



C-DAC R&D DIGEST

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Table of Content

Message from Director General	03
Message from Editorial Board	04
nspiring Insights on new frontiers	05
deas to Action	25
Progress Pulse: A Performance Dashboard	37
Гесh Roll-outs	61
nternational Outreach	65
Events	71
Awards	73
Back-end Squad	75





Message from **Director General**

I am delighted to announce the release of the seventh issue of Techzine R&D Digest from C-DAC. Heartfelt congratulations to the Corporate R&D team on this significant achievement. I extend my warmest greetings to all C-DACians who have contributed in Techzine for sharing their expertise, passion for research, innovation, and the pursuit of knowledge.

This edition of Techzine highlights the importance of Digital Accessibility and Inclusion, critical principles in the design and implementation of modern digital technologies. These principles ensure that people of all abilities and backgrounds can effectively use and benefit from digital tools, services, and platforms. As technology becomes increasingly integral to our daily lives, embedding these principles into the fabric of digital innovation is not just an ethical imperative but also a pathway to unlocking greater opportunities, creativity, and participation across the global community.

As many of you are aware, C-DAC had played a pivotal role in developing ICT Accessibility Standards for India. These standards, published as IS-17802 Part 1: Requirements and IS-17802 Part 2: Determination of Conformance, align seamlessly with global benchmarks such as WCAG (Web Content Accessibility Guidelines), EN 301 549, and Section 508. On May 11, 2023, the Ministry of Social Justice and Empowerment (MoSJE) made history by notifying the Rights of Persons with Disabilities (Amendment) Rules, 2023, mandating that all ICT products and services manufactured or procured in India must comply with these standards.

I am confident that this issue of Techzine will empower C-DAC members to ensure that all C-DAC products, solutions, and services are designed and implemented to be made digitally accessible. Together, we can uphold our commitment to creating inclusive technologies that benefit everyone.

Magesh Ethirajan



Message from Editorial Board

The Editorial Board of Techzine is delighted to reflect on the significant impact of our six previous issues in advancing the research and development activities of C-DAC. These editions have successfully showcased innovations, supporting their deployment and adoption across various ministries, including MeitY, academia, research institutions, industries, and other key stakeholders.

We are proud to present the Seventh Issue of Techzine, dedicated to the theme of Digital Accessibility and Inclusion. This issue of Techzine features thought-provoking articles on topics such as Accessibility Standard for ICT Products and Services, Accessibility and Inclusive Cybersecurity and Indian Accessibility Standards and Regulations for Digital Accessibility.

Each issue of Techzine celebrates the remarkable achievements of C-DACians across all centers. We extend our heartfelt gratitude and warmest greetings to our esteemed contributors and readers for their unwavering support and engagement.

As we embark on this next issue, we look forward to continuing this exciting journey with you. Thank you for being an integral part of Techzine.

Editorial Board

- · Shri Pramod P.J., Head Corporate R&D, C-DAC
- · Shri Manoj Gopinath, Head Branding & Communication, C-DAC Pune
- · Shri Shripad Shriram Kalambkar, Scientist E, Corporate R&D, C-DAC
- · Shri Anant Kelkar, Manager, Corporate R&D, C-DAC
- · Shri Sanjay Chakane, Admin Officer, Corporate R&D, C-DAC



Accessibility Standard for ICT Products and Services

How the Indian standard was evolved and a review of prominent global standards



Shri Srinivasan RamakrishnanFormerly DG, C-DAC and Scientist G, MeitY
Project Director, ERNET
Founder and CEO, IISAC pvt. Ltd.

ICT 4 Accessibility – Why a Standard emerged as a priority?

For one, People with Disabilities (PwDs) face a diverse variety of disabilities, 21 to be precise, as per the Rights of People with Disabilities (RPwD) act, 2016. These range from low visual impairment, hearing impairment, speech, learning and language disability, locomotor disability, intellectual disabilities, mental behavior, chronic neurological conditions, and multiple disabilities. In terms of 'International classification of Functioning, Disability and Health (ICF), the above disabilities can, in turn, be classified into nine.

Historically, upto '2000, ICT accessibility tools and devices have appeared in the market and served the needs of PwDs. But these typically addressed a single efficiency or disability, say blindness. That was when the power of ICT, increasing affordability and their ubiquity (internet, mobile, apps, web) that emerged by the turn of the century offered an opportunity to address multiple or all disabilities through a single ICT solution and a standard. It was thus progressively leveraged through formulation of an accessibility standard for ICT products and services that serviced the day-to-day needs of all or most of the PwDs.



The United Nations Convention on the Rights of Persons with Disabilities (UNCRPD) was adopted by the United Nations on December, 2006. It was the first comprehensive human rights treaty of the 21st century. India too endorsed it in 2008 and formulated a legislation "RPwD Act, 2016", which came into operation in 2017. The RPwD Act states under "Access to information and communication technology" — "the appropriate Government shall take measures to ensure that:

- All contents available in audio, print and electronic media are in accessible format;
- Persons with disabilities have access to electronic media by providing audio description, sign language interpretation and close captioning; and
- Electronic goods and equipment which are meant for everyday use are available in universal design."

RPwD Act, 2016 also presents a strategy for public procurement of Electronics and ICT services and solutions.

Prominent products and services included Web, mobile, apps, non-web documents ICT hardware and software, ATMs, Kiosks, Ticketing machines, audio and video (two way and broadcast), conferencing, email, office equipment, online services an transactional applications, emergency communication and user support documentation and services. It is applicable for use by public and private institutions. Most importantly, it mandated that the Indian standard be formulated at the earliest.

Based on the instructions of the Government of India, Ministry of Electronics and IT funded a project to Centre for Development of Advanced Computing (C-DAC) to prepare the standard at the earliest,

- Jointly with Standardization, Testing and Quality Certification (STQC) of MeitY, Bureau of Indian Standards (BIS) and an expert committee.
- In consultation with experts and key stakeholders like PwD community, ICT industry and users, including Government departments/ Ministries.
- Harmonized with prominent global standards.



C-DAC, by setting up a centre called Knowledge and Resource Centre for Accessibility in IT (KAI), completed the above exercise in a period of about two years, one of the fastest to have been completed as a BIS Standard, IS 17802:2021 (Part 1) – Accessibility Requirements for ICT Products and Services and IS 17802: 2021 (Part 2) – Conformance Criteria. In BIS, the exercise was guided by LITD SC 35 – Active Assisted Living Sectional Committee and followed all due processes including public consultation.

The standard has been recognized by the Department of Empowerment of Persons with Disabilities (DEPwD), Ministry of Social Justice and implementation has been made mandatory through Rule # 15. Further implementation steps are underway. What is noteworthy is that, given standards are voluntary, IS 17802 has been made mandatory and so soon after notification of the standard.

As regards substantive contents of the standard, it starts with a brief introduction and background section, setting the context. Specifically, it talks of the status of PwDs in Indian context, bring out the urgency and opportunity for stakeholders. Importance of growing mental and cerebral disabilities and the relevance of addressing Indian language contents in multiple media is mentioned in view of enormous penetration of use of Indian language content in the digital India that has grown leaps and bounds in the last ten years—be it in school textual and audio-visual material or in daily life. In fact, one survey says Indian language digital content has exceeded English digital content in India. It also talks of the three prominent global standards in this area, namely, WCAG 2.0 series, EN 301 549 series and US's AA 509, noting that the Indian standard has leveraged these and has been harmonized to bring in benefits of testing tools, compatible procurement from global sources, even while it is expected that the vibrant Indian industry, start-up ecosystem and academia/ R&D labs will bring out innovative and affordable products and services to meet the scale of Indian market. It also mentions the scope of coverage of applicability of the standard in terms of ICT products and services. It also briefly draws attention to Part 2 of the standard covering Conformance Criteria.

Next, in the main sections, in Chapter 4, functional performance requirements have been covered under nine disabilities. The following Chapter 5 covers General requirements. One of the key aspects brought out is the distinction between closed systems (where no accessibility tool can be attached) and open systems and the consequent differences in requirements. A ticketing kiosk or a coffee dispenser is an example of the former. Another factor introduced in this chapter, not figuring in other global standards, concerns Indian language input and display requirements. Consistent with Unicode, Indian standards exist for these (for text) and these are quoted.

Chapters 6 and 7 cover two-way voice communication and ICT with video capabilities, including broadcast, respectively. Telephones (voice), TV, Audio-Video equipment are covered here.



