

A Web based application to enable States/UTs to collect data of persons desirous of registering themselves for inclusion under NFSA, including migrants residing in other states.

The Common Registration Facility of Ration Cards (CRF), titled "Mera Ration Mera Adhikar," was introduced as a web-based application designed to empower States/ Union Territories (UTs) to collect crucial data from individuals seeking registration under the NFSA.

Under the framework of the NFSA 2013, NIC has been working towards the end-to-end computerization of NFSA schemes, streamlining the distribution of subsidized food grains across all states. This initiative encompassed various activities, including the real-time online Ration Cards Management System, FPS (Fair Price Shop) licensing, godown profiling, Allocation and Supply Chain Management of commodities, and Aadhaar-based distribution to beneficiaries.

2.5.7.6 Fortification of Rice and its Distribution under PDS (https://annavitran.nic.in/FR/avFortifiedRice)

NIC has developed the dashboard for Rice Fortification which was launched by Hon'ble Minister in Dec' 2021. The dashboard provides information on fortified rice allocation, distribution, beneficiaries, procurement of fortified rice by Food Corporation of India, procurement of fortified rice by States, details of the fortified rice suppliers, rice mills with blending capacity, etc. Apart from MIS related information, the dashboard also provides the various standards pertaining to rice fortification.

2.5.7.7 Subsidy Claims Application for NFSA (SCAN) (https://nfsa.gov.in)

The Hon'ble Minister of Consumer Affairs, Food, and Public Distribution, Shri Prahlad Joshi, inaugurated the **Subsidy Claims Application for NFSA (SCAN Portal)** on 05-12-2024 at Bharat Mandapam, New Delhi. This state-of-the-art application, designed & developed by the National Informatics Centre (NIC), revolutionizes the management and disbursement of food subsidies of approximately Rs. 2.8 Lac Crore under the National Food Security Act (NFSA) and other welfare schemes. The SCAN Portal ensures streamlined processing for all subsidy-related claims, making the system faster, more transparent, and highly efficient. It's a Game-Changer for Public Distribution Systems for Government of India & State Governments. The SCAN Portal's integration with the Public Financial Management System (PFMS) ensures automated and error-free fund disbursements directly to state food department accounts and FCI.

2.5.8 Law & Justice

2.5.8.1 eGovernance Support to Supreme Court (https://sci.gov.in)

eGovernance Support to Supreme Court include the official website for citizen-litigants centric services like Cause List, Case status, Daily orders, Judgements, Vernacular Judgements, e-Copying for providing benefits of scalability and extensibility

The **E-filing 2.0** provides ease in the business of electronic filing, defects notification, curing of defects, processing the documents for scrutiny to all the stakeholders, namely, Advocates-on-Record, Party-in-Person, and the registry.

FASTER, Fast and Secure Transmission of Electronic Records, courts can send e-authenticated copies of bail orders, stay orders, interim orders, and proceedings through secured electronic communication to duty officers at prisons, for releasing prisoners expeditiously.

Work from Anywhere module called the **e-office** has shifted the day-to-day work mode of Registry away from paper-dependency and confines of work-station space besides increasing ease and speed of performance.

e-SCR (Supreme Court Reporter) system, an online repository of reported judgments of the Supreme Court made available to citizens, free of cost, at the click of a button.

Neutral Citation System allows decisions of the Supreme Court to be identified and cited through a unique number.

SuSwagatam, a citizen centric, web-based, and mobile-friendly app, facilitates visitors to the Supreme Court to now request an e-Pass to enter the Court premises rather than waiting in long and tedious queues.

An **automatic transcribing of arguments** and exchanges in matters before the Constitutional Benches by use of artificial intelligence and is available in respective cases on the website.

Hybrid hearing system combines the best of video meeting tools and conferencing technology to ensure that advocates and parties-in-person have the convenience to choose to appear either in virtual mode or physical mode.

2.5.8.2 Tribunals, Regulatory Bodies and Commercial Courts

Online Tribunals System of NIC is an ICT enabled initiative towards digital transformation of processes, workflows followed in tribunals through process re-engineering and providing a configurable automated system to cater needs of all its direct and in-direct stakeholders.

Objectives	Dimensions	Features
❑ Implement decision support systems in Tribunals.	❑ **e-Filing:** Caters online filing of Petition /Application /Caveat by Litigants including requisite payments, document submission etc	❑ 24×7 availability of e-filing: Anywhere, Anytime
❑ Automate the processes to provide transparency in accessibility of information to its stakeholders	❑ **Case Information System (CIS):** Covers and facilitates end to end electronic processing of e-filed case by Tribunal	❑ Court fee calculation, online payment and unique filing number generation ❑ Online scrutiny check and defect notification via email
❑ To enhance judicial productivity, both qualitatively & quantitatively, to make the justice delivery system affordable, accessible, cost effective, predictable, reliable and transparent	❑ **Document Management System (DMS):** Online repository for accessing documents pertaining to cases.	❑ Case Type based unique registration number allotment and sms/email notification ❑ E-Causelist generation and publishing, orders generation and publishing
❑ To bring tribunals on board with online court system under common framework with minimal customizations	❑ **e-Hearing (Through VC):** Facilitates online appearance/ hearing of Litigants before benches in the cases. In hybrid mode, litigants can present in person physically or Video Conferencing.	❑ Digitized and digitally signed case documents/ Cause lists/Summon/ Notice/Orders/Judgements ❑ Business rules based case allocation to different courts

2.5.8.3 eCourts

e-Courts project has been planned by the eCommittee, Supreme Court of India by submitting the National Policy and Action Plan for Implementation of Information and Communication Technology (ICT) in the Indian Judiciary – 2005. The project lays great emphasis on service delivery to litigants, lawyers, and other stakeholders. It involves the creation of improved ICT infrastructure in Courts, Video conferencing etc., and ensures optimum automation of judicial and administrative processes

2.5.8.4 Case Information System (CIS), Application for Indian Judiciary (https://ecourts.gov.in)

Case Information System (CIS) is an application designed and developed by NIC for Indian Judiciary. It is implemented in High Courts and District & Subordinate courts of the country. Currently CIS version 3.2 & version 4.0 is implemented in 3,325 & 4760 District & Subordinate courts respectively and CIS HC Version 1.0 is implemented in 22 High Courts in the country. Automated SMS and Emails are triggered to Advocate/ Litigants on case events. Single unified portal (https://ecourts.gov.in) and eCourts services mobile app provides citizen centric services like case status, cause lists and orders/judgements to stakeholders like litigants, advocates, police etc.

2.5.8.5 National Judicial Data Grid (http://njdg.ecourts.gov.in)

National Judicial Data Grid is a consolidated nationwide judicial data warehouse which was set up with real time updates. NJDG provides statistics of pending and disposed cases in the country. It works as a monitoring tool to identify and manage the pendency of cases.

2.5.8.6 Virtual Courts

The concept of Virtual Courts is aimed at reducing footfalls in the courts by eliminating the physical presence of violators or advocates in the court. A virtual judge can preside over a Virtual Court whose jurisdiction can be extended to the entire state and working hours may be 24×7. Neither litigant need to visit the court nor judge will have to physically preside over the court, thus saving precious judicial time.

2.5.8.7 ePay (https://pay.ecourts.gov.in)

ePay is developed as a single payment gateway for the payment of various kinds of digital payments in the courts. It enables payment of court fees, judicial deposits, fine, penalty and other fee online through the ePay portal, thereby eliminating the use of stamps, cheque, and cash. ePay portal is integrated with 36 different State treasury applications like SBI ePay, GRAS, eGRAS, JeGRAS, Himkosh, etc. used by respective State Governments.

2.5.8.8 eFiling (filing.ecourts.gov.in)

eFiling 3.0 system is a complete end to end solution developed for online filing of plaints, written statements, replies, and various applications related to cases. Both Civil and Criminal cases can be filed before any High Court or District Court of the country. The system is designed in Bilingual (English and local language) to reach wider group covering advocates/litigants.

2.5.8.9 NSTEP

NSTEP provides a Centralized process service tracking application and a bilingual mobile app for bailiffs designed to reduce inordinate delays in process serving. New enhancement for sharing warrants/ summons with CCTNS application through ICJS has been introduced.

2.5.8.10 JustIS App

JustIS mobile app is provided to Judicial officers to monitor pendency and disposal at fingertips. It also includes several new features like “Briefcase” to view the disposal of cases during previous postings. Principal District Judge can monitor pendency and disposal of the entire district under the jurisdiction and for individual judges.

2.5.8.11 Judgment Search Portal

Judgment search portal provides facility to search High Courts and Supreme Court judgments. Facility provided to search judgements on various parameters like Case Type, Act, Judge, Decision date etc.

2.5.8.12 Digital Courts

Digital Courts, Green Initiative of Indian Judiciary, has been developed to make courts paperless/ digital. It provides a facility for Judges to view case files/ documents while sitting at home. Judges can view all the case-related pleadings, charge sheets, court orders etc. of both civil and criminal cases which aim at making the court paperless. It provides AI (Artificial Intelligence) based Automatic Speech Recognition (ASR) facility for converting speech to text to generate judgements. Case Information System (CIS), eFiling, JustIS Mobile App and Interoperable Criminal Justice System (ICJS) are integrated with Digital Courts.

2.5.9 Home Affairs

2.5.9.1 Interoperable Criminal Justice System (ICJS)

Inter-Operable Criminal Justice System (ICJS) is a national platform for enabling integration of the main IT system used for delivery of Criminal Justice in the country by five pillars namely: -

- Police (Crime and Criminal Tracking and Network Systems),
- e-Forensics for Forensic Labs,
- e-Courts for Courts,
- e-Prosecution for Public Prosecutors
- e-Prisons for Prisons.

The system is being built on the principle of 'one data one entry' whereby data is entered only once in one pillar and the same is then available in all other pillars without the need to re-enter the data in each pillar. It was mainly intended to make the Justice delivery system speedy and transparent.

2.5.9.2 National Cyber Crime Reporting Portal (https://cybercrime.gov.in)

This portal is an initiative of Government of India to facilitate victims/complainants to report cybercrime complaints online. It caters to complaints pertaining to all types of cybercrimes. Complaints reported on this portal are dealt by law enforcement agencies/ police based on the information available in the complaints. It is imperative to provide correct and accurate details while filing complaints for prompt action.

Types of Portals:

- **National Cybercrime Reporting Portal (NCRP)–** For citizens to report and track their Cybercrime complaints.
- **National Cyber Police Portal (NCPP)–** Backend portal for MHA, DoT, IB, CBI, TSPs, LEAs and financial intermediaries to process the complaints. (https://cyberpolice.nic.in).

2.5.9.3 ePrisons

ePrisons is a comprehensive application which has developed over time by studying the working process of various prisons across the country and it covers the entire lifecycle of the prisoner.

This product is highly configurable as per the needs of the state prison department and caters not only to the entire lifecycle of the prisoner but also caters to various needs of the prison authorities.

2.5.9.4 Citizen Portal

ePrisons has extended the services to the Citizens, whose relatives are lodged inside the Jail and Prison authority can provide the data in digital way without manual intervention.

2.5.9.5 Private Security Agency-License (PSA-License) Portal (https://psara.gov.in)

Private Security Agency-license (PSA-License) portal is single window Portal for new / renew of Private Security Agency license to run their businesses, required under the Private Security Agencies Regulation Act 2005 for all the States/ UTs of India.

2.5.10 Culture and Tourism

2.5.10.1 Tourism

Key ICT activities initiated by the collaborative efforts of NIC and Ministry of Tourism:

(i) Tourist Sentiment Tracker-

An innovative feedback mechanism through QR code designed to capture real-time insights from visitors across the country was launched in the month of September 2024. The Tourist Sentiment Tracker is a crucial step towards fostering a more personalized, high-quality experience for every visitor, ensuring that India continues to shine as a global tourism destination.

(ii) Yuva Tourism Club Portal- (https://ytc.tourism.gov.in)

The YUVA Tourism Club portal was developed to capture details and activities of several thousand Yuva Tourism Clubs across the world. Members can register through the dedicated portal, where they can upload details of their various activities and events.

(iii) Utsav Portal- (https://utsav.gov.in)

Utsav is a platform that showcases India's vibrant events and festivals across its diverse States and Union Territories (UTs), including Live Darshan for religious observances.

(iv) Incredible India 2.0- (https://incredibleindia.gov.in)

The Incredible India 2.0 platform was launched on 27th September on World Tourism Day at Vigyan Bhawan by the Hon'ble Vice President of India. It was developed to make as one of the finest tourism platforms in the world. Through utilizing advanced digital tools, this platform boosts India's visibility and provides personalized content to attract a wide range of tourists. It is enabling improved engagement with travelers, making India a preferred destination in established and emerging markets.

2.5.10.2 Culture Informatics

- **Bhartia Kriti Sampada Portal (Pandulipi Patala) (https://www.pandulipipatala.nic.in/)**

  National Mission on Manuscripts (NMM) aims to locate, document, preserve and render the Manuscripts, which constitute the memory and cultural heritage of India. It connects India's past with its future. A web-based workflow application is developed for NMM for Bhartiya Kriti Sampada where lacs of manuscript data files are uploaded. The application is developed in collaboration with NICSI, National Mission on Manuscript and NIC.

2.5.11 Labor & Employment

2.5.11.1 National Database of Unorganized Workers (eShram Portal)

NIC has developed an e-Shram portal for creating Aadhaar authenticated comprehensive NDUW. The portal has details of the Unorganized workers such as Name, Mobile Number, Occupation, Address, Aadhaar seeded Bank name, Educational Qualification, Skill types etc. It is the first-ever national database of Unorganized workers. More than 30.58 Crore eShram cards have been issued since the launch of the portal.

2.5.11.2 Unified Shram Suvidha Platform (USSP)

USSP portal facilitates the Ministry of Labor & Employment and its Labor Law Enforcement Agencies like EPFO, ESIC, CLC(C) and DGMS to monitor the implementation of Labor laws in various establishments in the central sphere. It facilitates the employer/establishment to file common registration, filing of annual returns under 8 Labor Laws along with online common Return under Mines Act of DGMS. Unique Labor Identification Number (LIN) is allotted to each establishment registered under any Labor law after deduplication of data coming from various enforcement agencies. Till date more than 46.74 Lakhs LIN have been issued through USSP. Nine State Governments are also onboarded with Shram Suvidha Portal.

2.5.11.3 Platform for Effective Enforcement for No Child Labor (PENCiL)

PENCiL portal connects the Ministry of Labor & Employment with 21 States, 280 Districts Project Societies with 3,400 (approx.) Special Training Centers (STCs) for effective enforcement for "No Child Labor". It sets baselines based on KPIs at the levels to monitor physical and financial progress reports. The platform captures children identified and rehabilitated through STCs and skill development depending on age group

and nature of industry from where the children have been rescued.

2.5.11.4 SAMADHAN Portal

SAMADHAN Portal is a digital initiative of the Ministry of Labor and Employment, Government of India to make the life of workmen, management, trade union and other stakeholders smooth by making the system more user-friendly, transparent & efficient though online documentation, centralized monitoring & reducing disposal time by giving them a single online platform for raising their grievances. SAMADHAN portal facilitates workmen, trade union or management to raise an industrial dispute, Claims and General Complaints before the Conciliation Officer (CO) of the area.

2.5.11.5 National Career Service Centre for SC/STs Portal

The National Career Service Centres (NCSCs) for Scheduled Castes and Scheduled Tribes (erstwhile NCSC) comes under Directorate General of Employment (DGE) which operate six courses, namely Special Coaching Scheme, Computer O Level Training, Computer Hardware Maintenance Training, Office Automation Accounting Publishing Assistant, Business Accounting Associate and Cyber Secured Web Development Associate.

The portal is developed for this scheme that contains the process flow from filling up the application form by beneficiaries till the monthly stipend being disbursed DBT through PFMS portal based on eligibility criteria.

2.5.12 Power and Energy

2.5.12.1 National Power Portal (NPP) (https://npp.gov.in)

NPP, an integrated suite of various energy applications for the Indian Power Sector facilitates online data capture at various frequencies (daily, monthly, annually). The data is provided by generation, transmission, and distribution utilities in the country through various automated subsystems which validate and process the collected data and disseminates the same through various analyzed reports, graphs, statistics at all India, region, state level for central, state, and private sector. NPP monitors around 62,594 urban distribution feeders, their power supply position, and AT&C losses and 1,31,335 rural feeders, their power supply position. The All India Installed Capacity and Generation data is captured from around 530 stations comprising 1724 units, besides monthly progress of around 1320 Transmission Lines and 1200 Sub-Stations from 88 transmission utilities.

2.5.12.2 Non-Industry and Industry Power Survey (NIPS) (https://cgp.npdms.nic.in)

This system is designed and developed by NIC to capture and monitor detailed data on captive power plant capacity and generation across the country.

2.5.12.3 Disaster Resource Inventory for Power Sector (DRIPS) (https://drips.npp.nic.in)

The Ministry of Power and Central Electricity Authority envisaged to provide an online centralized application to maintain inventory of power sector items for disaster affected areas to provide quick information on various power sector items available in nearby areas to restore electricity supply as soon as possible. An online web based integrated application has been developed by NIC for the same.

2.5.12.4 National Portal for PM – Suryaghar: Muft Bijli Yojna (https://pmsuryaghar.gov.in/)

National Portal for PM – Suryaghar: Muft Bijli Yojna aimed at installing rooftop solar plants in 1 crore households. The scheme was launched by Govt of India on 13.02.2024 and subsumed the earlier scheme of Phase-II of the Grid connected Rooftop Solar programme. This is a role based portal and different stakeholders MNRE, DISCOMs, SNAs, SECI, PSUs, Government Agencies, Vendor, and Beneficiary use this portal as per their requirements. This portal facilitates beneficiaries for registration followed by submitting applications for installation, inspection, installation and release of subsidy. The portal is integrated with around 80 DISCOMs for beneficiary verification. As of now, approximately 1.56 crore beneficiaries had registered on the portal, and 33.2 lakh applications had been received. Subsidies have been released for 5.45 lakh beneficiaries.

2.5.12.5 Biogas Portal (https:// biogas.mnre.gov.in)

The Ministry of New & Renewable Energy (MNRE) launched Biogas and BioUrja portals under the Umbrella scheme of the National Bioenergy Programme for the duration of FY 2021-22 to 2025-26 (Phase-I). Biogas Portal is a central platform for beneficiaries to install small and medium biogas plants ranging from 1 cubic meter to 2,500 cubic meter.

2.5.12.6 BioUrja Portal (https:// biourja.mnre.gov.in)

BioUrja Portal is an online platform developed to assist project developers in submitting applications for plant installation and commissioning of Biomass and Waste to Energy.

2.5.12.7 Akshay Urja Portal (https://akshayurja.gov.in/)

The Akshay Urja Portal, serves as a comprehensive centralized system for renewable sector which facilitate monthly data capture (solar, wind, hydro, bio) from various sources of the ministry and it disseminate renewable energy information (capacity, potential, generation) through interactive map of India which enhances data visualization, promotes transparency and informed decision-making using various data analyzed reports, graphs, and statistics at all India, region, and state level.

2.5.13 Good Governance & Enforcement

2.5.13.1 IVFRT: Immigration, Visa, and Foreigners Registration & Tracking

The Ministry of Home has embarked on a Mission Mode Project known as Immigration, Visa, and Foreigners Registration & Tracking (IVFRT). Its primary goal is to create and put into action a secure and unified service delivery system that streamlines the entry process for genuine travelers while enhancing security measures.

2.5.13.2 Indian Citizenship Portal (https://indiancitizenshiponline.gov.in)

An online application portal for Indian Citizenship, based on established rules, has been created for foreign individuals.

The process of renunciation of Indian Citizenship is entirely digital, devoid of cash transactions, and operates without direct face-to-face interactions, aligning with the Indian Citizenship Act. The application system has also been linked to the IVFRT database, facilitating the retrieval of data regarding Indian citizens who have renounced their citizenship.

2.5.13.3 e-Visa

e-Visa scheme facilitates international travelers in seeking Indian Visa on short notice for business visits, medical patients, and tourists.

2.5.13.4 National eVidhan Application (NeVA) (http://neva.gov.in)

NeVA aims to bring all the legislatures of the country together, in one platform thereby creating a massive data repository without having the complexity of multiple applications. The objective of National e-Vidhan Application is electronic flow of information, electronic laying of documents on the Table of the House and electronic information exchange among all the stakeholders to create a paperless legislature in the country.

2.5.13.5 Digital Sansad (https://www.sansad.in/)

Digital Sansad (Temple of Democracy at a click) Project for Parliament is an integrated platform for all stakeholders including Members of Parliament, Citizens, Lok Sabha Secretariat and Government Ministries/ Departments. It aims to provide various online facilities in a collaborative and transparent manner through integrated technology platforms to all stakeholders.

2.5.13.6 Service Plus

ServicePlus continues to evolve as a robust and scalable platform, enabling government departments to seamlessly deliver citizen-centric services across various sectors. By leveraging its Low Code-No Code architecture, ServicePlus ensures that even departments with limited technical capabilities can configure and deploy services with minimal effort. Additionally, ServicePlus places a strong emphasis on interoperability and scalability, accommodating the growing demand for digital public services while maintaining a user-friendly interface. ServicePlus has 3,548 services operational and has successfully processed over 344 crore applications, showcasing its significant impact and scalability.

2.5.13.7 Aadhaar Authentication Services

NIC is providing Aadhaar Authentication Services to various eGovernance projects. These services are utilized by more than 122 Digital India projects, such as Biometric Attendance System, Digi-Locker, Ayushman Bharat, PDS for 24 states and 5 UTs, MSME, PM KISAN, MGNREGA, Scholarship, Jeevan Pramaan, Pradhan Mantri Awaas Yojana (PMAY), National Urban Livelihood Mission, Goods Service Tax Network (GSTN), Dept of School Education etc. Aadhaar Authentication Services offers online and real-time services including Authentication, e-KYC, OTP, and tokenization.

2.5.13.8 Aadhaar Data Vault Services

NIC has set up a centralized facility for storing Aadhaar numbers in a secure dedicated storage. The Aadhaar numbers are encrypted using keys specifically created for the purpose. The keys are created and stored in intrusion resistant FIPS 140-2 Level 3 HSM devices. Aadhaar Data Vault is the enabler for applications like PFMS, PM KISAN, MGNREGA, NTAJEE, National Scholarship Portal, Jeevan Pramaan, and many more for storing Aadhaar numbers of beneficiaries under various government schemes as per UIDAI guidelines.

2.5.13.9 Aadhaar Enabled Biometric Attendance System (AEBAS) (https://attendance.gov.in)

Aadhaar Enabled Biometric Attendance System (AEBAS) application was created for all Central / State Government employees who are registered on the attendance portal to mark their attendance.

Currently, AEBAS System has more than 28,000 organisations with over 24 lakh transactions on daily basis.

2.5.13.10 E-Sign Gateway

NIC E-Sign Data Management Service Division had been managing the E-Sign Gateway for enabling NIC supported applications to consume E-Sign services of C-DAC. As on date a total of over 369 applications including NIC, eFile, SPARROW, eOffice, DBT, PM Kisan, ePrisons, CVC, CIC, DBT Fertilizers, MoEF, Cabinet Secretariat, several state governments and many others are using the service.

2.5.13.11 Jeevan Pramaan (https://jeevanpramaan.gov.in/)

Jeevan Pramaan is a digital service that allows pensioners to submit their life certificates through a biometric verification process. This service is available for pensioners of the Central Government, State Governments, and various other government organizations.

Jeevan Pramaan enables pensioners to submit a life certificate from anywhere, anytime, even from home. Aadhaar based biometric authentication is being used to ensure the aliveness of the pensioner. To further ease the way of submission of Jeevan Pramaan, Face Authentication based Life Certificate application has been launched on 29th Nov 2021. Face Authentication App eliminates the need of biometric devices and hence makes it easier to generate life certificates from home using just an android smartphone.

As of now, 206 sanctioning authorities and 201 disbursing agencies have been integrated with the Jeevan Pramaan platform. These include various entities such as central and state governments, banks, Public Sector Undertakings (PSUs), and autonomous bodies. In 2023-24 more than 1.51 Crore DLCs have been generated.

2.5.13.12 Smart Card Technology Division (https://kms.parivahan.gov.in/DLSmartCardWeb/home; https://kms.parivahan.gov.in/rcsmartcardweb/home)

Web-Key Management System (KMS) for Issuance of Smart Card Based Driving License (DL)/Registration Certificate (RC)

As an e-governance initiative, Ministry of Road Transport and Highways initiated the project of computerization of all RTOs and issuance of Smart card-based DL and RC. The application adheres to national standards based on ISO 7816, utilizing SCOSTA (Smart Card Operating System for Transport Application) o/s.

2.5.13.13 RTI Online Portal

The RTI Online web portal, initiated by the Department of Personnel and Training and developed by NIC-DoPT, allows citizens to submit RTI requests and appeals online. Launched for Central Government Ministries/ Departments in August 2013, it facilitates online registration by citizens and NRIs, with integrated payment gateways. The portal has been extended to subordinate organizations, attached offices, PSUs, and State Governments, including Maharashtra, Delhi, Karnataka, Uttar Pradesh, and Ladakh UT. The system provides bilingual support, enables online payment of RTI fees, generates unique registration numbers, and allows citizens to track the status of their requests and appeals.

2.5.13.14 SNMS (Summons and Notices Management System)

SNMS (Summons and Notices Management System) is a collaborative effort between NIC and domain experts from Serious Fraud Investigation Office (SFIO). Designed to effectively manage cases handled by different Investigation Units and the issuance of summons/ notices. The system, aligned with SFIO's workflow, facilitates the generation of investigation orders and captures information related to cases, companies, and individuals. through user-friendly interfaces.

CHAPTER

3 Make in India

Electronics Manufacturing

Electronics industry is the world's largest and fastest growing industry and is increasingly finding applications in all sectors of the economy. The Government attaches high priority to electronics hardware manufacturing and it is one of the important pillars of both "Make in India" and "Digital India" programmes of Government of India. The intent of the Government is to provide a level playing field for the domestic manufacturers, enabling them to compete with imports in the sector by rationalizing tariff structure, simplifying procedures, providing incentives and upgrading infrastructure.

3.1 National Policy on Electronics 2019

The National Policy on Electronics 2019 (NPE-2019) notified on 25.02.2019 envisions to position India as a global hub for Electronics System Design and Manufacturing (ESDM) by encouraging and driving capabilities in the country for developing core components, including chipsets, and creating an enabling environment for the industry to compete globally. The implementation of the schemes and initiatives under the aegis of NPE 2019 is expected to generate employment for about 10 million (1 crore) persons (Direct and Indirect) at various levels.

NPE-2019 has been formulated to reflect the new aspirations, requirements and realities of the electronics manufacturing sector in the country and the emerging international dynamics. The aim of NPE-2019 is as follows-

- The NPE-2019 is focused on promoting an eco-system of manufacturing (group of industries), which forms supply chain of a product against the previous policy, which emphasis on promoting individual industries. The NPE-2019 aims to increase domestic value addition by leveraging potential of both domestic demand and export, with the goal of making India, a global hub for electronics manufacturing. The policy also promotes generation of intellectual property in India and deepening of the domestic research, development and designing capabilities.
- NPE-2019 also envisages intervention in emerging sectors of electronics like IoT, 5G equipment, sensors, drones, additive manufacturing (3D printers), robotics etc. and promotes their R&D and manufacturing. Among the sectors, Medical Electronics, Strategic Electronics, Auto & Power electronics have been especially identified as thrust areas for promoting manufacturing in India.
- The introduction of concept of trusted value chain in electronics will help in addressing concerns related to cyber bugs and data thefts from our equipment. There is also focus on skilling, re-skilling and employment generation.
- To provide the supportive environment, NPE-2019 envisages extending the Phased Manufacturing Programme (PMP) to products other than mobile phones, maintain a progressive duty regime and incentivize industry to compensate for disabilities as compared to other manufacturing economies. The NPE-2019 will also enable India to take advantage of the global shifts in electronics manufacturing locations.
- NPE-2019 has ushered in a slew of new incentive schemes. Prominent among these are Production Linked Incentive (PLI) Scheme for Large Scale

Electronics Manufacturing, Scheme for Promotion of manufacturing of Electronic Components and Semiconductors (SPECS) and Electronics Manufacturing Clusters (EMC 2.0) Scheme.

3.2 Growth of Electronics Sector

Indian electronic manufacturing industry has undergone major transformation in the last couple of years with the host of initiatives and reforms. The government has taken several initiatives to promote electronics manufacturing and as a result, the domestic production of electronic goods has increased substantially from INR 5.54 lakh crore (~USD 76 Bn) in FY 2020-21 to INR 9.52 lakh crore in FY 2023-24 (~USD 115 Bn), growing at a Compound Annual Growth Rate (CAGR) of 19.78%. The key drivers of growth are the large domestic market, and availability of skilled talent and low-cost labour.

Production, Imports and Exports

The production, imports and exports of electronic goods for previous 3 years are presented below:

(Values in ₹ crore)

	2021-22	2022-23	2023-24
Production*	6,40,810	8,25,000	9,52,000
Imports**	5,49,713	6,20,752	7,27,664
Exports**	1,16,895	1,89,934	2,41,157

**Source: MeitY Annual Report, Industry Association for FY2023-24*

***Source: Directorate General of Commercial Intelligence and Statistics (DGCI&S)*

- *CAGR for Production from FY21-22 to FY23-24: 21.89%*
- *CAGR for Imports from FY21-22 to FY23-24: 15.05%*
- *CAGR for Exports from FY21-22 to FY23-24: 43.63%*

Electronics manufacturing sector has several verticals in terms of its constituents. The production profile of the electronics sector for FY 2022-23 and FY 2023-24, based on the information provided by Industry Associations is as follows:

Product Segment	FY22-23 (USD Bn)	FY22-23 (INR Crore)	FY23-24 (USD Bn)	FY23-24 (INR Crore)
Mobile Phones	44	3,50,000	51	4,22,000
IT Hardware (Laptops, Tablets)	4.5	37,291	5	41,395
Consumer Electronics (TV, Audio, Accessories)	12	99,442	13	1,07,627
Strategic Electronics	4.75	39,363	5.5	45,534
Industrial Electronics	12	99,442	12.5	1,03,487
Wearables & Hearables	1.25	10,359	2.5	20,697
Auto Electronics	7.5	62,151	8	66,378
LED Lighting	3	24,861	3.5	28,976
Telecom Equipment	2	16,574	3.5	28,976
Electronic Components	10	82,868	10.5	86,929
Electronics Manufacturing	**101**	**8,22,350**	**115**	**9,52,000**

Source: Industry Associations

Note: Medical Equipment and other Equipment having electronic content have not been taken into consideration.

As per DGCI&S data, import of electronic goods has increased from ₹ 6,20,752 crore in FY 2022-23 to ₹ 727,664 crore in FY 2023-24. It is seen that the growth rate of imports of finished goods have declined and that of electronic components have grown up indicating the need to set up of manufacturing units of electronic components in the country.

As per the data provided by DGCI&S, the export of electronic goods has increased from ₹ 1,89,934 crore in FY 2022-23 to ₹ 2,41,157 crore in FY 2023-24. The government has taken several measures for the growth of the exports of electronics hardware sector. Special Economic Zones (SEZs) are set up to enable hassle-free manufacturing and trading for export purposes and EHTP units are the major contributors to exports.

a. **Mobile Phones:** India has emerged as the 2nd largest manufacturer of mobile handsets in the world in volume terms. Over 260 units are manufacturing cellular mobile phones and parts/ components thereof in the country. Production of mobile phones stood at INR 4.22 lakh crore (~USD 51 billion) in FY23-24 as per industry association reports. The export of mobile phones stands at approx. INR 1.29 lakh crore (~USD 16 Bn) for FY 2023-24.

MeitY had introduced the Phased Manufacturing Programme (PMP) for cellular mobile handsets and related sub-assemblies/ parts manufacturing with the objective of progressively increasing the domestic value addition for establishment of a robust cellular mobile handsets manufacturing eco-system. As a result of implementation of the PMP and other Schemes/ Programmes of Government of India, now almost entire demand of cellular mobile handsets is being met from domestic manufacturing.

b. **Information & Communication Technology (ICT) Hardware:** The first application of electronics was in the domain of communication and computing. With the emergence of integrated circuit, the world saw the advent of the digital computer era, and with the advent of microprocessor in the 1970's, the world saw an exponential growth of the Information and Communication Technology (ICT) industry. Its strategic importance is such that countries across the world have declared it as an essential commodity. With its pool of technical manpower and proven capability as a design center for most of the global hardware companies, the country is ready to become an end-to-end player and global leader in the ICT hardware design and manufacturing space.

India has a huge opportunity arising from both import substitution and export-led manufacturing in the space of ICT hardware. In addition, ICT hardware holds the promise of high value addition in India, with the manufacturing of the Components (i.e., Sub-Assemblies of ICT Products), Product design and Semiconductor Design being done in the country.

Emerging domains of AI, ML, IOT are becoming the new driving forces behind the growth of ICT hardware segment. These domains require the design of specialized Semiconductors, Sensors and Servers for which India has the capability. Another emerging domain in ICT hardware is the Large-Scale Data Centres. India with its technical prowess, cheap labour, large pool of manpower, and English as the working language, has the opportunity to lead the world in all these domains.

c. **Electronic Components:** The global market for electronic components is expected to grow. Following this global trend, the Indian electronic components market is also poised to grow significantly. Mobile Phones, Consumer Electronics and Industrial Electronics account for the major demand (82%) for electronic components in India.

GoI launched the Scheme for Promotion of Manufacturing of Electronic Components and Semiconductors (SPECS) (notified vide Gazette Notification No.CG-DL-E-01042020-218992 dated April 01, 2020). This scheme provides financial incentive of 25% on capital expenditure for the identified list of electronic goods that comprise downstream value chain of electronic products, i.e., electronic components, ATMP units, specialized sub-assemblies and capital goods for manufacture of aforesaid goods. Apart from SPECS, the other policies of Government that boost the production of electronic components include rationalization of tariff structure, Phased Manufacturing Programme (PMP), and notification of electronics products under the Public Procurement (Preference to Make in India), Order 2017. Under the umbrella of "Make in India" program, Basic Customs Duty (BCD) has been imposed on Printed Circuit Board (PCB) Assembly of Mobile handsets with the intention to strengthen the domestic Electronics Manufacturing Services (EMS) and components segment in India. Production Linked Incentive Scheme (PLI) for Large Scale Electronics Manufacturing is also supporting manufacturing of specified electronic

components. The Indian government has imposed an anti-dumping duty (ADD) on bare printed circuit boards (PCBs) with fewer than six layers.

The Electronics Manufacturing Services industry in India is growing rapidly and key global players as well as a number of domestic companies are operational in the country. A strong component manufacturing base is essential for a sustainable Electronics System Design and Manufacturing (ESDM) ecosystem in India. This segment needs very high efficiency of operations to stay profitable. Availability of components and an effective supply chain is vital for EMS companies for their growth.

India's electronics sector has experienced substantial growth in manufacturing and has achieved considerable scale in assembly, largely driven by strategic government initiatives. It is high time to develop an ecosystem focused on component manufacturing to further this growth and enhance global competitiveness. In this regard, the Government is planning initiatives to develop a component manufacturing ecosystem.

d. **Consumer Electronics:** Consumer electronics refers to any device containing an electronic circuit board that is intended for everyday use by individuals for the purpose of entertainment, recreation or communication. This encompasses a massive category of electronic products which includes televisions, cameras, digital cameras, PDAs, calculators, VCRs, DVDs, clocks, audio devices, headphones, and many other home product. Key drivers for this market's growth are growing awareness, easier access, changing lifestyle, higher disposable income and reduction in the per unit prices.

Television is an important device in the home consumer electronics and has been identified as one product for which India can become the global hub for manufacturing. As per FICCI, India's TV production stood at USD 4.24 billion in 2020-21 and is expected to reach USD 10.22 billion by 2025-26 with a CAGR of 20%.

Some of the initiatives taken by the government are imposing the BCD on several consumer electronic goods to encourage companies to substitute imported goods with domestically manufactured goods; permitting 100% FDI in the consumer electronics manufacturing sector via the direct route and providing Capex subsidy under the Modified Special Incentive Package Scheme (M-SIPS), etc. Due to these efforts, foreign companies have been encouraged to set up manufacturing facilities for consumer electronics without a joint venture or other form of partnership with a domestic entity. In distributing consumer electronic goods to their end users, a local partner is both legally and practically required.

e. **Industrial Electronics:** Industrial electronics can be classified based on segments viz Power Electronics, DC/ AC converters, Material handling and Industrial Robots. The key application segments of the industrial electronics industry are process control equipment, test and measuring equipment, power electronics equipment, automation and analytical instruments. These technologies are gaining ground as modernization, automation and robotics play an important role in the modern industry. The industrial electronics sector is witnessing growth due to enhanced digitization and robotics applications in Industry 4.0. Additionally, the impetus on Smart Cities and IoT will bring a whole new focus and demand on smart and automation electronics.

Increasing focus on the use of renewable power sources across the globe, growing adoption of power electronics in the manufacturing of electric vehicles, and increasing use of power electronics in consumer electronics are the major growth drivers for the power electronics market. Power electronics space in India is dominated by unorganized regional players, which is expected to grow at higher rate due to huge demand and low penetration. Inverters and UPS are also becoming household items driving the growth of this segment. Some of the Indian players have set up global tie-ups over the last few years and have brought in newer technologies into the Indian industry. Solar Photovoltaic and allied equipment is another segment which is likely to grow at a sustained high

growth rate.

Industrial electronics is an empirical barometer of overall growth in the contribution of the manufacturing sector in the economy. The spurt in investments due to the "Make in India" programme is bringing significant interest in engineering, electrical, automotive and electronics segments which are the driving force behind the growth of industrial electronics sector. In future, M2M (machine-to-machine and machine-to-man) communication modules driven by Industry 4.0 activities will drive the growth of the Industrial electronic segment.

f. **Automotive Electronics:** Automotive electronics are electrically operated systems integrated and mounted in several vehicle applications such as body electronics, safety systems, and infotainment. The automotive market demand is experiencing trends related to advanced mobility solutions, powertrain & vehicle system electrification, and advanced safety systems. Due to the increased implementation of these systems in vehicles, the penetration of automotive electronics has also increased, further creating the demand for automotive electronics products across the globe. The digitization of automotive systems by including connected technologies, in-vehicle communication, and ADAS & automated systems have created several opportunities for market growth. The growing integration & adoption of automotive electronics in modern vehicles to deliver enhanced safety & comfort to consumers is one of the major factors driving the automotive electronics industry growth. Several features offered by OEMs including Automated Emergency Braking (AEB) system, airbag system, and lane departure warning, etc. have significantly decreased road accidents worldwide. Automotive electronics along with the presence of broad computing technologies and connected features are enhancing automobile capabilities. Alcohol ignition interlock, accident data recorder system, and emergency call system are some of the features gaining attraction, which will further propel the growth. According to Allied Market Research, the global Auto electronics market is estimated to reach USD 382.16 billion by 2026, growing at a CAGR of 7.3 percent from 2019 to 2026.

Automotive Mission Plan 2016-26 targets India to be among the top three in the world for engineering, manufacturing and export of vehicles and auto components. The growing presence of global automobile Original Equipment Manufacturers (OEMs) in the Indian manufacturing landscape has significantly increased the localization of their components in the country. India has become the preferred designing and manufacturing base for most global auto OEMs for local sourcing and exports.

g. **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 (IR) based detection and ranging system, Disaster management system, Internal security systems, etc.

India has the second largest armed force in the world, and is considered the seventh largest aerospace and defence (A&D) market globally with a sizeable budget to cover the needs of the country's Army, Navy and Air Force. The large-scale modernization of the defence forces and the drive to manufacture local have become focus areas of the government. Emerging technologies are going to reshape modern day warfare, and will harness the power of electronics to do so. This will make the Indian strategic electronics (SE) sector, mainly comprising aerospace and defence, a vibrant industry over the next decade.

The next decade is likely to see exponential growth in combat systems as well as non-platform-based programmes, facilitating smart battalions. Therefore, there are opportunities for electronics manufacturing in India in both standalone systems (as part of platforms) as well as at a sub-system level. Key factors that will influence growth are:

- The modernization of weapon platforms

- The induction of state-of-art weapons by the armed forces
- The impact of indigenization and the Make in India programme

h. **Medical Electronics:** Indian medical devices market is among the top twenty in the world by market size, and fourth in Asia after Japan, China and South Korea. The Government has taken various regulatory steps to promote this sector and has created excellent opportunities for the domestic manufacturers, thereby reducing the dependence on imports. Medical devices industry in the country is dominated by multinationals that controls about 75-80 per cent of the Indian market. Further, more than 80 percent of domestic manufacturers are in the small-scale sector and have a turnover of less than ₹ 10 crore. Also, more than 6,000 types of medical devices are in use worldwide, but India manufacturers are just one-sixth of these medical devices.

3.3 Schemes and programs

1. **Modified Special Incentive Package Scheme (M-SIPS):**

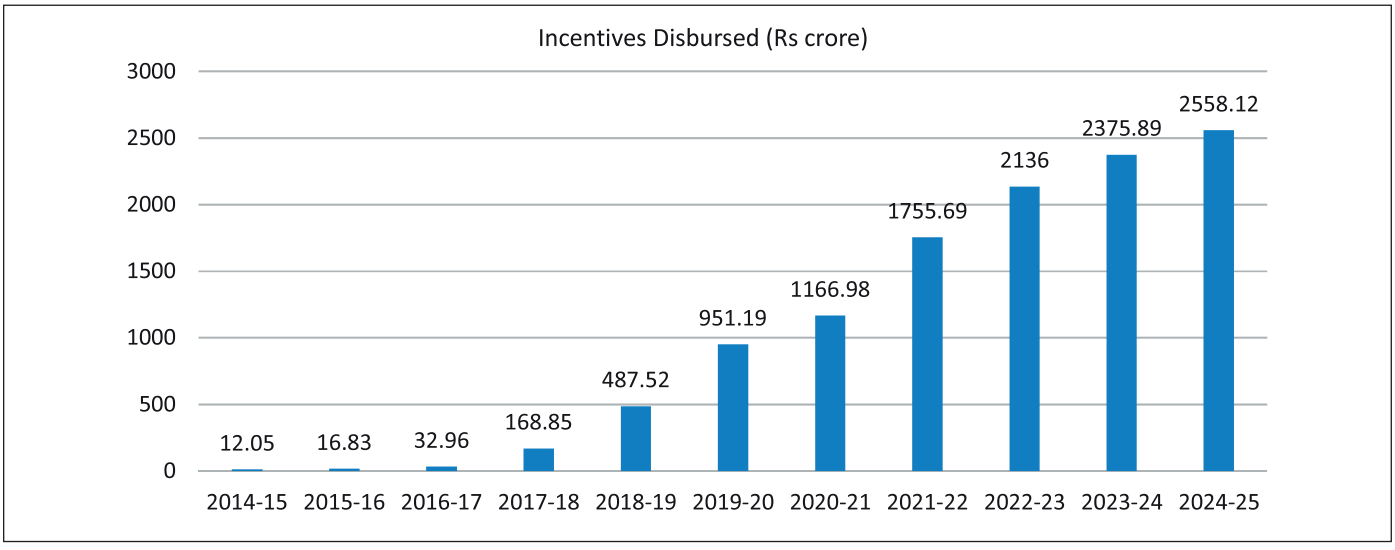
In order to promote large scale manufacturing in the country, a Modified Special Incentive Package Scheme (M-SIPS) was announced by the Government in July 2012. The Scheme has been amended twice – in August, 2015 and in January, 2017. The Scheme has been closed on 31st December, 2018 to receive new applications. The salient features of the Scheme are:

- Provides Capital Subsidy - 20% for investments in Special Economic Zones (SEZs) and 25% in non-SEZs.
- Provides incentives for both new units and expansion units.
- Provides incentives for a period of 5 years from the date of approval of application.
- Provides incentives for 44 categories/verticals across the value chain (raw materials including assembly, testing, packaging and accessories, chips, components).
- Minimum investment threshold for each product category/vertical.
- Unit to be in Industrial Area notified by Central/State Govt.

Status of M-SIPS till December, 2024 is as follows:

As on 31st December, 2024, 316 applications with proposed investment of ₹ **82,247** Crore are under consideration. Out of these, 316 applications, 315 applications with proposed investment of approximately ₹ 80,238 Crore have been approved, 1 application with proposed investment of ₹ 2,009 crore is under appraisal.

The incentives to the tune of ₹ 2558.12 Crore have been disbursed to the 145 applicants.



Out of 315 approved applicants, 293 applicants have started incurring investment on their projects and have made investment of ₹ 45,249 Crore. 275 applicants have commenced commercial production with reported turnover of ₹ 13,58,036 Crore, which includes exports to the tune of ₹ 3,16,413 Crore. These units have given employment opportunities (Direct & Indirect) to over 4,81,043 persons and given revenue of approximately ₹ 1,81,015 Crore to the Government.

2. Electronic Cluster Manufacturing (EMC) Schemes

To create conducive and sustainable ecosystem for electronics manufacturing in the country, Government notified the Electronics Manufacturing Cluster (EMC) Scheme in October, 2012 for providing support to create world-class infrastructure along with common facilities and amenities for attracting investments in the ESDM sector. The scheme was open to receive applications for a period of five years from the date of its notification i.e., upto October, 2017. Further period upto March 2026 is available for disbursement of funds to the approved projects. The salient features of the scheme are as follows:

i) To create robust infrastructure base for electronics manufacturing in the country through development of Greenfield EMCs and Common Facility Centres (CFCs).

ii) Financial assistance upto 50% of the project cost subject to a ceiling of ₹ 50 crore for every 100 acres of land for Greenfield EMC and 75% of the cost of infrastructure, subject to a ceiling of ₹ 50 crore for Common Facility Centre.

iii) State Government incentives are over and above the Central financial assistance.

iv) Development of EMCs to provide ready infrastructure for industry engaged in electronics verticals and its entire value chain to set up their manufacturing facilities in EMC.

Status of EMC till December, 2024 is as follows:

Under the scheme, MeitY received 50 applications out of which 46 applications were for setting up of Greenfield EMCs and 4 applications for setting up of Common Facility Centers (CFC) in Brownfield Clusters from 19 states across the country. Of these, nineteen (19) Greenfield EMCs and Three (3) CFCs were accorded approval admeasuring an area of 3,464 acres with project cost of ₹ 3,499 crore including Grant-in-aid of ₹ 1,470 crore from Government of India. These EMCs were poised to attract an investment of ₹ 46,619 crore and are expected to generate 6.30 lakh employment opportunities once operational.

As on December 2024, a Grant-in-aid amounting to ₹ 845.38 crore has been released for implementation of these projects. These EMCs/CFCs are providing developed infrastructure with plug & play facility along with requisite testing/validation services to electronics industry to start their production activity in the country. About 390 companies with projected investment of ₹ 54,546 crore have committed for setting up of their manufacturing facilities within these EMCs with estimated employment generation of about 2.69 Lakh. Of these, 140 companies started their commercial production with an investment of ₹ 19,743 crores and provided employment opportunities to over 70,242 persons. Another 113 electronics manufacturing units are at various stages of construction and implementation.

3. Modified Electronics Manufacturing Clusters (EMC 2.0) Scheme

To provide avenues for expanding and strengthening of electronics manufacturing ecosystem in the country; Ministry of Electronics and IT notified the Modified Electronics Manufacturing Clusters (EMC 2.0) Scheme on April 01, 2020. By providing support for creation of world class infrastructure along with common facilities and amenities for attracting major global electronics manufacturers along with their supply chains, the scheme aims to make India an Electronics Manufacturing Hub. The scheme also provides requisite financial assistance for

creation of industry specific facilities like Common Facility Centers, Ready Built Factory Sheds / Plug and Play facilities etc. This will attract large scale electronics manufacturers to commence their production in the country and act as Anchor units to bring their suppliers in such clusters. It will also ensure greater integration with the global supply chains in the electronics manufacturing sector. The salient features of EMC 2.0 Scheme are as follows:

i) Financial assistance upto 50% of the project cost subject to ceiling of ₹ 70 crore per 100 acres of land for setting up of Electronics Manufacturing Cluster projects and 75% of the project cost subject to a ceiling of ₹ 75 crore for Common Facility Centres (CFCs).

ii) Minimum land area requirement is 200 acres (100 acres in case of North-Eastern States, Hill States and UTs).

iii) Commitment from Anchor Units for having min. 20% of saleable/ leasable area with investment Commitment of ₹ 300 crore (10% and ₹ 150 crore in case of North-Eastern States, Hill States and UTs)

iv) Development of Ready Built Factory (RBF) Sheds and Plug & Play facilities in at least 10% of the saleable / leasable land area.

v) Open for new as well as expansion of existing EMCs/CFCs.

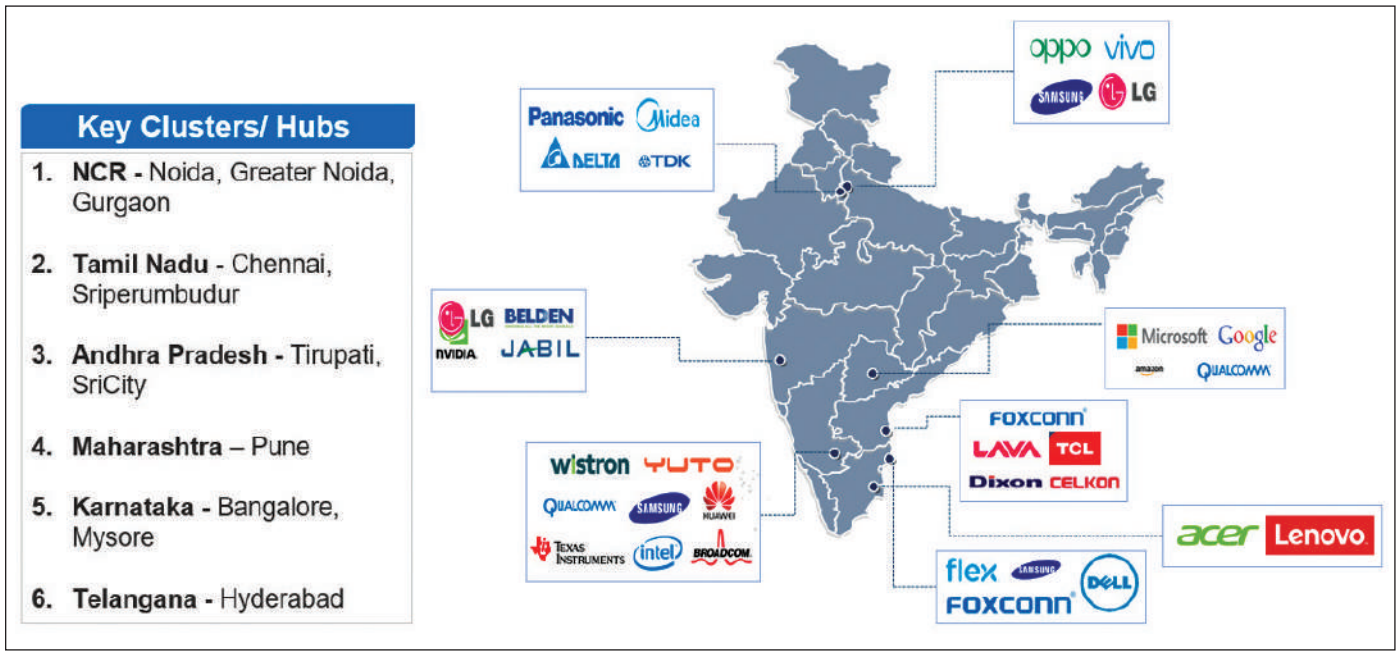
vi) Implementation and execution of scheme through Project Management Agency i.e., STPI.

vii) State Government/its agencies, Central PSUs/State PSUs, Industrial Corridor Development Corporations (ICDCs) or joint venture of such agencies with Anchor units or industrial park developers (existing SPVs in case of expansion of projects) all eligible to apply

viii) Scheme is open for receipt of application for a period upto March, 2024 and period upto March, 2028 is available for release of financial assistance to approved projects.

Status of EMC 2.0 till December 2024, is as follows:

Under the Scheme, 8 applications for setting up of EMC and 1 application for setting up of CFC



ESDM Landscape (Key Clusters/Hubs)

admeasuring an area of 2,689 acres with a project cost of ₹ 3539.56 crore including Central financial assistance of ₹ 1692.51 crore have been approved. These EMCs are poised to attract an investment of ₹ 40,919 crore and have potential to generate about 1.63 lakh employment opportunities once fully operational. Financial assistance of ₹ 262.35 crore has been released so far. An investment commitment of ₹ 30,799 crore has already been received from 60 companies with employment potential of 53,144 persons in these EMCs. 4 units have already started production and other 4 units are in construction. An investment of ₹ 8,571 crores has been mobilized with employment generation of 8,057 persons.

4. Electronics Development Fund (EDF)

Electronics Design & Manufacturing is a sector which is characterized by high velocity of technological change. Setting up of EDF was one of the important strategies to enable creation of an electronics industry ecosystem in the country. Encouraging a vibrant ecosystem of innovation, Research and Development (R&D) with active industry involvement is essential for a thriving electronics industry. It is with this objective that an Electronics Development Fund (EDF) has been set up as a "Fund of Funds" to participate in professionally managed "Daughter Funds" which in turn provides risk capital to companies developing new technologies in the area of Electronics and Information Technology (IT). This fund is expected to foster R&D and innovation in these technology sectors through creation of an ecosystem for providing risk capital to industry to undertake market driven R&D. It will, in the process, enrich the intellectual property in the country and encourage more entrepreneurs towards product and technology development.

Canbank Venture Capital Funds Ltd. (CVCFL), a 100% subsidiary of Canara Bank, is the Investment Manager and MeitY is the anchor investor of EDF. EDF has drawn Rs 216.33 crore from its contributors, which includes Rs 210.33 crore from MeitY. As on 31.12.2024, EDF has invested Rs 257.58 crore in eight Daughter Funds, which in turn have made investments of 1335.26 crore in 128 Ventures/ Startups. Total employment in supported Startups was more than 22600. The number of IPs created/ acquired by the supported start-ups is 360. Out of the 128 startups, Daughter Funds have exited from 35 investments and written off 13 investments. The cumulative returns received in EDF from the proceedings of these (including partial exits) is Rs 125.41 crore. The supported start-ups and companies are majorly working in IOT, Robotics, Drones, Autonomous Cars, Health-tech, Cyber security, Artificial Intelligence / Machine Learning etc.

S. No.	Name of Daughter Fund	Amount invested by EDF	Daughter Fund Investment	Total No. of Startups Funded
1	Unicorn India Ventures Trust	15.82	63.64	17
2	Aaruha Technology Fund - 1	6.75	26.22	13
3	Endiya Seed Co-creation Fund	30.00	137.03	12
4	Karsemven_ fund	24.00	83.43	17
5	pi Ventures Fund 1	14.82	186.53	15
6	YourNest India VC Fund II	43.15	184.78	19
7	Ventureast Proactive Fund - II	97.74	425.7	18
8	Exfinity Technology Fund Series II	25.30	227.93	17
	Total	**257.58**	**1335.26**	**128**

5. Production Linked Incentive Scheme (PLI) for Large Scale Electronics Manufacturing

Notified vide Gazette Notification No.CG-DL-E-01042020-218990 dated April 01, 2020, the Scheme provides financial incentive to boost domestic electronics manufacturing and attract large investments. The Scheme extends an incentive of 4% to 6% to eligible companies on incremental sales (over base year i.e., 2019-20) of manufactured goods including mobile phones and specified electronic components for a period of five years subsequent to the base year. The scheme will promote large scale electronics manufacturing particularly in the mobile phones segment and contribute significantly to achieving a USD 1 trillion digital economy and a USD 5 trillion GDP by 2025.

PLI Scheme has been a huge success in terms of the immense interest received from Global as well as Domestic Mobile Manufacturing companies. Over the next 5 years, the Scheme is expected to lead to total production of about ₹ 8.12 lakh crore. The scheme is also expected to boost exports significantly. Out of the total production, about 60% is expected to be contributed by exports of the order of ₹ 4.87 lakh crore. The Scheme will bring additional investment in electronics manufacturing to the tune of ₹ 7,000 crore. PLI Scheme will also help in promotion of domestic champion companies by reviving Indian Brands and strengthening Indian EMS companies.

After the success of the First Round of Production Linked Incentive Scheme in attracting investments in mobile phone and electronic component manufacturing, Second Round of the PLI Scheme for Large Scale Electronics Manufacturing was launched on 11.03.2021 for incentivizing Electronic Components. Under the Second Round, incentives of 5% to 3% have been extended on incremental sales (over base year i.e., 2019-20) of goods manufactured in India and covered under the target segment, to eligible companies, for a period of four years.

In accordance with the announcement made by Hon'ble Union Finance & Corporate Affairs Minister on 28.06.2021 to provide relief to companies approved under the PLI Scheme affected by the COVID-19 pandemic, the tenure of the PLI Scheme has been extended by one year i.e., from 2024-25 to 2025-26. The notification in this regard was issued on 23.09.2021.

The status of PLI Scheme for LSEM till December, 2024 is as follows:

As of December, 24, the companies approved under the PLI Scheme for LSEM have generated cumulative investment of INR 10,213 Cr, cumulative production of INR 6,62,228 Cr, cumulative exports of INR 3,49,342 Cr and cumulative employment of 1,37,189 (Direct jobs).

6. PLI Scheme 2.0 for IT Hardware

PLI Scheme 2.0 for IT Hardware was notified on 29.05.2023 with an approved outlay of Rs.17,000 crore with an objective to boost domestic manufacturing and attract large investments in the value chain. The Scheme extends an incentive of around 5% (based on localization of components/ sub-assemblies) on net incremental sales (over base year) of goods manufactured in India and covered under the target segment, to eligible companies, for a period of six (6) years. The Target Segment includes (i) Laptops (ii) Tablets (iii) All-in-One PCs and (iv) Servers (v) USFF (Ultra Small Form Factor). A total of 27 companies have been approved under the Scheme.

The Scheme is expected to generate following outcomes during its tenure:

i) Expected incremental production is ₹ 3.35 Lakh crore

ii) Expected incremental investment is ₹ 2,430 crores

iii) Expected incremental direct employment is 75,000

The status of PLI Scheme 2.0 for IT Hardware till December, 2024 is as follows:

As on 31.12.2024, the PLI Scheme for IT Hardware and PLI Scheme 2.0 for IT Hardware have combinedly led to a total production of ₹ 10,014.72

crore, total investment of ₹ 522.17 crore and total employment of 3,879.

7. Scheme for Promotion of Manufacturing of Electronic Components and Semiconductors (SPECS)

Notified vide Gazette Notification dated April 01, 2020, the Scheme provides financial incentive of 25% on capital expenditure for the identified list of electronic goods that comprise downstream value chain of electronic products, i.e., electronic components, semiconductor/ display fabrication units, ATMP units, specialized sub-assemblies and capital goods for manufacture of aforesaid goods. The scheme promotes development of electronic components manufacturing ecosystem in the country and deepening of electronics value chain and is expected to bring new investments to the tune of ₹ 20,000 crore with total employment generation potential (Direct and Indirect) of 6,00,000. The scheme is closed to receive new applications on 31.03.2024.

Progress under the scheme till December, 2024 as per latest Quarterly Progress Report

58 applications have been approved with total proposed investment of Rs.22,081 crore. As per the Quarterly Progress report submitted by the applicant total investment done by the approved applications is ₹ 9,481.56 crore. Total production done by the approved applications is ₹ 25,571.59 crore. Total employment generated by the approved applications is 39,092 persons.

8. Modified Programme for Development of Semiconductors and Display Manufacturing Ecosystem in India

In furtherance of the vision of AatmaNirbhar Bharat and positioning India as the global hub for ESDM, a comprehensive program for the development of semiconductors and display manufacturing ecosystem in India was approved by Government of India with an outlay of ₹ 76,000 crore (>$10 billion). The Programme contained various schemes to attract investments in the field of semiconductors and display manufacturing. The following four schemes have been notified under the Semicon India Programme: -

8.1 Modified Scheme for setting up Semiconductor Fabs in India

- The scheme is aimed at attracting large investments for setting up semiconductor wafer fabrication facilities in the country to strengthen the electronics manufacturing ecosystem and help establish a trusted value chain.
- The Scheme extends a fiscal support of 50% of the project cost across the technologynodes for setting up of Silicon based Semiconductor Fabs in India.

The fiscal support under the scheme shall be provided on pari-passu basis for a period of six years from the date of approval.

8.2 Modified Scheme for setting up of Display Fabs in India

The scheme is aimed at attracting large investments for manufacturing TFT LCD or AMOLED based display panels in the country to strengthen the electronics manufacturing ecosystem. The Scheme extends fiscal support of 50% of Project Cost for setting up of Display Fabs in India. The fiscal support under the scheme shall be provided on pari-passu basis for a period of six years from the date of approval.

8.3 Modified Scheme for setting up of Compound Semiconductors / Silicon Photonics / Sensors Fab/ Discrete Semiconductors Fab and Semiconductor Assembly, Testing, Marking and Packaging (ATMP) / OSAT facilities in India

The scheme extends a fiscal support of 50% of the Capital Expenditure for setting up of Compound Semiconductors / Silicon Photonics (SiPh) / Sensors (including MEMS) Fab/ Discrete Semiconductor Fab and Semiconductor ATMP / OSAT facilities in India.

8.4 Design Linked Incentive (DLI) Scheme

- 'Design Linked Incentive Scheme' has been notified on 21.12.2021. It shall offer financial

incentives as well as design infrastructure support across various stages of development and deployment of semiconductor design for Integrated Circuits (ICs), Chipsets, System on Chips (SoCs), Systems & IP Cores and semiconductor linked design.

- Under the "Product Design Linked Incentive" component of the scheme, reimbursement of up to 50% of the eligible expenditure subject to a ceiling of Rs15 crore per application will be provided as fiscal support to the approved applicants. This shall include expenditure relating to design, development, testing, fabrication, validation, prototype development, product development, filing of Intellectual Property Rights etc. It will also include manpower costs.
- Under the "Deployment Linked Incentive" component of the scheme, incentive of 6% to 4% of net sales turnover over 5 years subject to a ceiling of ₹ 30 crore per application will be provided to the approved applicants whose semiconductor design for Integrated Circuits (ICs), Chipsets, System on Chips (SoCs), Systems & IP Cores and semiconductor linked design are deployed in electronic products.
- C-DAC is the Nodal Agency to implement the scheme and establish the semiconductor design infrastructure such as EDA Tool Grid, repository of IP Cores, hardware and software licenses, patents and trademarks etc.

8.5 India Semiconductor Mission (ISM)

- India Semiconductor Mission (ISM) implements the schemes for Semiconductor and Display Fabs, Compound Semiconductor Fabs, Silicon Photonics Fabs, MEMS Sensors Fabs, Discrete Semiconductor Fabs and Semiconductor Packaging Units (ATMP / OSAT). It drives the long-term strategies for the development of semiconductor and display ecosystem in the country.
- The India Semiconductor Mission acts as the nodal agency for efficient and smooth implementation of the schemes for setting up of Semiconductor, Display Fabs and Compound Semiconductors/ATMP/OSAT facilities in India.

8.6 Semi-Conductor Laboratory (SCL)

The Union Cabinet has also approved that Ministry of Electronics and Information Technology will take requisite steps for modernization and commercialization of Semi-conductor Laboratory (SCL), Mohali. Semi-conductor Laboratory (SCL), Mohali has been brought under the administrative control of Ministry of Electronics and Information Technology from Department of Space.

SCL is an Integrated Device Manufacturer which undertakes activities pertaining to design, development, fabrication, assembly & packaging, testing and quality assurance of Silicon CMOS and MEMS Devices for various applications. Presently, SCL has two wafer fabrication lines, i.e., 200 mm wafer line operating in 180nm CMOS technology and 150 mm wafer line for MEMS technology. SCL predominantly caters to low volume requirements for various applications.

Boston Consulting Group (BCG) has been engaged for providing consultancy services for Modernization of Semi-Conductor Laboratory, Mohali.

8.7 Projects approved under the Programme:

The Government has approved following projects:

i. Micron Technology Inc.'s proposal for setting up an ATMP facility in India with an investment of ₹ 22,516 crore was approved in June 2023. Micron's facility in India will enable assembly and test manufacturing for both DRAM and NAND products and address demand from domestic and international markets with a production capacity of around 40 million per week.

ii. Tata Electronics Private Limited (TEPL)'s proposal for setting up a Semiconductor Fab

facility in India with an investment of ₹ 91,526 crore was approved in February 2024. The fab facility will be set up in technology partnership with PSMC, Taiwan. PSMC is an established semiconductor company having 6 semiconductor foundries in Taiwan. The production capacity of the project would be around 50,000 wafer starts per month (WSPM).

iii. Tata Electronics Private Limited (TEPL)'s proposal for setting up of OSAT facility in India with an investment of ₹ 27,120 crores was approved in February 2024. The facility will use indigenous semiconductor packaging technologies with a production capacity of 48 million per day.

iv. CG Power and Industrial Solutions Limited's proposal for setting up OSAT facility in India with an investment of ₹ 7,584 crore was also approved in February 2024. The facility will be set up as joint venture partnership with Renesas Electronics America Inc., USA, and STARS Microelectronic, Thailand. The technology would be provided for this facility by Renesas Electronics Corporation, Japan and STARS Microelectronic, Thailand. The production capacity would be around 15.07Million Units per day.

v. Kaynes Technology India Limited (KTIL) proposal of for setting up of Outsourced Semiconductor Assembly and Test (OSAT) facility at Sanand, Gujarat for Wire bond Interconnect, Substrate Based Packages was approved in September, 2024. The Technology would be provided by ISO Technology Sdn. Bhd. and Aptos Technology Inc. This facility will be setup with an investment of ₹ 3,307 crore. The facility will have the capacity to produce more than 6.33 Million chips per day.

vi. 51 start-ups and MSMEs companies have been approved for design infrastructure support under the DLI Scheme made available by ChipIN Centre at C-DAC Bengaluru. Out of these, 17 companies have also been approved for financial support for developing semiconductor chip/ SoCs for applications in sectors such as automotive, mobility, computing, communications etc namely - DV2JS Innovation LLP, Vervesemi Microelectronics, Fermionic Design, Morphing Machines, Calligo Technologies, Sensesemi Technologies, Saankhya Labs, Aryabhata Circuits and Research Labs, BigEndian Semiconductors, C2i Semiconductors, Aheesa Digital Innovations, Mindgrove Technologies, InCore Semiconductors, Netrasemi, Green PMU Semi, WiSig Networks, MosChip Technologies.

8.8 Employment: The semiconductor manufacturing facilities will generate direct employment of about 25 thousand advanced technology jobs and about 60 thousand indirect jobs.

3.4 Investment Promotion to Attract Investment in ESDM Sector

3.4.1 Promotion of PLI, SPECS, EMC 2.0 and Schemes for Development of Semiconductors and Display Manufacturing Ecosystem in India

To stimulate more investment in the Electronics System Design and Manufacturing (ESDM) sector in India, several investment promotion initiatives have been launched. In addition, these initiatives are aimed at creating a world-class semiconductor and display manufacturing ecosystem, these efforts also include the introduction of significant schemes like the PLI Scheme 2.0 for IT Hardware. Further, thorough outreach plan that includes online meetings with possible investors and in-depth presentations outlining the advantages of these programs were conducted. To address the concerns and establish a clear investment path, high-level discussions were arranged, including direct interactions between company representatives and senior officials from MeitY. As a result of these promotional efforts, India is now seen as a potential ESDM destination and have greatly increased awareness and interest in the international industry.

3.4.2 Advocacy and Outreach Programmes

A stakeholder Meeting on "Empowering Industries: Unlocking Tomorrow's Potential with PLI Schemes" was held at Bharat Mandapam in February 2024 in the presence of Hon'ble Commerce and Industries Minister (CIM). This event highlighted Electronics PLI Scheme's insights and achievements. The gathering shed light on the insights and accomplishments of the Electronics PLI Scheme, showcasing its significant contributions and promising prospects for the future.

The 4th Electronics Supply Chain Summit was, held in Noida in collaboration with ELCINA. The B2B forum had participation of over 200 delegates from 100+ companies. This business development program aimed to strengthen local manufacturing of Components, EMS, Semiconductor Products & Modules, and product segments including Mobiles & Accessories, Consumer Electronics, Lighting Equipment, Auto Electronics/ EVs, Security Products, IT products among others.

ICEA organised the conference on "Sub-Assemblies & Components

The Next Phase of Growth in India's Electronics Manufacturing" in New Delhi to chart out the roadmap for increasing Domestic Value Addition (DVA) in Indian Electronics.

Semicon India Conference 2024 (11-13 September 2024)

SEMICON India 2024, held from September 11-13 at the India Exposition Mart Ltd. (IEML) in Greater Noida, Delhi NCR, was a pivotal event spotlighting the rapid growth of India's semiconductor ecosystem and emerging industry trends. Inaugurated by Prime Minister Narendra Modi, it brought together global leaders, industry experts, academia, and government officials to explore cutting-edge innovations in areas such as smart manufacturing, supply chain optimization, sustainability, and workforce development.

With over 263 exhibitors and 45,000 in-person attendees, it established itself as one of Southeast Asia's premier platforms for showcasing advancements in semiconductors and electronics. Representatives from Applied Materials, Cadence, CG Power, KLA, Lam Research, Micron, NXP, Renesas, TATA Electronics, Tokyo Electron, SiLT, KAS Technologies, Western Digital, DISCO, Merck, Jacobs, and many other industry leaders attended the event.

3.4.3 Outreach Activities for Shifting Global Value Chain

As part of MeitY's ongoing outreach efforts, several interactions were organized with industry stakeholders to raise awareness about the PLI Scheme 2.0 for IT Hardware. These engagements aimed to encourage companies to localize their manufacturing processes in alignment with the newly introduced scheme, with a focus on boosting domestic production and creating employment opportunities within the IT hardware sector. Meetings with the applicants of PLI Scheme (IT Hardware & LSEM) to discuss investment plans, progress and challenges were conducted time to time by senior officials of MeitY

International Collaborations and Business Delegation Visits

A Taiwan Electrical and Electronic Manufacturers' Association (TEEMA) delegation called-on Secretary on 8th August, 2024. The discussions during the meeting focused on the way forward for India-Taiwan collaboration, fostering innovation and support technological growth in the electronics sector.

MeitY officials held discussion with delegation from Foxconn led by Dr. Young Liu, Chairman, Foxconn about Foxconn's plan for development of electronics ecosystem including Semiconductors in India on 14th August, 2024.

- 3rd India-Taiwan CEOs Roundtable Meeting & 2024 India-Taiwan Industrial Collaboration Summit was held along with FICCI in partnership with TAITRA, TEEMA & CNFI at New Delhi. Joint Secretary (Electronics) Shri Sushil Pal addressed the session wherein he highlighted that the global winds of trade dynamics present an opportune window for leapfrogging India-Taiwan industrial partnership to the next level.

- Indo-US Task Force for Electronics – 2nd Roundtable of Indo-US Task force was held on 4th October 2024 in association with ICEA comprising Industry leaders in the sector to boost and elevate electronics trade between India and USA to approx. $100 Bn within a decade from the current $13 Bn figure.

3.4.4 National Level Events & Facilitations

Task Force on Making India an Electronics & Semiconductor Product Nation

Ministry of Electronics and Information Technology, Government of India constituted a Task Force under the chairmanship of Prof. Ajay K. Sood, Principal Scientific Advisor to the Govt. of India to achieve the objectives of making India a product developer and manufacturer nation. The Task Force, consisting of members from both Industry and Government, had detailed deliberations and identified following potential areas where strategic initiatives are required to make India an Electronics & Semiconductor Product Nation:

(i) identification of products (with B2B and B2C perspectives)

(ii) Components and sub-systems other than chips

(iii) Chip requirement for India (Chips for All)

(iv) Policy, Regulations, Taxation and Tariffs, EoDB, Competitiveness

Numerous other Industry consultation sessions and one-to one meeting with ESDM companies were also conducted to understand the issues being faced by them.

3.4.5 International Events & Facilitations

- Outreach engagements held with Indian Consulates/ Embassies/ High Commissions in other countries for promoting the schemes launched by MeitY.
- MeitY participated in various Investment Promotion Roadshows organized by other Ministries like DPIIT to Taiwan, Korea, Japan, Singapore etc.
- MeitY also contributed to international engagements like G20, India-EU TTC, India-Taiwan Cooperation Forum, World Economic Forum, Industrial Collaboration Working Group (ICWG) between India and Taiwan (ICWG), India-Japan Industrial Competitiveness Partnership (IJICP)

3.4.6 Social Media Participation

To reach out to all ESDM stakeholders, all the events, webinars were widely promoted on X (erstwhile Twitter) through the official handle (Electronics GoI) of the IPHW Division of MeitY.

3.4.6.1 International Collaborations in the field of Semiconductors

MoU with Singapore: Government of India has recently signed an MoU with Singapore to establish an "India-Singapore Semiconductor Ecosystem Policy Dialogue". The Policy Dialogue will be used as a platform to:

- Discuss semiconductor supply chain related issues;
- Exchange best practices to leverage opportunities for growth in the global semiconductor industry;
- Explore areas for mutually beneficial semiconductor R&D collaboration;
- Encourage collaboration between Singapore-based and India-based companies towards mutually beneficial semiconductor related business opportunities and partnerships;
- Consider initiatives to enhance semiconductor supply chain resilience, based on areas of mutual strength such as fabs, packaging, design, equipment, specialty chemicals and gases, semiconductor grade materials;
- Promote Industrial Parks and workforce development for mutual benefit.

Building on the Semiconductor MoU, the first India-Singapore Semiconductor Ecosystem Policy Dialogue, co-chaired by Secretary, MeitY, Shri S Krishnan & Permanent Secretary, MTI, was held in November,2024.

3.4.6.2 Capacity building and talent development for semiconductors

New curriculums have been launched by AICTE at UG, Diploma level as a step towards creation of Talent pool

in Semiconductor design and Manufacturing domain. Curriculums at Diploma, UG and PG level have been adopted by more than 625 colleges and institutes with approved intake of 16,307 students. These courses at Diploma and UG level will drastically reduce the time gap to make students industry ready. Semiconductor design and technology specific curriculums in Diploma and Engineering, have been designed according to Semiconductor industry needs.

ISM has signed an MoU with Purdue University, to enable collaboration for development of skilled workforce (through curation of specific courses/ academic programs), specialized R&D programs, collaboration for funding/ grants support.

Lam Research, USA, Semiconductor Equipment Manufacture has announced to train 60,000 workforce in the next 10 years through its Semiverse Solution virtual platform in collaboration with Indian academic institutions, aiming to expedite India's semiconductor education and workforce development goals.

3.4.7 R&D Road map

Applied Materials Inc. (AMAT) has announced a planned investment of $400 Mn to establish Collaborative Engineering Centre in Bangalore. During the initial 5 years. the center would support $2Bn+ of spending and create ~500 advanced engineering jobs. This initiative will facilitate R&D collaboration amongst R&D team of Applied Materials, Indian academic institutions and R&D team of vendors of Applied Materials. This will also help in development and sourcing of components/ sub-assemblies required for the AMAT's semiconductor equipment.

3.5 Measures to facilitate Ease of Doing Business:

Central Board of Indirect Taxes & Customs (CBIC), Department of Revenue, Ministry of Finance has decided to exempt the Electronics and Semiconductor Manufacturing Sector from application of Section 65A of the Customs Act.

3.6 Other programs

Compulsory Safety Standards for Electronics

The "Electronics and Information Technology Goods (Requirements for Compulsory Registration) Order, 2012" was notified on 3rd October, 2012 under the Compulsory Registration Scheme notified by Bureau of Indian Standards (BIS) under the ambit of the BIS Act, 1986, to ensure the safety of Indian consumers and curb the inflow of substandard electronic products. The Order has been migrated to BIS Act 2016 as "Electronics and Information Technology Goods (Requirement of Compulsory Registration) Order, 2021". The Order necessitates creation of an institutional mechanism for developing and mandating standards and certification for electronic products to strengthen Conformity Assessment infrastructure nationwide. As per the provisions of the Order, before manufacturing, import, sale, stock etc of the products notified under the schedule of the Order, the products need to be registered with BIS based on testing of the notified product at BIS recognized laboratories as per the Indian Standards. The registration is granted to a manufacturer for manufacturing a product at a particular location.

The Compulsory Registration Scheme has resulted in high compliance of notified electronic goods to Indian safety standards and more than 45,000 registrations have been granted by BIS to manufacturing units covering approximately 4,00,000 products models/series.

Public Procurement (Preference to Make in India) Order 2017

Government has issued Public Procurement (Preference to Make in India) [PPP-MII] Order 2017 vide the Department for Promotion of Industry and Internal Trade (DPIIT) Order No. P-45021/2/2017-B.E.-II dated 15.06.2017 with subsequent revisions dated 28.05.2018, 29.05.2019, 04.06.2020, 16.09.2020 and 19.07.2024 to encourage 'Make in India' and to promote manufacturing and production of goods, services and works in India with a view to enhancing income and employment.

In furtherance of the aforesaid revised Order, MeitY has notified mechanism for calculating local content for 14 Electronic Products dated 07.09.2020 and 06.03.2024 viz., (i) Desktop PCs, (ii) Thin Clients, (iii) Computer Monitors, (iv) Laptop PCs, (v) Tablet PCs, (vi) Dot Matrix Printers, (vii) Contact and Contactless Smart Cards, (viii) LED Products, (ix) Biometric Access Control / Authentication Devices, (x) Biometric Finger Print

Sensors, (xi) Biometric Iris Sensors, (xii) Servers, (xiii) Cellular Mobile Phones and (xiv) CCTV/VSS Systems, for procurement to be made from local suppliers.

3.7 Centre of Excellence in Electronics and ICT application

3.7.1 National Centre of Excellence for Large Area Flexible Electronics (NCFlexE)

The project for setting up of National Centre of Excellence for Large Area Flexible Electronics (NCFlexE) at IIT-Kanpur was approved on 14th November, 2014 with a project cost of ₹ 132.99 crore including Government Grant-in-aid (GIA) of ₹ 111.12 crore. The main objective of the NCFlexE centre is to establish a research programme to engage in leading edge research in large area of flexible electronics and building strategic academic collaborations to address requirements through joint technology developments and to realize home-grown technologies for manufacturing.

The centre has been established with state-of-the-art laboratory facilities in the emerging flexible electronics area and has a portfolio of 64 filed patents. 7 Technology/ Know-how have been transferred to industry including incubation & mentoring support to start-ups. A startup M/s Transpack Ltd. has been incubated in Anti-counterfeiting technology. The technology has been transferred to M/s SPMCIL and got ordered of more than 300 crore from Delhi Excise Department etc. The other startup M/s Likhotronics Pvt. Ltd. has been incubated recently for the product Educational Kits using special inks. In addition, 5 technologies of the centre have been transferred to industries/start-ups for commercialization. Several companies have invested in the centre for R&D, prototype & product developments etc. The Centre is working closely with industries to meet their requirement in this thematic area and developed various prototypes like Temperature Sensors for Milk Adulteration & Gas Sensors for Food Spoilage, Smart Label with tamper evident tracking, OLED Display, Handheld Infrared Thermometer, Screen-printed sensor for Bilirubin detection in Serum, Warm Hug/Heater Jackets, TFT Array, Sensor for Breast Cancer detection, Smart IV Bottle, Piano keyboard on paper etc.

Product/prototype developed in the Centre

The Phase-I has successfully achieved its targeted objectives. Based on achieving of projected milestones and to take the center activities further, the Ministry of Electronics & IT accorded approval to IIT-Kanpur on 24.11.2023 for initiation of Phase-II activity with a project cost of ₹ 83.08 crore including Government Grant-in-aid of ₹ 60.00 crore from MeitY, ₹ 10.00 crore as industry contribution and ₹ 13.08 crore from IIT-Kanpur. As on date , MeitY has released a Grant-in-aid of ₹ 5.79 crores to IIT-K towards the Phase-II of the project. Under the Phase-II, prima-facie, the prototypes /technological applications in the field of level & Packaging, Strategic and Healthcare sector (but not limited to) has been considered to address the technological requirement of the industry/organization in these sectors. The center facility is available for industry/start-ups/academia / MSME /other organizations for active collaboration.

Under Phase-II, 5 industrial projects have been initiated and 2 prototypes viz; sustainable sensing platform for electrochemical sensors using sugarcane skin having varied applications from biosensing to heavy metal detection and Li ion-based technology (coin cell) having capacity of > 30 mAH developed and under field trial. 2 Technologies have been transferred to the industry.

Product / technology	Industry	Sector	Status
Bilirubin Sensor	Sensa Core Medical Instrumentation Pvt. Ltd.	Healthcare	Technology Licensed to M/s Sensa Core
LFIA based strips for detection of bovine mastitis	Prompt Equipment Pvt. Ltd.	Food Safety	Technology Licensed to M/s PROMPT Equipment's

3.7.2 National Centre of Excellence in Technology for Internal Security (NCETIS)

National Centre of Excellence in Technology for Internal Security (NCETIS) at IIT-Bombay has been approved on 28th May, 2015 with a total outlay of ₹ 83.89 crore (MeitY contribution: ₹ 83.89 crore). The aim of the CoE is to address the challenges of homeland security and to develop state-of-the-art technologies which are vital for the national security agencies for providing rescue and relief operations with the indigenously developed technologies/ products. The project is envisaged to set up the required infrastructures and carrying out R&D activities for developing prototype model, commercialization and technology transfer of multiple products. The project has been completed in March 2023. Under the project, various technologies have been developed and three of them have commercialized. Explosive detector developed under the project has been registered and made available at GEM portal after the successful certification and trials. Two Start-ups have been incubated under the CoE.

3.7.3 Next Generation AMOLED Displays, OLED Lighting and OPV Products

The project "Next Generation AMOLED Displays, OLED Lighting and OPV products: Development of disruptive Technologies to enable cost effective electronic component manufacturing in India", approved by MeitY and being implemented by IIT Madras with total budget outlay of INR 41.60 Crore, including MeitY's Grant-in-Aid amounting to INR 34.65 Crore. The objective of the centre is to demonstrate state- of-the-art AMOLED based displays developed by Fine Metal Mask (FMM) and Closed Space Sublimation (CSS) processes. OPV devices are also being developed for roll-to-roll manufacturing. A laboratory has been developed successfully for state-of-the-art research facility. A clean area has been set up of area around 3000 sq. ft. There are two parts in the clean area. One is of class 100 and the rest of the area is of class 1000. The class 100 area is used for substrate cleaning, which is very crucial for the fabrication. Class 1000 area has all the deposition units and is utilized for AMOLED device fabrication.

AMOLED Dock system control

3.7.4 Centre of Excellence in Medical Electronics and Bio-Physics

- Centre of Excellence on Medical Electronics and Bio-Physics has been set up at the Andhra Pradesh MedTech Zone Limited (AMTZ), Visakhapatnam with a total outlay of ₹32.02 crore (MeitY contribution: ₹18.67 crore). The Center of Excellence in Medical Electronics and Bio-Physics has been approved in April 2020. The Project is being implemented by the Kalam Institute of Health Technology (KIHT), AMTZ for a period of three years.
- The aim of the project is to strengthen the medical electronics devices manufacturing eco-system in the country with suitable innovations, import substitution and value addition, etc. The objectives of the CoE are to provide functional research support to design and prototyping for manufacturing in ESDM, conduct R&D for manufacturing of electronics and integration of components to make functional critical parts (PCB assembly/ sub-assembly) for medical devices, carrying out Bio-Physics research such as Bio-Organs/ Electro-organs, etc., and research and prototyping of key electro-potential based components, etc.

The CoE, since its inception has been providing functional research support for innovators, manufacturers, researchers on medical devices and has led to the following achievements:

- Skill building on ESDM has led to 82 trained professionals.
- Design, Prototype and Manufacturing for ESDM has enabled PCBA line installation which supports production of 10,000 units of ventilators, 5000 Oxygen Concentrators, 100 units of Defibrillator.
- Electro Bio Physics research has enabled development of prosthetic arms and prototyping of electro-bio organs.
- Ongoing research at Centre for Bio-physics include development of 3D bio printed synthetic ears.
- 10 startups have been supported so far.

3.7.5 Establishment of Gallium Nitride (GaN) Ecosystem Enabling Centre and Incubator (GEECI) at Society for Innovation and Development (SID), IISc Bengaluru

Ministry of Electronics and Information Technology has awarded the project to Society for Innovation and Development (SID), IISc Bengaluru for "Establishment of Gallium Nitride (GaN) Ecosystem Enabling Centre and Incubator **(GEECI)** for High Power and High-Frequency Electronics" at Centre for Nano Science and Engineering (CeNSE), Bengaluru with budget outlay of ₹ 334.30 Crore. The project envisions to nucleate an end-to-end ecosystem for enabling GaN-based electronics manufacturing in the country for power and RF electronics. The incubator will be a R&D foundry dedicated to GaN that will function to generate its own IP, generate IP for industries based on their problem definition for a fee and provide foundry services for pilot scale manufacturing. The objective of the Project is to establish GaN-based Development Line Foundry facility for RF and Power applications and to incubate startups and Entrepreneur-in-Residence.

The project is expected to meet India's strategic RF needs and develop devices that can be used to make prototype systems for the emerging 5G and power applications. Establishment of GaN foundry facility as part of the Incubator will help to stimulate the flow of capital and technology, create employment opportunities, promote higher value addition in the electronic products manufactured in the country, especially in RF and power applications, including strategic applications, reduce dependence on imports and give thrust to the Hon'ble Prime Minister's clarion call for "Atmanirbhar Bharat''.

CHAPTER

4 International Cooperation

4.1 Introduction

With the Government's outlook on Digital Diplomacy, Digital Economy and launch of Digital India Program (DIP), MeitY has synergized its efforts to expand Electronics and IT/Software sector globally. This expansion aims to diversify markets, enhance specialized knowledge in various domains, and leverage the expertise of a highly skilled workforce, creating new business avenues worldwide. For the promulgation of the public policy objectives, MeitY has been actively working to build strategic alliances with foreign partners, especially in the emerging areas of Information and communications technology (ICT), through bilateral and multilateral cooperation.

MeitY regularly engages with various foreign governments, academic institutions, and industry bodies to develop partnerships that are mutually beneficial, promoting the exchange of expertise, experience sharing and fostering innovation. The International Cooperation Division (ICD) of MeitY has taken the lead in driving these initiatives, focusing on key areas such as:

- **Supporting National Goals:** Ensuring that all international collaborations align with key government initiatives like 'Digital India' and 'Make in India,' which are central to India's long-term digital transformation and manufacturing objectives.
- **Engaging in Global Forums:** Enhancing India's presence and leadership on international platforms to address key issues such as G20, SCO, BRICS, ASEAN, digital transformation, bridging the digital and gender divides, and strengthening digital governance and infrastructure.
- **Facilitating International Industry Collaboration:** Creating an environment that encourages cooperation between Indian industries and their international counterparts to foster innovation and joint development in cutting-edge ICT solutions.
- **Encouraging R&D Initiatives:** Supporting international research and development partnerships to accelerate advancements in ICT applications, thereby contributing to the development of groundbreaking digital technologies.
- **Coordinating with Global Institutions:** Collaborating with international organizations such as the UN agencies (including UNESCO, UNCTAD, UNDP, ECOSOC, and ESCAP), WSIS, World Bank, WTO, ADB, and the World Economic Forum (WEF). These partnerships help safeguard India's interests and ensure that the country's priorities are represented in global ICT policies and discussions.
- **Spearheading Collaborative Projects:** Launching joint projects with global partners, including establishing IT institutes, software development parks, digital solutions and initiating joint R&D ventures.
- **Promoting India's ICT Expertise:** Showcasing India's ICT strength across various international forums by organizing, sponsoring and participating in trade fairs, symposiums, exhibitions, etc.

To achieve these objectives, the ICD, MeitY engages through various mechanisms, such as Memorandums of Understanding (MoUs), Joint Working Group (JWG) meetings, Free Trade Agreement (FTA) and multilateral deliberations/negotiations in the ICT, digital economy and digital trade areas. The ICD also leads India's involvement in key international events to highlight the potential of Indian IT and software industries. Moreover, the division actively works to address the challenges related to the export of Indian IT services and the mobility

of IT professionals, representing these issues at global forums.

Through these efforts, MeitY aims to strengthen India's position as a key player in the global digital economy, promoting its ICT capabilities while ensuring that the country's interests and expertise are well-reflected in international collaborations.

4.2 Multilateral Cooperation

To protect its national interests and advance its digital transformation on the global stage, MeitY has been actively engaging with various multilateral forums. These efforts involve collaboration, negotiations, and addressing technical and policy challenges with key international forums/organizations like the G20, G7, BRICS, SCO, WTO, UN-ESCAP, BIMSTEC, World Bank, ADB, Commonwealth, IPU, ITU, ASEAN, SAARC, OECD, IPEF, QUAD, and others in the IT, software, and electronics sectors.

India's participation in various international forums highlights its commitment to driving digital progress and fostering partnerships with global stakeholders. Through these forums, India showcases its achievements, explores opportunities for collaboration, and strengthens its influence in shaping the global digital economy.

4.3 Key Achievements

Brazil's G20 Presidency 2024: MeitY represented India in the G20 Digital Economy Working Group and Ministerial meetings under the Brazilian Presidency in 2024 to discuss four priority areas i.e. Digital Inclusion, Universal and Meaningful Connectivity; Digital Government and Inclusive Digital Public Infrastructure; Integrity of Information Online and Trust in the Digital Economy; and Artificial Intelligence for Inclusive Sustainable Development and Inequality Reduction. MeitY negotiated the key issues and put forth the DPI agenda agreed under the Indian Presidency in 2023.

The G20 Digital Economy Maceió Ministerial Declaration on Digital Inclusion for All, was ultimately adopted during the Digital Economy Ministers Meeting (DEMM) which reiterates the priorities of the Working Group and strengthens commitments on the proposed deliverables on Universal and Meaningful Connectivity, Governance of Digital Identity, Data access and data sharing, Information Integrity and Trust, and AI for good and for all.

WEF's Annual Meeting 2024: The 54th World Economic Forum (WEF) Annual Meeting held in Davos, Switzerland, from January 15-19, 2024, provided a significant platform for India to showcase its digital initiatives and strengthen global partnerships in the technology sector. The Hon'ble Minister of Electronics and Information Technology was part of the Indian government delegation and actively participated in various sessions and roundtable discussions with global political and business leaders. The Minister emphasized India's strategic focus on driving economic growth through investments in digital and physical infrastructure, semiconductor, electronics manufacturing, and inclusive development. The engagements included advancing India's semiconductor program, fostering AI development, and establishing partnerships with various global firms. India's leadership in building resilient supply chains and advancing Digital Public Infrastructure (DPI) was prominently highlighted during the WEF sessions.

The 3rd Voice of Global South Summit (VOGSS 3.O): The 3rd Voice of Global South Summit (VOGSS 3.O) was convened virtually on August 17, 2024, with the overarching theme, *"An Empowered Global South for a Sustainable Future"*, to deliberate on the Global South's priorities and the solutions that could emerge from partner countries in the developing world. It also served as a platform to discuss ideas and solutions from the Global South on various developmental priorities.

During the summit a session for Information & Technology Ministers themed *"DPIs for Development - A Global South Approach,"* was chaired by Secretary, MeitY. This session focused on leveraging DPIs for development, particularly from the perspective of the Global South. Secretary, MeitY shared use-case examples of India's DPI models in bringing about efficiencies and better governance, achieving SDGs and ensuring last-mile delivery. Participants agreed on the need to enhance interoperability among global DPI models, encourage sharing of best-practices, build trust among diverse stakeholders in the digital ecosystem, and encourage private and public innovation and competition to provide viable DPI options to Global South countries.

The Second G7 Ministers' Meeting on Industry and Technological Innovation: Secretary, MeitY, led India at the Second G7 Ministers' Meeting on Industry and Technological Innovation in Rome, Italy, on October 10, 2024. He highlighted India's commitments through electronics and semiconductor initiatives, the DPI approach, and the responsible use of AI for a globally digitally inclusive society.

The 2024 Annual Members Meeting organized by the Digital Public Goods Alliance (DPGA): MeitY participated in the 2024 Annual Members Meeting organized by the Digital Public Goods Alliance (DPGA) from November 13–15, 2025, in Singapore. The event provided valuable insights into enhancing India's DPI initiatives and ensuring alignment with global standards and best practices.

4.4 Bilateral Cooperation

With the Government's outlook on Digital diplomacy, Digital Economy and the launch of the Digital India Programme, MeitY has synergized its efforts to expand the IT and electronics sector globally including diversification of geographies, domain expertise, and highly skilled workforce to enhance business opportunities. Efforts have also been made to evolve strategic cooperation with potential foreign partners in emerging and frontier areas of Information and Communication Technology. The Ministry regularly engages with various Governments including academic and industry bodies to forge partnerships for mutual progress, and also provide an opportunity for the sharing of knowledge and experience. The International Cooperation Division has been involved in the following tasks:

- Aligning foreign collaboration activities in India's 'Digital India program' and 'Make in India' initiatives of the Government of India.
- 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.
- 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 International Cooperation Division of this Ministry has been pursuing the above objectives through Memorandum of Understanding (MoUs), Joint Working Groups (JWG) meetings, Projects in other geographies/ countries, participating in major international events to showcase India's strength and enhance business opportunity for Indian IT Industries. The division has also spearheaded the negotiations on Digital Trade chapter under various forums/ Free Trade Agreements (FTAs).

To strengthen cooperation with other emerging economies, the MoUs/ Agreements in the field of Digital technologies and Semiconductor were signed with the Malaysia, Singapore and UAE. Further, in order to expand India's Digital capabilities in Digital Public Infrastructure (DPIs), MeitY has signed MoUs on cooperation in the field of sharing successful digital solutions implemented at population scale for digital transformation with the 9 recipient countries - Cuba, Colombia, Lao People's Democratic Republic, Saint Kitts & Nevis, Ethiopia, Jamaica, Gambia, Fiji and Guyana.

4.4.1 Major bilateral engagements

1. A meeting between India and Estonia was held on 9 January 2024 in New Delhi. The Estonian side expressed interest in renewing the MoU and indicated a desire to collaborate in the fields of AI, HPC, startups, e-health, and cybersecurity.
2. A meeting between MeitY and the French Ambassador for Digital Affairs was held on 22

February 2024. The focus areas of the meeting included DPI and the achievements of the G20 in promoting DPIs, AI, India's presidency of the GPAI, and the Digital Personal Data Protection Act.

3. A meeting between the co-chairs of the Indo-French Joint Working Group for Digital Technology was held virtually on March 22, 2024. The focus areas of discussion included cooperation in emerging technologies, specifically Artificial Intelligence, Quantum Computing, semiconductors, startup innovation, and DPI.

4. The Hon'ble MEIT visited Doha, Qatar, on 27 February 2024, where he addressed a session on 'Digital Public Infrastructure' during Web Summit Qatar 2024. During the visit, the Hon'ble MEIT also engaged in bilateral meetings with the Chairman of the Qatar Investment Authority, the Minister of Transport, and the Minister of Communications and IT, met with about 100 business leaders from India and Qatar, and participated in a community engagement event.

5. A team of journalists from the Central Europe region met Secretary, MeitY, on March 15, 2024. The Secretary informed the delegation about the establishment of three semiconductor units under the 'Development of Semiconductors and Display Manufacturing Ecosystems in India' initiative, as well as developments in Digital Public Infrastructure (DPI).

6. The Joint Secretary (ICD), MeitY, virtually participated in the 3rd Summit for Democracy in Seoul, Republic of Korea, on March 18, 2024. He briefed participants about the Digital India initiative, India's DPI approach to digital transformation and development, initiatives on AI in India, and the Social Impact Fund (SIF) for accelerating DPI implementation across Global South nations.

7. A seminar on *"Digital Public Infrastructure (DPI): Empowering Nations for the Digital Era"* was held on March 26, 2024, to explore the transformative potential of DPI in enabling seamless service delivery, empowering communities through inclusivity, and enriching economies by driving innovation.

8. Bilateral meetings with the Government of Sri Lanka on digital transformation took place on March 27, 2024, in Colombo, Sri Lanka. MeitY participated and shared insights and experiences from India's success story with DPI, along with global and regional perspectives.

9. A meeting between India and Vietnam was held on May 15, 2024, at New Delhi. The discussions focused on cooperation in data center development in Vietnam, as well as collaboration in cybersecurity, artificial intelligence, emerging technologies, and the startup ecosystem.

10. Several meetings were held between India and Japan to discuss UPI deployment in Japan. India provided a presentation on the infrastructure, operational aspects, and use cases to apprise the Japanese side about the concept of UPI. Further, India and Japan also discussed collaboration focused on the semiconductor ecosystem, artificial intelligence, and the India-Japan Digital Partnership (IJDP).

11. The Embassy of India organized a seminar titled *"Building Digital Bridges: India-Japan Digital Partnership"* on September 30, 2024, in which MeitY virtually participated and delivered a presentation on India's digital transformation journey and potential areas of cooperation between India and Japan in the digital sector.

12. Secretary, MeitY participated in the Session on "Investment: Economic Prospects in India" during the 3rd India- Japan Forum on December 06, 2024 in New Delhi.

13. A meeting between India and Uzbekistan was held on July 17, 2024. The discussions focused on DPI, the IT and startup ecosystem, and exploring potential partnerships in IT education, including skill development initiatives.

14. On July 26, 2024, a team of journalists from Nepal visited MeitY and had a conversation with Secretary, MeitY about the growth of the Electronics Manufacturing Ecosystem in India, DPI, and various capacity-building programs carried out by NIELIT.

15. Under the framework of the MoU on Semiconductor, the 1st India-Singapore Semiconductor Policy Dialogue was held on November 5, 2024 in New Delhi. Discussions emphasized India's initiative and Singapore's expertise in supply chains, R&D, and workforce development. Key priorities included skill development, joint R&D in advanced packaging, compound semiconductors, and trade optimization.

16. The India-US Information and Communications Technology Working Group (ICTWG) Meeting was held at Sushma Swaraj Bhawan on October 17, 2024. The meeting, in which the Secretary, MeitY, and the US Ambassador to India participated, saw fruitful discussions on varied topics, including IT/IT-enabled services, digital talent, cross-border data flows, data privacy, collaboration in AI, semiconductor and electronics manufacturing, and telecommunications.

17. A virtual meeting of the Technology and IT Joint Working Group, co-chaired by India and Saudi Arabia under the Economy and Investment Pillar of the Strategic Partnership Council, was held on October 14, 2024. MeitY also participated in the 5th Senior Officials Meeting of the Economy and Investment Committee under the Strategic Partnership Council, held on October 17, 2024, at NITI Aayog.

18. MeitY virtually participated in a panel discussion on *"Deep Dive Digital Dialogues: Results, Opportunities, and Prospects for International Cooperation in Digital Policy"* during the 17th Federal Government Digital Summit, Germany, on October 22, 2024. The panel discussion focused on AI, DPI, digital literacy, and cybersecurity.

19. On November 7, 2024, the 8th session of the Indo-Russia Joint Working Group on ICT Cooperation, co-chaired by the Secretary, MeitY, and Russia's Deputy Minister of Digital Development, was held. Discussions during the meeting covered IT/ITeS, ESDM, telecom, cybersecurity, digital governance, and digital education.

4.4.2 International Projects

To showcase India's prowess in the electronics and IT sector and emerging technologies, MeitY has initiated joint projects with various countries. Also, MeitY has been assisting the Ministry of External Affairs in executing a number of projects in developing and least-developed countries. Under such initiatives, number of Centers of Excellence in IT, IT Parks, Capacity Building Institutes, telemedicine & tele-education facilities, e-networks have been established. The following projects are under execution and initiated during the year:

1. **High-performance Computing**: India and EU launched a joint call for proposal on HPC applications under the signed Intent of Cooperation (IoC) on High Performance Computing (HPC), Weather Extremes & Climate Modeling and Quantum Technologies.

2. **India-Argentina Centre of Excellence in Information Technology (IA-CEIT)** set up by C-DAC Delhi with financial assistance from the

Government of India in the University of Hurlingham, Buenos Aires conducted a convocation ceremony. The ceremony witnessed the participation of the Argentine Minister of Education, Hon'ble Jaime Perczyk; Ambassador of India, H.E. Dinesh Bhatia; Rector of Hurlingham University, H.E. Walter Wallach. IA-CEIT was handed over to the University of Hurlingham on 5th Dec 2024 and has trained more than 800 participants.

3. **Centre of Excellence for Software Development and Training (CESDT) in Cambodia** was established in Nov 2018. Training activities are currently going-on in Cambodia with the deputation of first CDAC expert in January 2024 for a period of 6 (**six**) months which is further extended for another six months i.e. till 15 Jan 2025 as per the request from Cambodian side. With the approval from Government of Cambodia three courses were launched at CESDT viz Certificate course in Network Administration, Certificate course in Cyber Security and Certificate course in Full Stack Development. A total of 330 students enrolled in these courses.

4. **India – Solomon Islands Centre of Excellence in IT (IS-CEIT)** setup by C-DAC Delhi with financial assistance from the Government of India located at SINU Honiara was made Operational. IS-CEIT specializes in delivering holistic ICT domain training and seeks to raise awareness about the wealth of resources and expertise available at the center. IS-CEIT commenced classes on 6th March 2024 for the Certificate courses in Information Technology and Data Analysis, for students, working professionals, and nominated Government officials.

5. **India – Vanuatu Centre of Excellence in IT (IV-CEIT)** set up by CDAC Delhi at Vanuatu Institute of Technology (VIT) Port Vila with financial assistance from the Government of India. The CoE was inaugurated on 11th June 2024 by the Hon'ble President of Vanuatu, Mr. Nikenike Vurobaravu along with H.E. High Commissioner of India to New Zealand (accredited to Vanuatu). CEIT in Vanuatu is offering courses in Micro Qualification course in Office Automation and Micro Qualification course in Information Technology is underway at CEIT in Vanuatu. The accreditation process for the Diploma in Java Programming course is under process in Vanuatu Qualification Authority.

6. **Vietnam Centre of Excellence in Software Development and Training (CESDT)** setup by C-DAC Delhi at Posts and Telecommunications Institute of Technology (PTIT) was inaugurated by Ambassador of India to Vietnam in Ho Chi Minh on 27th November 2024. CESDT is setup by C-DAC Delhi with the financial assistance under ASEAN – India Cooperation Fund.

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)

Under National Supercomputing Mission (NSM), approved by the Cabinet Committee on Economic Affairs (CCEA) in 2015 and being executed within the framework of 'Digital India', C-DAC is engaged in indigenous R&D in petascale computing systems encompassing HPC components (including HPC processor, server board, interconnect, cluster, cooling system), HPC System Software, HPC Applications, HPC Solutions and Services. Under NSM, it is mandated to design and develop Indigenous supercomputers targeted at the exascale ecosystem in a phased manner from "Assembly" to "Manufacturing" to "Design and Manufacturing" of HPC systems and deploy petascale computing systems across the country. NSM has also equipped HPC enabled workforce to cater to 'Skill India' scheme. The mission also aims at 'Atmanirbhar Bharat' in HPC for undertaking inventions by the scientific community and industry of the country.

5.1.1.1 HPC Systems Deployed under NSM

As of December 2024, under Phase-1, Phase-2, and Phase-3 of NSM, C-DAC has deployed 33 supercomputing systems, providing a total compute power of 32 Petaflops (PF). These systems, distributed across IITs, IISc, CDAC, and other R&D labs, support a variety of research initiatives. With the addition of six new systems, including a 20PF National facility at CDAC Bangalore, the total supercomputing capacity will soon reach 64 Petaflops. On 26th September, 2024 Hon'ble Prime Minister Shri Narendra Modi dedicated three PARAM Rudra Supercomputers to the nation via video conferencing. These supercomputers, are installed at the Inter-University Accelerator Centre (IUAC) in New Delhi (3 PetaFlops), the Giant Metrewave Radio Telescope (GMRT) at the National Centre for Radio Astrophysics (NCRA) in Pune (1 PetaFlop), and the S. N. Bose National Centre for Basic Sciences in Kolkata (838 TeraFlops). These supercomputers are built using indigenously designed and manufactured High Performance Computing servers, known as "Rudra," along with a locally developed software stack. The PARAM Rudra Supercomputers will significantly enhance research capabilities for young scientists in India, facilitating advanced studies in physics, earth sciences, and cosmology.

Unveiling of three "Param Rudra" supercomputers at IUAC New Delhi, GMRT-TIFR Pune, SN Bose NCBS Kolkata by Prime Minister Narendra Modi

Param Utkarsh at C-DAC Bengaluru is being used for Design Linked Incentive (DLI), Chip to Startup (C2S), Meghdoot Cloud, AI for cyber security and many other industries. PARAM Siddhi at C-DAC Pune is being used by many start-ups involved in varied applications of AI-ML.

Significant number of components utilized in building Phase-3 systems are designed, manufactured, and assembled locally. These include C-DAC's Rudra servers, DCLC and HPC Software Stack developed indigenously. A wide range of applications from Scientific, Engineering,

Finance and Data Science domains are optimized and scaled for underneath architecture/ processor. The systems are accessed by 10000+ active researchers and academicians from 220+ institutes across the country on Nation Knowledge Network (NKN). More than one crore jobs have been executed on these systems by 1,500+ PhD students who, in turn, have published 1,200+ research papers in leading journals in India and overseas.

5.1.1.2 Indigenous HPC Technologies under NSM

Rudra-I server

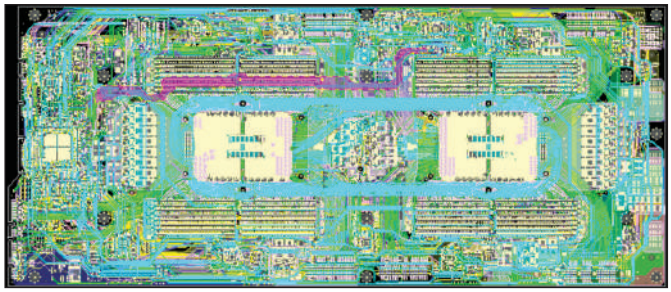
C-DAC's, indigenously designed Rudra-I server platform is targeted for Hyperscale Data Centers in addition to HPC, Cloud, Edge computing and Communication. It is poised to ensure India's self-sufficiency to design, develop and deliver as per country's needs. It has an edge in security conscious environments and businesses. Performance of HPC applications on Rudra-1 is found to be at par with clusters with commercial servers elsewhere. All Rudra systems under Phase-3 are based on Rudra-I server.

C-DAC has built a Rudra -1 based 1 PF pilot system in Open19 form factor and inhouse developed Network Interface Card Trinetra, Nvidia GPU cards A100, Mellanox InfiniBand Switch and Open19 Delta Power shelf.

C-DAC partnered with M/s VVDN Technologies, M/s Kaynes Technologies and Avalon with technology transfer of server design for proliferating Rudra servers in the commercial server market. C-DAC has signed contract with M/s VVDN Technologies and M/s Kaynes Technology for the production of 6000 Rudra-I servers for phase-3 systems.

Rudra-II server

C-DAC's RUDRA-II is based on Intel's (Sapphire Rapids/ Emerald Rapids processor). It supports next-gen industry-standard technologies such as PCIe 5.0, HBM & DDR5 memory speeds of up to 5600MT. It is compatible with Open Compute Platform (OCP) 48V DC for Cloud/ Data center. For cooling, it has option of both liquid (better energy efficiency) and air cooling. The server is designed with interfaces required for HPC system and in small form factor.



Rudra-II Base Board Layout

Rudra-II Server assembly consists of 3 Cards: Base Board (BB) carries processors, memory, Clock, PCIe gen5 connectivity and other control logic, Controller Board (CB) carries Chipset and BMC logic and Power Distribution Board (PDB) comprises of Power distribution logic. The Mechanical Design for Rudra-II is carried out considering efficient utilization of space and effective thermal design.

5.1.1.3 Trinetra Interconnect

C-DAC's Trinetra interconnect development is aimed at Indigenous exascale network design, allowing for scalability to hundreds of thousands of compute nodes, without the need for dedicated switching hardware. It consists of Trinetra-A (currently in production), and Trinetra-B (Under development). The interconnect has complex chip design (NCC: Network Controller chip), Platform design (PCB development), and Lightweight Protocol networking software design.

Trinetra-A is based on PCI-e Gen3 host interface, and 100 Gigabits physical link layer. It uses six 100 Gbps links to realize a 3D torus topology. The topology is scalable to large number of compute nodes. The software stack allows application interface, based on standards to run HPC applications seamlessly.

PARAM Rudra - Trinetra-A Cluster

PARAM Rudra – Trinetra-A cluster comprises of 24 nodes based on Rudra-I server, Trinetra-A 100Gbps (2 x 2 x 6) network, Trinetra software stack and AlmaLinux release 8.9 (Midnight Oncilla). Trinetra network was validated on this cluster using various benchmarks/ applications.

Trinetra-B is based on PCI-e Gen3 host interface and 200Gbps physical link layer technology. The design uses 10 such links to realize 'Supercluster' topology which is an improvement over 3D Torus used by Trinetra-A. Prototype of Trinetra-B hardware has been completed successfully. Aggregate throughput from Trinetra-B physical link layer is 2 Terabits/sec, full duplex.

5.1.1.4 C-DAC Storage Server Appliance

C-DAC has designed Rudra I based Object Storage Appliance (Mk1) to offer an optimal blend of flash performance and capacity. The appliance features a dual-processor setup (Rudra-1 server based) that maximizes SSD performance and includes a remote DMA feature to enhance throughput. It is equipped with a redundant power supply to ensure high availability, achieving sequential read and write speeds of 80 Gbps and random read and write speeds of 2,500 KIOPS.

C-DAC has developed an Object storage software system by deploying DAOS system. This is an open-source software-defined scale-out object store which provides high bandwidth and high IOPS storage containers to applications. This also enables next-generation data-centric workflows combining simulation, data analytics, and machine learning.

5.1.1.5 Development of HPC based applications for national need under NSM

Early warning system for flood prediction (EWS-FP) in river basins of India

A geospatial portal SimInu (Simulation of Inundation) was developed to disseminate early warning information on flood prediction to disaster managers, enabling them to make timely & informed decisions. It boasts of a significant lead time of around 2 hours to forecast flood for the next 48 hours. Flood forecast (inundation and water level) information is available on-click over the interactive map. The Odisha State Water Resources Department has been utilizing this portal during the 2024 monsoon season to gain a comprehensive understanding of the flood situation. The Central Water Commission has also commended the product for its utility and ease of use.

A HPC Software Suite for Seismic Imaging to aid Oil & Gas Exploration (SeisRTM) – 3.0

SeisRTM is capable of producing high resolution 2D and 3D seismic images of complex geological subsurface using acquired large seismic data. It is optimized using Boundary wavefield saving (BSRTM), Nyquist upscaling of cross-correlation frequency, depth resampling and partial snapshot storage. SeisRTM 3.0 includes GUI, visualization of data, TTI RTM, 3D RTM, utility development for 3D. Land and marine data are processed using 3D utility. The pre-processing utility includes geometry creation, muting of shot gathers, interpolation of velocity model etc. The post-processing utility includes shallow noise removal, ray tracing-based muting, stacking of shot image gathers etc.

Simulation Lab and Science Based Decision Support Framework to Address Urban Environment Issues

A visualization portal developed visualizes the daily forecast of meteorological conditions and heat wave events in five urban cities. The portal is used to visualize weather, air quality, and hydrology-related parameters from operational models and various available observational data.

High-resolution WRF model data is automatically extracted. The coupled Hydro-Met modeling Simulation platform is used for Quasi Operational Flood forecasting for Pune and Bengaluru Flood Events. Daily flood forecast based on model simulated rainfall and reservoirs water release information is automatically modeled and shared with DM cell, PMC, and WRD authorities for inundation details.

5.1.1.6 Application Porting, Optimization and Scaling

More than 300 applications/ libraries/ tools in Molecular dynamics, Material science, Computational chemistry, Weather prediction, CFD, Bioinformatics, AI-ML, and other domains were deployed and acceptance tests were completed on HPC systems at multiple sites. These

systems are maintained by a dedicated team and kept 98% up for effective use by the end-uses.

5.1.1.7 Human Resource Development under NSM

Under NSM HRD, C-DAC has provided training on HPC by conducting faculty development programs (FDPs), creating MOOC content, and hosting targeted workshops, hackathons, and bootcamps. Against the original commitment, C-DAC has trained more than 23000 personnel on niche areas like HPC, AL/ML/DL till date. Under an MOU with AICTE, knowledge in the area of HPC technologies was imparted to faculties and students in AICTE-affiliated institutes. C-DAC has trained 200 master trainers who will conduct FDPs nationwide, enabling faculties to teach HPC courses (SANKLAP).

5.1.1.8 International Association

C-DAC has become an affiliate member of Accelerated Data Analytics and Computing Institute (ADAC) during 2023. C-DAC has also become an affiliate member of "High Performance Software Foundation (HPSF)" launched during ISC High Performance Conference, 2024.

5.1.2 R&D and IP Development

5.1.2.1 Convergence, Communications & Broadband Technologies (CC&BT)

CC&BT has continued to play a pivotal role a key enabler of technologies for economic growth and development, facilitating India's journey towards digital transformation. The previous years have witnessed significant strides in R&D efforts in the domain of cutting-edge Communication and Broadband Technologies, with a clear focus on empowering citizens with pervasive access to digital services across a multitude of use cases and verticals.

The R&D efforts within the CC&BT group, MeitY aim to achieve several key objectives. These objectives include fostering R&D activities in CC&BT and Strategic Electronics, with a strong emphasis on collaborative initiatives involving academic and research institutions, user organizations, industry, and international partners. Furthermore, the Group strives to promote the commercialization of the developed technologies. It also plays a pivotal role in providing essential technical insights and support to various ministries, departments, and organizations, including the Department of Telecommunications (DoT), TRAI, Telecom Standards Development, Society of India (TSDSI), the Department of Science and Technology (DST), C-DOT, Telecom Centers of Excellence (TCOE), the Ministry of I&B, the Department of Space, and the Bureau of Indian Standards (BIS). These efforts collectively contribute to the growth and advancement of the digital technology landscape in India.

In alignment with the ever-evolving digital landscape, our relentless pursuit of R&D initiatives in CC&BT, and Strategic Electronics has been instrumental in nurturing indigenous capabilities. These initiatives have been centered around critical areas such as Next Generation Networks (NGN) and Communication technologies, Broadband Wireless Technologies, Green Communications, Quantum Communication, Vehicular Communication, Cyber Physical Systems, AI-enabled Communication, Big Data Analytics, and Internet of Things (IoTs) for societal applications and disaster management. Furthermore, Machine to-Machine (M2M) Communication and Strategic Electronics have emerged as instrumental components in both civil and defense domains, along with innovative backhaul communication technologies.

The R&D projects remain dedicated to creating intellectual property, leading to valuable patents, the design of innovative algorithms to enhance product development, and the development of prototypes that provide a head start in the pursuit of technological solutions and prototypes. The outputs stemming from these projects are poised to make substantial contributions in achieving the goals set forth by the 'Make in India' and 'Digital India' initiatives of the Government of India.

In the continued endeavor to foster indigenous capabilities in Next Generation Communications and Convergence technologies, focus extends to a diverse range of innovations, including massive multiple-input-multiple-output (MIMO), MAC and PHY SoC for Low Power and Long Range Networks, Metro Area Quantum Access Network (MAQAN) and its Network management innovation and experimentation, MMW Radiometer for NE Region of India. Additionally, emphasis is laid on ICT

applications in strategic sectors, Broadband Wireless Access Technologies, Visible Light Communication (VLC), Vehicular ad-hoc Networks (VANET), IP-based products and services, electromagnetic wave applications, high-power RF/microwave tubes, Terahertz (THz) wireless systems, and Radar Systems etc.

The significance of R&D initiatives lies in their potential to propel the nation into the next wave of digital transformation. These efforts underscore an unwavering commitment in advancing the frontiers of technology, promoting innovation, and fostering growth, thereby reinforcing India's position as a leader in the global digital landscape. The mission continues to be firmly rooted in pioneering breakthroughs that enhances the digital ecosystem and bolster the nation's position on the global stage.

Projects contributing to 6G: Over the past two decades, MeitY has supported projects including advanced technologies from 4G to 5G and Beyond, including 6G, contributing significantly to global standards and technology prototypes. This played a crucial role in introduction of usage scenario of "Ubiquitous connectivity" for IMT-2030(6G) by India in the WP5D meeting held at Geneva in June 2023.

This usage scenario, coupled with the new capability of coverage, enables the development of 6G technologies.

Substantial efforts, including the formulation of proposals like Extreme MIMO, 6G Satcom and New Waveforms have been undertaken, and these contributions have been integrated into the 6G Vision document.

The vision of Bharat 6G Mission is to contribute significantly to 6G standards and intellectual property, with the goal 10% of the standard essential IP in 6G to achieve 6G-self-reliant powered nation.

The following ongoing projects aligns with the above vision:

- Next Generation Wireless Research and Standardization on 5G and Beyond
- 6G End-to-End Communication System
- 6G: Sub-THz Wireless Communication with Intelligent Reflecting Surfaces (IRS)

Next Generation Wireless Research and Standardization on Fifth Generation (5G) and Beyond Technologies:

The imminent 5G and the future 6G wireless technologies have the potential to make a major societal transformation in India by enabling massive digital products aligned with the goals of the Government of India like the Make in India, Digital India and Atmanirbhar Bharat. "Next Generation Wireless Research and Standardization on 5G and Beyond" project was initiated with a broad objective to conduct collaborative research in the broadband wireless communication areas leading to standardization of 5G and Beyond technologies by utilizing the expertise available within the country. Further, the research outcomes have been taken to various standard bodies like 3rd Generation Partnership Project (3GPP), International Telecommunication Union (ITU), Telecommunications Standards Development Society, India (TSDSI), Institute of Electrical and Electronics Engineers (IEEE), etc. to contribute to evolving the technologies for 5G and beyond including 6G technologies.

- Significant contributions have been made to 3GPP toward the development of 5G-Advanced Technologies and these have been incorporated into the ongoing releases of 5G standards.
- Discussions with global stakeholders, including academia and industry, are shaping the development of 6G technologies and contributions will be submitted at the 3GPP plenary meetings.
- Indian researchers from leading institutions such as IIT Hyderabad, CEWiT IIT Madras, IIT Madras, IISc Bangalore, and IIT Kanpur, alongside technical experts from private companies, have contributed to defining performance requirements and evaluation methodologies for IMT-2030 (International Mobile Telecommunications). These contributions are pivotal for evaluating technology requirements that address performance needs in the development of 6G.
- The focus of the research is to ensure that the ensuing 6G technologies provide affordable connectivity and broadband services, especially in rural and underserved areas. This entails

concentrating on low-power consumption, reducing greenhouse gas emissions, and adopting circular economy practices to promote sustainability and contribute to the achievement of the United Nations Sustainable Development Goals (SDGs).

6G End-to-End Communication System: The main aim of the project is to develop fundamental technological innovations and solutions in two important areas i.e., the maximization of Network coverage & range at high operational frequencies and Development of wireless technology that offers extremely high data rates and extremely low latency that offers near wireline (fibre) experience. In this regard, the system hardware-firmware architecture prototypes have been completed and the design and development of a 6G NR modem is currently in progress. The modem uses the OTFDM waveform, which has been specifically chosen to align with the ITU WP 5D IMT 2030 requirements for 6G networks. This ensures the modem meets the high-performance standards necessary for next-generation wireless communication.

A key achievement in the project so far is the successful transmission of a 200 MHz OTFDM-modulated signal using the 26GHz RF, demonstrating the system's capability for high-speed, high-efficiency communication at these advanced frequencies.

Further, the team is developing the 6G NR modem to unlock the full potential of 6G technology. After completing these key milestones, the development of relay prototype chains will begin, with a demonstration.

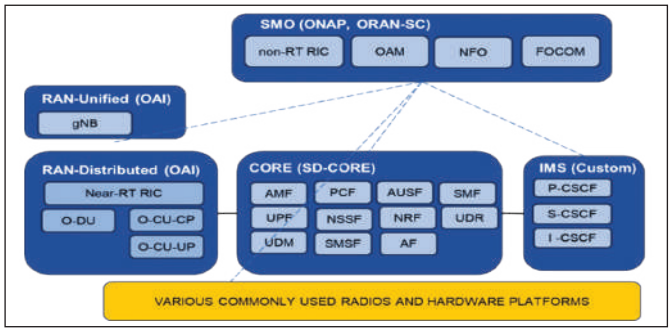
6G: Sub-THz Wireless Communication with Intelligent Reflecting Surfaces (IRS): The objective of this new technology demonstration project is to exhibit a fully functional 6G high speed communication link at 140 GHz under the Atma Nirbhar Bharat mission. SAMEER is executing this project with IIT Madras as a consortium member. SAMEER Kolkata has indigenously developed the D-band transmitter, receiver and lens antenna exclusively for this communication link. SAMEER successfully exhibited a Line-of-Sight (LOS) link at 140 GHz using the baseband signal generated by IIT Madras. SAMEER demonstrated 6G 6.4 Gbps Data Transmission in India Mobile Congress 2024. This kind of high frequency high speed wireless data link has been demonstrated for the first time in India with all indigenously developed components.

6G LOS communication link demonstration at India Mobile Congress 2024

6G antennas and components were also demonstrated during the "Digital India Future Labs" event in Delhi organized by MeitY in February 2024.

Indian Open Source Software Platform for an end-to-end 5G Networks (IOS-5GN)

This project aims to create an End-to-End 3GPP & Open Radio Access Network (O-RAN) compliant Open-Source 5G Software Platform, to provide commercial-grade open software platform that enables startups and companies to focus on their unique innovations rather than duplicating common software components, and to provide deep technical support to the industry in developing solutions. This will enable vendors to rapidly use, customize, make derivative works and thereby create mobile communication (5G/6G) products and services for Indian markets. The project is being jointly executed by Foundation for Innovation and Technology Transfer (FITT) of IIT Delhi, Foundation for Science Innovation and Development (FSID) of IISc, Bangalore, and CDAC-Thiruvananthapuram.

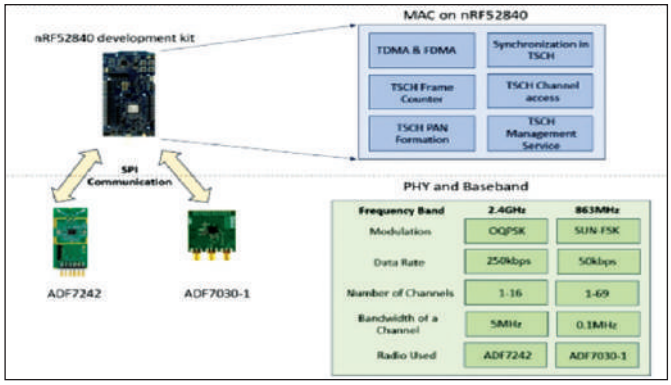


Solution Architecture

Hon'ble Secretary, MeitY at CDAC Booth at IMC 2024

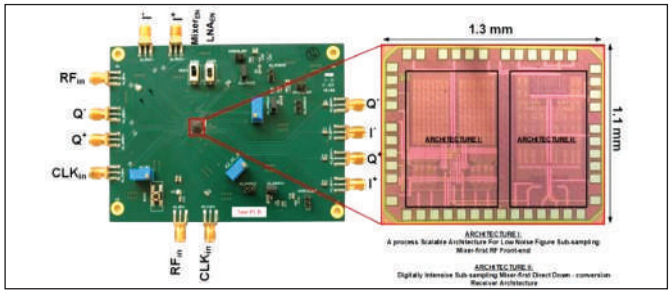
The first release of the software in GitHub involves 5G Radio Access Network (RAN) software, 5G Core (5GC) Software, Service Management and Orchestration (SMO) software to interwork with Lekha Wireless Solutions and VVDN technologies 7.2 Fronthaul (FH) n78 indoor Radio Units. More than 10 test beds across IISc, CDAC and IIT Delhi have been setup for enhancing test coverage through manual or automated testing. In lab conditions, data transfer speed of up to 900 Mbps on Core using standalone SD-Core testing with RAN simulators and up to 600 Mbps downlink and 50 Mbps uplink on RAN in an end-to-end setup with 2x2 split 7.2x Radio Unit (RU), gNB, and SD-Core transmitting wirelessly to a mobile phone were achieved. Four commercial User Equipment (UE) tests with RAN and Core for more than 24 hours in lab have been achieved. An Outdoor Radio Unit (ORU) simulator-based testbed for automated traffic model tests has been established. Configuration management of Core and RAN through SMO has been completed.

Design of Dynamic MAC and PHY SoC for Low Power and Long Range Networks: The project has successfully implemented and tested the IEEE 802.15.4:2020 standard on ARM M4 processor (nRF52840) and also implemented an out-of-tree module on GNU radio (ADF7242 and ADF7030) covering MAC features based on IEEE 802.15.4:2020 TSCH MAC Standard.

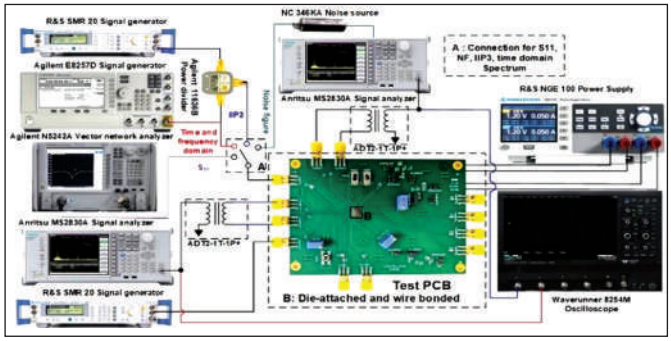


Implementation of TSCH MAC using ARM M4 processor and GNU radio

Tape-out of an RF front for receiver using sub sampling has been successfully implemented and tested. Further, two IEEE transaction and conference papers are also published on the same.



(a) Characterization board and microphotograph **(b) Full-chip**



(c) Measurement setup

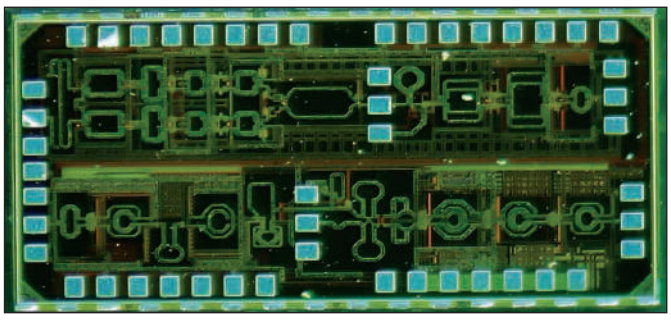
Development and testing of a low-power digital baseband at 2.4 GHz on FPGA using the beacon, MAC command and Data frame provided in the IEEE 802.15.4:2020 standard has been completed. The Physical testing and GDSII of developed digital baseband phase-1 is also completed and the test set-up for the same is also shown in the below Figure.

Test set-up for Digital Baseband Phase I

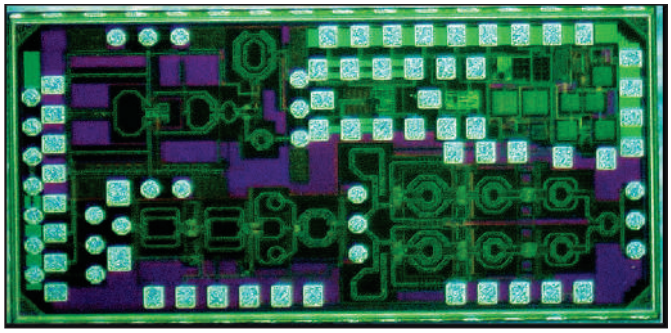
Further, tape-out and successful testing of the subblocks of the RF front end have been conducted. The team has published 2 IEEE transactions, 2 IEEE international conference papers and 2 MDPI journals based on the work done.

Development of signal and channel models, circuits, and antennas for Next Generation wireless systems with emphasis on vehicular communication

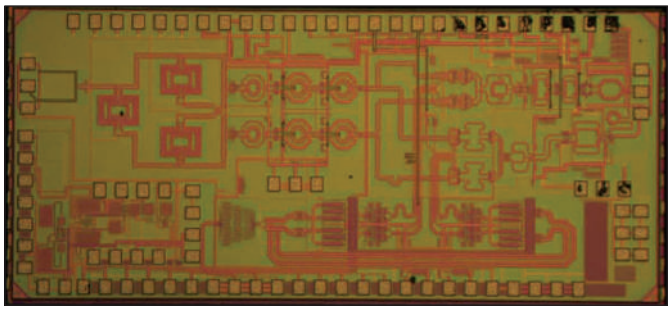
Millimetre wave (mmWave) research in India is still in its early stages. The objective of the project is to design and develop integrated circuits for mmWave communication, establishing mmWave characterization facilities and building expertise in Complementary Metal-Oxide-Semiconductor (CMOS) - based mmWave design and implementation. The focus is on designing, implementing, and characterizing CMOS mmWave circuits and systems, specifically targeting the n260 band (37–40 GHz). Two complete Transmitter (Tx) – Receiver (Rx) front-ends consisting of a power amplifier (PA), low noise amplifier (LNA) and Transmitter switch were designed in 65nm CMOS process, fabricated and tested. A transceiver consisting of PA, LNA, Transmit/ Receive switch, mixer, Intermediate Frequency (IF) amplifier, phase shifter, Local Oscillator (LO) buffer and In-phase and Quadrature (IQ) generation circuit has been designed and fabricated and testing is in progress.



Chip Micrograph of complete T/R Front End at 39GHz



Chip Micrograph of Injection locked oscillator at 39 GHz



Chip Micrograph of Phased Array at 39GHz

5G+/6G Converged Terrestrial and Satellite IOT (5G+/6G-sIoT): The project has made significant advancements in Satcom and terrestrial communication convergence, achieving key milestones such as developing 3GPP Rel-17compliant Satcom IoT systems. L-band NB-IoT SoC to support GEO satellites has also been successfully developed which enables a plethora of low-bit rate satellite IoT applications.

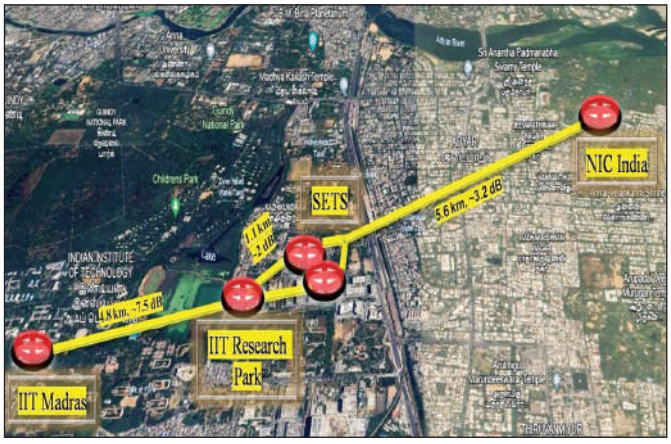
Furthermore, the project has contributed to the ITU WP 5D IMT-2030 Framework Document by integrating Satcom as a key interworking feature in IMT-2030. The notable achievements include the development of link and system simulators, integration of NB-IoT features, successful $\pi/2$-BPSK waveform simulations, and the completion of L2/L3 for 5G NR NTN gNB and UE.

Additionally, the team has enhanced its 5G base station (BS) and user equipment (UE) testbeds to support Satcom by designing advanced L1/L2/3 algorithms and protocols and has successfully filed 17 patents focused on advancements in 5G terrestrial and non-terrestrial technologies. These patents cover areas such as waveforms, physical layer (PHY) enhancements, scheduler features, and more.

Quantum Communication:

Quantum communication applies quantum principles in order to communicate via the transmission of quantum states. It is a field of applied quantum physics, closely related to quantum information processing and quantum teleportation, with the primary application of creating ultra-secure communication networks and quantum cryptography. Quantum communications use photons to transmit qubits between remote places. This is because photons are very well isolated from perturbations, which translates into long-lived superposition states for photonic qubits. It can propagate with low attenuation (down to 0.2 dB/km at 1.55 μm) in optical fibers.

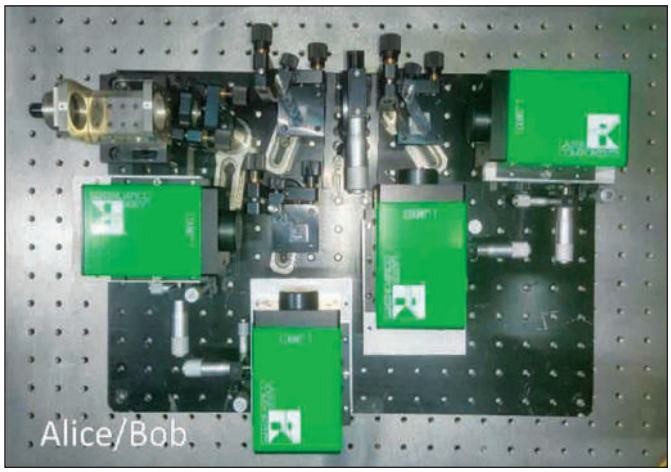
Metro Area Quantum Access Network (MAQAN): The project is a pioneering initiative aimed at developing India's first multipoint Quantum Key Distribution (QKD) network and R&D testbed over existing optical fibres. This indigenous effort focuses on creating hardware, firmware, and software to enable quantum-secure communication. Starting in March 2021, MAQAN now operates in a five-node topology across Chennai, connecting IIT Madras, ERNET, SETS, and NIC. For over 80 days, it has successfully generated secure cryptographic keys using Coherent-One-Way (CoW) and Differential Phase Shift (DPS) protocols. The project integrates SDN-enabled management through the DARPAN-Q platform and acts as a testbed for evaluating QKD protocols and post-quantum cryptography. This marks a significant milestone in advancing India's capabilities in secure communications, leveraging the principles of quantum mechanics for unmatched security.



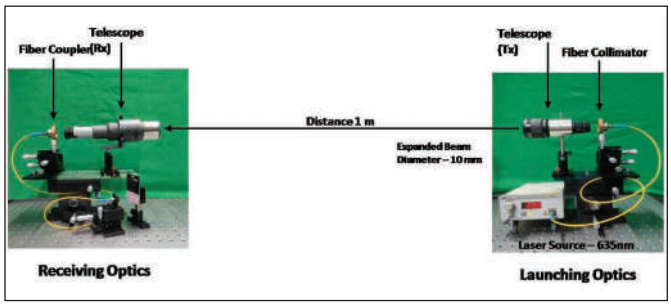
MAQAN Links

Quantum communication using entangled photons:

The objective of this project is to establish secure communication between a sender (Alice) and a receiver (Bob) through public channel between two buildings using quantum communication techniques. Entangled photons are transmitted through free space to allow both parties to securely share a quantum key. The sender uses this key to encrypt a message before sending it over a public communication channel and the receiver decrypts the message using the shared quantum key to retrieve its original message. The laboratory setup has been successfully established at Society for Applied Microwave Electronics Engineering & Research (SAMEER), Mumbai.



Basis Choice and Polarization Measurement Unit



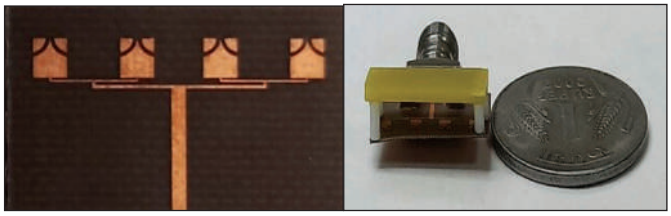
Free Space Photon Transmission

Design Studies of High-Power RF Amplifiers and Development of Antennae for mm-wave backhaul/ fronthaul Connectivity for 5G

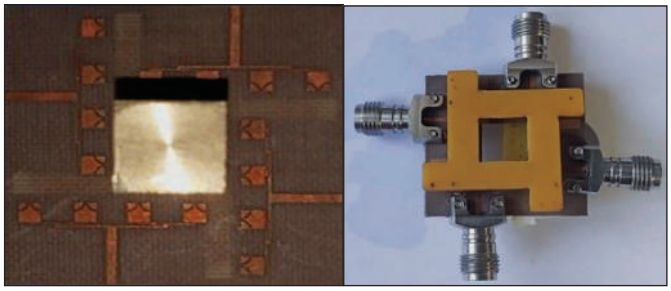
5G enables ultra-fast data speeds and near-instant response times using millimeter waves (mmWave), which offer high data capacity but have limited range and

are easily obstructed. High-power Radio Frequency (RF) amplifiers address these challenges by boosting signals for seamless backhaul and fronthaul communication.

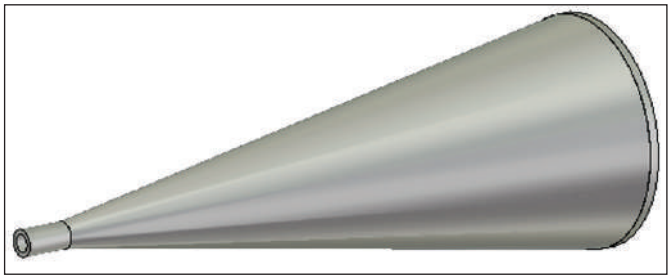
This project focuses on optimizing high-power RF amplifiers for mmWave applications in the V-band and these solutions are vital for rural areas, bridging the digital divide and supporting essential services like healthcare, education, and e-governance. Channel models which predict signal behavior to determine the required RF power and bandwidth, balancing output, efficiency, and challenges like path loss and interference were carried out. High-power, wideband linear amplifiers were designed. Printed patch antennas on Rogers substrate and low temperature co-fired ceramic (LTCC) antennas for point-to-multipoint (fronthaul) and point-to-point (backhaul) connectivity and conical horn antenna for point-to-point (backhaul) connectivity were fabricated.



Fabricated antenna prototype with high frequency connector



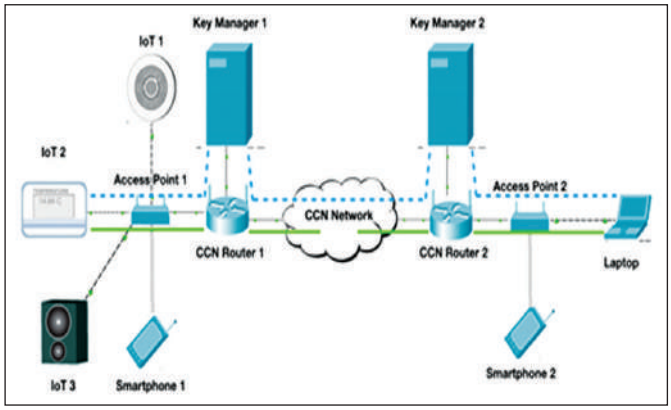
Fabricated antenna prototype for MIMO Implementation



Designed Conical horn antenna

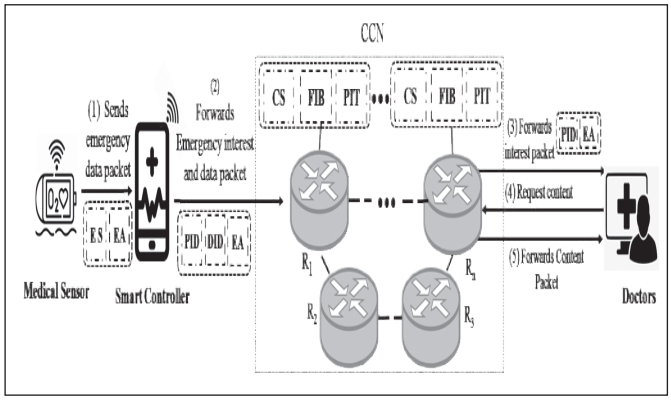
Design of Efficient and Secure Internet-of-Things (IoT) Communication Framework in Context of Content-Centric Network (CCN) using Elliptic Curve Cryptography (ECC) – A Next-Generation Smart Communication Technology: The following have been developed under the project:

1. ECC-Based Secure Handshake Protocol for Multicasting in CCN-IoT Environment is designed for secure communication in IoT data broadcasting and multicasting.



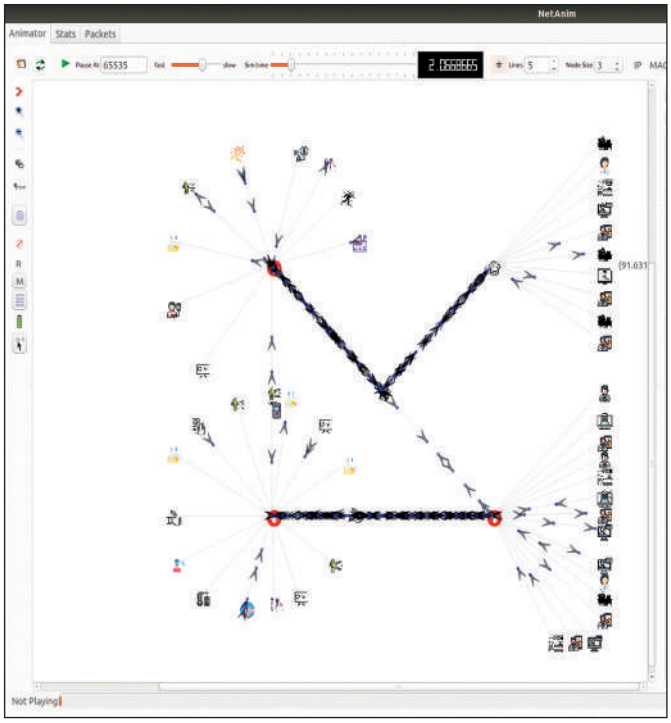
Handshake Protocol for Multicasting

2. Content-Centric Network-based Internet of Medical Things for Remote Patient Monitoring is developed for smart health monitoring in Content-Centric Networking (CCN).



IoMT for Remote Patient Monitoring

3. An Efficient Authentication and Content Dissemination Scheme for CCN-based IoMT in Remote Health Monitoring System is designed for secure remote healthcare management system integrated with CCN-based IoT and edge devices.



Content Dissemination Scheme for CCN-based IoMT

4. A CCN-based Proper Naming Scheme using Colon Classification and an ECC-based lightweight real-time CCN- IoT Protocol is developed for IoT data management.

5. Provably Secure Three Factor Based Authentication Framework in CCN-Based IoT with Edge Architecture is designed for secure content delivery between consumers and edge devices, featuring efficient content caching.

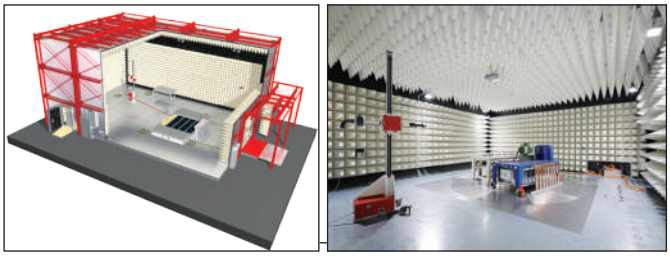
6. WIRTinX Subnetworks for 6G communication in the context of ICN is developed for a secure and efficient communication protocol for ICN-WinXS incorporating a privacy-preserving naming scheme.

7. All the designed communication protocols have been tested using AVISPA simulator and it is found to be safe from various network security threats and attacks. Further, the practical implementation aspects of all the developed schemes are being verified in the ndnSIM Network Simulator running on an Ubuntu workstation having Intel Xeon Gold 6226R 32 cores CPU @ 2.9 GHz with 384 GB RAM.

Establishment of EMC test facility for testing of strategic electronics systems: This initiative aims to set up an EMC testing facility in Maharashtra to support the Military, Navy, Air Force, and commercial manufacturers across India's western zone. With 70% of defence production shifting to indigenous development, India's limited MIL-STD testing facilities result in a 6–8 month waiting period for defence manufacturers. This project will boost Maharashtra and the nation due to the presence of defence hubs and the Western Naval Command in the region. SAMEER currently offers limited MIL testing for manufacturers from Pune, Nasik, and Aurangabad, who otherwise travel to southern regions like Chennai for compliance testing due to the absence of an EMC facility in the western zone.

The test facility will offer NABL-accredited compliance testing including Shielded Anechoic Chamber (10 m) with fully lined ferrite-tiled and hybrid absorbers meeting the all requirements of CISPR 16-1-4/5, IEC 61000-5-X standard and MIL-STD 461 F for full compliance EMI/EMC.

The project has progressed with all necessary statutory clearances, including environmental, fire, and Airport Authority approvals, allowing civil activities to commence. The City and Industrial Development Corporation of Maharashtra (CIDCO) has issued the commencement certificate for the construction of the chamber and laboratories. The Central Public Works Department (CPWD) awarded the civil structure contract to M/s. National Construction and construction have begun on-site.

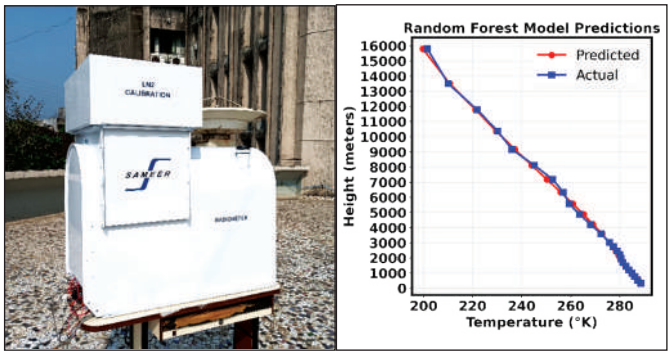


10 m Anechoic Chamber (right) and EMC Test Facility inside Chamber (left)

Development of MMW Radiometer for NE Region of India for Climate modelling studies for weather changes: A millimetre wave, ground-based passive radiometer

system has been developed in-house for unattended, time-contiguous measurement of tropospheric temperature and humidity profiles in the atmosphere (~ 10 km).

Statistical (Machine learning-regressor and neural network-based) and Physical modelling (Optimal estimation, 1D-Var model) based Inverse model was developed for retrieval of Temperature and humidity profiles.



MM- Wave radiometer (left) and the retrieved profiles for Temperature and comparison with sample Predicted using the random forest ML model (right)

Analysis, Design and Implementation of Intelligent Reflecting Surfaces (IRS) Assisted Wireless Communication Systems: The IRSs are man-made surfaces (generally the meta-surfaces consisting of several meta-atoms) of electromagnetic (EM) material and have unique wireless communication capabilities and are aimed to control the propagation environment intentionally and deterministically to boost the signal quality at the receiver. These surfaces can be controlled electronically to focus the EM energy at the receiver. In essence, an IRS intelligently configures the wireless environment to help the transmissions between the sender and receiver, when direct communication is not possible or is of poor quality.

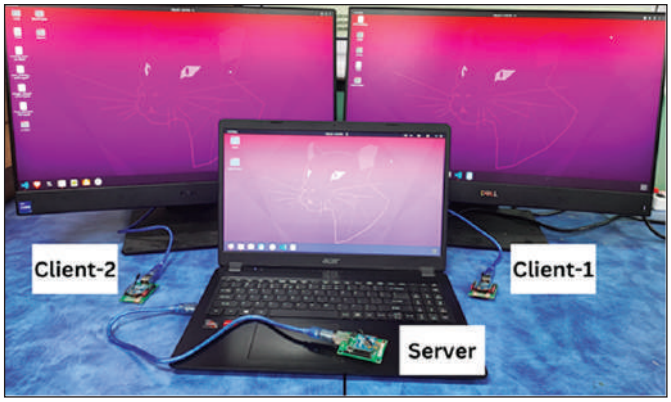
The project achieved milestones including high-quality publications, a functional RIS panel capable of beam steering, and a successful demonstration of smooth video streaming with notable data rates and SINR. The prototype was showcased at the India Mobile Congress, highlighting its innovation and impact.

Indigenously developed RIS assisted wireless communication system

A Data-Centric Approach to Study Fundamental Limits of Communication in Adversarial Wireless Networks" jointly implemented by IIT Delhi and IIIT Delhi: The project aims to employ data-centric approaches to secure next-generation networks from advanced adversaries.

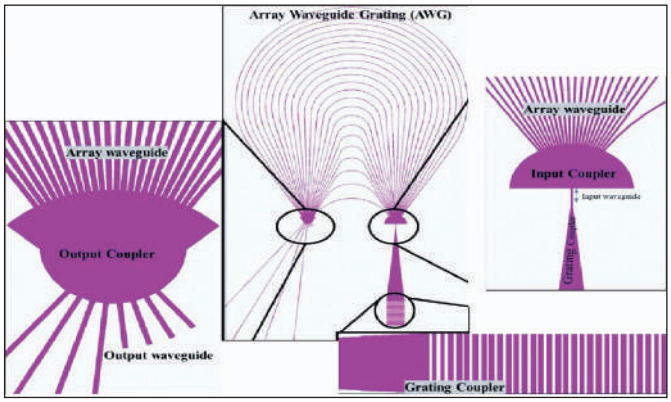
The wireless testbed has been developed at IIT Delhi and is designed to detect two types of attack adversaries: (i) Reactive adversaries with victim monitoring capability, and (ii) Reactive adversaries with impersonation capability. The testbed includes a generated dataset, an algorithm for attack detection, and the testbed infrastructure itself to demonstrate the effectiveness of Federated Learning in mitigating these security threats.

Testbed at IIT Delhi: Depiction of Adlam Pluto devices in our lab setting that are used to play the role of Alice, Dave and Bob



Testbed at IIT Delhi: Depiction of Xbee devices to play the role of base stations for implementing Federated Learning

On-chip Control of Polarization and Delay in Arrayed Waveguide Grating" implemented by IIT Indore: A platform for on-chip polarization control has been designed and optimized, demonstrating significant modal birefringence variation with rib thickness and biased voltages, achieving a change of 0.022 at 10 V for an 800 nm optimized waveguide. A nanophotonic ring resonator embedded in a hybrid plasmonic waveguide has been analyzed, presenting a comb-like structure that enables an ultra-large group delay. A chip-scale ring resonator with ITO-based vertical coupling has been developed to enhance nonlinear optical properties through electron heating, improving the refractive index and enabling high-speed optical data communication. Additionally, an AWG integrated with a ring resonator has been fabricated, achieving improved wavelength selectivity and a 5% reduction in crosstalk, with further work ongoing to develop an AWG with a shared free spectral region.



Schematic of the Developed AWG Device

Design and Development of a Millimeter-wave based Road Condition Detection Radar for Automotive Application implemented by TCE Madurai: The configuration and evaluation of mm-wave radar sensor boards and data capture boards were carried out to adapt the existing radar module to specific requirements. The integrated antenna and beamforming were simulated and tailored to effectively target road surfaces. Comprehensive theoretical analyses and simulations of signal processing algorithms, along with the development of enhanced data processing techniques, were performed to enable the radar to detect various road conditions, including potholes and speed breakers, under diverse climatic conditions. The integration of radar boards, data capture systems, and data processing was implemented on an Embedded C FPGA platform, with the output displayed on a Python-based GUI, followed by rigorous experimental evaluation. Additionally, a radome was designed, subjected to mechanical stress and vibration analysis, and developed to house the integrated radar system. The project culminated in the development of a complete end-to-end radar hardware prototype, which was experimentally validated on cars and two-wheelers across different environmental conditions.

5.1.2.2 Artificial Intelligence & Emerging Technology

Promoting the Adoption of Cutting-edge Technologies to Create Significant Economic and Societal Impact

India is now prepping for cutting-edge technologies including 5G, AI, blockchain, augmented reality & virtual reality, machine learning & deep learning, robots, natural language processing, etc. These will be critical in the government and industry, for planning or decision-making, expediting development or analyzing deployment, issue solving or product creation, detecting new trends or drawing out linkages and associations.

The Emerging Technologies Division of MeitY is responsible for fostering and promoting the utilization of cutting-edge technologies in the country. The Division is supporting work for policy/ strategy papers in emerging areas like AI, AR/VR, IoT, blockchain, robotics, computer vision, drones, etc.

Initiatives by MeitY in Emerging Technologies

Centre of Excellence (CoE) for Internet of Things (IoTs) (Gandhinagar, Bengaluru, Gurugram & Vizag)

Under the Digital India initiatives, MeitY along with NASSCOM and state governments has set up CoE on IoTs at Bengaluru, Gurugram, Gandhi Nagar and Visakhapatnam. First Centre on IoT was established in Bengaluru in 2016 along with the Government of Karnataka and NASSCOM. One of the objectives of these centres is to enable India emerge as an innovation hub in IoT through democratization of innovation and realization of prototypes. The CoE, supported by Government and industry is a nationwide platform for innovation sandbox to enable technology adoption and innovation, and to develop a culture of cocreation in Industry 4.0, manufacturing, automotive and transportation, life sciences and healthcare, Agriculture and other industry verticals and horizontals. More than 490 startups have been enrolled, 102 societal projects have been undertaken, and 110 IPs filed.

Centre of Excellence on Virtual & Augmented Reality (VARCoE) at IIT Bhubaneswar

Virtual & Augmented Reality (AR&VR) have massive innovation potential across a wide range of industries and research elds. With an objective to explore the opportunities in this niche area, Software Technology Parks of India in partnership with MeitY, Government of Odisha, IIT Bhubaneshwar and a philanthropist has established Centre of Entrepreneurship for VARCoE at IIT Bhubaneswar. It undertakes world-class research, develop state-of-the art testing facility/ laboratories for advanced algorithms, applications and methods in aid of AR&VR for immersive visualization in areas including skill development, product design, healthcare, art & architecture, transport, construction, tourism, entertainment, education & productivity software. Presently nine major projects on AR&VR applications in various domains involving 15 highly qualified faculty and researchers of IIT Bhubaneshwar are in progress. VARCoE has also supported 26 startups so far.

Centre of Excellence on Gaming, VFX, Computer Vision & AI at Hyderabad

This CoE has been set up in collaboration with MeitY, STPI, the gaming industry and the Government of Telangana in Jan 2020 to provide resources such as mentoring, technology support and funding for gaming, animation, VFX, computer vision and AI start- ups. It others integrated programs, CVLAB and Game Lab for start-ups to scale up through its incubation facility. The centre has been branded as IMAGE. The IMAGE accelerator program includes premium plug and play coworking space for start-ups and others access to the ecosystem which comprises IP owners, mentors, seed funding, investors and a platform to support Go-To-Market strategy. At present 75 start-ups have been on-boarded and so far,

Centre of Excellence on Blockchain Technology at Gurugram

The STPI APIARY, a Centre of Entrepreneurship in Blockchain Technology has been setup in collaboration with MeitY, STPI, Govt. of Haryana, Padup Venture Private Limited, IBM, Intel, GBA and FITT in March 2020. This is an initiative to identify and evaluate promising start-ups in the eld of Blockchain technology that will be hosted in the STPI Gurugram incubation facility. The CoE is created to be an Incubation-cum-Accelerator Programme through which acute challenges faced by start-ups from validation of idea to initial investment will be addressed. Total 37 start-ups have been onboarded and so far.

Design, Development and Deployment of National AI Portal (INDIAai)

INDIAai portal is a venture by MeitY that has been set up to prepare the nation for an AI future. This has been implemented as a one stop online portal for AI related developments in India, sharing of resources, details of start-ups, investment funds in AI, companies and educational institutions related to AI in India, etc. The portal also features the initiatives of the IndiaAI Mission. The portal currently has the following major sections - news, articles, case studies, research reports, listing of startups, listing of investment funds, colleges, companies, countries, people, videos, datasets, courses, and initiatives of states and central ministries. As of date, there are 3,590 articles, 1310 news, 366 videos, 171 research reports, 511 startups, 151 case studies, and 172 government initiatives listed on the National AI Portal.

AI Research Analytics and Knowledge Dissemination Platform (AIRAWAT)

The Government has initiated a project AIRAWAT for providing a common compute platform for AI research and knowledge assimilation. This AI computing infrastructure will be used by all Technology Innovation Hubs, research labs, scientific community, industry, start- ups and institutions under the NKN. The PoC for AIRAWAT will be developed with 200 petaflops mixed precision AI machine which will be scalable to a peak compute of 790 AI petaflops.

The AIRAWAT has secured 75th position in Top 500 Global Supercomputing List declared at International Supercomputing Conference (ISC 2023), Germany putting India on top of AI Supercomputing nations worldwide.

Formation of Inter-Ministerial Committee for Development of Robotics Ecosystem in the country

MeitY has constituted an inter-ministerial committee with secretaries from DoT, DSIR, DST, DPIIT and NITI Aayog as members and secretary, MeitY as the convener. The committee shall be studying the best practices on role of government in supporting their domestic robotics industry & suggest way forward to foster end-to-end ecosystem centred on robotics including research, design, manufacturing, prototyping and utilization in manufacturing.

Global Partnership on Artificial Intelligence (GPAI)

GPAI is an international and multi-stakeholder initiative to guide the responsible development and use of AI, grounded in human rights, inclusion, diversity, innovation, and economic growth. India is a founding member of GPAI, having joined the multi-stakeholder initiative on June 15, 2020. Since then, India has significantly contributed to the GPAI goals and objectives and is working on various domestic initiatives for the responsible development, deployment, and adoption of AI. As one of the largest Global South economies leading the AI race, India nominated itself for the position of incoming council chair of GPAI. India received more than two-thirds of preference votes and was therefore elected as the Incoming Council Chair in November 2022. India served as the Incoming Chair in 2023, then subsequently Lead Chair in 2024.

The GPAI Mid-Year Summit was hosted in July 2024, which took place at Bharat Mandapam, New Delhi, brought together 12,000+ attendees including 10,000+ virtual attendees from over 50 countries including Global South across 12 sessions with 100+ high-level speakers from governments, multilateral organizations, industry, academia, civil society and other relevant stakeholders.

IndiaAI Mission

The Government of India has approved IndiaAI Mission on 7th March 2024, a comprehensive national level program to democratize and catalyze the AI innovation ecosystem in the country and ensure the global competitiveness of India's AI startups and researchers. The Mission aims to establish a robust AI ecosystem through strategic programs and partnerships across the public and private sectors. By democratizing computing access, improving data quality, developing indigenous AI capabilities, attracting top AI talent, enabling industry collaboration, providing startup risk capital, ensuring socially impactful AI projects and bolstering ethical AI, it will drive responsible, inclusive growth of India's AI ecosystem. The Mission will be implemented by 'IndiaAI' Independent Business Division (IBD) under Digital India Corporation (DIC) and has the following components: IndiaAI Compute Capacity, IndiaAI Innovation Centre, IndiaAI Datasets Platform, IndiaAI Application Development Initiative, IndiaAI FutureSkills, IndiaAI Startup Financing, and Safe & Trusted AI. This Mission will propel innovation and build domestic capacities to ensure the tech sovereignty of India. It will also create highly skilled employment opportunities to harness the demographic dividend of the country and help India demonstrate to the world how this transformative technology can be used for social good and enhance its global competitiveness.

- **IndiaAI Compute:** IndiaAI compute pillar envisions building a high-end scalable AI computing ecosystem comprising AI compute infrastructure of 10,000 or more Graphics Processing Units (GPUs).
- **IndiaAI FutureSkills:** IndiaAI FutureSkills Pillar envisions to augment the number of graduates, postgraduate and PhDs in AI domain. Further, it

envisions setting up Data and AI Labs in Tier 2 and Tier 3 cities across India, to impart foundational-level courses in Data and AI. IndiaAI fellowships are being targeted annually to 400 B.Tech, 500 M.Tech and 100 PhD students working in AI domain from All India Council for Technical Education (AICTE) recognized engineering institutions.

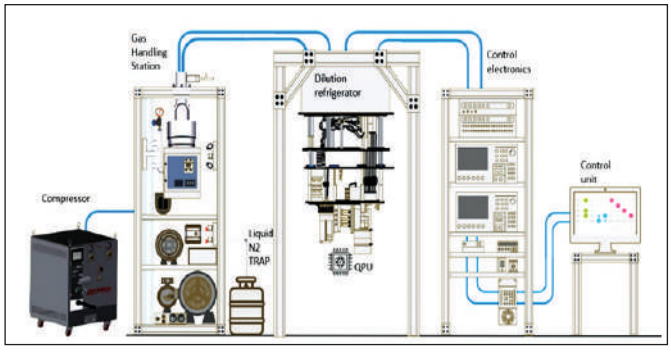
- **IndiaAI Startup Financing:** IndiaAI Startup Financing pillar aims to provide support to AI startups at all stages.
- **IndiaAI Innovation Centre:** IndiaAI Innovation centre aims to develop and deploy indigenous Large Multimodal Models (LMMs) trained on India-specific data.
- **IndiaAI Datasets Platform:** The IndiaAI Datasets Platform (IDP) seeks to enhance access, quality, and utilization of public sector datasets to make them AI-ready.
- **IndiaAI Applications Development Initiative:** IndiaAI Application Development Initiative aims to develop, scale, and promote the adoption of impactful AI solutions to effectively tackle significant problem statements.
- **Safe & Trusted AI:** Safe & Trusted pillar enables the implementation of Responsible AI projects including the development of indigenous tools and frameworks, self-assessment checklists for innovators, and other guidelines and governance frameworks. Eight Responsible AI Projects have been selected to address the need for robust guardrails to ensure the responsible development, deployment, and adoption of AI technologies. The projects cover a range of critical themes, including Machine Unlearning, Synthetic Data Generation, AI Bias Mitigation, Ethical AI Frameworks, Privacy-Enhancing Tools, Explainable AI, AI Governance Testing, and Algorithm Auditing Tools.

AI Governance Guidelines Development

The Government constituted an multi stakeholder Advisory Group under the chairmanship of the Principal Scientific Advisor (PSA) of India to provide guidance on AI governance and o-ering insights for the necessary regulatory oversight to enable sustainable and ethical development of AI technologies. Under the guidance of the Advisory Group, a Subcommittee on 'AI Governance and Guidelines Development' was constituted to provide actionable recommendations for AI governance in India. The Subcommittee has submitted its report. The Subcommittee's report emphasizes the need for a coordinated, whole-of government approach to ensure e-ective compliance and enforcement as India's AI landscape continues to evolve. The report has been kept for public consultation.

5.1.2.3 Quantum Technology:

- **Establishment of Superconducting based Quantum Computing Reference Facility:** The Ministry of Electronics and Information Technology (MeitY) initiated a project for "Establishment of Superconducting based Quantum Computing Reference Facility" to accelerate quantum technology R&D, capabilities and empower industry. This project aims to build a cutting-edge quantum computing facility at C-DAC, capable of handling advanced scientific and industrial problems using quantum technology. Setting up a powerful quantum computer with 50-100 qubits, along with the necessary supporting equipment like cooling systems, control electronics, and specialized software with cloud-based access for researchers and industry professionals, would enable them to run quantum experiments remotely. The project focuses on training hundreds of people, fostering collaboration with academic and industrial partners, and advancing India's leadership in quantum technology research and innovation.

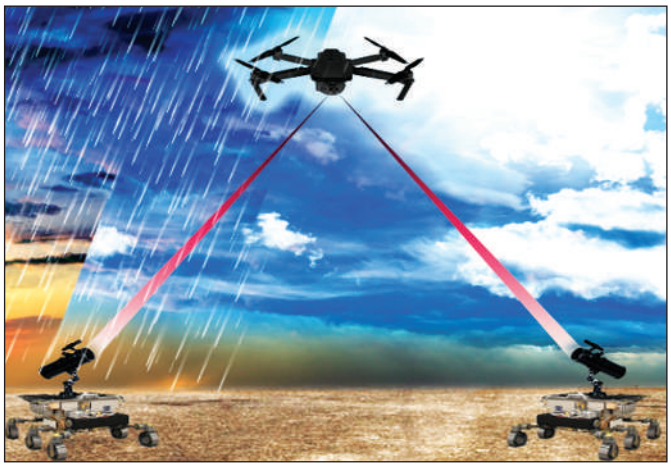


Reference Facility Set-Up

- **Agile and Ad hoc Free Space based Quantum Communication using Drone (Drone-QC)**: MeitY has initiated a project on the Drone based Quantum Communication (D-QC), which is a potential candidate for reconfigurable aerial quantum nodes. The project will achieve indigenous design, development and demonstration of aerial payload including indigenous quantum pointing acquisition and tracking system for performing quantum communication on a moving platform (vehicle/ drone).

  This project will pave way for a state of art quantum technology demonstration bringing India amongst the front runners of quantum communication technology.

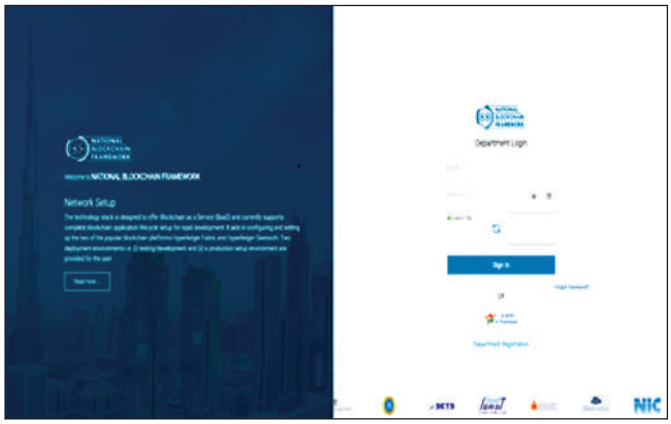
  The application domain will be free space quantum communication using Drones and Quantum optical relays. It can also serve as the last link for quantum satellites. The technology being developed will contribute to designing and developing application-specific payloads. This will enable us to make a significant contribution to a wide range of technological advancements in India.



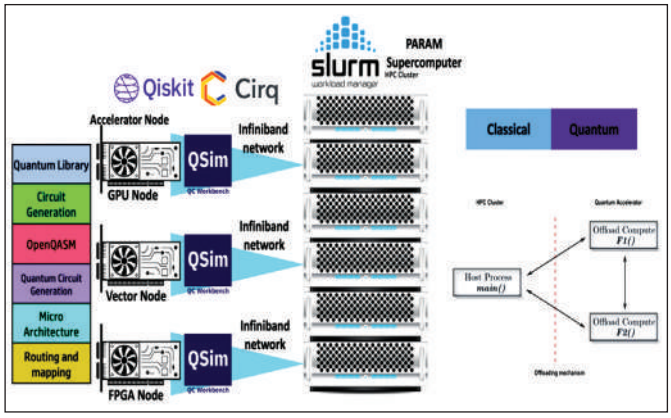
Quantum Key Distribution (QKD) using Drone

- **Design and Development of a Unified Blockchain Framework for offering National Blockchain Service and creation of a Blockchain Ecosystem:** Blockchain, a distributed ledger technology, enables a layer of trust and eliminates the need for a third party to validate the transactions. Considering the requirement for shared Blockchain infrastructure, Ministry of Electronics and Information technology has initiated an R&D project titled "Design and Development of a Unified Blockchain Framework for offering National Blockchain Service and creation of Blockchain Ecosystem". It is a consortium project with C-DAC centres (Hyderabad, Pune and Mumbai), NIC, SETS Chennai, IIT Hyderabad, IIIT Hyderabad and IDRBT Hyderabad as implementing agencies. MeitY launched NBF on 4th September 2024 to provide Blockchain-as-a-Service (BaaS). It supports distributed infrastructure, smart contracts, security, privacy, interoperability, and permissioned blockchain application development. Various use cases are being developed with government agencies under the Unified Blockchain Framework (UBF). The project has resulted in 5 patents and 38 research papers.

  National Level Blockchain Portal (https://blockchain.meity.gov.in/) is also developed with sections covering Blockchain related Articles, Education & Training programmes, Success Stories, Latest News, Startup details, and Use Cases

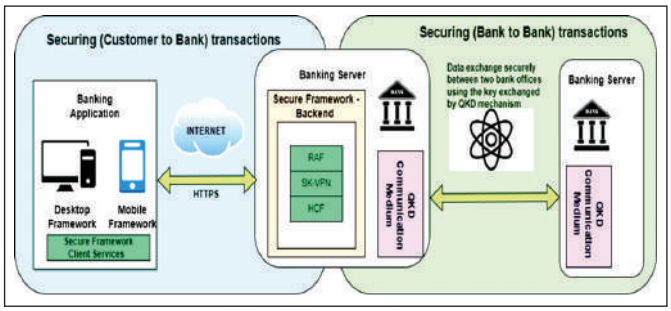


- **Bharat DB:** Databases play a vital role in enabling various services. However, many commercial databases and open-source platforms currently come from international vendors, creating a reliance on external sources. To reduce this dependency and leverage emerging opportunities, there is a need to develop a locally managed, secure, resilient, and reliable database platform that supports native Indian languages. In response to this need, MeitY has initiated a research project to develop an indigenous database platform, BharatDB. This is being implemented jointly by Indian Institute of Technology Madras, IITM Pravartak Technology Foundation Ltd and CDAC, Chennai. This platform aims to foster a comprehensive database ecosystem with a strong focus on security, resilience, and reliability. It will empower digital transformation and drive growth in the digital economy across various sectors. The project also emphasizes the development of specialized skills in database engineering to enhance, maintain, and support BharatDB. Furthermore, it aims to nurture startups that will create niche tools, enhancements, updates, and patches for the core open-source platform, ensuring a sustainable and thriving ecosystem.
- **Open Challenge Competition for Development of "Indian Web Browser with built-in CCA India Root Certificate:** A web browser is vital for digital transactions, yet existing popular browsers do not fully address India's unique requirements, particularly those related to digital signing under Indian laws. Additionally, these browsers lack support for Transport Layer Security (TLS) certificates issued by the Controller of Certifying Authorities (CCA) India. In alignment with the vision of Aatmanirbhar Bharat, the Indian Web Browser Development Challenge, launched by MeitY on August 9, 2023, and being implemented by C-DAC Bangalore, aims to create an indigenous browser for desktop and mobile platforms. The browser will adhere to W3C standards, include a Trust Store with CCA India's root certificate, support Indian languages, and feature parental controls and web filters. With the productization stage complete, the project will deliver three browsers—one winner and two runner-ups—advancing India's digital self-reliance.
- **HPC based Quantum Accelerators for enabling Quantum Computing on Supercomputers:** The Quantum Accelerator project, initiated by the Ministry of Electronics and Information Technology (MeitY), is an effort to develop a quantum computing simulator platform, using high-performance computing capabilities of existing PARAM supercomputers. Its primary objective is to expedite the execution of quantum algorithms, harnessing the processing power of GPU, Vector, and FPGA cards, with a notable demonstration featuring the state-of-the-art Rudra GPU board. The outcome of this project is establishment of a "Quantum Experience Centre," which will serve as a national hub for quantum software development in a cloud-based environment. With this cutting-edge infrastructure in place, the project aims to address a wide array of use cases spanning diverse fields, such as drug discovery, artificial intelligence, cryptography, agriculture, finance and more. This will prepare our country for the quantum revolution by providing the quantum ecosystem for the large technical workforce of the country. As India has already shown its potential in IT and software development sectors, Quantum Accelerators can give a platform to students, researchers, software developers, start-ups to innovate and implement their idea of Quantum Computing on Quantum Accelerators.



Quantum Accelerator Architecture

- **FinTeQ-Quantum-Safe Financial Transaction Framework:** The Ministry of Electronics and Information Technology (MeitY) has initiated the FinTeQ project to develop a quantum-safe financial transaction framework. The project focuses on creating a secure dongle for safe access to web and mobile applications in B2C and C2C transactions, adhering to PKCS#7 and PKCS#11 standards. For B2B transactions, it introduces an indigenous Quantum Key Distribution (QKD) solution ensuring quantum-enhanced security for high-value exchanges. This initiative strengthens the security of financial transactions with quantum technology, positioning the sector for future growth.



FinteQ Framework

- **Development of Secure Post Quantum Public Key Infrastructure:** The advent of quantum computers threatens the security of existing Public Key Infrastructure (PKI). To address this, MeitY has initiated a project "Development of Secure Post Quantum Public Key Infrastructure" which is proposed to enable PKI with Post Quantum Cryptographic Algorithms, ensuring a secure PKI in the quantum computing era. The project brings multidisciplinary expertise of prestigious institutions such as CDAC Bangalore, CDAC Noida, IIT Madras, SETS Chennai and IIITD Kurnool. The objective of the project is to develop Post Quantum Crypto Token by implementing CRYSTALS-Dilithium (for Digital Signature Scheme) and CRYSTALS-Kyber (for Key Encapsulation Mechanism) algorithms. These algorithms have been chosen by the National Institute of Standards and Technology (NIST) as winners in the competition for PQC Schemes. The project also envisages the development of new Post Quantum Cryptographic Algorithms. These algorithms will be implemented on Hardware (FPGA) platforms and integrated with Post Quantum Crypto token. The Certificate Authority suite will be enabled with Post Quantum Crypto Token. The developed solution will enhance the security of the Public Key Infrastructure against both classical and quantum computers.

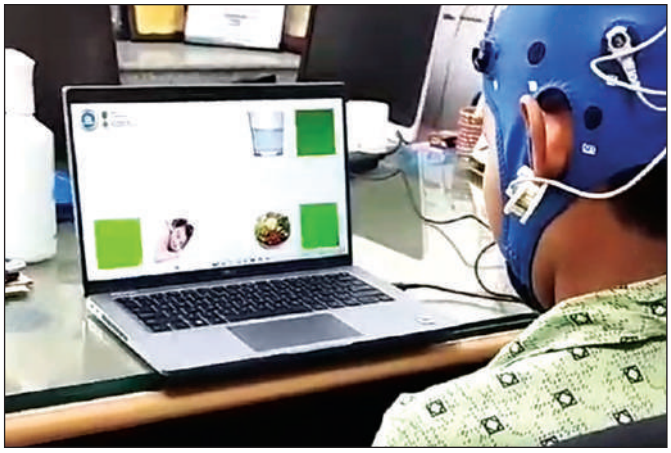
- **Quantum Machine Learning Use Cases and Applications:** MeitY has initiated a project envisioning the establishment of a robust quantum research and development ecosystem that drives long-term innovation in quantum machine learning (QML) and its real-world applications. The project is being implemented by CDAC (Hyderabad, Mohali, Noida, Delhi, CINE), IIT (Roorkee, Ropar, Gandhinagar) and IIIT Hyderabad. The project aims to Develop Quantum Machine Learning Applications which could leverage quantum advantage in solving complex problems in areas of healthcare, geology, surveillance, cyber security, emergency management, remote sensing and chemistry. Another major activity in the project includes Capacity building of more than 700 manpower in the country in the areas of Quantum Computing and Quantum Machine Learning. By fostering a skilled workforce and encouraging collaborations with startups and industries, the project will drive the growth of a self-sustaining quantum ecosystem in India.

- **Enabling Secure Boot in RISC-V Processors using Post Quantum Secure Schemes:** In light of the advancements in quantum computing, it is crucial to migrate to post-quantum schemes in various environments, especially for applications like secure booting. MeitY has initiated a project with the objective to demonstrate the secure boot functionality in a RISC-V environment, using both classical and post-quantum secure cryptographic schemes, alongwith on-chip keys generation. The project is being implemented by SETS Chennai and C-DAC Thiruvananthapuram focuses on developing three secure boot environments specific to RISC-V architecture, one based on Edwards-curve Digital Signature Algorithm (EdDSA), another

on eXtended Merkle Signature Scheme (XMSS3), and third using Cryptographic Suite for Algebraic Lattices (CRYSTALS)-DILITHIUM or MAYO.

- **Design and Development of software system for detecting and flagging Deepfake Videos and Images:** MeitY initiated a research project "Design and Development of Software System for Detecting and Flagging Deepfake Videos and Images". Under this initiative, C-DAC has developed a prototype software application for deepfake detection. The prototype tool for deepfake detection is developed as a web portal and desktop application. This tool with limited access is hosted at https://deepfakecheck.in and is currently in the testing phase. The desktop application "FakeCheck," with similar features to the web portal, is developed for users who need deepfake detection without the Internet. The tool has been provided to a few law enforcement agencies for testing and feedback.
- **Indigenous Intelligent and Scalable Neuromorphic Multi Chip for AI Training and Inference Solutions:** MeitY initiated a research project at IIT Hyderabad, aimed to design and develop an indigenous neuro-morphic architecture for AI training and inferencing. The project progresses from FPGA prototyping to System on Chip (SOC) realization, leading to fabrication of a MCM (Multi-Chip Module) module which comprises multiple SOCs. The team has demonstrated various applications such as image classification, object detection etc on the FPGA prototype. The first Chip Tapeout using TSMC 65nm has been completed, with ongoing optimization efforts to enhance performance, reduce power consumption, minimize chip area, memory integration etc.
- **Development of computational protocols for designing inhibitors using PARP-1:** Breast cancer is the most common type of cancer among the Indian population, with lack of awareness and high cost of treatment leads to lower reporting of illnesses. Poly Adenosine Diphosphate Ribose polymerase (PARP-1) inhibitors are among a few handfuls of targets which play an efficient role in treating breast cancer. A project has been initiated at NIPER, Guwahati for the development of computational protocols for designing inhibitors using PARP-1 as a model and synthesis & biological evaluation of designed inhibitors. Machine Learning models for prediction of PARP-1 activity have been designed and deployed as a web-server-based GUI. The work has led to publications in high-impact journals and development of two webtools: one for assessing drug synthesis routes and another for the prediction of PARP-1 inhibitors. The tool for assessing drug synthesis route greenness has been granted copyright, while the copyright for PARP-1 Inhibitors Predictor PIP1.0 has been applied
- **A Brain Machine Interface enabled Assistive Communication System for Children with Special Needs:** A Brain-Machine Interface (BMI)-enabled Assistive Communication System (VIVAVN) is designed for children with special needs. It assists them in fulfilling their requirements for food, posture adjustments, and other daily activities, and includes a basic alarm system for emergencies.. Brain Computer Interface (BCI) serves as a transformative bridge between individuals with special needs and the external world, offering assistive technology. People who can't communicate verbally or through gestures may communicate through this system by interpreting their brain signals. It collects EEG data from a person non-invasively and analyses it to understand their intentions. The computer performs the commands as per the person's requirement. This multidisciplinary research work is being conducted by C-DAC Delhi, AIIMS Delhi, C-DAC Thiruvananthapuram and GMC Thiruvananthapuram.

P300 oddball paradigm speller developed



SSVEP based paradigm is tested

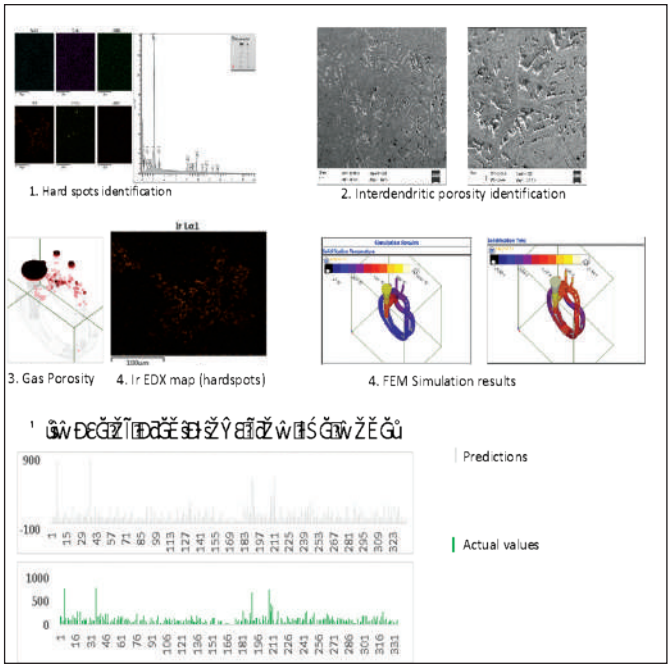
- **Multi-Model Neuro-Physiological Framework for Cognitive Behavioural Analysis:** Understanding Human Behaviour is a very important phenomenon. It can be done by human cognitive analysis with the help of Artificial Intelligence. The project integrates diverse neurological and physiological signal data of users to understand human cognition skills like perception, attention, memory, reasoning, and problem solving. The key feature of the project is to apply advanced fusion algorithms on generated Indianized data by setting-up a multi-modal lab. Here, the project objectives like Lie detection and malicious behaviour detection may help in further behaviour analysis in extended domains such as security and forensic. It is expected that this comprehensive approach will enhance the ability to decipher complex behavioural patterns using multidisciplinary domain expertise like Psychology, Neurology, and Artificial Intelligence.
- An Multi-Modal Neuro-Physiological Framework (Sangyan) for Behaviour Analysis (MNP) developed. This employs a comprehensive framework for insider threats detection and interrogation on suspects for inner cordon security purposes. The system utilizes advanced neuro methods of brain signal analysis for detecting lies, abnormalities, and malicious patterns, alongside multimodal fusion methods that incorporate six different modalities: EEG, ECG, EOG, GSR, eye tracking, and audio-video. A key feature is its interactive dashboard for data analytics, event reporting, and monitoring on web platforms. A dataset platform (Data-Echo) also has been created using Multi-Modal Neuro-Physiological data of EEG, EoG, ECG, GSR, Eye Gaze, Audio and Video data.