Chapter 8 covers stationary ICT set-ups like ATMs, Ticketing machines etc. Specifications relating to civil structures like height, width are covered in this to enable wheel-chair users, those with stunted growth etc. to use the set-up practically. ATM users are given the option to plug their headphones and use guides in key-boards so that they can use the services in privacy. This chapter incorporates Indian context in respect of a number of parameters.

Chapter 9 covers Web, fully based on WCAG 2.1 (the latest version at the time of writing the Indian standard). Again, it categorizes requirements into 'Perceivable', 'Operable', 'Understandable' and 'Robust'. It specifies 'mandatory' and 'desirable' features for each version, i.e., 2.0, 2.1 in a way it is easy to migrate from 2.0 to 2.1. Against each requirement, 'success factors' have been spelt out (equivalent of Conformance Criteria). This section is perhaps the most popular and widely implemented section of the standard.

Chapter 10 covers non-web documents as in respect of email, office documents and PDF documents. An update has been issued to the standard to make this section in sync with the latest versions of PDF. Also, colour scanner (500 dpi) and OCR (which take care of Indian languages as well) have been recommended for best effect.

Chapter 11 covers software that supports the above within the system, esp. user-interface, front-end, screen readers, authoring tools and the like. This chapter has to be read and understood properly by developers while implementing online transactional systems, esp., using agile software methodologies and 'DevOPs'.

Chapter 12 covers Documentation and Support services in support of the end-users. These include help-desks, agents etc. Since a PwD user aspiration is to be autonomous, this is a very important but often neglected requirement.

Chapter 13 covers Relay (RTT) and Emergency services. Key here is translation of one media to another by a human or automated intermediary to suit the needs of the situation. In increasing AI driven systems, this can be met well in well-designed systems.

Putting all the above in one standard (in fact, two standards) is a humongous task and the result is also a voluminous, and often abstract, document. But, now, it has become a guiding tool for regulators, industry, developers, users, PwD users and testing/auditing agencies. Impact on the market is of the order of \$200 million. The interesting and exciting opportunity for developers and industry is to come out with ICT products and services that serve the needs of Indian and global PwDs elegantly, cost-effectively and innovatively using new and emerging tools in software, AI, IoT, Wearables, BCI, mobile, automated testing tools and the like. Still, the diffusion process to address the needs of every PwD, in a vast and diverse country like India will take time, dedication of all and committed, consistent and innovative steps over a decade. Given the vitality of Indian ICT industry including startups backed by academia and R&D labs, one should remain hopeful.

U.S. started its accessibility journey, sensitizing its society alongwith legislature and regulatory steps in the last 20 years of 20th century with American with Disabilities Act (ADA), building its momentum since then. Digital accessibility standards and regulation adoption happened in this century and is aligned with WCAG 2.0 series and harmonized with European standard EN 301 549. Europe started its Accessibility journey this century and various versions of EN 301 549 were formulated since 2010, largely drawing from WCAG standards and Recommendations of WG of WCAG on accessibility requirements for ICT products and services. Under EAA, Europe is actively implementing ICT accessibility currently. W3C played a pioneering role in mobilizing the best brains of global ICT community in the cause of formulation and acceleration of Web and ICT accessibility standards. It is always ahead of other standards making efforts.

Now it is for all of us, to rally as a nation, to make a success of implementation of the standard – even as we keep an eye on maintaining our standard UpToDate, as we have done so in so many dimensions of the digital world over the last ten years.



Accessibility and Inclusive Cybersecurity



Dr. N. Subramanian,Executive Director
Society for Electronic Transactions and Security (SETS), Chennai

Present day Scenario

Advancement in Artificial Intelligence, sensor technologies and cloud services are creating new opportunities for devising novel accessibility solutions. Digitization across sectors is enabling the wider populace seamless access to information and services. This includes citizen facing services for elearning, e-governance, banking & finance, healthcare, transportation and delivery of goods and items etc. Users including elders, pregnant women and differently-abled are benefited based on these services and applications. According to the recent report from TRAI there are 924.07 Million Broadband subscribers. Similarly, the number of UPI transactions are 14963 Mn as on Aug 2024 and the public cloud services market is expected to reach \$17.8 billion by 2027(IDC report). As part of the government initiative, two lakhs+ Gram Panchayats (GP) are getting connected through BharatNet initiative setting the environment for inclusive growth.

While it is motivating to see these advancements in leveraging technologies, it is important that such mechanisms should ensure accessibility inclusive of security & privacy. Concerns of cybersecurity vulnerabilities due to weak authentication, gaps in upgrades, insecure interfaces, misconfigurations lead to attacks such as privilege escalation, man-in-the-middle and denial-of-service etc. Related challenges include gap in security during remote technical support, Personal Data breach, Identity Theft, Spoofing, Phishing (Vishing/Quishing), banking scam and social engineering concerns.



Consider the case of usage of an ATM after an upgrade to its configurations and menu options. This may lead to a situation for a differently-abled person taking support from an acquaintance leaving a gap from security perspective. Similarly, CAPTCHA is a commonly used mechanism to prevent spam and robotic software programs from completing forms. This measure has accessibility concerns as it relies on sight. Though audio alternatives are available in some cases they are not often audible. Hence a right authentication primitive that is secure and one that is accessible as well is required. There may be such challenges for persons who have no peripheral vision or have depth perception to prove their identity by taking a photo by themselves. Performing tasks such as clicking on the correct link, completing tasks online within specified time limits shall be very annoying and may lead to security weakness.

Accessibility and Inclusive Cybersecurity

As part of Universal Design principles, the technology design forms the core for devising mechanisms for ease of access and use regardless of user abilities that includes secure and seamless access as well. As we understand, there is little research that has been done in accessible cybersecurity which is not just about technical considerations but also about creating a secure digital environment accessible for everyone including disabled people.

It is very important to ensure inclusive cybersecurity as part of accessibility, meeting legal requirements leading to delivering better outcomes, or attracting and retaining a more diverse set of talent [1]. Addressing accessibility along with cyber security benefits by making systems more usable. It is required to design and implement cybersecurity measures fitting the needs of all individuals. This implies we need to design technologies meeting the needs and requirements of disabled persons and elderly persons. The goal of accessible and inclusive cybersecurity is to guarantee that everyone has equal access to the tools and resources necessary for protection from



cyber threats [2]. Through added layers of cybersecurit over accessibility, one can create a more equitable and secure digital environment for everyone.

From the system security perspective, there are growing concerns on attacks that exploit accessibility features. For example, accessibility support is becoming common in Operating Systems (OS). However, adding new features in complex OSs may introduce new security vulnerabilities. There is an interesting work by Yeongjin Jang et. al [3] where they present the security evaluation of accessibility support for four of the most popular computing platforms: Microsoft Windows, Ubuntu Linux, iOS, and Android. With respect to OS, Assistive technologies are subsystems that either transform user input or application & OS output on alternative devices. They show that inadequate security checks on these new I/O paths may lead to vulnerabilities leading to the launch attacks. The said work brings out twelve attacks that can bypass state-of-the-art defense mechanisms deployed on these OSs, including UAC, the Yama security module, the iOS sandbox, and the Android sandbox. This brings out the importance of secure design and the aspects such as compatibility, usability, security to be seen in a comprehensive manner to devise a secure system against misuse of accessibility support.

Arwa Binsedeeq et. al [4] explore the cybersecurity attitude, behaviour in their interesting survey on the cybersecurity needs and experiences of disabled users by. Key findings of their work include (a) concern regarding insufficient technological safeguards and (b) gap that exists between theoretical knowledge and practical application. Also, according to their survey, half of the respondents (52%) reported having had personal experiences with cybersecurity incidents.

Authentication, being one of the fundamental aspects of cybersecurity, has been explored by researchers [5] [6] specifically about challenges being faced by persons



with vision impairments, while various types of authentication mechanisms. Findings show that people with vision impairments face various difficulties related to the user interface. Similarly, assessment presented by Furnell et. al [4], who provide a literature review and some real-world examples that identify current authentication methods with people with different types of disabilities.

Another challenge pertaining to integration of AI into Assistive technology (AT) introduces new security concerns that must be addressed. Some of the essential AI security checks [7] include security checks to ensure data privacy, system integrity and user safety. It is important to implement these essential security checks into the design, development, and deployment phases of assistive technologies to create a much safer and reliable digital environment.

Possible Approaches:

Authentication and Access Control

- It is required to have fine-grained access control.
- Access Privilege of using the accessibility library to be well designed to ensure there are no security gaps.