Multimodal Neuro-Physiological Framework

- **Improving the effectiveness of the Gems and Jewelry Industry by leveraging Machine Learning and Data Science to improve the Hit Ratio and address the Casting issues:** A project has been implemented at IIT-Bombay to develop and build a data platform to collect data, and design machine learning algorithms to aid Gems and Jewelry industry in reducing their manufacturing cost, improve their jewelry quality and increase hit-ratio for their designs. In totality, this would help the sector consolidate its leadership position globally and make them more competitive to capture new emerging markets.

  The project is a collaborative initiative comprising of MeitY and GJSCI (Gem and Jewellery Skill Council of India). Eleven jewelry industries are working constantly with IIT Bombay under this project.

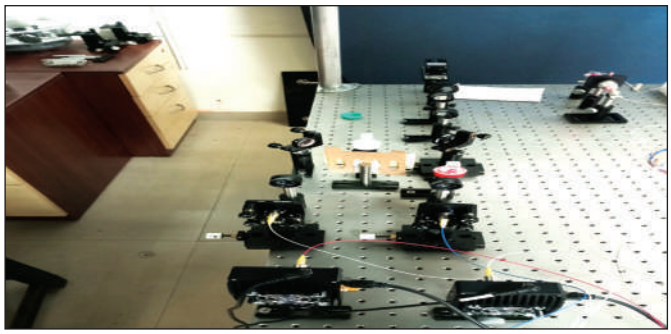
  This project comprises of two verticals, namely, Machine learning Model for porosity in castings and Machine Learning Model for demand forecasting.



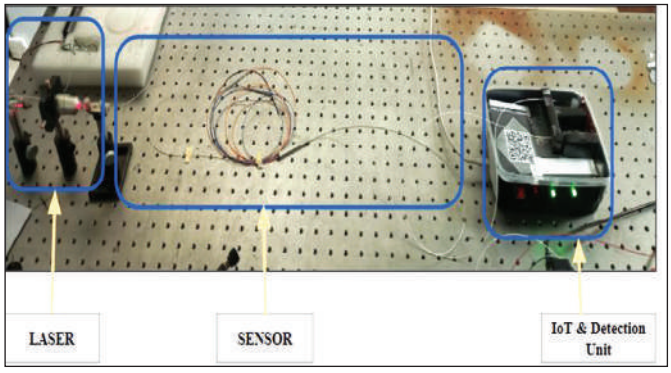
Under this project, machine learning models have been successfully developed to address key challenges in the Gems and Jewellery industry. A demand forecasting model has been built using sales and fixed shop data, enabling jewelry retailers to obtain weekly demand predictions for various product categories. Furthermore, a simulation-based porosity prediction model has been completed, along with an AI-based prediction model for optimizing casting parameters such as gating and riser design.

- **Development of a Quantum optical sensor based system to identify and categorize Arsenic and Lead in water even with very low concentration:** Identification of ultra fine trace elements in water, packaged food, etc. is a crucial societal need. However, existing measurement techniques face limitations in resolution. MeitY initiated a research project for the development of a quantum sensor-based array device for grading the quality of usable water, primarily for drinking purposes by CDAC Kolkata and Tezpur University, Assam. The team has synthesized and characterized sensing material Fe@rGO and Fe3O4@SiO2 for detecting arsenic (As) and lead (Pb) respectively. An optical fibre coupler with a sensing region has been fabricated. A GUI has been developed to allow seamless data retrieval from cloud for remote analysis. A three-day workshop "Quantum Computing Explained: From Qubits to Algorithms (Dec 14-16 2024)" was organized by CDAC, Kolkata to provide hands-on training to undergraduate/ graduate students in quantum technologies. ISQCI 2024, a two days Symposium also organized by CDAC Kolkata, Patna and CINE.

International Symposium on Quantum Computing and Innovations (ISQCI-2024) on 17th and 18th December 2024



A free space and fiber-based hybrid Mach Zehnder correlated output interferometric setup for enhanced sensitivity.



An all-fiber Mach Zehnder correlated output IoT-enabled interferometric setup for enhanced sensitivity

- **Blockchain and Machine Learning Powered Unified Video Know Your Customer (KYC) Framework:** Know Your Customer (KYC) is a key requirement for identity verification in the financial sector. MeitY has initiated a research project to develop a Blockchain and Machine Learning-powered Unified Video KYC Framework. The framework will enable multiple regulated entities (REs) in the financial sector to collaborate to carry out video-based KYC of their customers and to share KYC data among themselves on a need-to-know basis. Being implemented by IDRBT, IIIT Hyderabad, and IIT Bhilai, the project has developed an end-to-end framework solution with various integrated components. These include video KYC front-end and back-end applications, a voice-based bot, face and document image quality estimators, data extraction tools, face spoof and deep fake detectors, face matching, and a blockchain platform for secure KYC processing. The solution is currently undergoing testing.

Visvesvaraya PhD Scheme for Electronics and IT:

MeitY has initiated "Visvesvaraya PhD Scheme for Electronics and IT" with an objective to enhance the number of PhDs in Electronics System Design and Manufacturing (ESDM) and IT/IT Enabled Services (IT/ITES) sectors in the country. The scheme has been implemented by Digital India Corporation.

The Phase-I of the scheme was initiated in March, 2014 with a total budget outlay of Rs. 466 Crores for nine years. The major achievements of the first phase of the scheme includes completion of 751 Full-time and 157 Part-time PhDs. Additionally, 62 full-time and 9 part-time PhD candidates have submitted their theses, while 75 full-time and 107 part-time candidates are currently pursuing their PhDs. Furthermore, Phase I of the scheme has awarded 158 Young Faculty Research Fellowships (YFRF). Under this phase, PhD candidates and YFRF awardees have published 5,750 research papers and applied for 85 patents.

The Phase-II of the scheme was initiated in September, 2021 with a total budget outlay of Rs. 481.93 Crs. for a period of 9 years. The salient features of Phase-II of the scheme are:

- 1000 Full Time PhD seats in the areas of ESDM & IT/ITES.
- 225 Post-Doctoral Fellowships.
- One time support for 250 Candidates for 6 months Visit to Labs Abroad.
- Contingency Research Grant of Rs. 1.20 Lakh/ year to each Full Time PhD Scholars
- 150 Part Time PhD seats & 50 "Young Faculty Research Fellowships".
- One time award of Rs. 3.0 Lakh for Part Time PhD Candidates after completion of PhD.
- YFRF Fellowship & Contingency Grant of Rs. 20,000/- per month & Rs. 5 Lakh/year respectively upto 5 years.

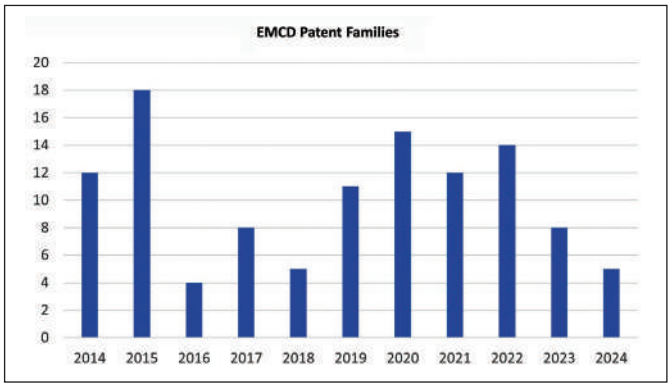
Under Phase-II of the scheme three rounds of PhD seat allocation have been completed. A total of 600 full-time & 90 Part-time PhD seats have been allocated to 112 institutions and 51 institutions respectively across the country. 11 Young Faculty Research Fellowship (YFRF) has been awarded. -

5.2 Translation R&D

5.2.1 Initiatives under Electronics Components and Material Development Programme (EMDP)

Electronics Components & Material Development Programme (EMDP) has been promoting research and development (R&D) activity since 1986 to nurture electronics development in the country for boosting local manufacturing. EMDP's core areas of research are electronics materials, components and process technology, photonics, electronics waste recycling (e-waste) and additive manufacturing. EMDP supported National MISSION under National Policy 2012 on Electronics: "**Promotion of a vibrant and sustainable ecosystem of R&D design, engineering and innovation in electronics**" during 2012 to 2018. EMDP is currently supporting National Policy on Electronics 2019 (NPE 2019): "**Encourage industry–led R&D and innovation in all sub-sectors of electronics**". The strategy under this objective is to adopt top-down approach or market pull R&D to cater for local manufacturing needs in the electronics sector. Under this

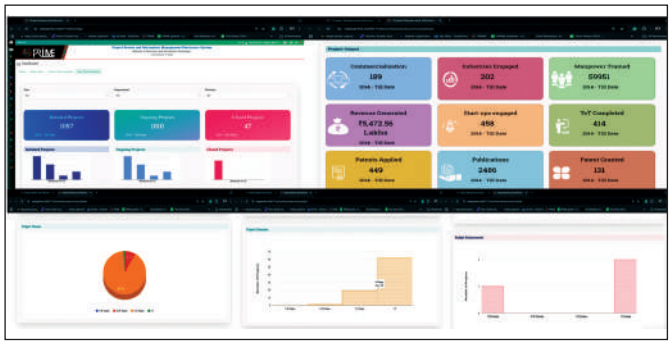
objective EMDP's core areas of research are Electronics Materials & Components, Photonics (Photonic Integrated Circuits etc), Circular Economy & E-waste, IoT Sensors and Additive Manufacturing & 3D Printing. To cater to the objective, EMDP has focused on establishment of self-sustaining R&D centres with industrial partnership where industry is playing key roles in technology road-mapping, administration, funding and self-sustenance of the R&D platform. Govt. is extending funding, knowhow, scientific manpower, laboratory access, and IPR (existing) for development of industry demanded product prototype, indigenous technology solutions and IPR generation with specific target plans for commercialization through ToT to industry & start- ups and create atmosphere for absorption of the technologies in Indian market.



EMDP program has 112 filed patents (figure above) in last 10 years and has initiated 16 R&D centres till date. Details of these centers have been included in Centres of Excellence sections of this chapter. The other ongoing technology developments under EMDP are provided below:

- **Project Review & Information Management Electronics (PRIME) System for MeitY:**
  - To promote transparency, efficiency, collaboration and data-based decision making an online portal "Project Review and Information Management Electronics System" or PRIME System has been launched by Ministry of Electronics and Information Technology (MeitY).
  - With PRIME, MeitY's vision is to ease the information sharing, strengthening of the research eco- system, developing a one-go dashboard for all, to enable sustained development and ease of doing business.
  - At its core, PRIME is an end-to-end life cycle management system that streamlines the entire process of proposal submission and project management. It is a comprehensive system that strengthens Meity's project management workflow by offering a range of powerful components. The portal is designed and maintained by Centre for Development of Advanced Computing (C-DAC), Noida.

  The portal can be accessed at **https://www.meityprime.in/**



- **CW/Modulated Thulium Fiber Laser (TFL) System for Soft Tissue Vaporization/Ablation:**
  - Vaporization is a promising technique for faster treatments of benign prostate hyperplasia (BPH), eliminating the use of additional step for morcellation phase. Pulsed Holmium: Yttrium--aluminum-garnet (Ho:YAG; λ=2.12 µm) laser is a 'gold standard' clinical tool in urology. However, the limited pulsed operation of Ho:YAG laser is not very much applicable for the process of cutting or coagulation.
  - In this respect, continuous wave (CW) operation of Thulium:Yttrium-aluminum-garnet (Tm:YAG; λ=2.013 µm) laser is an promising alternative laser for the surgical management of BPH. Over the bulk YAG based lasers, the recent technological advancement in fiber laser provides extremely high beam quality, high wall plug efficiency, and

maintenance-free operation to integrate with a compact system for surgical applications. TFLs at 1.94 µm are becoming a promising energy source for high end surgery as the operating wavelength is more closely matching the water absorption peak, resulting in a lower ablation threshold and higher ablation rate over the Ho:YAG or Tm:YAG laser. A single mode beam of TFL allows a high-power delivery through a small-core fiber.

- Additionally, TFL can operate for a wide range of pulse properties and CW power levels, allowing use of a single system in different mode of treatment. MeitY through CGCRI in collaboration with M/s BioradMedisys Pvt. Ltd, Pune has now been able to design and develop CW/Modulated Thulium fiber laser (TFL) for pre-clinical validation in soft issue Vaporization/Ablation. The system is ready for its lunching in January 2024. The project has been completed with ONE ToT, ONE Patent, FOUR research students training. The developed surgical system is unique not only as import substitution but for i) operating wavelength closely matches with cellular water absorption ii) minimally invasive surgery iii) wide range of TFL settings - use of same instrument to different mode of treatment, hence cost effective iv) minimum optical component architecture v) compact system with safety features and less maintenance.
- The development is jointly with industry hence all the protocols are maintained as per medical instrument certification requirement. The table top research on optimization of thulium fiber laser cavity such as efficiency, laser spectrum and Quasi-CW pulse temporal characteristic has been translated to a stable prototype which is under reliability testing as shown below.

- **Metamaterials based Compact Broadband Tunable Modulator for Terahertz Photonics:**
  - Indian Institute of Technology Guwahati, in collaboration with Mahindra University, Hyderabad, has been working on developing a compact prototype device for broadband terahertz frequency modulation. The device will be capable of modulating and transmitting information at hundreds of gigabits per second (Gbps).
  - To achieve this, a new class of electromagnetic metamaterial structures has been investigated. Currently, work is going on a multi-stacked metamaterial configuration for broadband tunable terahertz transmission.
  - Through numerical simulations, bandwidth of 0.7 THz has been achieved in the design. Efforts are being made to further fine-tune the broadband transmission, and the initial fabrication and characterization of the device have been completed.
  - A state-of-the-art experimental facility is being developed for characterizing devices at terahertz frequencies in transmission, reflection, and absorption modes at IIT Guwahati.
  - To gain a better understanding of the working principles of the multistacked metamaterial (MM), the circuit theory has been developed, which is useful for further optimizing the MM. Further exploration is going on for the active tenability of the device.

- **Hybrid battery power module with indigenously developed super-capacitor and Li-ion cell:**
  - MeitY initiated a development work for hybrid battery module for utilization of abundant North Eastern coal feed stock and provide a solution for the demand of large-scale graphene materials in power sector. The project was executed by CSIR-NEIST, Jorhat.
  - The graphene optimized synthetic process consists of a simple chemical approach combined with the ultracentrifugation/ultrafiltration techniques. This work also demonstrated that the low- grade and pollutive coal feedstock can have environmentally green and sustainable utilization as a suitable precursor for indigenous graphene derivatives

in our country with excellent potential in power applications.

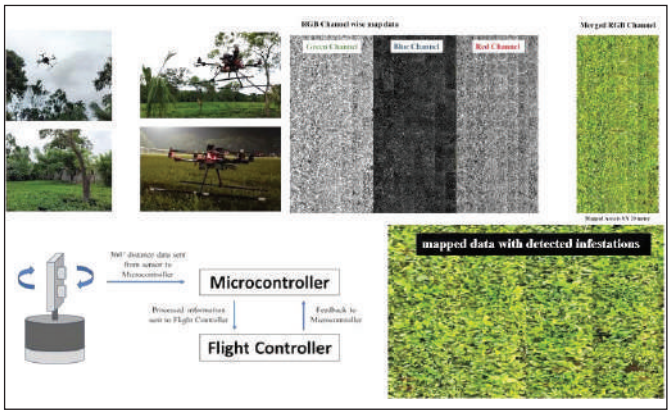
- The project demonstrated supercapacitor-battery hybrid module for e-rickshaw application. The application product technology has been transferred to M/s Anvaya Innovations, Jorhat, Assam.

- **Feasibility study for development of process technology to recover valuable materials from end-of life silicon solar modules:**
  - The R&D project has been initiated at C-MET Hyderabad with an objective to develop an environmentally benign technology for recycling of end-of-life (EoL) silicon solar modules.
  - Accordingly, a process technology has been developed to recover valuable materials from the waste crystalline silicon solar panels, which are currently dominant with ~95% abundancy in the market.
  - The R&D has reached a technology readiness level of 4 with 10 kg input per batch processing to final recovery of products. Silicon has been recovered as one of the major products with 99.999% (5N) purity.
  - The developed technology has also been transferred to M/s Greenko, a world-renowned industry in the renewable energy sector. Further up-scaling of process is in progress.

- **Development of digital networking for preventive and predictive environmental and climatic warning solutions - Building an Entrepreneurial ecosystem for addressing Environmental Issues:**
  - The primary focus of this project is to advance digital networking for proactive and predictive environmental and climatic warning systems. This project comprises two key components: the development of an intelligent sensor module to monitor and control environmental pollution and a smart water level monitoring system that includes flood alert capabilities.
  - In addition, we are establishing a digital infrastructure for efficient local water level monitoring and management. Furthermore, the project aims to foster a startup ecosystem and promote skill development in the context of IoT solutions.

- **Early detection of pest on Tea plantation through Multispectral imaging from Unmanned Aerial Vehicle:**
  - MeitY through Tezpur University, Assam is developing low- cost, rapid and early detection system based on arrays of multispectral and thermal imaging sensors on (unmanned aerial vehicles UAV) for pest infestation in tea crops to help the farmers to plan pest control strategies.
  - Under the program development of thermal imaging system, hyperspectral imaging sensor on Unmanned Aerial Vehicle and post processing deep learning algorithm has been completed and initial field testing has been completed. The system has now successfully demonstrated Red Spider Mite, Tea Mosquito Bug infestation on tea leaves. The project has now successfully developed multispectral imaging system to detect Looper caterpillar, Red spider moth and Tea mosquito Bug.
  - Creation of deep learning algorithm and pest infestation data base is near completed. Various multirotor drone designs and multiple materials have been tested. A highly customized ultra-high frequency telemetry trans – receiving modules are designed. Autonomous drone deployment mechanism is developed and tested. GPS based aerial mapping tool is developed and being tested.
  - Obstacle detection mechanism has also been developed and is currently being tested. A real time data link system between drone and ground station has been con-

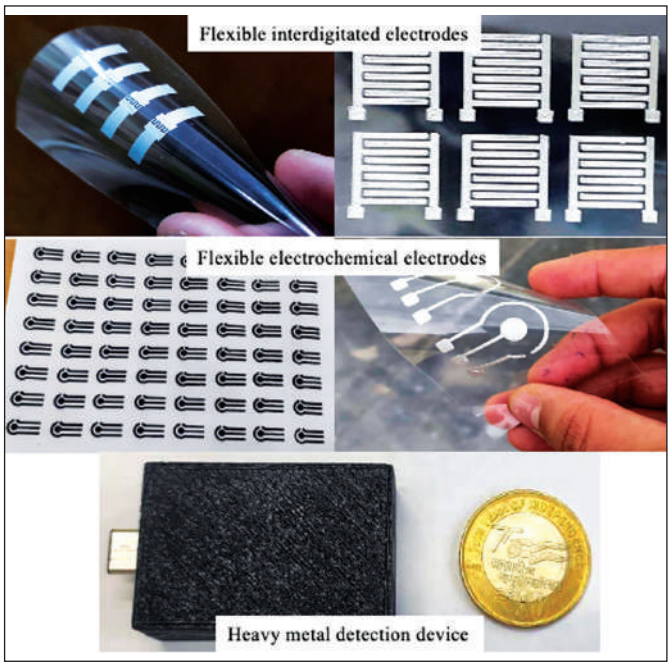
structed and development of Flight Control Software and field module is completed. The productization efforts with a smaller form factor drone and enhancement of accuracy of GPS location is underway. Field testing of developed system is also on-going.



- **Entrepreneurial Training Programme for Scheduled Tribe Community of Union Territory of Ladakh to Produce Solar Lanterns for Lighting Applications**
  - The project "Entrepreneurial Training Programme for Scheduled Tribe Community of Union Territory of Ladakh to Produce Solar Lanterns for Lighting Applications" is to bring up the under privileged communities in various areas of technology and for creating an indigenous local supply chain. C-MET in association with University of Ladakh is implementing this project to foster entrepreneurship and create livelihood among the ST communities in the UT of Ladakh.
  - Most of the tribal areas are isolated and located in remote places deep into the Himalayas and borders and hence electrification is not an easy task. Due to lack of electricity and lighting facilities, the tribal communities suffer a lot of difficulties including attacks from wild animals in the night. Moreover, the lack of proper lighting facilities affects the education of tribal children which in turn has direct impact on the social upliftment of the tribal community.
  - The quality of life can be improved very much if they can have a lighting system for their bare minimum requirements which can be charged directly from solar power. In addition to that, if they can produce it themselves and market it, they can also find out a steady income for their livelihood. C-MET has developed technologies for various types of solar lanterns such as Solar lantern with Li-ion battery, Solar lantern with super capacitor and Hybrid solar lantern with super capacitor and Li-ion battery.
  - In a similar programme, C-MET has imparted training on production of solar lanterns and LED bulbs to more than 300 youths in ST community in Kerala. Through this project, now the entrepreneurial training is extended to the Schedule Tribe communities of UT of Ladakh in association with University of Ladakh.
- **Development of Electrically Conductive Adhesives for the Microelectronic Packaging and Flexible Film Circuits**
  - The project "Development of Electrically Conductive Adhesives for the Microelectronic Packaging and Flexible Film Circuits" is an initiative of Government of India to indigenize conductive adhesives used in flexible electronics and its components such as nano-silver. The project is being implemented by IIT Ropar and NIT Warangal in association with an industry partner & financially sponsored by Ministry of Electronics & Information Technology, Govt. of India and an industry partner.
  - The project aims to generate know-how of making conductive adhesive formulation, using it in flexible electronics, and demonstration of a few devices. Specifically, the products envisaged for development under the project are conductive adhesive, heavy metal detection device, and gas sensing device. Besides this, the project will generate trained manpower including PhD hold-

ers and Research Associates. This will help bridge the gap of skilled manpower requirement of the industry.

- The developed technology has been transfered to startups incubated at N&T warangal and IIT Ropar.



5.2.2 Technology Development & Demonstration for Indian Industries

5.2.2.1 Collaborative Intelligent Transportation Systems Endeavour for Indian Cities – InTranSE Phase II.

Through InTranSE Program technologies/product developed which may provide ease of driving, safety, energy savings, reduce carbon footprint etc has been developed. These solutions have been designed and developed keeping in view the India specific scenarios like right hand driving, heterogeneous traffic, non-lane based driving, vehicles from wrong side etc. Many of these have been commercialized and being used in different cities in the country not only for traffic control but also as an important component of Smart Cities. Under this Program 74 Manpower has been trained. 22 technologies/systems have been developed and some of them are industrial grade.

Under the second Phase of ITS, wherein we have developed technology for Traffic Simulators, Driving Simulators, Surveillance camera for traffic control, Driving assistance technology, universal interfacing of devices using one M2M standards, Bus priority system, Data driven decision making systems, Fleet Management etc.

5.2.2.2 Development of Electronics & IT based Control & Automation solutions for consumer (Toy industries) electronic goods.

This is a project for creation of research and development capabilities among the candidates from SC/ ST and NE region. The young engineering graduates will be taken and after capacity building, they will be involved in design and development of electronics based toys as per the requirement of toy industry which has already been tied up. The candidates from these three categories will do the R&D activities in a small group of two and will also get toy industry exposure by visiting them/ working there as interns for a short duration. Their activities will be monitored and guided by senior scientists of CDAC Noida on one/two groups per scientist basis. Since these SC/ ST/NER candidates will be engineering graduates, they will be given a suitable stipend for the project duration.

Under the special budget provision for SC/ST/NER communities, 60 fresh engineering graduates will be provided with necessary capacity to do research & development in high tech electronics with an application to toy industry. About 25-30 prototypes of electronic toys are expected in this project.

Toys Convocation Ceremony of First Batch

5.2.2.3 Design and development of indigenous, cost-effective Autonomous Tractor, for Indian Farming Conditions and Applications (A-TRACT).

The project envisages the design and development of technologies and system components for an indigenous and cost-effective Autonomous Tractor, specifically for Indian farming conditions. In this project the aim is to undertake the indigenous development of the system components that are required for autonomous navigation. These components are currently sourced from external vendors and integrated into the system architecture, thereby increasing costs. The project is progressing.

5.2.2.4 Autonomous Bathymetric Survey Vessel (ABSV) for Advanced Glacier Lake Profiling

A project on Design and Development of an Autonomous bathymetric survey vessel for reservoir and glacier lake profiling has been awarded to CDAC -Thiruvananthapuram. The system is the first of its kind in the country and will be a great boon to the Nation in the area of disaster forecast and management. Although glacier outburst flood happened in many parts of the world, a scientific repository for analysis of the frequency of events, actual impact of the GLOF to the environment and to human settlements are not documented properly. By profiling the glacier lake on a regular basis may mitigate the hazard and make aware the people to be prepared to handle such situations. Also depending on the characteristics of the lake we could rank the glaciers based on the chance of occurrence of GLOF. Prototype of the system has been completed and testing is in progress. For Development of innovative and sustainable indigenous solutions for GLOF mitigation Grand Challenge on HIMASHIELD was announced.

5.2.2.5 The project on "TULIP: TEA HARVESTING UNMANNED ROBOTIC PLATFORM FOR NORTHEAST INDIAN TEA PLANTATION"

The project is being implemented in a collaborative manner with CDAC-Kolkata as nodal agency and TTRA-Jorhat, Jadavpur University and CIAE-Bhopal as participating agencies. The prime focus of the project is development of low cost Robotic harvester for small and medium scale Tea gardens with the features like selective plucking etc

The developed Selective Tea Plucker (STP) has been developed and fine tuning is in progress to make it ready as field deployable and industry grade.

Joint Call for Proposal under MeitY- NSF (USA) Research Collaboration.

The U.S. National Science Foundation (NSF) and the Ministry of Electronics and Information Technology (MeitY) of the Government of India have signed an Implementation Arrangement on research cooperation. The Implementation Arrangement provides a framework to encourage collaborations between U.S. and Indian research communities and sets out the principles by which joint activities might be supported. This NSF-MeitY collaborative opportunity focuses on research and technological development in areas of mutual interest listed through the participating NSF programs that develop new knowledge in all aspects of semiconductor research, next-generation communication systems, cyber-security, sustainability and green technologies, and intelligent transportation systems.

The Leaders announced the award of 12 funding awards under the National Science Foundation and Ministry of Electronics and Information Technology, research collaboration with a combined outlay of nearly $10 million to enable joint U.S.-India.

5.2.2.6 National Mission on Power Electronics Technology (Phase-III)

The National Mission on Power Electronics Technology Phase-III (NaMPET-III) program is ongoing with an

objective to strengthen the power electronics technology base in the country by carrying out a multitude of activities like Technology development, deployment, technology transfer, awareness creation & manpower development and strengthening the industry interactions with R&D and academic institutes through collaborative research projects. So far, 39 sub-projects in the areas of Power Electronics and its applications in different sectors like Wide Band Gap (WBG), semiconductor-based PE systems, Power, e-Mobility, Food processing, Agriculture, Industry and Health, Grid, Renewable Energy etc., have been taken up and progressing.

Under the programme more than 20 academic institutions and industries are participating in the technology development and commercialization through Transfer of Technologies (ToT). So far 1.5kW wireless charger, WBG material-based Magnetometer, MEMS sensors for torque/ vibration, Planar Magnetics, (50Hz) Transformer-less Dual mode Power Conditioner for Microgrid, AC & DC fast Charger for EV, LVDC power distribution in houseboat, Integrated drive for BLDC, Model EV charging station, AMI Pilot deployment, etc has been completed. Out of these technologies, 03 new technologies, the High voltage high-frequency Planar magnetics technology, Smart Energy Meter technologies, and Hybrid Power Conditioning Systems for Microgrids technologies have been transferred to the industries for further commercialization.

Transfer of High voltage high-frequency Planar magnetics technology to M/s Reliamotive Labs, Bangalore

Transfer of Smart Energy Meter technologies to M/s JMV LPS, Noida

Product Launch of Power Conditioning Systems for Microgrids technologies with M/s Hykon India Ltd. Kochi

5.2.2.6.1 Inauguration of Model EV Charging Station

Inauguration of Model EV Charging Station by Secretary, MeitY on 24.08.2024 at C-DAC, Technopark Campus

The Secretary, Ministry of Electronics and Information Technology (MeitY), has inaugurated the Model Electric Vehicle Charging Station at C-DAC Thiruvananthapuram,

Technopark Campus on 24.08.2024. This centre has developed a range of indigenous AC and DC EV chargers under NaMPET program, from 3.3kW to 50kW. This center will have various AC and DC fast chargers for vehicles ranging from 2W to Heavy vehicles and play a crucial role in catalyzing an ecosystem for the promotion of the charging infrastructure with indigenous EV chargers research, development, commercialization and manufacturing through industries.

Charging bays in MCS with DC and AC Chargers

5.2.2.6.2 NaMPET Outreach and Collaborations

The Ministry of Electronics and IT has initiated the National Mission on Power Electronics Technology Phase-III (NaMPET-III) program to strengthen the power electronics technology base in the country with awareness creation and R&D interactions with academic institutes through collaborative research projects also. Under this activity, various Memorandum of Agreement/ Understanding (MoA/MoU) and Non-Disclosure Agreement (NDA) has been signed such as MoA signed between C-DAC (T) and M/s Hykon India Ltd. Kochi in Vehicle to Grid (V2G, V2H & V2B) technologies, MoU signed with M/s Tata Power Renewable Microgrid Ltd. for technical collaboration in Microgrid technology and NDA signed with Tata Power Company Limited and Tata Power Autocomp System Ltd. for technical cooperation and product realization in the area of Solar inverters-Central Inverter and Remote monitoring. Apart from this a high reliable and compact (5cmx5cmx2.5cm) state-of-the-art GaN Power Conditioner of 3kW for integrated BLDC control has been developed and demonstrated in Wide Band Gap devices. The Smart Energy Meter (SEM) technology and AMI system has been CERTIN certified, which will enable its application in secured environments like Military camps.

MoU-M/s Tata Power Renewable Microgrid Ltd

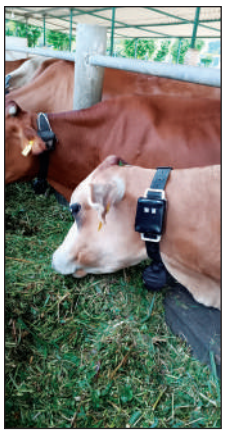
- High quality technical papers and products developed under NaMPET have been showcased at different Power Electronics International Forum like Energy Conversion Congress (ECCE), US Department of Commerce (USDOC) Renewable Energy (RE+) conference, IEEE Industrial Electronics Society (IECON) etc. The state-of-the-art technologies have been recognized and appreciated at international forums.

5.2.2.7 AgriEnIcs: National Programme on Electronics and ICT Applications in Agriculture and Environment

The Ministry of Electronics and IT has initiated a national-level programme to reform the agriculture and environment sectors with the interventions of IoT, ICT, machine learning and robotics technology. The objective of this umbrella programme is to encompass the industry, users, academia, R&D institutes working in the allied domains of the thematic areas to develop user friendly and market viable technology. The AgriEnIcs programme is on the verge of a successful completion leading to the development of products and technologies, which are ready for commercialization. C-DAC Kolkata is executing this program in collaboration with multiple collaborators and Industry/start-ups. Research and development in the domains of agriculture, livestock management, and environment were focused, and different product

prototypes were developed. Technology transfer of the Air Quality Monitoring Device (AI-AQMS) has been done and the ToT partner has already started marketing and selling the products. Technologies like Cattle health monitoring device (GoP), Mastitis disease detector in milk (MAST D), Multi-grain quality analyzer (GrainEX), Chilly quality analyzer (CT VIEU), Smart poultry management and Chick gender identifier (GEMS) and Robotic apple harvester device are already ready for commercialization.

AI-AQMS

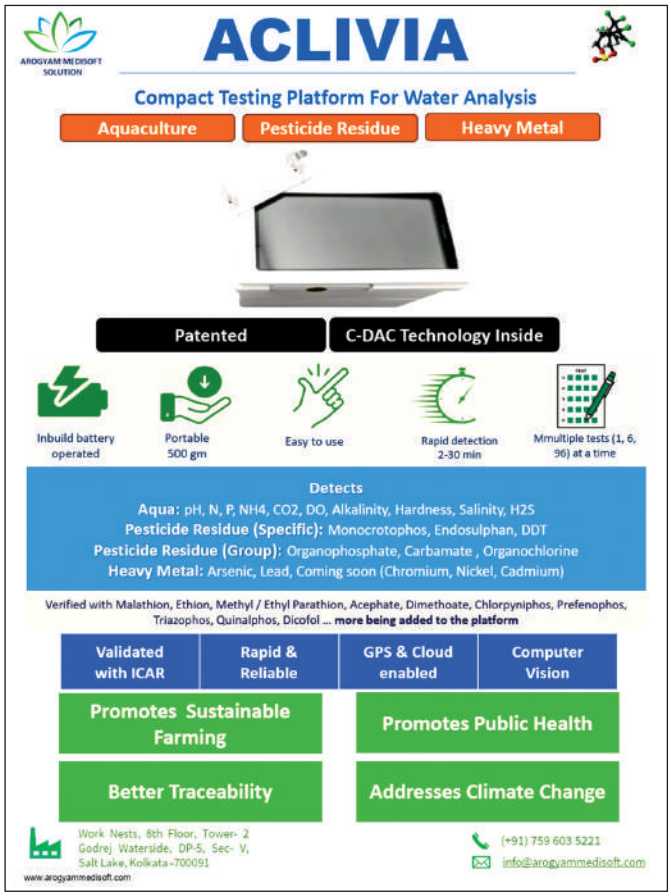


Go-P

Robotic Apple Harvester

5.2.2.7.1 'AquaSuraksha' as 'ACLIVIA; a biosensing-based system as a compact testing tool for water analysis.

The Ministry of Electronics and Information Technology under the AgriEnIcs programme has also supported the further commercial development of the earlier developed 'AquaSuraksha' system for pesticide residue detection in food and water with industry partner formalized and selected through the expression of interest process. The technology partner Arogyam Medisoft Private Limited with C-DAC, Kolkata has further developed the commercially sellable device for the market as an offshoot of the programme with addition of more industry-standard features.



Brochure of the ACLIVIA product being sold in the market developed under the AgriEnIcs programme

5.2.2.8 e-GUNA: Sensory assessment for quality of fermented foods from North-Eastern

The Ministry of Electronics and IT has supported the project which is being implemented by Centre for Development of Advanced Computing (C-DAC), Kolkata, the Institute of Bioresources and Sustainable Development (IBSD), Imphal, the National Institute of Technology (NIT), Nagaland, and the Indian Institute of Technology (IIT), Hyderabad. This initiative aims to develop and deploy a point-of-analysis device for the detection of bacterial pathogens and toxins in fermented food products. Currently, the project has

generated 03 technologies such as CG-STAT system, an electrochemical sensing platform for the detection of cyanogenic glycosides in fermented foods which has been developed, field trialed, deployed, and IP protected through an Indian patent application and copyright. IIT Hyderabad has pioneered the development of FP-SENS, a food pathogen sensor that can simultaneously detect a range of bacterial pathogens including Staphylococcus aureus, Bacillus cereus, Escherichia coli, Listeria monocytogenes, Clostridium botulinum, and Proteus mirabilis that integrates seamlessly with mobile phones. IBSD Imphal and NIT Nagaland have collaboratively worked on developing a software platform for the analysis of Foodpatho chips. The technologies are now ready and underway commercialization.

CG-STAT system

5.2.2.9 Development of Electric Vehicles (EVs) Sub System (EVSS)

The Ministry of Electronics & IT (MeitY) has initiated a program on "Development of Electric Vehicles (EVs) Sub System (EVSS-I) with broad objective to indigenously develop the Electric Vehicle sub- systems in the areas of Electric motor, controller, converters Chargers, BMS, etc., for 2-Wheeler, 3-Wheeler/e-rickshaw, and economy 4-Wheeler. The EV sub-systems development is being taken up in consortium mode consisting of academic institutes/ R&D organization for design and development, industry to commercialize it and vehicle manufacturers to use the developed product in the manufacturing. Technology of 1.2 KW Motor/controller for e rickshaw, 5KW Motor/controller for e Auto and 1KW BLDC motor/ controller for e-rickshaw has been developed, tested and transferred the technology to M/s Alphasine, M/s Amber Group, M/s Brushless Motor and M/s Lithion Power for production /commercialization. Currently 14 technology development activities are progressing under the programme.

Launch of Two Products developed under EVSS-01 programme on 12 March,2024 at CDAC-Thiruvananthapuram by Hon'ble MoS MeitY, Shri Rajeev Chandrasekhar

5.2.2.9.1 Announcement of MeitY-MHI Joint Call for Proposals

The Ministry of Electronics and IT in collaboration with Ministry of Heavy Industries (MHI) has announced MeitY-MHI Joint Call For Proposal for "Development of Electric Vehicle Sub-System " on 21.10.2024 in the presence of Secretary, MeitY. Now to enhance the chances of commercialization, a unique model has been introduced, involving Product Development Agencies (PDAs) like T-Works, iCreate, MOTION, NATRAX, and GARC. These agencies will support academic institutions in technology development by offering their expertise and state-of-the-art infrastructure. The expected outcome of the technology/product has to be cost-effective, quality competitive and ready for commercialization.

Announcement of MeitY-MHI Joint Call for Proposals for EVSS on 21.10.2024 in the presence of Shri S. Krishnan, Secretary, MeitY, and Dr. Hanif Qureshi, Additional Secretary, MHI

5.2.2.10 Development of DLMS/ COSEM (Device Language Message Specification/ Companion Specification for Energy Metering) testing tool for Smart Energy Meter)

The project is being implemented by CPRI, Bangalore in association with CDAC Thiruvananthapuram. The project aims at the "Development of an automatic test tool of DLMS/COSEM for Smart Energy Meters of different variants like NAN & WAN communication modules as per standard (IS 15959 series) requirements". The said software tool is named Smart Meter Integrated Testing and Higher Analysis (SMITHA). It is first-of-its-kind Indigenous testing tool for conformance and parameter verification of smart energy meter. The beta version of the testing tool SMITHA V1.0 was released on 17.05.2023 for limited users for feedback and the security tests conducted. The technology is currently underway in commercialization.

Beta version of the testing tool SMITHA V1.0

5.2.2.11 Development of IoT and Drone based Agricultural Monitoring System with Objective of Skill Development of Deprived Community

The project has been initiated under a special budget provision made for the SC community for the development and deployment of IoT and drone-based agriculture with Madan Mohan Malviya University of Technology (MMMUT) in the area of IoT and Drone. Training has been imparted to a total of 400 students in deprived communities. Two start-ups of deprived community students have emerged from this project. A total of 10 drones including 02 Agricultural Spraying drones of 10 Litre, 01 agricultural drones of 05 Litre, and other surveillance drones and data collection drones have been deployed. The drones have been designed with structural analysis for strength for tomato disease detection, crop prediction system based on machine learning, and weed identification system, therefore, reducing the cost of labor charge and increasing the quality of soil. Consecutively, 6-week summer training focused on this project has been provided to students about drone design, Internet of Things on Drones, Artificial Intelligence and Machine learning.

Agricultural Spraying drone, surveillance drone and Agro sensing display and unit

5.2.2.12 Development and deployment of Knowledge based Integrated Sustainable Agriculture Food Network (KISAN) cloud using Electronic Soil Nutrients Analyzer (ESNA)

This project has been initiated under special budget provision made for ST community for development and deployment of soil tester, skill development and entrepreneurship creation. So far, the development of ESNA device and its integration with KISAN cloud has been completed. The developed system has user-friendly Human Machine Interface. 25 types of tablets in dehydrated from were also developed for use of soil testing. So far more than 1000 tribal youths have been trained and around 450 skilled entrepreneurs have been established through the different course modules. Transfer of Technology (ToT) is underway.

Electronic Soil Nutrients Analyzer (ESNA)

5.2.3 Initiatives under Microelectronics and Nanotechnology areas

5.2.3.1 Some of the technologies developed/ are being developed indigenously under the R&D projects initiated in Microelectronics area are:

(i) Chips to Start-up (C2S) Programme: has been initiated by MeitY as capacity building programme at 113 organizations (including 100 academia/ R&D originations and 13 Start-ups/ MSMEs) with an outlay of Rs. 250 Crore for duration of 5 years in the year 2022. C2S Programme aims to generate industry-ready 85,000 number of manpower at 113 organizations (including academic institutions, R&D organizations, start-ups, MSMEs) at B.Tech, M.Tech and PhD levels specialized in the area of VLSI and Embedded System Design and leapfrog in ESDM space by way of inculcating the culture of Chip/ System-on-Chip (SoC)/ System Level Design at Bachelors, Masters and Research level and act as a catalyst for growth of Start-ups involved in semiconductor design in the country.

The Programme takes a comprehensive approach by offering students complete hands-on experience in chip design, fabrication, and testing. This is achieved through regular training sessions, conducted in collaboration with industry partners, and by providing mentorship and access to chip design, fabrication & testing resources to students, including state-of-the-art EDA (Electronic Design Automation) tools, access to semiconductor foundries for fabricating their chips etc. These opportunities include implementing the R&D (Research & Development) projects under C2S Programme for development of working prototypes of ASICs (Application-Specific Integrated Circuits), Systems/ SoCs (System-on-Chips), and IP (Intellectual Property) Core designs. Total 25,000+ number of engineering students have been trained at 113 organizations under C2S Programme till date

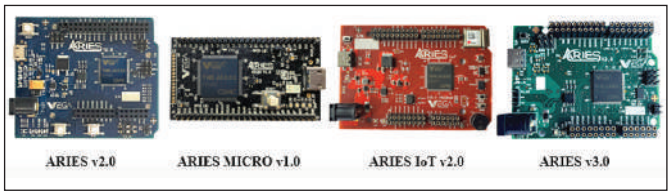
(ii) Design Linked Incentive (DLI) Scheme: Government of India has approved the 'Modified Programme for Semiconductors and Display Fab Ecosystem' with an outlay of ₹76,000 crore in order to catalyse the semiconductor & display ecosystem in the country. The Design Linked Incentive (DLI) Scheme has been approved as part of it with an outlay of Rs. 1000 Crore to offset the disabilities in the domestic semiconductor chip design industry as well as move up in value-chain and strengthen the semiconductor chip design ecosystem in the country. The DLI Scheme offers financial incentives & design infrastructure support to domestic companies, start-ups and MSMEs across various stages of development & deployment of semiconductor chips.

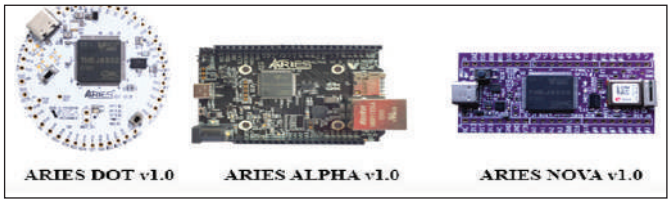
52 design companies (including start-ups and MSMEs) have been approved for design infrastructure support under the DLI Scheme. Out of these, 15 companies have also been approved for financial support for developing semiconductor chip/ SoCs for applications in sectors such as automotive, mobility, computing, communications etc.

(iii) Microprocessor Development Programme: Family of 32-bit/ 64-bit Microprocessor has been indigenously designed using Open-Source ISA (Instruction Set Architecture) along with reusable IP Cores by C-DAC, IIT Madras & IIT Bombay.

Following successful tapeouts were earlier carried out of – (a) 32-bit/ 64-bit SHAKTI Processors at 180nm, SCL foundry & 22nm, Intel foundry by IIT Madras, (b) 32-bit AJIT Processor at 180nm, SCL foundry by IIT Bombay (c) 32-bit VEGA Processor

at 130nm, Silterra foundry by C-DAC and 64-bit Dual-core VEGA processor at 28nm, TSMC. Following ARIES Development baords developed and commercialized using 130nm VEGA Processors (details at **https://vegaprocessors.in/devboards/**):





(iv) Design & development of NavIC Receiver: For effective use of Navigational services based on Indian Constellation of Satellites, named NavIC (Navigation with Indian Constellation), M/s Accord Software and Systems developed integrated NavIC and GPS Chipsets; which has been qualified by ISRO for deployment. About 4.5 Lakh Baseband Chipsets and 10 Lakh RF Chipset fabricated for deployment in civilian applications.

5.2.3.2 Some of the technologies developed/ are being developed indigenously under the R&D projects initiated in Nanotechnology area are:

A. Products/prototypes/technologies developed and MoU signed/collaboration under the Nanotechnology Area:

1. A point of care device namely "Mobilab" has been developed by a Start-up incubated under SWASTHA project at IITG for the detection of amylase, lipase, ALP, ALT, and AST. Ethical Clearances, ISO 13485 certification, ISO 9001, IEC, EMI, EMC and CDSCO Certification has been obtained and a plant has also been setup at Geater Noida for the product development activities. Around 1000 patient samples have been tested with Mobilab in AIIMS New Delhi, GNRC Guwahati, GMCH Guwahati, IIT Guwahati Hospital, and Government Hospital Kanpur for amylase, lipase, ALP, ALT, AST and results are found to be more than 90% accurate. MOBILAB is already available on the GeM portal and many units have been sold so far. It has received a funding of Rs. 4.5 Cr from Angel investor.

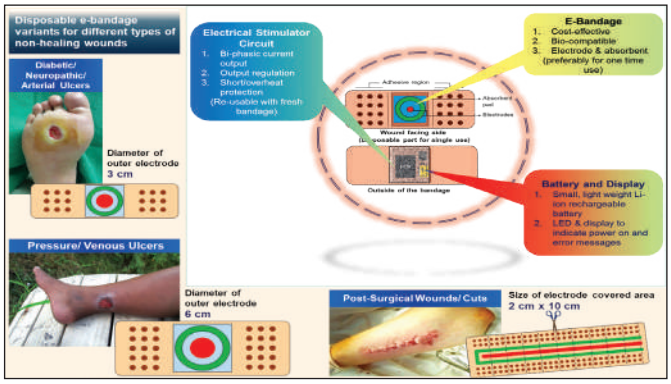
Point of care device namely MOBILAB

2. A portable SQUID magnetometer has been developed with sensitivity of $5x10^{-10}$ T. The capability of the device for sensing the rock samples obtained from the Indian Institute of Geomagnetism has been demonstrated.
3. Prototypes of a large area solid state lighting panels have been developed for green light source with luminosity 7000 Candela/m^2 and blue light source with luminosity 3000 Candela/m^2.
4. Microfluidic fuel cell for hydrogen generation using H_2/O_2 from PEC has been developed.
5. SERS chips for detection of Hemozoin (Marker for Malaria) have been developed and demonstrated for separation of Hemozoin and Bacteria.
6. A prototype device has been made for the detection of pseudomonas aeruginosa.

7. Prototype chips have been developed for the detection of lead, chromium, nickel and zinc in water in the detection limit of 1-100 ppm and for the detection of urea and pesticide/ herbicide/ insecticide in soil with LOD of 30 ppm.

8. Portable Conjugated Polymer based sensor has been developed for the detection of Monoamine Neurotransmitter and integrated with smartphone to perform onsite detection in real samples.

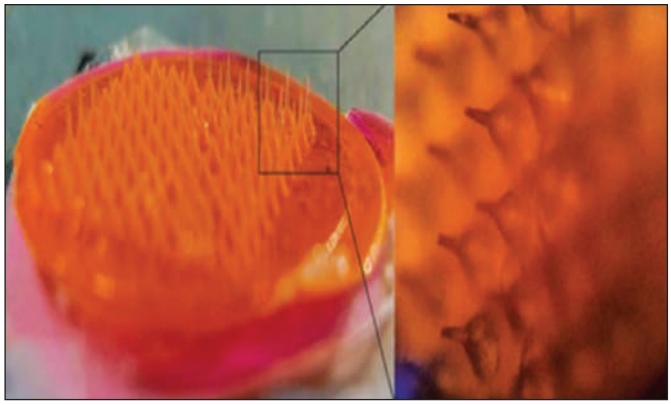
9. Affordable Wearable Anti-Microbial Electro-Stimulation Bandage for Treatment of Chronic Wounds have been developed.



10. An ultra-low-cost blood hemoglobin estimation device has been developed using a paper strip, offering results comparable to lab tests without the need for trained personnel.

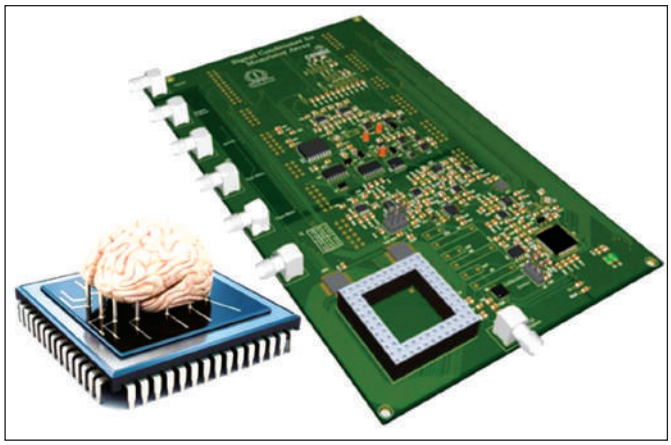
On-chip detection of haemoglobin

11. A skin-dissolving microneedle array patch made of curcumin-bioglass composite has been developed for painless drug delivery, promoting faster healing of deep wounds and diabetic ulcers at risk of biofilm formation.



Microneedle array patch

12. CMOS chips for neuromorphic computing are being developed at CeNSE, IISc Bangalore. A brain-inspired computing platform has been developed to store and process data in 16,500 conductance states within a molecular film. Reputed international journal 'Nature' has published the outcomes of the innovation. This innovation achieved an energy efficiency of 4.1 tera operations per second per watt (TOPS/W), making it 460 times more efficient than an 18-core Haswell CPU and 220 times more efficient than an NVIDIA K80 GPU, with even more potential for further optimization.



13. Two cutting-edge indigenous healthcare technologies developed by the scientists of IIT Delhi under the MeitY funded "Nanoelectronics Network for Research and Applications (NNetRA)" were transferred to industry on July 31, 2024. "Photonic Chip-based

Spectrometric Biosensor" for pathogen detection was transferred to UNINO Healthcare Private Limited, Mumbai, India. Technology named 'DNA Aptamer for Prostate Cancer Detection' has been transferred HUMMSA Biotech Pvt Ltd, Kolkata, India.

14. Smart Wearable Advanced nanoSensing Technologies in Healthcare ASICs (SWASTHA)" at IIT Guwahati.

For the upscaling and commercialization of the technologies developed under the Centre of Excellence in Theranostics Devices at IIT Guwahati, a project entitled "Smart Wearable Advanced nanoSensing Technologies in Healthcare ASICs (SWASTHA)" is being supported by MeitY.

Many projects including the development of an array of wearable, microfluidic and nanoelectronics technologies integrated with Application Specific Integrated Circuits (ASICs) for the detection of various diseases is being developed under SWASTHA.

State of the art ISO 5 and 6 cleanroom facilities at the Centre for Nanotechnology, IIT Guwahati were inaugurated by the Secretary, MeitY under the ground breaking project Smart Wearable Nanosensing Technologies in heathcare ASICs (SWASTHA) in February 2024.

B. Startups in different domains have been incubated during the reporting period:

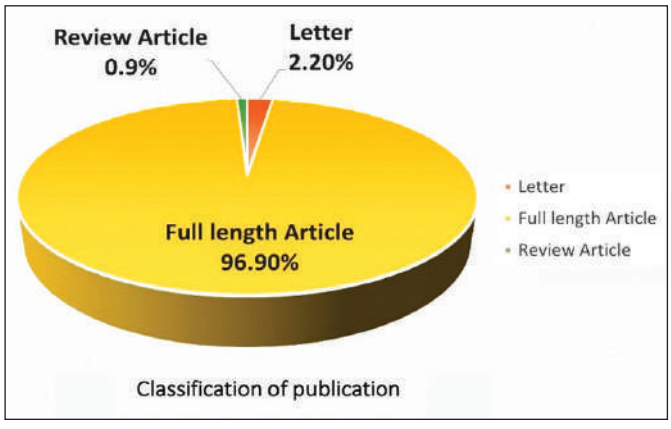
1. **Matterwave Technologies Private Limited-** startup incubated in August 2024 under the MeitY funded "Nanoelectronics Network for Research and Applications (NNetRA)" at IIT Bombay.

2. **Bengaluru based startup AGNIT Semiconductors secured 3.5 million dollar seed funding-** AGNIT Semiconductors at IISc working on vertically integrated Gallium Nitride (GaN) semiconductors, has raised $3.5 million in a seed round led by 3one4 Capital and Zephyr in October 2024. The round also witnessed participation from Lakshmi Narayanan, former CEO of Cognizant and noted angel investor. The company designs and manufactures GaN materials (wafers) and electronic components primarily for radio-frequency applications. AGNIT's GaN components offer performance-price footprint advantages for the defence and telecommunication industries. AGNIT's patent-protected technology comes from over 15 years of R&D at IISc and spans the verticals of Gallium Nitride materials, manufacturing processes, and device design.

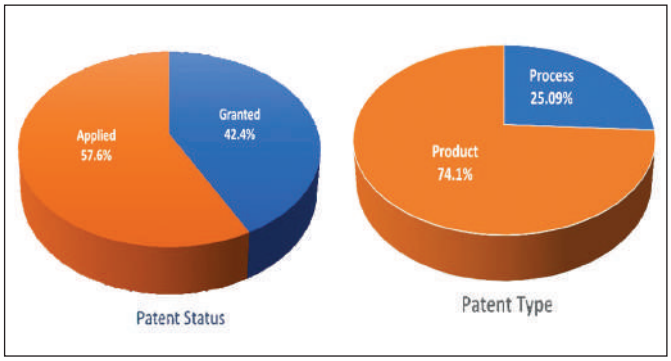
3. Proximal Soilsens Private Limited, a start-up incubated under MeitY funded project NNetRA at IIT Bombay has developed the NutriSens soil testing system, known for its accuracy and user-friendly interface. With Krishi Mangal's support, Soilsens has scaled its operations in Maharashtra by building B2B channel partners and enhancing ground reach through a micro-entrepreneurship model.

C. Patent & Publications

46 research articles have been published in National and International journals and 8 Patents have been filed in the reported duration.



Classification of publications under MeitY funded projects



5.3 Centres of Excellence

5.3.1 Nanotechnology Centres

Nanotechnology Initiatives Division at MeitY has established several Centre of Excellence in Nanotechnology to take the basic R&D outcomes to the prototype and then to manufacture Nano devices, subsystems, systems for the social benefits.

1. **Nanoscale Research Facility, NRF at IIT Delhi**

   A nanofabrication facility has been set up at IIT Delhi for developing nanofabrication processes and their use for making non-silicon nanoscale devices.

2. **Inauguration of State-of-the-Art ISO 5 and 6 Cleanroom Facilities at the Centre for Nanotechnology, IIT Guwahati**

   State of the art ISO 5 and 6 cleanroom facilities at the Centre for Nanotechnology, IIT Guwahati were inaugurated by the Secretary, MeitY under the ground breaking project Smart Wearable Nano sensing Technologies in healthcare ASICs (SWASTHA) in February 2024.

3. **Visit of Advisor to the Prime Minister of India Shri Tarun Kapoor at CeNSE IISc Bangalore**

   Advisor to the Prime Minister of India, visited the Centre for Nano Science and Engineering (CeNSE) at the Indian Institute of Science (IISc), Bangalore on 11th October, 2024. Shri Kapoor commended the efforts in training a skilled workforce for the India Semiconductor Mission and showed a strong interest in the cutting-edge research being conducted at CeNSE. Shri Kapoor's visit underscored the strategic importance of CeNSE's research in advancing India's technological capabilities, particularly in the semiconductor and nanoscience domains.

5.3.2 Centre of Excellence on E-waste Management

- Centre of Excellence (CoE) on E-waste Management is a unique concept, first of its kind in the country, to create physical infrastructure and knowledge hub for the development of cost-effective technologies for E-waste recycling and dissemination of E-waste solutions to interested industries.
- Currently e-waste is handled either by informal sector in a rudimentary manner or exported to foreign countries for recycling and recovery of precious metals. In order to develop environmentally benign and affordable e-waste recycling technologies,
- CoE on E-waste management has been created at Centre for Materials for Electronics Technology (C-MET), Hyderabad on PPP Model with the aegis of Ministry of Electronics and Information Technology (MeitY), Government of Telangana and Private industries (40:40:20).
- The main objective of CoE is to provide one stop solution for all kind of e-waste recycling technologies, strengthening the engineering ecosystem to improve process efficiency, design and development of affordable process equipment for e-waste recycling, extending consultancy services to interested industries, nurturing start-ups etc. The CoE is hosting incubation facilities to create prototypes for addressing various facets of E-waste management.
- CoE also promotes start-ups to develop their innovative ideas, offer training to MSMEs for dismantling practices, attract informal E-waste recyclers to practice environmental recycling practices, providing training to empower the Indian electronics and electrical industries on the E-waste Management Rule (2023) through RoHS facility available at C-MET etc. An M.Tech programme

on E-waste Resource Engineering & Management is also initiated jointly by IIT, Hyderabad and C-MET for quality human resource development in e-waste space. CoE has already transferred e-waste recycling technologies to 22 industries for commercial production.

5.3.3 CoE on Rechargeable Battery Technology (Pre-Cell)

- Lithium-Ion batteries are ideal power source for consumer electronics, e-mobility and power sectors. These batteries are also expected to find niche applications in e-governance electronics such as VVPAT machines.
- Current energy storage market in India includes applications such as mobile handsets and their accessories, solar rooftop, grid solar integration, wind integration, electric vehicles, inverter back-ups, telecom, UPS, rural micro-grid and off-grid applications, diesel replacement, railways etc.
- India has vibrant Lead Acid battery manufacturing industry and needs to augment Li-ion battery cell manufacturing to meet current and future demands of energy storage. India primarily imports Li-ion cells and manufactures battery packs of different capacity for various applications.
- Government support in form of R&D funding for development of cost-effective end-to-end indigenous technology for manufacturing of rechargeable battery (Li-ion and post lithium) suited for Indian environment is vital for meeting the future demands.
- The support for R&D is expected to lower up-front investment cost, utilize Indian supply chain, improve profit margin and bring SMEs into play for manufacturing industrial units of rechargeable battery cell manufacturing eco-system.
- In this direction, MeitY has initiated a self-sustainable R&D centre entitled “Centre of Excellence (CoE) on Rechargeable Battery Technology (Pre-cell)” at CMET, Pune for scale up and transfer of indigenous technology on Lithium-ion battery and Sodium ion battery (post lithium) to Indian SMEs for manufacturing of battery cells.

Sl. No.	Technology available for ToT	Description
1	Lithium cobalt oxide as cathode material for Li-ion batteries.	Cathode material for Li-ion Batteries
2	Lithium titanium oxide as anode material for Li-ion batteries	Anode material for Li-ion Batteries
3	Lithium (Nickel Manganese Cobalt) oxide as cathode material for Li-ion batteries.	Cathode material for Li-ion Batteries
4	Sodium Vanadium Phosphate (NVP) as cathode material for Na-ion batteries.	Cathode material for Na-ion Batteries

5.3.4 CoE on Additive Manufacturing- Optoelectronics Sector

- Additive Manufacturing (AM) is disruptive set of technologies which are bringing fundamental change in how manufacturing is carried out in many sectors due to its ability for mass customization. AM is enabler for digital manufacturing which has capability in producing products directly from design data by adding layers of material to obtain the final shape with minimal waste, supporting Industry 4.0.
- Ministry of Electronics and Information Technology (MeitY) has initiated a Centre of Excellence on Additive Manufacturing at Centre for Materials for Electronics Technology (C-MET), Pune in collaboration with Central Institute of Plastics Engineering & Technology (CIPET), Bhubaneswar.
- The objectives of the centre are to support Indian Additive Manufacturing Eco-system through focused and coordinated research, design and development in collaboration with 3 participating industries. The centre is expected to achieve self-

sustenance and focus on developing indigenous materials and machine technologies for electronics manufacturing sector.

- In current phase of the project, 4 technologies with 4 different machines, 13 materials and 4 different electronics application products are slated to be developed. The project is also bringing opportunities for Indian companies to develop their own AM material and machine technologies for global market at much reduced R&D cost for any sector (not limited to electronics) such as aerospace, medical, automotive etc. The centre is also training manpower to support growth of AM economy in India.

5.3.5 Centre for Programmable Photonic Integrated Circuit and Systems (CPPICS)

- Field Programmable Photonic Gate Array (FPPGA) core technology is a versatile photonic processor platform with potential applications in various sectors, including quantum computing, quantum communication, 5G/6G communications, IoT, radar, and avionics.
- The Ministry of Electronics and Information Technology (MeitY) has established the Centre for Programmable Photonic Integrated Circuit and Systems (CPPICS) at IIT Madras. This initiative, in collaboration with the industry, aims to design, manufacture, and develop applications based on FPPGA cores using Silicon Photonics.
- The centre is expected to achieve self-sufficiency in five years, commercialize the products through startups, and train manpower to enhance the ecosystem of such manufacturing. The centre is partnering with Izmo Microsystems, Bangalore, to provide System-in-Package solutions for the proposed silicon photonics FPPGA cores. This collaboration will lead to the creation of commercially viable products for the proposed startup, thereby fostering innovation and growth in the field of photonics.

5.3.6 CoE on Additive Manufacturing: Medical Device Sector

- Ministry of Electronics and Information Technology (MeitY) has initiated a Centre of Excellence on Additive Manufacturing at Andhra Pradesh MedTech Zone, Vishakapatnam, Andhra Pradesh which will support Medical Device Sector.
- The vision of the centre is to make COE at AMTZ a hub (common facility for local AM industry which will offset disabilities for competing with global peers) for medical device innovation in India by nurturing various medical device start-ups through Additive Manufacturing (AM) technology.
- Through this centre sustainable long-term ecosystem will be provided to start-ups and industries which will enable medical device innovation in India; build skill-sets in the AM industry, in particular AM in the medical industry to achieve competitive advantages in the global market; promote creation of Indian IPR & facilitate IPR filing activity and offer industry, academia, global linkages to provide market access to the incubated products.

- The CoE has achieved several milestones both in skill development and technology development. Over 1500 manpower were trained in 3D printing, Medical Device Design, Prototyping and Testing in CoE AM - MDS. CoE is successful in establishing production of materials and products which earlier were under import dependency. One of the key product is UHMWPE, a novel orthoplastic engineered for its weight-bearing properties. This has been the major liner component for orthopaedic implants in hip and knee arthroplasty. The CoE also created capacities to deliver the highest quality small metal components with outstanding levels of chemistry control, strength, and density across a wide range of alloys.

Lounch of Indiginized SIA 3D Printer in National AM Symposium 2024, Delhi

5.3.7 National Centre on Additive Manufacturing (NCAM)

- National Centre for Additive Manufacturing (NCAM) has been formed by the Ministry of Electronics and Information Technology (MeitY), Telangana State Government & Industry at Hyderabad. The NCAM is a company registered under section 8(1) of the Companies Act 2013.
- The vision of NCAM is to develop a comprehensive Additive Manufacturing ecosystem in the country and position India as a Global AM Manufacturing Hub. Since its inception the centre has established state of the art facility which was Inaugurated on 8th June 2023 by Shri Alkesh Kumar Sharma, IAS, Ex-Secretary Ministry of Electronics and Information Technology (MeitY), GoI & Shri Jayesh Ranjan, IAS, Principal Secretary ITE&C and I&C, Government of Telangana & Chairman-NCAM along with other dignitaries.
- The centre is incubating a batch of 6 start-ups with a focus to generate IPR. NCAM launched the National Skill Development Awareness Marathon and conducted Training Programmes across various cities in India; conducted 25 Additive Expert Sessions and upskilled 20,000+ working professionals in partnership with the industry; conducted National Startup Technology Grand Challenge funded by Industry during AM Tech Expo at Hyderabad; conducted 65+ Workshops, 23 Faculty Development Programs, and many webinars PAN India cumulatively. NCAM partnered with the industry and conducted seven international events so far in Delhi, Mumbai, Warrangal and Hyderabad. These events exhibited new technology and audience gained knowledge on the subject.

5.3.8 National Centre for Quantum Manufacturing Technology (NCQMT)

- Naturally occurring quantum phenomena have revolutionized modern electronics, serving as the backbone of telecommunications, computing, and industrial automation, deeply ingrained in our daily digital lives. Engineered quantum effects herald the dawn of Quantum Technologies (QT), poised to reshape sectors like finance, defense, aerospace, and energy.
- In India, the integration of QT promises transformative impacts through advancements in communication infrastructure, cybersecurity, and computing capabilities. Realizing the potential of quantum technologies necessitates a concerted effort to translate research into market-ready

innovations. The Prime Minister's Science, Technology, and Innovation Advisory Council (PM-STIAC) have prioritized the Quantum Frontier Mission to foster developments in quantum computing, communication, and materials.

- However, significant challenges lie ahead. Quantum Material Technologies (QMT) demand high-quality, reproducible materials conducive to high-temperature operations and miniaturization, alongside cost-effective manufacturing processes. Key to success is the consolidation of intellectual property rights and collaborative endeavours between industry and academia.
- To tackle these hurdles, the establishment of the National Centre for Quantum Material Technologies (NCQMT) at CMET, Pune, signifies a significant step forward. Through collaborative ventures with industry partners and the provision of indigenous materials, NCQMT aims to accelerate the development and deployment of quantum materials, driving India's quantum revolution onto the global stage. With a commitment to innovation and collaboration, India can position itself as a front-runner in the burgeoning field of quantum technology.

5.3.9 Centre for Promotion of Additive Manufacturing: Optical Computing Chips (OCC)

- Optical computational chips and photonic devices finds application in various fields of technologies such as communication, computation, healthcare, automation, sensor and defence. However, although they have shown plethora of applications, their industrial viability is mainly limited by their fabrication process which involves presence of foundries, numerous process- equipments and steps.
- In recent years, Additive Manufacturing (AM) processes are bringing fundamental change in how manufacturing is carried out in many sectors due to its ability for scalable, cost effective and sustainable fabrication process. AM is an enabler for digital manufacturing which has capability in producing products directly from design data by adding layers of material to obtain the final shape with minimal wastage. 3D printing in optical computing chip for global market
- The Ministry of Electronics and Information Technology (MeitY) has initiated a centre on Additive Manufacturing based Cost-Effective Optical Computing Chips at Indian Institute of Science, Bangalore (IISc) in collaboration with Centre for Materials for Electronics Technology (C-MET), Pune.
- The objective of the centre is to design and fabricate global state of the art 3D printer to achieve sub-micron resolution, indigenous materials for printing and to design & fabricate optical devices for computation. The centre is expected to achieve self-sustenance and focus on developing indigenous materials and machine technologies for photonics manufacturing sector.
- The centre is also bringing opportunities for Indian companies to develop their own AM material and machine technologies for global market at much reduced R&D cost for any sector (not limited to photonics) such as aerospace, medical, automotive etc. Till date the centre has designed and developed state of the art DLP light enginefor a full 3D printing machine and formulation of TiO2 nanocomposites for low resolution printing.

5.3.10 Centre for Promotion of Additive Manufacturing - Agri & Food Processing (CPAM – A & FP)

- The Center for Additive Manufacturing (CPAM), established under the Additive Manufacturing (AM) initiative of MeitY at the Centre for Development

of Advanced Computing, Kolkata, pioneers a groundbreaking concept of Agri-factories.

- These facilities integrate agri-produce lines with value-added agri-product lines, ensuring control over quality, quantity, and costs. Through this innovative approach, dependency on open agri-produce markets diminishes.CPAM's mission encompasses enhancing time-to-market, market resilience, and establishing product-independent manufacturing lines for value-added agri-products, introducing AM to the sector for the first time globally.
- Additionally, AM will streamline production by creating supply chain components such as agri-produce line modules and agri-photonics components, thereby reducing costs.
- Collaborating with institutions like CSIR - Central Food Technological Research Institute, Mysuru, Central Manufacturing Technology Institute, Bengaluru, and IIM Calcutta Innovation Park, CPAM aims to indigenously develop the Agri-Factory concept and AM machinery and materials.
- This initiative aligns with the government's vision to propel Indian brands in international markets, particularly in the food processing sector, as evidenced by the significant investment outlined in the Ministry of Food Processing Industries' annual report. CPAM's vision to catalyze product-oriented research and development in the agri and environment sectors is reinforced by its mission to enhance productivity, food safety, security, and inclusive growth through ICT and electronics-driven solutions.
- The center's objectives encompass controlling the quality and volume of agricultural lines, reducing infrastructure and food processing costs through 3D printing, fostering industry-driven economics, and promoting indigenous machinery and supply chains. Its scope includes designing and establishing Agri-Factory test beds, developing Agri-Factory technology, establishing a business office for self-sustenance, and preparing techno-commercial roadmaps for Agri-Factory development.

5.3.11 National Additive Manufacturing Centre West (NAMC-W)

- 3D printing or Additive Manufacturing (AM) is driving the industry 4.0 revolution, poised as the next-gen digital manufacturing technology. Projections from M/s HUBS suggest that the AM market will burgeon to nearly $50 billion by 2026-27, transitioning from rapid prototyping to mass production, thereby enhancing manufacturing sustainability and supporting broader environmental objectives.
- The Ministry of Electronics and Information Technology (MeitY) unveiled the National Strategy of Additive Manufacturing (NSAM) in February 2022, aiming to infuse $1 billion into the Indian AM market by 2025. Under this initiative, the "Establishment of National Additive Manufacturing Centre West (NAMCW) at Ganpat University, Gujarat – India" project, in collaboration with the State Government of Gujarat and industry stakeholders, seeks to augment AM adoption across six western states, aligning with NSAM's aspirations.
- NAMCW endeavours to create a self-sustainable facility for product development and training, promote the commercialization of AM products, foster skilled manpower, and instil future-ready skills among students through Science, Technology, Environmental, Advanced Manufacturing, or STEAM learning. By nurturing the domestic AM ecosystem through awareness programs, NAMCW aims to bolster inclusive growth and empower the AM manufacturing industry, spanning large enterprises, MSMEs, and startups, in line with the vision of 'Atmanirbhar Bharat'.

5.3.12 CoE on products based on Li-ion (Post Cell)

- The project "Establishment of Centre of Excellence (CoE) for Products Based on Li-ion Cells (Post-Cell)" is an initiative of Government of India to boost the mobile and other electronic industries in the country. The project is being implemented by CDAC Noida in association with the Industry Association – India Cellular and Electronics Association (ICEA) & financially sponsored by

Ministry of Electronics & Information Technology, Govt. of India and Department of IT & Electronics, Govt. of Uttar Pradesh.

- The genesis of CoE is to serve as a one stop facility centre for the design, development and testing of products related mobile handset accessories and other electronics applications. Specifically the products envisaged for development under CoE are Power Banks, Chargers, Wireless Chargers, Bluetooth Speakers, Smart Lighting Systems, Digital Radio, Headphones, Wearables, Solar Inverter, GPS Tag using NavIC, UPS System for IT Access, Power Tank, Access Control using RFID/ Biometric.
- Besides this, the CoE provides training to students & professionals in electronic system design to bridge the gap of skilled manpower requirement of the industry. Also, to cater to the requirements of the electronic industries, the CoE offers consultancy services and encourage professionals to embrace entrepreneurship through development of SMEs in mobile industry & other electronics domains.
- The CoE shall adopt a self-sustainability model after the project duration by generating revenue through design services, testing services, consultancy services and trainings. Also, the CoE has conducted "Grand Challenge" Contests for students & researchers to propagate design innovation in Indian development community.

5.3.13 Centre of Excellence (CoE) in Intelligent Internet of Things (IIoT) Sensors

- With the advancement of communication technologies in this modern era of digital connectivity, the concept of Internet of Things (IoT) has made its way into every walk of life. With the connected devices through IoT, it has become an easy affair to monitor and control any system remotely sitting anywhere in the world. One of the major parts of the IoT system is the sensors. They are the key components of intelligent devices capable of gathering data from different sources based on which decisions and actions will be taken by the smart devices.
- The IoT sensors, essentially find applications in diverse sectors including Health Care, Environment & Agriculture, Manufacturing, Energy management, Home automation, Smart Cities, Military & Space, Transportation, etc. A variety of IoT sensors including Light sensors, Accelerometer, Position sensors, Temperature sensors, Proximity sensors, Humidity sensors, Pressure sensors, Infrared sensors, Chemical sensors, gas sensors, gyroscope, etc. are required to cater to the whole spectrum of applications.
- Traditionally, majority of the companies in India, used the sensors for data collection and the data transmission was always done without any in-built intelligent processing. However, with the advent of Industry 4.0, the use of intelligent sensors is on the rise, with most sensors requiring self-correcting units, and intelligent data processing getting offloaded to the sensor nodes. This we believe is a fast-growing market with a large demand in industry.
- To make Indian sensor market self-reliant and globally appealing, MeitY and Government of Kerala jointly funded a project on "Establishment of Centre of Excellence (CoE) in Intelligent Internet of Things (IIoT) Sensors", which is being implemented jointly by C-MET, Thrissur and IIITMK, Trivandrum.

The salient features of the CoE are as follows:

- CoE is a collaborative programme of Central Government, State Government, Industries and R&D/academic institutes
- Provides required R&D support to industries based on their problem statement.
- CoE (IoT based Sensor) shall offer infra-structure, materials development and pro-cessing technologies, system design and packaging facility, etc.
- Creation of local IP to reduce the import bur-den
- Cost effective solutions as per industrial need
- Machine design and development

- Creation of start-ups/SMEs
- Services to Industries
- Testing lab as per International/national standards
- Training and Skill manpower development in the relevant areas

➢ Under CoE several sensors were developed with different communication modules in-built. 15 startups were incubated with the CoE and several skill development programmes were conducted by CoE. We strongly believe that Government should make an ecosystem for manufacturing and testing of various types of sensors and an electronic hub for integration of artificial intelligence and communications to sensor-based devices.

5.3.14 India Innovation Centre for Graphene (IICG)

Graphene is a wonder material and possesses remarkable properties including high strength, electrical conductivity, flexibility, and transparency, which makes graphene as desirable material for applications in sectors like electronics, energy storage, construction, defence, aerospace, automotive, medicine etc. Advancements in extraction and production methods can lead to improved quality and scalability, enhancing its usability across different sectors. Considering the facts, MeitY, has been engaged in Research and Development (R&D) in Graphene extraction and development processes in order to future unlocking economic growth in technological advancements and contributing to sustainable solutions across various industries.

India Innovation Centre for Graphene (IICG): The objective of this project is to set up the India Innovation Centre for Graphene (IICG) to focus on R & D, Innovation and Capacity building activities which leads to aknowledge centre that caters the following primary objectives:

➢ Undertake R&D, Product Innovation and Capacity building activities in the area ofgraphene, and other 2D material systems for sensors and actuators, energy storageand harvesting, graphene – CMOS integration, and wearable devices with a view todevelop indigenous technology, products, intellectual property rights (IPR) andtrained manpower.

➢ The centre is slated to establish a State of the art Research and Capability building facility for

- Microelectronic and semiconductor devices
- Sensors and thin film devices
- Nan electrodes for inexpensive organic electronic devices such as organic
- photovoltaic (OPVs), liquid-crystal devices (LCDs), organic light-emitting
- diodes (OLEDs), or organic field effect transistors (OFETs)
- Energy conversion devices (e.g., Supercapacitors, fuel cells and batteries).

➢ In addition, the centre aims

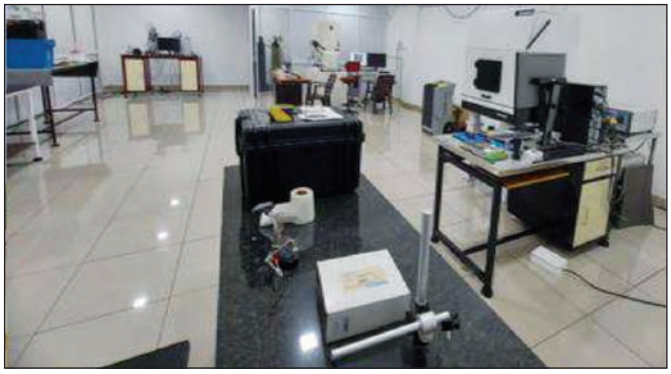
- To provide business and mentorship support to Start ups, companies along with the facilities to realize an industry standard product solution with graphene and 2D materials
- To create skilled manpower and jobs in the area of emerging technologies in graphene and 2D materials development, design and fabrication of future electronic components and devices.
- To promote innovation and entrepreneurship through design challenges, outreach programs, innovation and incubation grants.

➢ Significant progress was made by IICG through DUK and CMET in developing graphene-based heaters, energy storage materials, and sensors. Notable advancements include self-healing anti-corrosive coatings, improved transparent piezoelectric films, and polymer/graphene actuators for soft gripper applications. 16 patents have been filed, showcasing innovation across multiple domains.

➢ IICG has successfully completed six Innovation Grants, awarding winners from prestigious organizations. Additionally, two Grand Challenges were conducted. R&D training to about 300 students was carried out through 3 certificate

programs at DUK and 2 certificate courses at CMET.

Infrastructure for the IICG established at Kochi



The characterization Lab of IICG at C-MET

5.3.15 National Centre for Quantum Accelerator Chip using Lithium Niobate (NCQAC)

- A quantum accelerator chip (QAC) promises to solve complex problems much faster than the best possible classical computers by exploiting fundamental quantum physical laws, e.g., superposition and entanglement. Photonic integrated circuits (PICs) with suitable programmability offer a promising solution for developing scalable quantum-accelerated processors operating at room temperature which have the potential for diverse applications such as drug design and development, weather forecasting, logistic and scheduling optimization, financial modeling, etc.
- Lithium niobate has many favorable material properties for building scalable, programmable, PIC-based QACs including a large transparency window covering the entire spectrum of available optical sources and devices, stable physical and chemical characteristics suitable for reliable fabrication methods, strong second-order nonlinearity along with the possibility of periodic polling that can be harnessed for the efficient generation and manipulation of qubits, strong electro-optic effect providing access to fast and energy-efficient switching.
- The NCQAC at IIT Kharagpur, in partnership with C-MET, Pune, and M/S New Age Instruments and Materials, Gurgaon, aims to develop indigenous technologies (design, material, machine, process, packaging, and applications) for the LNOI PICs, validate them through ambient temperature QAC solutions, and deploy them for handling simulation and optimization problems in education and R&D sectors through R&D services and start-ups.

5.3.16 Graphene Aurora

- Graphene and related 2D materials have proven to show exceptional mechanical and electrical properties that make it an attractive alternative to build newer and better products. Today, Graphene is considered as a family of many 2D materials that is one atomic thick (monolayer) or in bulk form that can be added to existing products as a thin film or as a bulk material for developing several innovative solutions in the domains of building materials, sensors, electronics, electrical engineering, pharmaceuticals, etc.
- Graphene-Aurora aspires to revolutionize Graphene translational research & democratize commercialization for overall graphene based industrial growth while supporting SMEs deliver the Graphene products through the Program.
- This program compliments state of Kerala's and Govt. of India commitment to translate graphene technology to scale deployment and has approved setting up of a large-scale Graphene Pilot Production facility (GPPF) beyond the proposed Graphene Aurora program, supporting ongoing

program with MeitY and ensure developing commercialization ecosystem through this Program Graphene Aurora.

➢ The objectives are:

- Establishing world class Graphene material synthesisation for commercialization centre during the 5-year program period basis market.
- Launch targeted translation Graphene industrialization program in collaboration with Industry and academia developing new application and human intellect in Graphene-Aurora graphene program.
- Build global and local collaboration with the OEMs, Industry players, Academia, SMEs, and startup for targeted industrial translational research projects.
- Build democratized commercialization route across states working with SMEs, Startups, and industry players with the help of State Government and central government to accelerate technology absorption.
- Supporting SMEs / Startups and spin out startups in creating value through commercialization of Graphene technology and engaging in deep tech Translational research.
- Create a Graphene Technology & Commercial bridge (hub) for business and thought leadership between different stakeholders.

5.3.17 Startups Innovation & IPR

- India has evolved as the 3rd largest startup ecosystem in the world with more than 1,50,000 startups operating in the country and 115 unicorns with a total valuation of more than $ 350 Bn. Notwithstanding the raging global pandemic economic duress and other equally precarious challenges, the tech startup and the entrepreneurial ecosystem in the country have shown exemplary resilience and willingness to go beyond the norm. India now also boasts of more than 30,000 technology startups including 3,500 deep-tech start-ups operating in different segments of emerging technology areas.
- Ministry of Electronics and Information Technology (MeitY) in tandem with the well-laid down efforts to fast-track the tech startup ecosystem. Some of the flagship initiatives from the Ministry that includes Technology Incubation and Development of Entrepreneurs (TIDE 2.0), Centres of Excellence (CoEs) in diverse areas of national interest, MeitY Startup Hub (MSH), 'Gen-Next Support for Innovative Startups (GENESIS)' etc.
- New generation of start-ups emanating from these initiatives have taken up the cudgel of solving myriad problems ranging from governance to education, agriculture to healthcare in the country. Backed by robust efficiencies in the backend

Sr No	Expected Outcomes in Physical Terms Objective	Targets	Year					Self-Sustained of Funded	
		Program Target	Year 1	Year 2	Year 3	Year 4	Year 5	Year 6	Year 7
1	Number of Capacity building, industry internships and training Graphene Resources	100 Nos.	20	20	20	20	20	20	20
2	Number of Transfer ofTechnology to SME for commercialization	25 Tech Start-ups		3	5	7	10	10	10
3	No. of agreements with SMEs for commercialization roadmap	30 SMEs	1	4	5	10	10	15	15
4	Number of Graphene product commercialisation	10 Products		3		3	4		
5	Number of Technology and Business collaboration program launched	5 Collaborations	2		1	1	1	1	1
6	Number of startups supported with Product development Grant	5 Start-Ups	2		2	1			

and exploiting cutting edge emerging digital technologies such as AI, IoT, Data analytics, machine learning augmented and virtual reality, advanced automation, robotics and mobility among others, these startups are creating new benchmarks for themselves and for the world with wide scope for IP based solutions and products.

- MeitY has put in a well laid down mechanism to incubators and accelerator levels to sensitize, identify, protect and maintain the IP assets being generated in the country. So apart from creating funding opportunities for the startups it is also prioritizing sensitivity towards the need for IP generation in the country and has adopted a multi-pronged approach.
- The Startups Innovation and IPR Division of MeitY has unleashed a slew of initiatives for the benefit of technology startups dealing in IT/ ITeS and Electronics domains. These initiatives range from Technology Incubation Development for Entrepreneurs (TIDE 2.0) Scheme, domain specific Centres of Excellence (CoEs), SIPEIT for supporting filing of IPRs, etc. for benefitting startups and MSMEs. Some of the recent initiatives have been elucidated here:
- **GENESIS (Gen-Next Support for Innovative Startups):** MeitY has recently approved an overarching 'Gen-Next Support for Innovative Startups (GENESIS)' Scheme with a budgetary outlay of Rs. 490 Crore for a duration of 5 years to accelerate and enhance the fast-rising tech startup ecosystem. The Scheme aims to boost the startup ecosystem in Tier-II & Tier-III cities and upcoming towns in the country with emphasis on collaborative engagement among startups, government and corporates. GENESIS envisages further scaling up and sustaining the tech ecosystem especially to discover, support, grow and make successful startups. The platform envisages impacting and consolidating 10,000+ tech start-ups over the course of the next 5 years to pave the road for an equal startup ecosystem. Various outreach activities and awareness sessions in leading startup events were conducted to broadly disseminate information about the scheme pan India. A total of 65 implementing agencies are approved for implementation of the GENESIS scheme and functional to support the startups under the scheme
- **MeitY Start-up Hub (MSH):** To give wings to MeitY's vision of promoting technology innovation, start-ups and creation of Intellectual Properties, a nodal entity called MeitY Start-up Hub (MSH) has been setup under its aegis. MSH is a dynamic, singular and collaborative platform for tech startup community towards building meaningful synergies in the Indian startup space. MSH's quick value additions to domestic tech startups in terms of improving scalability, market outreach and domestic value addition and setting up innovative partnerships with various stakeholders has been a key differentiator in MSH's efforts to catapult the tech startup ecosystem in the country. MSH also has a mandate for capacity building of different tech incubation centres pan India, capitalizing on strengths of different centers to pull out moderately weaker centres into mainstream activity. MSH is acting as a hub and ensuring synergies among all the TIDE 2.0 Centres, theme based incubation centres, domain specific Centre of Excellences on Emerging Technologies and other existing platforms for facilitating criss-crossing of technology resources, sharing best practices and ideas across the entire gamut of innovation and startup ecosystem. MSH has seen a consolidation of 5200+ startups, 490+ incubators, 470+ mentors and 43+ state of the art Centres of Excellence (CoEs) and 23+ Accelerators.
- **TIDE 2.0 Scheme:** MeitY had initiated TIDE 2.0 scheme in 2019 with an outlay of Rs 264.62 Crores over a period of 5 years to promote tech entrepreneurship through financial and technical support to incubators engaged in supporting ICT startups primarily engaged in using emerging technologies such as IoT, AI, Block-chain, Robotics etc. in seven pre-identified areas of societal relevance. The Scheme will be implemented through 51 incubators through a three tiered structure with an overarching objective

to promote incubation activities at institutes of higher learning and premier R&D organizations, eventually leading to handholding of approximately 2000 tech start-ups over a period of five years. Towards this end TIDE 2.0 has been able to provision an empowering mechanism to establish necessary collaboration among the different actors of tech startup ecosystem to grow and benefit them through complementary strengths. As of now 51 TIDE 2.0 Incubation Centres have been approved and made operational.

Point-wise key achievements:

- 1485+ startups supported across 51 Incubation Centres
- 560+ low engagement programmes conducted
- 85+ deep engagement programmes conducted
- 140+ Challenge Grant/ Hackathons
- 510+ training workshops Conducted
- 900+ products/prototype/mvp Developed
- 300+ patents filed
- 250+ Trademarks registered/ copyrights filed
- 300 Cr Turnover of graduated startups
- 600+ Startups graduated
- 9000+ employments generated

- **Domain specific Centres of Excellence (CoEs):** To improve and transform innovation-led ecosystems in the country MeitY in partnership with various stakeholders has opened a clutch of domain specific Centres of Excellence (CoE) in order to create cohesive technology solutions built around the emerging technologies and support the next wave of budding entrepreneurs pan India. A brief of such initiatives are put forth below:

  (i) Centre of Excellence (CoE) on FinTech at Chennai: MeitY has initiated a Centre of Excellence (CoE) on FinTech at STPI, Chennai to provide infrastructure, resources, coaching/ mentorship, technology support and funding to emerging start-ups in the FinTech sector. The proposed CoE would establish ecosystem around FinTech with the latest trends and technologies in the financial services sector through a collaborative approach including NPCI, UIDAI and Partner Banks. The purpose of the FinTech CoE is to create holistic ecosystem so as to enable start-ups to experiment their innovative financial products or services within a well defined space and duration. The project aims to support 58 start-ups over a period of 5 years. Through this CoE, 60+ startups supported, 180+ products/prototypes developed, 27+ IPR filed, 1080+ employment, 26+ Crore revenue generated and 16+ Crore funding raised by supported startups.

  (ii) IOT OpenLab-a Centre of Excellence (CoE) for Internet of Things at STPI Bangalore: An IOT OpenLab - a Centre of Excellence (CoE) for Internet of Things in partnership with Arrow Electronics at STPI Bangalore has been initiated to provide academic and business mentoring of the start-ups in the IOT emerging technology area for developing products and/ or services around IoT along with networking opportunities for the startups. The IoT OpenLab intends to support and nurture 100 start-ups per year with an overall target to support 500 startups over a period of 5 years. Through this CoE, 59+ startups supported, 44+ products, 32+ prototypes developed, 34+ IPR filed, 2476+ employment, 66.49+ Crore revenue generated and 32.9+ Crore funding raised by supported startups.

  (iii) ESDM Incubation Centre at Bhubaneswar by STPI: MeitY has approved ESDM Incubation Centre with the objective of creating a holistic eco-system to promote ESDM innovation, R&D and create Indian intellectual property in the Eastern Region of the country. The centre will be operated through STPI, Odisha in collaboration with Government of

Odisha, IIIT Bhubaneswar and IESA. It aims to leverage 40 start-ups over the period of 5 years. This eco-system is necessary to develop, promote, incubate, mentor and create breakthrough innovations towards development of product and IP creation in the ESDM sector. Through this CoE, 30+ startups supported, 26+ products, 70+ PoC developed, 25+ IPR filed, 540+ employment, 8.5+ Crore revenue generated and 11+ Crore funding raised by supported startups.

(iv) **Centre of Excellence (CoE) on Medi-Electronics & Health Informatics at Lucknow:** MeitY has initiated a Centre of Excellence (CoE) on Medi-Electronics & Health Informatics at Lucknow to stimulate the establishment and growth of technology-based start-ups in the field of medical electronics and health informatics by providing the necessary infrastructure, mentoring, marketing, funding and eco-system required for their success and growth. The Medi-Electronics & Health Informatics CoE is being setup at SGPGI, Lucknow with Department of IT and Electronics, UP Govt. as funding partner, AiMED as industry partner, AMTZ as industry and seed funding partner and Kalam Institute of Health Technology as academic partner. The project aims to support 50 start-ups over a period of 5 years. Through this CoE, 46+ startups supported, 17+ products, 32+ prototypes developed, 6+ IPR filed, 200+ employment, 2.16+ Crore revenue generated and 2.97+ Crore funding raised by supported startups.

(v) **Centre of Excellence (CoE) in Emerging Technologies (EmTek) at Bhubaneshwar with Satellite Center at Rourkela:** MeitY has established CoE in Emerging Technology (EmTek) at STPI Bhubaneshwar with Satellite center at BPUT, Rourkela to support startups in Industry 4.0 technologies viz. Data Analytics, Machine Learning, Cyber Security & Artificial Intelligence (AI) & be the preferred Start-Up destination in Industry 4.0 in Odisha. EmTeK CoE is being setup with Electronics & IT Dept, Govt. of Odisha, MeitY, STPI as funding partners, NALCO, SAIL-RSP, Maxbyte as industry partners. The EmTeK CoE aims to support 150 start-ups over a period of 5 years. Through this CoE, 10+ startups are in the process of on-boarding for incubation.

(vi) **Centre of Excellence in Intellectual Property (CoE-IP):** A robust ICT-IPR ecosystem can help capitalize on the growth-enhancing effects of innovation vis-à-vis ICT. MeitY recognizes the importance of creating a conducive framework for IPR protection and has unleashed a slew of initiatives over the years to protect intellectual assets emanating from our country. CoE-IP forms the fulcrum of all MeitY IPR initiatives. It was setup essentially to support independent inventor community, academicians, MeitY societies, SMEs and startups with a clutch of IP related services. CoE-IP offers a gamut of IPR related services like IPR queries Prior Art searches, Patent filing assistance, invention analysis, Patent Landscape reports etc. especially curated for ICT based innovators. These service along with handling IPR queries and landscape reports is offered free of cost to the user community.

- **Theme based Incubation Centres:** With an aim to support the economic development of local region through supporting start-ups and businesses that will lead to creation of a more vibrant local entrepreneurial ecosystem, theme-based incubation centres under the aegis of MeitY has been setup across India. MeitY has initiated the following state of the art Theme based Incubation Centres:

(i) **Establishment of Incubator for Electronics Start-ups in Delhi-NCR (Electropreneur Park):** The Electropreneur Park established in collaboration with Software Technology Parks of India (STPI), India Electronics & Semiconductor Association (IESA)

and Delhi University (DU) with state of the art facilities at South Campus, Delhi University. The project aims to support 50 start-ups. As on date, the Electropreneur Park has supported 59 startups till date out of which 50 startups were incubated physically while 9 were incubated virtually. Till date 21 startups are in revenue generating phase. As an outcome, 129 new products, 183 working prototypes have been developed, 66 patents filed out of which 10 patents granted, Rs. 25.79 Cr funding received by the onboard startups, Rs. 149.75 Crore revenue generated by startups with a valuation of Rs. 640 Crores and 910 number of employment generated by the startups.

(ii) **Electronics Incubator by IIITM-Kerala and KSUM at Cochin, Kerala:**The project for setting up of Consumer Electronics Incubator at Cochin, Kerala by Indian Institute of Information Technology and Management Kerala (IIITM-K) and M/s Kerala Startup Mission (KSUM) aims to creation of new enterprises focused on Consumer Electronics through a holistic incubation ecosystem. This Incubator will incubate 40 startups over a period of 4 years. Infrastructure setup is completed. Testing and Equipment / IOT, Robotics Lab and Prototyping Room for SMT Assembly Line completed. As an outcome, 178 startups are incubated in the IC out of which 78 startups graduated, 97 products and 52 working prototypes generated, 81 Patents filed out of which 32 patents granted in addition 43 copyrights and 38 trademarks registered, 2275 employment generated, 220 Crore funding received and Rs. 212 Crore revenue generated by the onboard startups till date.

(iii) **Setting up of Incubation Centre in the area of ESDM with focus on Medical Electronics at IIT Patna:** The incubation facility developed through MeitY and State Government partnership aims to incubate 50 startups over a period of 5 years. The primary objective of this is to promote innovation and entrepreneurship with the aim to identify, nurture and translate technological ideas and innovation in the broad area of ESDM sector with a focus in Medical Electronics. Till date, 112 start-ups have been supported. As on date, 36 patents have been filed by the startups out of which 13 patents were granted, 51 products and 21 working prototypes have been developed 472 employment generated, 10.46 Crore funding received and Rs. 25.17 Crore revenue generated by the onboard startups till date.

- **Support for International Patent Protection in E&IT (SIP-EIT) Scheme for SMEs:** Ministry of Electronics & Information Technology (MeitY) had initiated a scheme titled "Support for International Patent Protection in E&IT (SIP-EIT) that encourages international patent filing by Indian MSMEs and start-ups so as to encourage innovation and recognize the value and capabilities of global IP. Reimbursement provided under the scheme is upto a maximum of Rs.15 lakhs per invention or 50% of the total expenses incurred in filing and processing of patent application upto grant whichever is lesser. A significant component of the SIP-EIT scheme is to provide financial support to academic institutions, industry bodies and MeitY's autonomous societies for conducting IPR awareness workshops pan India in ICT domain which aims to sensitize about Intellectual Property Rights and their protection among various stake holders consisting of students of engineering colleges, academia, startup community and business fraternity

  During the scheme tenure SIPEIT had supported a total of 80 applications approved from MSMEs and tech startups for international patent filing out of which 37 applied for reimbursement. With respect to the IPR awareness component, over 100 IPR Awareness workshops were conducted pan India in total including 2 International workshops.

- **IPR facilitation programme:** Under IPR facilitation programme of MeitY, The Innovation & IPR Division,

MeitY has been supporting its R&D societies and grantee institutions under various R&D projects for filing of different IPRs namely Patents, Trademarks, Copyrights and Industrial designs. The support includes end to end facilitation including prior art search, filing and maintenance of the IP assets in the form of annuities. The assignee ownership of IPRs is as per terms & conditions governing the GIA for particular R&D project. Through MeitY IPR Patent facilitation 418 patents have been filed out of which 180+ patents were granted, 529 copyrights filed and 168 trademarks applied.

5.4 Societal Reach R&D

5.4.1 Medical Tools, Equipments and Software

(i) Design and Development of 1.5 Tesla Magnetic Resonance Imaging (MRI) Systems:

The objective of the proposed project is to design, develop and test an indigenous 1.5 Tesla MRI System for medical imaging to provide a cost-effective solution and accessible MRI for people of our country.

Comprehensive quality assurance tests on ACR phantoms have been completed, while embedded coil development is ongoing. Multichannel imaging trials on knee and spine regions with human volunteers demonstrated clinical readiness. The indigenous 1.5T magnet has reached its final testing phase and will soon be integrated at SAMEER Mumbai, advancing India's self-reliance in MRI technology and healthcare innovation.

SAMEER signed MoUs and NDAs with seven leading industry players, marking a major step in transferring IMRI technology to industry. Testing with a 20kg phantom using body transmit and receive coils yielded images across multiple sequences, including Spin Echo, Inversion Recovery, GRASS, and Turbo Spin Echo. Rigorous efforts have improved image quality, aided by a state-of-the-art RF amplifier integrated with System I.

(ii) High energy 30 MeV linear accelerator (LINAC):

The objective of the project is to design & develop a 30MeV electron Linear Accelerator with 5-10kW beam power. The proposed LINAC will generate Medical isotopes (Molybdenum -99) which will be used to elute radioisotope Technetium (Tc-99m). It is envisioned that the High Energy Linear Accelerator (HEL) to be housed at INMAS would produce Mo99, which would then be transported to hospitals for medical diagnostics, industrial applications or for non-destructive testing in strategic sector. The advantages will be production of isotopes without involving hazardous, explosive or fissile materials, almost no nuclear waste and with normalized capital costs.

SAMEER is advancing electron acceleration to achieve energies of up to 30 MeV with a power range of 5 to 10 kW. This high-energy linear accelerator (linac) promises transformative applications in medicine, including isotope research and development, neutron imaging, and various industrial uses. The system has been fully integrated, and vacuum processing is currently underway. A stable 20 MeV beam has already been achieved, with plans to enhance the energy output soon.

The control system for the entire accelerator complex has been designed and developed by the SAMEER team and is now fully operational. Hardware functionality tests have been successfully completed, and the integrated console is capable of synchronizing all devices, managing interlocks, and coordinating with all subsystems. Fine-tuning of the console remains in progress to ensure optimal performance.

(iii) Digitally Connected Tribal Colonies (DCTC):

The project aims to develop and implement advanced technological solutions for screening common Non-Communicable Diseases (NCDs), including Oral and Cervical Cancer, Diabetic Retinopathy, and other retinal diseases. Digital pathology services are being utilized for remote diagnostic support, complemented by a robotic system for slide digitization. The initiative also focuses on establishing ICT infrastructure to digitally connect tribal communities in Wayanad

District, Kerala, providing improved healthcare and education services. To achieve these objectives, the project is developing an indigenized Fundus camera and a robotics system for slide digitization. The first prototype of the Fundus camera, integrated with AI capabilities for Microscopy and Funduscopy, has been completed. Certification processes with the Central Drugs Standard Control Organization (CDSCO) are currently underway for the developed products. Additionally, discussions for Technology Transfer (ToT) are in progress with industry partners interested in the slide digitizer and Fundus camera.

The project has made significant strides in addressing Non-Communicable Diseases (NCDs) in underserved communities, particularly in Wayanad district, Kerala. Cancer awareness programs and NCD screening camps have been actively conducted across the district. A mobile app-based door-to-door health survey, facilitated by trained project staff, has been launched to identify high-risk individuals within tribal communities for targeted screening. A dedicated screening hub, equipped with tools and devices developed by C-DAC, is operational in Wayanad for AI-assisted sample processing and analysis. This innovative model, with its documented workflow for NCD prevention, offers a scalable and replicable solution that can be implemented across India.

In recognition of its impactful efforts, C-DAC, Trivandrum, received the 2024 United Nations Inter-Agency Task Force Award for outstanding contributions to the prevention and control of NCDs and mental health conditions. The award was announced on September 25, 2024, at the 79th United Nations General Assembly in New York. C-DAC's Health Technology Group was honored for its work in screening the tribal population of Wayanad for cervical cancer, oral cancer, and diabetic retinopathy. The screening hub leverages C-DAC's cutting-edge technologies for mass screening, while a custom survey app and dashboard enable efficient door-to-door health surveys and follow-up tracking. This initiative highlights the transformative potential of technology in saving lives and improving healthcare accessibility in underserved regions.

(iv) Design and Development of Ultrasonic Transducer Probes for Medical Imaging:

The ongoing project focuses on the indigenous development of Ultrasound (US) probes for medical imaging, addressing India's reliance on imports in this high-demand market. This initiative supports the government's Make-in-India and Atma Nirbhar Bharat initiatives, aiming to achieve self-reliance in advanced medical technologies. The project is a multi-institutional collaboration involving stakeholders like C-MET Thrissur, NIELIT Calicut, MCC Kannur, and industry partners.

Functional layers such as piezo, backing, and matching layers were developed per specifications, alongside clinical protocols for ethical committee clearance. These advancements mark a significant step toward self-reliant medical imaging solutions in India. Key milestones include the development and characterization of 3.5 MHz and 10 MHz single-element transducer probes per IEC 62359 standards, with successful phantom imaging. A 128-element curvilinear US probe with a 3.5 MHz central frequency was prototyped. Imaging capability was demonstrated using test phantoms.

(v) Self-contained X-ray blood irradiator system:

The project aims to replace high activity radioactive sources that could pose a risk with non-radioisotope-based technologies. Radioisotope disposal is also becoming a big challenge throughout the world. Advanced nations have already migrated to these systems. The project is being implemented by SAMEER, Mumbai.

The technologies involved in engineering and development of self-contained X-ray blood irradiator (BI) system are heterogeneous and has major hi-tech components like orthovoltage X-ray tube, High voltage power supply, Dosimetry and dose delivery, Control electronics and interlocks, Irradiated products database management system, Water cooling system, Pb shielding etc.

The integrated X-ray System testing including X-ray tubes, High voltage power supplies and water-cooling system is completed at Radiation Shielded facility, SAMEER, Mumbai SAMEER, Mumbai have developed a prototype 'Xray Blood Irradiation System' and its dose characterization, qualifying AERB QA tests is completed inside radiation shielded facility.

(vi) Design & Development of EEG Based Real-Time Depth of Anaesthesia (DoA) Monitoring System:

The project aims to develop a machine learning model which will be trained using a locally compiled clinical database of Electroencephalogram (EEG) recordings. Since, the proposed DoA monitor will work on a large amount of EEG recordings as well as on the patient specific data, it will improve the accuracy of the DoA estimation without any restrictions on the type of anesthetic drug used or the patient's age. The machine learning model will then be realized on Field Programmable Gate Array (FPGA) to validate the software simulation results on hardware. The proposed DoA system will be an indigenous EEG based Real-Time Depth of Anesthesia Monitoring System.

Clinical EEG data from 1,333 surgical patients have been collected. Twelve key EEG features were identified using reverse feature elimination, and a Neural Network model was developed, achieving 88.21% accuracy with 11 EEG features and 4 patient details. Cross-validation methods were implemented, and hyperparameter tuning is currently underway.

The hardware architecture and RTL for the Pre-Processing Unit (PPU), Feature-Extraction Unit (FEU), and Classifier Unit (CLU) have been developed. PPU and FEU were integrated and evaluated on FPGA, while CLU was tested at the unit level. Complete system implementation on FPGA is underway, with synthesis and timing analysis performed using Synopsys EDA tools. Floorplanning, clock tree synthesis (CTS), placement, and routing are in progress.

(vii) Development of focused Compact Microwave Hyperthermia Applicator for small cancerous tumors:

The project focuses on developing a microwave-based hyperthermia applicator for therapeutic cancer treatment. Hyperthermia technique gaining significant attention in recent years, involves controlled exposure of tissues or organs to temperatures between 41°C and 45°C using radio waves and microwaves. This project aims to design and develop a noninvasive, focused applicator operating within the ISM band (2.45 GHz) to treat superficial melanoma lesions or small tumors on areas such as the face, neck, and nose. By introducing focused treatment and monitoring, the project presents an innovative approach to addressing these medical conditions.

A prototype applicator, featuring a double spiral antenna and a reflector structure, was developed, fabricated and tested. The testing involved two distinct measurement setups, incorporating the applicator and a simulated high-salinity liquid (HSL) within the ISM band at 2.45 GHz. The primary goal was to measure the Specific Absorption Rate (SAR) at various depths.

(viii) Setting up of Medical Electronics Laboratory for Calibration and Maintenance of Medical Electronics Devices & Equipment:

The aim of the project is to set up a Medical Electronics Laboratory at NRTC, Parwanoo to facilitate the hospitals, clinical laboratories, medical institutes and manufacturers of medical devices at Himachal Pradesh and nearby region and to generate skilled manpower by providing training to youth of the state for maintenance of medical electronics equipment.

Medical Electronics laboratory by procuring, installation and Commissioning of equipment has been accomplished. NABL Accreditation to the Laboratory as per ISO/IEC 17025: 2017 has been granted in August 2023 in the Discharge Equipment/ Devices, Patient Conditioning/ Maintenance, Monitoring Unit, Imaging/ Plotters groups. MoU

has been signed with NIELIT Shimla to jointly convene the program. Renewal of accreditation of the laboratory was also applied to NABL in August 2024 and assessment of the lab was conducted by National level assessors in October 2024. Training for the first batch is yet to be started.

(ix) Development of Indigenized Digital Dentistry Solutions targets development of indigenized and cost-effective solutions for Digital Dentistry which can streamline clinical workflow of dental procedures and benefit patients and clinicians alike.

The project targets to develop the entire ecosystem for Digital Dentistry which being (1) Cone Beam CT Scanner (b) Extra Oral Scanner (c) Intra Oral Scanner and (d) Virtual Dental Treatment Planning software. The project activities have been initiated with C-DAC, Thiruvananthapuram being nodal implementing agency with support from Centre for Dental Education & Research, AIIMS, New Delhi and Indian Institute of Technology - Madras. C-DAC has floated Expression of Interest for Industry participation from the project planning phase aiding better Technology Adoption by industries.

A workshop with participation by user agencies, domain experts and industries was conducted on 29th Jan '2024 titled "Digital Dentistry & Oral Health". Requirement collection for CBCT, Extra Oral Dental 3D Scanners and Virtual Treatment Planning & Simulation Software is completed. Prototype of Extra Oral Dental Scanner and VTPS (with features for MPR, Panoramic, Slice view and Airway) were complete and now undergoing evaluation. Design of CBCT Test Bench is complete and Component procurement is in progress.

(x) The development of an Integrated Surgical Platform with Navigation, Robot, Simulation, & Training for Total Knee Arthroplasty targets the creation of a cutting-edge, indigenous, and cost-effective solution for Total Knee Arthroplasty (TKA).

This initiative seeks to advance clinical workflows in TKA surgeries, ultimately benefiting both patients and clinicians. The project envisions establishing a holistic ecosystem for TKA, comprising:

- Image-Guided Surgical Navigation System
- Robotic-Assisted TKA System
- Preplanning and Simulation Platform with VR/AR/MR/XR

The project is jointly undertaken by the Indian Institute of Technology Madras (IITM) and the Centre for Development of Advanced Computing (C-DAC), Thiruvananthapuram, with clinical collaboration from AIIMS Delhi and Bhagwan Mahaveer Jain Hospital, Bangalore. IIT Madras has issued an Expression of Interest (EOI) to involve industry players from the project's early stages. This ensures streamlined technology adoption and facilitates smoother commercialization by achieving Technology Readiness Level (TRL)-9, the project aims to make these systems accessible, affordable, and tailored to the needs of healthcare providers in Tier II and III cities, reducing dependency on imports and improving clinical outcomes in TKA surgeries.

(xi) Under the MeitY R&D initiative, in collaboration with the Centre for Development of Advanced Computing (CDAC), Pune, and AIIMS Delhi, the iOncology.ai AI platform has been developed to support doctors in the early detection of breast and ovarian cancer—two of the most common cancers in women in India. The platform integrates six AI models that analyze CT, USG, histopathology, and mammogram images, as well as a mammogram MIAS object detection and classification model. These models, tested with patient data from AIIMS, achieved prediction accuracy exceeding 75% for both breast and ovarian tumors.

By leveraging AI-based clinical decision support systems, the platform can process large amounts of patient data, including genetic information, to generate personalized treatment plans, thus improving the effectiveness of cancer treatments. Additionally, the platform facilitates early cancer detection through the analysis of medical images, enabling quicker interventions and better patient

outcomes. iOncology.ai has already been deployed in seven hospitals across the country.

5.4.2 Training Programmes for Scheduled Caste & Schedule Tribe Communities and North East Communities of India

EMDP programme has been building knowledge on electronics manufacturing for last several decades and as part of its outreach for weaker sections of the societies EMDP has initiated several projects on manpower training among SC/ST and NE communities. These projects are supporting entrepreneurship programmes in the areas of E-waste management, Circular Economy and Resource Efficiency and RoHS laboratory manpower. State governments are also taking active participation in these projects through State Pollution Control Boards (SPCB) and Institute of Human Resource Development (IHRD). Many batches of entrepreneurship programmes have passed out. Details of these programs are provided below:

- **Capacity building through skill and entrepreneurship development on e- Waste management PU Chandigarh**

  In order to develop skilled manpower and entrepreneur in the area of E-waste dismantling and segregation, a project on "Capacity building through skill and entrepreneurship development on e-Waste management" is being implemented by Panjab University Chandigarh with the active participation of industry partner M/s Exigo Recycling Pvt. Ltd, under the Circular Economy in EEE sector initiatives of Ministry of Electronics and Information Technology, Govt. of India. A standard content on e-waste dismantling and segregation has been developed to provide training to the candidates of nearby states/UT i.e Haryana, Panjab, Himachal Pradesh and Chandigarh. An E-waste segregation and dismantling training centre also has been set up at PU Chandigarh for national benefit. Handholding, capacity building and entrepreneurship development by providing training with Industry recognized skill-sets leading to better employability prospects are the main objective of this project.

E-waste lab (Dismantling and segregation) setup at UIET, Panjab University Chandigarh

- **Skills development training program for Scheduled Caste and Scheduled Tribe students on E-Waste recycling technologies and testing of Restricted Hazardous Substances**

  Under this project, SC/ST students from various colleges were provided training on RoHS and

E-waste management. In total, 526 SC students and 487 ST students were trained for RoHS and E-waste dismantling. Conducted RoHS and E-waste dismantling awareness programs to 192 SC students. Trained 334 SC graduate and post graduate students of Telangana social welfare residential junior colleges and also on PAN India basis on E-waste dismantling and RoHS testing at C-MET, Hyderabad.

- **Informal Sector Capacity Building Up gradation with Formation of Recycling Clusters and Enabling Technology for Recovery of Resources from Electronic Waste thereby Promoting Resource Efficiency and Circular Economy**

  The major objective of the project is to upgrade the informal sector operators engaged in e– waste recycling to enhance capacity building, skill sets and assist them with indigenous technologies to process e-waste in environmentally sound manner and informal sector will be facilitated with MSME cluster formation scheme (CFC) to create cluster through respective State Government. The idea is to generate an interest within the state governments and thereby initiating proposals wherein land can be provided by the state governments to set-up eco-parks which can house the formalized informal sector allowing them to dismantle e-waste in a scientific manner. Accordingly, technical support for setting up eco-parks will be provided so that they can access technology and operate the same at industrial scale to provide benefits of circular economy in extraction of precious metals from e-waste and recycling of plastics from e-waste. Another objective is to operate the technology at industrial scale and facilitate other state governments to adopt the same and formalize the informal sector in their states thereby securing their livelihoods. Through this project, it is envisaged that around 15000 persons engaged in e-waste management will be trained for scientific methods of dismantling, segregation and identification of value chain and converting them to micro entrepreneurs. The project will be implemented at different states of the country through state government supports and technical support on various technologies will be provided by C-MET Hyderabad, NML Jamshedpur and CIPET, Bhuvneshwar.

CHAPTER

6 Internet Governance and Security of Cyber Space

6.1 Internet Governance Overview

Internet Governance, broadly defined, is the development and application by Governments, the private sector and civil societies, in their respective roles, of shared principles, norms, rules, decision making procedures and programmes that shape the evolution and use of the internet. It includes development and coordination of technical standards, operation of critical infrastructure and public policy issues.

Conceptually Internet Governance includes following layer

- Physical Infrastructure layer
- Code or Logical layer
- Content layer
- Security layer

Internet Governance involves IP addressing, Domain Name System (DNS), Routing, Technical Innovations, Standardization, Security, Public Policy, Privacy, Legal Issues, Cyber Norms, issues pertaining to Intellectual Properties and taxation.

6.1.1 Achievements

Some of the significant achievements of MeitY includes representation of India's Public Policy concerns on global platforms, creating awareness on Internet Governance, encouraging greater participation in Internet Engineering Task Force (IETF) working groups, engagement with Internet Society (ISOC), promotion of Multistakeholder model of Internet Governance in India etc.

6.1.1.1 Engagement in International Forums/ Meetings

a. **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 of the internet and its governance are appropriately voiced in 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 platform, to bring people together from various stakeholders' 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 sector at their annual meetings, delegates discuss, exchange information and share good practices with each other. The IGF facilitates a common understanding on how to maximize internet opportunities and address risks and challenges that may arise.

b. **Internet Corporation for Assigned Names & Numbers (ICANN):** MeitY is actively involved with the activity of ICANN and participates in its proceedings through Government Advisory Committee (GAC) and other public engagement fora. The GAC's key role is to advise ICANN on issues of public policy and especially where there may be an interaction between ICANN's activities or policies and national laws of international agreements. Shri Sushil Pal, Joint Secretary, Government of India is currently GAC representative from India.

c. **WSIS+20 Forum High Level Event:** The WSIS+20 Forum High-Level Event is convened with the objective to take stock of the achievements and key trends, challenges and opportunities since the Geneva Plan of Action in 2003. The WSIS+20 Forum High-Level Event 2024 was held at Geneva, Switzerland from 27-31 May 2024. A delegation of MeitY attended the event in person.

d. **APNIC:** The Asia Pacific Network Information Centre (APNIC) serves as the Regional Internet Registry (RIR) that allocates and manages IP addresses and ASNs in the Asia-Pacific region. India actively participates in this event to discuss policy matters.

6.1.1.2 India Internet Governance Forum (IIGF)

IIGF is a multi-stakeholder forum wherein representatives from various internet stakeholder groups convene together to discuss public policy issues pertaining to the Internet. It plays a pivotal role in representing India's interests at the larger International policy and stakeholder discussions. This is a national initiative of the United Nations IGF. The Fourth edition of IIGF was held from 9th to 10th December, 2024, with the theme "Innovating Internet Governance for India"

6.1.1.3 Multi-stakeholder consultations

India supports multi-stakeholder model of Internet Governance, which would involve all stakeholders and helps to preserve the character of the internet as unified, dynamic engine for innovation and which encourages equity and innovation.

6.1.1.4 Promotion of Universal Acceptance

MeitY is working towards the implementation of a multilingual internet to enable all Indians to connect to and use the internet by ensuring that Internet domain names in languages other than English (Hindi, Marathi etc.) can be issued and used by all Internet enabled applications, devices and systems. भारत-(Internationalized Domain Name) is now available in 10 scripts covering 22 scheduled languages of India. With the launch of.भारत, end users may book domain names in all scheduled Indian languages.

Universal Acceptance (UA) is a global effort to drive a more inclusive and multilingual internet. MeitY in support from NIXI hosted the regional level event on 2nd Universal Acceptance (UA) Day was held on 21st March, 2024, at Dr Ambedkar International Centre in the National Capital. (Theme: BhashaNet: Impetus Towards Universal Acceptance). India, which is fast turning into a digital economy, has been chosen as the flag bearer to promote and promulgate UA for digital inclusion. The event was a serious effort to initiate thought-provoking, meaningful and result oriented dialogues to raise awareness, break the language barriers and make the internet accessible to a larger population and bring every citizen in the ambit of economic progress.

6.1.1.5 The research, development and awareness agenda under Internet Governance

Various projects have been initiated to have evidence-based research which will build capacity for India's participation in multiple international fora and also strengthening domestic policy related to internet. The projects would lead India to become a model Centre and provide thought leadership in DNS and DNS security related technologies, conducting high-end research in DNS Security, building internal competencies in DNS Security by offering advanced training programs and establish a test-bed of DNS for research and training. The outcomes of the projects in IG would enable meaningful and sustained engagement in internet governance institutions (International) and processes with particular focus on the ICANN, IETF etc.

6.1.2 Projects under Internet Governance Division

A. **Advanced Internet Operations Research in India (AIORI) Phase-II (Building Internet Engineering & Standards Ecosystem in India) Funded by NIXI:** The AIORI project has been a pioneering effort in India in field of Internet measurement, DNS and resiliency research and has been capable of producing a production ready testbed for India and the world which is capable of

- Finding new models and practices of resilient deployments of CII (Critical Internet Infrastructure).
- Measuring quality metrics of Internet from end users' perspective.
- Research on next generation DNS
- A platform which can be used to code and test protocols
- A testbed for researchers in Internet standards

- Work in sync with the world on Internet evolution

Under this project, we are focused on creating an accurate Geo IP database for India and developing tools for last-mile performance measurement and troubleshooting for ISPs.

B. IG SIM-Internet Governance Structured Implementation Module by CDAC, Delhi The project envisages to provide technical and policy support to conduct Research, Training and Workshops and preparation of position paper, technology reports etc. on various Internet Governance Technology and policy related issues.

IG-SIM would take forward the work of reviewing the global Internet policy & Technology landscape and provide assistance w.r.t. structured implementation on matters related to Internet Governance taking into account of rapid technical developments and dynamically changing needs to provide ongoing implementation support to IG related activities of the Government of India, Ministry of Electronics and Information Technology (MeitY)

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 IT. NIXI is performing the following three activities.

- Internet Exchange
- .IN Registry and Internationalized Domain Names (IDNs)
- National Internet Registry (NIR)

Internet Exchange: 77 Internet Exchange Nodes are functional across the country. The Internet Exchange nodes have been successful in ensuring peering of ISPs among themselves for the purpose of routing the domestic traffic within the country, instead of taking abroad, thereby resulting in better quality of service (reduced latency) and reduced bandwidth charges for ISPs by saving on International Bandwidth. The maximum volume of Internet traffic being handled by NIXI at present is 1.53 tbps with 369 members including CDN till 31st December, 2024.

Recently NIXI has introduced Bilateral peering along with existing Multilateral peering. CDNs are allowed to connect at NIXI exchange points free of cost (zero port charges). Once CDNs are onboard, more and more ISPs shall connect at Exchange points. All functional NIXI nodes are IPv6 ready.

.IN Registry and internationalized domain names (IDNs): Since 2005, NIXI also manages the .IN Registry (www.registry.in). As on December, 2024, 219 Registrars have been accredited to offer .IN domain name registration worldwide to customers. This has helped proliferation of web hosting in the country and promotion of Indian language content on the Internet. Over 4.14 million .IN domain names have been registered till December ,2024. IDN's in all 22 official languages are launched and over 0.31 million IDNs domain names have been registered. Following schemes are launched to ensure adoption of IDN domains and inclusive growth of internet in India: -

- Free IDN (.भारत) to academia
- Bundled free email with every .भारत domain

National Internet Registry (NIR): Since March, 2012, NIXI is also running the NIR for India named as Indian Registry for Internet Names and Numbers (IRINN). IRINN is responsible for delegation of IP addresses and AS Numbers within the country. Over 4,483 affiliates have joined IRINN. NIXI has delegated over 14.73 billion IPv6 and over 11.21 million IPv4 addresses till December, 2024.

NIXI also undertakes training and workshop for Network managers and other Technical engineers in co-operation with Asia Pacific Network Information Centre (APNIC). NIXI has also prepared an audio visual of comparison of IPv6 with IPv4 and launched it on various social media platforms. NIXI has also hired a training agency for providing training on IPv6 fundamentals by way of video recordings which gets published on NIXI Academy for mass level capacity building.

6.3 Security of Cyber Space

6.3.1 Overview

Cyberspace refers to the virtual computer world and more specifically, is an electronic medium used to form a global computer network to facilitate online communication and dissemination of information. It is a complex environment of people, software, hardware and internet. Today, cyberspace is the common platform being used by citizens, civil society, businesses and Governments for messaging, communication and dissemination of information online, e-services, e-transaction, etc. As the cyberspace is virtual, borderless and offers complete anonymity, attacks can be launched from anywhere in the world with limited possibility of trace back and positive attribution. Emerging technologies such as Internet of Artificial Intelligence (AI), Machine Learning (ML), Things (IoT), 5G, etc, are going to add various connected devices in cyberspace in near future. Cyberspace has been facing many security challenges due to emerging cyber threats and widespread use for social media and increasing e-transactions.

MeitY has taken a number of legal, technical and administrative policy measures for addressing cyber security challenges. This includes National Cyber Security Policy (2013), Guidelines on Information Security Practices for Government Entities (2023), enactment of Information Technology (IT) Act, 2000 and setting-up of Indian Computer Emergency Response Team (CERT-In) for 24×7 cyber incident response under the IT Act, 2000, Cyber Security R&D and Capacity Building in Cyber Security.

6.3.2 National Cyber Security Policy (NCSP)

NCSP, 2013 was released for public use in July 2013. The policy caters to the cyber security requirements of Government and non-Government entities as well as large, medium & small enterprises and home users. The policy recognises the need for objectives and strategies that need to be adopted both at the national level as well as international level. The policy aims at facilitating creation of secured computing environment and enabling adequate trust and confidence in electronic transactions and also guiding stakeholders' actions for protection of cyber space. Considering the developments in cyber technology, delivery of services through cyber space and the changing nature of cyber threats over the years, Government of India has formulated the National Cyber Security Strategy (NCSS), which will enhance the objective and implementation of NCSP, 2013. The NCSS is under the process of approval.

6.3.3 Guidelines on Information Security Practices for Government Entities

Guidelines on Information Security Practices for Government Entities have been circulated to all Central Ministries/Departments, State/UT Governments and government organisations for compliance in order to strengthen cyber security. The purpose of these guidelines is to establish a prioritized baseline for cyber security measures and controls within government and their associated organisations. The guidelines shall assist security teams to implement baseline and essential controls and procedures to protect their cyber infrastructure from prominent threats. These guidelines shall also act as baseline document for administration and audit teams (internal, external/Third-party auditors) to evaluate an organisation's security posture against cyber security baseline requirements.

6.3.4 Cyber Surakshit Bharat (CSB)

The CSB programme was initiated in partnership with industry consortium in Public-Private Partnership (PPP) mode with the objective to educate & enable the Chief Information Security Officers (CISOs) & broader IT community of Central/State Governments, banks and PSUs to address the challenges of cyber security. The technical content of the training was developed after intense discussion with industry consortium and knowledge partners. So far, 45 batches of deep dive training have been conducted in cities namely, Delhi, Gurgaon, Mumbai, Kolkata, Bangalore, Hyderabad, Chennai, Chandigarh and Bhopal. A 1662 CISOs/IT officials from Government, PSUs, banks and Government organisations have been trained till September 2024. The Phase-I of CSB has been completed and Phase-II is under intiation.

42th Batch of CISO Deep Dive Training Program on Cyber Security 5-9 Feb 2024 inaugurated by Additional Secretary, MeitY

6.3.5 Grand Challenge for Start-ups

To promote innovation and entrepreneurship spirit in the country, the first version of Cyber Security Grand Challenge for Start-ups was launched on 15th January 2020, which was concluded in November 2021. Based on the success of Grand Challenge version 1.0, Cyber Security Grand Challenge (CSGC) version 2.0 has been initiated.

6.3.6 Public Procurement (Preference to Make in India) Order for Cyber Security Products

In furtherance of the Public Procurement (Preference to Make in India) Order 2017, notified by Department for Promotion of Industry and Internal Trade (DPIIT) (erstwhile Department of Industrial Policy and Promotion (DIPP)) vide notification No. P-45021/2/2017-B.E.-II dated 15.06.2017 and partially modified order No. P-45021/2/2017-PP(BE-II) dated 28.05.2018 to encourage 'Make in India' and to promote manufacturing and production of goods and services in India with a view to enhancing income and employment, MeitY notified an order on 6th December 2019 for promoting indigenous Cyber Security products giving details of (a) indicative categories of cyber security products and (b) a format for self-declaration regarding 'local supplier'. A revision of Public Procurement (Preference to Make in India) Order 2019 for cyber security products is under process in line with the DPIIT order no. P-45021/2/2017-PP(BE-II Part-IV, Vol. II) dated 19.07.2024.

6.3.7 Notification of Forensic Labs as 'Examiner of Electronic Evidence' under Section 79A of the Information Technology Act, 2000

Section 79A of the Information Technology Act, 2000 mandates the Central Government to notify Examiner of Electronic Evidence for the purpose of providing expert opinion on electronic form evidence before any court or other authority. For identification and selection of Examiner of Electronic Evidence, MeitY has designed and developed a scheme, initially to access and notify Examiner of Electronic Evidence on the pilot basis. So far, 16 Cyber Forensics Labs have been notified by MeitY which are available at https://www.meity.gov.in/notification-forensic-labs-'examiner-electronic-evidence'-under-section-79a-information-technology.

6.3.8 Cyber Security Projects

There has been increasing trends in cyber security threats. The newer cyber security threats and risks are emerging due to application of emerging technologies and there are no technology-specific guidelines to defend these threats and challenges. In order to develop best practices to defend emerging cyber threats and build women capacity in cyber security, Meity has initiated the following projects

(i) **"Development of Best Practices to Counter Cyber Security Threats and Challenges arising due to Emerging Technologies** to deal with and prevent cyber security threats arising due to Artificial Intelligence, Cloud Computing and Internet of Things and create awareness through workshops in five different regions (North, South, East, West & North-East) among Central and State Governments and different Government organizations"

(ii) **CyberShakti: Empowering Indian Women Government Officials in Cybersecurity** to develop the women workforce in cybersecurity. The target is to train 1000 women employees from various State/UT Governments, Government organizations and PSUs through beginner-level and advanced-level courses in online and offline modes respectively.

6.4 R&D initiative under Cyber Security

Research and Development (R&D) in Cyber Security focusses on promotion of applied research in addition to futuristic and blue-sky research in the thrust areas of IoT, Hardware Security, End point security, Network and System Security, Cryptography, Cyber Forensics, Threat Intelligence etc. Grant-In-Aid support is extended to research and academic institutions to promote creation of R&D infrastructure, capacity building and enhancement of skills and expertise. Specific efforts are made to nurture institutions and capacity enhancement in the entire country.

This has helped in establishing an ecosystem for cyber security startups & industry which resulted in production of indigenous state-of-the-art tools for forensics, device and end-point security, IoT Security, Threat Intelligence tools. Ongoing projects are reviewed periodically and follow up actions are taken. Efforts in the projects have resulted in the development of certain indigenous security solutions and technologies which are deployed / being deployed at various user organisations. In the year 2024-25, the significant outcomes of some of the on-going projects are given in the following subsections.

6.4.1 Secure Networks and Edge-Computing Hardware for Industry 4.0

This project is being implemented by IIT Delhi. It involves two work packages WP1 and WP2. WP1 handles secure test-bed development with reactive adversaries, whereas WP2 addresses security edge computing solutions for industry 4.0 use cases. WP1 comprises Design and Development of Communication Protocols against Denial-of-Service threats from reactive adversaries. In WP1, protocol designs and their performance analyses under the generalized energy detectors and development of Key-exchange algorithms under reactive adversaries have been completed. WP2 comprises development of Edge computing apps, secure compressed channel, secure enclave on server, Hardware (HW) protection of server chip and secure app.

6.4.2 Design and Development of Advanced Forensics Data Analytics Tool

The project is implemented by a consortium of CDAC Trivandrum, CDAC Bangalore and IIT Palakkad, where CDAC Trivandrum is the lead implementing agency. The other collaborative agencies include Federal Bank, Kerala State Forensic Science Lab (KSFSL) and Kerala State Electricity Board (KSEB).

Under the MeitY funded project "Design and Development of Advanced Forensics Data Analytics Tool", CDAC Trivandrum launched the enhanced versions of the Cyber Forensics Tools, CyberCheck - a Forensic Data Recovery & Analysis tool, Win-LiFT - Windows Live Forensics Tool Suite, Advik CDR Analyzer - A Call Data Record/IPDR Analysis Tool, Web Investigator - Internet Forensics Tool for Windows Computers, Photo Examiner - An Image Forensics Tool, and TrueImager - Portable disk imaging hardware solution. These tools were officially released by the Secretary, MeitY on 4

September 2024. The upcoming phase of the project will focus on the development of three new tools in the areas of FinTech Forensics, IoT Forensics and Forensic Data Analytics.

6.4.3 Cyber Security Technology Development and Centre of Excellence

"Cyber Security Technology Development and Centre of Excellence" called National Centre of Excellence (NCoE) in cyber security, commenced its journey on 30th March, 2019 as a joint initiative of MeitY, Government of India and Data Security Council of India. It was established with an overall objective to establish India as a leading cybersecurity hub by accelerating, identifying and developing cybersecurity technologies in the country, catering to existing market demand, and driving future readiness. The NCoE founded on three pillars: (i) Entrepreneurial acceleration, (ii) Technology development and (iii) Market development of Indian cybersecurity ecosystem. So far, NCoE has contributed by accelerating 142 startups in various domains of cybersecurity like OT Security, IoT security, etc.

6.4.4 Network Telescope Feed for Threat Intelligence Generation

The project aims to advance the development and deployment of a Network Telescope, emphasizing improved performance and expanded features. Tasks include refining the existing prototype with additional functionalities, deploying the Network Telescope to collect real-time Internet Background Radiations generated by malicious activities like scans, worm propagation, password cracking attempts and botnet operations.

Development of tools/APIs for sharing Network Telescope data with CERT-In/NCCC will facilitate query-based extraction of protocol fields, country of origin, Autonomous System Numbers, timestamps and Internet Service Provider information from the collected data. Efforts will focus on enhancing the visibility of the Network Telescope by expanding it to cover larger IP blocks.

The project intends to supply data feeds to support comprehensive threat intelligence generation and to create a repository of Internet Background Radiations for future trend analysis. Additionally, research will concentrate on Network Telescope-centric Threat Intelligence, exploring techniques like TI scoring, analysing malicious patterns in packet payloads, detecting singletons within other sources of threat intelligence and investigating the application of AI and ML techniques for identifying unique security patterns and emerging trends.

6.4.5 Detecting adversarial machine learning

This project facilitates smart applications such as smart homes and smart manufacturing, energy constrained devices are inter-connected through bandwidth-constrained communication protocols to form the internet-of-things (IoT).

Due to such constraints, an IoT network fails to employ conventional security protocols, which makes them vulnerable to security threats. One resource-efficient way to secure the IoT network is to deploy a comprehensively trained machine learning (ML)-based intrusion detection system (IDS). However, the existing IDSs are vulnerable to adversarial machine learning (AML)-assisted attacks that occur during the inference phase of the ML model, i.e. when the IDS employs the ML model for analysing specific network traffic to determine the presence/absence of a malicious attack. In an AML-assisted attack, the attacker makes carefully crafted perturbations in the network packets with the goal to evade detection by the IDS. In this project, our objective is to resolve this issue by developing an AML-resilient IDS for detecting AML-assisted attacks in IoT networks. We also plan to set up an IoT testbed and conduct extensive experiments to evaluate the effectiveness of the proposed IDS.

6.4.6 Malware and Malware-based attack Detection Using Statistical and Machine Learning Approach

This project aims to counter the escalating threat posed by malware and malware-based attacks on the Internet and its services, extending beyond traditional devices to include IoT networks and critical infrastructures. The focus is on leveraging machine learning for defence solutions. The project is organized into seven modules: (i) establishing test-beds for experimental analysis and visualization of malware, (ii) generating benchmark malware datasets for Android and Windows platforms, (iii) defending against known malware using supervised

learning, (iv) integrating malware defence by combining grey level and feature data, (v) enhancing the prototype with early responses for unknown malware on CPU-GPU platforms, (vi) detecting malware-based attacks on critical infrastructure and (vii) supporting the prototype with a dynamic signature-based mitigation technique for fast and accurate detection of both known and unknown malware.

The overall goal is to address the evolving nature of cyber threats by developing dynamic defence mechanisms through machine learning techniques.

6.4.7 Centre on Hardware Security: Hardware-Security Entrepreneurship Research & Development (HERD)

The project aims to promote research and entrepreneurship in hardware security. The project is implemented by a consortia of leading hardware security institution IIT Kharagpur, IIT Madras and Data Security Council of India, which is creating a national ecosystem for cyber security research and entrepreneurship through National CoE. The goal is to make India the leading nation in hardware security, both in research and entrepreneurship. The objectives are:

(i) **Promotion of Hardware Security Research:** Set up a well-devised research agenda in hardware security focussing on contemporary and emerging challenges. Promote hardware security research and ensure concerted efforts for measured and visible progress in the research work.

(ii) **Productization and Commercialisation of Research IPs:** Create market-ready IPs in hardware security, focussing on productization and commercialisation. Run a focussed incubation and acceleration program for start-up activities in hardware security. Develop market and investment ecosystem industry adoption and innovation growth.

(iii) **Pool of Hardware Security Researchers:** Develop a pool of resources for hardware security research and product development. Attract minds of engineering students challenges of hardware security.

(iv) **Support to Hardware System Assurance Efforts:** Develop formal methods, tools, and utilities assessing the security and trustworthiness of hardware/cyber systems. Support hardware and embedded assurance efforts with them.

(v) **Methods and utilities for Supply Chain Security**: Close observations on the hardware components, their role in the supply chains, investigate them for security threats, devise utilities for helping assess their security, and evolve methods for managing the risks emanating from them.

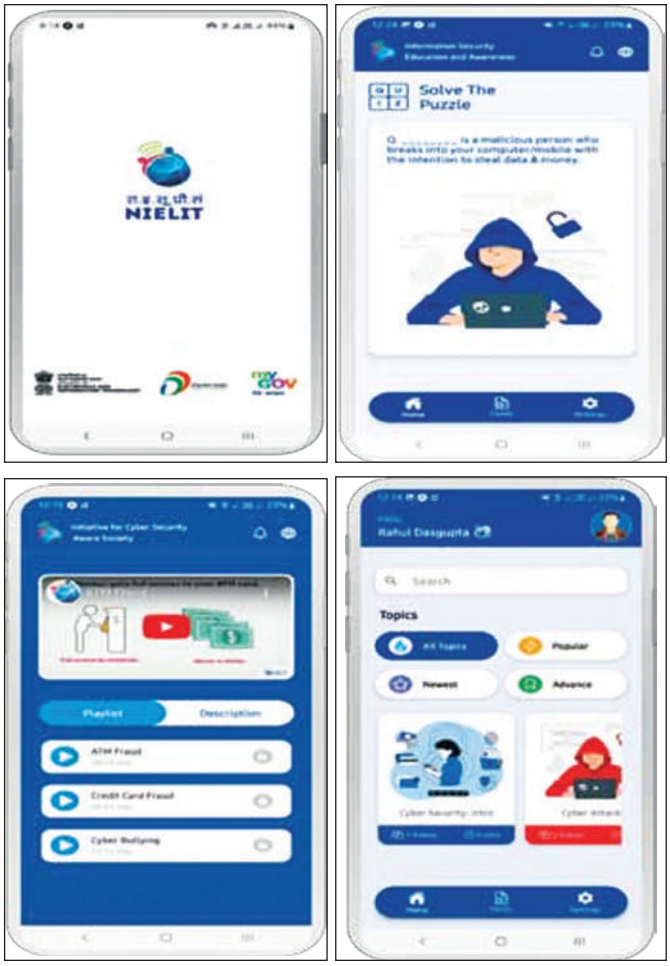
(vi) **Sectoral Hardware Security:** Examine hardware and embedded systems deployed in the industry verticals and undertake experimental evaluation/ assessment exercises. Develop test cases for testing, carry vulnerability research, and help in devising hardening guidelines.

(vii) **Enterprise Systems for Managing Hardware Security Risks**: Explore ways, methods, and techniques for enterprise systems to manage hardware-level threats on a real-time and continual basis.

6.4.8 Efforts / activities in North Eastern (NE) States

Ministry of Electronics and Information Technology (MeitY), Govt. of India has taken initiative as per NE Vision 2022, with the broad vision of providing cyber-crime investigation skills effectively. Major projects in NE states include:

1. Initiative for Cyber Security Aware Society in NE States- Cross Platform Mobile Application developed to initiate cyber security aware society.



The prime objectives of the project are to raise overall awareness about risks in cyber space targeting different sections of society by designing and conducting audience specific campaigns to create impact, so that people before connecting to online world, understand the risk and vulnerabilities in cyber space; and would be in a position to promote the use of cyber security resources and tools for carrying out a number of awareness programs with the aim to encourage participation in cyber security focused activities in each district of the three states, viz. Nagaland, Mizoram and Sikkim, and the development of "Cybersmart Citizen" and "Stay Smart online" campaigns catering to different sections of the society. The targeted segments would include general public (SHGs (self-help groups)/ NGOs/ CSCs (common service centers)/ VLEs (village level entrepreneurs)/ ASHA workers etc.), students, undergraduate student, young professionals, including elderly citizens, government employees and SMEs.

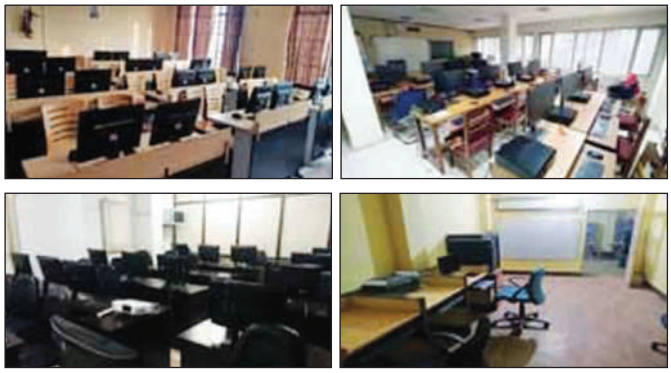
2. Development of Cyber Forensic Training cum Investigation Labs in North-Eastern States and Cloud based Centralized Cyber Forensics Lab Infrastructure.

The prime objective of the project is to:

(i) Setup Cyber Forensics Training cum Investigation Labs in 8 NIELIT Centre of 8 North Eastern states,

(ii) Capacity building of various stakeholders of criminal justice system like Police officers, Prosecutors, Judges, Investigation Officers of all LEAs etc. in each of the 8 NE states,

(iii) Develop resource portal with Dashboard along with e-learning methodologies over cloud, and creation of MIS based facility for courseware dissemination, information exchange, resource persons/ organizations for sharing of expertise among the eight NE states



Glimpses of Cyber Forensic Labs created at the NIELIT Centre's

6.4.9 New projects initiated

During the year 2024-25, the following R&D project has been initiated.

6.4.9.1 A Comprehensive IoT Security Ecosystem and Sandbox

This project is jointly implemented by consortia of 10 research and academic institutions: (1) C-DAC Bangalore, (2) C-DAC Hyderabad, (3) C-DAC Thiruvananthapuram, (4) C-DAC Chennai, (5) SETS Chennai, (6) ERNET Chennai, (7) IIT Madras (8) IIT Bombay (9) IIIT Bangalore

and (10) Amrita Vishwa Vidyapeetham Kollam. The objective is to develop components and solutions for enabling a secure IoT ecosystem layered with Edge Intelligence and also establishing a sandbox for validating the functional and security features of IoT devices. The expected outcomes of this project can be classified into four categories viz., (i) IoT Device Security Solutions, (ii) IoT Network Security Solutions, (iii) IoT Functional Sandbox and (iv) IoT Security Sandbox. The sandbox facility for validating the functionality and security of IoT will evaluate interoperability, scalability and other protocol-specific testing towards validating the functionality of the device. IoT device security will be validated at each layer namely physical, firmware and application. The baseline architecture for the IoT functionality and security sandbox has been designed with diverse protocols. The project also envisages development of security solution for IoT devices as well as for networks through the implementation of Zero Trust architecture with SDN, secures device provisioning, lightweight cryptographic algorithms, secure bootstrapping, identity management system for IoT devices, and traffic monitoring with anomaly detection. The sandbox facility will be made up of indigenous hardware and software components in an isolated environment. This facility shall be accessible via web portal also, where the client can select from a variety of functionality and security tests to evaluate on IoT devices.

6.5 Indian Computer Emergency Response Team (CERT-In)

The Indian Computer Emergency Response Team (CERT-In) is a government organisation under Ministry of Electronics and Information Technology, Government of India. CERT-In has been designated under Section 70B of the Information Technology Act, 2000 to serve as the national agency to perform the following functions in the area of cyber security:

a) Collection, analysis and dissemination of information on cyber security incidents

b) Forecast and alerts of cyber security incidents

c) Emergency measures for handling cyber security incidents

d) Coordination of cyber security incident response activities

e) Issue guidelines, advisories, vulnerability notes and white papers relating to information security practices, procedures, prevention, response and reporting of cyber incidents

f) Such other functions relating to cyber security as may be prescribed.

CERT-In creates awareness on cyber security issues through dissemination of information on its websites (https://www.cert-in.org.in and https://www.csk.gov.in) and operates 24x7 incident 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 January 2024 to December 2024 comprised of the following:

Activities	Numbers (January 2024 to December 2024)
Incidents handled	2041360
Security Alerts	959
Advisories	72
Vulnerability Notes	360
Trainings	23
International cyber security drills/exercises	05
Domestic Cyber security drills/exercises	18

6.5.1 Cyber Security Assurance

Under Security Assurance Framework, Indian Computer Emergency Response Team (CERT-In) has created a panel of 'IT security auditing organizations' for auditing, including vulnerability assessment and penetration testing of computer systems, networks & applications of various organizations of the Government, critical infrastructure organizations and those in other sectors of Indian economy. CERT-In has empaneled **160** Information Security Auditing organizations, on the basis of stringent qualifying criteria, to carry out information

security audit, including the vulnerability assessment and penetration test of the networked infrastructure of government and critical sector organizations. CERT-In also completed technical skills re-verification of already empanelled auditing organizations.

6.5.2 Cyber Crisis Management Plan

CERT-In has formulated 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 organizations under their administrative control. Along with the CCMP, CERT-In has developed "Guidance Framework for CCMP "which may be used as a template by various entities including Central Government Ministries/Departments/States/UTs and entities under their administrative control to prepare & implement their own CCMP. CCMP outlines a framework for dealing with cyber related incidents for a coordinated, multi-disciplinary and broad-based approach for rapid identification, information exchange, swift response and remedial actions to mitigate and recover from malicious cyber incidents. CERT-In has conducted **35** workshops from January 2024 to December 2024 to appraise various organizations under the Central Ministries/States/UTs about the implementation of CCMP and cybersecurity best practices and all necessary assistance is being provided to them for implementation of CCMP.

6.5.3 Cyber Security Exercises

Cybersecurity exercise is an effective tool to help entities in assessing cybersecurity preparedness to counter cyber-threats and building cyber-resiliency. CERT-In regularly conduct Cyber Security Exercises for critical sector organizations.

a) Table Top Exercises & Cyber Security Drills

Till date, CERT-In has conducted **108** Cybersecurity exercises of different complexities, including table-top exercises, with participation from about **1435** organizations covering various sectors of Indian economy from Government/Public/Private i.e. Defence, Paramilitary forces, Space, Atomic Energy, Telecommunications (ISPs), Finance, Power, Oil & Natural Gas, Transportation (Railways & Civil Aviation), IT/ ITeS/ BPO sectors and State Data Centres. During January- December 2024, CERT-in has conducted the following Table Top Exercises (TTX).

(i) Table Top Exercise (TTX) for Multi Commodity Exchange (MCX) on 19th March and 21st October 2024, respectively.

(ii) 03 Cyber Security Operational & Strategic Table Top Exercises (TTX) for Securities and Exchange Board of India (SEBI) on 18th March, 27th September and 23rd December 2024.

(iii) A cybersecurity Table Top Exercise for Tehri Hydro Development Corporation Ltd (THDC) held on 12th December 2024. The exercise was based on cyber resilience for Operational Technology (OT), Industrial Control Systems (ICS), Supervisory Control and Data Acquisition (SCADA) technologies used in industrial operations

(iv) 01 Table Top Exercise (TTX) for National Investigation Agency (NIA) on 23rd August 2024. The theme of the exercise was "Counter Cyber Terrorism".

(v) A 10-day long Cybersecurity Drill "Cyber Shock-3" for Banks, Insurance Companies, SEBI Regulated Entities, Hydro-Power Organisations, Thermal-Power Utilities, Transmission & Distribution units, Grid Operation, and Renewal Energy Entities. More than 400 organisations and over 1400 officials participated in the hands-on "Cyber Shock-3" from 27th May-7th June, 2024 to improve their cybersecurity posture by building Cyber Resilience to counter Ransomware & Cyber Extortion Attacks.

b) International Cyber Security Exercises

(i) CERT-In contributed and participated in the APCERT Annual Cyber Drill 2024 held on 29th August 2024. The objective of the drill was to test the response capability of leading Computer Security Incident Response Teams (CSIRT) within the Asia Pacific

economies. The theme of this drill was "APT Group Attack Response: Where is Wally".

(ii) CERT-In participated in the first BRICS Cyber Drill held in Kazan, Russia held from 16th to 19th September 2024. The theme of the drill was "Attacks on Suppliers (SupChain)". The primary agenda of the drill was to enhance communication, coordination and threat intelligence sharing among member countries and improving cybersecurity resilience.

(iii) CERT-In participated in the ACID Drill & TTX held on 15th & 16th October 2024. The theme of the drill was "Navigating the Rise of AI-Enabled Cyber Attacks". The primary objective of this drill was to test incident response processes, best practices to identify areas for further improvement and enhance operations planning capabilities.

(iv) CERT-In participated in the 4th edition of AFRICA CERT Cyber Drill held on 29th November 2024. The theme of the drill was "Enhance Your Readiness (Technical Exercise)" The drill included various threat simulations, including ransomware attacks, reverse engineering of malware, and strategic scenarios tailored to represent current cyber risks.

6.5.4 International Cooperation and Collaboration

a) Memorandum of Understanding (MoU)/ Memorandum of Cooperation (MoC)

Strengthening cooperation with all stakeholders to effectively deal with cyber security issues has been one of the main focus areas of the Government. This aspect is being dealt with by way of security cooperation arrangements in the form of Memorandum of Understanding (MoU)/ Memorandum of Cooperation (MoC)/Program of Cooperation (PoC) between Indian Computer Emergency Response Team (CERT-In) and its overseas counterpart agencies that are willing to work together and share information in a timely manner for preventing cyber-attacks as well as collaborating for providing swift response to cyber security incidents.

Currently, the Indian Computer Emergency Response Team (CERT-In) has 8 active Bilateral agreements in the form of MoU/MoC/PoC in the area of cyber security with counterpart agencies in Bangladesh, Egypt, Estonia, Japan, Maldives, Russian Federation, UK, and Vietnam.

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. To deal with the complex, sophisticated cyber-attacks, CERT-In partners with cyber security organizations from industry for collaboration in the area of cyber security with CISCO India, CloudSEK, Fortinet Inc, Google India, Quick Heal, Information Sharing and Analysis Centre (ISAC), Mastercard India Services Private Limited, Microsoft, Micro World Technologies (eScan), National Institute of Electronics & Information Technology (NIELIT), K7 Computing, Kaspersky, Skills DA and Redinent Innovations.

b) CERT-In in Multilateral forums

- CERT-In is an Operational Member of Asia Pacific Computer Emergency Response Teams (APCERT). APCERT is a regional forum to ensure Internet security in Asia Pacific region.
- CERT-In is a full member of Forum of Incident Response and Security Teams (FIRST). FIRST is a global forum for cyber security teams around the globe.
- CERT-In is Accredited Member of Task Force for Computer Security Incident Response Teams / Trusted Introducer (TF-CSIRT/TI) from 13th September 2022. TI-CSIRT was established by the European CERT community in 2000 to address common needs and build a service infrastructure providing vital support for all security and incident response teams.

- CERT-In is an associate partner in Charter of Trust (CoT) global forum. The Associated Partner Forum (APF) of CoT brings together regulators, research institutes, universities, and think tanks with the CoT's industry partners to build a trusted network committed to creating a strong digital security environment across the global economy.
- CERT-In leverages these forums for timely resolution of cross-border related Cyber security incidents affecting Indian cyber space.

c) Working Groups

CERT-In is the convener of "IoT Security working group" across APCERT. Two reports of the "IoT Security" working groups has been circulated to the APCERT operational members.

CERT-In is also member of various other working groups under APCERT such as Information sharing working group, Drill working group, Malware Mitigation working group, Tsubame working group and Training Working Group.

6.5.5 CVE Numbering Authority (CNA)

CERT-In has been undertaking responsible vulnerability disclosure and coordination for vulnerabilities reported to CERT-In since its inception. To move a step towards strengthening the trust in "Make in India" as well as to nurture responsible vulnerability research in the country, CERT-In has partnered with the CVE Program, MITRE Corporation, USA. In this regard, CERT-In has been authorized by the CVE Program, as a CVE Numbering Authority (CNA) for vulnerabilities impacting all products designed, developed and manufactured in India since October 2021.

CNAs are organizations responsible for the regular assignment of CVE IDs to vulnerabilities, and for creating and publishing information about the vulnerability in the associated CVE Records within their own specific scopes of coverage. Till December 2024, **80** CVE IDs have been assigned and published by CERT-In.

6.5.6 Sectoral CERTs and State CSIRTs

Under Sub-section (IV), clause (e) of the National Cyber Security Policy, 2013 proposed to create mechanisms for Security threat early warning, vulnerability management and response to security threats, CERT-In functions as the umbrella organization in enabling creation and operationalization of Sectoral and State Computer Security Incident Response Teams (CSIRTs) as well as facilitating communication and coordination actions in dealing with cyber crisis situations. CERT-In is issuing the necessary guidelines for setting up of sectoral CSIRTs and state CSIRTs.

CERT-In is sending out fortnightly reports on vulnerable services and botnet infections through its Cyber Swachhta Kendra (Botnet Cleaning and Malware Analysis Centre) to sectoral CSIRTs, Ministry of Power and other stakeholders in Power sector.

CSIRT-Power facility has been operationalized and notified on 23 September 2024 to serve as the responsible agency for responding to and preventing cybersecurity incidents within the power sector in coordination with CERT-In.

6.5.7 CSIRT-Fin

CSIRT-Fin under CERT-In has been assigned the responsibility for coordinating and supporting the response to a computer security event or incident within the financial sector constituency. CSIRT-Fin is the incident response force which focuses on mitigation processes, providing on-site awareness, expertise, and recovery oversight.

The snapshot of activities performed by CSIRT-Fin this year, is as follows:

- Handling of security incidents in collaboration with CERT-In which included security incidents related to vulnerable services, botnets, open services and phishing incidents. Entities have also been on boarded to CERT-In's Cyber Swachhta Kendra (CSK) for providing automated feeds regarding malware infections, botnets and vulnerable services
- Issuing of vulnerability notes and virus alerts along with CERT-In.
- Tailored threat intelligence alerts for proactive measures were sent to financial sector constituency

and entities have been on boarded on CERT-In's automated threat intelligence platform.

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

- Cyber Swachhta Kendra (CSK) - The Botnet Cleaning and Malware Analysis Centre has been setup to create a secure cyber space by detecting botnet infections in India and to notify, enable cleaning and securing systems of end users to prevent further infections. CSK is covering about 94% of Indian internet users as well as **1371** organizations across sectors. The Centre is working with Energy, Finance, Healthcare, Infrastructure, Transport, "Industries and Manufacturing", "IT & ITeS", Government, Agriculture and Academia Sector organizations to detect malware infections in their networks and enable remedial actions. More than 400 organizations have been added in last 6 months (July-December 2024) to get benefited by the services provided by CSK.
- Cyber Swachhta Kendra aims to secure India's digital IT Infrastructure by creating a dedicated mechanism for providing timely information about Botnet/Malware threats to the victim organization/ user and suggesting remedial actions to be taken by the concerned entity.
- CSK is playing a very proactive and pivotal role in a continuously evolving cybersecurity environment through identifying new botnet/malware, understanding their threat level and subsequent Information dissemination to organizations with suggestive remedial actions.
- In order to reach out larger audiences in the country, the website of Cyber Swachhta Kendra is available in Hindi language and a new domain "www.सीएसके.सरकार.भारत" was created. Hindi website of CSK received positive response and became very popular among citizens. CSK also started notifying end users about botnet/malware infection in their digital devices via Internet Service Providers (ISP) in Hindi as well as English language. This activity was also appreciated by users.
- During the period January- December 2024, over **570** botnet/malware family were tracked and reported to collaborating ISPs/organizations. The type of Malware/Botnet infections include Trojans, IoT bots, Ransomware, Crypto currency miners, POS Malware, Worm, Botnets, Adware, Exploit kit etc. Moreover, systems with vulnerable services that could be exploited to carry out cyber-attacks were also reported to various critical sector organizations. The vulnerabilities could also have severe impact such as information disclosure, launch DDoS attacks, unauthorized access etc. CSK suggests about solutions/ patching of the vulnerabilities.
- Besides the core activity mentioned above, CSK also participated in various cyber security events/awareness programs in collaboration with Government agencies/ Academia/ ISP etc. to create cyber security awareness & hygiene among the users/ organizations in the country.
- During 01-15 February 2024, CSK celebrated "Cyber Swacchta Pakhwada" to create cyber security awareness among internet users across the country. CSK coordinated with ISPs, Anti-Virus companies to reach out and inform end users of internet about malware attacks, implications and safe guard their interest in cyber space. Around **3.19** lakh Free Bot Removal Tool downloads were observed during this period (01-15 February 2024).
- CSK also published cyber security awareness information during "Cyber Jaagrookta Diwas (CJD)" on its website as and when it is celebrated (First Wednesday of every month) so that the useful information about cyber security awareness may reach to citizens.
- CSK is committed to enable users getting their digital devices secure against any cyber infection. CSK also strives to collaborate with Indian entities/ cyber security companies to come up with good security solutions/ AVs. CSK currently has collaboration with three Free Bot Removal Tools (FBRTs) namely Escan, K7 and QuickHeal to citizens through its portal/website. CSK is now providing FBRT for Windows as well as for Android platform. The overall count of number of downloads

of all the FBRT (total 3 in numbers) till December 2024 stands at over **69.83** lakh.

- The FBRTs are regularly updated with latest malware signature of recent botnet/ malware so that citizens can be safe against evolving cyber malware.
- For the future endeavor of CSK, it is planned to reach out to more sectors for outreach of CSK so that more organizations may benefit from CSK services. CSK envisages coordination and collaboration with entities working in the field of cyber security (such as Antivirus companies, Academia, Govt. agencies or Private Players etc.) for the welfare of ICT users in the country, enable users/organizations to keep their network secure against cyber infections.

6.5.9 Cyber Forensics Lab

Cyber Forensics Laboratory of CERT-In is a notified Lab under the scheme of Examiner of Electronic Evidence in exercise of the powers conferred under section 79A of the Information Technology (IT) Act, 2000 in Computer Forensics and Mobile Device Forensics as its scope.

Cyber Forensics Lab of CERT-In is equipped with the state-of-the-art equipment and tools to carry out data retrieval, processing and analysis of the raw data extracted from the digital data storage, mobile devices, cloud service providers, Internet of Things (IoT) devices, Drones, Digital Video Recorders (DVRs) and Network Video Recorders (NVRs) using sound digital forensic techniques. The Lab also has the capabilities of unlocking/bypassing complex passwords of high-end devices and extracting data from hidden folders.

The primary task of the Cyber Forensics Lab is to assist the Incident Response (IR) team of CERT-In on occurrence of a cyber-incident and extend digital forensic support to carry out further investigation. In addition, the Cyber Forensics Lab assists different Law Enforcement Agencies (LEAs), Intelligence Agencies and State Police departments in digital forensic data retrieval and analysis which is being extensively used in investigation of the cases of terrorism, anti-national activities, narcotics, trafficking etc, that involves unlocking and bypassing of security features of high-end digital exhibits in a forensically sound manner such that the report can be presented in the Court of Law. In 2024, the Lab has worked on 56+ cases which are related to National importance and provided vital inputs to various agencies thereby helping the agencies to nab the perpetrators by understanding the different contours of crime.

6.5.10 CERT-In Threat Intelligence eXchange - Proactive Threat Intelligence Sharing Platform

CERT-In established its automated Cyber Threat Intelligence Sharing Platform [CTIS] in 2018 for facilitating bidirectional sharing of operational, strategic, enriched tactical threat intelligence to various counterparts and stakeholders. This initiative is helping Indian stakeholders to enhance the effectiveness of security and IT teams in reducing exposure by attempt to uncover unknown threats and informing better, faster decisions. The platform collects, correlates, enriches, contextualizes, analyses, integrates, tags with Traffic Light Protocol (TLP) and pushes to the partners in near real time. The shared data can be consumed by the recipients into their automated workflows so as to streamline the threat detection, management, analysis, and defensive process and track it through to completion by leveraging its powerful API integrations with supporting SIEMs, firewalls, and other endpoint protection solutions.

CERT-In envisages that implementing threat intelligence profoundly elevates Government/Critical organization's security posture, enabling the respective security team to understand and effectively predict the cyber threats that imperil their organization's key assets. Empowering organizations to anticipate who may attack next, and how, allows security teams to focus on prioritizing resources so they can respond effectively to future cyber-attacks.

6.5.11 Security awareness, skill development and training

As part of its mandate, CERT-In is regularly carrying out various activities for development of cyber security capacities, skill building, awareness and citizen sensitization with respect to cyber-attacks and cyber frauds. In order to create security awareness within the Government, Public and Private Sector organizations, CERT-In regularly conducts trainings / workshops to

train officials of Government, Public and Private sector organizations across all sectors and citizens on focused topics of Cyber Security.

The training/workshop programs focus on technical topics with technology presentations & demonstration/ Hands-on sessions for technical cyber community.

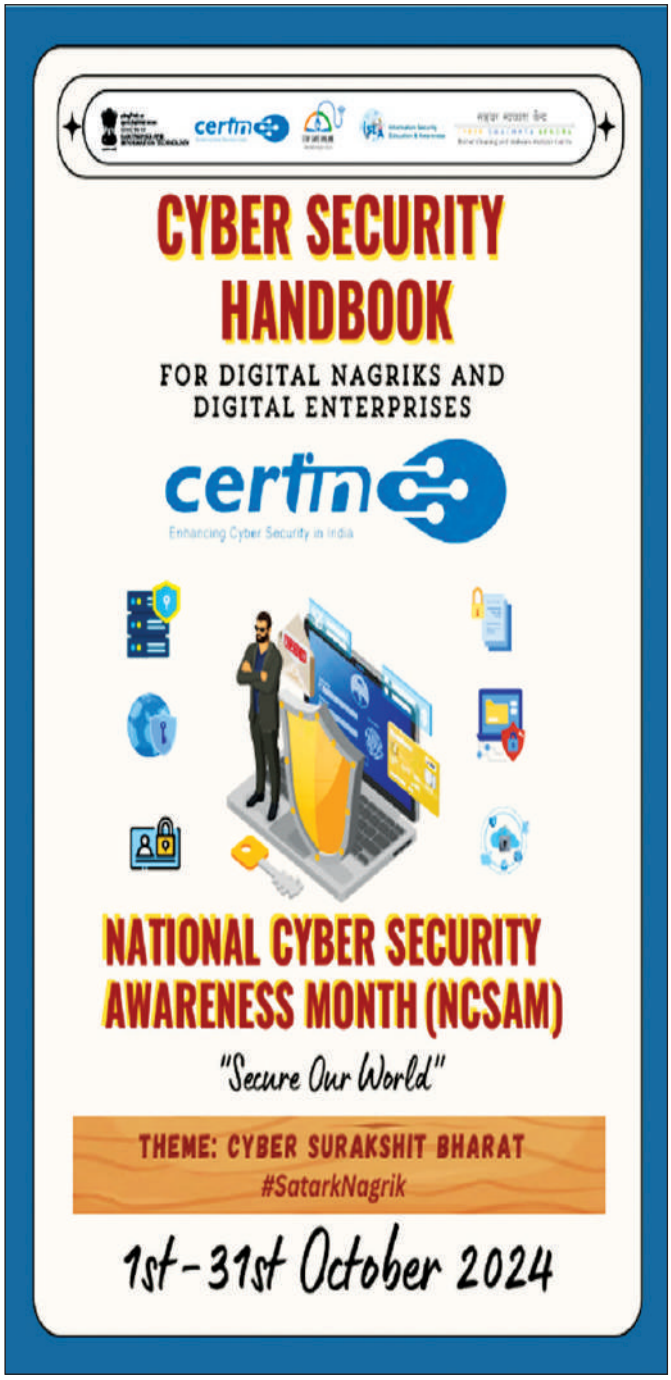
During the period of January 2024 to December 2024, CERT-In has conducted 15 trainings on various specialized topics of cyber security. About 12,014 Officers including system/Network Administrators, Database Administrators, Application developers, IT Managers, Chief Information Security Officers (CISOs)/ Chief information officers (CIOs), and IT Security professional have been trained.

CERT-In is carrying out various activities and campaign for creating cyber security awareness and sensitizing internet users for safeguarding from various cyber threats, frauds and crimes. CERT-In is observing Cyber Security Awareness Month during October of every year, Safer Internet Day on 1st Week Tuesday of February Month every year, Swachhta Pakhwada from 1 to 15 February of every year and Cyber Jagrookta Diwas (CJD) on 1st Wednesday of every month by organising various events and activities for citizens as well as the technical cyber community in India. CERT-In officials provide Cyber security and Cybercrime frauds awareness sessions to different Ministries, Government Departments, Educational institutions and Industry across the country.

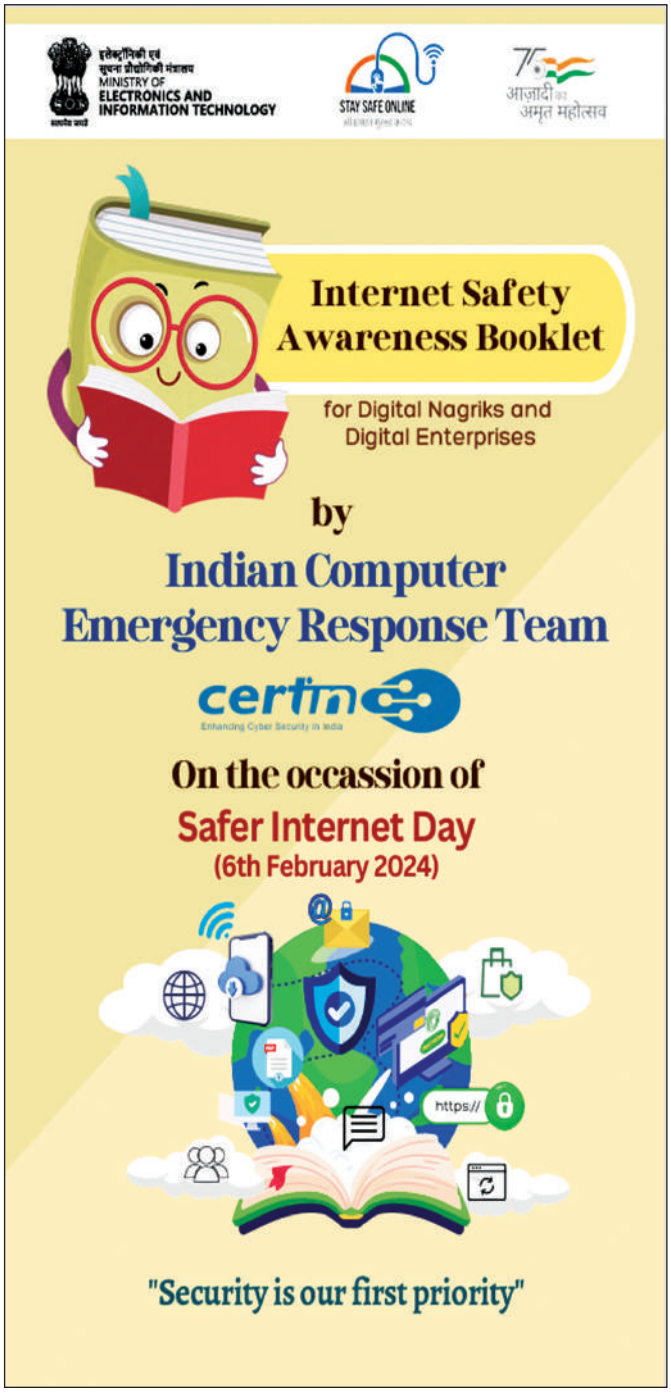
During October Month (NCSAM 2024), CERT-In conducted 69 awareness sessions for different sectors in collaboration with different organizations covering 18,472 participants. In 2024, CERT-In has conducted 95 awareness sessions covering 23,724 participants (including NCSAM 2024).

CERT-In conducted various cyber security awareness activities during National Cyber Security Awareness Month (NCSAM), October 2024 with the theme “SatarkNagrik, Secure our World”. CERT-In conducted several awareness activities such as Quiz, webinars, Capture the Flag event in collaboration with ISEA, C-DAC, Noida and other industrial partners. Total outreach during the NCSAM 2024 is 2,91,51,056

CERT-In released a Cyber security Awareness Booklet for Digital Nagriks and Digital Enterprises during the National Cyber security Awareness Month 2024 to create more awareness on the cyber-attacks and cyber frauds with information on best practices and reporting mechanisms. The booklet is available online at https://www.cert-in.org.in/PDF/CSH_Booklet.pdf



CERT-In released Internet Safety Awareness Booklet for Digital Nagriks and Digital Enterprises during the Safer Internet Day on 06th February 2024 to educate the users on the best practices that needs to be followed for using the internet in a safe and secure manner. The booklet is available online at https://www.cert-in.org.in /PDF/ISA_Booklet.pdf.



CERT-In carried out various cyber security awareness campaigns in the form of hosting cyber security quiz in collaboration with ISEA and awareness sessions on cyber hygiene to Government Ministries, Departments, PSUs, Private sector organizations, Academia and Research organizations in collaboration with its partners.

CERT-In is regularly sharing safety and security tips and awareness posters, info-graphics and videos through its official websites and social media handles such as Facebook, X (Twitter), Instagram LinkedIn and YouTube for sensitising internet users on cyber frauds and Cyber Security best practices.

Key training programs conducted for various sectors and organizations

- CERT-In in collaboration with Google successfully conducted a workshop on Cyber Crisis Management Plan (CCMP) on 12th March 2024 at Delhi for various Government Departments including Power & Energy sector.
- CERT-In in collaboration with Google India Pvt. Ltd. Successfully conducted two–day Training programme a “Joint Cyber Security Training Program” for Senior and Mid-level officers of Government Ministries/Departments, Central Government Organizations and Public Sector Units (PSUs) on 27th and 28th June 2024 at the Google India Private Limited office, Bangalore.
- CERT-In and GCA (Global Cyber security Association) jointly conducted a workshop on “Cybersecurity Governance and Risk Assessment & Management” for senior officials from various Government departments and PSUs on 21st March 2024 at CERT-In office, Shastri Park, New Delhi.
- CERT-In conducted a workshop on Cyber Crisis Management Plan (CCMP) on 30th July 2024 at IIT-Kanpur and also provided insights on regulatory guidelines targeting the port sector.
- CERT-In conducted Two–day Training programme on Cyber security preparedness for Cyber security

preparedness for Health Sector on 25th and 26th July 2024.

- CERT-In conducted Two–day Training programme on Cyber security preparedness for West Bengal Computer Security Incident Response Team (WB-CSIRT) on 25th and 26th September 2024.
- CERT-In conducted Two–day Training programme on Cyber security preparedness for Power CSIRT on 08th and 09th October 2024

6.5.12 National Cyber Coordination Centre (NCCC)

CERT-In has operationalised the National Cyber Coordination Centre (NCCC) project with the objective to generate situational awareness of existing and potential cyber security threats and enable timely information sharing for proactive, preventive, and protective actions by individual entities. NCCC aims to create a structured system to facilitate coordination effort among stakeholders by sharing with them inputs in terms of information about threats/attacks and possible extent which in turn enables immediate remedial actions by the stakeholders.

The project is facilitating various organizations and entities as well as major events in the country to mitigate cyber-attacks and cyber incidents on a near real-time basis.

6.5.13 CERT-In Initiatives towards Security including Digital Payments

- CSIRT-Fin under CERT-In has been assigned the responsibility for coordinating and supporting the response to a computer security event or incident within the financial sector constituency. CSIRT-Fin is the incident response force which focuses on mitigation processes, providing on-site awareness, expertise, and recovery oversight.
- 959 Alerts, 72 Advisories and 360 vulnerability notes have been issued by CERT-In to enable organizations and users to secure their systems and data during January- December, 2024.
- CERT-In has empanelled 160 Information Security Auditing organizations to carry out technical information security audit, including the vulnerability assessment and penetration testing of ICT infrastructure of government and critical sector organizations.
- Cybersecurity exercise is an effective tool to help entities in assessing cybersecurity preparedness to counter cyber-threats and building cyber-resiliency. CERT-In regularly conduct Cyber Security Exercises for critical sector organizations. Till date CERT-In has conducted 99 Cyber security exercises of different complexities, including table-top exercises, with participation from about 1260 organizations covering various sectors of Indian economy from Government/Public/ Private i.e. Defence, Paramilitary forces, Space, Atomic Energy, telecommunications (ISPs), Finance, Power, Oil & Natural Gas, Transportation (Railways & Civil Aviation), IT/ IT-eS/ BPO sectors and State Data Centres.
- CERT-In along with RBI (College of Agriculture Banking) conducted a technical cybersecurity exercise on Incident Response and Analysis on 03rd September 2024, participants from 27 banks joined in the exercise.
- CERT-In conducted Operational as well as Technical cyber security exercise “Cyber Shock 3” from 27th May-7th June 2024. The theme of the exercise was to improve the cybersecurity posture by building Cyber Resilience to counter Ransomware & Cyber Extortion. Finance sector organizations like Banks, Insurance Companies, SEBI Regulated Entities have participated in this cyber drill.
- All authorized entities/banks issuing PPIs in the country have been advised by CERT-In through RBI to carry out special audit by empaneled auditors of CERT-In on a priority basis.

- The snapshot of activities performed by CSIRT-Fin this year, is as follows:
    - Handling of security incidents in collaboration with CERT-In which included security incidents related to vulnerable services, botnets, open services and phishing incidents. Entities have also been on boarded to CERT-In's Cyber Swachhta Kendra (CSK) for providing automated feeds regarding malware infections, botnets and vulnerable services.
    - Issuing of vulnerability notes and virus alerts along with CERT-In.
    - Tailored threat intelligence alerts for proactive measures were sent to financial sector constituency and entities have been on boarded on CERT-In's automated threat intelligence platform

6.6 Cyber Laws and Data Governance

MeitY is the custodian of two Acts, namely, the Information Technology Act, 2000 ("IT Act") and the Digital Personal Data Protection Act, 2023 ("DPDP Act").

IT Act— The IT Act was enacted on 17th October, 2000 with a view to (a) provide legal recognition of electronic records, (b) facilitate e-governance, e-transaction and e-commerce and (c) deter computer-based crimes. The IT Act was amended in 2008 by incorporating provisions relating to protection of sensitive personal data, exemption from liability to intermediaries, protection of critical information infrastructure, penal provisions for new forms of cybercrime such as obscenity, sexually explicit materials, identity theft, cheating by personation, cyber terrorism, etc. The IT Act has been recently amended through the Jan Vishwas (Amendment of Provisions) Act, 2023 [*vide* Serial No. 32 and entries relating thereto in the Schedule] to amend certain provisions for decriminalization and rationalisation of offences to further enhance trust-based governance for ease of living and doing business. The Jan Vishwas (Amendment of Provisions) Act, 2023 may be accessed at the following link:

https://egazette.gov.in/WriteReadData/2023/248047.pdf

Further, it may be noted that MeitY is regularly undertaking review of the existing rules under the IT Act with an attempt to overhaul them to address many present-day and emerging challenges in the cyberspace. In order to achieve the Government policy which is aimed at ensuring an Open, Safe & Trusted Internet and accountability of intermediaries including the social media intermediaries to users in India and to address other emerging issues relating to digital media entities, the Ministry of Electronics and IT (MeitY) in exercise of its powers under the Information Technology Act, 2000, has made and notified the Information Technology (Intermediary Guidelines and Digital Media Ethics Code) Rules, 2021 ("IT Rules, 2021") on 25th February, 2021, which were subsequently amended on 28th October, 2022.

Based on the above amendment, the Government, then, establishes three Grievance Appellate Committees on 28th January 2023. The Grievance Appellate Committee (GAC) is an online dispute resolution mechanism. The entire appeal process, from filing to decision, is in digital mode. GAC functions as a regulatory body overseeing the resolution of appeals related to social media platforms, including but not limited to Facebook, Instagram, WhatsApp, Twitter, LinkedIn, etc. The GAC deals with the appeals of users (Digital Nagriks) aggrieved by decisions of Grievance Officers of social media intermediaries and other intermediaries on complaints of users or victims against violation of the rules and any other matters pertaining to the computer resources made available by the intermediary.

The said rules were further amended on 6th April 2023, to regulate the manner in which responsible online games may be made available in India and put a framework and guardrails to prescribe and regulate permissible online games. The latest amended IT Rules, 2021 may be accessed at the following link:

https://upload.indiacode.nic.in/showfile?actid=AC_CEN_45_76_00001_200021_1517807324077&type=rule&filename=information_technology_(intermediary_guidelines_and_digital_media_ethics_code)_rules,_2021_(updated_06.04.2023)-.pdf

DPDP Act - The Digital Personal Data Protection Act, 2023 has been enacted, which provides for the processing of digital personal data in a manner that recognizes both the rights of the individuals to protect their personal data and the need to process such personal data for lawful purposes and for matters connected therewith or incidental thereto. The URL of the notified Act is as under: https://www.meity.gov.in/writereaddata/files/Digital%20Personal%20Data%20Protection%20Act%202023.pdf

Ministry has held discussions on the DPDP Act with the objective of seeking inputs on various aspects of the Act with a diverse range of stakeholders of the technology ecosystem including industry associations, startups, IT professionals, think tanks and lawyers. In accordance with the procedure provided in the Manual of Parliamentary Procedures published by the Ministry of Parliamentary Affairs, subordinate legislation, including DPDP Rules such as those framed under the DPDP Act are required to be published for the purpose of seeking public feedback/comments, which are being drafted by the Ministry of Electronics and Information Technology.

CHAPTER

7 Skill India

Capacity Building

Activities of the HRD Division, MeitY are targeted to support the availability of trained human resources for the manufacturing and service sectors of the electronics and IT industry. Initiatives include identifying gaps emerging from the formal sector and planning programmes in non-formal and formal sectors to meet these gaps. This includes skill development in the domain of electronics and IT and related areas. 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), and Centre for Development of Advanced Computing (C-DAC). In addition, the various organizations and attached offices under the Department viz. ERNET India, Digital India Corporation, CSC E-Governance Services India Limited, STQC, NIC, etc. are also engaged in training various stakeholders in small numbers. The following schemes/ projects are under implementation for capacity building and skill development in the domain of E&ICT:

7.1 Post Graduate and Doctorate Level

7.1.1 Visvesvaraya PhD Scheme for Electronics & IT

MeitY, with the approval of the Cabinet Committee on Economic Affairs (CCEA) had initiated 'Visvesvaraya PhD Scheme' with the objective to enhance the number of PhDs in Electronics System Design & Manufacturing (ESDM) and IT/IT Enabled Services (IT/ITES) sectors in the country in 2014. Phase-I of Visvesvaraya PhD Scheme with a budget of ₹466 Crores, initially approved for 9 years from 2014, is extended till Mar 2025.

Status of Phase-I of the Scheme:

- 754 Full-time and 158 Part-time PhD candidates completed their PhD
- 62 Full-time and 08 Part-time PhD candidates submitted Thesis
- 72 Full-time and 107 Part-time PhD candidates currently pursuing PhD
- 158 Young Faculty Research Fellowships awarded
- 85 Patents filed
- 5750 Research Papers published
- Workshops held for assessment of quality of research

Research has been undertaken under the scheme in emerging research areas viz. Image Processing, DSP, Pattern Recognition, 3D Printing, 5G Communications, AI, Big Data, Blockchain, Distributed Computing, Cyber Security, Green and Sustainable ICT, Quantum Computing/ Communication, Semiconductor Design etc. Some of the granted Patents of Visvesvaraya PhD Scholars:

- Method of Reducing DoS Attacks Using Voice Response in IoT Systems
- System for providing energy management in smart grid environment
- System For Detecting Type of Sleep Disorders and Method of Operating Thereof
- Electrochemical Measurement of Creatinine in Serum
- A Device for Assessment of Seed Pre-Treatments
- Spoof Recognition in an Ear Biometric System
- Image Compression for Transmission
- A Novel Microfluidic Approach for Bio-Mems Applications
- A completely miniaturized on-chip electron paramagnetic resonance sensor

Visvesvaraya PhD Scheme Phase-II

Based on assessment of Phase-I, demand from the institutions and role of such scheme in strengthening research eco-system, Phase-II of Visvesvaraya PhD Scheme, was initiated with an outlay of ₹481.93 Crore for 9 years w.e.f. Academic Year 2022-23. Salient features of the scheme are:

- 1000 Full-time PhD seats in the areas of ESDM & IT/ITES.
- Current monthly rates under the scheme: ₹38,750/- (1st & 2nd Year), then ₹43,750/-.
- 225 Post-Doctoral Fellowships.
- One time support for 250 Candidates (50 candidates/year) for 6 months Visit to Labs Abroad.
- Support for International Conference up to ₹1.5 Lakh.
- Contingency Research Grant @ ₹1.20 Lakh/year per Full Time PhD
- 150 Part-time PhD seats & 50 "Young Faculty Research Fellowships" to be awarded.
- One time award of ₹3.0 Lakh for Part Time PhD candidates after completion of PhD.
- YFRF Fellowship & Contingency Grant @ ₹20,000/- per month & ₹5 Lakh/year respectively up to 5 years.

Status of Phase-II of the Scheme:

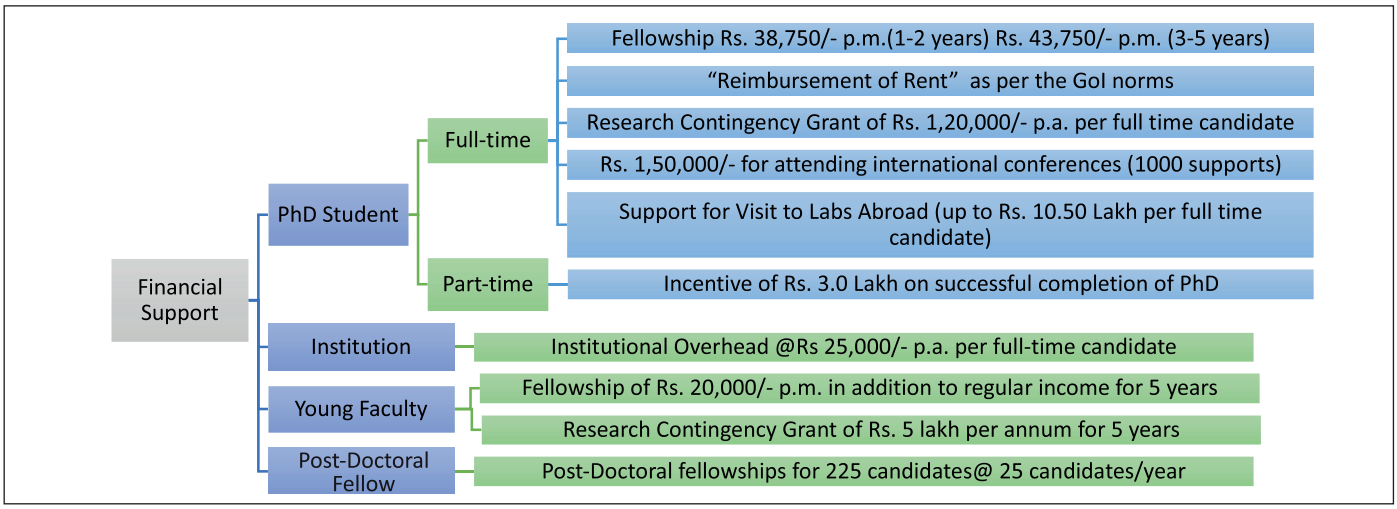
1. 600 Full-time & 90 Part-time PhD seats allocated to 116 institutions
2. 492 Full-time and 20 Part-time enrolments reported in 96 and 21 institutions respectively
3. Finalization of 75 PDF & 30 YFRF awards underway
4. One workshop for review of research work of PhD scholars held at IIT Mandi in September, 2024
5. Research undertaken in emerging research areas viz. AI, Big Data, Blockchain, 6G & 5G Communications, Semiconductor Design, Cyber Security, Green and Sustainable ICT, Quantum Technologies, etc.

7.2 Graduate level

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

MeitY has setup seven (07) Electronics and ICT Academies at premier and leading academic institutions viz. (i) IIT Guwahati (ii) IIT Kanpur (iii) IIT Roorkee (iv) IIITDM Jabalpur (v) MNIT Jaipur (vi) NIT Warangal and (vii) NIT Patna to address the requirement of training the faculty in the latest as well as upcoming/ emerging areas of Electronics and ICT for Engineering and other streams. These academies have been conducting the 'Faculty Development Programs' (FDPs)/ courses in Conventional Classroom mode, NKN mode, and online mode. Under the scheme, a total of 3,47,867 beneficiaries have been

Financial Components under "Visvesvaraya PhD Scheme Phase-II



trained under 2,010 faculty development programs (Faculty: 1,13,106; Students/ Others: 2,34,761) by these E&ICT Academies.