'Accessibility' and 'Usability' to be part of security requirements

 While designing interfaces to avoid complicated interfaces, mis-labelled buttons, ambiguous link text and provision for multi-modal warnings (like audio/video)



- Security that co-exist with accessibility functionality is important
 - To clearly provide mechanisms for a UI developer details on how different widgets in their UI will handle various requests from the Assistive Technologies

Al Security for Assistive Technologies

- Data Privacy including data minimization, encryption and access control
- Al model validation and adversarial testing
- Threat modelling and secure software development lifecycle

Security Testing and Compliance along with Accessibility Testing

- Vulnerability Assessment and Penetration Testing has evolved with automated tools and as part of the process. It is required to carry out such security testing for ATs and accessibility solutions.
- Involvement of Differently-abled communities and end-users in such testing processes would be very useful.

Reference:

- Accessibility as a cyber security priority, Article from National Cyber Security Centre
- https://www.ncsc.gov.uk/blog-post/accessibility-as-a-cyber-securitypriority
- $\bullet \quad \text{The importance of accessible and inclusive cybersecurity, } Mark\,Stone,$



Security Intelligence

- https://securityintelligence.com/articles/importance-of-accessible-inclusive-cybersecurity/
- A11y Attacks: Exploiting Accessibility in Operating Systems, Yeongjin Jang, Chengyu Song, Simon P. Chung, Tielei Wang, and Wenke Lee
- https://wenke.gtisc.gatech.edu/papers/a11y.pdf
- Assessing the Cybersecurity Needs and Experiences of Disabled Users, Arwa Binsedeeq, Steven Furnell, Kirsi Helkala, Naomi Woods, Darren Chadwick, Chris Fullwood, Xavier Carpent and Nicolas Gervassis
- https://www.open-access.bcu.ac.uk/16012/1/Binsedeeq_et_al._2024.pdf
- A review of literature on accessibility and authentication techniques, Andrew, S., S. Watson, T. Oh, and G.W. Tigwell, in Proceedings of the 22nd International ACM SIGACCESS Conference on Computers and Accessibility. 2020.
- https://dl.acm.org/doi/10.1145/3373625.3418005
- "I'm Stuck!": A Contextual Inquiry of People with Visual Impairments in Authentication. in SOUPS. 2015, Dosono, B., J. Hayes, and Y. Wang.
- https://dl.acm.org/doi/10.5555/3235866.3235879
- Al Security Checks: A Must for Assistive Technology
- https://www.linkedin.com/pulse/ai-security-checks-must-assistivetechnology-leverage-online-8kizf/



Indian Accessibility Standards and

Regulations for Digital Accessibility







Shri Shubhanshu Gupta Scientist D, C-DAC Pune Shri Saidarshan Bhagat, Scientist 'D', C-DAC Mumbai

Digital products and services are ubiquitous; in fact, it's difficult to imagine a day without them. Whether it's banking, bill payments, transportation booking, ordering food, creating presentations, or managing expenses in a spreadsheet, these tasks are accomplished in a matter of seconds; thanks to digital platforms.

Is it possible to live without them? Most would emphatically say, "No." Life without digital products and services would seem like a step back to another era. No one today would willingly stand in a queue to pay a bill, visit a bank, wait for a cab on a scorching day, or maintain voluminous ledgers manually.

The COVID-19 pandemic underscored the indispensability of digital solutions. During those challenging times, digital tools became our primary means to live, connect, and work while maintaining social distancing. This period served as a turning point for digital literacy in India, significantly accelerating the adoption and penetration of digital services at grassroots levels.

In this tech era, digital services are not just a convenience but a necessity. They hold the potential to bridge gaps and bring citizens closer to mainstream opportunities. Ideally, digital services should uphold the principles of diversity and inclusion. However, inaccessible and poorly designed platforms can inadvertently create a digital divide. To ensure true inclusivity, digital services must be designed for everyone, regardless of their physical, visual, auditory, cognitive, or linguistic abilities.

17

Understanding Digital Accessibility

Digital accessibility refers to the practice of making digital products and services usable for all, including persons with disabilities. While usability focuses on making services user-friendly for the general population, accessibility ensures that barriers are removed for those with specific needs.

Accessible services benefit not only persons with disabilities but also senior citizens and individuals who prefer regional languages. For instance, accessible design can help those with temporary or situational disabilities—like a broken arm or a noisy environment—demonstrating its universal appeal and necessity.

Consider the following scenarios of use demonstrating, Accessibility is for All.



Temporary Disability



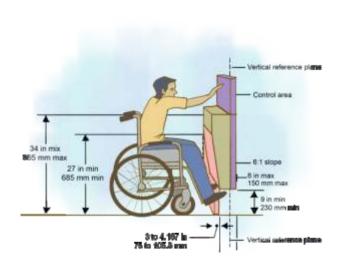
Rehabilitation post medical treatment















India's Accessibility Standards

To address inclusivity challenges, a range of accessibility standards and guidelines are available in various jurisdictions such as US Section 508 of the Rehabilitation Act, European Accessibility Act, with the Web Content Accessibility Guidelines (WCAG) being the gold standard referred by all. Created by the World Wide Web Consortium (W3C), WCAG serves as the foundation for many national and global accessibility frameworks.

Recognizing the importance of an indigenous standard catering to the Indian context, the Ministry of Electronics and Information Technology (MeitY), in collaboration with the Centre for Development of Advanced Computing (C-DAC), Standardisation Testing and Quality Certification (STQC), and the Bureau of Indian Standards (BIS), developed India's own accessibility standard, IS-17802.

This standard, published in two parts—IS-17802 Part 1: Requirements and IS-17802 Part 2: Determination of Conformance—is fully aligned with global benchmarks like WCAG, EN-301549, and Section 508. On May 11, 2023, the Ministry of Social Justice and Empowerment (MoSJE) made history by notifying the Rights of Persons with Disabilities (Amendment) Rules, 2023, mandating that all ICT products and services manufactured or procured in





IS 17802 Part 1

भारतीय मानक Indian Standard IS 17802 (Part 1): 2021

आइसीटी उत्पादों और सेवाओं के लिए अभिगम्यता

भाग 1 अपेक्षाएें

Accessibility for the ICT Products and Services

Part 1 Requirements

ICS 35.240.80, 11.180

@ BIS 2021



भारतीय मानक व्यूरो BUREAU OF INDIAN STANDARDS मानक भक्त, 9 बहादुरलाह ज़फर मार्ग, नई दिल्ली – 110002 MANAK BHAVAN, 9 BAHADUR SHAH ZAFAR MARG NEW DELHI-110002

www.bis.gov.in www.standardsbis.in

December 2021 Price Group 16

IS 17802 Part 2

भारतीय मानक Indian Standard IS 17802 (Part 2): 2022

आइसीटी उत्पादों और सेवाओं के लिए अभिगम्यता भाग 2 अनरूपता का निर्धारण

Accessibility for the ICT Products and Services

Part 2 Determination of Conformance

ICS 35.240.80, 11.180

O BIS 2022



भारतीय मानक क्यूरो
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April 2022

Price Group 18

DEPwD, MoSJ has notified the RPwD (Amendment) Rules 2023 on May 10, 2023. The following clause is inserted under Rule 15, sub-rule (1), in clause (c) after Item (ii) of RPWD Rules 2017 for enforcement of the standard.

"(iii) Websites, apps, information and communication technology based public facilities and services, electronic goods and equipment which are meant for everyday use, information and communication technology based consumer products and accessories for general use with persons with disabilities, and other products and services which are based on information and communication technology, shall comply with the Indian standards IS 17802 (Part 1), 2021 and IS 17802 (Part 2), 2022, published by the Bureau of Indian Standards vide notification numbers HQ-PUB013/1/2020-PUB-BIS(278), dated the 24th December, 2021 and HQ-PUB013/1/2020-PUB-BIS(358), dated the 4th May, 2022, respectively as amended from time to time:"

The Right of Persons with Disabilities Act 2016 recognizes 21 disabilities listed in the first column of the table below. Accommodating requirements associated with the disabilities requires understanding of the functional performance requirements associated with the disability and the Assistive technologies that can be used are provided in the second and third Columns respectively.