Electronics & ICT Academy Scheme – Phase-II

MeitY has approved the 'Electronics & ICT Academy Scheme - Phase-II' project on 26.04.2024. The project aims to train 1,35,000 faculty members/trainers in emerging technology areas, aligning with MeitY's vision. Phase-II would continue to focus on improving faculty quality in engineering colleges and technical institutions by leveraging the existing 7 E&ICT academies and extending to other institutions, particularly in tier-2/tier-3 areas. The project would be implemented through 14 implementing Agencies viz. (i) IIT Guwahati, Assam, (ii) IIT Roorkee, Uttarakhand, (iii) IIT, Kanpur, Utttar Pradesh, (iv) NIT Warangal, Telangana, (v) NIT Patna, Bihar, (vi) IIITDM Jabalpur, Madhya Pradesh, (vii) MNIT Jaipur, Rajasthan, (viii) ICT Academy, Tamil Nadu, (ix) NIELIT, Aurangabad, Maharashtra, (x) NIELIT, Calicut, Kerala, (xi) NIELIT, Gorakhpur, Uttar Pradesh, (xii) CDAC, Mohali, Punjab, (xiii) CDAC, Patna, Bihar; and, (xiv) CDAC, Hyderabad, Telangana.

Under the scheme, a total of 7,458 beneficiaries have been trained under 137 faculty development programs (Faculty: 6,553; Students/ Others: 905) by these E&ICT Academies

7.3 Vocational Skill Development Level

I. Schemes for Skill Development in the ESDM sector

MeitY has approved the following two schemes for Skill Development in the ESDM Sector viz. "Scheme for Financial Assistance to select states/UTs for skill Development in Electronics System Design and Manufacturing (ESDM) sector" (Scheme-1) and "Skill Development in ESDM for Digital India" (Scheme-2) to facilitate creation of an eco-system for development of ESDM Sector in the entire country.

Scheme-1 was approved with a total target of 90,000 candidates. This Scheme is being implemented in the States/UTs viz. Andhra Pradesh, Telangana, UT of Jammu & Kashmir, UT of Ladakh, Karnataka, Punjab, Uttarakhand, and Uttar Pradesh (Kerala left the Scheme in 2017). This Scheme is implemented through the State Implementing Agencies (SIAs) nominated by their respective States/UTs. These SIAs are responsible for implementation and creating necessary mechanisms for implementation, monitoring, and placement within overall Scheme Guidelines approved by MeitY.

Scheme-2 has a total target of 3,28,000. This Scheme is being implemented through NIELIT-PMU which is operating and managing the Scheme under the aegis of MeitY in 32 States/ UTs.

The cumulative target of both the Schemes is 4,18,000 and training is being implemented in NSQF-compliant courses (upto1stApril 2022 at Level L1-L2 to L5 courses and now at Level L3 to L5-L6 courses) at PAN-India level. Both the above Schemes are being implemented concurrently with NIELIT acting as the Program Management Unit (PMU). Under both of the Schemes so far, a total of 4,93,928 candidates have been registered, 4,93,926 trained, out of which, a total of 3,72,834 candidates have been certified and 1,37,119 candidates have been placed under the schemes.

To provide thrust to employability, an industry-linked demand-based Letter of Intent (LOI) mechanism was adopted under the Schemes, i.e. "Place & Train" model, wherein 58,918 candidates have been trained and 55,153 candidates have been placed. Also, to ensure the efficacy of training and employment of the candidates enrolled under "Place and Train" model online/offline monitoring of placed candidates have been conducted in respective industries premises.

II. 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:

a. Electronics Sector Skill Council of India (ESSCI)

b. Telecom Sector Skill Council (TSSC)

c. IT-ITeS Sector Skill Council (NASSCOM)

The above Sector Skill Councils have taken up various courses for the skilling of candidates in their

respective domains. The Ministry has also supported the development of new job roles/NOSs with ESSCI, TSSC, and IT/ITeS Sector Skill Council in the area of Electronics and IT.

7.4 Capacity Building in Niche Areas

I. Programme in Chips to Startup (C2S)

The C2S Programme aims to train 85,000 number of Specialized Manpower at 113 participating Institutions (including Academia, R&D Organization, Startups, MSMEs) over a period of 5 years in the area of VLSI and Embedded System Design and leapfrog in ESDM space by way of inculcating the culture of System-on-Chip (SoC)/ System Level Design at Bachelors, Masters and Research level and act as a catalyst for growth of Start-ups involved in fabless design.

The programme would not only generate 85,000 number of Specialized Manpower at B.Tech, M.Tech & PhD level in Chip design area; but also results in the development of 20 Systems/ 175 Chips/ 30 reusable IP Cores and incubating 25 startups in this area. Details of the Programme are available at http://c2s.gov.in/

- Under the programme, 113 Organizations across the country (Including Academia/ R&D Organization/ Startup/ MSME) are being supported by way of providing centralized access of EDA tools, Fabrication and financial support for implementing R&D projects for IP/ Chip/ SoC development.
- ChipIN Centre, setup at C-DAC Bangalore as one stop centre for chip designers, is providing following design and fabrication services to PIs under C2S Programme:

A. Design infrastructure support:

1) EDA tools commissioned and onboarded about 240 institutions (against a target of 100 institutions). Details at https://c2s.gov.in/EDA_Tool_Support.jsp

2) Commissioning of FPGA Boards: Details at https://c2s.gov.in/DetailsFPGA.jsp

   i) FPGA Boards from XILINX(AMD) has been provided to 100 PIs to provide hands-on training on FPGA prototyping to the students.

   ii) Some of the Advanced FPGA boards are centrally hosted at ChipIN Centre and are made accessible to institutions participating in C2S Programme. These boards are designed for advanced applications, such as AI acceleration, data analytics, high-performance computing, advanced hardware prototyping, etc.

B. Design flow trainings

i. ChipIN Centre has collaborated with semiconductor industry and providing regular training on ASIC design flow and EDA Tools. So far, 141 training sessions conducted by the ChipIN Centre in collaboration with SCL Mohali, IMEC, MUSE Semiconductors and Semiconductor Industry such as Synopsys, Cadence, Siemens EDA, Ansys, Keysight Technologies, AMD (Xilinx) and IBM. The details are available at https://c2s.gov.in/training2024.jsp

ChipIN Centre, as VCA (Value-chain Aggregator) of SCL Mohali, is providing MPW fabrication support to 113 PIs for fabrication of their designs at 180nm, SCL Mohali.

ii. SMART Lab Facility:

VLSI SMART Lab Facility has been setup at NIELIT Calicut (with two labs having 100 hardware system) to train about 1 Lakh candidates in 5 Years (20,000 candidates /year) in Hardware design including VLSI Design, Embedded hardware design, Board design, etc. through NSQF aligned Courses and by providing remote access of FPGA boards ported with SHAKTI/ VEGA Processors. Total of 38,622 candidates have been trained till October 2024 for different courses offered through SMART Lab. Details of SMART Lab courses are available at https://c2s.gov.in/NIELIT_Calicut.jsp

iii. M.Tech and M.DesProgramme in Electronics Product Design

To train manpower in the area of Electronics Product Design for designing innovative products, rapid prototyping & development and hands-on experience with cutting edge technology and

processes, MeitY has initiated following programme with an objective to promote indigenous design and development of Electronics System in the country.

a) M.Des programme/Executive development programme in Electronics Product Design:

M.Des programme/Executive development programme in Electronics Product Design has been initiated at IIT Guwahati in March 2021 to graduate 120 M.Des students and 4 PhD Student in Electronics Product Design over the period of 5 years. Under the Programme, so far, 82 M.Des students have been enrolled. Besides this, Executive Development Programme are being conducted regularly with Industry experts.

b) Special Manpower Development Programme (SMDP)- M. Tech. in Electronic Product Design and Skill Development:

M. Tech. in Electronic Product Design and Skill Development has been initiated at IISc Bangalore in March 2021 to train 305 Students/Faculty (125 students via M.Tech Programme, 144 Students via Short-term Certificate//Workshop and 36 Faculties vis Faculty Development Programme) over the period of 5 years. Under the Programme, so far, 54 M.Tech students have been enrolled. Besides this, Faculty Development Programme, workshops are being conducted regularly with Industry experts.

II. Information Security Education and Awareness (ISEA) Project:

The Ministry is implementing the Information Security Education & Awareness (ISEA) Project for generating human resources in the area of Information Security and creating general awareness on various aspects of cyber hygiene & cyber security among the masses.

ISEA Phase-II (2014-2023): Under the project, a total of 94,306 candidates were trained in various formal/non-formal courses in Information Security through 52 institutions (further, 5 Technical Universities participating under the project have reported around 2.90 Lakh candidates as trained in formal courses in their respective affiliated colleges). Besides this, 28,440 Government officials have been trained in various short-term courses in the area of Information Security through direct/ e-learning/ VILT mode. Under the awareness activities, 1,567 awareness workshops on Information Security were organized across the country for school & colleges students, teachers, faculty, Government personnel, LEAs, general users, parents, women, CSCs, etc. covering 3,53,558 participants. 1,24,909 school teachers were trained as master trainers and around 6.29 crore estimated beneficiaries were covered through indirect mode.

ISEA Phase-III (Oct. 2023 onwards): The project was approved in October 2023 with a targeted approach for the development of human resources for safe, trusted, and secure cyberspace. The project envisaged generating 2.75 lakh human resources in the area of Information Security over a period of 5 years comprising 45,000 skilled & certified Cyber Security Professionals (i.e. CISOs, Deputy CISOs, Associate team of CISOs/Aspirants) and training of 2.3 lakh students (UG/ PG level), research scholars, faculty, etc. in various formal/non-formal courses in the advanced and emerging areas of Information Security and innovation activities. In addition, more than 12 crore beneficiaries comprising school children & teachers, college students & faculty, women, specially-abled, senior citizens, government employees, MSMEs, other non-IT users, CSCs, NGOs, CSOs, etc. are envisaged to be covered under the Cyber Aware Digital Naagrik (Mass Awareness) component through direct/indirect mode. The project is implemented through 50 premier academic institutions (IITs/ NITs), autonomous organizations of MeitY (C-DAC/ NIELIT), and Technical Universities in a hub-n-spoke mode. So far, 990 candidates have been trained in various academic/innovation activities. In addition, 471 awareness workshops on Information Security have been organized covering 1,27,186 participants and 1,966 school teachers, faculty and po-

lice officers have been trained as master trainers.

III. FutureSkills PRIME (Programme for Re- skilling/ Up-skilling of IT Manpower for Employability)

MeitY in collaboration with SSC-NASSCOM has initiated a programme titled FutureSkills PRIME (Programme for Re-skilling/Up-skilling of IT Manpower for Employability). The programme is aimed at re-skilling/ up-skilling of IT professionals in 11 new/emerging technologies which include Augmented/Virtual Reality, Internet of Things, Big Data Analytics, Artificial Intelligence, Robotic Process Automation, Additive Manufacturing/ 3D Printing, Cloud Computing, Social & Mobile, Cyber Security, Blockchain and semiconductors.

FutureSkills PRIME Programme is based on *'aggregator of aggregators'* approach for digital skills training on a national scale, with the entire platform being hosted online. Premium content from Indian and global content providers is aggregated on the FutureSkills PRIME portal and made available to candidates, to facilitate any time anywhere learning, in line with their aptitude and aspirations.

Under the programme IT-ITeS Sector Skills Council (SSC), NASSCOM is the Key Implementing Agency. To strengthen physical and digital connectivity, the existing pan-India presence & skilling capabilities of training providers (SSC NASSCOM, NIELIT, C-DAC etc.) is also leveraged. Towards this, 40 C-DAC/ NIELIT Centres are identified as Lead & Co-Lead Resource Centres (RCs) to institutionalize the blended-learning training programmes in a hub and spoke mode for the 11 emerging technologies.

Under the FutureSkills PRIME as of 31.12.2024, a total of 20Lakh+ candidates have signed-up on the FutureSkills PRIME portal (https:// futureskillsprime.in/), and around 8.93 Lakh candidates have been enrolled in various courses, out of which a total of 4.34 Lakh candidates have completed the courses. Also, the Resource Centres (Lead/ Co-Lead Centres), have trained 11,519 Government Officials (GoT) and 2,367 Trainers (ToT). Moreover, 1447 Bootcamps are organized.

IV. Capacity building for human resource development in Unmanned Aircraft Systems (Drone and related Technology)

MeitY has approved the project entitled "Capacity Building for Human Resource Development in Unmanned Aircraft System(Drone) and Related Technology)" on 11.07.2022. The primary objective of the programme is to leverage collaborative activities in human resource development through capacity building in education and training in the area of UAS. The programme is conceived to achieve the broad objectives which include

I. To enhance capacity & capabilities of select institutions in identified WTs on Unmanned Aircraft Systems,

II. To institutionalize a collaborative ecosystem through identified Resource Centres (RCs) and Participating Institutions (PIs) for synergy of capabilities & expertise

III. To foster development of competent human resources at various levels including Post Graduate & Graduate programs, PG Diploma/Certificate programs, Faculty Updation and Master Trainers in niche areas of UAS

IV. To promote entrepreneurial mindset and nurture technical talent among the student community

V. To nurture technical talent and ideation among the student community through IPR generation, Competitions, Workshops/ Conferences, etc.

The project, implementation is being carried out by 30 premium institutions, in a hub-n-spoke mode, comprising 5 Resource Centres; 15 Academic Participating Institutes (PI- Academic); and 10 C-DAC/NIELIT Participating Institutes (PI-C-DAC/ NIELIT) Centers. The project aims to create an overall trained manpower of 42,560 which includes 100 candidates undertaking M.Tech Degree in UAS/Drones, 4000 candidates undertaking Minor Degree/Retrofitting courses in UAS/Drones, 1000 Master Trainer/FUP, 32,400 students trained through non-formal short term and certificate course.

Under the project, as of 31.12.2024, 13,668 beneficiaries have been trained through various formal and non-formal activities. A total of 288 Bootcamps has been organized and participated by 10,870 candidates, 17 Faculty Updation Programme FUPs) conducted wherein 417 Faculty members have been trained, 07 workshops have been conducted which were participated by 555 participants, 22 IPR-papers with 74 participants, 04 IPR-patents with 11 participants and 80 Proof of Concepts (POC) with 414 participants have been submitted. IIT Kanpur has started a new M.Tech in Unmanned Aerial System Engineering from August, 2023 onwards and has enrolled 23 students in two batches. Post Graduate Diploma in Unmanned Aircraft System Programming (PG-DUASP)' has been launched by C-DAC Pune and the course has been started with the effect of September 2023. It has enrolled 25 students at various CDAC/ NIELIT Center. Also, 03 Minor degree programs have been initiated at IIT Kanpur, IIIT Hyderabad, and IIITDM Kurnool respectively, and enrolled 66 students. A total of 52 Retrofitting Electives have been started by various participating institutes and enrolled 1213 students.

V. Empowering Police Personnel and Governance Officials of NE states through IT and Cyber Security Training.

a) The Ministry of Electronics and Information Technology (MeitY) has approved the "Empowering Police Personnel and Government Officials of NE States through IT and Cyber Security Training" project on 26.02.2024. The primary objective of the proposed project is to enhance IT literacy, strengthen cyber security, and improve cybercrime investigation skills. It focuses on training 4,940 personnel in handling digital evidence, cyber forensics, and utilizing advanced tools. Key objectives include promoting awareness of cyber laws, enhancing data security, enabling efficient technology use in governance, building incident response capacity, fostering collaboration among stakeholders, and bridging the digital divide in remote areas. The program also emphasizes public awareness, integrates a Learning Management System (LMS), and develops a Virtual Training Environment (VTE) for hands-on cyber security training.

b) In the North East states, instances of system intrusion, identity theft, and information exploitation have already occurred within the states themselves, across international borders, and between interstate borders. To address this issue, the Police Forces require enhanced training in Information, Technology at a general level, as well as more comprehensive training specifically focused on cyber security. It is crucial to extend this training to a significant portion of the active Police Force. Additionally, the general population and state government officials, in particular, need extensive training in system security and device security to safeguard themselves against potential cyber criminals. The objective of this project is to equip police personnel and Govt. Officials predominantly with the necessary knowledge to effectively combat cyber threats and crime. It also aims to provide state government officials with a comprehensive understanding of cyber crimes and information security to prevent cyber-attacks and exploitation.

c) Under the Empowering Police Personnel and Government Officials of NE States through IT and Cyber Security Training as of 31.12.2024, 982 Government Officials have been trained.

VI. AI Capacity Building Program for Schools: Empowering Students with FutureSkills

Ministry of Electronics and Information Technology (MeitY) has approved the project titled "AI Capacity Building Program for Schools: Empowering Students with FutureSkills" to be implemented by the RCC Institute of Information Technology (RCCIIT).

The project initiative aims to revolutionize AI education across Eastern and North-East India by empowering 300 specialized teachers from 300 schools with advanced AI knowledge and skills, while also educating 1,200 teachers from diverse academic backgrounds, along with Headmasters (HMs), on AI and its applications. It will provide hands-on AI training to 1,200 students from classes XI and XII and foster AI awareness among 3,600 students from classes VIII to X in 60 adopted schools. The program includes mentoring AI curriculum implementation for classes VIII to XII, benefiting approximately 18,000 students. Additionally, 30 faculty members of RCCIIT will undergo intensive AI training, supported by the development of four specialized AI labs and the retrofitting of computer labs in 60 schools to make them AI-ready. This comprehensive initiative lays the foundation for widespread AI literacy and skill development in the region.

Progress:

Centralized AI Training Center (Lab and Seminar Hall) with 100 desktop, high end workstation and notebook, Smart board and utilities have been completed. The Trainers' Training, Faculty Development Programme, Selection of Partner Schools and the Curriculum of AI Courses for Class VIII to XII in collaboration with Intel have been completed. Development of Robotics Lab, Web portal and LMS, Subsequent phases of FDP and Trainers' Training are ongoing.

7.5 Indian Nanoelectronics Users Program -Idea to Innovation (INUP-i2i)

Based on the grand success of project "Indian Nanoelectronics Users Programme (INUP)-Phase I" and Phase II"- a joint project at IISc, Bangalore and IIT Bombay, an umbrella project entitled Indian Nanoelectronics Users Program-idea to Innovation (INUP-i2i) is being implemented by IISc, Bangalore, IIT Delhi, IIT Madras, IIT Kharagpur, IIT Guwahati and IIT Bombay.

The project aims to take the 'open national nano centers' concept to the next stage, while retaining the key aspects of training at different levels introduced in the initial phases of INUP. The project INUP-i2i is supporting researchers in the area of nanoelectronics across the country by organizing the hands-on workshops as well as to train researchers/users by undertaking the R&D projects on different aspects of nanoelectronics and mentor the start-ups in nano area. The approach adopted under this project has been to make available large research facilities created at nanoelectronics centres.

So far 49 familiarization workshops, 42 Hands-on-training workshops, 36 Industrial trainings and 10 Hackathon have been conducted. More than 8000 skilled manpower has been trained and around 348 short term and 220 mid-term R&D projects are being supported under the project.

33 startups in the nanotechnology domain and 52 institutions including IIITs/NITs/CUs/SUs/PUs are being supported through Hub and Spoke model under the program. All the nanocentres are closely connected to a number of institutions across the country who are being encouraged to promote their students getting trained at the state-of-art experimental facilities.

NSQF Certification

Under the project INUP-i2i, two courses have been developed and approved under National Skill Qualification Framework (NSQF) by NCVET in Feb 2023:

a. Foundation Program on Nanoscience & Technology: https://nqr.gov.in/qualifications/3809

b. Advanced Program on Nano Science & Technology: https://nqr.gov.in/qualifications/3808

The Qualification Files and Model curriculums for both programs are available on the NQR Portal.

INUP Users' meet

The INUP Users' Meet, a national-level event, was held on August 10, 2024, at IIT Bombay, in collaboration with IIT Guwahati, IIT Delhi, IIT Kharagpur, IIT Madras, and IISc Bangalore. The event celebrated the achievements and future directions of the INUP program, bringing together approximately 350 researchers, academicians, industry professionals, startups, and INUP users.

Shri S. Krishnan, Secretary, MeitY, inaugurated the meet as the Chief Guest and delivered a keynote address highlighting INUP's pivotal role in advancing nanoelectronics research in India. The event featured

success stories, keynote addresses by eminent experts, technical sessions, poster presentations, and interactive discussions to foster collaboration and innovation.

Sessions at INUP Users' Meet

7.6 Development of North-Eastern Region by enhancing the Training/ Education capacity in the Information, Electronics & Communications Technology (IECT) Area:

Ministry of Electronics and Information Technology (MeitY) is implementing a Project approved by the Cabinet with budget outlay of Rs.296.95 Crore (GIA of Rs.269.62 Crore). The project objective includes up-gradation of the three existing NIELIT centers located at Imphal, Aizawl, Gangtok; Setting up of seven new Extension centers at Senapati and Churachandpur in Manipur; Dibrugarh, Jorhat and Kokrajhar in Assam; Lunglei in Mizoram; Pasighat in Arunachal Pradesh; and upgradation of two existing extension centers located at Chuchuyimlang in Nagaland and Tezpur in Assam to increase the training capacity from 3,080 per year to 14,400 per year from the 5th year onwards.

Presently all the NIELIT Centres/ extension centers are operational from permanent/ temporary premises. Six (06) NIELIT Centers i.e. Imphal, Aizwal, Churachandpur, Kokrajhar, Tezpur and Chuchuyimlang had been inaugurated on 16th and 17th September, 2021; another four (04) Centres viz. Pasighat, Senapati, Jorhat and Dibrugarh had been inaugurated on 6th May, 2022; Gangtok Centre (01) had also been inaugurated on 8th April, 2023 and are operational from its permanent campuses; the remaining NIELIT Centre, namely NIELIT Lunglei (01) has been completed in all respect by 31st March, 2023 and is functional.

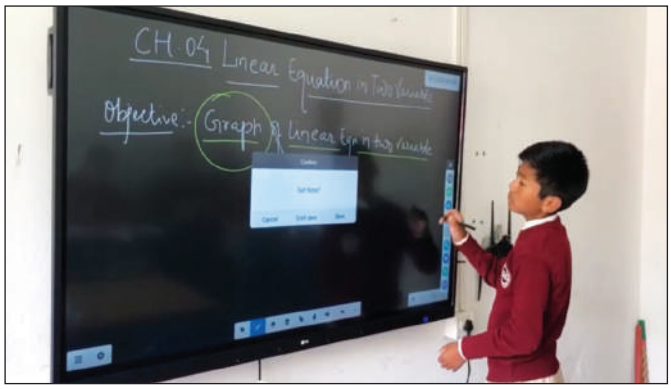
As of now, the annual training capacity of these centers (including six centers operational from temporary locations at Guwahati and Silchar in Assam; Itanagar and Tezu in Arunachal Pradesh; Shillong and Tura in Meghalaya) is around 20,000 candidates. The Project has been completed and Closure Report has been submitted by NIELIT.

7.7 Establishment of Intelligent Educational Infrastructure (Smart) in Eklavya Model Residential Schools (EMRSs):

The project is approved by the MeitY to be implemented by ERNET India. The objective of the project is:

- Setting up of intelligent educational infrastructure (Smart) in Eklavya Model Residential Schools (EMRSs) by creating an echo system using the latest tools and technologies, which helps to improve the learning outcome.
- To provide Internet connectivity in Eklavya Model Residential Schools (EMRSs).

Under the project, total 328 EMR schools are covered in three phases (Phase-1: 48, Phase-2: 126 and Phase-3: 154). All works including setting up of Internet link in 48 EMR schools of Phase-1 have been completed. The smart classes have been setup in all 126 EMR schools and Internet link has been setup in 112 schools out of 126 schools of Phase-2. The work of setting up internet link in the remaining schools is in progress. These smart classes are being used for promoting e-education in the growth and development of the tribal students and to bridge the digital divide by using latest technology. The works of setting up smart classes and connectivity in remaining 154 EMR schools of Phase-3 are in progress.



EMRS Lumla, Arunachal Pradesh

7.8 Grass-Root Level

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

MeitY is implementing a Project with the objective of upgrading three existing NIELIT centres located at Imphal, Aizawl, Gangtok; Setting up seven new Extension centres at Senapati and Churachandpur in Manipur; Dibrugarh, Jorhat, and Kokrajhar in Assam; Lunglei in Mizoram; Pasighat in Arunachal Pradesh; and Upgradation of two existing extension centres located at Chuchuyimlang in Nagaland and Tezpur in Assam to increase the training capacity from 3,080 per year to 14,400 per year from the 5th year onward. As of now the annual training capacity of these centres (including six centres operational from temporary locations at Guwahati and Silchar in Assam; Itanagar and Tezu in Arunachal Pradesh; Shillong and Tura in Meghalaya) is around 20,000 candidates. Presently all the12 NIELIT Centres/ extension centres under the project are operational and providing skill training programs in the E&ICT domain. It is also to mention that at present there are 22 NIELIT Centres/ Extension Centres providing Skill Training Programmes across all 8 NER states.

Also, MeitY is supporting for setting up NIELIT Centres / Extension Centres at Muzzafarpur and Buxar in Bihar, UT of Daman, Bikaner in Rajasthan, Shillong in Meghalaya, Pilibhit in Uttar Pradesh, Tirupati in Andhra Pradesh, Hyderabad in Telangana and Chitradurga in Karnataka in FY 2024-25.

II. Capacity Building in IECT including training in Digital Skill sets and Current Industry Demanding Technologies for various sections of society in the NE States:

The objectives of the project are to fulfil the gap in technological skilling and awareness, NIELIT centres in the North Eastern Region have conceptualized this project with the following objectives:

(a) To provide awareness and training in IECT to citizens spread across different sections of society by 08(eight) NIELIT Centres located in the NE Region using mobile ICT labs to reach out to all places including remote corners of the North Eastern States to provide essential training.

(b) To promote awareness & training related to Digital Inclusion/ Digital services to common citizens including Farmers, Women, Elderly persons, School and College students, and-school dropouts.

(c) To impart job-oriented value addition courses to the Graduates, polytechnic diploma holders/students in the utility areas such as Digital marketing, Solar Technology, Computer Applications, Computerized Accounting, Cyber Security, AR-VR, Blockchain, IoT, Machine Learning, AI, Drone Piloting Technology, Multimedia, etc., to fulfil the local needs.

(d) To train the graduate in current Industry demanding technologies such as Programming or coding, Web or Mobile, Database, System Administration and Security, Software Testing/ QA/ Management, Technical Support and BPO Expert etc. to improve employability.

(e) Up-skilling and re-skilling of NIELIT staff and school teachers in emerging and future technologies. vi. To create and promote an ecosystem for local start-ups and entrepreneurship development in the NIELIT Campuses of NE Region.

Under the project, so far a total of 1,70,377 candidates have been trained.

III. Capacity Building Program Using ICT Tools & Technology to Enhance Livelihood of Weavers/ Artisans of Bodoland Territorial Council (BTC), Assam

MeitY has approved the project entitled “Capacity Building Program using ICT Tools & Technology to Enhance Livelihood of Weavers/ Artisans of

Bodoland Territorial Council (BTC), Assam" with an objective of training for Handloom community development at Two Districts of BTC, Assam i.e., Kokrajhar & Baksa using modern technologies like a computer embroidery machine, e-tailoring Technology, Design creation using CAD software, etc. and to train 5000 beneficiaries. Under the project, two high-end ICT Labs equipped with modem Hardware and handloom machinery have been developed at Baksa and Kokrajhar districts, BTC Assam, and, out of targeted 5000 Weavers & Artisans of Bodoland Tribal Community (BTC), there are 4600 beneficiaries already successfully completed their training on all parameters of Handloom Sectors like, raw material purchase to product preparation, by state-of-art design creation, product quality checking to packaging, marketing to selling and profit gain under this project. Another 200 beneficiaries are now undergoing through training at Baksa and Kokrajhar district of BTC, Assam, on Graphics Design and training 400 beneficiaries on Handloom machinery is ongoing; and, a total of 3,000 motifs and 5000+ designs have been created; and, 2 workshops have been organized at Baksa and Kokrajhar district of BTC, Assam with weavers & artisans, domain experts in the handloom sector, policymakers, and all other stakeholders.

7.9 IT for Masses Programme

IT for Masses Programme is aimed at initiating/ promoting activities in IECT for focus groups (Women, Scheduled Caste, Scheduled Tribe, Senior Citizens, Differently Abled & Economically Weaker Section) and underprivileged areas (North Eastern Region, Backward Districts and Blocks having more than 40% SC/ST population) for their development and empowerment. The activities undertaken are through Infrastructure Creation, Deployment of IT tools, Training, Capacity Building & Entrepreneurship Creation activities in IECT.

During year 2024 the following activities have been taken under the programme:

- IT & Electronics Training
    - Skill development in 81 Aspirational districts and 100 backward districts through NSQF aligned ICT courses for upliftment of SC/ST & Women (EWS) youths.
- Infrastructure Creation
    - Modernisation of handloom sector at Leh through IT-enabled incubation centres.
    - Establishment of design and assembly labs for Solar-led products at Leh and Kargil districts of Ladakh
- Capacity Building
    - Establishment of CyberGyan lab for building capacity of engineering graduates/post graduates in cyber security.
    - Capacity building of engineering graduates/ post gradates in "IoT technologies" on PAN India level.
    - Capacity building of 10^{th} /12^{th} pass and graduates in Multimedia and Animation, 3D printing, Mechatronics etc.
    - Capacity building in IT services and digital marketing.

Till December 2024, around 10008 (SC: 5102, ST: 2795, Women: 1124, EWS: 963 and OBC: 24) nos. of candidates have benefited.

Fee reimbursement to SC/ST Programme

As per the directions and guidelines received from NITI Aayog (erstwhile Planning Commission) by MeitY (erstwhile DeitY) vide their communication No.D.O.No. M13054/2/2005-BC dated 05.09.2007, no fee should be charged from the SC and ST candidates for educational and skill development programmes by the Government and autonomous institutions and the expenditure for the Scheme should be accounted for from the SCSP and TSP fund of the respective Ministries/Departments.

Since 2007-08, the National Institute of Electronics and Information Technology (NIELIT) is implementing the "Fee Reimbursement to SC/ST" programme. The aforesaid programme is a DBT on-boarded scheme in which free training is being provided to the SC/ST candidates in various formal, non- formal, and IT literacy courses pat NIELIT's own centres under budgetary support of MeitY.

During the FY 2023-24, a total of 4704 Scheduled Caste and 16001 Scheduled Tribe Candidates benefitted under the Fee reimbursement programme.

7.10 E-Learning Platform

I. OLabs NextG (OLabs Next Generation)

MeitY has approved the project titled "OLabs NextG: Next Generation Online Labs (OLabs) for schools" which is being implemented by CDAC, Mumbai jointly with Amrita Vishwa Vidyapeetham, Kerala. OLabs portal (http://www.olabs.edu.in) is a resource point for access to online labs that cover all experiments as per the CBSE curriculum for Physics, Chemistry, Biology, Science and also activities under Maths, Social Science, Computer Science, EDP, and Languages (English. Hindi, and Sanskrit). 173 labs Physics, Chemistry, Biology, and Maths are available in regional languages Hindi, Marathi, Malayalam, etc. OLabs NextG (OLabs Next Generation) which is aligned with the New Education Policy 2020 has been approved and jointly funded by MeitY and the Ministry of Education (MoE).

The objective of the project is to design and develop 500 Online Labs and upgrade of existing 173 labs using the latest tools/ technologies for the students of classes VI- XII for various subjects, training of 10,000 teachers/students from 200 schools.

The project achievement till December 2024 are as:

a) Total of 423 labs in subjects Physics, Chemistry, Biology, Science, Mathematics, Social Science, Computer Science, and Languages (English, Hindi and Sanskrit) for classes 6th to 12th have been developed and available on OLabs website (olabs.edu.in).

b) 212 Labs of OLabs are also available on the Diksha virtual labs portal https://diksha.gov.in/virtuallabs.html,

c) OLabs mobile app (version-1.0.15) is hosted on GOV.in app store and Google Play Store.

d) OLabs Windows installer (version 2.2): Created three class wise separate installer in this version of installer i.e. for class 6 to 8, 9-10 and 11-12.

e) 4783 teachers trained and deployment of OLabs is done in 20 schools across India till December 2024.

f) OLabs offline version deployment was done in 142 schools (342 devices) in 33 districts of Rajasthan

g) OLabsThon: OLabs Hackathon was announced in December 2024 across India to invite innovative ideas into this pool of labs, Till 6th January 2025, 65 teams registered from the different colleges of India. The hackathon will be completed in February 2025.

II. MedSIM2.0 (Online Skills Lab and Virtual Patient Cases)

MietY has approved a project titled 'MedSIM 2.0-Online Skills Lab' and Virtual Patient Cases for the development of a Medical Simulation platform for medical students being implemented jointly by CDAC, Thiruvananthapuram, Amrita University and AIIMS Bhubaneswar.

MedSIM (Medical Simulation Platform for Medical Students) is a simulation-based medical education platform that allows medical students to enhance their clinical reasoning and judgment skills.

Key objectives of the MedSIM (2.0) (http://medsim. in) is to design and develop a Preclinical and Paraclinical Online Skills Lab, develop New Virtual Patient Case Simulations to cover the entire MBBS curriculum, Aligned with MBBS Regulations 2020, National Medical Commission, enhance existing MedSIM (1.0) platform with Authoring tool, Learning Analytics, Assessment & Feedback and training of 5,000 medical students and 1,000 medical faculty from 500 medical colleges.

Under the project so far, a total of 100 clinical cases and 38 pre/para labs have been studied. Currently, 72 simulation-based clinical cases and 25 skills lab have been added to the website from 24 departments.

CHAPTER

8 Statutory Organisations

8.1 Controller of Certifying Authorities (CCA)

8.1.1 Introduction

The Controller of Certifying Authorities (CCA) has been appointed by the Central Government under Section 17 of the Information Technology Act (IT Act 2000) for purposes as defined in the Act. The Office of the CCA came into existence on November 1, 2000. Since then, the Office of CCA is executing its statutory functions under the administrative control of Ministry of Electronics and Information Technology. It aims at promoting the growth of E-Commerce and E-Governance through the wide use of digital signatures.

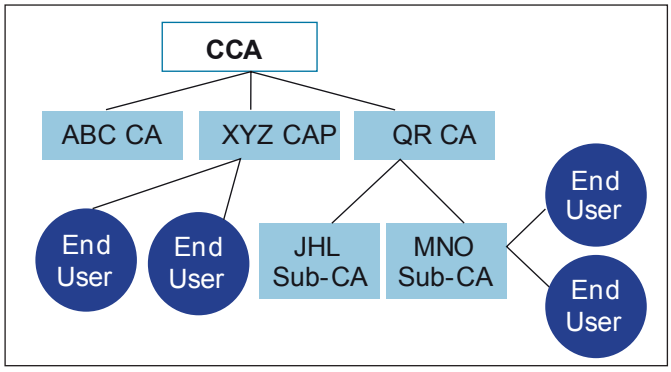
The Information Technology Act, 2000 facilitates the acceptance of Electronic Records and Electronic Signatures through a legal framework for establishing trust in digital transactions.

The Controller of Certifying Authorities (CCA) established the Root Certifying Authority of India (RCAI) under Section 18(b) of the IT Act to digitally sign/certify the public keys of Certifying Authorities (CA) in the country. The RCAI is operated as per the standards laid down under the Act. The CCA certifies the public keys of CAs using its own private key, which enables users in cyberspace to verify that a given certificate is issued by a licensed CA. The IT Act provides for the Controller of Certifying Authorities (CCA) to license and regulate the working of Certifying Authorities. The Certifying Authorities (CAs) issue digital signature certificates for the electronic authentication of users in the cyber world.

8.1.2 Root Certifying Authority of India

8.1.2.1 Root CA

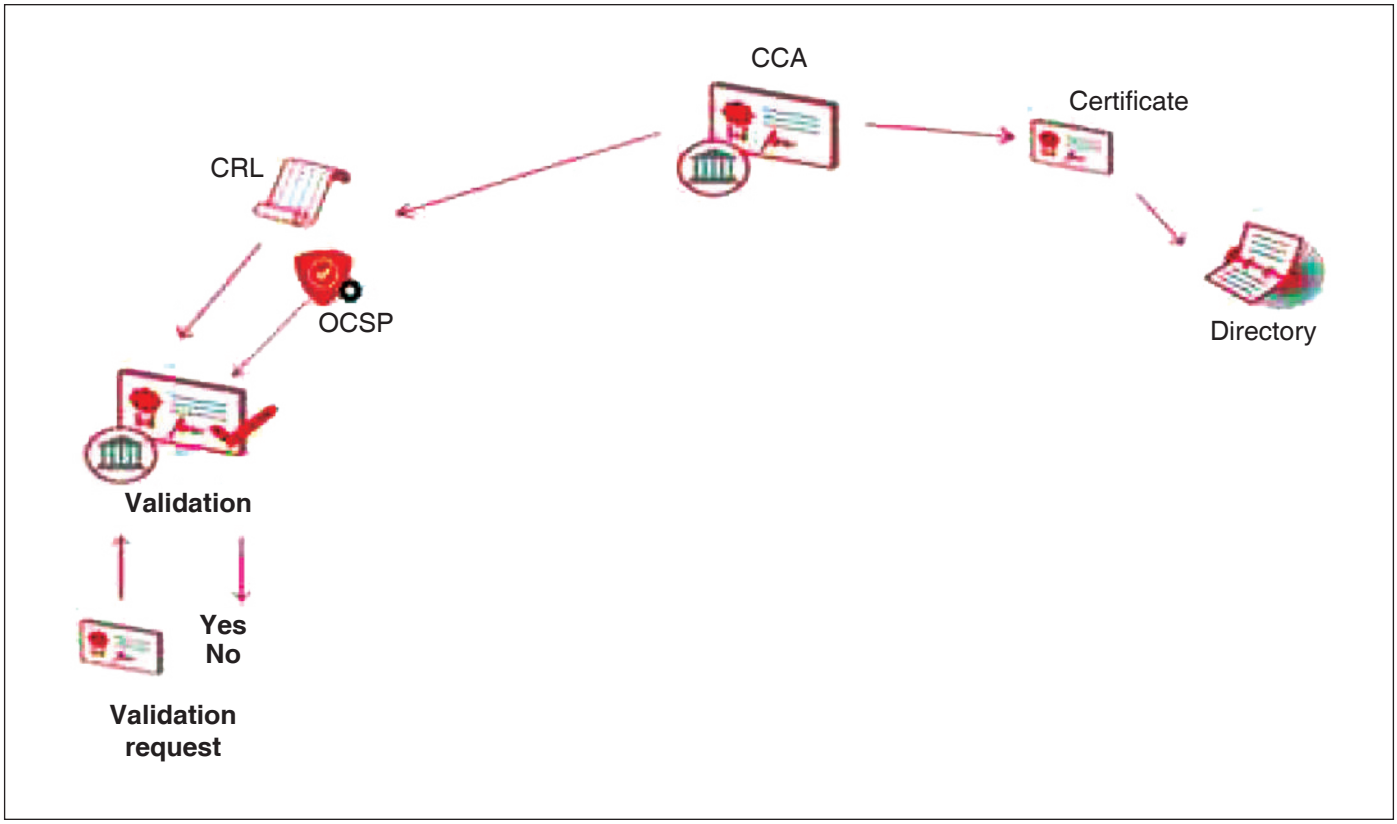
The model adopted by India is a hierarchical PKI with the trust chain starting from the Root Certifying Authority of India (RCAI). RCAI is operated by the CCA, Government of India. Below RCAI there are Certifying Authorities (CAs) licensed by CCA to issue Digital Signature Certificates under the IT Act



Hierarchical structure of RCAI

The IT Act provides for the Controller of Certifying Authorities (CCA) to license and regulate the working of Certifying Authorities (CA). The following are some of the functions of CCA

- Function as Root Certifying Authority of India
- Certifying the public keys of the CAs.
- Laying down the standards & Guidelines to be followed by the CAs,
- Licensing Certifying Authorities (CAs) and exercising supervision over their activities.
- Addressing the issues related to the licensing process
- Approving the Certification Practice Statement (CPS)
- Auditing the physical and technical infrastructure of the applicants through a panel of auditors maintained by the CCA.
- Resolving conflict of interest between CAs and subscribers



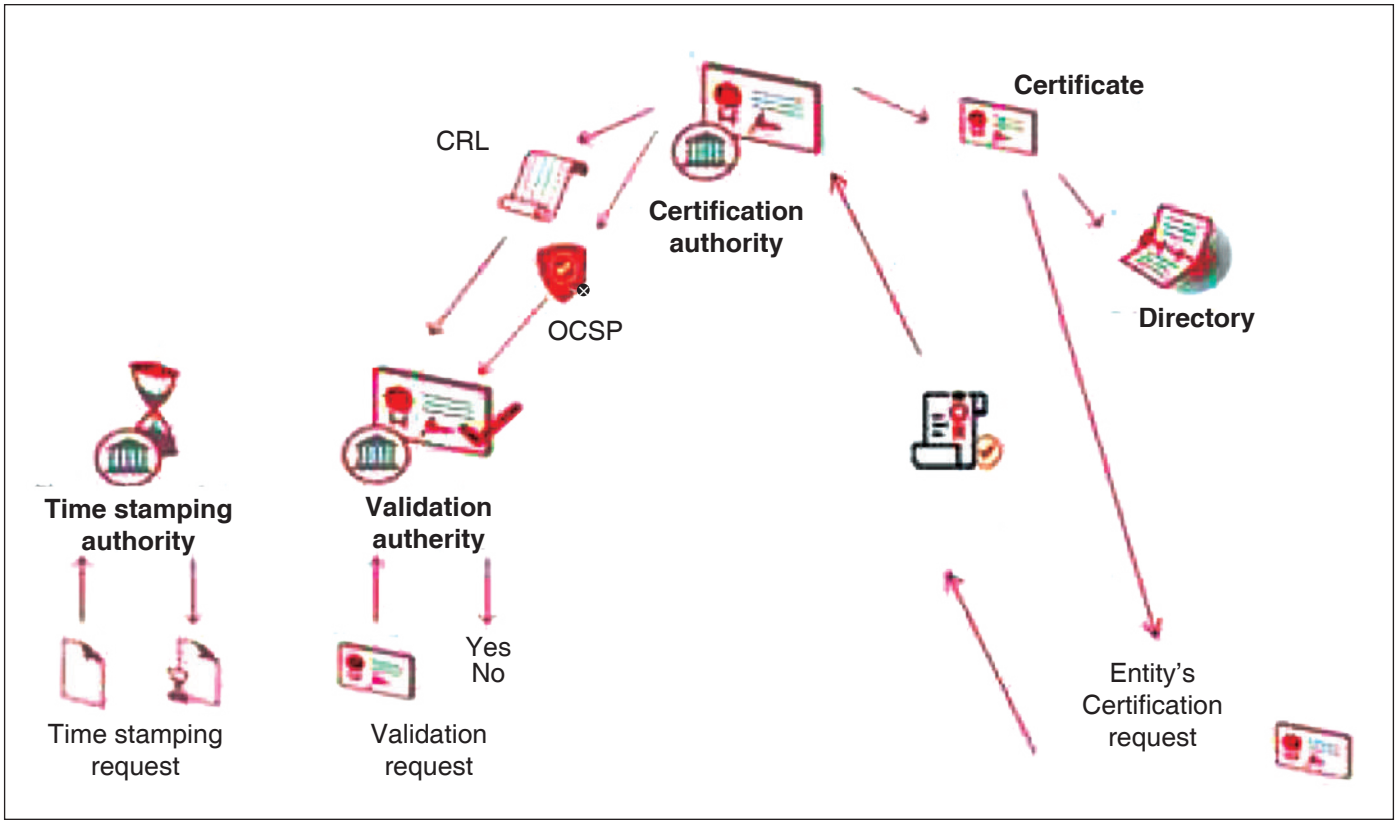
Overview of Technical Operations as Root CA

The Root Certificates of CCA is the trust anchor of all the CA certificates and DSCs issued by Licensed CAs. In the year 2022, two new self-signed Root certificates with a key-size of 4096 RA have been created. CCA India 2022 will be used for certifying the CA who issue end-entity digital signature certificates and CCA India 2022 SPL will be used for certifying the CAs who issue Certificates. Twenty-three (23) CAs have been certified under CCA India 2022 Root Certificate. The enrollment of root certificates in Adobe and Microsoft products is in progress.

8.1.2.2 Certifying Authorities

CAs can be private sector companies, Government departments, public sector companies, or non-governmental organizations (NGOs). These are also called Licensed CAs. At present, there are twenty-two CAs licensed by Root CA and all of them are operating under same policy, standards, and verification methods, subjected to be audited by the criteria set by Root CA. The policy IDs of certificates are also same for all CAs. CAs are required to provide CRL, OCSP and Timestamping Services. CAs are also not allowed to issue certificates other than that mentioned in the CPS which is approved by CCA. The certificates issued by Licensed CAs are legally valid in India. A Certifying Authority can create sub-CAs to meet the business branding requirement. These sub-CAs, which will be part of the same legal entity as the CA, will issue certificates to the end entities or subscribers. The CAs are allowed to create ONE level of sub-CA only. CA are required to operate under the provisions of Act, Rules, Regulations and orders issued by CCA. The orders issued by CCA are published in the form of Guidelines.

The license is issued for a period of 5 years. CAs are required to renew the license after the expiry of the license. The license is subject to suspension, revocation and renewal. The terms and conditions for the renewal are same as fresh license. The licence is issued based on eligibility criteria like net worth, paid-up capital and compliance to technical and physical infrastructure in accordance with the provision under Act.



Overview of Technical Operations as Certifying Authorities

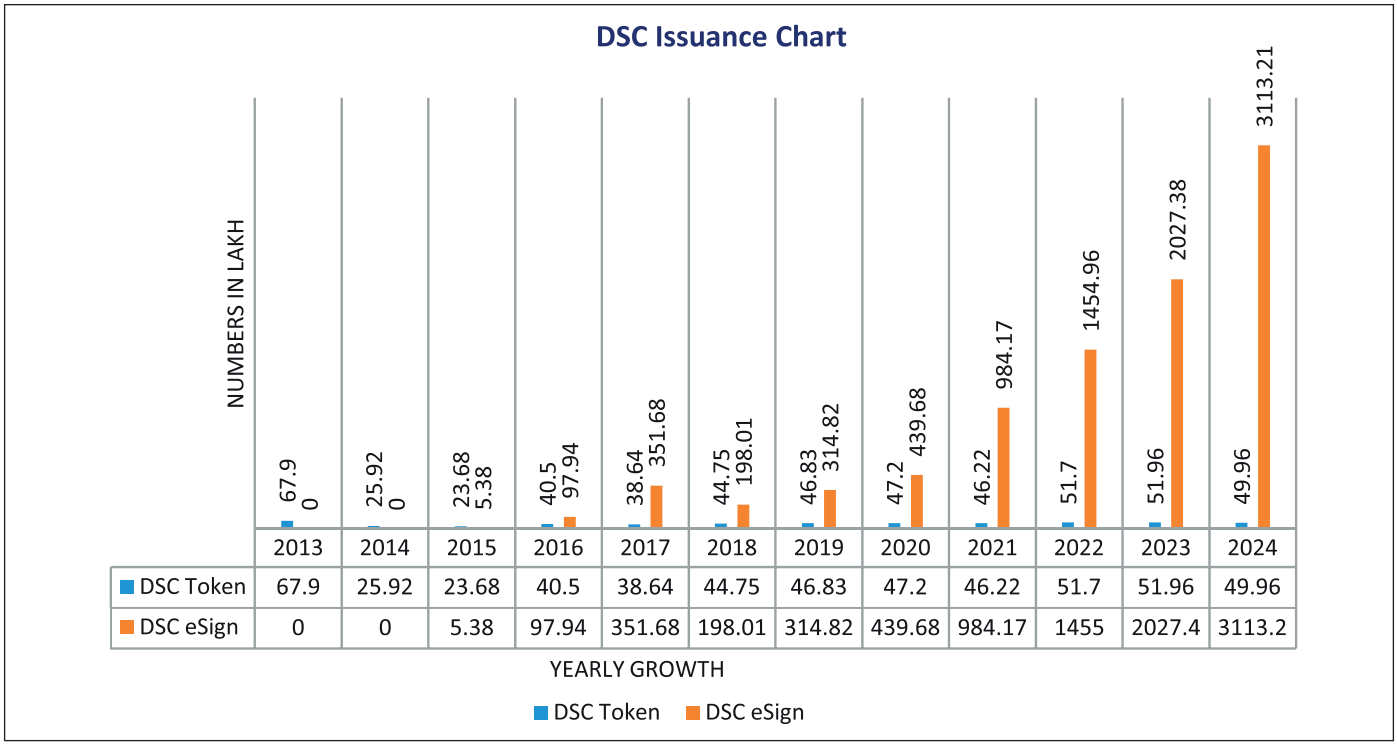
8.1.2.3 Electronic Signature Certificates

To obtain an Electronic Signature certificate from CA, the applicant needs to undergo a verification process as mentioned in the Identity Verification Guidelines (IVG) issued by CCA and upon successful verification.

In order to issue Digital Signature Certificates (DSC), KYC of DSC applicants are carried out by CA. In the current scenario, the submission of DSC application and verification by CA are fully electronic. For KYC, the option available include online Aadhaar verification, Aadhaar offline eKYC, banking eKYC, organizational eKYC, PAN based eKYC or a direct verification. End user electronic signature certificates are strictly issued in a Hardware Crypto Token for a period of 1-3 years.

CA creates an eKYC account and issue an electronic Signature certificate to the applicant. As the verification process are online, the certificate can be obtained within 2-3 hours. For all categories of applicants, email-id, mobile number, photo, scanned copy of proof of identity and scanned copy of proof of address are required to be submitted to CA.

The total number of Digital Signature Certificates (DSC) issued in the country grew to more than 95.22 crore (out of which 89.87 crore DSCs are for eSign) by 31st December 2024 & continues to grow rapidly and is expected to increase significantly with the launch of various e-Governance/e-Commerce programmes.



Yearly Growth of Electronic Signature

8.1.2.4 Time stamping

Time stamping The National Physical Laboratory, India (NPLI), is responsible for the maintenance and development of the Indian Standard Time (IST). NPLI maintains the time scale of Indian Standard Time (IST) with the help of a commercial cesium atomic clock. The time scale maintained by NPL is designated as UTC. CAs are required to derive time from national time source for their use in the issuance of electronic signature certificate and eSign Service. Also, the time included in the time-stamp token shall be synchronized with Standard Time Source within the accuracy of ±1 second. CAs are providing time-stamping services in compliance with RFC 3161. The timestamp token includes a representation (e.g. hash-value) of the datum being time-stamped as provided by the time stamp requestor/subscriber. The Guideline was also issued in this regard by CCA.

8.1.2.5 OCSP & CRL

Digital certificates are used to create trust in online transactions. The usage of certificate-related functions is deemed as valid only if the certificate is valid at the time of usage. The validity of the certificate is determined through the Certificate Revocation List (CRL) or Online Certificate Status Protocol (OCSP). CA issues certificates with a validity period up to 3 years. Within the validity period, the certificate may be revoked by CA under certain circumstances. CA periodically issue the revocation list and publish it on the website of CA. Certifying Authorities publishes the Certificate Revocation List (CRL) in accordance with the provisions of Information Technology Act and Guidelines specified by the Office of CCA. Relying parties can verify revocation status of DSC in an offline mode, by periodically downloading CRLs or by accessing CRLs from the CAs website.

To provide more timely status information, all CAs provide an Online Certificate Status Protocol (OCSP) service to enable relying-party application software to determine the status of an identified Certificate in an online mode. The CAs are required to operate their OCSP service as per the requirements specified under the Guidelines issued by CCA.

8.1.2.6 eSign

eSign is an online Electronic Signature Service, based on successful authentication of individual using e-KYC

services, the key pairs generation, the certification of the public key based on authenticated response received from e-KYC services, and digital signature of the electronic document are facilitated by the eSign online Electronic Signature Service provider instantaneously within a single online service. The key-pairs are used only once and the private key is deleted after one time use. The Digital Signature Certificates are of 30-minute validity, and this makes verification simple by eliminating the requirements of revocation checking. Document that is signed using eSign will contain a valid digital signature that can be easily verified using standard methods.

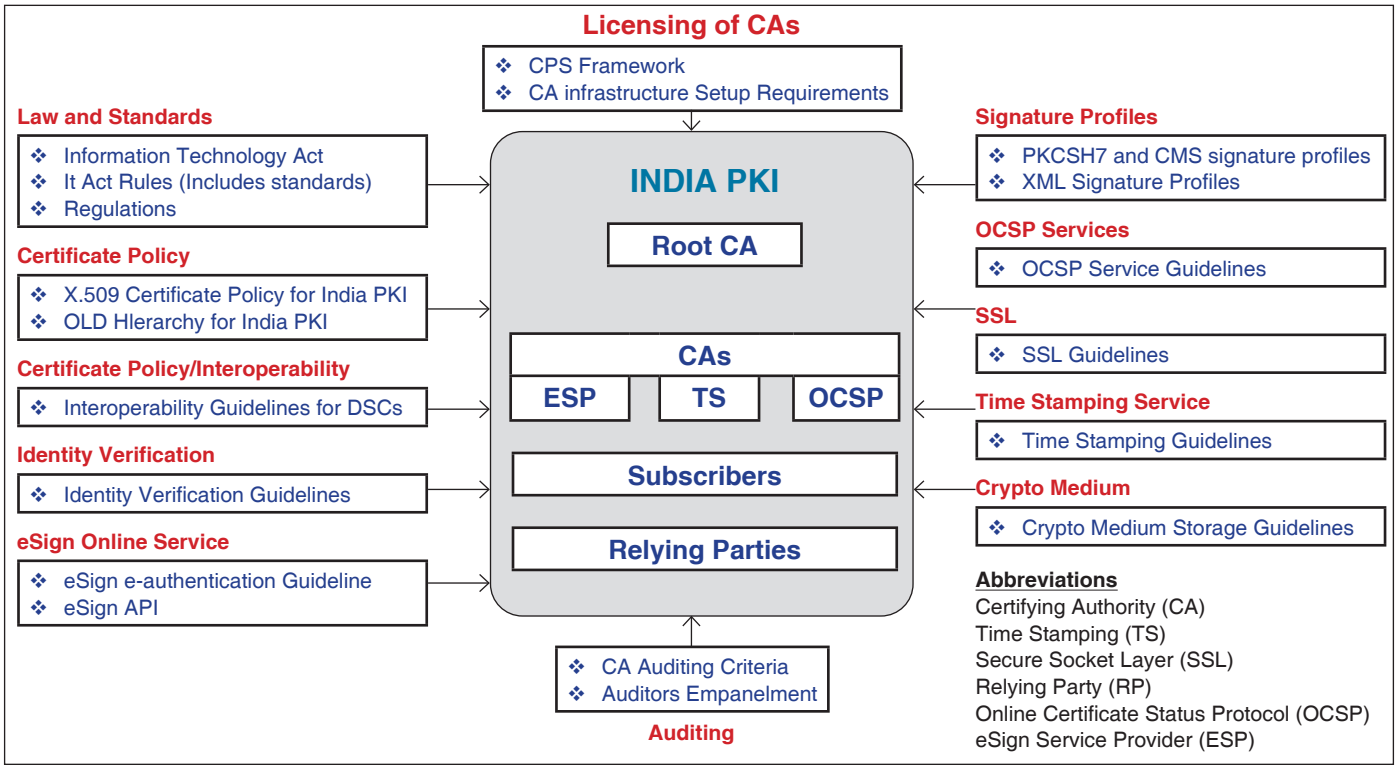
MeitY in consultation with UIDAI, approved the use of online Aadhaar authentication & eKYC for issuance of DSC as specified under Rule 4 of the Aadhaar Authentication for Good Governance (Social Welfare, Innovation, Knowledge) Rules, 2020. With this, the adoption of eSign service is rapidly increasing.

8.1.3 Electronic Signatures Policy Framework

A pictorial representation and a brief description of policies applicable to CA, electronic Signature Certificate and Electronic Signature are given below:

Policy Framework

- In India PKI hierarchy, have two separate trust chains- one for one end-entity certificates and one for SSL. There are twenty-two Licensed CAs that are operating in different parts of the country.
- CAs are operating under single India PKI Policy. There is no separate policy for any of the licensed CA by RCAI.
- The verification requirements prior to issuance end-entity certificates are governed by Identity Verification Guidelines specified by Root CA. Licensed CAs are required to adhere to these Guidelines for issuance of any certificate.
- The certificate policy for India PKI covers the policy Id given to each class of certificates which are common across all CA and adhere to India PKI CP.
- To facilitate interoperability, Root CA has specified "DSC Interoperability Guidelines for issuance certificates under the Root Chain. A detailed specification for end entity and SSL certificates are covered under DSC 10 / 15 interoperability Guidelines specified by Root CA and the same is followed by each sub-CA.



- Under the provisions of IT Act Controller to license the Certifying Authorities and also to ensure that none of the provisions of the Act are violated. Audits are carried out to ensure the adherence to Information Technology Act 2000, the rules and regulations thereunder, and guidelines issued by the Controller from time-to-time. Auditing of the physical and technical infrastructure of CA is carried out through a panel of auditors by the CCA. The audit reports are submitted to Root CA directly by auditors. The criteria for the audit include WebTrust and CAB requirements.
- In order to establish a single national policy, Root CA has already laid down common CPS template for sub-CAs. Each CA will have their own CPS and have provided links to policy, procedure, and guidelines of Root CA. The CPS are available in the disclosure records of each CA published on the website of CCA.

In order to streamline the activities of Registration Authorities engaged by CAs, Office of CCA included the guidelines with respect to enrollment and operation of Registration Authorities in the Identity Verification Guidelines. Now the RAs are under ambit of audit and liable for action by CAs in the case of dishonest activities.

8.1.4 Licence granted/renewed to operate as Certifying Authority

CCA grants a license to the organization to operate as a Certifying Authority and CA issues Digital Signature Certificates to end users. The progress in the licensing of Certifying Authorities is below:

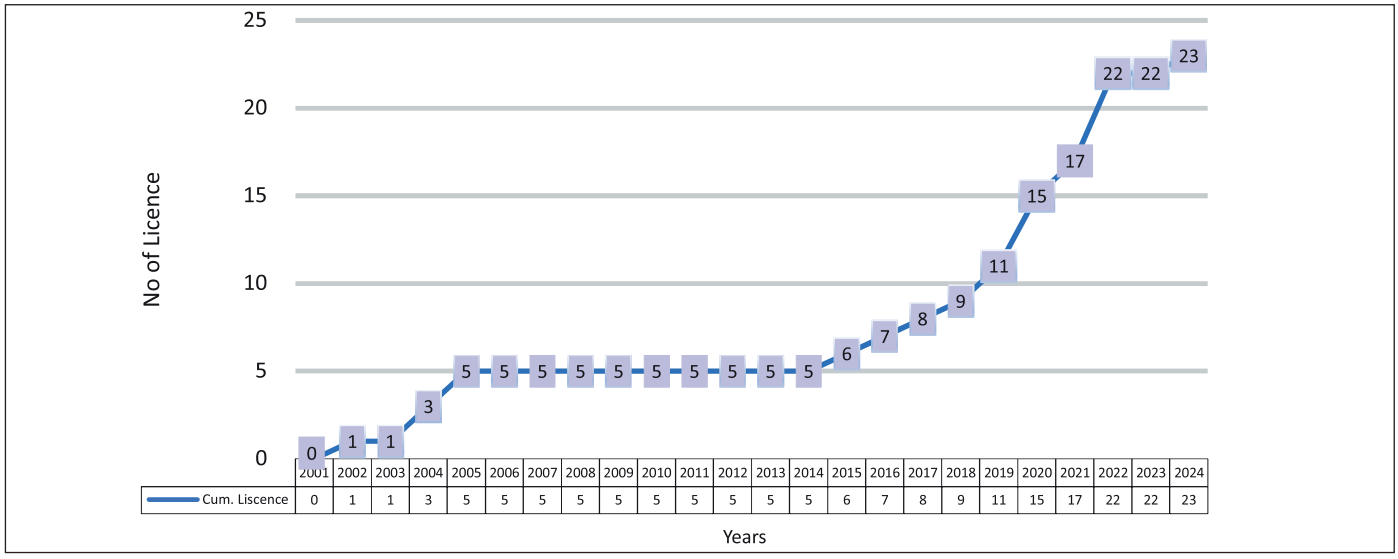
8.1.5 Services offered by Certifying Authorities

The licensed Certifying Authorities offer services to the public depending on their Organizational policy. A brief overview of the different services offered by the certifying authorities is in the table below:

Overview of Services Available with Licensed CAS

	Licensed CAs	Class 1-3 DSCs	eSign	SSL*	Time Stamping
1.	Safes crypt	✓	✓		✓
2.	(n) code Solutions	✓	✓		✓
3.	e-Mudhra	✓	✓	✓	✓
4.	Capricorn	✓	✓		✓
5.	Vsign (Verasys)	✓	✓		✓
6.	RISL (Raj Comp)	✓	✓	✓	✓
7.	ID Sign	✓	✓		✓
8.	Pantasign	✓	✓		✓
9.	Xtra Trust	✓	✓		✓
10.	Pro Digi Sign	✓	✓		✓
11.	SignX	✓	✓		✓
12.	Care 4 Sign	✓	✓		✓
13.	CDAC		✓		✓
14.	Protean (NSDL e-GOV)		✓		✓
15.	CSC		✓		✓
16.	CDSL Ventrues		✓CDSL		✓CDSL
17.	RPSL		✓		✓
18.	IDRBT	✓Banks		✓Banks	✓Banks
19.	Indian Air Force	✓IAF		✓IAF	✓IAF
20.	India Army	✓Army		✓Army	✓Army
21.	Indian Navy	✓Navy	✓Navy	✓Navy	✓Navy
22.	IGCAR	✓IGCAR			✓IGCAR

**The Root CA Certificate of India is listed only in Microsoft Products (Including IE)*



8.1.6 Next Generation PKI for Smart Application

As part of its promotional role for boosting electronic transactions for e-Commerce and e-Sign application, the Office of CCA conducts awareness programmes. Training programs on Digital Signatures and Public Key Infrastructure are continuously being organized across the country for various target audience groups. These awareness programmes are conducted across the length and breadth of the country. CDAC, Bangalore has been identified as an awareness partner, through a grant-in-aid project CDAC, Bangalore has conducted various awareness programs on behalf of CCA India.

A series of Digital Signature and Public Key Infrastructure events were organized from 5-6th September 2024 in Bangalore which included:

- 5th International Conference on Public Key Infrastructure and its Applications (PKIA 2024) - A Joint Conference by IEEE CS & IAS Bangalore Chapter (5-6th September 2024)
- A Tech Expo was organized on 6th September 2024.

8.1.7 Digital Locker Authority (DLA)

Under the Digital India Programme, Government of India has planned to provide shareable private space on a public cloud and to digitize all documents and records of the citizens and make them available on a real-time basis. These mechanisms of 'e-Document repositories' and 'Digital Lockers' will greatly improve citizen convenience and usher in paperless transactions across the entire ecosystem of public services. The framework for the Digital Locker Ecosystem has been set up by the Controller of Certifying Authorities (CCA) who has been given additional charge to function as 'Controller of Digital Locker Authority (CDLA)'.

A new digital locker service providers (DLSP) data exchange model has been proposed as the existing framework of Digital locker was having a dependency on Aadhaar and usage of same was restricted by the verdict given by Supreme Court of India. This new model allows each DLSP to be in conformity to the updated Aadhaar act and still be able to provide their users access to issuer data within the Digital Locker ecosystem. Each DLSP will be free to further add more documents from these issuers to their system, while also providing users access to documents available via MeitY DigiLocker system.

8.1.8 Projects/assignments planned for execution undertaken by CCA

a) *Development of PKI-based Digital Certificates for IoT Device Security*

b) *Common API Platform and method to fetch the number of digital signatures signed through DSC Token*

c) *Blockchain-based Digital Signature Certificate Validation and storage System with a Smart Dashboard*

d) *Implementation of ISO 27001 for WebTrust Compliance to Root Certifying Authority of India (RCAI)*

e) *Secure Mobile based PKI solution*

8.2 Unique Identification Authority of India (UIDAI)

8.2.1 Introduction

8.2.1.1 The Unique Identification Authority of India (UIDAI) was established to develop the policy, procedure and systems for issuing Aadhaar numbers to individuals and perform its authentication.

8.2.1.2 UIDAI was set up through a Government notification dated 28th January 2009 as an attached office of the then Planning Commission, to lay down plans and policies to implement the UID Scheme and to own, operate, update and maintain the UID database. The first Aadhaar number was issued on 29th September 2010.

8.2.1.3 Following the enactment and coming into force of the Aadhaar (Targeted Delivery of Financial and Other Subsidies, Benefits and Services) Act, 2016 ("Aadhaar Act"), UIDAI was established through a notification dated 12th July 2016 of the Ministry of Electronics and Information Technology (MeitY) as a statutory authority under the Aadhaar Act.

8.2.2 Relevance of Aadhaar number

8.2.2.1 The inability to establish one's identity has been

a major challenge for the poor and marginalised sections of society in accessing benefits, subsidies and services made available by the government. Given the large population of India, it was difficult to identify each and every individual. Further, with a multiplicity of agencies issuing different identity documents and government departments and agencies requiring different identity documents, every time an individual sought to avail of a subsidy, benefit or service, she or he had to undergo a fresh cycle of identity creation and/or verification, which typically entailed possession of some other documents. Such duplication of efforts and "identity silos" not only increased the overall cost of delivery of subsidies, benefits and services but was also not in the interest of furthering ease of living.

8.2.2.2 Therefore, a need was felt to create a digital identity and, to this end, the Aadhaar Act was enacted. 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 to such individuals and for connected and incidental matters. The objective was to harness the benefits of a unique identity for all residents, which would offer a means to detect any duplication of identity and which may be authenticated/verified in an easy, cost-effective manner.

8.2.3 Aadhaar Act

8.2.3.1 The validity of the Aadhaar Act was upheld by the Hon'ble Supreme Court in its judgement dated 26th September 2018 in Justice (Retd.) K. S. Puttaswamy and Anr; vs Union of India & Ors; with certain observations and directions. The directions of the Apex Court were given effect to through an amending Act that amended the Aadhaar Act, the Telegraph Act, 1885 and the Prevention of Money-Laundering Act, 2002. The provisions of the amending Act came into force on 25th July 2019. Salient features of the amended provisions of law are as follows:

(a) To provide for voluntary use of Aadhaar number, only with the informed consent of the Aadhaar number holder, by authentication or offline verification;

(b) To enable use of Aadhaar authentication by State Governments as well;

(c) To provide that services shall not be denied upon refusing to or being unable to undergo authentication;

(d) To provide for safeguards and restrictions on the performing of authentication;

(e) To lay down the procedure for offline verification;

(f) To confer power upon the Authority to give such directions as it may consider necessary to any entity in the Aadhaar ecosystem;

(g) To establish the Unique Identification Authority of India Fund;

(h) To provide for civil penalties, adjudication and appeal;

(i) To omit section 57 of Aadhaar Act, which permitted use of Aadhaar for any purpose, since the same had been struck down by the Apex Court; and

(j) To allow the use of Aadhaar number for authentication on voluntary basis as acceptable KYC document under the Telegraph Act, 1885 and the Prevention of Money-Laundering Act, 2002.

8.2.4 Features of Aadhaar number

8.2.4.1 Key features of Aadhaar number are as follows:

(a) It is a 12-digit random number, generated after a process of de-duplication using biometrics to ensure uniqueness of identity;

(b) It does not contain any intelligence and does not bear any relationship to the attributes or identity of an Aadhaar number holder;

(c) It is created and managed using scalable technology architecture;

(d) It operates using open-source technologies; and

(e) An individual is issued only one Aadhaar number.

8.2.5 Enrolment

8.2.5.1 UIDAI has set up a nationwide infrastructure for Aadhaar enrolment in India through a network of Registrars and accredited enrolment agencies. The Registrars are largely Government departments, agencies and public sector banks. Enrolment agencies

are selected through rigorous selection criteria. An individual is enrolled by a UIDAI certified operator through UIDAI software under a highly robust, controlled, non-repudiable and secure process. Individuals are enrolled for Aadhaar through certified operators, who are selected on the basis of a rigorous examination and test process. The operator authenticates every enrolment through her/his own fingerprints and Aadhaar number. In this manner, a complete account is maintained as to which operator enrolled whom, where and when, so that in case of any default, accountability of the enrolment operator and agency may be readily fixed. Thereafter, biometric data of enrolling persons are matched against the entire database of existing Aadhaar number holders, and only after checking that there is no match, an Aadhaar number generated. All enrolment data, including biometrics, are encrypted using a 2,048-bit encryption key at the time of the enrolment and are not accessible to any agency except UIDAI, which alone can access the data through a secure decryption key available only with UIDAI.

8.2.5.2 Enrolment for issuance of an Aadhaar number and update of identity information linked to Aadhaar number is enabled through the following (information is as on 31.12.2024):

(a) India Post – 7,809 permanent enrolment centres (PECs);

(b) Banks – 6,868 PECs;

(c) State Government office locations – 29,163 PECs;

(d) UIDAI –88 AadhaarSevaKendras (ASKs) in 72 cities across 33 States and Union territories;

(e) CSC eGovernance Services India Limited – 840 CSC ASKs (at State, district and block level); and

(f) India Post Payments Bank – 53,000 operators for mobile Aadhaar update and child enrolment services, offered using mobile Aadhaar enrolment kits.

8.2.5.3 UIDAI has taken the following major initiatives for strengthening the Aadhaar enrolment ecosystem:

(a) *Document update:* Considering that Aadhaar has emerged as the most widely accepted proof of identity and is being used to avail numerous services by the Aadhaar number holder, for which they are required to submit their Aadhaar number linked with latest and updated identity information details, and with a view to provide them a facility to revalidate their demographic information (name, gender, date/year of birth and address), UIDAI has developed a new feature called ''document update'', which can be accessed online through UIDAI's myAadhaar portal or by visiting any Aadhaar enrolment centre and submitting copies of supporting documents evidencing Proof of Identity (PoI) and Proof of Address (PoA).

(b) *Adult enrolment:* To ensure the robustness of the enrolment process, enrolment of adults for issuance of fresh Aadhaar numbers is now done with verification by State Nodal Officers appointed by the State Government concerned, on a portal made available by UIDAI. In order to ensure proper monitoring of the enrolment and usage of Aadhaar the State Unique Identification Implementation Committees under the chairpersonship of Chief Secretaries have been reconstituted and District Level Aadhaar Monitoring Committees have been constituted.

(c) *Child enrolment:* Pursuant to the recommendations of a committee constituted under the chairpersonship of the Registrar General of India, Aadhaar numbers of both parents are now being collected and biometric authentication of one parent or legal guardian is being done at the time of enrolment of a newborn. Further, birth registration Aadhaar enrolment is being promoted across the country through issuance of Aadhaar enrolment kits to operators in hospitals, with a view to ensure enrolment of newborns at the hospital itself. Moreover, the enrolment of the biometrics of children upon attaining the age of five years and the update of biometrics upon attaining the age of 15 years is offered free of charge if such enrolment/update is done within two years of attaining such age.

(d) *Resident Foreign nationals enrolment:* Special provisions were created for enrolment of a Foreign national, where the validity of Aadhaar so generated shall be restricted to the validity of VISA period in India. In case of OCI card holders and Nepalese/ Bhutanese applicants the validity of Aadhaar shall be restricted to 10 years. The validity period and

the term 'Foreigner enrolled as a resident' shall be mentioned in the Aadhaar Letter/Aadhaar PVC Card issued for such Aadhaar number holders.

8.2.6 Authentication

8.2.6.1 Aadhaar authentication is the process wherein Aadhaar number, along with other attributes (demographics/biometrics/OTP) is submitted to UIDAI's Central Identities Data Repository (CIDR) for verification. The CIDR verifies whether the data submitted matches the data available in CIDR and responds with a "yes/no" or an e-KYC.

8.2.6.2 The purpose of authentication is to enable an Aadhaar number holder to establish her/his identity to the authentication requesting entity, for the purpose of getting any subsidy, benefit or service provided by or through such entity.

8.2.6.3 *Authentication requesting entities*: All requesting entities are required to be registered with UIDAI before they may undertake authentication. Such a requesting entity is onboarded as an Authentication User Agency (AUA), enabling it to perform Yes/No authentication. In case it is to perform e-KYC authentication as well, it is also registered as an e-KYC User Agency (KUA). An AUA or KUA may, with the permission of UIDAI, appoint one or more entities as their sub-AUA or sub-KUA. All requesting entities are required to store Aadhaar numbers and any connected Aadhaar data in a separate, secure database/vault/system, called Aadhaar Data Vault.

8.2.6.4 *Authentication Service Agencies (ASAs)*: ASAs provide secure Multiprotocol Label Switching (MPLS) connectivity between requesting entities and UIDAI's CIDR.

8.2.6.5 *mAadhaar mobile application:* UIDAI has developed the mAadhaar mobile app to enable Aadhaar number holders to download their e-Aadhaar from the Aadhaar database. It also provides a number of other facilities, such as ordering a PVC Aadhaar card, scanning of the secure QR code on an Aadhaar card / e-Aadhaar / Aadhaar letter, download of paperless offline e-KYC in XML format, etc.

8.2.6.6 *Face authentication:* Smartphone based face authentication, which uses artificial intelligence technology, has been introduced with effect from on 15th October 2021. This offers a touchless biometric authentication alternative to fingerprint or iris based biometric authentication. As of 31st December 2024, 64 entities in production have commenced using face authentication while 25 in pre-production.

8.2.6.7 As on 31st December 2024, there are 212 AUAs, including 208 KUAs, and 20 ASAs. 14,046.14 crore authentication transactions have been performed since inception, including 2,225.45 crore e-KYC transactions.

8.2.7 Security measures

8.2.7.1 UIDAI uses advanced encryption technologies for protecting data in transmission and storage. UIDAI's Information Security Management System is ISO 27001:2022-certified. Further, the CIDR has been declared as a protected system under Section 70 of the Information Technology Act, 2000 and the National Critical Information Infrastructure Protection Centre provides key security inputs on an ongoing basis to maintain its cyber security posture.

8.2.7.2 A leading global firm has been engaged to facilitate the creation of a framework for the Governance, Risk, Compliance and Performance of the Aadhaar ecosystem and oversight of the same for adherence to the framework, with a view to ensure a robust, comprehensive and secure environment.

8.2.8 Customer relationship management

8.2.8.1 UIDAI has set up an Aadhaar Sampark Kendra as the central point of contact for resolution of queries and grievances of Aadhaar number holders, accessible through the toll-free number 1947 and the email address help@uidai.gov.in. The contact centre has a mechanism to log queries and grievances and provide Aadhaar number holders with a unique reference number for tracking till closure of the matter. It also offers support in major regional languages.

8.2.8.2 The customer relationship management system of UIDAI supports multiple channels, *viz.,* phone calls, email, chatbot (Aadhaar Mitra), web portal, seven major social media channels, letters and walk-in as the means through which grievances may be registered, tracked and resolved.

CHAPTER

9 Attached Offices and Societies

9.1 Centre for Development of Advanced Computing (C-DAC)

C-DAC is a premier R&D organization under the Ministry of Electronics and Information Technology (MeitY). The organization focuses on applied research, design & development and deployment of innovative IT and electronics solutions for various key sectors.

The core research and development areas of C-DAC include High Performance Computing (HPC), Quantum Computing, Artificial Intelligence (AI), Strategic Technology (Including Emergency / Disaster Management), Digital India RISC-V (DIR-V), Software Technology (Including Cloud & BOSS), e-Governance, Healthcare and Educational Technologies, Cyber Security and Cyber Forensics, Automotive Technology, Power Electronics and Renewable Energy, Communication Technology and Internet of Things (IoT).

In the year 2024-25, C-DAC achieved notable progress in the areas of electronics and information technology through extensive research and development. The organization successfully created and implemented a range of solutions, while also establishing collaborations with renowned organizations at both national and international levels. Additionally, C-DAC played a major role in providing training opportunities and organizing various events, conferences, workshops, etc.

Key technological achievements of C-DAC during the year in each of its focused areas are outlined below.

9.1.1 National Supercomputing Mission (NSM)

Details are covered in Chapter 5.

9.1.2 National Level Initiatives

9.1.2.1 Digital India RISC-V Program (DIR-V)

As part of Digital India RISC-V (DIR-V) Program, C-DAC has successfully completed the design and development of the VEGA series of microprocessors including India's first indigenous 64-bit multi-core RISC-V based Superscalar Out-of-order Processor. The VEGA series comprise of 32/64-bit Single/Dual/Quad Core Superscalar Out-of-Order high performance processor cores based on RISC-V Instruction Set Architecture along with a robust ecosystem. A new 32-bit processor variant AT1051 has been added to the portfolio during 2024-25 and currently six processors are available in the VEGA series. The Processors are in soft IP form and are available for licensing for the development of custom SoCs. Currently the processor IPs have been licensed to three startups/academia. Licensing to three more organisations is under process.

The first VEGA microprocessor-based SoC chip 'THEJAS32', a 32-bit Single core SoC has been successfully fabricated and available. Another SoC chip "THEJAS64", a 64-bit Single core SoC chip has been fabricated at SCL, Chandigarh, packaged and testing is in progress. The design implementation and tape-out of the 'DHRUV64', 64-bit Dual core SoC ASIC to TSMC foundry has also been completed, devices fabricated and packaging is in progress. The 'DHANUSH64', 64-bit Quad core SoC variant is in development.

A series of fully indigenous "Make in India" development boards named "ARIES" have been built upon the RISC-V ISA-compliant VEGA Processor (THEJAS32 SoC) comprising easy-to-use hardware and software for the development of embedded systems for a wide range of applications including Sensor fusion, System supervisors, Remote sensors, Small IoT devices, Toy and electronic education equipment, etc. The VEGA SDK provides a full ecosystem with numerous examples and support documentation.

Five more variants of ARIES development boards (ARIES V3, DOT, ALPHA, Nova and Eco) have been developed. Eight ARIES development boards with

THEJAS32 SoC ASIC are currently available. The ARIES development boards are made available through online (robu.in, amazon.in, vegprocessors.in) and direct channels. Around 850 boards have been sold. Around 1000 members of academia and industry have been trained on VEGA processors as part of 18 workshops and hackathons conducted.

9.1.2.2 Emergency Response Support System (ERSS) NextGen Emergency Response Support System - 112 (NG112)

Consequent to the success of Phase-1 of Emergency Response Support System (ERSS-112), MHA has awarded ERSS Phase-2 (NextGen ERSS-112) also to C-DAC. The responsibilities include modernization of ERSS-112 with strengthened infrastructure and incorporation of intelligent features in the solution. NG112 solution is enriched with intelligent and innovative features to perform operations in a better manner on the strengthened infrastructure. Currently, NG112 is in the final stages of its deployment phase and eleven States/ UTs have already migrated to the new system.

9.1.2.3 Other helplines integrated to ERSS – CHL, WHL & DHL

In addition to ERSS 112, C-DAC is the TSP for other helpline services such as the Child Helpline-1098 (CHL) and Women Helpline-181(WHL) of Ministry of Women & Child Development (MoWCD), Govt. of India. Currently, system developed by C-DAC for CHL is successfully running in all the States/UTs with 670+ districts across the country. Similarly, WHL is installed and running in 440+ districts. The implementation of Hub for Empowering Women (HEW), which is integrated with WHL is installed and running successfully in 19 districts of Bihar. C-DAC is also the solution provider for disaster helplines of National Disaster Management Authority (NDMA) and various State Disaster Management Authorities (SDMA). A dedicated control room deployed with C-DAC's software solution for Disaster Helpline (DHL) was setup by C-DAC for SDMA of Himachal Pradesh and the system is now running successfully since July 2024. All these helplines – CHL, WHL and DHL are tightly integrated to the ERSS 112 system via APIs facilitating two-way data and voice communication.

9.1.2.4 National Mission on Power Electronics Technology (NaMPET-III)

NaMPET is a National level R&D Programme which facilitated Research, Development, Deployment, and Commercialization of Power Electronics Technology. As a part of the same, Advanced technology/ products are developed/deployed in field (1.5kW wireless charger, WBG material-based Magnetometer, MEMS sensors for torque/ vibration, Planar Magnetics, (50Hz) Transformer-less Dual mode Power Conditioner for Microgrid, AC & DC fast Charger for EV, LVDC power distribution in houseboat, Integrated drive for BLDC, Model EV charging station, AMI Pilot deployment, etc.)

Under the NaMPET-Phase-III programme, following are the activities undertaken by C-DAC during the period.

- Wireless charger at 1.5kW for 15cm is developed by VNIT Nagpur and C-DAC
- VCU Toolkit licensed and commissioned at Royapuram Locoshed. VCU tool kit is for testing the subsystem PCBs (8Nos) in VCU. It is being used by ToT partners and also by Locosheds. More EoIs are in process from other locosheds.
- Smart meter evaluation toolkit licensed for evaluating the meters as part of Smart meter tendering in KSEBL Ltd, Kerala Along with Smart meter technology, A comprehensive test platform also is developed for meter testing (protocol as well as parameter level) by C-DAC and CPRI.
- M/s Prochip technologies (Startup) has developed RF interface for C-DAC smart meter system under Startup promotion program of NaMPET. With this development C-DAC smart meter technology is having Cellular, RF and WIFI interfaces. RF is mainly for secured environments like MIL camps, etc.
- Phasor measurement Unit (PMU) Technology for Power Distribution sector is developed and implemented in 3 locations in KSEBL distribution network. The technology is developed in technical association with IISc, Bangalore
- 3 Phase loco propulsion technology development program for Indian Railways will be initiated shortly.

9.1.2.5 Chips to Startup (C2S)

C-DAC is Programme Coordination Institution for overall implementation of Chips to Startup (C2S) Programme. 100 Institutes, 13 Startups /MSMEs have been selected for financial support based on Call-For-Proposals. Various FPGA boards identified and recommended by the CEPC were procured and distributed to all participating institutes under C2S Programme. 200+ organizations are supported for the EDA tools including institutes supported for funds. Currently Synopsys, Cadence, Siemens-EDA, Ansys and Keysight EDA Tool Licenses under C2S Programme are successfully installed and hosted at ChipIN Centre, C-DAC Bengaluru for all participating institutions under C2S Programme. A total of over 120 EDA tool technical training sessions have been organized for all participating institutions so far.

9.1.2.6 Design Linked Incentive (DLI)

The Design Linked Incentive (DLI) Scheme shall offer financial incentives as well as design infrastructure support across various stages of development and deployment of semiconductor design for Integrated Circuits (ICs), Chipsets, System on Chips (SoCs), Systems & IP Cores and semiconductor linked design over a period of 5 years. As on January 01, 2025, total of 190 applications are received, 89 are under scrutiny (Financial & Technical) and, 17 are approved under PDLI funding, and 50 are approved under for EDA tool support. There are 98 indigenous start-ups and 73 MSME applicants. Total cost of approved financial incentive under DLI is Rs. 203.22 Cr. and Rs. 22.16 Cr had already been disbursed to Startup and MSME based on the achieved project milestones.

9.1.3 Quantum Computing

9.1.3.1 Metro Area Quantum Access Network (MAQAN)

MAQAN is India's first Quantum Key Distribution (QKD) network and R&D testbed, marking a significant step towards quantum-safe communication. The project led to the indigenous development of a QKD chassis with control electronics for CoW and DPS protocols, alongside a hardware and software-based key distillation engine. A softcore Post Quantum Cryptography (PQC) mechanism was implemented as a fail-safe, and SDN-enabled QKD network management was achieved through the DARPAN-Q application. Additionally, a QKD network simulator and chassis emulator with integrated Optical Time Domain Reflectometer (OTDR) monitoring were also developed. This initiative resulted in an indigenous quantum-safe security solution for critical communication infrastructure and enhanced domestic capability in quantum technology. The network is currently operational in a 5-node topology. The project was a collaborative effort of IITM, SETS India, ERNET and C-DAC. The project has translated into the next phase project titled "Quantum Internet with Local Access" under the National Quantum Mission focussing on long distance fiber based QKD over 2000 km across India.

MAQAN Network

9.1.3.2 QSim - Quantum Computer Simulator Toolkit

The Quantum Computing Toolkit Project significantly advanced India's quantum computing research as one of the country's pioneering initiatives. Developed through a collaborative effort involving IISc Bengaluru, IIT-Roorkee, and C-DAC, the project led to the launch of QSim by Shri Rajeev Chandrasekhar, then Hon'ble Minister of State for Electronics & IT. It provided a robust, indigenous toolkit for simulating and experimenting with quantum circuits, including noisy circuits, and delivered hands-on training to students, researchers, and scientists. This effort has cultivated an expansive user network, boasting over 6,800+ registered users on QSim (qctoolkit.in) from leading academic institutes and organizations like IITs, DRDO, IISER, TCS, Infosys, and IBM. Various training and workshops are conducted using QSim platform. Additionally, QSim is optimized for accelerator platforms like GPUs, enhancing performance and enabling faster simulations.

9.1.3.3 Quantum Network Simulator

Quantum Network Simulator (QNS) is a software framework designed to simulate and model quantum networks up to the application layer, contributing towards the realization of the Quantum Internet. It allows users to study the performance of various quantum network protocols, topologies, and configurations. Key features of the QNS include support for built-in quantum communication protocols like teleportation, QKD, and super-dense coding; flexible parameter exploration for experiments; simulation of noisy quantum channels and network synchronization; and modelling of quantum entanglement processes.

9.1.3.4 Centre of Excellence in Quantum Technology

The project achieved significant milestones in indigenous quantum technology development, including the creation of a 4-qubit Superconducting Quantum Processing Unit (QPU at IISc) , FPGA-based control measurement hardware at C-DAC/IISc and Photonics Quantum Processor ecosystem development. Key breakthroughs included QKD demonstrations in higher dimensions, a Free-space QKD protocol for qudit-based systems, semi-device independent Quantum Random Number Generation (QRNG) development, and the creation of a magnetometer operating in the femto-Tesla regime using spin noise spectroscopy. The project was executed collaboratively by IISc, Raman Research Institute (RRI) & C-DAC.

9.1.3.5 Development of Secure Post Quantum Public Key Infrastructure

C-DAC is leading a MeitY funded project “Development of Secure Post Quantum Public Key Infrastructure”. The project brings multidisciplinary expertise of prestigious institutions such as C-DAC Bengaluru, C-DAC Noida, IIT Madras, SETS Chennai and IIITD Kurnool. The objective of project is to develop Post Quantum Crypto Token by implementing CRYSTALS-Dilithium (for Digital Signature Scheme) and CRYSTALS-Kyber (for Key Encapsulation Mechanism) algorithms. These algorithms have been chosen by the National Institute of Standards and Technology (NIST) as winners in the competition for PQC Schemes.

9.1.3.6 Agile and Ad-hoc Free Space based Quantum Communication using Drone (Drone-QC)

As part of the project, C-DAC has successfully demonstrated an in-house Quantum Random Number Generator (QRNG) to a delegation from the National Payments Corporation of India (NPCI). The QRNG, which operates on the principle of path branching, was showcased alongside a secure data transfer system utilizing QRNG-seeded Post-Quantum Cryptography (PQC) in collaboration with the e-Sign team. During the demonstration, a message encrypted using PQC, with the key seeded by the QRNG in the Quantum lab, was securely transmitted via a web service to the meeting venue, where it was decrypted and displayed. This innovative technology utilizes quantum superposition, where a system exists in multiple states simultaneously until measured, causing a random collapse per the Born rule.

9.1.4 Strategic Electronics

C-DAC has developed various systems of strategic importance to the nation’s Defense, Space and Atomic Energy programs with highest level of reliability and performance. The following are the key activities undertaken by C-DAC in Strategic Electronics.

- C-DAC developed Advanced System for Solid Propellant Burn Rate Measurement facility was jointly inaugurated by Chairman, DRDO, Dr. Samir V Kamat and DG, C-DAC, Shri. E. Magesh at High Energy Materials Research Laboratory (HEMRL), DRDO, Pune in March, 2024. Accurate burn rate measurement is critical for precisely predicting the trajectory of rockets and missiles. This new system represents a significant advancement in the field.
- C-DAC developed, CEMILAC-certified indigenous engine controller is installed in Chetak helicopters operated by the Indian Army, Navy, and Air Force. These helicopters are being operating successfully in various weather conditions throughout the nation. This accomplishment led to collaborative projects with HAL for Dornier & Jaguar aircrafts and Heron UAVs.
- C-DAC designed and developed MIL-qualified simulators of the Navigational Suite for the Indian Navy as part of the Integrated Combat Suite project

for submarines through DRDO labs Research Center Imarat (RCI) and NPOL.

- C-DAC has designed, developed and successfully installed Digital Electromagnetic Transducer for Naval ships. This would result in realization of compact, low cost and high-performance Electromagnetic Log system for Naval ships.
- C-DAC developed NDT system (SoUNDS Mk2R5) delivered to L & T Defence. This is the first ever delivery of the system to a private firm.
- C-DAC developed Vessel Tracking System (VETRA)-Neo for the Indian Navy and delivered to Underwater Ranges (UWR), Goa in January 2024. VETRA-Neo is an advanced DGPS positioning system equipped with a multi-frequency GNSS receiver and multi-rover radio telemetry, capable of providing centimetre-level accuracy to marine vessels enabling accurate navigation.
- C-DAC expedition team successfully completed the bathymetry survey of two glacial lakes, 4800 meter ASL in Himachal Pradesh braving hard trekking and climatic conditions, using indigenously developed Autonomous Bathymetric Survey Vessel.
- MoU signed between NDMA and C-DAC for Design, Development and Deployment of Indigenous GLOF-EWS for Uttarakhand, Sikkim, Arunachal Pradesh, HP and Union Territories -J&K and Ladakh.
- Installation and commissioning of USBRMS at SFC, DRDO, Jagdalpur, Chhattisgarh has been carried out in September 2024. Received Letter of Appreciation and 100% Customer Satisfaction Index rating from SFC, DRDO, Jagdalpur for the project USBRMS.
- Navigational equipment Submarine Echosounder designed and developed by C-DAC is fitted to two submarines of Indian Navy – INS Sindhusasthra & INS Sindhukirti.

9.1.4.1 Intelligent Transportation Systems

C-DAC as a Nodal centre in collaboration with IIT Bombay, IIT Madras, and IISc Bengaluru has completed Collaborative Intelligent Transportation Systems Endeavor for Indian cities (InTranSE Phase II) programme funded by MeitY, resulting in the realization of a following hardware and software products.

- On-board Driver Assistance and Warning System (ODAWS)
- Bus Priority System (BPS)
- A mobile app-based Departure Time Traveler
- A mobile app-based Personalized Transit Route Guidance System (PRTGS)
- A web-based app for Operational Strategy to Headway Reliability for Public Transport Buses (OSHR)
- CMOS-based Industrial Smart Camera
- Industrial 10GigE CMOS Camera
- Online Sucro Crystal and Imaging System
- Thermal smart camera with road traffic application
- Development of Common Service Layer based on Global standard for ITS (CoSMiC)
- Desktop-based driving simulator integrated with a general-purpose traffic simulator

During the launch event of " Digital India FutureLABS Summit 2024" held at IIIT- Delhi, the signing of TOT for Thermal camera were done with RRPS4E Innovation Pvt Ltd, SCITA Solutions, TAK Technologies Pvt Ltd, AABMATICA Technologies, Prama India Pvt Ltd, Samriddhi Automations Pvt Ltd, Norden Research and Innovation Centre and Vehant Technologies Pvt Ltd. The ToT signing of CMOS SMART camera was done with Spookfish Technologies Pvt Ltd.

Fleet Management System for live tracking and Flexible Operations (FlexiFleet), Personalized Transit Route Guidance System (PTRGS) & Operational Strategies for Headway Reliability (OSHR) technology was transferred to M/s. IBI Group India Private Limited, M/s. Atulya Abhinav Tech Private Limited, M/s. Unidad Techno Labs(P) Ltd and M/s. UL Technology Solutions Pvt. Ltd.

The state-wide rollout of the Vehicle Tracking and Fleet Management System for SUPPLYCO [VTFMS] has been completed, facilitating the monitoring of feet movements for the transportation of food grains from warehouses to ration shops across Kerala. A total of 944 vehicles have been enrolled in the system.

9.1.5 Agri Electronics

9.1.5.1 The National Program on Agriculture and Environment Electronics (AgriEnIcs)

The multi-institutional R&D program, AgriEnICS, supported by MeitY, Government of India has been successfully completed. Presently the project team is actively pursuing the commercialization of developed products. This program has been executed by C-DAC Kolkata Centre in collaboration with multiple Collaborators and Industry/start-ups. Sectors like agriculture, livestock management and environment were covered, and product prototypes were developed. Technology transfer of the Air Quality Monitoring Device (AI-AQMS) has been done and the ToT partner has already started marketing and selling the products. Technologies like Cattle health monitoring device (GoP), Mastitis disease detector in milk (MAST D), Multi-grain quality analyser (GrainEX), Chilly quality analyser (CT VIEU), and Smart poultry management and Chick gender identifier (GEMS) are already ready for commercialization. The Robotic apple harvester device also showed potential for commercialization after proper tuning. Also, the tomato sorting and grading machine (eQuality-Veg) is under lab trial.

9.1.5.2 ColoSENS

C-DAC Kolkata has developed a product, namely, "ColOSENS" - a Bio-Sensing system to diagnose bacterial diarrhoea, under a MeitY funded project, titled, "An Affordable Colorimetric Diagnostic Instrument: ColOSENS And Field Validation at Imphal, North-East India". The device is a battery-operated field portable biosensing system equipped with DNA aptamer-based receptor towards rapid screening of bacterial diarrhoea. This rapid tool would help the Physicians to treat diarrhoea patients, particularly children, in a proper way. The agreement for the transfer-of-technology of Colosens is ready and formal signing is expected soon.

9.1.6 Solutions for Smart Cities

9.1.6.1 Delhi Safe City Project

The Safe City initiative, launched under the vision of the Ministry of Home Affairs (MHA), Government of India, continues to make significant strides towards enhancing public safety, especially in relation to women's safety, through CCTV surveillance and advanced technological infrastructure. The following activities are carried out during the period. All the command-and-control centers at various levels, including the Police Headquarters (C4i), district levels (C3is), and police stations (C2is), are ready and few of the C3is were pivotal in managing significant events including G20, Independence Day and Republic Day celebrations. The Data Center is ready and functional. The installation of surveillance cameras has progressed significantly and 4396 cameras have been successfully integrated into the Video Management System (VMS). The testing & evaluation of the software components, inspection of field locations are in progress.

9.1.7 Language Computing and Heritage Computing

9.1.7.1 Speech Technologies for Northeastern Language (STNEL)

C-DAC, in collaboration with IIT Madras, IIT Guwahati, NIT Manipur, and IIIT Siri City, is working on speech technologies for Northeastern languages, which is a sub-project under the consortium-based umbrella project "Speech Technologies in Indian languages" under NLTM. As part of the activity, C-DAC is working on the task of data collection in the Nepali language, curation of datasets in the Bengali language, and development of KWS systems in these languages with application to speech-based Healthcare Information Dissemination. C-DAC in collaboration with other consortium members, developed a baseline end-to-end keyword recognition system for Bengali, Mizo, and Manipuri Languages.

9.1.7.2 Scalable Speaker Recognition Technology in Different Applications

C-DAC, in collaboration with IIT Madras, IIT Dharwad, IIIT Dharwad, NIT Patna, NIT Manipur, KLE Tech University, and KL University, is working on "Development and Deployment of Scalable Speaker Recognition Technology in Different Applications" as a sub-project under the consortium-based umbrella project "Speech Technologies in Indian languages" under NLTM. As a part of this activity, C-DAC is working on the task of Forensic Speaker Recognition with development of related data(speech) resources and baseline systems. The speaker recognition system has already been shared with the BHASHINI team for further deployment.

9.1.7.3 Speech Based Examination System

A Speech-based Examination System for visually challenged students has been developed by C-DAC. Automatic Speech Recognition (ASR) and Text-to-Speech Synthesis (TTS) technologies are used as the core in this system. The system interacts with students in speech form, takes answers in speech form, and converts the same into text using ASR. The primary objective is to remove the dependency on human scribes. The system works for subjective as well as objective types of questions and currently supports English and major Indian languages. Project is developed under Bhashini. One college in Thane, Maharashtra adopted this system, and a visually challenged student wrote all 7 papers of his second-year graduation examination using the same.

9.1.7.4 Kanthasth 3.0 Bahubhashi भारतीय भाषाओं का अनुवाद सारथी

On the occasion of Hindi Diwas Samaroh-2024 & 4th Akhil Bhartiya Rajbhasha Sammelan held at New Delhi on 14-15 September 2024, Union Home Minister and Minister of Cooperation Shri Amit Shah had launched Bharatiya Bhasha Anubhag. Keeping in view the intent of the Constitution and the Prime Minister's direction, to promote the use of Indian languages along with Hindi and establish better coordination between them, the Department of Official Language, MHA have established Bharatiya Bhasha Anubhag in association with C-DAC to develop a multifaceted translation system of Kanthasth Bahubhashi for 16 Indian constitutional Languages. A Translation Memory & NMT-based translation system for 15 scheduled official languages (Assamese, Bengali, Gujarati, English, Kannada, Kashmiri, Konkani, Malayalam, Manipuri, Marathi, Odia, Punjabi, Tamil, Telugu and Urdu)

Kanthasth-Rajbhasha 2.0 Customization and Deployment: Kanthasth 2.0 is a software-aided translation system that helps in the translation from English to Hindi and vice versa which has been developed by C-DAC, Pune. The same has been customized and deployed for for various Government department for LAN access to maintain the security and privacy. It is deployed on the intranet of DRDO, ICG, and SEBI.

9.1.7.5 HIMANGY (HIndustani Machini ANuvaad TechnoloGY):

Under the National Language Translation Mission (NLTM) 'BHASHINI', C-DAC is working on a consortium-based project aimed at developing and deploying a bidirectional machine translation system between Indian languages to Indian languages which includes Punjabi, Telugu, Urdu, Gujarati, Kannada, Odia, Kashmiri, Sindhi, and Dogri. The project focuses on creating resources and offering machine translation services, primarily targeting the domains of Governance & Policy and Health. The consortium is involved in generating linguistic resources, establishing benchmark data for each language pair, defining evaluation standards, building corpora, and implementing the machine translation system for all stakeholders. C-DAC is responsible for Punjabi, Dogri and Odia for the aforementioned tasks. So far, C-DAC has created high-quality parallel corpus of 100000 for Hindi-Punjabi pairs and 60000 each for Hindi-Dogri and Hindi-Odia pairs.

9.1.7.6 VIDYAAPATI: A Bidirectional Machine Translation system for Bengali, Konkani, Maithili, Marathi, and Hindi

Under National Language Translation Mission (NLTM) 'BHASHINI', C-DAC is working on a Machine Translation project, Vidyaapati: A Bidirectional Machine Translation System involving Bengali, Konkani, Maithili, Marathi, and Hindi using the Neural Machine Translation (NMT) framework. It aims to create linguistic resources in the domain of Admin, Law, Education and Tourism, Health etc., establishing benchmark data, defining evaluation standards, creating corpora, and implementation of Machine Translation (MT) system for all stakeholders involved. For Hindi-Bengali and vice versa pair of around 20000 corpora has been translated along with Named Entity tagging of 3000 Bengali sentences. For Hindi-

Marathi and vice versa pair around 9000 corpora have been translated along with evaluation of approx. 2000 DMU sentences from various domains.

9.1.7.7 English to Indian Language & Vice Versa Machine Translation system [English to Hindi, Marathi, Gujarati, Odia, Kannada & Malayalam Languages]

Under National Language Translation Mission (NLTM) 'BHASHINI'; a consortia-based project with aim to develop and deploy a Machine translation system as a service from English to Hindi, Marathi, Gujarati, Odia, Kannada, and Malayalam languages and vice versa. Creation of resources and development of Machine Translation System as a service Domain would be Governance and Policy (Primary), Science and Technology & Education, Health, & Agriculture. The task includes generating linguistic resources, establishing benchmark data for each language pair, defining evaluation standards, creating corpora, and implementing the Machine Translation (MT) system for all stakeholders involved.

As of now, nearly 35,600 English-Hindi sentences, 32500 sentences in English-Marathi, 27000 English-Kannada sentences, 10430 English-Malayalam, 12500 English-Odia sentences have been translated. 5500 from Hindi-English and 26000 from Kannada to English sentences has also been translated.

9.1.7.8 Design, Development & Deployment of UA Knowledge Dissemination Portal for UA & Multilingual Internet

On March 21, 2024, India's tech community marked a significant step towards a multilingual internet with the launch of the Bhashanet portal. This event coincided with India's celebration of Universal Acceptance (UA) Day, which focuses on ensuring all languages and scripts are supported by internet infrastructure.

The Bhashanet portal was officially inaugurated by the Secretary of MeitY, Shri. S. Krishnan. The launch ceremony was graced by prominent figures like Dr. Devesh Tyagi (CEO of NIXI), Shri Sushil Pal (Joint Secretary at MeitY), Prof. Rajat Moona (IIT Gandhinagar), and Shri. Samiran Gupta (VP of APAC & Stakeholder Engagement for South Asia). The event brought together dignitaries from NIXI, industry experts, and various stakeholders invested in the initiative.

9.1.7.9 Sign Language Accessibility for e-Governance Services

The project titled "Sign Language Accessibility for e-Governance Services" is completed in August 2024. This was executed by C-DAC in collaboration with Amrita Vishwa Vidyapeetham, Kollam which aimed at providing accessibility of e-Governance services to hard of hearing, with use case of UMANG which provides numerous services of various government departments on single platform.

9.1.8 Health Informatics

9.1.8.1 Telemedicine Solutions

9.1.8.1.1 eSanjeevani

eSanjeevani - National Telemedicine Service is an innovative, indigenous, cost-effective, microservices based telemedicine system developed and operationalized by C-DAC for the Ministry of Health and Family Welfare, Govt of India. It is implemented in two variants: 1. eSanjeevani-AAM Ayushman Arogya Mandirs (a provider-to-provider telemedicine platform): It enables the access of quality and specialized health services to rural and isolated populace in assisted mode. 2. eSanjeevaniOPD (a patient to provider telemedicine platform): it empowers citizens to access health services in the confines of their homes through smartphones or laptops etc.

From 1st January 2024 to 30th December 2024, the eSanjeevani service has successfully catered to 135.88 million patients. It operates at 124,519 Health and Wellness Centres (HWCs) as spokes, supported by 15,796 hubs and 344 online OPD services. Over 34,259 practitioners, including doctors, medical specialists, super-specialists, and healthcare workers, have utilized the platform during this period.

Recognizing the scalability and robustness of eSanjeevani, MeitY, Government of India, has positioned it as part of the India Stack, offering it to the global community as a model for telemedicine. Furthermore, it is anticipated that the platform will achieve an additional 25 million consultations by March 2025, underscoring its continued growth and impact in transforming healthcare delivery.

9.1.8.1.2 Mercury™ Nimbus Neo Suite

Mercury™ Nimbus Neo Suite is a 5G and cloud-enabled Telehealth solution offering Telemedicine, TeleICU, EMR/EHR-centric teleconsultation. The solution is analyzed using in-house developed 5G simulation environments and CEWiT, IIT Madras 5G testbed. The TeleICU / Telemedicine services are setup and continued for Odhisha state, NTPC Ltd. and Jammu division using Mercury™ Nimbus Solution.

Recently, Odhisha Telemedicine network has extended with addition of 08 medical colleges and 01 district hospital using Mercury Nimbus Neo Suite. These new sites are established and ready for telemedicine activities. In the NTPC Telemedicine network, 17 remote NTPC sites are connected with 02 speciality centers benefiting NTPC employees and their families. Mercury™ solution is also deployed at Jammu division Data Centre for Tele ICU services at Govt. SMGS Hospital, Jammu.

9.1.8.2 Healthcare Solutions

9.1.8.2.1 e-Upkaran

e-Upkaran is a full-fledged equipment maintenance and management system to manage medical equipment life cycle of the equipments deployed in the health facilities across the States. e-Upkaran will help to improve, monitor, speed up process related to purchase of equipment, equipment complaint management and its usage and help in better decision making in purchase, effective utilization of existing and purchased equipment which help state in providing better health services to the citizen of state. e-Upkaran deployment tally has increased to 13 Instances in India covering 12 States and 01 Union Territory.

9.1.8.2.2 e-Aushadhi

e-Aushadhi is a major step towards adapting technology to improve distribution of drugs, vaccines and sutures by leveraging computing power at low cost. The main aim of e-Aushadhi-DVDMS is to ascertain the pharmaceutical needs of various district drug warehouses such that all the required materials/drugs are constantly available to be supplied to the user district drug warehouses without delay and finally issuing drugs to the patients, who is the final consumer in the chain. Currently, 18 States, 06 UTs, 05 Central Programs, 01 Program under Ministry of Defence and 02 Programs under Insurance Medical Services (Andhra Pradesh and Telangana) are using this application.

9.1.8.2.3 e-RaktKosh

e-RaktKosh is a comprehensive IT solution to connect, digitize and streamline the workflow of blood banks. It has 3500+ blood banks on board throughout 36 states and UTs in the country. e-RaktKosh Portal is extensively used by the citizens for requirements related to blood, blood banks' location identification, blood stock enquiry, maintenance of donation repository etc. e-RaktKosh is integrated with various state-wide blood bank solutions & has become a single data repository for management of data regarding blood, blood-related products, blood donation camps, donor repository etc. e-RaktKosh has been integrated with State Portals / HMIS, PayTM, Arogya Setu, etc. It is also integrated with Govt. of India e-Pramaan & e-Prayaas to provide the single sign-on facility.

9.1.8.2.4 e-Sushrut

e-Sushrut HMIS incorporates an integrated computerized clinical information system for improved Hospital administration and patient health care record Management. It provides an accurate, electronically stored medical record of the patient. The real-time e-Sushrut streamlines the treatment flow of patients and simultaneously empowers workforce to perform to their peak ability, in an optimized and efficient manner.

e-Sushrut HMIS is being rolled out in 10 States, Indian Railway Hospitals, 16 AIIMS, SAIL, NHPC, NIMS Hyderabad, IGIMS Patna, PGIMER Chandigarh and CGHS. At present, e-Sushrut HMIS is being rolled out in more than 4000 Health Facilities in India with e-Sushrut Railway HMIS generating approximately 2 Crores e-Prescription.

9.1.8.2.5 Integrated Pharmaceuticals Database Management System (IPDMS2.0)

National Pharmaceutical Pricing Authority (NPPA) is under Department of Pharmaceuticals (DoP), Ministry of Chemicals & Fertilizers as an independent Regulator for

pricing of drugs and to ensure availability and accessibility of medicines at affordable prices.

C-DAC has developed IPDMS2.0 a web-based integrated application along with Pharma-Sahi -Dam Mobile App for NPPA's to stream line pharmaceutical pricing regulation in India. The System automates and improve consolidation of information and reduces analysis time for Pricing and Overcharging. NPPA collects information from State Units Price Monitoring and Resource Units (PMRU)s for monitoring and analysis which all are on-boarded on IPDMS2.0. Pharma Industries are also providing required data through interface provided for industries on IPDMS2.0. Some of the features has been configured for mobile application which is required to the public for price controlling and ensuring the drugs availability.

9.1.8.2.6 Student Life Cycle Management System (SLCMS) For Medical College

The Student Life Cycle Management System (SLCMS) is a SaaS-based web application designed for Medical Colleges to manage Student/Faculty data and services efficiently from student admission to alumni management. The system features digital data storage, role-based access, interactive dashboards, a mobile app (iOS/Android), payment gateway integration, digital signatures, SMS/Email configuration, responsive, and multi-user access with web security certification. Core modules include admission management, student profile management, fee/fine/refund management, timetable creation, and student attendance, examination scheduling and result management, digital notice boards, scholarship and sponsorship, and research & publication, Hostel management, internship management, certificate generation, alumni management, assignments and assessments, and a grievance redressal system. SLCMS Implemented at MGIMS Sevagram Wardha, SAIL Rourkela, and AIIMS Bhubaneswar. This is helpful in improvising the Research & Education System.

9.1.8.2.7 SaQsham

National Health System Resource Center (NHSRC), MoHFW under its Quality Improvement Division, has the mandate to certify public health facilities on defined standards and measuring elements implemented nationwide. SaQsham Portal has been designed, developed and put into use to support the mandate, the entire Quality Certification process is being automated and integrated into an Enterprise Workflow System to automate the National Quality Assurance Standards Certification process for health facilities across the nation. SaQsham enables external assessment of primary & secondary care public health facilities i.e., DH, SDH, CHC, PHC, UPHC and HWC for NQAS, LaQshya / MusQan/Any Other Scheme/ Virtual certification. Quality Improvements (QI) division at NHSRC, MoHFW has been supporting the states for achieving certification in these health facilities.

9.1.8.2.8 ABDM Integrations Middleware

To exchange e-Sushrut generated EMR (Electronic Medical Record) with ABDM (Ayushman Bharat Digital Mission) Ecosystem, e-Sushrut needs to support the building blocks of ABDM as well as Fast Healthcare Interoperability Resources (FHIR). e-Sushrut application has been upgraded for Health ID Generation, sharing the electronics records to digilocker, exchange of care context with NDHM ecosystem. The Platform provides ABHA Number based Patient registration, Patient waiting time management, Crowd Management through integrated Scan and Share feature in HMIS. It is made generic so that it can be enabled in any HMIS Deployment. It also helps to reduce the patient's demographic data entry and typo mistakes. The solution has been implemented in 16 AIIMS and 10 State instances of e-Sushrut HMIS.

9.1.8.3 Assistive Research in Health

9.1.8.3.1 Mental Health and Normalcy Augmentation System" (MANAS)

"Mental Health and Normalcy Augmentation System" (MANAS) is a comprehensive and scalable digital wellness platform, aimed to strengthen mental well-being through digital medium with a national scope, initiated and funded by the Office of the Principal Scientific Adviser (PSA) and endorsed by The Prime Minister's Science, Technology, and Innovation Advisory Council (PM-STIAC), Government of India.

The MANAS platform includes the MANAS mobile app, a dashboard, and web services. This comprehensive

mental well-being platform is designed to host scientific and evidence-based indigenous mental health content. It also facilitates workflow management for curating and integrating third-party new content into the app while ensuring data security and privacy. Additionally, the platform features a visualization dashboard for content analysis, providing valuable insights into user engagement and content effectiveness. The MANAS app is available on both Android and Apple App stores, and supports English and Hindi languages. Currently, the app was downloaded by 34,000 devices with 21,000 active users. In continuation with the efforts in mental wellness and wider outreach, C-DAC completed MANAS WeConnect program to create awareness among youth for mental wellbeing and sensitizing them to code for mental wellness.

9.1.8.3.2 Adaptable e-Learning Accessibility Model for the Disabled (e-Saadhya)

The e-Saadhya (Saral Anukulaney Adhyayan) is an Adaptable & Accessible e-Learning software framework that caters to the learning needs of children with mild intellectual disability and autism. It supports all the stakeholders, such as special educators, parents, rehabilitation team and Children with Special Needs(CwSN). It provides automated support for the processes used by Special educators and therapists in Special Schools for child assessment, creating individualized learning plans, and delivery of lessons. This framework is a unique product with a combination of standard diagnostic and special educational assessment checklists, and special educational teaching methodologies namely Applied Behavioral Analytics(ABA), Discrete trail training(DTT), using audio-visual prompts and reinforcements.

The Child Learning environment supports the features of Fun and Learning, online lessons, quizzes, etc. This environment is user-friendly with cognitive accessibility features embedded with audio-video navigational guidance and Voice support. The e-Saadhya is supported by Telugu, Kannada, and Hindi Indian languages making it viable for PAN India implementation for training to Special educators and CwSN.

e-Saadhya has been deployed in 15 states across India and continues to grow in collaboration with NIEPID Headquarters, Secunderabad. This year, it was implemented at the Department of Special Education for Children with Special Needs (CwSN). As part of the initiative, 60 special educators were trained at Ambika Shishu Kendra Kurnool, Vidya Vikasini Opportunity School Coimbatore, NIEPID Headquarters Secunderabad.

9.1.9 Cyber Security and Cyber Forensics

9.1.9.1 National Blockchain Framework

The National Blockchain Framework (NBF) in an initiative towards building trust in digital systems and promoting research & development, technology & application development based on Blockchain technology. Under this initiative, Shri S. Krishnan, Secretary, MeitY launched the Vishvasya - Blockchain Technology Stack on 04th September 2024 to offer Blockchain-as-a-Service over a geographically distributed infrastructure designed to support various permissioned Blockchain based applications. A number of Government departments are utilizing the stack for development and deployment of trusted Government Services that need immutable, secure and verifiable records of transactions across multiple stakeholders. Additionally, the Secretary, MeitY also unveiled the NBFLite - Lightweight Blockchain Platform, Praamaanik - an innovative blockchain-enabled solution for verifying mobile app origin and a National Blockchain Portal.

Launch of National Blockchain Framework by the Hon'ble Secretary, MeitY, Shri. S Krishnan on September 04, 2024

9.1.9.2 GHOST: Generation of In-House Secure Trusted Elliptic Curve

GHOST is a cryptographic tool indigenously developed using novel algorithms for generation of secure, trusted and proprietary elliptic curves which are used as security backbone of critical applications such as digital signing, PKI, SSL/TLS, RNGs, authentication and encryption

services etc. GHOST tool is now deployed at Signal Unit of Indian Army at Anand Parvat Military Station, New Delhi to secure their critical security applications.

9.1.9.3 C-DAC-Intelligent Malware Sandbox

To secure Indian cyberspace from evolving malware threats, C-DAC has developed an indigenous Intelligent Malware sandbox, which has comprehensive methods, including static, dynamic, and computer vision approaches to detect and classify malware using artificial intelligence (AI).

9.1.9.4 Cyber Forensics Solutions

Under Cyber Forensics, C-DAC has continued enhancement of existing cyber forensics tools and the development of new tools as a part of the project titled as Design and Development of Advanced Forensics Data Analytics Tool.

As a part of 100 days program of MeitY, enhanced cyber security tools including Cyber Check, Advik CDR Analyzer, Win-LiFT, Web Investigator, PhotoExaminer, and TrueImager were released by the Hon'ble Secretary, Shri S. Krishnan MeitY at New Delhi on September 04, 2024. In addition to this, C-DAC has developed and released a mobile phone forensics software tool named Mobile Insighter, which supports latest version of Android & iPhones and different models of Drones from DJI & Pixhawk.

9.1.9.5 CDACSIEM

A comprehensive security solution having a data aggregator which gathers immense amounts of log data from the entire networked environment, normalizes and applies analytics, as well as provides complete visibility of security to the SOC analyst. It is a centralized solution that enables detection and allows for investigation while providing insight visibility. CDACSIEM solution enables the security analysts to be more effective and efficient in their job of protecting the organizational digital assets and IT systems. The system's capabilities include detailed asset discovery, log management, automated vulnerability scanning, threat intelligence, User and Entity Behavior Analytics (UEBA), EDR, and ticket management, among other features. CDACSIEM is a robust, indigenous platform that aligns with global standards such as the MITRE ATT&CK framework and STIX, and it supports comprehensive compliance reporting.

CDACSIEM is now listed on the GEM portal and the solution has already proven its effectiveness through successful deployments at several prestigious institutions namely Madhya Pradesh Paschim Kshetra Vidyut Vitaran Company Ltd. (Indore), Madhya Pradesh Poorv Kshetra Vidyut Vitaran Company Ltd. (Jabalpur), Madhya Pradesh Madhya Kshetra Vidyut Vitaran Company Ltd. (Bhopal), Jawaharlal Nehru Port Trust, Mumbai, National Skill Development Corporation Limited, New Delhi, India Trade Promotion Organization (ITPO), Delhi, Project 22, MHA Agency, Delhi, Murmogao Port Trust, Goa, C-DAC Noida Data Centre, Panjab University, Chandigarh, Research Centre Imarat, Hyderabad, C-DAC Centres (12).

C-DACSIEM is a flexible monitoring platform for log sources, network packet data and end points. It aggregates, standardizes, stores, and applies advanced analytics to scrutinize data, facilitating early threat detection and empowering organizations to conduct comprehensive investigations in response to alerts. It was implemented at ITPO in Delhi during the G20 event to address the challenges with real-time security threats.

9.1.9.6 GANGA

GANGA is a cryptographically secure pseudo random number generator (CSPRNG) indigenously designed and developed by C-DAC to offer desired randomness to the operating systems. The objective of integration of GANGA with any OS is to secure sensitive kernel operations from exploitation.

GANGA was released by Shri Bhuvnesh Kumar, IAS, Additional Secretary, MeitY, Govt. of India on February 29, 2024 during the launch of the "Cryptography Roadmap of India". GANGA has been evaluated and gone through field trials by the Indian Army and now it is integrated with the Indigenous Cryptographic Suite of the Indian Army.

9.1.10 Software Technologies including FOSS

9.1.10.1 MeriPehchaan: National Single Sign On

Details are covered in Chapter 2.

9.1.10.2 Aadhaar Data Vault (ADV) as a service

Aadhaar Data Vault (ADV) service, developed by C-DAC is offered as a national service to securely store and manage Aadhaar numbers to various government, private and PSU organizations. C-DAC also offers a complete Aadhaar-based solutions and services in the form of AUA-ASA to interested entities. A total of 48 services and 23 departments have been integrated and around 263 crore transactions have been carried out as part of this initiative.

9.1.10.3 e-Hastakshara: An Online Digital Signing Facility (C-DAC's e-Sign Service)

Details are covered in Chapter-2

9.1.10.4 Employees Provident Fund Organization (EPFO)

C-DAC has successfully implemented and continues to manage the Unified Portal project for the Employees' Provident Fund Organisation (EPFO). As part of the Centralization project, Union Minister for Labour & Employment and Youth Affairs & Sports, Dr. Mansukh Mandaviya, on August 13, 2024, introduced the new 'Online Facility for Surrender of Exemption from the EPF Scheme. This system streamlines the process by enabling online submission, application validation, and the transfer of members' past accumulations. It replaces the traditional physical document submission process, allowing establishments to track their applications with a tracking ID, thus saving time and effort.

C-DAC has also successfully implemented several essential functionalities within the Unified Portal for the Employees' Provident Fund Organisation (EPFO) like Joint Declaration Functionality, Standard Operating Procedures (SOP) for Freezing/ Defreezing, Pension Calculator for Higher Wages, Bulk Payment Functionality for Pension on Higher Wages, Bank Integration for EPFO Payments, Re- engineered user management system, etc.

9.1.11 Free and Open-Source Software

9.1.11.1 Secure BOSS OS

C-DAC Customized version of Secure BOSS, built on BOSS 10.0, has been specifically tailored for the Army Civilnet Systems to enhance security and compliance across the network. Army Civilnet 3.0, based on Secure BOSS, has been deployed on over 10,000 machines across the Indian Army. The customized Secure BOSS Linux has been installed on all client machines. The Internet Security Operations Centre (ISOC) is also part of the solution, responsible for monitoring end nodes and enforcing central policies on the network.

9.1.12 Capacity Building Initiatives

9.1.12.1 Information Security Education and Awareness (ISEA)

The ISEA project is implemented through 50 premier academic institutions, autonomous organizations of MeitY (C-DAC/NIELIT) and Technical Universities, grouped into 10 logical clusters with 5 institutions as leads/co-leads as a hub in particular thematic area, supported by several spoke institutions to facilitate co-creation of knowledge, courses, tools, products/solutions, etc.

Under the project, so far, a total of 329 officers from various PSUs, Government and Pvt., organizations were trained as Associate/ Deputy / CISOs at National level. Besides this, a total of 321 awareness workshops on Information Security have been organized through direct/virtual mode for school & college students, teachers, faculty, Government personnel, LEAs, general users, parents, women, CSCs, etc. covering 1,05,460 participants and 1264 school teachers/ faculties , Police officers have been trained as master trainers in 5 training programs.

Organized 2 Cyber Safety and Security Awareness Week in Bihar and Uttar Pradesh and released awareness material, Awareness hand books , Cyber Hygiene Quiz , Conduct Cyber Awareness workshops at community centres, schools, colleges, Government offices ,Road shows and rally with students to create awareness on cyber safety.

9.1.12.2 Future Skills PRIME

The FutureSkills Project, an upskilling and reskilling initiative by MeitY in collaboration with NASSCOM, aims to enhance skills in emerging technologies such as Additive Manufacturing/3D Printing, Artificial Intelligence, Augmented/Virtual Reality, Big Data Analytics,

Blockchain, Cloud Computing, Cybersecurity, Internet of Things, Robotic Process Automation, and Social & Mobile technologies. C-DAC serves as the Project Management Unit (PMU) for this program.

MeitY has extended the Phase 2 of the program in April 2024 for 3 more years with an augmented Target of reskilling/upskilling 10 Lakh+ Beneficiaries by 2027. During the period, the C-DAC/NIELIT has developed 193 trainers and reskilled/upskilled 5,563 beneficiaries through 13 Bridge Courses developed by 40 Teams of 22 C-DAC/NIELIT Centers. Furthermore, 1,213 government officers from more than 20 government organizations were trained to enhance their skills and competencies, while 931 participants took part in bootcamps designed to provide hands-on learning and specialized training.

9.1.12.3 SwaYaan- Capacity Building for Human Resource Development in Unmanned Aircraft Systems/Drone & related technology

SwaYaan, a MeitY initiative, aims for positioning India as a global drone hub by 2030 through various capacity building programs in Drone/UAS & related technologies. The project seeks to establish a robust Drone/UAS Industry-Academia Ecosystem, leveraging over 30 institutions and industries through a hub-and-spoke model. Five premier institutions (IITs, IIITs, and IISc) serve as Resource Centers, while 15 IITs and NITs, alongside 10 C-DAC/NIELIT Centres, function as Participating Institutes. The initiative focuses on key areas like Drone Electronics, GNC Algorithms & Simulation, Aeromechanics, Allied Drone Technologies, and Drone Applications. C-DAC Hyderabad leads as the Program Management Unit, supported by 5 other C-DAC Institutes. Additionally, strategic industry partnerships with organizations like the Drone Federation of India (DFI), FICCI, and Sector Skill Councils further strengthen the initiative.

In the current year, a diverse range of programs has been launched to enhance knowledge and skills across various learner categories. The 'Training and Development' segment included 8 Faculty Development Programs (177 participants), 1 Workshop (85 participants), and 191 Bootcamp sessions (7,138 participants), providing hands-on experience for faculty members, open learners, and students. Furthermore, Drone/UAS laboratories were established at 25 institutes, including those in the North-East region. The 'Academic Programs' launched this year comprise 4 batches of a 6-month certificate program (17 participants), an M-Tech program (12 students total), and 36 retrofitting electives (755 participants). In the realm of 'Research and Innovation', 40 Proof of Concept projects were developed, involving 237 participants, with 14 published papers and 3 patents contributed by 56 researchers. Two Qualification Packs have also been approved by NCVET: (a) Junior Drone Engineer (NSQF Level 5.5) by ESSCI and (b) Drone Data Analyst (NSQF Level 5) by TSSC. Overall, the initiative has positively impacted over 8,500 participants through more than 300 activities across 60+ cities, reflecting a strong commitment to advancing expertise in the Drone/UAS and related sectors.

9.1.12.4 Cyber Gyan- A Real-Time Cyber Security Scenario-based Self-Paced Learning Training Facility

Cyber GYAN, was launched to provide specialized cybersecurity training for SC, ST, and Economically Weaker Section undergraduate and postgraduate students, as well as faculty members from government colleges across India. The project aims to establish a Self-Paced Learning Training Facility focused on enhancing cybersecurity skills within the academic community.

As part of this initiative, 100 real-time cyber-attack scenarios based on modern tools and techniques have been developed. These scenarios provide participants with a practical understanding of cyber defense mechanisms in a controlled yet realistic setting. Till date, 5600 students have been registered to the portal and 2600 have been trained. 538 faculty members have also successfully completed the training program, demonstrating the project's far-reaching impact in building a skilled and informed workforce in cybersecurity.

9.1.13 Education and Training

C-DAC's Education and Training have been developing skilled resources as part of the Skill India initiative through its Post Graduate Diploma and Post Graduate Degree awarding programmes for its internal human resources needs of Research and Development activities and IT industry. These skill enhancement ICT training courses

are imparted by C-DAC training centres as well as Authorised Training Centres spread across India.

C-DAC's education and training division is involved in the following activities:

1. Post Graduate Diploma courses in ICT
2. Education and Training Technologies
3. Comprehensive Recruitment System
4. International Training & Solutions
5. IT & Skill Development Programmes for Capacity Building
6. Corporate Training for Corporate, PSU and Government Organization

9.1.13.1 PG Diploma Courses in ICT

A total of 3789 students completed the training on 22 February 2024 and placement for the successful students was completed on July 31, 2024 in five regions. A total of 3102 students Joined the training in March 06, 2024 and placement for the successful students has commenced in five regions from August 28, 2024. A total of 3603 students (including 44 under NSM and 9 under Drone) joined across India in the August 29, 2024 batch. These students will undergo the C-DAC Course End Examination (CCEE) from January 20 - 24, 2025. The placements of the successful students will commence on February 21, 2025.

The admission for the Post Graduate Diploma in ICT for the February 2025 batch has commenced from November 28, 2024 and the C-DAC Common Admission Test (C-CAT) is scheduled on January 11 and 12, 2025. There are over 7058 aspirants applied for the PG Diploma courses and will appear in the C-CAT. The course is going to commence from February 25, 2025.

9.1.13.2 Corporate Training for Corporate, PSU and Government Organization

C-DAC has conducted Institutional training for organizations including DRDO, Indian Armed Forces, and NTIPRIT, Ghaziabad. C-DAC has also conducted the ITEC and e-ITEC programs for the international participants. C-DAC is conducting training to five (5) International participants from friendly nations who are joining various Post Graduate Diploma courses such as PG-DAC & PG-DITISS from Argentina (2), and Solomon Island (3) nominated by the Ministry of External Affairs (MEA). In the August 2024 batch, 5 participants from Vietnam have joined the PG Diploma courses. The HQ Southern Command Pune training on Incident handling and security will commence on January 06, 2025. The institutional training for ACCS, Ahmednagar commences on January 07, 2025.

9.1.13.3 Capacity Building in HPC programme

C-DAC have completed the NSM Capacity building project by conducting two HPC programmes for the Socially Disadvantage Group candidates. Over 242 students were trained in the PG Diploma in HPC System Administration and PG Diploma in HPC Application Programming over last two years. 82 students have been trained during the year 2024-25 over two batches.

C-DAC have conducted the Faculty Development Programme in HPC domain association with AICTE for over 84 faculties. C-DAC have conducted trained the 278 students of VIT Mumbai in Python Programming as a academic collaboration initiative.

9.1.13.4 OLabs NextG: Next Generation Online Labs (OLabs) for schools

The objective of OLabs NextG: Next Generation Online Labs (OLabs) for schools, is to design and develop 500 Online Labs for Schools for various subjects of classes 6-12. This is being undertaken in collaboration with Amrita Vishwa Vidyapeetham, Kerala. Current Status of the project is as given below:

- 77 New labs (Maths-34, 5 Social Science, 38 Language labs) developed by C-DAC in various subjects from Class 6 to Class 12.
- 212 online labs (including 173 Olabs labs and 39 new labs added) integrated on the Diksha Platform.
- Training of 1375 teachers conducted for Online labs via online mode till Dec 2024.
- OLabs offline version deployment was done in 142 schools (342 devices) in 33 districts of Rajasthan
- OLabs mobile app (version-1.0.15) is hosted on Mobile Seva app store and Google Play Store.

- OLabs Windows installer (version 2.2):- Created three class wise separate installer in this version of installer ie for class 6 to 8, 9-10 and 11-12.

Activities planned till March 2025

- OLabsThon : OLabs Hackathon was announced in December 2024 across India to invite innovative ideas into this pool of labs, Till 6th January 2025, 65 teams registered from the different colleges of India. The hackathon will be completed in February 2025
- 23 new labs to be developed to complete the target of 250 labs.
- 2000 teachers' training to be completed.
- Deployment of OLabs in 90 schools across India.

9.1.13.5 Process Automation for Competitive Examinations (PACE)

Since January 2024, under the PACE project, C-DAC has successfully completed the Graduate Aptitude Test in Engineering's (GATE 2024) Result Processing, Scorecard Generation for 8 Lakh Candidates, Joint Admission Test for Masters (JAM 2024) Result Processing, Scorecard Generation, Choice Filling, Seat Counseling for 65 thousand candidates, and the National Board of Examinations (NBE) seat counseling for 2600 seats for NBE's DNB/PDCET/DNB (POST MBBS). Furthermore, PACE has secured a work order for the next three cycles of GATE and JAM exams process automation.

9.1.14 North East Initiatives

1. Vulnerability Assessment and Penetration Testing (VAPT) was conducted at the National Investigation Agency (NIA) offices in Guwahati and Imphal, and it is funded by NIA and is currently ongoing. The Stage I report has been submitted to the clients upon completion, and Stage II will commence once confirmation is received from the client's end.
2. The project titled "Security Audit of Online Agenda Submission Portal, funded by Mizoram State E-Governance Society, is Ongoing. The Stage I has been completed, with reports submitted to the clients.
3. The project titled "E-HRMIS for Society for Electronic Transactions and Security (SETS)" Chennai is funded by SETS Chennai. The Project is currently in the User Acceptance Testing (UAT) phase.
4. Developing a Time Sensitive Networking software stack and integrating TSN and TCC communication for the Smart City project, with the work currently in its initiation phase to enhance real-time data transmission and connectivity in urban infrastructures
5. In collaboration with IIT Guwahati, a fluorescence intensity measuring device (PRATIDIPT) has been completely developed and it is under validation and currently undergoing rigorous testing at IIT Guwahati, Bioscience Lab.
6. The development of a Quantum Framework for Natural Disaster Management in North East India is currently ongoing, with the implementation of classical algorithms in progress. This project leverages Quantum Machine Learning (QML) algorithms to simulate optimal escape routing during emergencies, aiming to enhance disaster response and management in the region.
7. Under the Centre for HPC Upskilling and Knowledge Sharing (C-HUK) Project, the 4th Faculty Development Programme (FDP) was held at the North Eastern Regional Institute of Science and Technology (NERIST). Additionally, the 2nd Capacity Building Programme (CBP) ran from March 1 to August 31, 2024, followed by the commencement of the ACC batch which started on September 01, 2024 and will end in February 2025.
8. The Work-Based Learning (WBL) Internship Program, funded by MeitY (2022–2027), enhances employability for SC, ST, EWS, and women candidates by providing hands-on experience in AI, cybersecurity, IoT, and more, with a monthly stipend of ₹10,000. At C-DAC Silchar, 27 candidates joined level 1, 7 advanced to level 2, and 16 have been certified. A new WBL advertisement is issued in November-December 2024.

9. The first Post Graduate Diploma in Artificial Intelligence (PG-DAI) course, launched on August 29, 2024 offering in-depth training in artificial intelligence. The course is being conducted entirely online, providing flexible learning opportunities. A total of 5 candidates have enrolled in the program, ensuring focused, personalized instruction.

9.2 Society for Applied Microwave Electronics Engineering and Research (SAMEER)

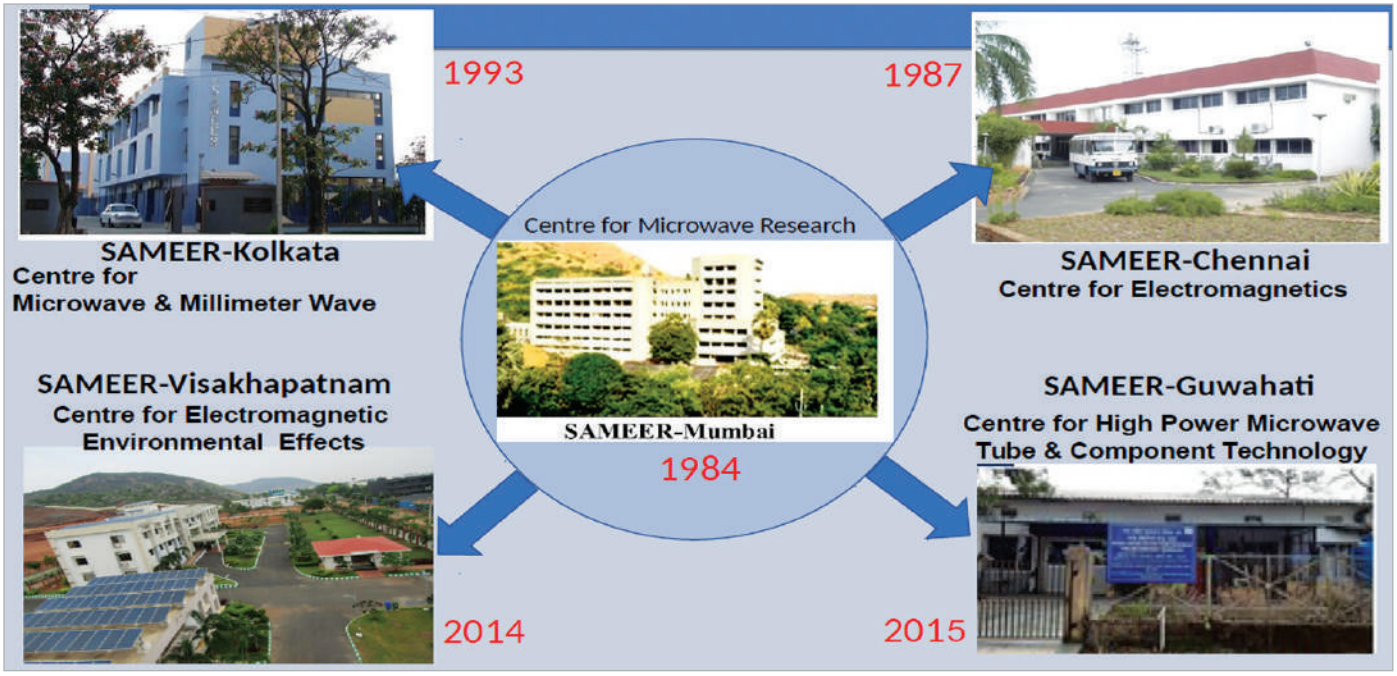
9.2.1 Introduction

Society for Applied Microwave Electronics Engineering and Research (SAMEER) is an autonomous R&D institution under the Ministry of Electronics and Information Technology (MeitY), Government of India. It was formed in 1984 as an R&D Laboratory of the then Department of Electronics, Government of India with an objective to support the various Radio frequency (RF) and Microwave application specific requirements of the different ministries of the Government of India. SAMEER has five centres located in Mumbai, Chennai, Kolkata, Visakhapatnam and Guwahati. The headquarters of SAMEER is located at IIT campus, Powai, Mumbai.

SAMEER undertakes various state-of-the-art and challenging projects from HF to photonics with the aim of remaining at the forefront in the various microwave and millimetre wave domains including (but not limited to) the linear accelerator technology, atmospheric radars, microwave heating and drying, photonics, microwave communication, 5G and 6G communication systems, quantum technology and other such applications. SAMEER also designs and develops passive and active components and subsystems such as amplifiers, antennas, digital receivers, transceivers etc. The research findings and results are regularly documented and reported in reputed journals and conferences by SAMEER scientists.

SAMEER also offers test and measurement services in Electromagnetic Interference & Compatibility (EMI/EMC), antenna performance measurement services, shielding effectiveness evaluation of chambers, calibration services for different electronic equipment and testing of equipment to safety standards to support private industries and government agencies of the country in qualifying their products as per various national and international standards.

9.2.2 SAMEER CENTRES



SAMEER Centres

9.2.3 R&D Activities

9.2.3.1 NexGen Technology

9.2.3.1.1 Research in Bharat 6G

- **Sub: THz Wireless communication with Intelligent Reflecting Surfaces(IRS)**

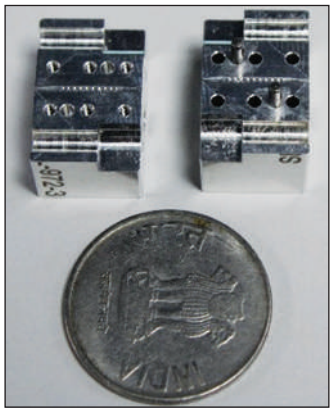
  The objective of this new technology demonstration project sponsored by MeitY is to exhibit a fully functional 6G high speed communication link at 142 GHz under the Atma Nirbhar Bharat mission. SAMEER is executing this project with IIT Madras as a consortium member. SAMEER Kolkata indigenously developed the D-band transmitter, receiver and lens antenna exclusively for this communication link. SAMEER successfully exhibited a Line-of-Sight (LOS) link at 142 GHz using the baseband signal generated by IIT Madras. SAMEER demonstrated 6G 6.4 Gbps Data Transmission in India Mobile Congress 2024. This kind of high frequency high speed wireless data link has been demonstrated for the first time in India with all indigenously developed components.

6G LOS communication link demonstration at India Mobile Congress 2024

6G antennas and components were also demonstrated during the "Digital India Future Labs" event in Delhi organized by MeitY in February 2024.

- **6G: THz Test bed with Orbital Angular Momentum and Multiplexing**

  This 6G Test bed sponsored by DoT, is being implemented by SAMEER, jointly with three other IITs with the objective of design, development and deployment of end to end 6G Test bed at 270 GHz and is the first of its kind in the country. SAMEER has indigenously developed the J-band 4-channel transmitter and receiver which were deployed to successfully establish a Line-of-Sight (LOS) link at 283 GHz using the baseband signal generated by IIT Madras. The 6G components developed by SAMEER were launched during the India Mobile Congress 2024 by Shri Jyotiraditya Scindia, Honorable Union Minister for Communications and Development of North Eastern Region, Govt. of India. Circuit components such as band pass filter at J-band and Coaxial cavity filter for the baseband channel have been designed and developed.



6G components developed for the baseband channel Band pass filter at J-band

mm wave radiometer

9.2.3.2 Societal Applications

9.2.3.2.1 ATMOSPHERIC SYSTEMS

- **Development of MMW Radiometer for NE Region of India for Climate Modelling Studies for Weather Changes**

  A millimeter-wave, ground-based passive

radiometer system has been developed in-house for unattended, time-contiguous measurement of tropospheric temperature and humidity profiles in the atmosphere (~ 10 km).

Statistical (machine learning-regressor and neural network-based) and physical modelling (optimal estimation, 1D-Var model) based an inverse model was developed for the retrieval of temperature and humidity profiles. The trained inverse model was operated on the test data (15%) brightness temperature to retrieve temperature and humidity profiles and compared with the actual profiles. This routine was implemented in all regressor and neural network models.

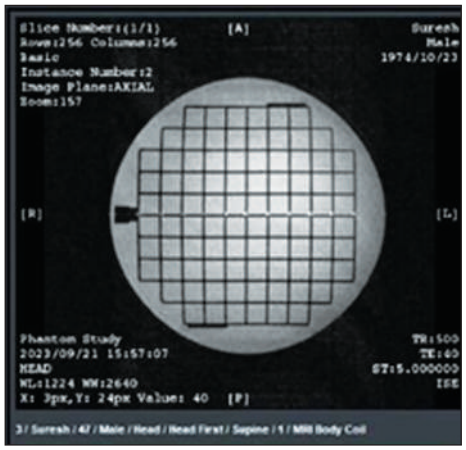
9.2.3.3 Medical Systems

- **Indigenous Magnetic Resonance Imaging (IMRI)**

The project entitled "Indigenous Magnetic Resonance Imaging (IMRI) – A National Mission (Swadeshi Chumbakiya Anu-naad Chitran – Ek Rashtriya Abhiyaan) (SCAN-ERA)" was initiated with a goal to "Design, develop and test an indigenous 1.5 Tesla MRI system for medical imaging."

1. **System-I: (Utilizing procured magnet):** Testing was conducted with the body transmit and receive coil and images were also obtained across multiple sequences like: Spin Echo T1-weighted and PD-weighted sequences. Through rigorous experimentation guided by the task force, SAMEER has made significant progress in enhancing the image quality. A state-of-the-art RF amplifier, was successfully integrated with System I, delivering good-quality imaging results. Comprehensive quality assurance tests on ACR phantoms were completed, embedded coil development is underway and multichannel imaging trials on knee and spine regions were successfully conducted on human volunteers, demonstrating clinical readiness.
2. **System-II: (with India magnet):** The magnet developed in India, has reached its final stages of testing and was ramped to 1.5 T. Following a few more tests, this magnet will soon be shipped to SAMEER Mumbai for integration, paving the way for a fully self-reliant MRI ecosystem in India.

This initiative not only propels India's self-reliance in critical medical technology but also reinforces SAMEER's commitment to advancing healthcare innovation for the nation.



Orientation-Coronal RL for Spine Echo image TI weighted

9.2.3.4 RF & MICROWAVE SYSTEMS

- **Through Wall Imaging (TWI) Radar for Home Land security**

An Ultra Short pulse Radar imaging system for acquiring a microwave image from behind the wall or through the wall has been developed. This was a MeitY sponsored project. This radar technique addresses electromagnetic "vision" behind walls in order to detect, count, and localize people inside a room/ building, detection of human target and its movement. Such radars are useful for applications like Home Land Security, Anti –Terrorism, Fire Fighting – rescuing humans trapped inside burning structure, hidden weapon detection in box and observation at short distances. This is a low power and low cost Radar which provides the location of human being/other objects in 2D from behind the wall. Detection and location of the object can be found with fine imaging resolution, good through wall characteristics, and high performance in noisy environments. Differentiation of the objects behind the wall was also achieved.

- **ToT of °Brix meter**

  SAMEER's Microwave-Based Compact, Cost-Effective Brix Meter is a ground-breaking solution for the sugar industry, enabling precise °Brix measurement – a key indicator of sugar concentration. This innovative, non-destructive technology facilitates real-time monitoring of °Brix levels during the crystallization process, addressing critical quality control needs in sugar production, fruit juice processing, and soft drink manufacturing. Through an Expression of Interest (EOI) process, Technology Transfer (ToT) agreements were signed with Toshniwal Hyvac Pvt. Ltd. and Sir Automation Industries, enabling large-scale production of this advanced system. The ToT event was graced by Shri S. Krishnan, Secretary, MeitY, in Mumbai on August 10, 2024, marking a significant milestone in bringing indigenous technology to the forefront of India's sugar industry.

BRIX ToT with Toshniwal Hyvac Pvt. Ltd. and Sir Automation Industries in the presence of Shri S. Krishnan, Secretary, MeitY

1. Indian Defense Indigenization

SAMEER has been awarded the contract for the design and development of Integrated Control System (ICS) and subsystems. The development of various subsystems has been completed.

2. Services

- **Testing and calibration services**

  SAMEER has carried out EMI/EMC and Safety and Environmental testing assignments for more than 125 industries for testing their products as per various international and national military and civilian standards. EMC calibration services were offered to more than 25 laboratories. EMC design consultancy was offered to various companies and Shielding effectiveness test was done for various paints and shielded chambers. The NABL accreditation for the test and calibration labs were renewed where needed in order to offer quality testing services to the industry.

  SAMEER supports the national missions like "Make-in-India" and "Digital India" by encouraging Indigenization in Electronics, Electrical and IT sectors. Facilities staged at SAMEER are very important for defense sector of the country and ensures satisfactory performance of strategic hardware and all critical Infrastructure sectors by ensuring protection against EMP.

  EMP qualification for products such as Indigenously developed Bullet Proof Vehicle, Nuclear radiation detection probe for EMP, Bullet Proof Vehicle, Direct Extractor & Cross Contamination Monitor (DECCOM) and indegenously developed highly specialised EMP filters was carried out.

  Radiated Emission of Electric Multiple Unit (EMU) was performed at G in Stationary mode and Slow moving mode (Traction & Braking mode), Magnetic field & Electric field measurement was performed at a Data centre in Pune and IIT Bombay.

- **EMC Consultancy**

  EMC design consultancy was offered to a number of industries. EMC consultancy was provided for "EMC Shielded Door for Naval Ships". EMC Shielded Doors Meets the Design objective of 60dB

Shielding Effectiveness in the frequency range 10KHz to 40 GHz. Consultancy was also provided for HEMP hardened structures, EMC qualification of torpedoes, Waste & fresh water monitoring system, Solar Controllers, thermal camera.

3. Memorandum of Understanding (MoU)

- On May 27, 2024, SAMEER entered into MoUs and NDAs with seven leading industry players, in the presence of Secretary of MeitY. This partnership marks a vital step in transferring IMRI technology to industry, ensuring that this pioneering innovation reaches the public efficiently and effectively.
- MoU was signed between CTTC Bhubaneswar and SAMEER Kolkata. This was initiated to get precision fabrication support for various projects being executed by SAMEER.
- In recognition of the capabilities and credentials of thermal design and consultancy services offered to URSC/ISRO, Bangalore, an MoU was signed between SAMEER and SAC/ISRO, Ahmedabad on 6th February 2024. The main purpose of this collaboration is to carry out Thermal Design and Consultancy Services through thermal simulation of spacecraft and its sub-systems.
- CSIR-CEERI and SAMEER signed an MoU to combine expertise of both organizations for development of Vacuum Electronics Devices and Components aimed to accelerate deployment of Indigenous Vacuum Electronics solutions.
- SAMEER and University of Mumbai signed an MoU for collaboration in research work.
- SAMEER and the Military College of Telecommunication Engineering (MCTE), Mhow signed a MoU to advance collaboration in 'Next Generation Wireless Technologies for the Indian Army'.
- Technology for safe storage of grains in warehouses developed by SAMEER was transferred to Paras Defense and Space Ltd at the launch of Digital India Future Labs in the presence of Honorable MoS Shri. Rajeev Chandrashekar on 4th February 2024 as a step towards Innovation, Science and Technology theme of Viksit Bharat @2047.
- SAMEER and Gurutvaa Systems Pvt. Ltd, (GSPL), Pune entered into a Memorandum of Understanding to combine expertise for development of home grown technologies in the areas of RF systems and components, Radar and communication equipment and areas of mutual interest for industry.
- An MoU was signed between SAMEER and Three D Integrated Solution Limited (an airport systems solutions provider) in the esteemed presence of Prof. Ajay Sood, Principal Scientific Adviser, GoI and Shri S. Krishnan, Secretary, MeitY, GoI.

4. Skill Development

Work Based Learning (WBL) Programme:

SAMEER is implementing the WBL programme sponsored by MeitY. The main objective of this programme is to provide an opportunity to SC/ST/EWS/Women candidates to acquire Technical skills in emerging technologies that make them industry-ready. A number of candidates completed their Level 1 and the advanced Level 2 WBL programmes at all the five Centres of SAMEER.

9.3 Centre for Materials for Electronics Technology (C-MET)

Centre for Materials for Electronics Technology (C-MET) was set up as a registered Scientific Society in March 1990 under the Department of Electronics (now Ministry of Electronics & Information Technology) as a unique concept for development of viable technologies in the area of materials mainly for electronics with the objectives of;

- To establish technology up to pilot scale for a range of electronic materials and transfer the same to industry for commercialization.
- To establish relevant characterization facilities.
- To undertake applied research activities in the areas of its operation.

9.3.1 Core competence at C-MET laboratories

C-MET's R & D activities have been implemented in three laboratories i.e. Pune, Hyderabad and Thrissur. C-MET headquarter is at Pune monitoring the administrative & technical activity and coordination with the MeitY. Each

of C-MET laboratories has its own area of specialization with requisite infrastructure and expertise. This approach has proven to be successful in creating core competence at each laboratory.

a. **Pune laboratory:** Pune laboratory is mainly focusing on cutting edge R & D research on materials for Additive Manufacturing (CoE), electronic packaging, renewable energy, energy storage (CoE), sensors and nano-materials/ composites, this also includes inorganic materials, polymers, organics and glasses, National Centre on Quantum Materials Technology (NCQMT). These key areas of research have been thrived out into various inter-disciplinary applications.

b. **Hyderabad laboratory:** C-MET, Hyderabad has evolved as a unique facility for high pure materials in the country and is working independently in a focused manner to create excellent national facility for ultra-pure materials, compound semiconductors, MEMS acoustic sensors, NavIC antennas for location mapping, Permanent magnets for electric vehicles, refractory metals, alloys, Restriction of Hazardous Substances (RoHS) and E-waste recycling.

c. **Thrissur laboratory**: Major thrust area of C-MET Thrissur includes microwave material (including microwave dielectrics and substrates), energy materials (Carbon aerogel and Graphene based super capacitors), Sensors and Actuators (Thermal sensors, Piezo ceramics and Piezo actuators) and Nanomaterial (nano structured oxides, thin films, thick films and materials for Plasmonic application), India Innovation Centre for Graphene (IICG) and IIoT sensors.

Various reputed organizations such as DRDO, ISRO and DAE institutions have joined hands with C-MET through Memorandum of Understanding (MoUs) to facilitate collaborative activities. These meaningful associations exemplify C-MET's dedication towards encouraging innovation, knowledge exchange, and progress in diverse fields through joint efforts.

9.3.2 Products developed by C-MET for different applications

- 3D Printable Composite Filaments and 3D printed Patch Antenna, materials for Additive Manufacturing technology.
- DLP-based 3D printing technology for low-cost Low Temperature Co-Fired Ceramic (LTCC) based electronics package fabrication
- Nano silver screen-printable ink for flexible Electronics Applications
- Silver screen-printed RFID tags technology for NFC applications
- Plasmonic based portable Biosensor with disposable chip developed jointly with C-MET and Rajiv Gandhi Centre for Biotechnology, Thiruvananthapuram
- Eddy current sensor fabricated using LTCC technology at C-MET, Pune
- LTCC based Micro coolers with one inlet and one outlet configuration for 200W microprocessors.
- Polybutadiene-based Cu cladded MW substrates of various dielectric constants
- CuIn1-xGaxSe2 and perovskite thin films and tandem solar cell fabrication
- New photocatalyst based on coupled catalytic system for Hydrogen generation and Metal Organic Frameworks (MOFs) for hydrogen storage.
- Developed the first indigenous pilot plant to produce space grade Hafnium (Hf) metal is established at C-MET, Hyderabad with the financial support from VSSC, ISRO. The plant has the capacity to produce 320 kg/annum of Hf sponge.
- Indigenously designed and developed Hydrogen Decrepitation Furnace
- Developed a cost-effective technology for discarded Li-ion battery recycling and transfer the same to 15 industries.
- Indigenous development of processing equipment for Printed Circuit Boards (PCB) recycling at 1000 kg per day capacity.

- Technology development on spent permanent magnets recycling and End of Life (EoL) Silicon Solar cells recycling.
- Developed Single element ultrasound transducer with central frequency of 3.5 MHz
- Developed the ferrite/ferromagnetic based metal oxide-polymer composites as microwave absorbing material.
- Miniaturized chip type multilayer type piezo actuator
- Tri-band composite NavIC Antenna
- Humidity/Temperature sensor Module with Zigbee communication
- Wi-Fi enabled temperature module for cold storage and perishable food and medicine supply
- Soil moisture sensor

The research achievements of C-MET have been particularly exciting, evident through 47 publications in esteemed peer-reviewed international journals, 10 prestigious awards and recognitions, 9 inventive patents, and 3 impactful books authored by our scientists. Additionally, researchers have contributed to the scientific community through 49 invited lectures at both national and international events, and they made their mark by presenting 60 enlightening papers at conferences and symposia of national and global significance.

9.4 Education and Research Network (ERNET) India

9.4.1 VSAT Network

ERNET India operates a VSAT Network in C-band which provides reliable Internet / Intranet access to education and research institutions located remotely in the country. The VSAT Hub is located at Bengaluru and it also functions as the Network Operations Centre (NOC). Presently, the network has 103MHz transponder bandwidth on GSAT satellite and this bandwidth is successfully used in providing High Capacity SCPC VSAT connectivity services to Lakshadweep Islands and Andaman & Nicobar.

The following are major projects under VSAT Network:

- **High Capacity SCPC VSAT links for National Knowledge Network (NKN)**

  ERNET India has established two High Capacity SCPC VSAT links for NKN project of MeitY located at (i) NKN Kavaratti, the U. T. of Lakshadweep Islands; and (ii) NKN Port Blair, the U. T. of Andaman & Nicobar Islands. The links are operational with total satellite bandwidth of 53MHz and are being used by NKN for providing connectivity to knowledge institutions of the respective areas.

High Capacity SCPC VSAT at Kavaratti, the U.T. of Lakshadweep Island for NKN

- **High Capacity SCPC VSAT links for LITSS Lakshadweep**

ERNET India has established 09 High Capacity SCPC VSAT links for Lakshadweep Information Technology Services Society (LITSS) in 09 Islands of Lakshadweep viz., Agatti, Amini, Andrott, Chetlat, Kadmat, Kalpeni, Kavaratti, Kiltan and Minicoy. The links are functional with total satellite bandwidth of 50MHz and are being used by LITSS, Lakshadweep.

9.4.2 Eduroam (education roaming) services in India

The 'eduroam' stands for **education roaming services**. It is the secure, world-wide roaming access service developed for the research and education community. It allows students, researchers and staff from participating institutions to obtain Internet connectivity across campus and when visiting other participating institutions. The 'eduroam' service is available in 106 territories worldwide.

ERNET India is a National Roaming Operator for providing eduroam services in India. This facility has been successfully availed by Indian and foreign participants in the universities/ institutions. Academic and Research Institutions including IITs, IIMs, NITs, Central and State Universities and various other renowned institutions are benefited from these services.

9.4.3 Establishment of Intelligent Educational Infrastructure (Smart) in Eklavya Model Residential Schools (EMRSs)

The project entitled 'Establishment of Intelligent Educational Infrastructure (Smart) in Eklavya Model Residential Schools (EMRSs)', approved by MeitY and jointly funded by MeitY and Ministry of Tribal Affairs (MoTA), is being implemented by ERNET India. The objective of the project is to setup the educational infrastructure in 328 nos. of EMRSs by creating ecosystem using latest tools and technologies, which helps to improve the learning outcome and also to provide the Internet connectivity in EMRSs. In phase-1 and 2, the ICT infrastructure has been installed and commissioned at 174 schools. In phase-3, the work of setting up of smart classes in the remaining 154 EMR schools is under progress.

9.4.4 Setting up Wi-Fi Enabled Campus Network at Patna University, Patna

ERNET India has established MeitY funded project "Setting up a Wi-Fi enabled campus network at Patna University, Patna, Bihar". The objective of the project was to setup a model Wi-Fi Enabled Campus Network at Patna University. The network at Patna University is a controller based high speed wireless network with security and centralized monitoring & management systems. The project was made functional and operational with effect from 5th March 2024 and is under warranty support for a period of 02 years.

9.4.5 Web Hosting Services

ERNET India is providing webhosting infrastructure on cloud and providing web hosting as a service on both sharing and dedicated mode to various academic & research institutions, organizations and departments of Government for hosting their websites, etc.

9.4.6 Participation in International Collaboration

ERNET India is a primary member of Asia Pacific Advanced Network (APAN) association which has members from various countries including India, Australia, New Zealand, Japan, Singapore, Malaysia, South Korea & China. APAN provides a forum for user communities to come together with network engineers to help promote and exploit opportunities to enhance research and education in relevant disciplines, like Tele-health, Natural disaster mitigation, Research collaboration, Knowledge discovery, etc. The Director General of ERNET India is an elected Director of APAN Board. Further, an official of ERNET India has been awarded fellowship under Fellowship program of APAN 57 meeting which was held in February 2024.

ERNET India is also a member of Asia Pacific Network Information Centre(APNIC) under 'Large' category. APNIC is a Regional Internet Registry (RIR) for the Asia Pacific region for providing Internet number resources to its members. It is one of the world's five RIRs (Regional Internet Registry's) and is part of the Number Resource Organization (NRO). APNIC manages Internet resources according to policies developed through an open process of consultation and consensus. The officers of ERNET India participated in APNIC-57 during 27 Feb-1 March 2024 in Bangkok (Thailand) and APNIC-58 during 3-6 September, 2024 in Wellington, New Zealand.

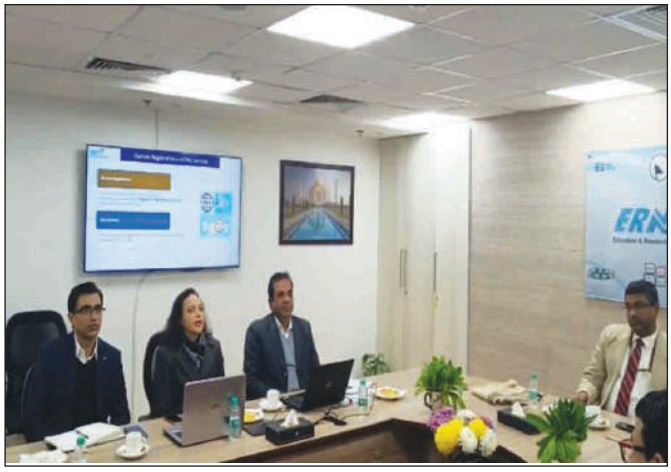
9.4.7 Domain Registration:

ERNET India is an exclusive Registrar for Domain name registration for the education and research sector under. in registry.

Under the .IN Registry, ERNET India has been registering 3rd level domain names under ac.in, edu.in, res.in since 2005. Additionally, ERNET India registers **विद्या.भारत** under Internationalized domain names (IDN). During the financial year 2023-24, ERNET India has *also* started registering domain names under **शिक्षा.भारत** and **शोध.भारत.**

In pursuit of providing high-quality services to domain users, ERNET India has developed an integrated domain portal for domain registration with Online payment, DNS Services and Value-Added Services i.e Website as a Service (WaaS) and Learning Management as a Service (LMaaS). Following are the key features of new integrated domain portal:

1. Registration and renewal of domain names for multiple years from 1year to 10 years.
2. Registration of domain names under 2 additional domain extensions - **शिक्षा.भारत** and **शोध.भारत.**
3. Easy to use online payment options including UPI
4. Dual Authentication for domain users for secure access to portal
5. Online updation of user contact information records and Nameservers
6. Customer support through Chat Bot
7. Provision of In-house Secure DNS Services
8. Generation of customized MIS reports and various customized settings of portal through admin panel



Figures: The integrated domain portal was launched by Hon'ble Secretary, MeitY on 5th Jan, 2024

Under the Value Added Services(VAS), any Institute (domain user) can create its own customized website and LMS portal/website with few clicks and minimal technical expertise. ERNET India is providing these domain related services at very nominal rates.

Following are the key features of the VAS:

a) Creation of CMS based secure website/portal in quick manner with click of few buttons.

b) Various ready-to-use templates to choose from, for the creation of website/portal

c) Specific Templates for Schools, Colleges and Universities for customized website

d) Upload educational contents such as presentations, pdf, docs etc.

e) One-Click secure hosting (https) of customized websites of domain users on ERNET India's cloud.

Currently, there are more than 18,000 active domains *registered* under the domain services of ERNET India.

9.4.8. Optical Wireless Access Network for Rural and Urban Communication

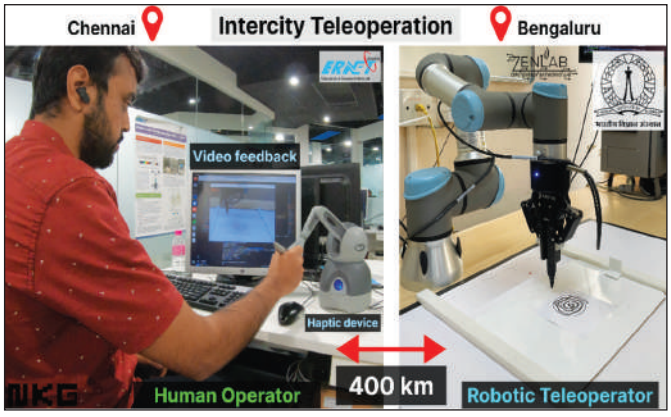
ERNET India has implemented Optical Wireless Access network for rural and urban communications, jointly with Indraprastha Institute of Information Technology, Delhi(IIITD), funded by MeitY. Under the urban scenario, Handover Algorithms for Hybrid LiFi-WiFi co-existence and link aggregation were developed.

Under the rural scenario, an optical link was established from LiFi transmitter to solar panel as an optical receiver. The experimental evaluations were carried out in outdoor environment. The peak data rate of 10 Mbps was achieved at a distance of 4 meters using OFDM modulation. The designed system supports the connectivity upto 10 meters of distance between the solar panel and transmitter. The project has been successfully completed.

9.4.9. Designing Reliable and Low-latency Networks for Tactile Cyber-Physical Systems

ERNET India jointly with Indian Institute of Science (IISc) Bangalore is executing a project on "Designing Reliable and Low-latency Networks for Tactile Cyber-Physical Systems", funded by MeitY, with an objective to design and implement Tactile Cyber-Physical System that addresses the challenges of achieving real-time interaction between physical and virtual worlds in prominent applications like teleoperation and virtual reality that require ultra-reliable low latency communications (URLLC).

WAN link setup between ERNET Chennai and Bengaluru has been configured with DSCP Expedite Forwarding (EF) strategies for transmitting both priority flows and best effort flows. The WAN link configurations are currently being experimentally evaluated with the Geomagic Touch (Haptic) device setup at one end (ERNET Chennai) and robotic arm at other end (IISc Bangalore). Further, the IEEE TSN strategies developed under the project are evaluated in the end-to-end network for demonstration with teleoperation or AR/VR use case using haptic device and robotic arm.



Haptics application demonstration between ERNET Chennai and IISc Bangalore

9.4.10. Network Management Innovation and Experimentation with MAQAN

ERNET India through the "Network management, innovation and experimentation with MAQAN" project funded by MeitY joined the MAQAN initiative executed between IIT Madras, C-DAC and SETS.

ERNET India is hosting the quantum key distribution node and actively participating in experimental work using the MAQAN testbed. MAQAN fiber links has been established between IITM, ERNET India, SETS and NIC, and the testbed links are being monitored regularly. A new 2-core fiber cable has been laid between SETS and NIC for extending the MAQAN testbed to NIC. There is an additional Free Space Optics (FSO) classical communication link between 6th floor Electrical Science Block at IITM and D-Block 9th floor at ERNET India at IITM-RP is being established as part of the MAQAN.

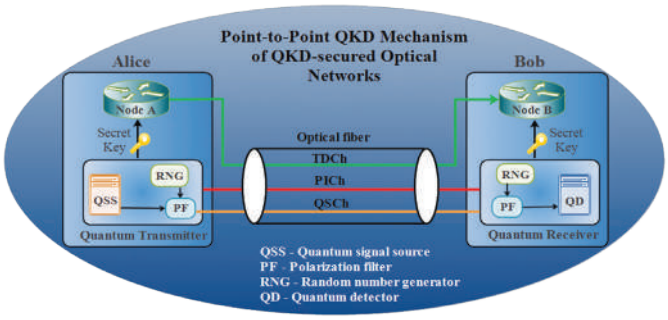
The MAQAN network links are being monitored using Optical Time-Domain Reflectometer (OTDR) traces by integrating the NMSWorks OTDR device for live monitoring of the OFC cable and the dashboard to view the real time OTDR integrated with Q-SDN software. ERNET India is also contributing to standards through TSDSI SGSS study item on "Interoperability of multivendor QKD node using SDN'.

9.4.11. Quantum Key Distribution-based Ultra-Secure and Reliable Optical Networks using Shared Fiber Topology

ERNET India jointly with IIT Indore and NSUT Delhi is executing MeitY funded project on "Quantum Key Distribution-based Ultra-Secure and Reliable Optical Networks using Shared Fiber Topology", from Aug 2023 to Dec 2025. The objective of the project is to analyze a physical layer model of a quantum channel integrated with the existing optical networks, demonstrate co-existence of quantum and classical data channels, investigate new disaster aware strategies for providing survivability against natural disasters in optical networks integrated with QKD, and strategies for optimal placement of trusted repeater nodes (TRNs) in a metro area network.

Simulation of the BB84 quantum key distribution (QKD) protocol using IBM Qiskit is in progress to explore

the impact of noise in a quantum channel. Further, the classical channel can be simulated by adding different noise models that could result from classical communication. The goal is to multiplex quantum and classical data into a single optical fiber and analyze how noise and potential security attacks affect quantum information. Once the simulation is complete, calculation of key performance metrics such as Quantum Bit Error Rate (QBER), secret key rate, and yield. These metrics helps in understanding the channel's resilience to noise and its security performance under practical conditions.



Proposed architecture of QKD-secured Optical Networks

9.4.12. Advanced Optical Communication Testbed – QKD Network Security

ERNET is a member of the IIT Madras led "Advance Optical Communication (AOC) testbed" project consortium. The AOC testbed is funded by DoT under the Telecom Technology Development Fund for the duration of 2 years from Oct 2023 to Oct 2025.

ERNET Work Package (WP15) focuses on the QKD Network Security. In collaboration with CDOT and MAQAN project partners, ERNET India will add additional QKD node to the existing MAQAN testbed. As part of the project various security attack scenarios will be emulated and suitable mitigation strategies will be developed. One of the goals of the project is to develop SDN-enabled path control methods in the event of link failures due to security attacks such as Trojan horse and fibre tampering.

ERNET India has signed an MoU with C-DOT for the collaboration under the AOC testbed project. In consultation with C-DOT, the technical specifications for the nodes belonging to Alice, Bob, and Eve have been finalized for the QKD security system architecture. The integration test for combining the C-DOT QKD node with the MAQAN testbed has been successfully completed, and the integration process will be fully finalized during the deployment of the C-DOT's QKD node. For the testbed, the Eve node supports two attack scenarios: the Trojan Horse attack and the Fiber Tampering attack. An experimental work has been carried out in terms of QBER, SKR, and click rate.

Further, involving secured optical path provisioning using SDN has been initiated. Initially, link failure scenarios will be identified, and software tools/frameworks will be developed for path provisioning to provide alternate paths when QBER increases. Also, ERNET India will be contributing to QKD standardization study items at TSDSI.

9.4.13. A Comprehensive IoT Security Ecosystem and Sandbox

ERNET India executing a MeitY funded project on "A Comprehensive IoT Security Ecosystem and Sandbox", executed jointly with C-DAC, IIT Madras, IIT Bombay, IIIT Bangalore, SETS and Amrita Vishwa Vidyapeetham.

The objective of the project is to develop an IoT Sandbox Environment for validating the functionality and security of IoT devices and networks. It will involve creating indigenous hardware and software tools, such as libraries, scripts, and evaluation methodologies, to thoroughly assess IoT systems. Further, a Sandbox will be set up as a demonstration hub to showcase the tools as a facility and for collaboration. ERNET will be contributing for functional validation of IoT device like network layer protocol analysis, application layer analysis and basic cloud interfacing.

9.4.14. Work Based Learning (WBL) programme to strengthen and empower SC/ST/Women/EWS graduate engineers

ERNET is one of the Implementing Organization in the MeitY funded 'Work Based Learning (WBL) programme to strengthen and empower SC/ST/Women/EWS graduate engineers through MeitY institutions' led by C-DAC Mohali, for duration of 5 years from April 2022 to March 2027.Under this program, 6 months paid

Internship is offered to the candidates under selected categories. Overall, ERNET across its three regional centres (Delhi, Chennai and Bangalore) will provide opportunity to 180 WBL beneficiaries over the 5 year project period (36 Interns per annum). So far, 70 WBL interns were benefitted under this programme working on various ongoing project initiatives.

9.5 National Informatics Centre (NIC)

9.5.1 About National Informatics Centre (https://www.nic.in)

NIC under the Ministry of Electronics and Information Technology (MeitY) is the technology partner of the Government of India. NIC was established in 1976 with the objective to provide technology-driven solutions to Central and State Governments.

NIC MANDATE:

- Technology partner of the Government
- Design and Develop IT Systems for the Government
- Provide ICT Infrastructure to the Government
- Explore & Advise on use of Emerging Technologies

Since its inception, NIC has been a driving force for digital advancements that promote sustainable development. With over 47 years of experience, NIC has played a crucial role in providing support for Information and Communication Technology (ICT) and eGovernance.

9.5.2 Network Services

9.5.2.1 NICNET

NIC Network (NICNET) backbone is fully upgraded to multiple 10 Gbps capacity with sufficient redundancy. NIC States are connected through multiples of 10 Gbps links and NIC District Centres are connected with 34/100 Mbps links with redundancy built at State and District links. Last mile redundancy for NICNET has been extended to a greater number of districts, with primary links from BSNL and secondary links from RailTel/PGCIL. Most of the Bhawan Links at Delhi are upgraded from 100 Mbps to 1 / 10 Gbps depending upon the requirement.

Through the creation of NICNET, the ICT Network, NIC has established connections with Central Government Ministries/Departments, 36 State Governments/Union Territories, and more than 758 District administrations in India, aligning itself with the goals of the Digital India program.

Direct peering of NICNET with BSNL, PGCIL and RailTel are completed at Delhi and Hyderabad for saving Internet Bandwidth and faster access of each other's Network and Data Centre. Peering with Google, Microsoft, Facebook, and Akamai Content Delivery Network has facilitated faster access to Google services and other important international websites. NIC network has been enabled to minimize delay and handle large scale important video conferencing such as PRAGATI and GST Council Meetings.

High speed Internet services are provided to all National Data Centres (NDCs) to ensure applications hosted are accessible to users across the globe with minimum latency. Capacity planning and upgradation of Internet Gateway at regular intervals has been undertaken to provide smooth Internet access to all NICNET users throughout the country. To maintain accurate timing and synchronization of all network elements and servers on the network Stratum-1 clocks are installed at Delhi and Hyderabad.

9.5.2.2 NKN

The details are available in Chapter 2 at Section **2.4.2 National Knowledge Network (NKN)**

9.5.3 Data Centre & Cloud Services

9.5.3.1 Data Centre

NIC has set up state-of-the-art National Data Centres at Delhi, Pune, Bhubaneswar, and Hyderabad to provide cloud services to various central and state Government Ministries, departments, and PSU etc. at all levels. These Data Centres combine round-the-clock operations and management of systems with onsite skilled personnel. These Data Centres are designed to provide a full stream of hosting services which extend from physical to shared hosting, dedicated servers with managed hosting solutions to infrastructure services like collocation & bandwidth, Disaster Recovery (DR) etc. Many missions critical applications/web sites of various State and

Central Government departments are hosted at these Data Centres.

At the National Data Centre, the storage capacity was augmented, and the capacity has been increased to approx. 100PB. It includes All Flash Enterprise Class Storage, Object storage, Unified storage etc. Around 5000 odd servers are being used for various cloud workloads. NDC Delhi and NDC Bhubaneswar are ISO 27001:2013 certified.

Another state-of-the-Art National Data Centre (Tier-III) of 200 Racks expandable to 400 Racks is being established at Guwahati, Assam. The non-IT infrastructure is nearing completion and for ICT establishment a work order has been issued to the selected MSP. This National Data Centre is expected to be operational by 2025.

Presently, National Data Centres of NIC/NICSI at Delhi, Hyderabad, Pune, and Bhubaneswar are dedicated to host NIC National Cloud under the umbrella of Meghraj Cloud, a Government of India initiative which has been providing a wide range of services which include but not limited to IaaS, PaaS and SaaS, which can be used to host websites, portals, web & mobile applications. NIC Cloud Service offers various services including virtual servers, Kubernetes containers, DevOps and provides hosting support to all types of applications. This allows cloud users to avail the services from multiple locations as per their choice and prepare the DR setup. In recent years, government organizations have been adopting cloud technologies and hosting their ICT applications on cloud platforms. NIC National Cloud is the de facto platform to host any applications & workloads. To further enhance cloud capacity from NDCs at Delhi, Pune, Bhubaneswar and Hyderabad, managed service providers have been on-boarded in the PPP model. Under this initiative Cloud Services in pay-as-you-use model have been made operational from 2 NDCs (Bhubaneswar and Hyderabad) already.

9.5.3.2 Cloud Services

NIC launched National Cloud Services in 2014 under Megh Raj Government of India Cloud Initiative. NIC Cloud Services are being provided from multiple locations of the National Data Centre. Container as a Service and multiple Artificial Intelligence based services are now offered on NIC Cloud platform such as External Endpoints, Software as a Service, WAF as a Service, Agile as a Service, Resource Monitoring as a Service, Data Analytics (DA) as a Service, Application Performance Management (APM) Service, Load Testing as a Service, AI – Manthan, AI – Tainaatee, AI – Satyapikaanan, AI – VANI, AI – Panini, AI – Shruti, AI-Saransh, etc.

To cater the projects envisioned under the Digital India program and growing requirements of existing Projects, over 28,855 Virtual Servers were provisioned and allocated to over 1917 Users/Applications for e-Governance Projects.

National Informatics Centre has taken various steps to augment the existing Cloud Infrastructure of the National Data Centres (NDCs) to provide SLA based managed Cloud services in collaboration with industry stakeholders. To achieve this goal, the National Government Cloud (NGC) is being set up. NGC shall consolidate the cloud services across NDCs via a single Cloud Management Platform.

9.5.3.3 Command and Control Centre

Command & Control Centre (CCC) has been operational at NIC HQ with the objective of providing a single window solution for monitoring, troubleshooting and technical support for applications hosted in NIC Cloud, National and NIC Mini Data Centers across the country. CCC has been providing following services:

(i) **CDN service**
(ii) **Resource Monitoring Service**
(iii) **Application Performance Monitoring (APM)**
(iv) **NIC Assurance (Load Testing as a Service)**
(v) **Troubleshooting & technical support**
(vi) **DC service**

9.5.4 Cyber Security

Cyber Security incorporates the security standards and procedures followed to ensure protection of sensitive data, personal information, intellectual property etc. Multi layered access mechanisms are implemented on information systems for prevention from security breach and unauthorized access.

9.5.4.1 Network Security

During the year, the Network Security Division (NSD) was constantly engaged in ensuring Cyber Security of NICNET information infrastructure through assessment, planning, deployment, management and administration of state-of-the-art security appliances and solutions. The security span of NSD comprises National and State Data Centers, over 1000 LANs of Govt. offices and MPLS networks, more than 2 Lac endpoints and a series of networking devices deployed across the country. Multi-layer security was provided to NICNET users with high availability infrastructure and specialized teams were deployed to work on different Layers of security. Critical Security Controls were maintained for effective cyber defense and change control management. Distributed Denial of Service (DDoS) attacks towards NIC infrastructure were prevented using Anti-DDoS Appliances deployed at gateway level in National Data Centers (NDCs). Network Firewalls are being used to provide the requisite security to the digital assets in NIC's National and State Data Centers. Network Intrusion Prevention Systems (NIPS) were maintained in monitoring and blocking mode for performing deep packet analysis. Up-to-date signatures were applied on a regular basis in all IPS Sensors deployed in NICNET across the country. Geo-fencing of applications was also facilitated wherever it was needed.

As a part of enhancing endpoint security, the Host Intrusion Prevention System (HIPS) solution was deployed in server systems in National Data Centers. Next Generation Antivirus solutions with AI & ML, Endpoint Detection & Response (EDR) and Sandboxing for malware analysis were deployed in client and server systems in NICNET. Necessary support was provided to server owners to fix the vulnerabilities and improve the VA score so that the applications can be securely deployed. Audit of Network and Security devices was conducted at National Data Centers, State Data Centers and various State & Bhawan networks.

The 24×7 Security Monitoring Centre was constantly engaged in identifying suspicious activities towards NICNET based on real time log correlation using SIEM solution. Several awareness programs and capacity building programs were conducted on Cyber Security.

9.5.4.2 NIC-CERT

NIC-CERT has been set up with the objective of creating a comprehensive security and incident response framework that integrates world class security components and inbuilt threat intelligence for detection, prevention and incident management. Using the tools, the team monitors and correlates events that would help in generating a canvas of the attack surface and identify the vulnerabilities and possible exploits.

KEY INITIATIVES:

- Continuous analysis of logs and traffic patterns enabled early detection and mitigation of critical vulnerabilities. A Unified Intelligence Platform was rolled out for monitoring of Dark web/Deep web, Social media, mobile Apps and for brand monitoring & protection.
- NIC-CERT integrated the Threat Intelligence Platform (TIP) into its security operations, significantly boosting its ability to identify and analyze threats in real time.
- The team played a crucial role in securing government IT infrastructure by real-time monitoring and effectively managing over 43,328 cybersecurity incidents, minimizing downtime and mitigating risks to sensitive data.
- NIC-CERT conducted multiple workshops, webinars, and training sessions for government employees covering topics such as phishing attack prevention, safe browsing practices, and secure handling of digital resources.
- Strengthening collaboration with other national and international CERTs, NIC-CERT facilitated the exchange of threat intelligence to combat emerging cyber threats.
- To bolster preparedness, NIC-CERT conducted simulated cyberattacks as a part of red teaming and regular vulnerability assessments across critical government systems were conducted.
- The deployment of the DHRISTI (Dynamic Holistic Real-time Identification System for Threat Intelligence) framework marked a significant milestone in threat analytics.

During the year, NIC-CERT has ensured round the clock Cyber Security of NICNET in general and National and State Data Centres in particular during the year. The NIC-CERT team was constantly engaged in monitoring alerts from security appliances and solutions deployed in its security span comprising various Data Centres, over 1000 LANs of Govt. offices and MPLS networks, more than 2 Lakh endpoints and a series of networking devices deployed across the country. The centre was operational 24x7, functioned uninterrupted during the period and took care of real time monitoring, detection, prevention, analysis and reporting of cyber threats and attacks. Asset owners were alerted on attack attempts and remedial measures were suggested on a regular basis.

9.5.4.3 Application Security

Security Audit of hosted Web Applications / Websites is taken up as per the NIC Security Audit policy. The Security Audit activity comprises Source Code Analysis, Automated scanning and Manual Audit process. Periodic Audits in the form of Post deployment vulnerability. Testing (Penetration Testing) and Vulnerability Analysis, SSL compliance testing, Version. Detection for the application hosting environment with infrastructure compliance checks are also undertaken. Response provided to Application Security issues received through RTI, Parliament questions, grievance, and LEAs. Capacity building programmes for NIC, Government officials in the Information Security domain are taken up on a regular basis.

NIC has also been spearheading the Comprehensive Security Audit of 112 critical ICT applications/Databases of the government based on a 282 pointers checklist.

9.5.4.4 NIC VPN (Virtual Private Network)

Virtual Private Network is a secure method of connecting **remote** users to their private and corporate networks over the Internet.

NIC's VPN service is used by Government officials, Central and State Government departments, PSUs, and Autonomous bodies under Central and State Governments to

a) access e-governance applications and

b) update their web sites and remotely manage the servers hosted in NIC's Data Centers.

- Web VPN: Web Based Users (application access): 6,00,000+
- Remote access: Client Based users (Server Management): 20,000+
- Site to site Users: 80+

VPN Services provided to:

- 50+ Central Ministries and 500+ its Departments, all State Government and its Departments and 700 Collectors, 187 Indian missions abroad, Intelligence agencies etc.
- Total applications on boarded: 550 +
- Average no. of connections per day: 60,000+
- Average time spent on VPN per day: 3-4 hours
- Uptime of service: 99.9 %

9.5.5 Web, Messaging and Support Services

9.5.5.1 Gov.in Domain Registration Service (https://registry.gov.in/)

The National Informatics Centre (NIC) is the sole authority responsible for registering domain names under the Gov.in domain, ensuring that the allocation process complies with the guidelines set forth by the Ministry of Electronics and Information Technology (MeitY). Domain names are not limited to English; they can also be registered in various official regional languages, using Internationalized Domain Names (IDN), which promotes the development of fully localized websites—from the domain name to the site's content—in different languages. This is a key step toward enhancing accessibility and inclusivity for regional users.

The entire domain registration process is conducted through NIC's registry portal. Applicants can log in to the portal and complete the registration process online, benefiting from various features, including the e-Sign facility. Currently, there are 5,026 of total Active Domain (3rd level) 1,45,224 of Total Active domain at 4th level (Registered under 3rd level Domain Hosted in NIC).

9.5.5.2 Email

E-mail serves as the backbone of all e-Governance initiatives in the country. The service was implemented by NIC and has been massively used by both Center and State Governments. The service provides 24×7×365 support to a user base of more than 33 lakh officials under Ministries/ Departments/ Statutory bodies/ Autonomous bodies of both Central and State/ UT Governments.

The prominent features supported by the service are multi-lingual support, Internationalized Domain Name (IDN), Standardized Official Template, User Persona, Video Conferencing Integration, Undo Send, Briefcase etc. The security features offered in the service are Multifactor Authentication, Geo-fencing, Device Mapping, Mail encryption etc.