Disabilities as per the RPwD Act ,	User Functional Performance	Solution space / Assistive
2016	Requirements	Technologies
 Blindness Low-vision Leprosy Cured persons Hearing Impairment (deaf and hard of hearing) Speech and Language disability Locomotor Disability Dwarfism Intellectual Disability Mental Illness Autism Spectrum Disorder Cerebral Palsy Muscular Dystrophy Chronic Neurological conditions Specific Learning Disabilities (Dyslexia) Multiple Sclerosis Thalassemia Hemophilia Sickle Cell disease Parkinson's disease Acid Attack victim Multiple Disabilities including deafblindness 	 Usage Without Vision Usage with Limited Vision Usage without Perception of Colour Usage without Hearing Usage with Limited Hearing Usage with no or Limited Vocal Capability Usage with Limited Manipulation or Strength Usage with Limited Reach Minimize Photosensitive Seizure Triggers Usage with Limited Cognition, Language or Learning Privacy Support to Indian Languages 	 Screen Readers Screen Magnifiers Speech Recognition Software Text-to-Speech (TTS) Software Braille Displays and Translators Alternative Input Devices - Eyetracking systems, Sip-and-Puff systems, Head pointers, Switch controls Augmentative and Alternative Communication (AAC) Devices for users with speech impairments Captioning and Transcription Tools Color and Contrast Tools Accessible Browsers and Plugins Cognitive Support Tools

Benefits of Digital Accessibility

The benefits of digital accessibility extend far beyond compliance. At its core, accessibility empowers individuals, enabling them to participate fully in society. For persons with disabilities, it means independence and equal opportunities. For businesses, accessibility opens doors to a broader audience, enhancing user satisfaction and brand loyalty.

On a national level, embracing accessibility can significantly contribute to India's vision of becoming a digitally inclusive economy. Accessible platforms can drive greater participation in e-governance, education, healthcare, and employment. They can also help reduce the digital divide, ensuring that no citizen is left behind in the journey toward a more connected and prosperous India.

The Way Forward

To truly harness the power of digital accessibility, it is imperative to:

- Raise Awareness: Promote the importance of accessible design among developers, businesses, and policymakers.
- Capacity Building: Provide training for developers, designers, and testers on accessibility best practices.
- Encourage Collaboration: Foster partnerships between the government, industry, and civil society to develop innovative accessibility solutions.
- $\bullet \quad \text{Ensure Compliance: Strengthen enforcement mechanisms to ensure adherence to IS-17802 and other accessibility regulations.}$
- Innovate Continuously: Leverage emerging technologies like AI, machine learning, and natural language processing to create more intuitive and accessible digital experiences.

India's commitment to digital accessibility reflects its dedication to creating an inclusive digital ecosystem. By ensuring that digital products and services are accessible to all, we can build a society that values diversity, equity, and inclusion, paving the way for a truly accessible India.

IDEAS TO ACTION





NEW MEITY PROJECTS

IDEAS TO ACTION



Name of Project:

Development of Indigenous Medical Radiation Dosimeter based on organic field effect transistors (DosFET).

Co-Cl: Shri Jitesh Choudhary, Centre Head, C-DAC Silchar.

CI: Dr. V. Ramgopal Rao, Senior Professor & Vice Chancellor, BITS Pilani & Ex-Director IIT Delhi.

Collaborators: BITS Pilani, Hyderabad & IIT Delhi.

Brief Description:

To develop an Indigenous radiation dosimeter based on Organic Field Effect Transistors (DosFET) for medical use, targeting TRL 6. It will leverage Al/ML to enhance accuracy, reduce variability, and include hospital trials to benchmark the device against commercial sensors.

NEW MEITY PROJECTS

IDEAS TO ACTION







Name of Project:

Cyber-Forensic Framework for User-Centric Human Threat Intelligence Analysis

CI: Shri N K Jain, Scientist G & Centre Head, C-DAC Delhi

Co-Cl: Dr. Priyanka Jain, Scientist F, C-DAC Delhi

Collaborators: NFSU Gandhinagar, RLA College Delhi University

Brief Description:

The objective of the proposed holistic framework with multifaceted emerging areas is to provide an insider threat intelligence system. Behavioural analysis can help identify patterns in user actions that might expose individuals or systems to vulnerabilities. Focusing to the objective of employee dossier, insider-threat investigation, integrity-check(s) and Cyber-Forensic awareness, it covers the major objectives which includes Applied Cyber Forensic Framework with Neuro-Behavioural Research, Data Acquisition, System Design & Project Development, Onboarding Start-ups/Industry for Field Deployments and Capacity Building & Knowledge Sharing.

3

NEW MEITY PROJECTS

IDEAS TO ACTION





Name of Project:

Cyber Shakti: Empowering Indian Women Government Officials in Cyber Security

CI: Ms. Rekha Saraswat, Scientist E, C-DAC Noida

Co-Cl: Ms. Kanti Singh Sangher, Scientist E, C-DAC Noida

Brief Description:

The project "CyberShakti Empowering Indian Women Government Officials in Cyber Security" is a MeitY sponsored project with the aim to sensitize women Government officials in the field of Cyber Security and bring more women in this field to bridge the existing gender and skill gap. The project objective is to equip women Government Officials with the necessary skills, so that they can take up the roles of CISOs and Deputy CISOs in their respective organizations, if needed.

NEW MEITY PROJECTS

IDEAS TO ACTION





Name of Project:

Design and Development of school Management system, Office ERP and Integrated content Management Portal for Eklavya Model Residential Schools under the NESTS

CI: Ms. Aparna Ramamurthy, Scientist F, C-DAC Noida

Co-Cl: Ms. Nishtha Jaiswal, Scientist D, C-DAC Noida

Collaborators: National Education Society for Tribal Students (NESTS)

Brief Description:

Scope of the project is to develop School Management System and Hostel & Mess Management System to manage the complete processes related to student process life cycle in school, Office ERP, Payroll and an integrated web portal for effective information dissemination for the schools.





5

Name of Project:

Multi-channel Precision Instrumentation Amplifier

CI: Shri Haneesh Sankar T P, Scientist E, C-DAC, Thiruvananthapuram

Co-Cl: Shri Sarath Chandran R, Senior Project Engineer, C-DAC, Thiruvananthapuram

Collaborators: Satish Dhawan Space Centre (SDSC SHAR), ISRO, Sriharikota

Funding Agency: ISRO

Brief Description:

The project envisages design, development and supply of multi-channel high accuracy instrumentation amplifier for the measurement of critical parameters like thrust, pressure, displacement, firing current for the static firing testing of rockets and missiles. It is a mission critical equipment indigenously designed and developed for space applications

NEW R&D PROJECTS

IDEAS TO ACTION (External Funding)





Name of Project:

Kanthasth 3.0 Bahubhashi

CI: Shri Shashi Pal Singh, Scientist E, C-DAC Pune

Funding Agency: Department of Official Language, Ministry of Home Affairs, Government of India

Brief Description:

The project aims to bolster Indian languages and encourage the use of regional languages, fostering pride in our linguistic heritage while enhancing the integration of Hindi with various Indian languages. The system will facilitate seamless translation between Hindi and 15 other Indian languages listed in the Eighth Schedule of the Constitution, which serve as the first languages of various states and Union Territories.

NEW R&D PROJECTS

TO TO ACTION (External Funding)





Name of Project:

GIS based Asset Management Information System (AMIS)

CI: Ms. Asima Mishra, Scientist F, C-DAC Pune

Co-Cl: Shri Prabu I, Scientist E, C-DAC Pune

Funding Agency: Oil India Limited

Brief Description:

The primary objective of project is to carry out research, design, and development of a suite of GIS-based applications to implement a AMIS, which will comprehensively address the asset management needs of the OIL. The GIS based AMIS will represent a paradigm shift in asset management for the OIL. By harnessing the power of geospatial technology and data analytics, this system shall empower decision-makers to optimize operations, mitigate risks, and ensure the sustained success of OIL assets.

7

NEW R&D PROJECTS

TO TO ACTION (External Funding)





Name of Project:

Comprehensive Reliability and Robustness Assessment Toolbox for Al Applications (CRAT)

Cl: Shri Ramesh Naidu Laveti, Scientist F, C-DAC Bangalore

Co-Cl: Ms. Sukeshini, Scientist D, C-DAC Bangalore

Funding Agency: Defence Research and Development Organisation (DRDO)

Brief Description:

The proposed toolbox comprehensively evaluates the robustness of AI models against common corruptions, adversarial attacks, and quantify uncertainty & data quality. It also aims at facilitating Formal Verification for certifying robustness of AI models against adversarial attacks.

This toolbox additionally strengthens the monitoring and reviewing of Al applications by providing insightful decisions to take necessary actions against these challenges, ultimately making them more trustworthy.

NEW R&D PROJECTS

TO ACTION (External Funding)





Name of Project:

Neural methods for voice search across ancient Indian Vedic Sanskrit texts

CI: Dr. R C Saritha, Scientist 'F', C-DAC Bangalore

Co-Cl: Dr. CH Janaki, Scientist 'F', C-DAC Bangalore

Funding Agency: Department of Science and Technology (DST), Ministry of Science and Technology, Govt. of India

Collaborating Agency: Samskriti Foundation, Mysuru

Brief Description:

Sanskrit is the only language preserved in vocal form since its inception. The objective of this project is to preserve India's ancient heritage language Sanskrit including Vedic Sanskrit in their vocal form, and to develop an Al-powered voice search engine along with a real-time voice search application. This will be accomplished by creating Vedic Sanskrit golden datasets and developing automatic speech recognition (ASR) systems for efficient information retrieval. Additionally, the project aims to disseminate knowledge through capacity-building initiatives for researchers and training programs for domain experts.

9

NEW R&D PROJECTS

TO TO ACTION (External Funding)





Name of Project:

Crime Criminal Tracking Network System (CCTNS) Goa Police Crime Criminal Tracking Network System (CCTNS) Lakshadweep Police

CI: Dr. Vijay Kumar K, Scientist E, C-DAC Chennai

Co-Cl: Shri Padmanabhan J, Scientist E, C-DAC Chennai

Funding Agency:

State Crime Records Bureau (SCRB), Goa Police State Crime Records Bureau (SCRB), Lakshadweep Police

Brief Description:

The Crime and Criminal Tracking Network System (CCTNS) Project is an initiative by NCRB/MHA, New Delhi, aimed at digitizing the policing system. To manage this project effectively, a System Integrator (SI) is essential. C-DAC Chennai has been designated as the SI responsible for developing and maintaining the CCTNS application, along with its Operations & Maintenance (O&M). The scope also includes implementing and integrating ICJS 2.0 with the CCTNS application and developing a government website.

10

NEW R&D PROJECTS

TO TO ACTION (External Funding)

PROGRESS PULSE:

A PERFORMANCE DASHBOARD

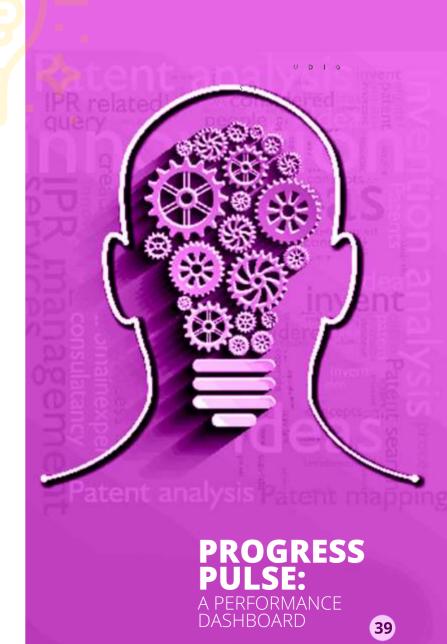




IPR PORTFOLIO

To create awareness and increase the Intellectual Property Rights (IPR) footprint across C-DAC, the Corporate IPR Cell has been established. Details of the IPR activities of C-DAC during this quarter are as below:

	IPR portfolio of C-DAC (Year 2013 to December 2024)			Quarterly IPR portfolio of C-DAC (October 2024- December 2024)				
	Patents	Copyrights	Trademarks	Design	Patents	Copyrights	Trademarks	Design
Applied/Filed (Pending)	61	16	29	1	4	8	3	0
Granted/ Registered	106	179	23	2	3	6	0	1
Total	167	195	52	3	7	14	3	1



DESIGN LINKED INCENTIVE SCHEME (DLI)

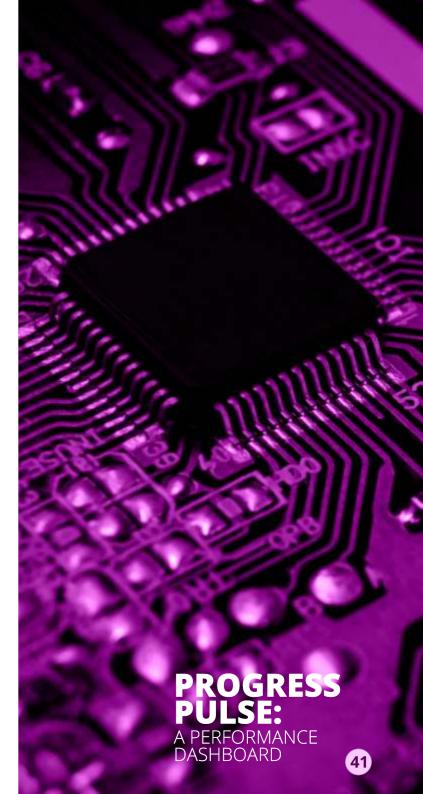
The Design Linked Incentive (DLI) Scheme aims to provide financial incentives as well as design infrastructure support across various stages of development and deployment of semiconductor design for Integrated Circuits (ICs), Chipsets, System on Chips (SoCs), Systems & IP Cores and semiconductor linked design with an aim to achieving significant indigenization in semiconductor and electronic products and IPs deployed in the country, thereby facilitating import substitution and value addition in electronics sector in the next 5 years. As per the approval accorded by Cabinet, DLI Scheme is being implemented by C-DAC.

Application Status					
	Proposals				
DLI Applications	Product Design linked Incentive/ Design linked	EDA Tools Access Request			
Proposals Received	Incentive 76	58			
Evaluation Ongoing	28	7			
Proposals Approved	16	49			
Proposals Rejected	32	2			



DETAILS OF APPROVED APPLICANTS FOR FINANCIAL SUPPORT UNDER DLI SCHEME

Approved applicants for Fiscal Support under DLI Scheme (PDLI)					
Sr. No	Applicants	Approved incentives under the DLI Scheme (Rs. In Lakhs)	Funds disbursed (Rs. In Lakhs)		
1	DV2JS Innovation LLP Pvt Ltd	341.5	54.19		
2	Vervesemi Microelectronics Pvt Ltd	1353.0	249.35		
3	Fermionic Design Pvt Ltd	413.9	93.00		
4	Morphing Machines Pvt Ltd	1024.4	22		
5	Calligo Technologies Pvt Ltd	1475.5	207.31		
6	Sensesemi Technologies Pvt Ltd	1500	16.63		
7	Saankhya Labs Pvt Ltd	1138.297	216		
8	Aheesa Digital Innovations Pvt Ltd	1500.0	694.37		
9	Netrasemi Pvt Ltd	1500.0	344.69		
10	Green PMU Semi Pvt Ltd	484.00	30.00		
11	WiSig Networks Pvt Ltd	1267.785	85.00		
12	MosChip Technologies Pvt Ltd	1265	50.00		
13	Mindgrove Technologies Pvt Ltd	1500	87.68		
14	InCore Semiconductors Pvt Ltd	823.5	10.00		
15	Aryabhata Circuits and Research Labs Pvt Ltd (ABCRL)	1500	NIL		
16	BigEndian Semiconductors Pvt Ltd	1500	NIL		
	Total	18822	2,160 (disbursed)		



DETAILS OF APPROVED APPLICANTS FOR FINANCIAL SUPPORT UNDER DLI SCHEME

Achievements -	- DLI Funded Applicants
Applicant Name	Achievements and Outcomes
Fermionic Design Private Limited	 Successfully taped out X-band Beamformer 8-12GHz 4T4R IC. Successfully demonstrated the silicon performance to customers. Raised VC funding of Rs 50 Cr
Netrasemi Pvt Ltd	 Raised Investor funding of Rs 8.3 Cr Tape expected in Dec' 2024
Green PMU Semi Pvt Ltd	 Tape out done in Feb' 2024 Raised funding of Rs 6.5 Lacs from WxBunka Foundation, Japan
Morphing Machines Pvt Ltd	• Raised VC funding of Rs 23 Cr
Calligo Tech. Pvt Ltd	 Received the 1st version of fabricated design in March' 2024 Raised Investor funding of Rs 1.15 Cr
Sensemi Technologies Pvt Ltd	 Architecture and Specifications finalised with the potential customer Raised VC funding of Rs 80 Lacs.
Mindgrove Technologies Private Limited	• Raised VC funding of 20 Cr
Incore Semiconductors Pvt ltd	• Raised VC funding of Rs. 24.6 Cr

Outcomes – DLI Scheme				
Manpower Generated	284			
IP Cores Generated	33			
SoC Fabricated	3			



MOBILE SEVA (MOBILE SERVICE DELIVERY GATEWAY)/ MOBILE SEVA APPSTORE

Mobile Seva platform is an innovative initiative aimed at mainstreaming mobile governance in the country. It provides an integrated whole-of-government platform for all Government departments and agencies in the country for delivery of public services to citizens and businesses over mobile devices using SMS, IVRS, CBS, LBS, apps. It is a centrally hosted cloud-based mobile enablement platform, which allows the departments to expeditiously start offering their services through mobile devices anywhere in India, without having to invest heavily in creating their separate mobile platforms. Over 5041 accounts of government departments and agencies with over 6376 cr+ transactions are integrated with Mobile Seva platform.