9.5.5.3 Messaging services (SMS, WhatsApp, IVR)

NIC SMS gateway, hosted at NDC Delhi and Hyderabad, provides PUSH PULL SMS services. It is a TRAI TCCCP regulation 2018 complaint. There are 3738 applications integrated, which send 8 to 9 crore SMS per day to citizens as well as international subscribers. Major applications include, UIDAI, GSTN, UMANG, DigiLocker, Parichay, UWIN, Bharat Ke Veer, MyGov, CGHS, EPFO, Courts, Sansad, PMO etc. On an average 18 SMS campaigns per month have been executed for information dissemination and citizen engagement like Rozgar Mela, Yuva Pratibha, Digital India Week, Garib Kalyan MahaQuiz, Chandrayaan Quiz, Trinity Quiz, UPSC, Cooperative Society, PPC etc. The gateway is integrated with all major TSP (telecom service providers) with a combined bandwidth of 26000 TPS (transaction per second). In 2024, till the writing of this report 3053 crore SMS were transacted. NIC SMS gateway delivers more than 90% of SMS and 95% of OTP SMS, which is at par with industry standards.

NIC SMS Gateway also provides voice services like OBD (Out Bound Dialing) and Miss Call services. Total around 10 crore missed calls have been generated by citizens accessing various services like EPFO, UMANG, MNRE, eKAMAAN etc. Similarly, 3.4 crore OBD made under MyGov, Punjab Grievance, Mera Aaspatal, MyBharat, CM Office Haryana etc. This resulted in more than 53 crore seconds duration voice calls to citizens. 30+ departments onboarded for WhatsApp service. In 2024, 19.80 crore messages were shared.

9.5.5.4 Single Sign on Parichay

Single sign-on (SSO) is a centralized session and user authentication service in which one set of login credentials can be used to access multiple applications.

Parichay: SSO framework for the **Government to Government (G2G) Services** along with an added layer of security by providing a strong authentication mechanism.

Parichay application allows the user to access multiple applications through single sign-on. Once the user login to the Parichay application, all the applications that comply with Parichay integration will be auto logged in by sharing Parichay sessions. After login to Parichay, the user can move seamlessly between two or more applications.

Jan Parichay (Meri Pehchaan): SSO framework for **Citizen-Centric (G2C) Services** that authenticates user using any of the user identifier like Email/ Mobile/ Aadhaar/PAN/Other Government Ids

9.5.5.5 Government Instant Messaging System (GIMS) - Sandes

SANDES stands as a secure and indigenous open-source instant messaging platform developed by the National Informatics Centre (NIC). It is designed to facilitate communication between government entities (G2G) and between the government and citizens (G2C) with a strong focus on security and privacy. Every message within Sandes is encrypted end-to-end (E2EE) for enhanced protection. The key features of Sandes encompass one-on-one and group chat functionality, audio and video calls for both individual and group conversations, seamless contact synchronization with your phone's address book, the ability to share media files and message broadcasting. The Sandes adheres to the Social Media Intermediary Guidelines and the government's Privacy and Data Retention policy, ensuring compliance with official regulations.

This versatile platform is actively used by various government ministries and state departments, including Delhi Police, Defense Production, AIIMS, BSF, and

more. Additionally, it has been seamlessly integrated with a range of e-Governance applications, such as ICJS, NIC email, eOffice, DigiLocker, PFMS etc. for secure messaging, alerts, and the delivery of one-time passwords (OTP). The Sandes App is readily available on both the Play Store and the App Store, making it easily accessible to authorized users.

9.5.5.6 Service Desk

NIC Service Desks (NSD) has been steadfast in its mission to provide a single-window platform for resolving issues related to a wide range of services offered by NIC. NSD serves as the Single Point of Contact (SPOC) for government entities, statutory bodies, and the general public, enabling them to raise queries, calls, complaints, and suggestions for any issues they encounter in their day-to-day activities with different NIC services.

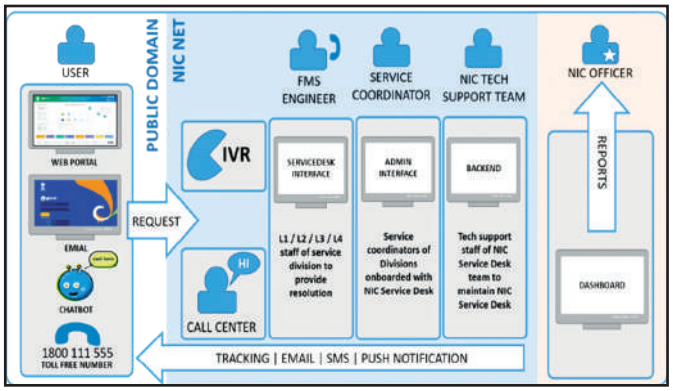


Image: Showing request low of the NIC Service Desk

NSD enables 24×7 support through a toll-free call center (1800111555) and a user-friendly web portal (https://servicedesk.nic.in), where complaints related to any NIC services can be effortlessly lodged.

9.5.6 Video Conferencing Technologies and Services

9.5.6.1 Video Conferencing Services

NIC provides video-conferencing services from more than 2700+ videoconferencing studios spread across the country which includes all Central Ministries/ Departments, State & District Hqrs., Union Territories, etc. Video conferencing infrastructure over NICNET has been strengthened by augmenting with state-of-the-art technology as per latest technological trends keeping in pace with the international standards.

NIC's video-conferencing services are being used for monitoring of various Government Projects, Schemes, Public Grievances, monitoring of law and order, Hearings of RTI cases, Tele-education, Tele-medicine and launching of new projects/schemes etc. NIC is also providing state of the art cloud-based video conferencing solutions, which enables services from **Anywhere, Anytime, and Any network**.

NIC has also developed an in-house webinar application by integrating with BharatVC and webcast streaming application. This is being used to organize training programs, workshops, seminars and other official events.

NIC's video-conferencing services are being extensively used by highest dignitary of the country i.e. **Hon'ble President of India, Hon'ble Vice President of India, Hon'ble Prime Minister of India, Union Ministers, Governors, and Chief Ministers of States, Cabinet Secretary, Chief Secretaries, Chief Election Commissioner, Chief Information Commissioner** and various other senior officials across the country.

During the year, about 2.60 lakh multi-site video conferencing sessions were conducted with more than 23.13 participants in 14.75 lakh site hours.

9.5.6.2 Webcast & Webinar Services

NIC has been providing webcast services for the last two decades. NIC webcast services cover events like Union Budget, President and Prime Minister's addresses, Prime Minister's Mann ki Baat, Independence Day and Republic Day celebration (New Delhi), PIB Press conferences, Army and Air force day celebrations, State Assemblies proceedings etc.

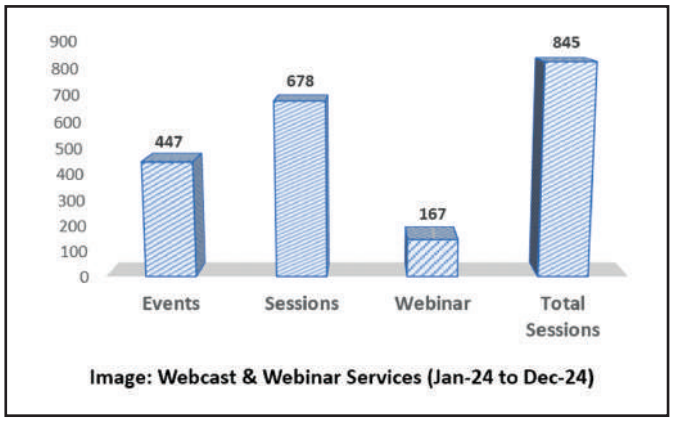


Image: Webcast & Webinar Services (Jan-24 to Dec-24)

9.5.7 Geospatial Technology and Services (https://mapservice.gov.in/, https://stategisportal.gov.in/)

1. **BHARAT MAPS (https://bharatmaps.gov.in/)**

   To fulfill the objectives of Digital India and to establish end to end geospatial electronic delivery systems as part of National GIS Mission Mode Project, GIS Platform was established by NIC using NICMAPS Services. It has been revamped as "BHARAT MAPS". This depicts core foundation data as "NICMAPS", an integrated multi-scale, multi-resolution base map service using reference data from Survey of India, ISRO, FSI, RGI and so on. This encompasses a large number of layers containing administrative boundaries, transport layers such as roads & railways, forest layer, settlement locations etc., Service offerings include India specific Basemap services, updated Admin boundary database, coding and reverse geocoding services and All-India rural focused navigation services.

2. **Map Service Portal (https://mapservice.gov.in/)**

   Map Services are being provided to various ministries and departments through the map services platform. About 250 applications are using these services.

3. **State GIS Portal (https://stategisportal.nic.in/)**

   STATE GIS PORTAL empowered by BharatMaps is a simplified user interface for all the states and union territories of India. Six Centers of Excellence in GIS have been established in Madhya Pradesh, Tamil Nadu, Odisha, Bihar, Andhra Pradesh, and Assam. They are also offering GIS services to various departments.

4. **Survey of Villages Abadi and Mapping with Improvised Technology in Village Areas (SVAMITVA) (https://svamitva.nic.in/ , https://grammanchitra.gov.in/)**

   SVAMITVA Dashboard Application provides role-based access to update status on Key Performance Indicators of SVAMITVA scheme dealing with drone survey of village Aabadi areas and activities involved there on resulting in Property card generation and distribution. The key stakeholders are the Ministry of Panchayati Raj, Survey of India, State Govts and NIC. The Portal was also used to distribute property cards to beneficiaries through SMS. The drone data which is generated under SVAMITVA project being integrated with GramManchitra application for rural planning.

5. **Parivesh GIS Portal (https://parivesh.nic.in/.)**

   Geospatial division is playing an important role in another flagship project PARIVESH for the Ministry of Environment, Forest and Climate Change where GIS based decision support is integrated in the workflow of Clearance process from Stakeholder level to decision authority level.

6. **Power Portal (https://indiapowermap.gov.in)**

   India power portal is a GIS based web application for mapping and analysis of electricity infrastructure. This project aims at mapping the existing assets and planning for new assets under various schemes in REC and IPDS under the ministry of power for strategic decisions.

7. **GIS For Financial Inclusion (https://dbtgis.nic.in)**

   DBT-GIS is an application of mapping of financial infrastructure across the country to facilitate financial inclusion of rural masses so that Direct Benefit Transfer can reach the unreached. This application captures, edits, views and analyzes the financial services touch points and its service delivery to six lakhs plus villages of the country.

8. **School GIS (https://schoolgis.nic.in)**

   School GIS project has been undertaken for the Department of School Education and Literacy under the Ministry of Education to visualize and analyze the GPS data of school locations collated from various State Government Departments on the National GIS Platform established at NIC.

Geo-Spatial Technology and Services also plays a crucial role in the management and planning of utility service systems. Utility Service Systems includes Global

Positioning System, CORS, Topographic/Cadastral Mapping, UAV / drone survey Photogrammetry and AM/ FM/GIS. One Map Series has been launched for cities wherein all city level modules like plot information, Utility workflow management, Solid Waste management, Vehicle Tracking and Road information are incorporated. Some of the major projects accomplished in this financial year are One Map Greater Noida Geo portal, One Map Noida Geo portal, Mega City Portal, Delhi Jal Board, E-Dharti web and Goa State Urban Development Agency (GSUDA).

9.5.8 ICT Solutions for Northeastern Region

Project Monitoring System (PMS) for monitoring progress of projects under various schemes has been implemented by the Ministry of Development of Northeastern Region (MDoNER).

A. POORVOTTAR SAMPARK SETU (https://nesetu.mdoner.gov.in/)

Hon'ble MoS, MDoNER, launched the 'POORVOTTAR SAMPARK SETU', a powerful portal to manage Minister's visits to NER, more effective, transparent and impactful. The portal provides valuable insights and graphical information about State wise/ District wise visits to NER.

B. DoNER Analytics Dashboard (https://dashboard.mdoner.gov.in/)

Portal show cases 828 KPIs of 143 GOI schemes from 51 GOI Ministry /Department covering 6 major sectors.

C. POORVOTTAR VIKAS SETU – Pre-Sanction (https://nesetu.mdoner.gov.in/vikassetu/)

This Portal is a tool for complete project life cycle broadly classified under pre-sanction and post-sanction. Portal assists in monitoring the implementation of the Projects pertaining to the North Eastern Region commencing from the submission of the Project Proposal in the form of Concept Note & DPR until the completion of the Project.

D. POORVOTTAR VIKAS SETU – Post Sanction (https://ne.pmgatishakti.gov.in/DoNER/login)

PM Gati Shakti portal in addition to GIS mapping of the projects has been customized to act as a Project Monitoring System (PMS) for all the MDoNER projects. In this portal around 3579 projects of various schemes of MDoNER are present and monitoring the implementation and progress of projects & updation of data related to all those projects is carried out.

E. Projects Dashboard (https://mdoner.gov.in/dashboard/)

This is the Projects Dashboard, which shows the details related to all the projects, which are implemented by MDoNER and NEC.

F. 10% GBS MIS (https://nesetu.mdoner.gov.in/gbs/)

The main purpose of this portal is to monitor the financial expenditure made by 54 non-exempted ministries.

9.5.9 Innovation and IPR

Intellectual Property & Know-How Informatics Division takes care of IPR Management of NIC-developed software solutions with particular emphasis on Copyright Registration and Trademark Protection.

NIC's IPR Profile

- Total Copyrights Registered - 95.
- In 2024 Registered – 5, Applications pending at Copyright Office - 1, Under Process (in house) - 1
- Total Trademarks Registered - 1 Trademark in the USA; Trademark of 10 NIC Logos; Trademark of NIC Application Logos Applied for - 7
- Total Patents Granted - 1 Patent in the USA; In 2022; 1 Patent for Jal Tarangini applied by NIC Assam in 2024

9.5.10 eGovernance Services and Products

NIC is playing an instrumental role in executing key IT projects, in close collaboration with Central and State Governments, making the last-mile delivery of

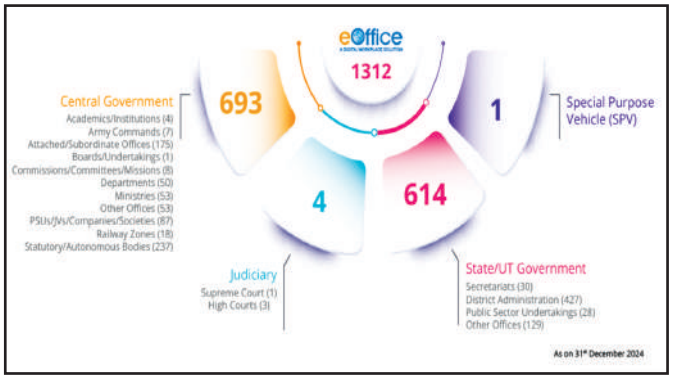
government services to the citizens a reality, through a variety of digital solutions. NIC endeavors to cater to ICT needs at all levels of governance including central, state, districts, judiciary, and legislative layer.

9.5.10.1 eOffice (https://eoffice.gov.in)

eOffice is one of the key IT projects of NIC, aimed at improving internal efficiencies in an organization through electronic administration leading to informed and quicker decision making, which in turn results in better public service delivery. It is a complete digital workplace solution for Government offices and is based on the Central Secretariat Manual of Office Procedure (CSMOP), formulated by Department of Administrative Reforms and Public Grievances (DAR&PG).

The eOffice analytics dashboard facilitates ministries/ departments to view the progress on delayering, receipt pendency and inter-ministerial movement of files status on the eOffice analytics dashboard.

Kanthastha is a translation utility built by Rajbhasha Vibhag & C-DAC with eOffice for translation of content written in English to Hindi & vice-versa.



9.5.10.2 My Gov

A platform for citizens' Engagement towards Good Governance (https://www.mygov.in/)

The MyGov platform has successfully empowered citizens by providing them with a direct voice in the governance process. It has established a framework that enables citizens to actively participate as stakeholders, not only in policy formulation but also in implementation through actionable tasks and meaningful discussions.

In the year 2024-25, the MyGov platform reached 494.59+ lakh registered users, with 117 episodes of 'Mann Ki Baat' aired. The portal is now accessible in 11 languages. MyGov operates in 24 State/UT instances, including Chandigarh, Himachal Pradesh, Haryana, Maharashtra, Madhya Pradesh, Uttar Pradesh, Karnataka, Tamil Nadu, Gujarat, Rajasthan, and others, ensuring wide citizen engagement across the country.

9.5.10.3 India Portal

The India Portal started in 2005 as a mission mode project under the National e-Governance Plan. The aim was to serve as a single window for government information and services, promote standards for e-governance, and encourage innovative digital initiatives.

Initiatives/activities under the aegis of India Portal are:

- **National Portal of India (https://www.india.gov.in)**

  National Portal of India (NPI) provides single window access to government information and services for citizens, businesses, overseas Indians etc. Over the years, NPI has successfully met its goals to promote e-governance and encourage technology innovation. The India Portal has over 28.9 million visitors (65 million-page views) and 10.78 Lakh registered users.

- **National Government Services Portal (NGSP) (https://services.india.gov.in)**

  The National Government Services Portal (NGSP) serves as a centralized hub for services provided by various government entities. The portal lists over 13871 services that can be searched by

categories and has over 43.4 million visitors (97.6 million-page views).

- **Integrated Government Online Directory (iGOD) (https://igod.gov.in)**

  The integrated iGOD platform serves as the central directory of websites of government entities at all levels. It comes equipped with various filters, and categories that have been thoughtfully designed to streamline the process of accessing government websites.

- **Guidelines for Indian Government Websites (GIGW) (https://guidelines.india.gov.in)**

  Launched in February 2023, GIGW 3.0 is a collaborative effort with STQC and Cert-In. This updated version prioritizes Security, Accessibility, Quality and Lifecycle management. It has the responsibility of the three stakeholders viz. Organization, Developer, Evaluator with respect to each guideline and the risk associated with non-compliances.

- **Know India Portal (https://knowindia.india.gov.in)**

  The Know India Portal celebrates our nation's rich cultural tapestry, offering a glimpse into India's soul. It serves as a repository of our heritage, symbols, and traditions, allowing users to explore our country's cultural diversity, unique traditions, and more.

9.5.10.4 S3WaaS

S3WaaS (Secure, Scalable and Sugamya Website as a Service) developed by the National Informatics Centre (NIC) helps government entities to generate Secure, Scalable, and Sugamya (Accessible) websites. It allows government entities to select from various certified templates and offers easy customization and content management, enabling them to maintain their online presence and publish citizen-centric information with minimal effort and technical expertise.

S3WaaS offers GIGW 3.0 conformant responsive design, secure hosting within NIC Data Centres, and automated updates, all contributing to an enhanced user experience. Additionally, it supports multilingual content in 18 official languages, catering to a diverse audience, particularly those who prefer using websites in their regional language. S3WaaS integrates smoothly with social media platforms, making information access and sharing easier for stakeholders. The platform is also integrated with Parichay Single Sign-On (SSO) simplifying user access across systems.

S3WaaS has been implemented and adopted by 659 District websites, 36 NIC state centres, 135+ Ministries and State Departments (including Maharashtra and Department of Empowerment of Persons with Disabilities), 11 Raj Bhavans/State portals and 50 e-Counselling portals. The Supreme Court of India website and 723 District Courts websites have also been migrated. The Kendriya Vidyalaya Sangathan (KVS), under the Ministry of Education, which manages schools in India and abroad, is in the process of migrating its 1300+ websites to the S3WaaS platform. As of now, 930+ websites have been successfully migrated, including the KVS Headquarters website, five Zonal websites, 25 Regional websites, and 900+ Individual School websites.

9.5.10.5 OGD-Open Government Data 2.0 (https://data.gov.in)

MeitY under the aegis of National Data Sharing and Accessibility Policy (NDSAP) initiated Open Government Data (OGD) Platform India, to share government data with its citizens. The Platform has been set-up and managed by the National Informatics Centre (NIC).

OGD 2.0 - Micro Services Based Architecture Leveraging Cloud Technology has been initiated from May 2020. The Platform provides Government to Government (G2G) service by allowing Ministries/Departments/ States/ Organizations to publish and manage their datasets on the Platform through a Chief Data Officer (CDO). The datasets are available to all free of cost.

OGD India has 5,05,060 dataset/resources, 12,462 catalogs, 3,321 Visualizations created, and 2,62,052 Application Programming Interfaces (APIs) created. OGD India has 36.89 million times viewed and 10.56 million times datasets have been downloaded.

9.5.10.6 Electronic transaction Aggregation and Analysis layer (eTaal) (https://etaal.gov.in)

eTaal 3.0 aims to measure qualitative aspects of eService

delivery, enabling performance comparisons across Central Ministries, States, Union Territories, and Smart Cities, down to the district level. It also incorporates AI-enabled chatbots, predictive analysis, and Business Intelligence (BI) dashboards for generating meaningful insights.

Achievements:

- **4,317 eServices** have been integrated since the launch of the eTaal portal.
- **1,022 eServices** integrated with granularity upto district level.
- As of 31 December 2024, a total of **10,3913 Cr. eTransactions** have been recorded.
- Currently, a total of **93.33 Cr. eTransactions** are being recorded daily.
- Currently, a total of **90.44 cr eTransactions** are being recorded daily
- Users can access **15+ types of analytical reports** on the eTaal 3.0 website
- Qualified eServices on a 9-parameter Key Performing Indicator (KPI) framework. Each eService is evaluated and scored on parameters such as Use of Digital Signatures, ePayment integration, Implementation of Mobile Application, Local Language Interface, Application Security Audit, Accessibility etc.

9.5.10.7 Gov.in Secure Intranet Portal

The Gov.in Secure Intranet is a Government-to-Employee (G2E) initiative designed to enhance the efficiency of Government officials across Ministries and Departments, offering seamless access to multiple applications through single sign-on (SSO) without requiring separate logins. It provides users with features such as calendar scheduling, task and appointment management, and tools to monitor ongoing tasks assigned to individuals or teams. Reports and dashboards further enhance workflow oversight.

Key government applications, including Bharat VC, Sparrow, eOffice, and Bhashini, are accessible via the platform through SSO, streamlining user experience. Notifications for logins, upcoming meetings, appointments, and other engagements are delivered through email and SMS, ensuring users stay informed. The platform integrates with the CPGRAMS, LIMBS, RTI and Press Information Bureau (PIB) platforms via APIs, enabling users to receive the latest news and updates relevant to their Ministry or Department.

9.5.10.8 CollabFiles

CollabFiles is an indigenous platform to Connect, Create, Share and Collaborate on Office Documents. It is a secured, scalable, web-based and cloud-enabled platform to create and manage Documents, Spreadsheets and Presentations in a collaborative mode with a strategic control so that Government users could use it through a Secured and Privileged access of Parichay and JanParichay, Single-Sign-On frameworks of Government.

The platform is enriched with features viz.

- Web-based, Cloud-enabled, Secured, Scalable platform
- Create & Manage on Documents, Spreadsheets, Presentations and Pdfs
- Real-time and Asynchronous Collaboration
- File sharing and Access controls
- Integrated Messaging and Notifications
- Advanced File Management
- Dashboards for Monitoring
- Security and Privacy

9.5.10.9 Direct Benefit Transfer (DBT) 2.0 (www.dbtbharat.gov.in)

DBT Bharat Portal has been designed with the intention of monitoring the enhancement in the delivery of public schemes and services in India by ensuring that the intended beneficiary receives the in-kind and monetary benefits of government services and programs on time and efficiently.

DBT Bharat Portal collects Data from Central Sector/CSS/State/UT/District Schemes regarding DBT Beneficiaries and DBT Expenditure from implementing body like Ministries, Departments, States, UTs. Assessing the number of verified beneficiaries based on Aadhaar and the total amount of electronic payments are significant

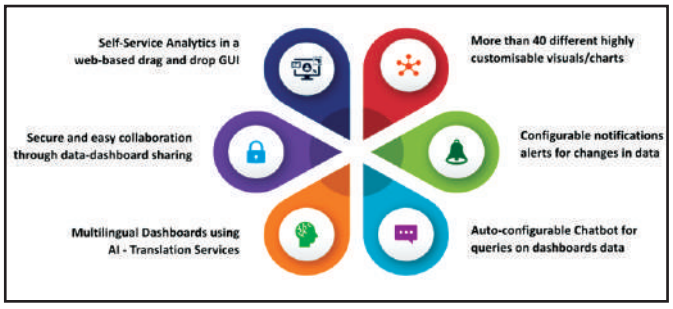
key performance indicators that contribute to removal of duplicate or ghost beneficiaries and reduce corruption opportunities and middlemen. Aadhaar Authentication brings in transparency and accountability in the system.

APB (Aadhaar Payment Bridge) enables government schemes to directly transfer DBT benefits subsidies to beneficiaries' bank accounts using Aadhaar as a financial address, reducing the chances of payment failures and discrepancy in recording bank account details.

9.5.10.10 TejasVI: Empowering Data-Driven Governance

Tejas, a comprehensive Self-service Analytics & Visualization Platform, developed specifically to meet the data analytics and visualization needs of the Government Departments. Built on open-source technologies, Tejas provides a powerful, user-friendly, and cost-effective solution for processing and analyzing the extensive data generated by initiatives such as mission mode projects under the National e-Governance Plan and the numerous online services provided by Ministries and Departments.

Tejas stands out with its innovative data-driven conditional alert system, which notifies users of changes in data. It enhances collaboration within the NIC ecosystem, incorporates predictive analytics, offers real-time data querying chatbot, and breaks down language barriers with multilingual support, making it a vital tool for fostering data-driven governance.



Tejas Features

9.5.10.11 eSamikSha

With the help of this portal, PMO and Cabinet Secretariat can keep a track on all the pending work in various departments and direct the concerned authorities to take proactive steps by fastening the pace of projects as per expectation. The portal helps to bring transparency and enhance the interoperability between Government-to-Government (G2G) and Government to Businesses (G2B).

One separate instance of eSamikSha has been implemented for Rashtrapati Bhawan (RB-eSamikSha).

9.5.10.12 Digidhan Dashboard for monitoring Digital Payment Transactions

The Digidhan Dashboard serves as a comprehensive platform for monitoring digital payment transactions across the country. It provides detailed statistics on the number and value of transactions, categorized by various types such as UPI, debit cards, credit cards, and more. Additionally, the dashboard offers insights into the platforms facilitating these transactions, including BHIM, UPI, and a range of e-wallet services.

The platform supports the monitoring of digital payments across 16 distinct payment modes, such as UPI, USSD, IMPS, and debit cards, utilizing data from sources like the Reserve Bank of India (RBI), National Payments Corporation of India (NPCI), and over 110 public and private sector banks.

9.5.10.13 Dashboard for Analytical Review of Projects Across Nation (DARPAN)

DARPAN (Dashboard for Analytical Review of Projects Across Nation) is a configurable multilingual product of NIC-UP for Hon'ble Governors, Hon'ble Chief Ministers, Chief Secretaries, Divisional Commissioners and District Magistrates/District Collectors. The Product facilitates the presentation of real-time data on Key Performance Indicators (KPIs) of selected government schemes/projects to all the levels (State, Division, District) of officers for planning, evaluation, and monitoring.

DARPAN has footprints of State/Central Ministries and a Data Collection Portal for PRAYAS, a dashboard of dashboards.

Current Statistics

Dashboards	Instances	Projects	KPIs
Darpan Dashboard ver 1.0 (State /UTs)	12	890	3687
Darpan Dashboard ver 1.0 (Central Departments/UTs)	20	406	1347
NexGen Darpan	2	1166	7849

NexGen DARPAN 2.0

As per the feedback and requirements of various states and ministries, PMU-DARPAN has developed a lightweight DARPAN 2.0 performance Dashboard on an entirely new platform with latest UI/UX Style, more flexible and configurable features.

9.5.10.14 PRAYAS – Pursuing Excellence in Governance (https://prayas.nic.in)

PRAYAS – "Dashboard of Dashboards" pursuing excellence in governance has been developed under the direction of the PMO with collaborative efforts of Data Analytics Informatics Division, NIC and Centre of Excellence for Data Analytics (CEDA), NICSI to present a comprehensive and consolidated view of schemes of various Ministries/Departments in one single platform for improved monitoring and decision-making.

This platform offers interactive visualizations, robust analytics, and actionable insights to support data-driven governance, ensuring alignment between policy making and program implementation. Prayas integrates data electronically via APIs directly from the MIS/IT systems of the concerned Ministries and Departments.

9.5.10.15 Rashtriya Puraskar Portal

Rashtriya Puraskar Portal is an Award Ecosystem of Government of India. It is a configurable platform, designed and developed by MHA Informatics Division II, National Informatics Centre. This platform has been developed in an endeavor to achieve the vision of Hon'ble Prime Minister of India to transform the entire ecosystem of the National Awards instituted by various Ministries/ Department/Organization of Government of India. It has the capability of accepting nominations for each award as per the defined format, digitized diversified selection process, developed awardees dashboard, scientific analysis for supporting of various decisions, monitoring dashboard for monitoring ongoing nominations etc.

9.5.10.16 Government eProcurement system of NIC (GePNIC©)

GePNIC provides a platform to conduct online tendering for Goods/ Works/ Services including Global Tenders, Turnkey projects, Rate Contracts. Widely used in 31 States /UTs and over 800 Central Govt entities. User entity specific rule configuration, regular capacity building and handholding support as part of the implementation. Central Public Procurement Portal (eprocure.gov.in) has been integrated with Government eMarketplace [GeM-CPPP] as per directions of Procurement Policy Division, Min of Finance. On an average, around 6,000 tenders are processed every day.

On similar lines the State Public Procurement portal has been developed and at present is used by Govt **of Assam. It also bagged the Gems of India award in July 2024.**

9.5.10.17 e-Granthalaya (https://egranthalaya.nic.in)

e-Granthalaya is an Integrated Library Management Software developed by NIC for the Automation & Networking of Government Libraries, which facilitates web-based data entry with a centralized Database. This digital platform provides a complete cloud ready solution to convert traditional libraries into Digital Library.

Latest version of e-Granthalaya 4.0 is a Web-based and Mobile based access solution with a centralized database for clusters of libraries. The ICT solution is compliant with international standards prevalent in libraries with the use of the latest ICT technology.

9.5.10.18 Digital Archiving and Management

The National Informatics Centre (NIC) is leading the charge in promoting the need for digitizing and archiving government documents. Using DSpace, an open-source software tool for managing digital assets, NIC is helping government departments build robust digital repositories. DSpace enables the seamless creation of digital archives

where all types of content such as text, images, etc. can be securely stored and easily accessed.

Projects Undertaken are:

1. **The Official Debates of Rajya Sabha Digital Repository** (https://rsdebate.nic.in).
2. **India Code Information System Digital repository of Central and State laws and their subordinate legislations** (https://indiacode.nic.in)
3. **Parliament Digital Library** (https://eparlib.nic.in/)
4. **MetaOnline** (https://metaonline.nic.in):.
5. **Tribal Digital Document Repository** (https://repository.tribal.gov.in/)
6. **eRecords (NIC Records Preservation System)** https://erecords.nic.in
7. **Digital Files of Rajya Sabha Secretariat** (https://rsrecords.nic.in/)

9.5.10.19 Swagatam

Swagatam is an initiative by the Government of India to facilitate the common man. Swagatam facility enables the citizens to have a smooth and simple process of making an appointment. It has advanced features of eliminating all the cumbersome and tedious procedures of making a request for an appointment and then visiting the premises.

9.5.11 Mobile Apps Store

Mobile Application Division has Nodal center in NIC-HQ Delhi and four competency centers at Chennai, Shimla, Patna, and Kannur. All the centers are collectively working for development and hosting of mobile apps in android and iOS. To bring all these apps under one umbrella for better visibility and global reach from a single point of contact NIC has subscribed to user accounts in Google play store and iOS/ iTunes. Total mobile app count reached 257 published mobile apps on Android App store. The Total count on iOS Account reached 91.

9.5.12 Centre of Excellence and Software Development Unit

1. **Centre of Excellence for Data Analytics (CEDA),** a joint initiative of NIC & NICSI, was established in February 2018 and formally inaugurated by Hon'ble MeitY in September 2018. CEDA has undertaken several Projects for various Ministries/ Departments; notable among them are:

PRAYAS PM Dashboard	**A Dashboard of Dashboards developed for the PMO** • Platform with three Components – Data Collection, Analytics layer and Dashboard • Provides analytical insights for Flagship Programs & Schemes of the Government • 186 Schemes, 1244 KPIs across 61 Min/Deptts already on-boarded; data updation through API • Demonstrated successfully to Hon'ble Prime Minister on 4.9.2020 and to all Union cabinet Ministers and MoS
Data Analytics Solutions	**Developed for more about 12 Ministries/Departments** eWay Bill -GSTN, Import/Export – D/o Commerce, Immigration Analytics – Bureau of Immigration , RD Schemes – D/o RD, Tribal Scholarships – M/o Tribal Affairs, Steel Analytics – M/o Steel, Ministry, D/o Commerce – Trade Analytics, Public Distribution System (PoC), National Scholarship Portal (PoC), Ministry of Consumer Affairs (Poc), VBSY scheme survey dashboards (Poc) etc.
Pragyan Platform	**Enterprise-ready Data Integration, Exploration & Visualisation Platform** • JAVA written APIs will be provided to fetch the data from any data source such as Database, Data Warehouse and DataMart • Ingest Data from, 40+ direct data sources whether it's stored on your database or in a centralized data repository • 60+ charts for comprehensive insights into your data, enabling informed, data-centric decision-making • Build analytical dashboard and required visualizations as per your own data sources • Integrated under Sambhav Programme (15 Ministries/Departments) and built analytics dashboards
DoNER Dashboard	**Dashboard for M/o DONER – (Completed)** • Data Analytics portal has been created to monitor Schemes/Projects implemented in North-Eastern Region • 144 schemes, 836 KPIs across 52 Min/Deptts already on-boarded; data update through API
Trainings	**Training on Analytics at multiple Government platforms / Institutions** • IIPA, LBSNAA, NIC, IASRI, AASC (Assam) etc.

2. **Centre of Excellence in Artificial Intelligence (COE-AI)** was set up in January 2019 with a vision to improve transparency and efficiency in e-governance projects through AI implementation in work automation and to improve Citizen Government Communications. NIC has set up two state-of-the-art AI labs with supercomputing facilities at Delhi & Kolkata and is poised to further increase its AI compute capabilities to train large AI models

3. **The Centre of Excellence in Blockchain Technology (CoE-BCT)** has been established at NIC, Karnataka with a vision to build niche applications using Blockchain technologies in close coordination with the Government, which can be rolled out across the country. Blockchain networks have been established with Blockchain nodes distributed across NIC data centers. The CoE is instrumental in deploying various Blockchain platforms, such as Certificate Chain, Drug Logistic Chain, Property chain, Document chain and Judicial chain

   These generic platforms can facilitate easy roll-out for any State or Ministry.

   National Blockchain Framework (NBF) is an initiative of MeitY to facilitate for large scale adoption of Blockchain technology in the domain of e-Governance As a part of this initiative, NIC has deployed State-of-the-art distributed infrastructure at Data Centres located at Pune, Bhubaneswar, and Hyderabad. NIC has designed, developed and deployed blockchain platforms such as Certificate chain, Document chain, Property chain, Supply chain, and Judicial chain on NBF infrastructure. NBF was launched by the Hon'ble Secretary, MeitY, Shri. S Krishnan on 4th Sep 2024.

4. **Centre of Excellence (CoE) in Application Security** is established to provide state-of-the-art Security solutions & services for the Information Technology needs of the Government of India, and establishing best practices, standards, and initiatives in Application security. The centers are located at Bhubaneshwar, Guwahati, Jaipur, Lucknow, and Thiruvananthapuram. The centers are involved in Application Security Audit Compliance and Testing related activities.

5. **NIC Software Development Units (SDU)** provide state of art services using latest tools and technology. NIC Software Development and Training Centers are engaged in important e-Governance projects in respect of development of software on turnkey basis, implementation, project level training and subsequent support

6. **Open Technology Group (OTG)** focus areas are to evaluate and recommend Open-Source Software (OSS) for e-Governance Solutions, maintain distribution repository of recommended OSS for usage across NIC, guide and handhold NIC teams in keeping their OSS driven system Secure and provide training on OSS. The OSS Stack 2024-25 initiative is underway, with an updated document currently under review

7. **NIC Centre of Excellence on Microservices** acts as the resource center of consultancy, development of microservices based projects and support for identifying and moving feasible monolithic applications to microservices based applications. The Centre has been instrumental in educating the NIC Units across the country about the benefits of using microservices based architecture in designing new software projects as well as migrating existing monolithic applications to microservices based architecture.

9.5.13 NICSI

National Informatics Centre Services Incorporated (NICSI) is a Company registered under section 25 of the Companies Act, 1956, a Government of India Enterprise under National Informatics Centre (NIC), Ministry of Electronics & Information Technology (MeitY). NICSI provides procurement and supply of total information and communications technology (ICT) solutions and services in the entire Government Sector including departments and organizations of the Central Government and State Governments.

NICSI services include state-of-the-art hardware, software, consulting, technical support, design and develop-

ment, operations and management, quality check as well as end-to-end ICT solutions and services. It has undertaken various ICT projects of government departments and organizations providing state-of-the-art technology and cost-effective solutions to ensure efficiency, transparency and reliability in their implementation, and has been providing such services since last more than 29 years to most of the departments/organizations both in the Central and State Governments. Some of the prestigious projects include National Data Centre at Lakshmi Nagar, New Delhi, enhancement of NIC Cloud Services, National Data Centre at Shastri Park, New Delhi, National Knowledge Network (NKN), facilitating various projects like e-Procurement, e-Office, e-Hospital, iRAD, Diksha, Contactless Biometric Attendance System etc.

With a turnover of more than Rs.2350 Crores (FY 2023-24), and Rs 1889 crores (till 31.12.2024) (unaudited) NICSI has successfully executed more than 29,000 projects in India and other developing nations by providing state of art and cost-effective solutions for all their growing ICT needs.

NICSI has set-up a Product Business Division (PBD) with an aim to productize, standardize and promote Software Products developed by NIC/NICSI at International Level. NICSI has also set-up the Centre of Excellence of Data Analytics (CEDA).

9.6 National e-Governance Division (NeGD)

NeGD is an Independent Business Division (IBD) within Digital India Corporation (erstwhile Media Lab Asia), under MeitY. NeGD's major operational areas include program management, project development, technology management, capacity building, awareness and communications related activities under Digital India program. NeGD provides technical and advisory support to Central Ministries / Departments, State Government Departments and other Government organizations in their Digital India initiatives. NeGD has developed and is managing several national public digital platforms such as DigiLocker, UMANG, Rapid Assessment System, OpenForge, API Setu, Poshan Tracker, Academic Bank of Credits, National Academic Depositories, National AI Portal, MyScheme, India Stack Global, Meri Pehchaan, etc. The details may be seen at Chapter 2.

9.7 Standardization Testing and Quality Certification Directorate

9.7.1 Introduction

Standardisation Testing and Quality Certification (STQC) Directorate, an attached office of the Ministry of Electronics and Information Technology, Government of India, provides Quality Assurance services in the area of Electronics and IT through countrywide network of laboratories and centres.

Over the last four and half Decades, STQC has established itself as a pioneer in the field of Testing, Calibration, IT & e-Governance, Training, Certification and providing nationwide support to various government, Public and Private organizations including Startups, MSME etc. Major clientele STQC served are: **Central Government Ministries / Departments /State Governments ,R & D organizations** (DRDO, ISRO) **Dйfense** (Indian Army, Navy, Airforce) **Telecom** (DoT, TRAI) Power (Power Grid, CPRI) **Railway** (Indian Railways & Metro Rail) **PSUs** (IOC, NTPC, Coal India, BHEL, SAIL etc) **Recruitment agencies** (SSC, State Bodies) **Statutory Bodies** (e.g., BIS, UIDAI, Cert-In etc.) and many more.

9.7.2 STQC Labs/ Centre

9.7.3 Activities /Services of STQC

IT & e- Governance

e-Governance Conformity Assessment

- ✓ Quality Assurance Framework
- ✓ Scheme for Empanelment of Cloud Service Provider
- ✓ Scheme for Empanelment of e-Gov. Software Test Labs

IT System & Product Certification

- ✓ IoT System Certification
- ✓ Common Criteria Certification
- ✓ Website Quality Certification
- ✓ Trusted Electronics Value Chain Certification
- ✓ E-Procurement System Certification (EPS)
- ✓ Bio-metric Devices Testing and Certification
- ✓ Smart Card Testing and Certification
- ✓ QR Code Scanner Testing & Certification
- ✓ NCMC certification

Software & System Testing

- ✓ Software Testing and Assessment
- ✓ Software Process Assessment
- ✓ Information Security Testing and Assessment
- ✓ Software Functional Testing
- ✓ Application Performance Testing
- ✓ Application Security Testing
- ✓ Mobile app Security testing
- ✓ API Security Testing
- ✓ Vulnerability Assessment & Penetration Testing
- ✓ Acceptance Testing of e-Governance Projects
- ✓ Independent Verification and Validation
- ✓ Usability Testing
- ✓ Accessibility Testing
- ✓ Embedded Device/Software Security Testing
- ✓ Secure Code review

Electrotechnical Testing

- ✓ Component Testing of SMDs (passive and active, VLSI devices)
- ✓ Equipment/Subsystem and Module Software Functional Testing
- ✓ Environmental Testing
- ✓ Testing for Safety of Electronics/Electrical products
- ✓ EMI/EMC Testing
- ✓ Opto Electronics Testing
- ✓ Reliability Testing and Analysis
- ✓ EVM /VVPAT Testing
- ✓ Medical Electronics equipment testing
- ✓ Power / Energy meter Testing

Calibration

- ✓ Electro Technical Calibration
- ✓ Non-Electrical Calibration
- ✓ High Precision Calibration
- ✓ RF Calibration
- ✓ Optical Calibration,
- ✓ EMI/EMC Calibration
- ✓ Bio-Medical Equipment Calibration
- ✓ On Site Calibration

Certification

Management System Certification

- ✓ ISO 27001 Information Security Management System (ISMS) Certification
- ✓ ISO 9001 Quality Management System (QMS) Certification

Product Certification

- ✓ Product Safety Certification based on IEC Standards (S mark)

Capacity Building

- ✓ Quality Management Programs as per ISO: 9001:2015
- ✓ ISMS LA program as per ISO: 27001:2022

- ✓ Laboratory Management Programs as per ISO: 17025:2017
- ✓ Reliability Engineering Programs
- ✓ Environmental Management Programs
- ✓ Common Criteria
- ✓ Information Security
- ✓ E-Governance Quality Assurance
- ✓ Software Quality Engineering
- ✓ Measurement Uncertainty

9.7.4 Major Activities / Achievements

9.7.4.1 STQC Hq, New Delhi

a) IT & e-Gov Division

1. STQC has been entrusted by MoHUA for third party cyber security audit of all 100 smart cities under Smart City Mission

   ETDC Ajmer is assigned as a nodal office for the cyber security audit of Smart Cities

   The following Activities are to be considered in the Smart City Audit:

   End Point Devices Security Audit

   Vulnerability Assessment of Network Infrastructure

   Process Audit

   Trusted Electronics Value chain audit

   - Total SRF sent to City: 100 out of 100
   - 1st cycle audit report received from Lab: 49 out of 100
   - 1st cycle audit report issue to City: 42 out of 49

2. Indian Common Criteria Certification Scheme (IC3S) is operated by STQC Directorate, (MeitY), Govt. of India. Under IC3S scheme, the Evaluation Laboratories or Common Criteria Test laboratories (henceforth will be referred as CCTLs) perform evaluations of Information Technology (henceforth will be referred as IT) products against the Common Criteria Standards.

   Common Criteria Test Laboratories (CCTL) are established to support IC3S. CCTLs at Delhi, Kolkata Bangalore, and Mumbai maintain adequate systems to support IT security evaluations

   STQC has participated as an observer in VPA of JISEC (Common criteria) at Tokyo Japan.

   STQC (representing India) participated in CCRA meeting held at Qatar, Doha.

   STQC, certification body of Common Criteria representing India in CCRA (Common Criteria Recognition Arrangement) from April 2023 to April 2025. India has been nominated as chair of CCS Committee (One of the committees of CCRA responsible for audit of certification Bodies of 18 Certificate Producing country).

3. STQC Directorate has been entrusted by Unique Identification Authority of India (UIDAI) as a quality assurance partner. The objective of Biometric Device Certification Scheme (BDCS) is to perform assessment/evaluation and subsequent certification of Biometric Devices and to facilitate availability of quality assessed Pre-certified Hardware, authentication/ enrolment Biometric Devices along with QR Code scanner device for offline authentication to user agencies like AUAs/ KUAs as per Aadhaar Act.

4. STQC has developed a Website Quality Certification Scheme based upon National and International Standards/Best practices. The certification scheme aims to help in hardening of websites from wide range of Security threats, increasing accessibility, assuring commitment to services and ensuring compliance to the requirements of Guidelines for Indian Government Websites (GIGW) developed by National Informatics Centre (NIC) and adopted by Department of Administrative Reforms and Public Grievances (DARPG), Government of India. STQC has issued approx. 15 Certificates under this scheme in this year and total 128 websites has valid certificate.

5. IoT System Certification Scheme (IoT SCS): The objective of this scheme is to promote security of IoT ecosystem. This scheme will facilitate improvement of National Cyber Security profile.

   The implementation of this Certification Program

will provide confidence to users that the risks associated with the threats currently set forth in the IoT-SCS are addressed by a device/system provider through conformance to this scheme. Demonstration of conformance through this certification program provides formal recognition of a conformance to the industry standards. STQC has certified 07 products under this scheme from January, 2024.

MeitY has entrusted STQC to conduct Testing, Audit & Certification of CCTV Camera Under PPO and BIS has empanelled STQC labs for Testing/ Evaluation of CCTV Camera Under CRO Scheme.

6. National Common Mobility Card (NCMC) Certification Scheme: NCMC Ecosystem Testing and Certification is an impartial assessment of a product by an independent body.

   STQC labs at Delhi and Bangalore, maintain adequate systems to support IT security evaluations in keeping with the tests for which it is seeking accreditation and maintain records on all test equipment or test suites used during the testing ion of NCMC Ecosystem.

   STQC developed a testing facility at Delhi and Bangalore to test four products of NCMC Ecosystem namely Validation Terminal, Gate Control Unit, AFC System and Acquirer System.

   STQC is working out on the modalities for NCMC testing with MoHUA.

7. E Procurement System Certification Scheme: E-Procurement is identified as a mission mode project under national E-Governance plan. E Procurement System Certification is an integral requirement by Government envisaged by MeitY, CVC and other Govt Ministries. STQC has been entrusted for evaluation, assessment and Certification of EPS. 08 EPS are certified by STQC from January,2024 and 22 EPS has valid certificate.

8. SAB- STQC Empanelled Test Laboratory (SETL): STQC Directorate is the designated approving body for the operation of the scheme. STQC maintains a management system in accordance with international practices (ISO/IEC 17011) and that its approved conformity assessment bodies are competent in their operations of testing and assessments.

   The scheme is intended to recognize the competence of IT test laboratories and to provide confidence to the stakeholders that Test results of Solutions tested in these laboratories are reliable, reproducible and repeatable. Under the scheme, after satisfactory completion of the assessment, the laboratory is issued a `Certificate of Approval' indicating conformance to specified requirements of applicable standards as specified in the scheme.

   SETLs assessment are carried out by designated assessors of labs/centres empanelled by STQC Hq.

   The scheme covers both private and public (Government) IT test laboratories involved in software and system testing with in-house and/or onsite capabilities. At present total 13 SETLs are empanelled by STQC.

b) Certification Division of STQC is implementing various certification schemes

1. ***Information Security Management System (ISMS) Certification Scheme:***

   Total 09 certificates are issued by STQC for ISMS from January 2024.

2. ***Quality Management System (QMS) Certification Scheme:***

3. ***Safety(S-Mark) Certification Scheme:***

   Total 05 products are certified under S Mark scheme by STQC from January,2024.

4. ***Data Centre Certification Scheme***

   STQC has also successfully trained 12 Officers for EXIM EPI Certified Data Centre Professional (CDCP) Course organized by M/s EPI, India

5. ***Assessment of Cloud Service Providers***

6. ***Assessment and notifications of Digital Forensics labs as Examiner of Electronics Evidence***

MeitY has entrusted STQC Directorate for assessment and evaluation of Central Govt / State Govt bodies i.e Forensic science laboratories for notifying as "Examiner of Electronic Evidence" as per provision under Section 79A of Information Technology Act 2000.

MeitY under a scheme for the above purpose has notified 15 labs till date as Examiner of Electronic Evidence as provisioned Under Section 79A of IT Act 2000 upon assessment and evaluation of applicant laboratories by STQC auditors.

STQC has also been entrusted to conduct annual surveillance assessment of notified laboratories and is carrying out surveillance assessments regularly.

9.7.5 Capacity Building

STQC is conducting various Capacity building & skill development programs through regular/ short term training courses, workshops etc. ETDC Jaipur/IIQM, CFR Chennai, ETDC Goa & ETDC Solan are dedicated centres for training and have conducted many training courses on Quality Management Reliability, Lab Management, Information Security etc.

STQC has conducted following courses in 2024

Information Security Management System (ISMS)

IIQM Jaipur has conducted following courses on ISMS

- ✓ Lead Auditor training course for ISMS (ISO 27001:2022)- NBQP registered:
- ✓ STQC-CISP- Certified Information Security Professional Course (5 days)
- ✓ STQC-CIISA- Certified Internal Information Security Auditor (3 days)
- ✓ ISMS Transition cum Awareness based on ISO 27001:2022 (2 days)

Quality Management System (QMS)

IIQM Jaipur conducted courses on QMS such as

- ✓ Lead Auditor training course for QMS (ISO 9001:2015)-NBQP registered:
- ✓ QMS Internal Auditor Course based on ISO/IS 9001:2015 (3 Days):

IIQM

Indian Institute of Quality Management (IIQM), a division of Electronics Test & Development Centre Jaipur operates under STQC Directorate, Ministry of Electronics & Information Technology, Government of India and provides training to industries and user departments in the area of QMS (ISO 9001), Laboratory Quality Management (ISO 17025) and Information Security Management Systems (ISO 27001).

Since inception, IIQM has trained over 20000 professionals, including those working overseas. The trainings imparted by IIQM have resulted in creating a Quality oriented infrastructure across the industries and institutions at National level.

Recognitions/Accreditations:

IIQM functions as an approved Training Organization (TO) recognized by NBQP (QCI) for conducting approved courses in the area of Quality and Information Security Management Systems.

Trainings Provided by IIQM Jaipur:

IIQM has conducted following specialized training on regular basis:

- Lead Auditor training course for QMS (ISO 9001:2015)- NBQP registered (**26 candidates**)
- Lead Auditor training course for ISMS (ISO 27001:2022)- NBQP registered (**119 candidates)**
- Laboratory QMS and Internal Audit as per ISO 17025:2017 (**approx. 140 candidates**)
- STQC-CISP - Certified Information Security Professional Course (5 days) (**28 candidates**)
- STQC-CIISA - Certified Internal Information Security Auditor (3 days) (**97 candidates**)
- QMS Internal Auditor Course based on ISO/IS 9001:2015 (3 Days) (**10 candidates**)
- ISMS Transition cum Awareness based on ISO 27001:2022 (2 days) (**17 candidates**)

Other than above courses various courses as per the specific need of client organization have also been conducted by IIQM

ETDC Solan conducted following training courses:

Training on ISMS LA Course as per ISO/IEC 27001:2022 Officers of THDC (Tehri Hydro Development Corporation) and internal candidates from STQC HQ and other STQC Labs during 28 May to 01 June 2024 at ETDC Solan.

On-site QMS Internal Auditor Training Course as per ISO 9001:2015 is successfully designed and organized for Officers DGRE (Defence Geoinformatics Research Establishment) in August 2024

ERTL (E) conducted various knowledge-based and skill oriented training programmes for industries, laboratories, Students & individuals in different Areas of Technology, such as, Measurement Uncertainties, Quality Assurance & Management Standards (ISO 9001: 2015), Information Security Management system ISO 27001:2013), Laboratory Quality Management Standards ISO/IEC 17025:2017

ETDC Goa Conducted following training programs for capacity enhancement through design, development and conduct of training for the working professionals to develop their skills in different areas-

- ✓ Lead Auditor training course for ISMS (ISO 27001: 2022) (5 days)
- ✓ STQC-CISP - Information Certified Security Professional Course (5 days)
- ✓ STQC-CIISA - Certified Internal Information Security Auditor (3 days)
- ✓ ISMS Transition cum Awareness based on ISO 27001:2022 (2 days)
- ✓ Laboratory Management System & Internal Audit as per ISO/IEC 17025:2017 (4 days)
- ✓ Calibration System and measurement Uncertainty (3 days)

Training programs are attended by 76 participants from 25 organizations.

ERTL(N) conducted various knowledge-based and skill oriented training programmes such as:

- Design and Development of Certified Accessibility Auditor course
- Lectures on Mobile Device Security and Cyber Security Testing and Audit [Compliance Assessment and Evaluation Techniques] in CISO deep dive training under Cyber Surakshit Bharat Project of MeitY for CISO's at GNLU, HIPA& IIPA.
- Awareness Workshop for Smart Cities regarding Cyber Security Assessment Requirements
- Training to STQC Officials on Cyber Security & Cyber Crimes
- Online training for the Government & Private Establishments on the Accessibility of digital platforms (Websites/Apps/Portal, etc.) conducted by CCPD
- Conducted training to STQC Officials from different IT centres on End Point Devices (CCTV), e-Procurement System, Mobile & Web Application Security and Code Review.

National Webinar on Data Centre-related standards for Dept. of Telecom.

Participation in WBL scheme

The Work-Based Learning (WBL) program (Ministry of Electronics and IT, Govt. of India) is designed for fresh Graduate Engineers of Scheduled Caste (SC), Scheduled Tribe (ST), Women and Economically Weaker Section (EWS), to gain practical experience and exposure in Information Technology, Electronics and related areas. STQC labs are involved in providing training to candidates under this scheme in the field of electronics & IT.

Digital India Internship Program

The Digital India Internship Scheme 2023 was launched by MeitY and STQC has trained various candidate for

Safety testing at ERTL(N) for this scheme.

Various courses, as per the specific need of client organization and Industries have also been conducted by Lab/Centres of STQC.

9.7.6 Activity in North East Region

ETDC Guwahati & Agartala are two laboratories under the STQC Directorate, MeitY, Govt. of India operating in the NE Region. and extending services to 08(eight) states of the region

ETDC, Guwahati

The services provided by ETDC Guwahati are as follows:

- ✓ Test & Calibration services to the Industries, Technology users & Service providers.
- ✓ Website Quality certification for different websites of Govt. Ministries, Department and PSUs etc.
- ✓ Smart City Audit

Initiatives in Test & Calibration services:

Test & Calibration services of ETDC Guwahati is extended to the organizations located throughout the NE Region covering all the 8(eight)-States towards improvement of Quality of their products and services. The services are received by most of the Small, Medium and Large Scale Industries covering the Industrial sectors like – Oil & Natural Gas, Oil Refineries, Exploration units, Railways, Indian Air Force(IAF), 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. About 2246 calibration jobs being executed by ETDC Guwahati – covering more than 64 Nos. of LSI, MSI, SSI Industrial units, Govt. PSUs, Private and other technology user organizations of NE-Region.

On-Site Calibration Camps:

To make the STQC services available at the door steps of the client's' site located at various remote places in the NE Region, on-site calibration camp being organized by ETDC Guwahati at Oil India Ltd., NEEPCO, BCPL, GAIL, AGCL, BVFCL, AAI to facilitate the qualitative requirements of the industries and technology users.

NABL Accreditation & Inter Laboratory Comparison (ILC):

Calibration services of ETDC, Guwahati are accredited (No. CC-3797) by the National Accreditation Board for Testing and Calibration Laboratories (NABL) in conformance to ISO/IEC 17025, 2017 international standard for accreditation in the fields of Electro-Technical (AC/DC Current, Voltage, Power, Energy, Frequency, Resistance, Inductance & Capacitance), Thermal (Temperature), Mechanical (Acoustics, Pressure, Mass, Balance, Dimension & Volume) & Optical (Optical -Power, Wavelength & Stability) calibration services. Inter Laboratory Comparisons (ILC) programme is also being participated for parameters like Power, Frequency, Temperature, Pressure, Dimension & Acoustics at various reference labs towards achieving satisfactory qualitative performance level.

Initiatives in IT Test & Assessment Services:

Initiatives have been taken by ETDC Guwahati towards facilitating services in the field of Website Quality Certification as per GIGW 2018 and GIGW 3.0 requirements under the STQC Website Quality Certification (CQW) scheme. ETDC, Guwahati also actively participated in the Smart City Audit project as per ISMS guideline. This center audited 07 of numbers of smart cities located throughout the country. More than 15 Nos. of Websites corresponding to different Directorate/ Ministries of the country are being Tested/ Evaluated/ Assessed by ETDC, Guwahati for their certification.

ETDC, Agartala

- Website evaluation /certification job as per GIGW 3.0 with W3C recommended open source tools.
- Physical and Configuration verification of several PC, peripheral and UPS for different Govt. organization.
- Job executing with collaboration of ERTL (East).
- The smart city audits for a total of seven cities have been conducted by ETDC Agartala.

9.8 National Institute of Electronics and Information Technology (NIELIT)

9.8.1 Introduction

NIELIT is an autonomous scientific society under the administrative control of Ministry of Electronics and Information Technology (MeitY), Government of India. NIELIT is actively engaged in Capacity Building and Skill Development in the areas of IECT, such as Future Skills, Cyber Law, Cyber Security, Cloud Computing, ESDM, and related verticals. It offers courses in Degree/ Diploma Levels as well as Skilling Courses. It is also one of the National Examination & Accreditation Bodies, which accredits institutes/ organizations for the conduct of courses in the Non-Formal Sector. NIELIT is also rolling out Digital Competency Programmes for many State Governments for its employees and the masses. NCVET recognizes NIELIT as an Awarding Body and Assessment Agency for NSQF-aligned courses.

NIELIT has its presence over 50+ locations across the country. Besides its own Centres, NIELIT is also well networked through 700+ Accredited Training Institutions for the training of O/A/B/C level courses and through a network of about 9000+ Facilitation Centres engaged in training of Digital Competency Courses, making NIELIT distinctly positioned in terms of its outreach to all corners of the country and all segments of the society.

Spectrum of NIELIT Courses

NIELIT plays an important role in skilling youth in the IECT area. The wide repertoire of NIELIT Courses includes: (i) **Degree/Diploma Level Courses** such as **M.Tech, B.Tech, MCA, BCA** programs offered by the NIELIT Centres in association with State Universities/ Technical Board; Aurangabad Centre is also facilitating **PhD** Program in the area of Electronics (ii) **Skilling Courses (Long Term)** such as O Level(IT), A Level (IT), CHMT-O Level, etc. ; (iii) **Skilling Courses (Short Term)** in niche areas such as IoT, Cloud Computing, Machine Learning, Cyber Security, AI, etc. and (iv) **Digital Competency Programmes** for the proliferation of Digital Proficiency in the country; besides specialized programs in emerging technologies targeted towards empowering the employees of the State Governments and Departments of Central Line Ministries. In addition, NIELIT has also created expertise for the rollout of customized skilling, upskilling, and reskilling programs as per the specific needs of youths and industries.

NIELIT qualifications are widely accepted across the country. Owing to the quality, some of the NIELIT digital competency courses are linked with both promotion & recruitment by the number of state governments viz; Arunachal Pradesh, Bihar, Chandigarh, Daman & Diu, Gujarat, Rajasthan, Sikkim, Uttar Pradesh. Also, NIELIT offers its CCC course free of cost in online mode as a knowledge product through its virtual academy. The course is also available at 15+ Indian and International Language, accessible at https://nva.nielit.gov.in/ccc

Since 2014, NIELIT has trained more than 80 lakh candidates. The following data summarizes the number of candidates trained in various courses under NIELIT up to the 3rd quarter of the fiscal year 2024-25.

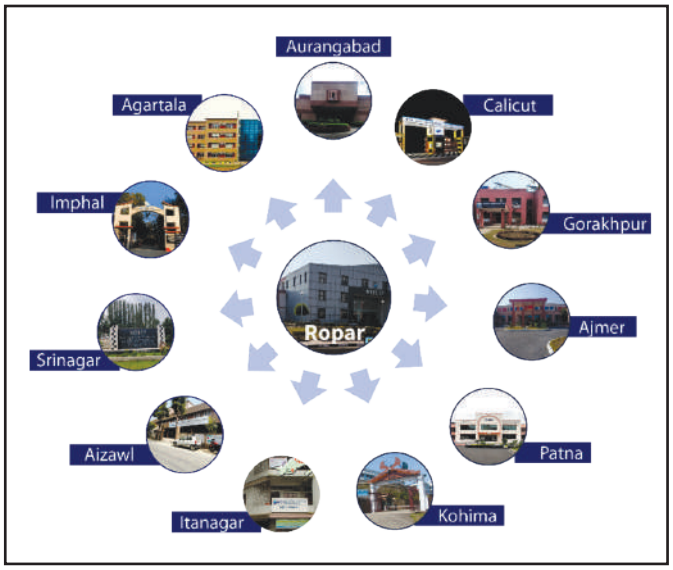
S. N.	Course Category	Number of Skilled
1	**Degree/Diploma Level Courses**	3,226
2	**Skill Based Long Term Courses**	92,807
3	Skill Based Short Term Courses	2,63,251
4	**Digital Competancy Courses**	2,45,315
	Total	**6,04,599**

Taking into the account advancement in IT and Electronics and emergence of disruptive technologies, NIELIT has been making efforts to update its repertoire of courses in upcoming technologies such as Artificial Intelligence, IoT, Big Data, Cloud Computing, Robotics and 3D Printing. In this regard, NIELIT Centres at Aurangabad, Calicut,

Kolkata have been identified as Technology Resource Centres to offer blended learning programmes under the Future Skills prime initiative which is being jointly conceived by MeitY and NASSCOM. NIELIT is amongst the front-runners that have aligned 124 Skill Oriented courses with National Skills Qualifications Framework (NSQF) at different levels ranging from Level 2 to 6.

Further, in the recent past, NIELIT has successfully organized two international conferences titled NIELIT's International Conference on Communications, Electronics and Digital Technologies (NICE-DT 2023 and NICE-DT 2024). To honour and recognize the contribution of the women workforce in the Electronics Manufacturing Industry in India, an event was organised by NIELIT on 27th January, 2024 wherein over 250 women workers from 5 prominent manufacturing companies participated. NIELIT also organised the first Future Skills Summit in Guwahati on 15th February, 2024

NIELIT Deemed to be University



Ministry of Education on the advice of UGC has issued Notification dated 15th July, 2024 declaring NIELIT Ropar (Punjab) with its 11 constituent units as an Institution deemed to be University under distinct category. Consequently, NIELIT has obtained the status of Deemed University vide Gazette Notification No. 9-3/2023-U.3(A) dated 15 July 2024, published in Part -I, Section-1 of the Gazette of India. NIELIT Deemed to be University launched Diploma, Undergraduate (Engineering), Postgraduate (Engineering), Undergraduate (Computer Applications), Postgraduate (Computer Science), Postgraduate (Computer Applications) and Ph.D. (in CSE/CSA/Electronics) Level programmes.

9.8.2 NIELIT Centres/Labs/Infrastructures Launched/ inaugurated

I. On 6th October 2024, Hon'ble Union Minister of State for Electronics & Information Technology and Commerce & Industry, Shri Jitin Prasada, laid the foundation stone of a New NIELIT Centre at Pilibhit, Uttar Pradesh. On this occasion, he also inaugurated the "Yuva Rojgar Mela" for the youth of Pilibhit. Further, the MIELIT Centre Pilibhit has been made operational and was inaugurated by the Hon'ble Union Minister of State for Electronics & Information Technology and Commerce & Industry, Shri Jitin Prasada, on 23rd December 2024.

II. NIELIT Alumni cum Placement Portal was launched on 20th August, 2024 by Hon'ble Union Minister of State for Ministry of Electronics & Information Technology & Commerce & Industry, Shri Jitin Prasada.. The portal provides for one-to-one alumni connection with global map feature and multiple job opportunities for NIELIT alumni and students, connecting them with leading recruiters.

III. A newly constructed Girls Hostel was inaugurated by Shri. S. Krishnan, Secretary, Ministry of Electronics & Information Technology (MeitY) at NIELIT Srinagar on August 3, 2024.

IV. The NIELIT Bishramganj Study Centre, was inaugurated on 13th Sept 2024, marking a significant milestone in Tripura region's educational landscape. NIELIT Bishramganj centre, besides introducing Computer/IT courses initially, will expand in Hardware/Electronics courses with various Lab setup soon.

9.8.3 Capacity Building Projects

9.8.3.1 Initiative for Cyber Security Aware Society in NE States

Project is sponsored by MeitY vide Administrative Approval No. AAA.22/2/2022-CSRD-MeitY dated 22/02/2022 with financial support of Rs. 725.19 Lakh over a period of three (03) Years. Project is being implemented by NIELIT Kohima in the state of Nagaland with the objective to raise comprehensive complete awareness about risk in cyber space targeting different sections of society. Achievement as on 31.10.2024: -

- Procurement of equipment-Completed
- Review and Upgradation of existing Awareness Material to be used in the project-On-going
- 22 plus awareness Audio and videos are developed
- Creation and hosting of Resource Portal along with MIS and helpline-Underdevelopment
- 246 Awareness Workshop has been conducted
- State Level Cyber Security expo cum Conferences-Schedule to conduct in the coming months
- Cyber Security awareness week in selected schools/colleges-On-going
- Updating and maintenance of resource portal and MIS – On-going process

9.8.3.2 Design and Development of EEG Based Real-Time Depth of Anaesthesia (DoA) Monitoring System

Project is sponsored by MeitY vide Administrative Approval No. 1(1)/2022-ME&HI MeitY dated 28/03/2022 with financial support of Rs. 455.23 Lakh over a period of three (03) Years. Project is being implemented by NIELIT Imphal in the state of Manipur. The objective of the project is to pre-process publicly available EEG data. Achievement as on 31.10.2024: -

- Development of Methods for Pre-processing and Feature Extraction of EEG data-Completed
- Development of preliminary machine learning model for DoA Estimation-Completed
- Compilation of clinical EEG database with expert annotations-Completed
- Finalization of the machine learning model using clinical EEG data-In Progress
- Development and Validation of the hardware architecture of the model-In Progress
- Prototyping of the proposed hardware architecture on FPGA-In Progress
- Finalization of test setup along with the test plan - In Progress

9.8.3.3 Skill Development of Youths in Aspirational Districts in area of IECT leading to enhancement in Employability

Project is sponsored by MeitY vide Administrative Approval 1411/10/2019-HRD dated 28/02/2020 with Financial Support of Rs. 29.81 Crore over a period of three (03) Years. Project is being at 21 States in 81 Aspirational Districts. Under the project, a total of 18,474 candidates are registered and 17,298 candidates have been trained so far against the target of 18,209.

9.8.3.4 Capacity Building and Training in Emerging Technologies for Enhancing Employment Opportunities and Skilling

Project is sponsored by MeitY, vide Administrative Approval No. L-14011/11/2021-HRD dated 26/03/2021 with Financial Support of Rs. 248.05 Lakh over a period of three (03) Years. The project is implemented by NIELIT Agartala to enable entrepreneurship & sustainable development among Youths of Tripura by providing Skill Development Training. Under the project, 1,856 candidates have been trained so far against the training target of 1,400.

9.8.3.5 Digital Intervention of Handloom and Handicraft Sector for Livelihood enhancement of artisans of NE States

Project is sponsored by MeitY, vide Administrative Approval No. L-14011/12/2021-HRD dated 30/03/2021 with financial support of Rs. 619.12 Lakh, over a period of three (03) Years with the objective to setup Digital Enabled Common Facility Centre. Under the project, a total of 6,605 candidates have been trained so far against the total training target of 6,920.

9.8.3.6 Capacity Building in IECT including training in Digital Skill sets and Current Industry Demanding Technologies for various sections of society in the NE States [NECB 2.0]

Project is sponsored by MeitY vide Administrative Approval No. L-14011/33/2021-HRD, dated 02/02/2022 with financial support of Rs. 9232.76 Lakh over a period of two (02) Years. The project is jointly being implemented by NIELIT Guwahati, Kohima, Itanagar, Imphal, Shillong, Aizawl, Gangtok and Agartala with the aim of overall up-liftment of the socio-economic status of NE Citizens by creating a smart ecosystem with necessary IT education and skills. Under the project, 1,70,402 candidates have been trained so far against the total training target of 1,71,710.

9.8.3.7 ICT intervention in Travel & Tourism (T&T) Industry through Capacity Building in New Age Digital Technologies

Project is sponsored by MeitY, vide Administrative Approval No. L-14011/23/2021-HRD dated 18/02/2022 with financial support of Rs. 144.25 Lakh over a period of three (03) Years with the objective of empowering the youth with Digital skill including understanding of e-commerce digital transactions and associated concepts. Achievement as on 31.10.2024: -

- Infrastructure Creation - 100%
- Creation of VR Content for Tourists & it's hosting/ Digital Dash Board and Portal- 100%
- Mobile Application Containing multilingual e-audio contents for e- Tourist Guides/ Tourists - 100%
- Development of e-content-100%,
- LMS-100%
- 234 stakeholders/youths have been trained.

9.8.3.8 Self-employment Capacity building of the Engineering pass-out students belonging to Scheduled Caste/Scheduled Tribe community

Project is sponsored by MeitY vide Administrative Approval No. L-14016/2/2021-HRD dated 30/03/2021 with financial support of Rs. 443.73 Lakh over a period of three (03) Years. Project is being implemented jointly by NIELTI Patna, Haridwar, Chennai and Delhi (PMU). The objective of the project is to build the capacity of the Engineering pass-out students belonging to Scheduled Caste/Scheduled Tribe community. Under the project, 720 candidates are to be trained out of which 285 Candidates have been trained.

9.8.3.9 Work Based Learning (WBL) programme to Strengthen and Empower SC/ST/Women/EWS Graduate Engineers through MeitY Institutions

The Project is sponsored by MeitY vide Administrative Approval No. L-14011/19/2021-HRD dated 09/03/2022 with the financial support of Rs. 5140.18 Lakh over a period of five (5) years. The main objective of this programme is to provide an opportunity to SC/ST/EWS/ Women candidates to acquire Technical Knowledge Expansion, Real time Working Skills, Technology Use, Problem Solving Skills, Reasoning, Analytical Thinking, Interpersonal Skill etc. on PAN India basis. Total 1157 interns are engaged by NIELIT Centres.

9.8.3.10 Future Skill Prime project (Programme for Reskilling/Up-skilling of IT Manpower for Employability)

Project is sponsored by MeitY vide Administrative Approval No. 14011/21/2017-HRD (Vol. II) dated 24/12/2019. Total estimated cost of the project is Rs 436.87 crore (approx.) with GIA of Rs. 433.21 Crore from the Central Government and 3.66 Crore to be incurred by NASSCOM over a period of Three (03) Years. The project is being implemented at NIELIT Calicut, Kolkata and Aurangabad (Lead Centres) and NIELIT Delhi, Agartala, Calicut, Gorakhpur, Chennai, Aurangabad, Chandigarh, Kolkata, Imphal, Gangtok, Guwahati, Kohima, Patna, J&K (Co-Lead Centres) providing training in the emerging technologies viz. Artificial Intelligence, Robotic Process Automation (RPA), Internet of Things (IoT), 3D Printing/Additive Manufacturing, Big Data Analytics,

Virtual Reality/Augmented Reality, Cloud Computing, Cyber Security, Block Chain Technology and Social and Mobile.

9.8.3.11 Development of Cyber forensic Training cum Investigation Labs in North-Eastern States and Cloud based centralized Cyber forensics Lab Infrastructure

Project is sponsored by MeitY vide Administrative Approval No 12(03)/2019-CSRD, dated 25/03/2020 with the financial support of Rs. 1692.20 Lakh over a period of 5 years. The objective of this project is to setup cyber forensic training cum investigation labs in 8 North Eastern states equipped with associated cyber forensic system and tools. Achievement as on 31.10.2024: -

- Set up of Cyber Forensic cum Training Lab at 4 four locations-Kohima, Agartala, Imphal & Aizawl
- Creation of resource portal along with e-learning methodologies over cloud and facilities for MIS, courseware dissemination, information exchange, resource persons/ organizations
- A total of 2198 trainings under (Awareness level, Beginners level, Advanced level and Judiciarylevel) have been completed.
- Creatde a centralized database facility for digital crime tool profiling and usage of cyber forensic tools & reference library of various cyber forensic software tools for evidence extraction and analysis for cyber forensics
- Design and development of the course curriculum and its delivery for various stake holders

9.8.3.12 Capacity Building and Training on Cutting-edge technologies for employable youth of Tripura

Project is sponsored by MeitY vide Administrative Approval No L-14011/2/2022-HRD, dated 28/03/2022 with the financial support of Rs. 441.44 Lakh over a period of Three (3) years. The project is being implemented by NIELIT Agartala with the objective of enabling entrepreneurship & sustainable development among youth of Tripura by providing Training in cutting-edge technologies. Under the project total 3480 candidates are to be trained, out of which 1562 candidates have been trained so far.

9.8.3.13 Establishment of Design and Assembly Lab of solar LED based products

Project is sponsored by MeitY vide Administrative Approval No 14016/3/2021-HRD, dated 28/09/2022 with the financial support of Rs. 211.20 Lakh over a period of Three (3) years. The project is being implemented by NIELIT Leh with the objective of setting up a complete design and assembling lab of solar LED based products like Solar lanterns, Solar street lights etc. Under the project, 350 candidates are to be trained, out of which 185 candidates have been trained and set up of complete design and assembling lab of solar LED based products is under process.

9.8.3.14 Skilled Manpower Advanced Research and Training (SMART) Virtual Prototyping Lab at NIELIT Calicut

Skilled Manpower Advanced Research and Training (SMART) facility or Virtual Prototyping Lab is set up at NIELIT Calicut as part of the Chip to Start-up (C2S) programme of MeitY the for proliferation of advanced VLSI and Embedded system design training, research and electronics systems development across the country. The 'SMART' remote lab facility is available 24x7, and the students, researchers, and start-up industries can access the facility anytime and anywhere. A total no. of 38,622 candidates have registered & 13,868 candidates have been trained using SMART.

9.8.3.15 Ultra Low Power SHAKTI RISC V Based Lightweight Edge AI Processor for IoT enabled Healthcare Applications

Project is sponsored by MeitY vide Administrative

Approval No EE-9/2/2021-R&D-E, dated 15/01/2024 with the financial support of Rs.288 Lakh over a period of five (5) years. The Project is being implemented by NIELIT Aurangabad with the objective of Design and Development of Indigenous Edge AI Coprocessor for IoT healthcare applications, Design of energy-efficient coprocessor capable of seamless integration into various healthcare IoT devices & Development of functional prototypes of healthcare applications leveraging the coprocessor's local data processing capabilities. Under the project, setting up of DIR-V based SoC and Embedded System Design Labs & the installation of Synopsys, CADENCE and Mentor Graphics VLSI Design tools have been completed. Achievement as on 31.10.2024: -

- Completed high level-design of IoT enabled healthcare system and high-level design document is prepared.
- Two conference papers are presented for VDAT Conference.
- Manpower JRF/Project Associate recruitments are completed and onboarded.
- Procurement of sensors for FPGA based system integration is under progress.
- SHAKTHI RISC-V Processor RTL analysis is in progress.
- Conducted FDPs, bootcamps and Skilling programs for Airforce officials in VLSI and Embedded systems

9.8.3.16 Empowering Police Personnel and Government Officials of NE States through IT and Cyber Security Training :

Project is sponsored by MeitY vide Administrative Approval No L-14011/7/2023-HRD, dated 26-02-2024 with the financial support of Rs. 2245.47 Lakhs over a period of three (3) years. The Project is being implemented by NIELIT Kohima with the objective to train Police Personnel and Government Officials of NE States through IT and Cyber Security Training through a comprehensive training program with setting up IT cum Security labs equipped with the latest hardware and software at different police headquarters and selected districts in NE States. Under the project , 504 Police personnel & Govt. officials have been trained out of the assigned target of 18,660.

9.8.3.17 Electronics & ICT Academy Scheme, Phase-II

Project is sponsored by MeitY vide Administrative Approval No L-14011/1/2024-HRD, dated 26-04-2024 with the financial support of Rs. 9468.82 Lakh over a period of five (5) years. The Project is being implemented by NIELIT Aurangabad, NIELIT Calicut, NIELIT Gorakhpur along with 11 other institutes (IITs, CDACs & NITs etc.). The objective of the project is to conduct faculty/mentor training through specialized Faculty Development Programs (FDPs) with the vision of MeitY by promoting emerging areas of technology and other high priority areas that are pillars of both, the "Make in India" and the "Digital India" programmes in ITI/Polytechnic. The target of the NIELITs is to train 7500 faculties & also to develop 60 Faculty Development Programs (FDPs) on emerging Technologies. Training activities yet to be started.

9.8.3.18 Capacity Building for human resource development in Unmanned Aircraft System (Drone and related Technology)

Project is sponsored by MeitY vide Administrative Approval No L-14011/29/2021-HRD, dated 11.07.2022 with the financial support of Rs. 89.87 Crore over a period of five (5) years. The Project is being implemented by NIELIT Aurangabad, NIELIT Bhubaneswar, NIELIT Calicut, NIELIT Imphal & NIELIT J&K. The objective of the project is to leverage collaborative activities in human resource development through capacity building in education and training in the area of Unmanned Aircraft System (UAS). Under the project, 2196 Candidates are trained in 59 Bootcamps, 4 candidates have completed PG Diploma course, 03 POCs are approved, 07 PoCs are under process and Drone Electronic Labs have been set up in all 5 PIS

9.8.3.19 Skill Development of unemployed youths of Odisha, Jharkhand, West Bengal, and Bihar for enhancing Employability and enabling Entrepreneurship towards Sustainable Development of States.

Project is sponsored by MeitY vide Administrative Approval No L-14011/8/2023-HRD, dated 24.05.2024 with the financial support of Rs.5076.39 Lakh over a period of three (3) years. The Project is being

implemented by NIELIT Bhubaneswar, NIELIT Ranchi, NIELIT Kolkata & NIELIT Patna. The Objective of the project is to conduct free Skill Development programme to enhance employability and enable entrepreneurship towards sustainable development among youths of Odisha, Jharkhand, West Bengal and Bihar through various NSQF aligned courses under IT and Electronics domain. Training activities yet to be started.

9.8.3.20. Employability Enhancement & Livelihood Training Program [EELTP] of SC/ST& EWS (Women) Youth through Capacity Building and Skill Development in IECT

Project is sponsored by MeitY vide Administrative Approval No. L-14016/2/2022-HRD, dated 12/10/2022 with financial support of Rs. 9090.42 Lakh over a period of three (03) Years. The project is jointly being implemented by 21 NIELIT Centres with the aim of capacity building and skill development of SC/ST & EWS (Women) youth in IT and Electronics Sectors to enhance their employability and livelihood in SC/ST populous districts of States/UTs by imparting training in selected futuristic and upskilling courses. Under the project, 1798 candidates have been trained so far against the total training target of 52,300.

9.8.4. Synergy through Collaborations and MoUsA

I. MoU was signed with NIELIT and Information Technology Institute (ITI), Ministry of Communications and Information Technology (MCIT), Egypt on 11th March, 2024. The objective is to foster mutual collaboration for improving workforce skills, promoting employment opportunities, addressing skills gaps, and fostering international cooperation. Trainings shall be imparted to Egyptian students.

II. MoU was signed with NIELIT and Microsoft Corporation Pvt Ltd on 12th Feb, 2024 with the objective to enable digital skilling interventions and continuous learning framework in Artificial Intelligence and extend their existing programs, joint programs, skilling interventions and joint certification opportunities aligned to the National Skills Qualifications Framework ("NSQF") to enable digital transformation of India.

III. MoU was signed with NVIDIA on 15th Feb, 2024 with the objective to work on opportunities to address the AI skill development, upskilling and reskilling requirement of India, to support the IndiaAI Mission of the Government of India.

IV. MoU was signed with Uniques Technologies on 15th Feb, 2024 with the objective to develop skilled manpower in the domains of common interest such as management, technology, finance, digital skills, Cyber Security, Digital Payments etc. through participatory mode such as summer internships, placements, field visits, workshops, conferences etc.

V. MoU was signed with Dr. B.R. Ambedkar Nation Law university, Sonepat on 5th Jan, 2024 with the objective to develop skilled manpower in the domains of Cyber Security, Artificial Intelligent, Cyber Law, Cyber forensic etc. through participatory mode such as formal, non-formal training programs, summer internships, placements, field visits, workshops, conferences etc and exchange of Academic and non-Academic staff to their respective campus etc.

VI. MoU was signed with Erekrut on 13th Feb, 2024 with the objective to collaborate for enhancing employment opportunities for NIELIT students and facilitating campus recruitments processes, and to connect the institutions students with a diverse range of potential employers, thereby achieving optimal placement outcomes.

VII. MoU was signed with Kyndryl on 13th Feb, 2024 with the objective to collaborate and work together in the areas of skill development, quality education and training, content and certifications and any other services that may be decided from time to time.

VIII. MoU was signed with Siddhi Infonet on 15th Feb, 2024 with the objective establish a collaborative relationship between NIELIT and Siddhi Infonet Private Limited, aimed to increase industry interaction, providing internship and placement opportunities to NIELIT students.

IX. MoU was signed with NIELIT and Madhya Pradesh State Electronics Development Corporation Ltd on 11th March, 2024 for imparting training in Skill Development and Capacity Building. All the parties also agree for joint execution and implementation of future Skill Development / Capacity Building Projects

X. MoU was signed with NIELIT and National Telecommunications Institute for Policy research, Innovation and Training on 3rd June, 2024. The collaboration is planned to promote mutual growth through different initiatives. Key areas of collaboration include joint planning and execution of Faculty Development Programs, organization of national and international events such as workshops and conferences, and the provision of specialized training in fields like Data Communication, Signal Processing, and AI. NIELIT shall also extend its Virtual Academy platform, IT infrastructure, and Remote Labs to NTIPRIT. The collaboration also supports NSQF training and internship programs.

XI. MoU was signed with NIELIT and United Service Institution of India (USI) on 14th Aug, 2024 to develop and implement training programs of Cybersecurity, Digital forensics and emerging technologies for Agniveers, retired defense personal and other stakeholders and co-develop educational materials and curricula tailored to need of military personal and defense stakeholders.

XII. MoU was signed with NIELIT and INTERNSHALA (Scholiverse Educare Private Limited) on 05th Sept, 2024. The objective to MoU is to enhance the internship and employment opportunities, collaboration for joint recognition of online skilling courses as per industry standards.

XIII. MoU was signed with NIELIT and HireMee (i.e. KAAM Service Private Limited) on 05th Sept, 2024 with the aim to enhance the employment opportunities for students by Employbility Skill Assessment and felicitating the effective campus recruitment drive.

XIV. MoU was signed between NIELIT and Directorate General of Resettlement (DGR) on 10th Sept, 2024 with the aim to provide training and capacity building of Ex-Serviceman in emerging technologies and NSQF align courses and shall offer the virtual academy along with virtual lab and smart lab facility.

XV. MoU was signed between NIELIT and Military College of Telecommunication Engineering (MCTE) on 26th Sept, 2024. The objective of MoU is to establishment of Satellite Campus and Accreditation centers, Joint Certification and recognition, Customized courses aligning with military perspective, access to virtual and smart labs.

XVI. MoU was signed between NIELIT and Maharashtra State Board of Technical Education (MSBTE) on 1st Oct, 2024. The focus area of the collaboration is to establish Center of Excellence in AI, IoT, Industry 4.0, 3D printing and allied technologies for capacity training and R&D centers in State of Maharashtra.

XVII. MoU was signed between NIELIT and Physics Wallah Pvt. Ltd. on 10th Oct, 2024. The main objective of MoU is to develop skilled manpower in the domains of common interest such as Artificial Intelligence, Computer Science, Data Science and other emerging technologies etc. through participatory mode such as summer internships, placements, field visits, workshops, conferences etc.

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 Ministry of Electronics & IT (MeitY), Government of India. 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 have been statutory services, High Speed Data Communication (HSDC) services, State-of-the-art Incubation services, Information Security Audit Service, Project Management & Consultancy services and IT Managed services/co-location services to the satisfaction of the IT Industry.. STPI has played a key developmental role in the promotion of software exports with a special focus on SMEs and startup units. Apart from this, STPI is also executing various initiatives i.e. Centres of Entrepreneurship (CoEs), Next Generation Incubation Scheme (NGIS) etc. for promotion of startup ecosystem in the country.

STPI has been implementing the Software Technology Park (STP) scheme and the Electronics Hardware Technology Park (EHTP) scheme for the promotion of IT/ITES/ESDM industry. The phenomenal success of the IT/ITES industry has been possible, inter-alia, due to pivotal role played by the STP Scheme. STP Scheme is a unique scheme, designed to promote the software industry and growth of Start-Ups and SMEs without any locational constraints. As on 31st December,2024, 5097 units are exporting under the STP scheme and 42 units are exporting under EHTP scheme.

Till 31st December,2024, IT/ITES export from STP units stands at Rs. 6,68,372.65 crore (tentative) and Electronics Hardware export of Rs.5173.48 crore (tentative) under EHTP scheme.

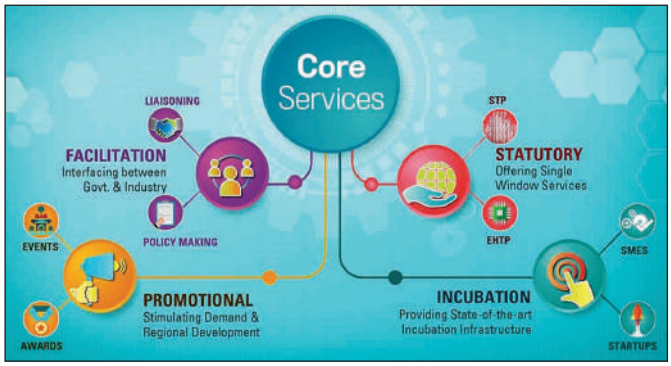
9.9.2 STPI Centres

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 on date, a total of 65 STPI centres/ Sub-centres are operational across the country, out of which 57 centres are in Tier II and Tier III cities.

STPI is working closely with the respective State Governments/local authorities for creation of more space, equipped with state-of–the-art infrastructure facilities, for development of the software industry and increasing exports.

Services:

The main services rendered by STPI for the software exporting community are as below:



- **Statutory Services**

  STPI provides Single Window Clearance to Software exporters under the STP/EHTP Schemes. STP scheme provides these units with various benefits making it a phenomenal success.

- **Incubation Facilities**

  Business and technology incubation stimulate the growth of startups. STPI is offering ultra-modern office facilities to small units and entrepreneurs. Plug-n-Play facilities for startups enable short gestation period. This has encouraged many entrepreneurs to start their own operations and grow in a competitive environment.

- **Datacom Services**

  One of the STPI's remarkable contributions to the software-exporting sector is provision of High-Speed Data Communication (HSDC) services. STPI has designed and developed state-of-the-art HSDC network called SoftNET for software exporters. Local access to international gateways is provided through point-to-point and point-to-multipoint microwave radios which has overcome the last mile problem and enabled STPI to maintain an uptime more than 99%.

- **Consultancy Services**

  STPI provides consultancy and Project Management Services and turnkey solution to various national and International organizations in the areas of Communication Networks, Network

Operation Centres, Network Management Systems, Computerization, e-Governance networks etc. The technology capability coupled with process strengths has enabled STPI to secure a number of projects from time to time.

9.9.3 India BPO Promotion Scheme/North East BPO Promotion Scheme

The Ministry of Electronics and Information Technology (MeitY) had launched two BPO Promotion Schemes viz. North East BPO Promotion Scheme (NEBPS) and India BPO Promotion Scheme (IBPS) in 2015 and 2016 respectively under Digital India programme. The IBPS and NEBPS are aimed at creating employment opportunities and promoting investment in IT/ITeS sector across the country, particularly in small cities/ towns, including rural areas, by incentivizing setting up of 48,300 and 5,000 seats BPO/ITeS operations with an outlay of ₹493 crore and ₹50 crore respectively. The seven cities with significant level of IT/ITeS activity viz. Bangalore, Kolkata, Mumbai, NCR, Pune, Hyderabad and Chennai have been excluded from these schemes to expand the base of IT/ITeS industry by promoting new economic activity. The duration of IBPS and NEBPS was up to March 2019 and March 2020 respectively to invite new bids, however disbursement may go beyond this period as per schemes timelines.

The IBPS and NEBPS provide financial support up to ₹1 lakh per seat in the form of Viability Gap Funding (VGF) towards Capital and Operational expenditure in three yearly installments. The Schemes also provide several special incentives within the overall cap of financial support (₹1 lakh/seat) as under:

Special Incentives: % of eligible financial support (within VGF cap)

- 5% for promoting local entrepreneurs
- 5% for providing employment to women (at least 50%)
- 2% for providing employment to persons with disability (at least 4%)
- Up to 10% for providing employment beyond target
- 5% for setting-up operation at non-Capital location

Under IBPS, till now, 227 BPO/ITES units have set up operations, which are distributed across 93 small towns/ cities covering 21 States/UTs. These BPO/ITES units have reported direct employment to 52,506 persons.

Under NEBPS, till now, 19 BPO/ITES units have set up operations, which are distributed across 11 locations covering 6 States/UTs of NER. These BPO/ITES units have reported direct employment of 819 persons.

9.9.4 Centres of Entrepreneurship (CoEs)

For ensuring India builds leadership in the emerging technologies such as IoT, Blockchain, FinTech, Artificial Intelligence, Augmented & Virtual Reality, Medical Electronics & Healthcare, Gaming & Animation, Machine Learning, Data Science & Analytics, Cyber Security, Chip Designing, ESDM, etc. and to build next wave of budding entrepreneurs, STPI is setting up several domain-focused CoEs in collaboration with suitable partners in various parts of country. These CoEs function as single-window facilitation centre with an aim to provide comprehensive structural &fundamental support including lab & incubation, training, mentoring, hand-holding, access to funds, networking, market connect etc. through a collaborative effort of Govt. of India, various State Govts., Industry, Academia, Domain & Technology Experts, Venture Capitalists and other startup ecosystem players. This collaborative model of the CoEs is further extended with an eminent personality from industry/academia/start-ups onboarded as “Chief Mentor” who would also act as brand ambassador of the CoE.