Mobile Seva platform					
	April 2012 to December 2024	October 2024 to December 2024			
Accounts of Dept/Agencies integrated	5041	75			
No of Push SMS Transaction	6376 Cr	175 Cr			





E-HASTAKSHAR / E-SIGN

As a flagship initiative within the Government's Digital India program, C-DAC has introduced 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 and e-Hastakshar Mobile APK has been downloaded over 2.75 lakh times, with 2.64 lakh active users till 31 Dec 2024.

As of December 2024, C-DAC has issued over 21.20 crore e-Signs. More than 260 government agencies are utilizing C-DAC's eSign service at the production level. The State Crime Records Bureau (NCRB) has successfully integrated the eSign service into the Crime and Criminal Tracking Network and Systems (CCTN) project, with the service operational in the following states and union territories: Andaman & Nicobar, Andhra Pradesh, Assam, Bhubaneswar, Chandigarh, Chhattisgarh, Delhi, Gujarat, Haryana, Ladakh, and Telangana.

In the third quarter, the eSign service was extensively utilized to generate Fame ID cards through the Agri-Stack application under the Ministry of Agriculture. Additionally, key agencies such as the Tamil Nadu e-Governance Agency (TNeGA), Employees' Provident Fund Organisation, National Informatics Centre, and the Centre for e-Governance, Karnataka, are leveraging eSign at the production level.

eSigns offered by C-DAC				
July 2016 to December 2024 October to December 2024				
21.20 Cr	2.79 Cr			

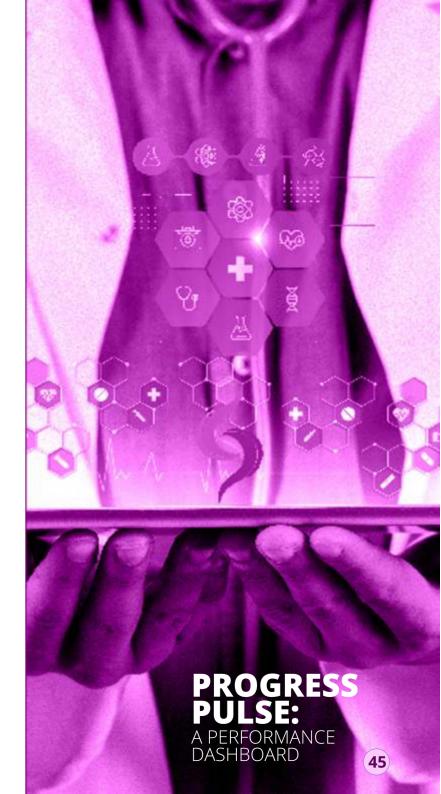




ESANJEEVANI

eSanjeevani is the National Telemedicine Service of Ministry of Health & Family Welfare (MoHFW), Government of India. Owing to its widespread and speedy adoption, eSanjeevani has evolved into the world's largest documented telemedicine implementation in the primary healthcare. eSanjeevani – National Telemedicine Service is testimony to the fact that digital health has come of age in India. eSanjeevani has revolutionised primary healthcare in India by bringing health services to the masses in rural areas and isolated communities. In eSanjeevani network nationally, 1,31,147 Health and Wellness Centres (HWCs) have been registered as spokes and 16,849 hubs have been operationalized. eSanjeevani boasts over 2,30,198 doctors, specialists, and health workers as telemedicine practitioners, operating in all states and union territories of India. It serves approximately 6,30,315 patients daily, with the capacity to handle up to 1 million patients per day. eSanjeevani is operational in all States/UTs across India. However, In Delhi, eSanjeevaniAB-HWC is available from December 2024.

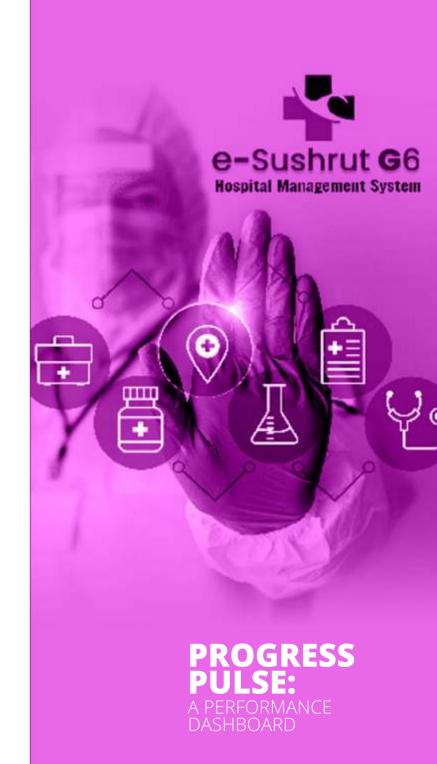
eSanjeevani Usage Report						
	November 2019 t	o December 2024	October 2024 to December 2024			
	Total Tele-Consultations	Registered Doctors	Total Tele-Consultations	Registered Doctors		
eSanjeevaniAB- HWC	31,86,34,207	61,618	3,35,33,998	3,494		
eSanjeevaniOPD	1,20,99,883	12,461	2,26,350	439		
eSanjeevani	330,734,090	74,079	3,37,60,348	3,933		



HOSPITAL MANAGEMENT SYSTEM- E-SUSHRUT

e-Sushrut- C-DAC's Hospital Management Information System is a major step towards adapting technology to improve healthcare. HMIS incorporates an integrated computerized clinical information system for improved hospital administration and patient health care. It is integrated with ABDM Mile Stones and provides an accurate, electronically stored medical record of the patient. A data warehouse of such records can be utilized for statistical requirements and for research. The real time HMIS streamlines the treatment flow of patients and simultaneously empowering workforce to perform to their peak ability, in an optimized and efficient manner.

e-Sushrut Report: National					
	No. of Patient Visited				
	Till Dec 2024	Oct 24- Dec 24			
e-Sushrut for AIIMS (16 No's)	32875163	2780688			
e-Sushrut PAN Railways HMIS	50604410	4462752			
SAIL BSL e-Sushrut HMIS	1155122	140933			
HMIS-NHM UP	27948719	3332294			
HMIS- DGME UP	18356687	2311829			
Punjab	72071162	11897044			
Telangana	37025405	4175447			
Odisha	58540536	4632823			
NIMS HMIS Hyderabad	4794155	215783			
HMIS Maharashtra	20814053	2358988			
IGIMS Patna	1673054	285783			
HMIS TN	3064443	836049			
HMIS HP	3133658	1038010			
SAIL RSP e-Sushrut HMIS	483516	102224			
Goa State	2667825	294321			
GIMS	850103	72458			
Arunanchal Pradesh	2073111	174734			
Sikkim	1064180	157069			
NHPC	294610	26889			



e-RaktKosh is a comprehensive IT solution to connect, digitize and streamline the workflow of blood banks. It has on-boarded more than 4200 blood banks on its platform. e-RaktKosh Portal is also extensively used by the citizens for requirements related to blood, blood banks' location identification, blood stock Enquiry, maintenance of donation repository etc. eRaktKosh is integrated with various statewide blood bank solutions & has become a single data repository for management of data regarding blood availability, blood-related products, blood donation camps, donor repository etc.

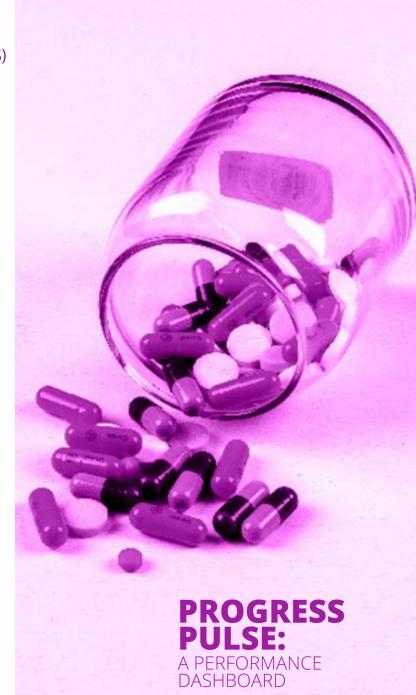
eRaktkosh					
Description	Year 2017 to Dec 2024	Oct 2024 to Dec 2024			
Total Blood Bank Registered in eRaktKosh	4,280	40			
Total Govt Blood Bank Registered	1,277	8			
No of Active Blood Banks	3,264	3264			
No of Camp Conducted	1,56,777	13,584			
No of Donor Registered	86,44,488	11,18,840			



EAUSHADHI DRUGS AND VACCINE DISTRIBUTION MANAGEMENT SYSTEM (DVDMS)

It is a web-based programme that manages the supply chain of pharmaceutical supplies such as medications, sutures, and surgical items needed by various Drug Warehouses/Drug Stores. The primary goal of DVDMS is to determine the pharmaceutical demands of the state drug programme and the MoHFW's national level programme for various drug warehouses/drug stores so that all necessary materials/drugs are always available to be given to patients/beneficiaries in the state without delay. This involves item classification/categorization, item codification, item quality control, and lastly issuing pharmaceuticals to patients, who are the end consumers in the chain.

eAushadhi (DVDMS) - Coverage across India along with Procurement and Issue Details for Drugs							
Sl.no	Institutions	January 2023 to [(Amount i		October 2024 to December 2024 (Amount in Crore)			
		Procurement Value	Distribution Value	Procurement Value	Distribution Value		
		A. States Im	plementation				
1	Andhra Pradesh	1884.93	1373.33	106.31	123.70		
2	Assam	702.00	76.00	73.00	8.53		
3	Bihar	1288.39	1236.77	152.39	153.83		
4	Gujarat	974.23	1027.77	122.14	97.22		
5	Himachal Pradesh	218.00	204.80	29.00	22.90		
6	Jharkhand	58.14	86.00	8.53	9.00		
7	Madhya Pradesh	1264.97	960.27	159.22	113.73		
8	Maharashtra (PHD & DMER)	951.60	905.84	55.36	100.33		



EAUSHADHI DRUGS AND VACCINE DISTRIBUTION MANAGEMENT SYSTEM (DVDMS)

9	Punjab	6625.86	9054.38	398.3	1077.2		
10	Rajasthan	4537.27	3789.05	652.96	460.52		
11	Telangana	1029.94	936.73	88.74	78.11		
12	Uttarakhand	106.09	95.13	18.63	12.05		
13	Uttar Pradesh	1913.77	107.18	216.22	268.68		
		B. Union Teritories ((UT) Implementat	ion			
1	Jammu and Kashmir	676.52	579.6	46.15	111.78		
2	Puducherry	179.65	691.38	52.7	19.39		
3	Lakshadweep	542.11	1313.05	7	402.78		
4	Chandigarh	3.00	6.64	3	1.68		
	С	. Centralized / Natio	onal Implementa	tions			
1	DGAFMS- Ministry of Defence (Army, Navy, Airforce and subsidaries)	1136.62	824.82	503.29	209.785		
2	Central Medical Services Society - MoHFW	4493.59	2368.75	560.52	445.34		
3	Dept of Family Planning -MoHFW	1205.11	741	551.24	187.74		
4	National Tuberclosis Elimination Programe- MoHFW	739.15	4747.39	7.21	218.71		
5	Medical Stores Organization-MoHFW	384.08	524.04	48.99	52.70		
	D. Other Implementations						
1	Directorate of Medical Insurance-Govt of Andhra Pradesh	60.24	8.35	0	0.7732		



IPDMS 2.0, INTEGRATED PHARMACEUTICAL DATABASE MANAGEMENT SYSTEM 2.0

The Integrated Pharmaceutical Database Management System (IPDMS) 2.0 has been developed for the National Pharmaceutical Pricing Authority (NPPA) as a responsive, web-based application. The IPDMS 2.0 web application and Pharma Sahi Daam 2.0 mobile application were officially launched by the Honorable Union Health Minister, Sh. Mansukh Mandaviya, on August 29, 2022, during the silver jubilee foundation day celebrations of NPPA. This advanced system integrates essential functional processes to monitor and regulate the prices of drugs and medical devices across India.

The National Pharmaceutical Pricing Authority (NPPA), established through a Government of India Resolution, operates as an attached office under the Department of Pharmaceuticals (DoP), Ministry of Chemicals & Fertilizers. The NPPA's primary mandate is to oversee drug and medical device pricing independently, ensuring their availability and affordability.

IPDMS 2.0, in conjunction with the Pharma Sahi Daam 2.0 mobile application (available on Android, iOS, and UMANG platforms), offers users an efficient online tool to instantly check the prices of both Scheduled and Non-Scheduled medicines at the point of purchase. Furthermore, the Pharma Jan Samadhan platform enables users to file and track four types of complaints:

- Overcharging.
- · Sale without prior approval.
- · Shortage or unavailability of drugs.
- Refusal to sell medicines.

This complaint mechanism is integrated as an add-on feature in both the Pharma Sahi Daam mobile app and the IPDMS 2.0 web platform. The detailed usage of the system is as follows-



IPDMS 2.0, INTEGRATED PHARMACEUTICAL DATABASE MANAGEMENT SYSTEM 2.0

Integration Pharmaceuticals Database Management System, IPDMS 2.0						
Activities done by Pharma/Medical Devices Companies & NPPA	Till 31 st December 24	October 2024 - December 2024				
Total Companies (Drugs & Medical Devices) Registered in the IPDMS 2.0	1602 (1430- Drugs, 172 - Medical Devices)	34 (30 - Drugs, 4 - Medical Devices)				
Number of Manufacturing Unit verified by the companies	7794	212				
Number of Drugs verified by companies	54967	2333				
Medical Devices Plant Registered	511	19				
Medical Devices Registered	55274	1729				
Quarterly Stock Collection	17138	2839				
State Pricing Monitoring Resource Unit (PMRU) registered.	31	0				
Form-I (Application for Price Fixation) Submitted	512	46				
Form-II (Submission of Revised Prices) Submitted	13775	169				
Form-III (Quarterly Return) Submitted	51431	7687				
Form-IV (Discontinuation of Production) Submitted	128	4				
Form-V (Price List) Submitted	71908	5876				
Form – VI (Medical Devices) Submitted	50594	10711				
Complaints Registered through Web and Mobile Apps	5793	396				
Legal Cases Registered for Overcharging	728	50				

The Ceiling and Retail Price calculations of drugs with defined overcharging workflows linked with 31 state PMRUs have been automated and implemented in IPDMS 2.0 application. Individual can verify ceiling price and register four types of complaints, as mentioned aforesaid, through mobile app and web application.



DASHBOARD

CYBER GYAN

Cyber Gyan is a significant project entrusted to C-DAC Noida by the Ministry of Electronics and Information Technology (MeitY). Titled "Cyber Security Scenario-Based Self-Paced Learning Training Facility," the project is designed to equip SC, ST, and Economically Weaker Section (EWS) undergraduate and postgraduate students from government colleges across 8 North-Eastern states and 4 other states—Uttar Pradesh, Haryana, Gujarat, and Kerala—with critical cyber security skills.

The initiative aims to develop skilled manpower in the rapidly evolving domain of cyber security, essential for protecting critical infrastructure from cyber threats and attacks. Now, this initiative has extended its opportunities nationwide, inviting students from government engineering colleges across India to participate, fostering a generation of cyber security experts capable of addressing modern digital challenges.

Enrolment under Cyber Gyan Project						
Name of State	February 2022 - December 2024	October 2024 - December 2024				
Maharashtra	361	315				
Uttar Pradesh	1024	179				
Bihar	239	128				
Andhra Pradesh	212	119				
Gujarat	382	95				
Odisha	92	84				
Karnataka	83	83				
Tamil Nadu	293	73				
Telangana	63	63				
Haryana	335	61				
Chhattisgarh	121	53				



CYBER GYAN

Kerala	193	50
Manipur	164	45
Delhi	254	41
Puducherry	51	40
Jharkhand	83	35
Rajasthan	88	34
Jammu and Kashmir	148	31
Tripura	109	28
Punjab	114	23
Assam	230	13
Madhya Pradesh	261	10
Meghalaya	83	9
Uttarakhand	75	9
Mizoram	78	7
Arunachal Pradesh	107	5
West Bengal	116	2
Sikkim	13	1
Himachal Pradesh	13	0
Nagaland	3	0
Goa	1	0
Grand Total	5389	1636



ONLINE MANAGEMENT, MONITORING AND ACCOUNTING SYSTEM (OMMAS) FOR PRADHAN MANTRI GRAM SADAK YOJANA (PMGSY)