As on date, STPI has operationalized the following 24 domain focus CoEs in collaboration with suitable partners in various parts of the country:

1. Electropreneur Park at Delhi University
2. IoT OpenLab at STPI-Bengaluru
3. FINBLUE at STPI-Chennai
4. Electropreneur Park, an ESDM CoE at STPI-Bhubaneswar
5. NEURON at STPI-Mohali
6. VARCoE at IIT Bhubaneshwar
7. IMAGE at STPI-Hyderabad

8. APIARY at STPI-Gurugram
9. MOTION at STPI-Pune
10. MedTech at SGPGI Lucknow
11. Atal Incubation Centre (AIC) at STPI-Bengaluru
12. OctaNE - IoT in Agriculture CoE at STPI-Guwahati
13. OctaNE - Animation CoE at STPI-Shillong
14. OctaNE - AR/VR CoE at STPI-Imphal
15. OctaNE - IT Applications in Health care &AgriTech CoE at STPI-Gangtok
16. OctaNE - GIS Applications including Drone Tech CoE at STPI-Itanagar
17. OctaNE - IT Applications in Graphic Design CoE at STPI-Kohima
18. OctaNE – Gaming & Entertainment CoE at STPI-Aizawl
19. OctaNE - Data Analytics & AI CoE at STPI-Agartala
20. Efficiency Augmentation CoE at Bengaluru
21. FASAL at Dr. Panjabrao Deshmukh Krishi Vidyapeeth Akola
22. Kalpatru at RINL Visakhapatnam
23. Emerging Technology CoE at Bhubaneswar & Satellite Centre at BPUT, Rourkela
24. FinGlobe – FinTech CoE at Gandhinagar, Gujrat.

The STPI CoEs are enabling a 360-degree support ecosystem in the form of state of art Infrastructure, hand holding & funding support, Mentoring & Networking opportunities to nurture innovative start-ups in emerging technologies and making India a “Product Nation”. Collectively, 24 operationalized CoEs through well-publicized Open challenge programs and contests have selected a total of 1776 startups, out of which 745 are onboarded.

As a result of this, these start-ups have transformed their brilliant ideas into 1218 path-breaking products, 479 IPRs created and have showcased 1567 prototypes.

9.9.5 Modified Electronics Manufacturing Cluster (EMC 2.0) Scheme

The EMC 2.0 scheme was notified on 1st April 2020 with an implementation period of 8 years (i.e., up to March 2028). The objective of the EMC 2.0 scheme is

to create a comprehensive supply chain/ecosystem for strengthening electronics manufacturing base, attract Anchor Units to set up production along with their supply chain, build world class plug-n-play infrastructure and reduce the infrastructure & logistics cost. Total budgetary support for the scheme is Rs. 3,762 crores. STPI is the Project Management Agency (PMA) for implementation of the scheme.

The financial assistance that are entitled under EMC 2.0 are as stated below:

- EMC project: Up to 50% of project cost with ceiling of ₹70 crore for every 100 acres of land. Overall financial assistance for an EMC project cannot exceed ₹350 crore per project.
- Common Facility Centre (CFC): Up to 75% of project cost with ceiling of ₹75 crore per project.

This scheme will bring huge investment to India so that India can become the topmost destination in Electronics Manufacturing. The scheme is open for receipt of applications till 31st March 2024 and 31 applications have been received on EMC 2.0 portal.

As on 31st December,2024, eight (8) EMC projects at Andhra Pradesh, Haryana, Maharashtra, Karnataka, Telangana, Tamil Nadu and Uttarakhand and one CFC project at Telangana have been approved.

9.9.6 Next Generation Incubation Scheme (NGIS)

NGIS has a vision to drive the rise of India as a Software Product Nation so as to make it a global player in development, production and supply of Innovative, Efficient and Secure Software Products (including embedded software) thus facilitating the growth across the entire spectrum of ICT sector as envisioned in the National Policy on Software Products (NPSP)–2019. NGIS is operationalized from 12 Tier-II locations of India viz. Agartala, Bhilai, Bhopal, Bhubaneswar, Dehradun, Guwahati, Jaipur, Lucknow, Prayagraj, Mohali, Patna & Vijayawada with an aim to support 300 start-ups/ Entrepreneurs/SMEs in the field of IT/ITeS/ESDM and generate 50+ patent/IPRs from them over a period of 3 years. NGIS has a total budgetary outlay of INR 95.03 Cr.

NGIS's partners & stakeholders include MeitY, STPI etc. as well as a vast spectrum of industry, academia, investment & funding agencies to support the innovative product-focused start-ups in the most comprehensive manner. 19 challenge programs (CHUNAUTI - Challenge Hunt Under NGIS for Advanced Uninhibited Technology Intervention) have been successfully concluded. A total of 626 startups have received support in the form of mentoring, stipends, and seed funding. Out of this, 115 startups have been disbursed seed fund, 359 startups have been extended stipend, and all 626 startups have been mentored. As of 31st December 2024, the beneficiary startups of NGIS have cumulatively developed 826 products, filed 220 Patents and generated employment of 7003. Additionally, more challenge programs may be launched in the future.

Under this scheme, to support startups Tech Startups in the scaling stage & growth stage from across India, especially from Tier 2 & 3 cities, a new initiative LEAP AHEAD (Launchpad for Tech Entrepreneurs towards Accelerated Growth and Pioneering AHEAD) was launched in this year. The objective of LEAP AHEAD is to identify & support tech startups through high-quality mentorship, scaleup funding in co-investment model, and letting startups establish global connections. Tech Startups in the scaling or growth stage aiming product diversification or planning expansion into new geographical locations benefited from mentoring and funding support under this initiative. Out of 546 completed applications received from 27 States/UTs. following multi-tier screening & evaluation process, 87 startups were finally selected for LEAP AHEAD 1st Edition. These 87 Startups undergone intensive 3-month mentoring program, 22 startups got the opportunity of global connect, and 17 startups have received investment from various investors including NextGen Technology Fund–I.

27 investors partnered with STPI through MoUs and assisted LEAP AHEAD startups in raising funds and these investors along with NextGen Technology Fund – I issued multiple term sheets to these startups.

2nd Edition of LEAP AHEAD has been launched on 15th October 2024 with last date for application submission 15th January 2025.

9.9.7 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 STPI participated/ sponsored include:

- Interactive session for startups on World Intellectual Property Day (26th April 2024) organized by STPI Neuron CoE.
- ICAI's Startup Sphere 2024 event, held between 27th to 29th June 2024 at Karnataka Trade Promotion Organization (KTPO), Bengaluru.
- Second Edition of CII Vidarbha IT Conclave 2024 held on 27 July 2024 at Nagpur.
- 4th edition of the Digital Senate Summit held on 11th September 2024 at Delhi.
- India Mobile Congress 2024 held from 15th to 18th October 2024 at Delhi
- India Blockchain Summit 2024 held on 19th October 2024 at Delhi
- Singapore Fintech Festival 2024 held from 6th to 8th November 2024 at Singapore Expo
- IndiaJoy 2024 held from 13th to 17th November 2024 at Hyderabad
- Cloud Data Centre India 2024 10th Annual Conference held on 14th November 2024 at Delhi
- The International Conference on Cybernation & Computation (CYBERCOM 2024) held on 15th November 2024 at Dehradun
- STPI co-hosted the Bengaluru Tech Summit 2024 held from 19th to 21st November 2024 at Bengaluru
- 15th Agrovision India held from 22nd to 25th November 2024 at Nagpur
- Digital Bharat Summit 2024 held on 29th November 2024 at Delhi
- Bharat Defence Summit 2024 held on 6th December at Delhi
- STPI co-organized the 1st NE Tech Summit held on 9th December 2024 in Kohima, Nagaland
- STPI co-hosted 9th TiE Global Summit 2024 held from 9th to 11th December 2024 at Bengaluru
- 22nd Edition of CII Connect 2024 held on 17th & 18th December 2024 in Chennai.

9.9.8 Startup Accelerator of MeitY for Product Innovation, Development, and Growth (SAMRIDH) Programme

The Startup Accelerator of MeitY for Product Innovation, Development, and Growth (SAMRIDH) programme was launched in August, 2021 for a period of three years (further extended for one year) to accelerate around 300 Startups through existing and upcoming Accelerators. At present, under the SAMRIDH programme, 175 startups have been selected and accelerated through 22 selected accelerators spread across 12 states of India, in the focused areas of Health-tech, Ed-tech, Agri-tech, Consumer-tech, Fin-tech, Software as a Service (SaaS), and Sustainability.

Meity launched the second cohort of SAMRIDH on 4th September, 2024 to support 125 startups through potential accelerators.

9.9.9 Innovation Challenge for the Development of Indian Video Conferencing Solution

MeitY has announced "Innovation Challenge for Development of a Video Conferencing Solution" under the "Digital India Programme" in April, 2020 for Indian startups/entrepreneurs to develop indigenous videoconferencing software applications for use by the Government.

- The "Techgentsia Software Technologies Pvt. Ltd. (Product name: Vconsol)" was declared as winner of the innovative challenge and MeitY entrusted NIC to roll out the Vconsol service for the Government of India.

The following three potential VC solutions start-ups were also selected for the Video Conferencing solution development:

- M/s Instrive Soft labs Pvt Ltd (Product Name: HydraMeet)

- M/s Sarv Webs Pvt. Ltd. (Product Name: Sarv Wave)
- M/s People Link Unified Communications Pvt Ltd' (Product name: Insta VC)

NIC has created a secure infrastructure for "Vconsol" product at National Data Centre New Delhi with a capacity of around 1000 concurrence users and started rolling out the services for the Government of India uses in the brand name of "BharatVC". More than 3 Lakh VC meetings have been held on Bharat VC as on July 31, 2024.

9.9.10 Centre of Entrepreneurship on Industry 4.0 at Rashtriya ISPAT Nigam Ltd. - Visakhapatnam Steel Plant (RINL-VSP)

The demand for Industry 4.0 products and solutions is going to rise exponentially in the backdrop of growing Industrial Automation. Strengthening domestic capabilities of Industry 4.0 products & solutions will take the domestic industry up the value chain significantly by way of an increase in products, patents & IPR. In order to boost start-ups in these fields, a Centre of Excellence in the field of Industry 4.0 at RINL Visakhapatnam has been established. It will nurture around 175 innovative startups over a period of five years.

The CoE facility includes an area of 6,000 Sq.ft. with the state-of-the-art incubation facility housed on the campus of RINL-VSP. This CoE has domain-specific physical laboratories like IIoT, AI/ML & AR/VR and Industrial Automation, Robotics, Drone & 3D printing setup with the required equipment and software in the domain to support the startups. So far, 10 startups have been onboarded, resulting in the development of 3 prototypes, 2 products by these start-ups.

9.9.11 iTamil Nadu Technology (iTNT) Hub in Chennai

The iTNT Hub in Chennai has been established with a total outlay of ₹54.61 crores with MeitY's contribution of ₹27 crores over a period of five years. The primary objective of Tamil Nadu Technology Hub is to nurture the deep/emerging tech innovation ecosystem in Tamil Nadu that can guide, develop, implement and support startups, especially in the scaling-up phase in Deep Tech. The iTNT Hub shall support 200 start-ups in the hub & spoke model and provide acceleration and infrastructural service. In addition, 200 numbers of start-ups will be accelerated in deep tech/emerging tech. So far, 24 startups have been incubated and 6 products launched by these startups.

9.10 Digital India Corporation (DIC)

9.10.1 Introduction

Digital India Corporation (DIC) is a not-for-profit company set up & promoted by the Ministry of Electronics and Information Technology (MeitY), Govt. of India. The Company leads & guides in realising the vision, objectives and goals of the Digital India program. It provides strategic support to Ministries / Departments of Centre / States to carry forward the mission of Digital India by way of capacity building for e-Governance projects, promoting best practices, encouraging Public-Private Partnerships (PPP), nurturing innovations and technologies in various domains.

The company encompasses 7 Independent Business Divisions (IBDs) viz. KIDIC Core or Technology Development & Deployment Division (TDDD), NeGD (National e-Governance Division), MyGov, MeitY Startup Hub (MSH), India Semiconductor Mission (ISM), Digital India Bhashini Division (DIBD) and INDIAai.

9.10.2 DIC Core or Technology Development & Deployment Division

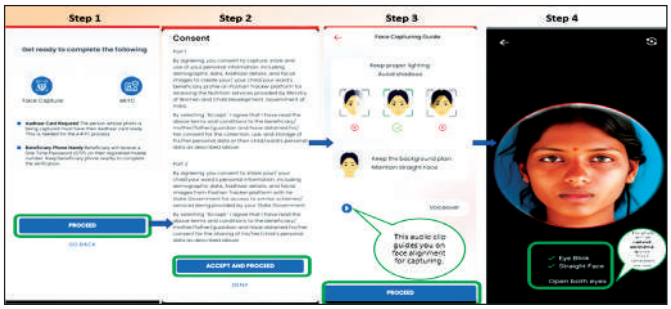
9.10.2.1 Poshan Tracker

'Poshan Tracker' is a mobile-based application for dynamic identification of stunting, wasting, and under-weight prevalence among children and last-mile tracking of nutrition service delivery by Anganwadi Workers at Anganwadi centres. The application has further been made available to State Officials with the integration of the Supportive Supervision Application and also to beneficiaries through the new Beneficiary interface.

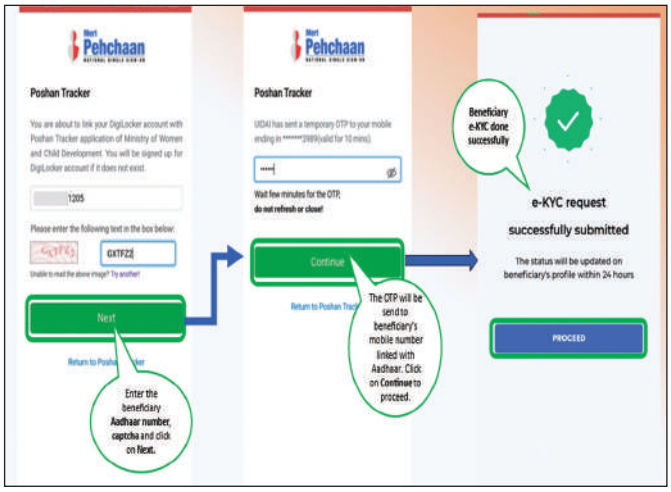
The work undertaken in the area of Process Re-engineering for Digital Transformation:

A. **Face Capture and Authentication in SNP distribution:** The Poshan Tracker is equipped with the new face capture and authentication feature

to ensure that nutritional services are provided to genuine beneficiaries. The implementation of the feature in the Poshan Tracker is a significant step towards ensuring transparency and accountability in the distribution of services, ultimately leading to better nutrition outcomes for the target groups.



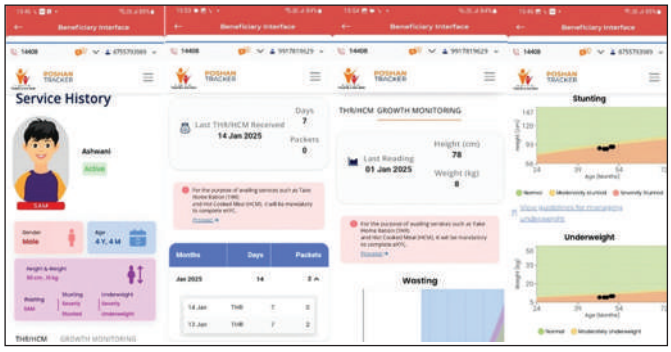
B. **Beneficiary e-KYC** allows Anganwadi Workers (AWW) to complete the e-KYC (electronic Know Your Customer) process for beneficiaries. This feature aims to streamline the verification process and ensure that benefits are delivered efficiently and accurately. It makes it simple for AWWs to verify beneficiaries' identities using electronic methods, ensuring accurate and up-to-date records, faster access to benefits, and a secure and reliable process.



C. **Keycloak Module** has been implemented to make logging into the Poshan Tracker easier and safer. Keycloak is used to provide a login facility for the application. Roles are managed on Keycloak and based on role user can switch their application behaviour. One can use multiple applications to login via Keycloak with the same user credentials. It makes the app more secure, preventing unauthorized access and keeping user data safe. Additionally, Keycloak has also been implemented in the Supportive Supervision application for State Officials.

D. **Beneficiary interface** has been provided in the Poshan Tracker application to enable the beneficiaries (users) to register themselves directly on the app.

- Self-Registration Made Simple: This minimizes the dependency on Anganwadi Workers for manual registration.
- Approval by Anganwadi Workers: Once a beneficiary registers, the request is sent to the Anganwadi worker, to verify and approve the registration.
- Access to Personal Information and Services: Beneficiaries can view their service history, which includes information about the child's health and development, like height and weight tracking and details about the nutritional support they received, based on their eligibility or category



E. **Supportive Supervision Application** has been integrated with the Poshan Tracker

Key features of Supportive Supervision (SS):

i. **Real-Time Monitoring and Support:** Supervisors can access real-time data to provide instant support to AWCs, including:

a. AWC open status with timestamps.

b. Live access to the AWW dashboard.

c. Correction of growth monitoring data.

ii. **Visit Planning and Scheduling:** State officials can plan and schedule visits with defined objectives and goals, ensuring regular monitoring at pre-defined intervals.

iii. **Automated Analysis for Improvement:** The application provides automated insights and analysis visit inputs to identify areas for improvement and track quality indicators.

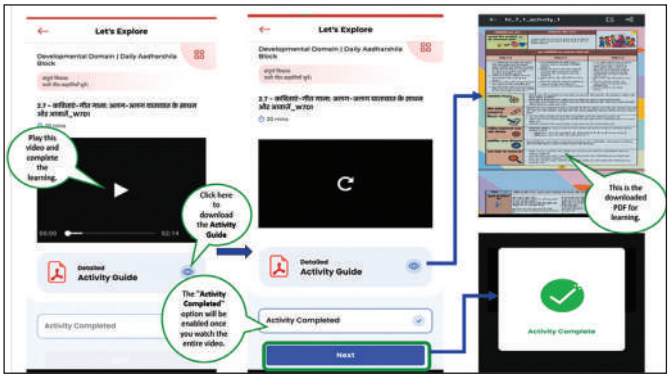
iv. **Self-Assessment Interface: d**edicated interface for supervisors and officials to conduct self-assessments.

v. **Performance Review:** State officials can easily review the performance of their immediate subordinates, ensuring accountability across levels.

vi. **Learning Resources:** Provides easy access to learning capsules and training materials within the application to enhance knowledge and skills.

F. **Protocol for Management of Malnutrition in Children (CMAM):** The CMAM protocol monitors and manages cases of severely malnourished children aged 0-6 years with a focus of identifying, treating, and managing malnourished children both at Anganwadi Centres and in communities. CMAM protocol helps in determining when to refer a malnourished child to Nutritional Rehabilitation Centre (NRC)/ medical facility. The protocol also outlines the steps for identification, management, referral, care level decision-making, nutritional and medical management, and follow-up at the Anganwadi level.

G. **Early Childhood Care and Education (ECCE):** In the endeavor to reposition Anganwadi Centre (AWC) to become the first village output for health, nutrition, and early learning with adequate infrastructure and human resources, appropriate provisions have been brought on to the Poshan Tracker application for ground-level dissemination and implementation of ECCE in every Anganwadi Centre. The purpose of Early Childhood Care and Education (ECCE) is to ensure responsive care, early learning and development which includes physical and motor; language, cognitive, socio-personal, emotional and creative and aesthetic appreciation. It encompasses the inseparable elements of care, health, nutrition, play and early learning within a protective and enabling environment.



H. **Stock Register Module** introduced wherein the Anganwadi worker will be able to keep track of the Supplementary Nutrition Programme stock (Take Home Ration-THR/ Hot Cooked Meal-HCM) required, received and distributed for the month in the Anganwadi Centre (AWC). The new Stock Register module displays the THR and HCM stock requirements based on the beneficiary type in the AWC. The Anganwadi Worker is also provided with an additional feature to enter the THR and HCM Stock received in the AWC date wise. The Stock Register module has inbuilt capability to keep track and update the SNP stock distributed based on the daily THR/CM distribution as part of the AWC daily tracking of beneficiaries.

I. **Family Details:** The register provides an insight into the number of families registered at the Anganwadi Centre, total members in each family, resident Type (Temporary/Permanent) and category wise count of the beneficiaries. It also provides details such as family number (which is unique), name of the family member, their relationship with the head of the family, gender, marital status, DOB, age, beneficiary type, resident type, religion, and their willingness to avail ICDS services like SNP and PSE.

J. **Growth Chart:** The Growth Chart section has been enhanced to enable the Anganwadi workers to view a child's complete growth monitoring history. AWW can now access growth records from the child's first monitoring date to the current date.

K. **Beneficiary Vaccination** module added in the application to enable the Anganwadi Worker to keep track of the vaccination status of the beneficiaries. The module enables the Anganwadi worker to monitor the beneficiaries upcoming vaccinations schedule, vaccinations that are completed and vaccinations that are overdue. The module also provides a vaccination profile of the beneficiary wherein the details of vaccinations due and vaccinations given are listed date wise.

L. **Heat Map** section has been added to the PT dashboard wherein users can view different indicator statistics on national and state level on India map view. Users based on their login rights are able to select State to check stats based on different colors. Each colour indicates a different range which is mentioned in the legend bar. There are different indicators like AWC open, Morning snacks, Home visits, Growth Monitoring, SNP distributed, SAM, MAM, Wasting children. Stats are also shown in tabular form which can be downloaded in csv format. Users can check/ compare the stats on bar graph format. National, State and District average is shown on a bar graph to compare the stats. Users are able to drill down till AWC level in the bar graph. There is a third option which is trend analysis in which users can compare stats of the entire year on a monthly stats basis.

M. **Growth Trends** shows trends of children's health status in a selected quarter. It showcases health status numbers in tabular form and users can download beneficiary details on district level. Additionally, health status of Stunting, Underweight and Wasting health status are also provided.

N. **Head Count** will enable the AWW to capture group photograph of the children during morning attendance and the module will showcase the count of children. AWW and State Officials can use this count to tally attendance of children in the AWC.

O. **Suposhit Gram Panchayat** page provides an option to State Officials to nominate a Gram Panchayat for award. A listing of all eligible Graph Panchayats is showcased and State Officials can filter Gram Panchayat based on District or Block level and then nominate a Gram Panchayat. The interface also provides the view to State Officials wherein they can see all nominated Gram Panchayats. Additionally, the option for deletion of nominated Gram Panchayat is also available. National users can also see all nominated Gram Panchayats on PAN India level.

9.10.2.2 Visvesvaraya PhD Scheme for Electronics & IT

MeitY, with the approval of the Cabinet Committee on Economic Affairs (CCEA) had initiated 'Visvesvaraya PhD Scheme' with the objective to enhance the number of PhDs in Electronics System Design & Manufacturing (ESDM) and IT/IT Enabled Services (IT/ITES) sectors in the country in 2014.

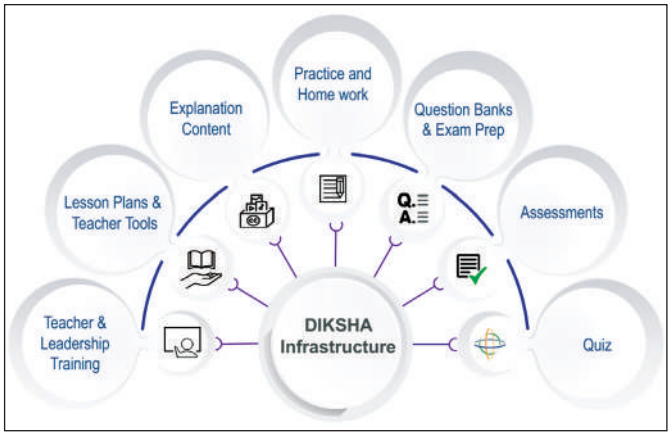
Phase-I of Visvesvaraya PhD Scheme with a budget of ₹466 Crores, initially approved for 9 years from 2014, is extended till Mar 2025. Based on assessment of Phase-I, demand from the institutions and role of such scheme in strengthening research eco-system, Phase-II of Visvesvaraya PhD Scheme, was initiated with an outlay of ₹481.93 Crore for 9 years w.e.f. Academic Year 2022-23.The scheme is being implemented by DIC.

9.10.2.3 DIKSHA (Digital Infrastructure for Knowledge Sharing)

DIKSHA (Digital Infrastructure for Knowledge Sharing-https://diksha.gov.in/) is a national platform for school education, an initiative of National Council for Educational Research and Training (NCERT), under the aegis of the Ministry of Education (MoE), GoI. DIKSHA can be accessed by learners & teachers across the country and currently supports over 30 languages and the various curricula of NCERT, CBSE and States/UTs across

India. The platform is being leveraged and developed for school education, foundational learning programs and to support inclusive learning for underserved and differently-abled communities of learners and teachers.

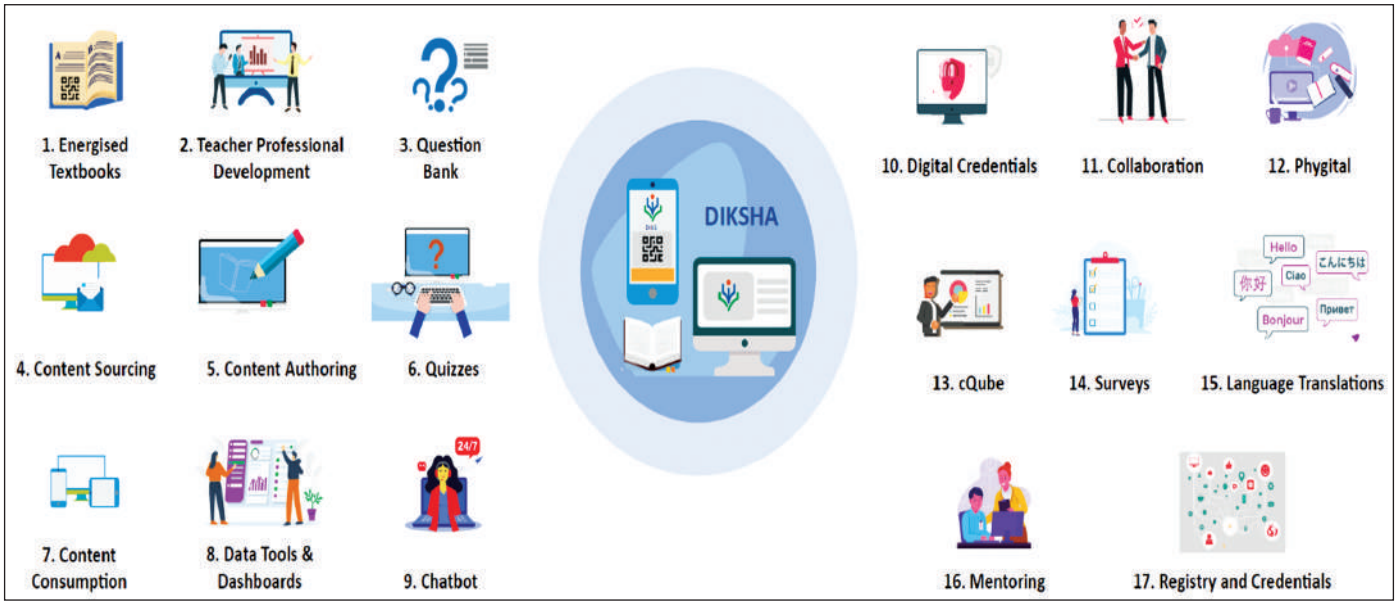
DIKSHA is developed on open-source technology and deployed on the cloud platform. DIC provides technical administration and manages the Cloud of DIKSHA platform.



Key Solutions / Use-cases of DIKSHA

DIKSHA is a flexible and evolving platform that continues to expand, based on the aggregated needs of the various states/UTs and overall ecosystem. DIKSHA infrastructure also follows a modular approach by design and the core building blocks of DIKSHA have enabled some successful use-cases such as:

1. **Energized Textbooks - Physical Textbooks to Phygital Textbooks**.
   - DIKSHA has over 6,800 unique ETBs on the platform being consumed nationwide. These ETBs provide students with quality learning materials, contributing to their academic growth - aligned to each academic Board, Medium, Grade, Subject and Chapter concepts.
2. **Online Courses for Teachers and Students (with Digital Credentials)**
   - To ensure continuity of training & capacity building, several programs were rolled out at centre as well as states/ UTs focusing on digital training. DIKSHA contains around 20,677 capacity-building courses attracting over 18.04 Crores enrolments and resulting in generation of over 12.44 crore digitally verifiable certificates.
   - NISHTHA i.e. National Initiatives for School Heads and Teacher's Holistic Development, is a nationwide capacity building program by NCERT which is also conducted online on DIKSHA.



3. **Question Bank Tool**
4. **Content Sourcing Tool** - Engage, Contribute and Curate with Ecosystem (VidyaDaan)
5. **Content Authoring Tool**: Apart from content sourcing tools, DIKSHA also has a content authoring tool which allows teachers or users, designated by centre or state departments, to create interactive digital content.
6. **Quiz - Making Learning Fun**:
7. **Content Consumption Tools - Multi-device and multi-modal user access**
    - DIKSHA provides access to over 3,66,000 digital resources, available in more than 126 languages, catering to the diverse educational needs of users.
8. **Data Tools**
9. **Chatbot Tools**
10. **Digital Credentials**

The impact of DIKSHA's offerings is evident in the numbers, with over **558 Crores learning sessions** facilitated on the platform till date.

9.10.2.4 AAINA – Dashboard for cities for Ministry of Housing and Urban Affairs

AAINA - Dashboard for cities is an initiative of the **Ministry of Housing and Urban Affairs**, which would serve as a tool for comparing similarly placed ULBs (Urban Local Bodies) and promoting peer learning amongst ULBs. These dashboards will inspire the ULBs by pointing to possibilities and areas of improvement and providing them the opportunity to learn and engage with frontrunners.

AAINA portal will provide information on status and progress of the ULBS on five broad thematic areas viz. **Political and Administrative Structure, Finance, Planning, Citizen Centric Governance and Delivery of Basic Services**. AAINA Portal was launched on **November 14, 2023** for ULB's to fill the data across 5 thematic areas.

As on 31st December 2024, 1081 ULBs have submitted the data and around 871 ULBs are under various stages of filling the data.

9.10.2.5 Gov.in AppStore

The GOV.IN AppStore is India's official platform for hosting mobile applications that deliver public services. It streamlines access to government services across sectors like health, education, finance, and more, ensuring users can download and use apps anytime, anywhere. Accessible through both its website and mobile app, GOV.IN AppStore empowers developers and enhances service delivery for citizens nationwide.

Key milestones include the onboarding of 2,200 applications and over 8,000 developers. The total number of downloads reached 119,397, while 133,785 new users were onboarded.

Progress made during the year:

The knowledge transfer of the project taken from C-DAC, Mumbai including handover of user portal and Admin portal. The user acceptance testing conducted and cloud setup. The User Interface & Experience (UI/UX) has been revamped for both web as well as android app with improved accessibility, voice search option, location-based personalization, improved navigation and onboarding flow. CERT-In certified agencies have been engaged for vulnerability assessment and penetration testing of the website as well as android app.

9.10.2.6 LokOS: Digitizing Self-Help Groups (SHGs) in India

The Deendayal Antyodaya Yojana - National Rural Livelihoods Mission (DAY-NRLM), under the Ministry of Rural Development, Government of India, aims to eradicate rural poverty by empowering SHGs and strengthening livelihoods. It has a vast network of 10+ crore SHG members across 93+ lakh SHGs, utilizing various digital systems for transaction capture and MIS at state and national levels, including state-specific portals.

LokOS, introduced by NRLM, is a community-centric digital platform designed to enhance SHG operations by digitizing transactions, records, and financial activities of Community-Based Organizations (CBOs). Built on a microservices-based, federated architecture, LokOS aims to improve data accuracy at the source and strengthen the central NRLM MIS. Key modules and applications under LokOS ecosystem:

- Transaction Module
- Digital Ajeevika Register
- Village Prosperity and Resilience Plan
- Producers Group Portal
- Training Module
- Saksham, e-FMAS & FDM applications
- Project Activities Monitoring & Tracking Module
- Centralized User Management Module
- Cadre Training & Management

Impact and Reach

LokOS supports:

- 10.58 crore SHG Members
- 93 lakh Self Help Groups
- 5.2 lakh Village Organizations
- 31,000 Cluster Level Federations

It also enables real-time tracking of the Lakhpati Didi Initiative, with:

- 2.92 crore potential Lakhpati Didis identified
- 3.2 crore entries captured in the Digital Aajeevika Register

By enhancing transparency, efficiency, and digital access, LokOS is transforming rural livelihoods through data-driven decision-making and real-time monitoring.

9.10.2.7 Customization, Enhancement & Deployment of Digital Solutions for Empowerment of Citizens of North-East India

DIC has taken up the project with the objective to empower the citizens of North-East India by providing digital solutions to ease their job and enhance their productivity & livelihood with a special focus on Farmers, Artisans, Weavers and Teachers (special schools). The project is focused on deploying DIC technologies / applications in the area of ICT in Agriculture, Embroidery & Weaving and Differently Abled which have lots of potential for large-scale deployment in all the North-Eastern States for the benefit of farmers, women, embroidery artisans, weavers and teachers of special schools. To achieve the proposed objective, three technology components have been identified for necessary customization and following deployment based on its usability and potential in North-East Region.

Component 1: Interactive Information Dissemination System (IIDS): Empowering Agri Institutions & Farmers

Manipur: Loumisingi Paojel

The sub-component has been taken up in collaboration with the College of Agriculture, Central Agricultural University Imphal to empower the farmers by providing the right information at the right time through mobile-based agro-advisory system.

During the period, the following activities were undertaken: Total 32 Awareness Programme was conducted and 1,336 farmers were registered, and with this, total 11,000+ farmers have been registered under the project. 2,06,189 text messages (consuming 4,13,579 SMS) and 1,682 voice messages were sent to registered farmers in the local language on various aspects of agriculture and animal husbandry. 16,749 calls were received on Toll-Free number and 43,353 outbound calls were made for registration, advisory and enquires purpose.

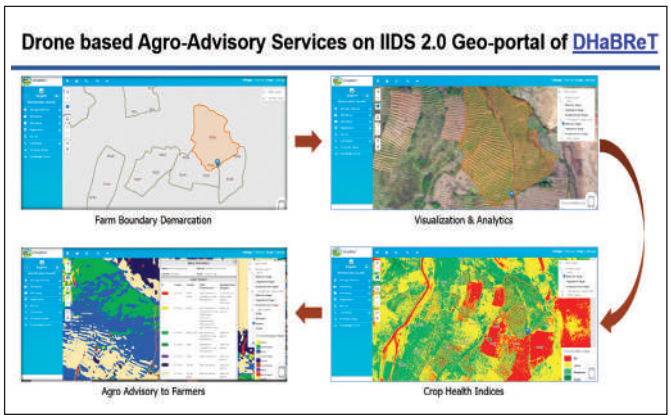
Meghalaya: Integration and Application of UAV for Crop Health Assessment and Monitoring with IIDS in Providing Evidence Based Agro-Advisory Services to Farmers of North-East India (DHaBReT)

The sub-component has been taken-up in collaboration with North-East Space Application Center and College of Post Graduate Studies in Meghalaya to develop a model for enhancement of the farm productivity by providing evidence based agro-advisory services generated by UAV data and integrating with IIDS platform. During the project period following activities were undertaken:

- UAV Aerial Surveys have been conducted using RGB and Multispectral cameras for the six crops viz., (1) Cabbage (5.8 Km2 approx.), (2) Cauliflower (4.5 Km2 approx.), (3) Paddy (5.7 Km2 approx.), (4) Ginger (5.8 Km2 approx.), (5) Pineapple (7.9 Km2 approx.), and (6) Turmeric (6.1 Km2 approx.) Generated ortho-products such as - 3D Point Clouds, Digital Surface Models (DSM), Digital Terrain Models (DTM) & Orthomosaic Images of all the project agricultural fields.

- A Prototype has been developed for one crop (cabbage) to reflect basic information of farmer and their farm details (Data collected through UAV) to the Agri Experts while delivering the advisory to the farmers through IIDS platform. The prototype is being refined.

Glimpses of UAV Data integrated with IIDS platform



Arunachal Pradesh: Arik Abik Lumon

The sub-component has been taken up in collaboration with the College of Horticulture and Forestry, (CoH&F), Pasighat, Arunachal Pradesh to empower the farmers by providing right information at the right time through mobile-based agro-advisory system.

During the period, the following activities were undertaken: Total 29 awareness programmes, and 29 Training programmes / Health Camps were conducted benefiting 1,838 farmers. During the year, 1,156 farmers were registered and with this total 7,213 farmers have been registered under the project. 3,29,659 text messages (consuming 6,33,071 SMS) and 3,90,208 voice messages were sent to registered farmers in the local language on various aspects of agriculture and animal husbandry. 39,708 calls were received on the Toll-Free number and 17,676 outbound calls were made for registration, advisory and enquiry purposes.

Sikkim: Jaivik Varta

The sub-component has been taken up in collaboration with the College of Agricultural Engineering & Post Harvest Technology (CoAE&PHT), Ranipool, Gangtok, Sikkim to empower the farmers by providing the right information at the right time through mobile-based agro-advisory system.

During the period, the following activities were undertaken: Total 30 awareness programme and 35 Training programmes / Health Camps were conducted benefiting 2,433 farmers. During the year, 1,385 farmers were registered and with this total 7,000 farmers have been registered under the project. 10,11,802 text messages (consumed 19,41,612 SMS) and 2,03,277 voice messages were sent to registered farmers in the local language on various aspects of agriculture and animal husbandry. 13,668 calls were received on the Toll-Free number and 16,963 outbound calls were made for registration, advisory and enquiry purposes.

- **Component 2: CAD Tools (DigiBunai™ & DigiKadhai): Empowering Weavers, Designers & Artisans**

Digital India Corporation (DIC) has implemented CAD applications (DigiBunai™ and Chic™ CAD Plus) in the Handloom & Handicraft sectors, aiming to enhance the skills and productivity of weavers, designers, and artisans across North-East India. These applications have been tailored to meet the specific requirements of the region, with CAD labs established in Assam, Manipur, Meghalaya, Tripura, Arunachal Pradesh, and Sikkim to support their effective use.

To further promote these technologies, DIC, in collaboration with its training partner, the Textile Sector Skill Council (TSC), has organized 33 awareness-building workshops for local weavers, designers, artisans, and students. These workshops aimed to introduce CAD tools and their practical applications in handloom designing. A total of 721 handloom weavers, designers, students, and artisans have received hands-on training on these technologies, leading to the creation of over 600 digital designs.

- **Component 3: Punarjjani™:** Empowering Teachers of Special Schools & Children with Intellectual Disabilities. It is a web-based tool that assists Special Teachers in the assessment of children (6 -18 years of age group) with Intellectual Disabilities (IDs)

The project includes implementation of the tool in 19 Special / Inclusive Schools in the North East region of the country through training of Special Educators, requisite hardware support for Special / Inclusive Schools, incentives for Special Educators and follow-ups.

Follow-ups with the Schools/Special Educators encouraging them to use the tool are going on.

Hardware support for Special / Inclusive Schools

Empowers special teachers for easy, efficient, quick and regular assessment, evaluation & monitoring of children with IDs:

- Training & Technical support provided to Special / Inclusive Schools and they were encouraged to upload case records of children with IDs.
- No. of Special / Inclusive Schools registered in Punarjjani web tool has reached 19
- No. of Children with ID registered has reached 1,158
- No. of Special Teachers using the tool has reached 145

The Assamese version of the tool has been made available as per the feedback of the Teachers.

9.10.2.8 Kisan Sarathi 2.0 - Enhancement, Operations, Maintenance and Support.

The project has been taken up in partnership with the Indian Council of Agricultural Research (ICAR) to facilitate farmers location-specific 'Demand Based Tele Agriculture Advisories' in their local languages through Krishi Vigyan Kendras (KVKs).

Following are the progress of the project during the period:

- A total of 740+ Krishi Vigyan Kendras (KVKs)/ District Agricultural Advisory and Transfer of Technology Centers (DAATTCs) have been on-boarded.
- During this period, 228 KVK experts were enrolled, with a total of more than 3,066 Subject Matter Experts also on-boarded for the implementation of Kisan Sarathi from all states and UTs.
- 79.56+ Lakh new farmers were registered during this period, bringing the total to 247.74+ Lakh farmers registered in the system.
- 51,609+ calls were received from farmers, with a total of 2,08,183+ calls received to date
- During the period 17.14 Crore messages were sent (consumed) to the Farmers. With this total of 54.17 Crore messages were sent (consumed) to the Farmers.
- The IVRS has been enhanced to deliver domain-specific advisories in 13 languages according to the availability of domain experts at the KVKs.
- A new module to manage multimedia queries has been developed to address queries received from farmers through UMANG.
- A module has been created to minimize the manual entry of domain, subdomain, crop, problem, and problem types into the system.·

Development and Enhancement:

Kisan Sarathi Apps:

- *Kisan Sarathi Farmer App* and *Kisan Sarathi Experts App* are developed and available on the UMANG platform.
- The standalone farmer app with features like Farmer Registration and Raising Query 2.0 is expected to be ready for testing by mid-January 2025.

Three-Tier Call Flow System (L1, L2, L3):

- L1 (Kisan Call Center/ ATARI FTA)
- L2 (KVK Experts, Head, ATARI and Admin)
- L3 (ICAR Research Institutions)
- Development is in progress.

Agricultural Advisory Management System (AAMS):

- Creator and approver modules have been developed.
- Enhancements are ongoing, and the customizer module is under development.

Integration with Kisan Sarathi :

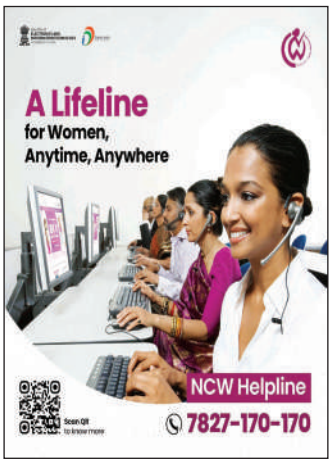
- **Integration with CSC (Common Service Centers)**: Completed integration.Pilot testing is currently underway.
- Integration with KCC (Kisan Call Center) has been initiated, and required APIs have been provided.
- Integration with IMD (India Meteorological Department) for weather data is in progress, with APIs provided by ICAR.
- Integration with e-NAM (National Agricultural Market) has started, but required APIs are still awaited.

9.10.2.9 NCW 24x7 Women Helpline

In order to facilitate the women victims and provide them psychological support, the National Commission of Women (NCW) has taken the initiative to start a helpline. DIC has been providing technical support to NCW for developing and hosting the helpline platform which is based on the IIDS platform of DIC. A dedicated helpline number 7827170170 has been provided for the purpose.

This helpline is being operated from NCW premises which is located in New Delhi. During the period, 1,73,510 calls have been received or made through the NCW Helpline Platform, with this total call number have been reached to 4,38,189.

During the period, security audit for the application has been completed, Support tickets resolution on priority and provided the technical support and maintenance to the application.



9.10.2.10 NCW - Her Legal Guide App

"NCW- Her Legal Guide" – A Mobile application focusing on various rights and statutes pertaining to women in India has been developed by DIC for National Women Commission. This Mobile App will act as a new friend for women in difficult situations and will make them aware of their rights. It also contains details about the helplines pertaining to women. Also, the App is available under UMANG. This app was officially launched on 9th November 2023 by Dr. D.Y. Chandrachud , chief Justice of India.The content is available in Hindi and english languages.

During the period tech support is provided to the app and server. Various helpline numbers are added in the application.

9.10.2.11 NCW Women Safety Audit Platform

National Commission for Women (NCW) intends to conduct Women's safety audit in Indian cities to assess the level of safety experienced by women in public spaces and workspaces in the city based on a sample survey & focused group discussions (FGDs). DIC has developed a Mobile application for data collection and a Web Panel to manage the agencies and the survey with a dynamic dashboard and City Safety Scorecard for the audited city. The Mobile App for survey data collection contains a secure login for authenticated surveyors. The app works in both offline and online modes. Web Application contains different admin-level logins which control the mobile app. Survey module, Questionnaire module, Agency Module, Task Management module, Location management, Notification, Profile, Report and Dynamic dashboard and City Safety Scorecard for the audited city.

During the period City Safety Scorecard for the tire II, 12 cities have been calculated and published in software. Dashboard and analytics of the survey has been calculated.Detailed report and score card has been published by NCW . 11 other cities have been chosen for Phase 2 Survey. Survey completed for the 8 cities of phase 2. Scorecard has been generated for these 8 cities by software.Project detailed report review is going on by NCW.

9.10.2.12 MY Bharat (Mera Yuva Bharat): Empowering India's Youth

MY Bharat, an initiative by the Department of Youth Affairs under the Ministry of Youth Affairs and Sports, Government of India, was launched on October 31, 2023, by the Honourable Prime Minister. Digital India Corporation is the Knowledge Partner for its digital platform.

Since its inception, MY Bharat has made significant strides in connecting and empowering Indian Youth. By December 2024, MY Bharat achieved remarkable milestones in youth empowerment, with over 1.24 crore registrations and around 8.37 crore hits, reflecting its widespread impact and popularity.

The platform, designed for Indian youth aged 15 to 29, seeks to create a youth-centric Phygital ecosystem for Youth Development and Youth-led Development in rural, urban, and rurban India. It offers a wide range of opportunities and high-impact tools for youth to unleash their true potential and create a level playing field irrespective of their geographical, educational, or economic diversities. Primary offerings include Experiential Learning Opportunities, Volunteering Opportunities, Mega Events, CV Building Tools, and Public Profiles for youth. To enhance accessibility, MY Bharat portal is available in 15 regional languages, ensuring a user-friendly experience for a broader audience.

9.10.2.13 E-SARAS (https://www.esaras.in/)

The **Digital India Corporation** has undertaken an initiative to develop an efficient and effective online platform aimed at enhancing the livelihoods of rural communities under the **National Rural Livelihood Mission (NRLM)**, Ministry of Rural Development (MoRD), Government of India.

This platform serves as a showcase for products crafted by **Self-Help Groups (SHGs)** and associated organizations. Its primary objective is to curate and present **authentic artisanal products** from across the country.

Through this portal, customers gain access to **100% authentic, uniquely handcrafted products** that reflect the rich cultural heritage and craftsmanship of rural India. These products, beautiful and extraordinary in design, come straight from the heart of India, connecting artisans to a wider audience and empowering them economically.

- Developed the **eSaras Portal** (www.esaras.in) and mobile application (available on Android and iOS) to showcase SHG products under the **NRLM initiative** by the Ministry of Rural Development (MoRD).
- Integrated **Shiprocket** as the logistics partner and **Razorpay** as the payment gateway for seamless operations on both the eSaras portal and mobile application.
- Successfully onboarded **eSaras** onto the **ONDC network**, boosting visibility and accessibility for SHG products across India.
- Designed and incorporated advanced features and functionalities customized for the **ONDC buyer app**, enhancing user experience and operational efficiency.
- Completed **API integration** for the **Social Tag** feature on the ONDC Network, enabling efficient product tracking and categorization.
- Configured shipping charges to ensure smooth and seamless order processing on the ONDC network.
- eSaras products are now visible on 8+ buyer (consumer) apps within the ONDC Network, significantly expanding product reach and market penetration.
- Development of the eSaras Multivendor Module is currently underway.
- Managed over **1,554 IVRS calls** (inbound and outbound) to assist with registrations, inquiries, and grievance redressal, ensuring effective customer engagement and support.

- Total number of **2,746+ products** uploaded on eSaras, highlighting a diverse and extensive range of SHG offerings.
- Processed over **1,086 orders** through the eSaras platform, demonstrating increasing consumer engagement and trust in the platform.

9.10.2.14 India Handmade

Indiahandmade: (www.indiahandmade.com)

Indiahandmade (https://www.indiahandmade.com/) is an e-commerce portal (designed & developed by Digital India Corporation) to strengthen artisans and weavers for promoting/selling their exquisite handloom and handicraft products to customers, by eliminating middlemen and ensuring fair remuneration. The portal was launched by the Ministry of Textiles on 22nd April 2023.

For sellers, all systems & processes are properly documented to make sure the sellers know what they need to do and how. Artisans and weavers are being supported by the Weavers Service Centres (WSCs) and Handicraft Service Centres (HSCs) at the ground level for awareness building, on-boarding, product uploading & order processing. A well-trained customer care team has also been deployed to take complaints/queries and resolve issues of the buyers and the sellers through Toll-free number- 18001216216.

Indiahandmade has various handmade products on the portal. The products include handloom items like clothing, furnishings, toys and decorative items, as well as handicrafts like paintings & sculptures, furniture, home décor, art jewellery, accessories and more.

This platform facilitates the buyers for getting authentic handloom and handicrafts products directly from the Indian artisans and weavers. This innovative platform is revolutionizing the traditional handicraft industry by directly connecting handloom weavers and handicraft artisans with customers.

During the year, following activities were undertaken:

- Development, maintenance and Tech Support of online portal and mobile apps.
- More than 1900 sellers have been registered on the portal.
- More than 9000 products have been uploaded.
- More than 650 orders have been received on the portal.
- Various training sessions are being conducted for the orientation, setting up the user account, uploading products with different attributes, ordering process and reporting module, etc.
- The portal is being promoted through social media, print media and various state level Melas.
- Indiahandmade ONDC integration live for Beta production.

9.10.2.15 NHAI DATALAKE 3.0

https://datalakeg.nhai.gov.in/nhai

The Memorandum of Understanding with NHAI was signed on 28 November 2023 for the development of NHAI Data Lake 3.0 to manage the extensive portfolio of NHAI projects. The estimated cost of the Project in the First Year of implementation is Rupees Thirty Crore and Eighty-Four Lakh(30.84) for twelve months. The financial are prepared based on the estimation for the development and deployment of the Proposed project for the First Party.

Achievements for the year are as follows:

- Meeting with NHAI - Requirement analysis and System DL 2.0 understanding
- Prototype design and documentation of various modules

- Study of similar platforms and tools to be used for the development of Datalake applications.
- Comprehensive business requirement documents prepared to delineate project scope and objectives.
- The hiring of the core team for NHAI Datalake 3.0 team.
- User Interviews are being conducted for key insights and improvements.
- Onboarding of the NHAI Manpower resources for NHAI Datalake 3.0 Team
- CMS has been finalised as SDA for the project through GeM.
- Provisioning of Cloud Infrastructure is in progress.
- WhatsApp has been Integrated with existing NHAI Datalake applications
- Created comprehensive test cases for all 10 modules, aligned with Figma designs and the Business Requirement Document (BRD)
- Development work is scheduled to start shortly.
- Developed and designed web screens for login and OTP-based registration, supporting contractual employees.
- Enabled agency registration through integrated SSO in Datalake for seamless experience in Web and Mobile.
- Uploaded the login and OTP implementation code to the server for deployment
- Integrated API for the login and OTP screen functionality on the web.
- Incorporated new role management capabilities and RBAC in datalake to enhance user access and functionality.
- Set up the database on the server to support backend operations.
- GIS will be integral to Datalake 3.0, with a comprehensive GIS database designed for NHAI. We are utilizing OpenLayers, GeoServer, PostGIS, and QGIS, while exploring proprietary platforms like Esri and MapmyIndia.
- The short-term development goal of completing the Login and Registration module AND Access Management System is expected to be achieved by the end of January.
- Phase 2: DRD for Onboarding Contractor Managment and DPR Deliverables completed Land Acquisition Cost (LAC) process currentity underway.

9.10.2.16 MANAS- National Narcotics Helpline

Development and Implementation of National Narcotics Helpline for NCB.

The project has been taken up in partnership with the Narcotics Control Bureau, Ministry of Home Affairs. MANAS - National Narcotics Helpline, was launched by the Hon'ble Union Home and Cooperation Minister, Shri Amit Shah, on 18th July 2024 at Vigyan Bhawan, New Delhi. MANAS is a 24/7 platform with four modes of communication: a toll-free number **(1933)**, a web portal **(www.ncbmanas.gov.in)**, email **(info.ncbmanas@gov.in)**, and the **UMANG** mobile app. This platform enables citizens to connect with the Narcotics Control Bureau (NCB) anonymously, around the clock, to report and seek help for drug-related issues.

The objective is to implement, operate and manage the MANAS helpline services. The MANAS setup intends to enable the Drug Addicts / Informer / Citizen to communicate their issues or complaints related to drugs through MANAS service for taking up their matter with respective stakeholders. The objective of the helpline centre are to strengthen the measures for safeties / awareness etc. of Drug Addicts/ Informer / Citizen / other concerned as follows:

i. **Round-the-Clock Toll-Free Assistance:** To provide toll-free **24x7** telecom service to Drug Addicts/ Informer/ Citizen seeking support and information.

ii. **Non-Crisis Intervention:** To facilitate non-crisis intervention through referral to the appropriate agencies and other concerned departments/ services.

iii. **Awareness and Accessibility:** To provide information about the appropriate support services,

government schemes and programmes available to the Drug Addicts/ Informer/ Citizen affected by drugs, in particular situations within the local area in which he/she resides or is employed.

iv. **Integrated Assistance:** To provide integrated support and assistance to Drug Addicts/ Informer/ Citizen affected by Drugs or drug users, both in private and public places under one roof through the concerned Helpline Centre.

v. **Integrated Multi-Sectoral Support Framework:** To facilitate non- emergency access to a range of Information services including medical, legal, psychological, rehabilitation and counselling support under one roof.

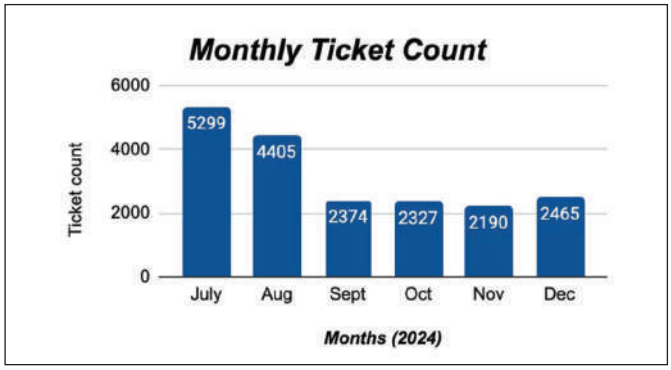
Four Communication Channels for the MANAS Helpline:

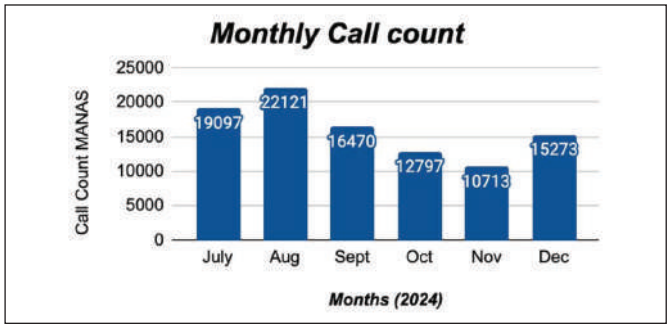
Web Portal	IVRS	Email	UMANG Application

The MANAS Helpline operates from the Narcotics Control Bureau (NCB) headquarters in New Delhi. It is currently integrated with 30 zones across India and is set to expand in the next phase by connecting with 36 Anti-Narcotics Task Forces (ANTFs). During the reporting period, the platform successfully generated a total of 175,897 tickets, reflecting its significant reach and effectiveness in addressing drug-related concerns nationwide.

Hon'ble Union Home Minister and Minister of Cooperation, Shri Amit Shah, officially launched the MANAS Helpline Portal during the 7th Apex Level Meeting of NCORD, held at Vigyan Bhawan, New Delhi, on 18th July 2024.

Performance Metrics from Launch (18th July 2024) to December 2024:





1. Academic Bank of Credits (ABC)

- Academic Bank of Credits (ABC) was launched on July 29, 2021, by the Prime Minister
- Alignment with the NEP-2020, conceived as a national-level facility.
- ABC has been envisaged to facilitate the academic mobility of students with the freedom to study across the country with an ap-

propriate "credit transfer" mechanism from one programme to another, leading to attain a Degree/ Diploma/PG-diploma, etc.,

- The APAAR ID (Automated Permanent Academic Account Registry) is a unique identifier in this system which acts as a central pillar for tracking students' academic and skill achievements throughout their educational journey.

APAAR ID Announced as part of the 'One Nation, One Student ID' initiative coined by Union Minister Shri Dharmendra Pradhan.

Total APAAR ID created	Verified APAAR ID	Institution Registered	Educational Records Mapped
31.52 Cr	15.42 Cr	2318	3.05 Cr

Features

- Enables multiple entries & exits in the academic lifecycle of students
- Only verified academic institutions can upload credits records
- Fully in online mode
- To enable students to select the best courses or combination of courses to suit their aptitude and quest for knowledge.
- To allow students to tailor their degrees or make specific modifications or specialisations rather than undergoing the rigid, regularly prescribed degree or courses of a single university or autonomous college.
- Courses undergone by the students through the online modes through National Schemes like SWAYAM, NPTEL, V-Lab etc. or of any specified university, shall also be mapped under ABC for credit accumulation.

Institutional Engagement:

As of January 2025, ABC boasts a robust network with 2,318 registered institutions, comprising Central Universities, State Universities, Deemed to be Universities, Private Universities, Institutions of National Importance, Autonomous Colleges, School boards, Technical Boards and various other educational bodies. This collaborative effort has resulted in the validated APAAR IDs of 15.42 Crore unique learner. The details are as follows:

Category	Total Awarding Institutions (Approx.)	Institutions Enrolled on ABC	Students/ Learners APAAR IDs created
Central University	57	53	45,46,406
Deemed University	132	124	11,55,507
Private University	490	471	23,44,825
State University	489	448	2,71,18,678
Autonomous College	1,083	736	20,42,482
Institutions of National Importance (IIT, IIM, NIT, IIIT,etc.)	158	135	2,97,299
Skill Institute	64	50	1,32,98,963
Other Institutions (Standalone, Councils, Technical & Examination Boards, etc.)	532	301	33,39,782
School Education (UDISE+)			9,64,11,521
Grand Total	**3,005**	**2,318**	**15,05,55,463**

Key Highlights:

- A total of 31 Crore APAAR IDs have been created, with 15.42 Crore validated. These include 9.64

Crore IDs for school education, 4.56 Crore for higher education (which is 120% increment from the last year), and 1.32 Crore for skill education.

- In just two months (Nov-Dec 2024), 8 Crore APAAR IDs were validated in school.
- 3 Crore credit records have been successfully seeded with APAAR IDs this year.
- Real-time API and ERP integrations enable efficient processes for result declaration, eKYC, and credit mapping.
- Seamless integration with national platforms like DigiLocker, E-Samarth ERP, NTA, Skill India Digital, and others has enhanced transparency and efficiency.
- Over 300 workshops have been organized in collaboration with state higher education departments to further promote these initiatives.
- Gujarat leads in credit record mapping with 35.56 L records, followed by Maharashtra (30.02 L) and Karnataka (24.39 L).
- 14,000 Files are uploaded and 23 lacs records proceed on a single day (achievement)
- APAAR IDs can now be created using Driving Licenses and PAN cards. The creation process is available through multiple convenient channels: DigiLocker, Umang, the ABC portal directly by the student, Common Service Centres (CSC) with assistance, and via API/Bulk module through academic institutions. For minor students, APAAR IDs can be generated with parental consent through school administrations.
- Support services include a ticketing system, video conferencing for institutions, and a dedicated call canter (1800-889-3511) for student inquiries, along with updated knowledge and resource pages.

Way Forward:

- Strengthening two-way integration with key schemes and platforms such as NSP, NTA, and Samarth to ensure seamless data exchange and process optimization.
- APAAR ID generation for foreign students
- Developed credit transfer guideline and module
- Enhancing the ABC student account dashboard to align with National Credit Framework (NCrF) standards, ensuring comprehensive and standardized record-keeping.
- Expanding the use of APAAR ID for eKYC in critical processes, including admissions, entrance tests, counselling, examinations, and scholarship applications.
- Facilitating document verification through APAAR ID for recruitment, employment, apprenticeships, and admissions to streamline verification processes.
- Conducting awareness workshops at both state and institutional levels to promote the adoption and understanding of ABC and APAAR initiatives.
- Establishing ABC as a one of a parameter in accreditation evaluations
- Develop advanced data analytics tools to provide institutions and policymakers with actionable insights into academic trends, credit utilization, and student progress.
- Link APAAR IDs with skill certifications from recognized organizations to bridge the gap between formal education and vocational training.

CHAPTER

10 Other Matters

10.1 Use of Official Language Hindi in Official Work

In order to promote the use of Hindi in official work in the Ministry, Kanthastha tool developed by Department of Official Language has been integrated with e-Office.

In order to ensure implementation of Official Language Policy in the offices under the administrative control of this Ministry, Official Language Inspection was conducted by Official Language Committee in NIC, Dehradun; STPI, Dehradun; NIELIT, Shimla; ETDC, Hyderabad; ETDC, Bengaluru; NIC, Gandhinagar; STPI, Visakhapatnam; NIC, Hyderabad; STPI, Lucknow; NIELIT, Lucknow; NIC, Kolkata; NIELIT, Kolkata; NIELIT, Gorakhpur; NIC, Jaipur; C-DAC, Pune; NIC, Lucknow; ETDC, Solan; NIC, Patna; NIELIT, Patna; Semiconductor Lab, Mohali. Besides, Official Language Inspection was conducted at Ministerial level in C-DAC, Mumbai; C-DAC, Mohali; NIELIT, Gorakhpur.

During the reporting period, various important documents such as Annual Report, Outcome Budget, various Cabinet Notes and Tables for Parliamentary Standing Committee, answers to Parliament Questions and Questionnaire on Demands for Grants, Power Point Presentation for Standing Committee, Follow-up Action Report, Monthly Report to the Cabinet, and other miscellaneous documents were translated from English into Hindi.

10.2 RTI Matters

There is an RTI Cell in the Ministry, which is the central receiving point for RTI applications/appeals and responsible for overall coordination in respect of RTI matters of MeitY and its organisations. MeitY and its Attached/Subordinate Offices/Societies are separate Public Authorities in terms of Section 2 (h) of RTI Act, 2005. Each of these Public Authorities has its own Central Public Information Officers (CPIOs)/First Appellate Authorities (FAAs). For any information relating to these organisations, applications need to be submitted to the concerned Public Authorities as per provisions of RTI Act, 2005. All Public Authorities also host 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.

During the period from 01.01.2024 to 31.12.2024, 2931 RTI applications and 140 RTI Appeals were received in this Ministry. The main subject of the applications received in MeitY and its organisations are IT Act, Social Media, DPDP Act, e-Governance services, online gaming and PLI Scheme.

10.3 Public Grievances

Public Grievances Cell in MeitY is headed by Nodal Grievance Officer.

The grievances received in PG Cell through CPGRAM portal and also offline mode were mainly relate to the following:

a) CSC

b) Digital India/e-Services

c) Social Media

d) Cyber Security

e) NIC

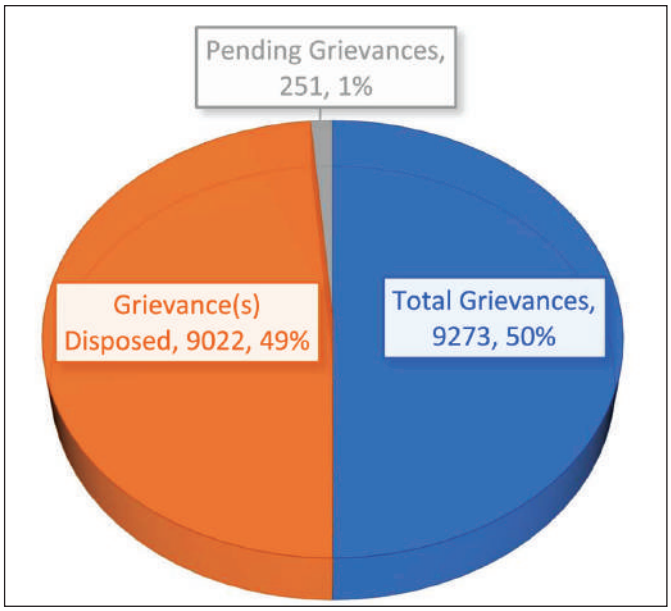
f) My Gov

g) DPDP Act

During the period from 01.01.2024 to 31.12.2024, **9273** grievances were received and out of these, **9022** were disposed of. Detailed information for the period is shown below:

Grievance Source	Brought Forwarded	Receipt During Period	Total Receipt	Case Disposed During Period	Closing Balance
DARPG	15	126	141	138	03
Direct from complainant	304	6720	7024	6823	201
President Secretariat	11	333	344	336	08
Pension	05	33	38	37	01
PMO	181	1545	1726	1688	38
Total	**516**	**8757**	**9273**	**9022**	**251**

Pie Chart showing the details of grievances received during the period 01.01.2024 to 31.12.2024.



During the period 01.01.2024 to 31.12.2024, **1410** Grievance Appeals were also received and out of these, **1296** were disposed of.

10.4 Citizens' Charter

The basic objectives of Citizens' Charter are to empower the citizen in relation to public service delivery. It represents the commitment of the organization towards the standard, quality and time frame of service delivery, grievance redress mechanism, transparency and accountability. The Citizens' Charter is written, voluntary declaration by service providers about service standards, choice, accessibility, non-discrimination, transparency and accountability. It is useful way of defining for the customers the nature of service provision and explicit standards of service delivery. Details on Citizens' Charter are available on MeitY's website, url: **https://www.meity.gov.in/clients-citizens-charter**

10.5 Information & Documentation Centre (Library)

This Ministry has a spacious well-planned Library viz Information and Documentation Centre (I&DC), with an inventory of books, journals, magazines, annual reports and newspapers. It uses RFID based Library Management System to manage acquisition, cataloguing and circulation, of books/journals/magazines. I&DC also provides various other services like Inter-Library loan facility to the officials of the Ministry through DELNET (Developing Library Network) and arranges books/ journals/magazines/articles 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 20,872/- books on various subject including Electronics, Computer, IT, Computer Languages, Fiction, Artificial Intelligence & Cyber Security. I&DC has books on Hindi and English literature also. I&DC procures on an average 125 books and approximately 34 Journals (Print) per annum and E-books services (Book 24x7) is also made available to the authorized users.

The Ministry is spearheading an Intra-Ministerial initiative viz the Library Consortium, Ministry of Electronics & Information Technology (MCIT). Consortium of the Ministry (MCIT Consortium) comprises the users from

the National Informatics Centre (NIC), C-DAC, NIELIT, SAMEER, C-MET, STQC Directorate, STPI, ERNET India, C-DOT. The Ministry provides on-line access to various e- resources i.e. IEEE Journals/Transactions/ Proceedings, IEE Journals/Proceedings, ACM Digital Library and ISO Standards to its users through MCIT Libraiy Consortium.

I&DC provides Gartner Research and Advisory Services which is useful e- resource consists of reliable global trends & best practices• and latest reports on digital technologies.

I&DC also provides "Bloomberg Terminal Services". The Bloomberg Terminal service is a global, 24-hour a day, financial information network providing real-time and historical pricing, indicative and fundametal data, and customized analytics. Other features include on-demand print and multimedia news and research, extensive electronic-trading capabilities, and a superior communications platform.

10.6 Parliament Section

1. In Calendar Year 2024 the Budget Session, the Special Session, Budget cum Monsoon Session and Winter session were held. During these Sessions 124 number of Parliament Questions in Lok Sabha (8 Starred & 116 Unstarred) and 120 number of Parliament Questions in Rajya Sabha (8 Starred & 112 Unstarred) were admitted and handled by the Parliament Section. These were mainly related to Development of IT Hub, Financial Cyber Crime, Control of Cert-In, Development of Additive Manufacturing (3D Printing) in India, National Knowledge Network(NKN), Global Outage, Incentive for Semiconductor and display ecosystem, Digital India Bill, Uniform Fiscal Support, Robotic Process Automation Lab, Grievance Redressal By Social Media Intermediaries, Visveswaraya Ph.D. Scheme, Development of Metaverse, Big Tech companies, Digital Public Infrastructure and AI, Electronic Manufacturing Companies, Research and Development, Online Gamers, Cyber Security Incidents, Progress of Digital India Programme, Future Skills Prime Programme, Digital copyright infringement by online chatbots, Leakage of personal data on Dark Web, Manufacturing of Mobile Phone, Implementation of Digital Personal Data Protection Act, 2023, TIDE 2.0 scheme, Electricity supply to data centres, Tariff rationalisation for smart phone manufacturing, Action against Data Breaches, Semiconductor Industry, Technological expertise for blockchain effectiveness for MSMEs, Digital Personal Data Protection Act (DPDPA), Legislation/ Rules for Online Gaming and Online Gambling, Adoption and Development of Artificial Intelligence under PPP Model, Amendment in IT Act to regulate AI, Support to Tech-Startup, Semiconductor chip fabrication, Digital Literacy and Skill Development, Greenfield Semiconductor Fab, Personal Data Mining and Phishing, Deepfake, Digital Public Infrastructure, Scheme for scaling up electronics production, Identified digital villages in Andhra Pradesh, Digi Locker, National Cyber Security Policy, Software Technology Park, Business Process Outsourcing Industry, Generative Artificial Intelligence, High Purity Silicon.
2. Department related Parliamentary Standing Committee on Communications and Information Technology has discussed on the following subjects:-
   i. Demands for Grants (2024-25);
   ii. Impact of emergence of Artificial Intelligence and related issues.
3. The Parliamentary Committee on Information and Communication Technology Management (ICTM), Rajya Sabha has taken meeting on the subject "Exploring the Use of Artificial Intelligence (AI) in Parliamentary Processes" in New Parliament Building.
4. The Parliamentary Standing Committee on Communications and Information Technology has selected the following subjects for discussion during the year 2024-25:
   i. Impact of emergence of Artificial Intelligence and related issues
   ii. Social and digital platforms and their regulation

iii. Impact of Information Technology Agreement in the new Age

5. The following Annual Reports of Societies and Notifications of the Ministry of Electronics and Information Technology have been laid on the Table of the Both Houses (Lok Sabha and Rajya Sabha) of the Parliament:

Sl. No.	MeitY and its Organisations/ Attached Offices	F.Y.	Laid in Lok Sabha	Laid in Rajya Sabha
1.	**C-MET** (Annual Report)	2022-23	20/12/2023	09/02/2024
2.	**C-DAC** (Annual Report)	2022-23	20/12/2023	09/02/2024
3.	**STPI** (Annual Report)	2022-23	20/12/2023	09/02/2024
4.	**ERNET India** (Annual Report)	2022-23	20/12/2023	09/02/2024
5.	**SAMEER** (Annual Report)	2022-23	20/12/2023	09/02/2024
6.	**UIDAI** (Annual Report)	2022-23	07/02/2024	09/02/2024
7.	**Statement-** 45th Report of the Standing Committee on C&IT on Demand for Grants (2023-24) of MeitY	-	20/12/2023	02/02/2024
8.	UIDAI Notification:- • Unique Identification Authority of India (Appointment of Officers and Employees) Amendment Regulations, 2023; • The Aadhaar (Enrolment and Update) Amendment Regulations, 2023; • The Aadhaar (Payment of Fees for Performance of Authentication) Regulations, 2023; • The Aadhaar (Authentication and Offline Verification) Amendment Regulations, 2023.		20/12/2023	09/02/2024
9.	Detailed Demand for Grants (DDG) and Output-Outcome Monitoring Framework (OOMF) for the year 2024-25	-	31.07.2024	-
10.	**UIDAI Notification:-** i. The Aadhar (Enrolment and Update) Amendment regulation, 2024 ii. The UIDAI (Appointment of Officers and Employees) Amendment Regulations, 2024 iii. The Aadhar (Enrolment and Update) Second Amendment regulation, 2024 iv. The Aadhar (Sharing of Information) Amendment regulation, 2024 v. The Aadhaar (Payment of Fees for Performance of Authentication) Amendment Regulations, 2024 vi. The Aadhaar (Authentication and Offline Verification) Amendment Regulations, 2024 vii. The Aadhaar (Payment of Fees for Performance of Authentication) Amendment Regulations, 2024	-	31.07.2024	02.08.2024

Sl. No.	MeitY and its Organisations/ Attached Offices	F.Y.	Laid in Lok Sabha	Laid in Rajya Sabha
11.	**UIDAI Notification:-** UIDAI (Appointment of Officers and Employees) Second Amendment Regulations, 2024, under Section 55 of the Aadhar (Targeted Delivery of Financial and Other Subsidies, Benefits and Services) Act, 2016	-	04.12.2024	06.12.2024
12.	**SCL** (Annual Report)	2023-24	11.12.2024	13.12.2024
13.	**NIELIT** (Annual Report)	2023-24	11.12.2024	13.12.2024
14.	**BISAG-N** (Annual Report)	2023-24	11.12.2024	13.12.2024
15.	**STPI** (Annual Report)	2023-24	To be laid during Budget Session 2025	20.12.2024
16.	**DIC** (Annual Report)	2023-24	To be laid during Budget Session 2025	20.12.2024
17.	**UIDAI Notification:-** Aadhar (Authentication and Offline Verification) Second Amendment Regulations, 2024, under Section 55 of the Aadhar (Targeted Delivery of Financial and Other Subsidies, Benefits and Services) Act, 2016	-	To be laid during Budget Session 2025	20.12.2024

10.7 Vigilance Unit

Vigilance Unit, Ministry of Electronics and Information Technology (MeitY) is the Nodal Unit for addressing all vigilance matters concerning MeitY and its Organizations under the administrative control of the Ministry. The Vigilance Unit is headed by Joint Secretary, who has also been appointed as Chief Vigilance Officer (CVO) by Central Vigilance Commission (CVC). The CVO with the assistance and support of a team of officials looks into the vigilance matters of MeitY and its organizations and is the Nodal Officer for MeitY for interaction with CVC and CBI. Each of the Autonomous Societies under MeitY are provided with an independent CVO appointed by Secretary, MeitY based on the CVO's recommendation in consultation with CVC. The organizations under MeitY have their own vigilance setup in their respective organizations, who work in close coordination with the Vigilance Unit of the Ministry to ensure effective vigilance administration.

During the year 2024, a total of 84 complaints were received in Vigilance Unit, MeitY which included complaints from Central Vigilance Commission (CVC) and others received through various platforms, including Prime Minister's Office, Public Grievance Portal etc. These complaints primarily involved allegations on favoritism, corruption in recruitment and promotion, violation of CVC guidelines/GFRs and GeM's terms and conditions in tendering process/ hiring of manpower, misuse of official position, harassment, unfair transfer/ posting etc.

During the year 11 major cases were examined/ investigated in Vigilance Unit and after taking due action necessary advice was provided to the concerned authorities for bringing in Systemic Improvement in their functioning. Wherever necessary advisories were issued and in some cases disciplinary action was initiated against the erring officials. In the disposal of disciplinary cases, whenever necessary, advice of UPSC is obtained before imposing penalty as per CCS(CCA) Rules, 1965.

In order to mitigate potential risk of corruption, Vigilance Unit, MeitY conducts regular scrutiny Annual Property Returns of the officers/officials of MeitY. The review aims to identify possession of assets disproportionate to known sources of income, non-intimation of transaction of property etc. During the year 2024 more than 234 Annual Property Returns (APRs) were scrutinized. Necessary directions based on the observations noticed in scrutiny of APRs were conveyed to the concerned authorities with a view to strengthen the vigilance mechanism of this Ministry.

In terms of the advice of the Central Vigilance Commission, MeitY organized a three-months campaign on various

Preventive Vigilance activities as a prelude to Vigilance Awareness Week (VAW) 2024 from 16th August 2024 to 15th November 2024. The campaign focused on building awareness about Public Interest Disclosure and Protection of Informers (PIDPI) Resolution, and included training programs on various topics such as Ethics and Governance, Conduct Rules, Systems and Procedure of Organization, Cyber Hygiene and Security, Procurement etc. The trainings were well attended by the officials of MeitY. As per the directions of Central Vigilance Commission, Vigilance Unit, MeitY observed the Vigilance Awareness Week, 2024 from 28th October to 3rd November 2024. The week commenced with administering of integrity pledge within the premises of Electronics Niketan, MeitY by Additional Secretary, MeitY on 28th October, 2024. During the VAW-2024, officers of Vigilance Unit visited NIC- Lucknow, C-DAC Chennai, C-DAC Thiruvananthapuram, STPI-Bhubneshwar, STPI-Lucknow, C-MET Thrissur for sensitizing the officials on vigilance aspects.

Random inspections of records were carried out by Vigilance Unit and necessary Systemic Improvement Measures were communicated wherever shortcomings were identified to strengthen administrative efficiency. Additionally, surprise inspections were carried out with a view to bring in efficiency and accountability.

Periodical reports and returns were timely sent to the concerned authorities and preventive measures were communicated to the organizations under MeitY to enable them to bring in robust mechanism to curb corruption and unethical practices in public administration and to bring about transparency, fair-play, objectivity, accountability and responsiveness to the aspirations of the citizens. Efforts were made by Vigilance Unit to conduct periodic rotation of staff and ensure 100% e-payment and procurement made through GeM. Wherever deviation from Govt. procedures were observed, necessary advisories were issued to the concerned authorities.

Annexure - I

Approval of Union Cabinet for extension of the Digital India Programme for the duration of 15th Finance Commission

The Government had launched the DIP in July 2015 with three key vision areas, namely digital infrastructure as a core utility to every citizen, governance and services on demand, and digital empowerment of citizens. The overall goal is to ensure that digital technologies improve the life of every citizen, expand India's digital economy, and create investment and employment opportunities. It has also helped in the delivery of services directly to beneficiaries in a transparent manner. In the process, India has emerged as one of the pre-eminent nations of the world to use technology to transform the lives of its citizens.

The Government, in August 2023, approved the extension of the DIP with a total outlay of Rs 14,903.25 Crore for the period of 15th Finance Commission i.e., 2021-22 to 2025-26.

The extension of the programme will have the following major benefits:

- 6.25 Lakh IT professionals will be re-skilled and up-skilled under the FutureSkills PRIME Programme.
- 2.65 Lakh persons will be trained in information security under the Information Security & Education Awareness Phase (ISEA) Programme. In addition, more than 12 Crore beneficiaries are envisaged to be covered under the Cyber Aware Digital Naagrik component through various activities.
- 540 additional services will be available under the UMANG app/ platform. At present over 1,700 services are already available on UMANG.
- 9 more supercomputers will be added under the National Super Computer Mission. This is in addition to 18 supercomputers already deployed.
- Bhashini, the AI-enabled multi-language translation tool (currently available in 10 languages) will be rolled out in all 22 scheduled 8 languages.
- Modernisation of the NKN which connects 1,787 educational institutions.
- Digital document verification facility under DigiLocker will now be available to MSMEs and other Corporates.
- 1,200 startups will be supported in Tier 2/3 cities.
- New initiatives in the area of cyber security including the development of tools and integration of more than 200 sites with the National Cyber Coordination Centre.

Annexure - II

Ministry of Electronics and Information Technology

ANNUAL BUDGET 2025-26

Sl. No.	*Scheme/Non-Schemes*	*Budgetary Support (Rupees in crore)*
	Non-Schemes	
1	**MeitY Secretariat**	**210.25**
2	**National Informatics Centre**	**1600.00**
3	**Regulatory Authorities**	**445.00**
3.1	Standardisation Testing and Quality Certification (STQC)	170.00
3.2	Cyber Security (CERT-In)	255.00
3.3	Controller of Certifying Authorities (CCA)	15.00
3.4	Data Protection Board	5.00
4	**Assistance to Autonomous & Other Bodies**	**1700.00**
4.1	Centre for Development of Advanced Computing (C-DAC)	275.00
4.2	Society for Applied Microwave Electronics Engineering and Research (SAMEER)	160.00
4.3	Centre for Materials for Electronics Technology (C-MET)	100.00
4.4	Bhaskaracharya National Institute for Space Applications and Geo-Information [BISAG(N)]	50.00
4.5	Semi Conductor Laboratory (SCL)	500.00
4.6	Digital India Corporation (DIC)	15.00
4.7	Unique Identification Authority of India (UIDAI)	600.00
	Sub-Total (Non-Scheme)	**3955.25**
	Schemes	
5	**Digital India Programme (Umbrella Programme)**	**6071.00**
5.1	Capacity Building & Skill Development Scheme	575.00
5.2	Electronic Governance (incl. EAP)	617.00
5.3	National Knowledge Network	0.25
5.4	Promotion of Electronics & IT Hardware Mfg (MSIPS, EDF & Manufacturing Clusters)	712.00
5.5	Promotion of IT/ITeS Industries	130.00

Sl. No.	*Scheme/Non-Schemes*	*Budgetary Support (Rupees in crore)*
5.6	R&D in IT/Electronics/ CCBT	1249.75
5.7	Cyber Security Projects (NCCC & Others)	782.00
5.8	Promotion of Digital Transactions (excluding Digital Payments)	5.00
5.9	IndiaAI Mission	2000.00
6	**Other Schemes**	**16000.00**
6.1	Production Linked Incentive Scheme	9000.00
6.1.1	Production Linked Incentive for Large Scale Electronics Manufacturing	8885.00
6.1.2	Production Linked Incentive for IT Hardware	115.00
6.2	Modified Programme for Development of Semiconductor and Display Ecosystem in India	7000.00
6.2.1	Modified Scheme for setting up of Compound Semiconductors/Silicon Photonics/ Sensors Fab/Discrete Semiconductors Fab and Semiconductor Assembly, Testing, Marking and Packaging (ATMP)/Outsourced Semiconductor Assembly and Test (OSAT) facilities in India	3900.00
6.2.2	Modified Scheme for Setting up of Semiconductor Fabs in India	2499.96
6.2.3	Modified Scheme for setting up of Display Fabs in India	0.04
6.2.4	Modernisation of Semi-Conductor Laboratory, Mohali	400.00
6.2.5	Design Linked Incentive Scheme	200.00
	Sub-Total (Scheme)	**22071.00**
	Total (Scheme & Non-Scheme)	**26026.25**

Annexure - III

Ministry of Electronics and Information Technology Employees structure as on 01.01.2025

Group	Permanent/ Temporary	Total No. of Employees	SC	% of SC total employees	ST	% of ST total emp-loyees	Persons with disabilities	% of PWDs
Group 'A'	**Permanent**							
	(i) Other than lowest rung of Group A	183	24	13.11	13	07.10	05	02.73
	(ii) Lowest rung of Group A	10	00	00	00	00.00	00	00
	Temporary							
	(i) Other than lowest rung of Group A	04	00	00	00	00	00	00
	(ii) Lowest rung of Group A	03	00	00	01	3.33	00	00
Group 'B' (Gazetted)	Permanent Temporary	60	16	26.67	03	05.00	02	03.33
	Temporary	00	00	00	00	00	00	00
Group 'B' (Non - Gazetted)	Permanent	67	13	19.40	05	07.46	03	04.48
	Temporary	20	03	15.00	01	05.00	01	05.00
Group 'C'	Permanent	128	24	18.75	06	04.69	03	02.34
	Temporary	58	04	06.90	04	06.90	03	05.17
Total		**533**	**84**	**15.76**	**33**	**06.19**	**17**	**03.19**

Annexure - IV

MINISTRY OF ELECTRONICS AND INFORMATION TECHNOLOGY

List of Abbreviations

AEBAS	Aadhaar Enabled Biometric Attendance System
AEPS	Aadhaar Enabled Payment System
AI	Artificial Intelligence
AKAM	Azadi Ka Amrit Mahotsav
API	Application Programming Interface
ASIC	Application Specific Integrated Circuit
ASP	Application Service Provider
ASR	Automatic Speech Recognition
BHIM	Bharat Interface for Money
BISAG-N	Bhaskaracharya National Institute for Space Applications and Geo - informatics
BOSS	Bharat Operating System Solutions
BRAP	Business Reform Action Plans
BSNL	Bharat Sanchar Nigam Limited
CCTNS	Crime and Criminal Tracking Network & Systems
C-DAC	Centre for Development of Advanced Computing
CEDA	Centre of Excellence for Data Analytics
CERT-In	Indian Computer Emergency Response Team
CFC	Common Facility Centre
CGIT	Central Government Industrial Tribunal
CIPET	Central Institute of Plastics Engineering & Technology
C-MET	Centre for Materials for Electronics Technology
CMTI	Central Manufacturing Technology Institute
COSEM	Companion Specification for Energy Metering
CPGRAMS	Centralized Public Grievance Redress and Monitoring System
CSC	Common Services Centre
CSSS	Champion Service Sector Scheme
CTDP	Comprehensive Telecom Development Plan
C2SD	Chip to System Design
DAPSC	Development Action Plan for Scheduled Castes
DBT	Direct Benefit Transfer
DEPwD	Department of Empowerment of Persons with Disabilities
DGHR	Directorate General of Human Resource Development
DIC	Digital India Corporation
DIHAR	Defence Institute of High-Altitude Research

DIP	Digital India Program
DILRMP	Digital India Land Records Modernization Programme
DLC	Digital Life Certificate
DLMS	Device Language Message Specification
DPIIT	Department for Promotion of Industry and Internal Trade
DSC	Digital Signature Certificate
EGDI	eGovernment Development Index
EMC	Electronics Manufacturing Clusters
EoDB	Ease of Doing Business
EoL	Ease of Living
ERNET	Education and Research Network
ESP	eSign Service Provider
eTaal	Electronic Transaction Aggregation and Analysis Layer
FINTECH	Financial Technologies
FOSS	Free and Open Source Software
FSOC	Free Space Optical Connectivity
GeM	Government e-Marketplace
GSTN	Goods and Services Tax Network
HRD	Human Resource Development
IBM	Indian Bureau of Mines
iCAS	Indian Conditional Access System
ICJS	Interoperable Criminal Justice System
ICT	Information and Communication Technology
I&DC	Information and Documentation Centre (i.e. Library)
IIFPT	Indian Institute of Food Processing Technology
IIDS	Implementation of Interactive Information Dissemination System
IIT	Indian Institute of Technology
INCEP	Integrated Citizen Engagement Platform
IndEA	India Enterprise Architecture
InDEA	India Digital Ecosystem Architecture
IoT	Internet of Things
ISEA	Information Security & Education Awareness
IVFRT	Immigration, Visa, and Foreigners Registration & Tracking
JAM	JanDhan, Aadhaar and Mobile
KMS	Knowledge Management System, Key Management System
LMS	Learning Management System
MAQAN	Metro Area Quantum Access Network
MDoNER	Ministry of Development for North-Eastern Region

MeitY	Ministry of Electronics and Information Technology
MMIC	Monolithic Microwave Integrated Circuit
MNRE	Ministry of New and Renewable Energy
MSME	Ministry of Micro, Small and Medium Enterprises
MTS	Mining Tenement System
MSDE	Ministry of Skill Development and Entrepreneurship
M-SIPS	Modified Special Incentive Package Scheme
NaMPET	National Mission on Power Electronics Technology
NAPS	National Portal for Rooftop Solar
NCMEC	National Centre for Missing and Exploited Children
NCRP	National Cybercrime Reporting Portal
NDUW	National Database of Unrecognised Workers
NEBPS	North-East BPO Promotion Scheme
NCoG	National Centre of Geo-informatics
NCCC	National Cyber Coordination Centre
NCPP	National Cyberpolice Portal
NCSC	National Career Service Centres
NeGD	National e-Governance Division
NDC	NER -National Data Centre in North -East Region
NDEAR	National Digital Education Architecture
NER	North- Eastern Region
NERS	Nationwide Emergency Response System
NeVA	National eVidhan Application
NavIC	Navigation with Indian Constellation
NFVI	Network Function Virtualization Infrastructure
NGDRS	National Generic Document Registration System
NIC	National Informatics Centre
NICSI	National Informatics Centre Services Inc.
NIDHI	National Integrated Database of Hospitality Industry
NIELIT	National Institute of Electronics & Information Technology
NJGD	National Judicial Data Grid
NLCPR	Non-Lapsable Central Pool of Resources
NSSO	National Single Sign-On
NKN	National Knowledge Network
NMM	National Mission on Manuscripts
NPP	National Power Portal
NREN	National Research and Education Network
ONDC	Open Network for Digital Commerce

ORS	Online Registration System
PENCiL	Platform for Effective Enforcement for No Child Labour
PFMS	Public Financial Management System
PMAY	Pradhan Mantri Awas Yojana
PMGDISHA	Pradhan Mantri Gramin Digital Saksharta Abhiyan
PMSYSM	Pradhan Mantri Shram Yogi Maandhan Yojana
PRAGATI	Proactive Governance and Timely Implementation
PRIME	Project Review & Information Management Electronics System
SAMEER	Society for Applied Microwave Electronics Engineering and Research
SANKALP	Skill Acquisition and Knowledge Awareness for Livelihood Promotion
SCAN	Subsidy Claims Application for NFSA
SCOSTA	Smart Card Operating System Specification for Transport Applications
SDWAN	Software-Defined Wide Area Network
SEZ	Special Economic Zone
SFIO	Serious Fraud Investigation Office
SID	Skill India Digital
SMDP	Special Manpower Development Programmes
SMITHA	Smart Meter Integrated Testing and Higher Analysis
SNMS	Summons and Notices Management System
SPECS	Scheme for Promotion of Manufacturing of Electronic Components and Semiconductors
SSDG	State Service Delivery Gateway
STPI	Software Technology Parks of India
SWASTHA	Smart Wearable Advanced nanoSensing Technologies in Healthcare ASICs
TCPS	Tactile Cyber-Physical System
TDIL	Technology Development for Indian Languages
UIDAI	Unique Identification Authority of India
UMANG	Unified Mobile App for New -Age Governance
ULPIN	Unique Land Parcel Identifier Number
UPI	Unified Payment Interface
USOF	Universal Services Obligation Fund
USSD	Unstructured Supplementary Service Data
USSP	Unified Shram Suvidha Platform
UTTRA	Universal Transparent Tracking of Applications
UX4G	User experience for Government Websites & Apps
VVPAT	Voter Verifiable Paper Audit Trail
YUVAi	Youth for Unnati and Vikas with Artificial Intelligence


MeitY Startup Hub
eSanjeevani National Telemedicine Service
UPI UNIFIED PAYMENTS INTERFACE
API Setu
BISAG-N
Digital India Power To Empower
INDIAai
futureDESIGN India Semiconductor Mission
mySCheme
BHASHINI
CDAC
DigiLocker
UMANG
UX4G
certin
AADHAAR
CCA
CSC
NIC
Meri Pehchaan
SAMEER
NIELIT
STQC
ERNET
nixi
OpenForge
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NeGD
सत्यमेव जयते
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