OMMAS is an e-Governance solution designed to manage and monitor the entire lifecycle of PMGSY projects, covering planning, execution, real-time tracking of physical and financial progress, and maintenance, while ensuring high-quality standards. It serves as a powerful data analytics and decision-making tool for the Ministry of Rural Development (MoRD), Ministry of Finance (MoF), and National Rural Infrastructure Development Agency (NRIDA). OMMAS has become a model for e-Governance in infrastructure, inspiring similar initiatives across other sectors, and has supported key programs such as the Vibrant Village Programme by MHA and PM-JANMAN by MoTA. With a robust grievance redressal system through the Meri Sadak app, OMMAS enables citizens to raise concerns. Its impact has been vital in enhancing rural connectivity and fostering socio-economic development

		Till Sept 2024			Oct 2024 – Dec 2024				
SL No	State	Completed Length (In Km)	Sanctioned Cost (In INR Lacs)	Expenditure (In INR Lacs)	Habitations Connected	Completed Length (In Km)	Sanctioned Cost (In INR Lacs)	Expenditure (In INR Lacs)	Habitations Connected
1	Andaman And Nicobar	119.19	8,278.81	4,098.39	7	0.00	23,317.21	0.00	0
2	Andhra Pradesh	17,831.71	8,28,835.63	6,05,461.93	1435	35.18	27,507.02	11,311.45	0
3	Arunachal Pradesh	13,642.33	13,89,878.75	10,05,642.83	641	63.81	0.00	17,534.60	3
4	Assam	31,835.60	22,34,938.55	22,81,024.39	13721	55.99	0.00	3,711.04	0
5	Bihar	60,809.32	41,78,913.59	34,30,950.17	31395	400.77	0.00	39,225.98	2
6	Chhattisgarh	42,584.51	19,93,993.43	16,70,809.72	10924	20.47	55,650.87	14,505.46	2
7	Gujarat	15,329.47	6,00,048.55	5,06,088.40	3048	0.95	0.00	4,272.78	0
8	Haryana	8,024.55	3,71,893.55	3,26,296.13	1	6.33	0.00	968.75	0
9	Himachal Pradesh	21,386.32	11,33,755.83	7,92,463.66	2563	196.59	0.00	20,804.99	3
10	Jammu And Kashmir	19,164.92	14,81,069.70	12,54,520.46	2140	314.12	0.00	27,602.09	2

ONLINE MANAGEMENT, MONITORING AND ACCOUNTING SYSTEM (OMMAS) FOR PRADHAN MANTRI GRAM SADAK YOJANA (PMGSY)

11	Jharkhand	30,307.88	16,41,063.12	13,36,947.80	10934	222.03	0.00	27,850.81	0
12	Karnataka	23,886.42	8,15,143.80	8,34,029.25	296	40.27	3,044.32	3,275.33	0
13	Kerala	4,237.15	3,22,681.81	2,39,961.38	404	31.91	0.00	3,577.75	0
14	Ladakh	1,092.66	1,33,253.26	79,257.39	17541	12.70	0.00	4,664.62	0
15	Madhya Pradesh	89,562.71	38,80,330.20	32,80,117.73	1420	91.00	18,605.52	20,651.22	1
16	Maharashtra	30,094.99	15,16,235.72	11,76,548.98	652	228.36	0.00	30,650.59	1
17	Manipur	10,853.31	5,95,259.90	4,74,357.98	601	2.15	0.00	0.00	0
18	Meghalaya	4,658.85	3,42,267.29	2,97,980.93	232	59.22	1,07,469.86	7,074.93	4
19	Mizoram	4,405.91	3,40,278.80	2,63,299.23	109	2.00	0.00	616.54	0
20	Nagaland	4,322.41	1,92,267.04	1,39,520.99	17001	0.00	5,475.55	210.80	3
21	Odisha	70,598.09	34,26,270.10	32,90,239.19	389	122.74	0.00	14,227.64	0
22	Punjab	10,194.62	6,48,155.20	4,69,191.74	14292	66.27	0.00	8,501.35	0
23	Rajasthan	75,144.45	20,42,395.35	16,66,077.81	350	346.70	4,556.65	14,876.47	0
24	Sikkim	4,711.77	2,85,475.32	2,38,521.18	1985	18.69	10,061.42	2,741.58	0
25	Tamil Nadu	23,466.64	11,02,852.52	8,68,140.83	2005	113.37	0.00	10,503.68	0
26	Telangana	12,704.66	6,58,382.94	4,65,844.34	11749	65.94	0.00	13,885.78	0
27	Tripura	4,948.88	4,33,997.52	3,32,903.38	1864	20.23	0.00	2,390.94	0

INFORMATION SECURITY EDUCATION AND AWARENESS (ISEA) PROJECT PHASE –III

ISEA Activities	January 2024 to December 2024	October -December, 2024			
	Total number of candidates	Total number of candidates			
Generating highly skilled & certified Cyber Security Professionals - CISOs	Under CISO component of ISEA Project, conducted 6 Certificate trainings covering 226 CISOs/Dy. CISOs/Associate team of CISOs across India covering PSUs, Government and Pvt sectors.	C-DAC Hyderabad in association with Indian Computer Emergency Response Team (CERT-In) organized a 4-day training and certification program on "Level 1 Training on "Cyber Security for Banking, Fin. Services & Insurance (BFSI) Sector" from October 23-26, 2024 at CERT-IN Campus, New Delhi. 36 CISO team members/officers participated from various organisations.			
Strengthening Research and Education	3rd Phase of ISEA started from January 2024 and selection of Institutions are under progress.	2			
Grooming students towards products & solutions development in Cyber Security	3rd Phase of ISEA started from January 2024 and selection of institutions are under progress.	IoT Boot Camp organized by C-DAC, Hyderabad from December 2-4, 2024. 31 participants have participated.			
Cyber Aware Digital Naagriks (Mass Awareness) Cyber Hygiene, Security & Privacy Role based awareness, progression pathways Mass Awareness	ISEA Phase –III details up to December 2024 As part of "National Awareness Campaign on Information Security Education and Awareness (ISEA) Program – Phase III a total of - 471 Awareness workshops / Training were organized by covering 1,27,186 participants.	As part of "Cyber Aware Digital Naagrik (Mass Awareness Program) as part of Information Security Education and Awareness (ISEA) Program — Phase III a total of 385 Awareness workshops / Training were organized by covering 80,686 participants from October—December, 2024.			



SWAYAAN: CAPACITY BUILDING FOR HUMAN RESOURCE DEVELOPMENT IN UNMANNED AIRCRAFT SYSTEM

Project 'SwaYaan: Capacity Building for Human Resource Development in Unmanned Aircraft System' is led by C-DAC Hyderabad and IIITDM Kurnool as the Programme Management Unit (PMU) to develop a UAS/Drone Ecosystem across the Nation. The project is implemented in a hub-and-spoke model through 30 institutions including IISc Bangalore, IITs, IIITs, NITs, CDAC, and NIELIT Centres. Under the project, the overall target is to train 45,000+ candidates through various Formal, Non-Formal programs and Research Program such as MTech in UAS/Drones, Minor degree/Retrofitting courses in UAS/Drones, PG Diploma Program, Short term Skilling Courses, Innovation Challenge, Bootcamps, POC, National Workshops, International Conference, Open Online Courses, IPR (Paper and Patents) creation, etc. over a period of 5 Years.

As on date, overall, 478 activities have been conducted across India as part of various Academic programs, Research & innovation activities, Trainings/Workshops and other Knowledge sharing initiatives across 13,636 participants has been carried out thereby expediting the spirit of the Nation towards becoming a Global Drone Hub by 2030.



SWAYAAN: CAPACITY BUILDING FOR HUMAN RESOURCE DEVELOPMENT IN UNMANNED AIRCRAFT SYSTEM

2024 Last Quarter (October 24 – December 24) Progress

Research & Innovation

12 Proof-of-Concepts (PoC) completed in diverse areas of component design, autonomous operations, GNC, flight controller system, agriculture, traffic safety and air quality monitoring.

Call for proposal initiated for 1st International Conference in Drone/UAS by IISc Bangalore

Academic Activities

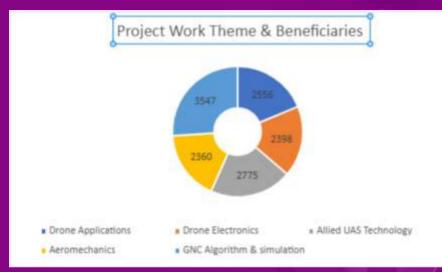
Development of two 6 months Certificate Programs in the domain of UAS Security and Drone System Development initiated

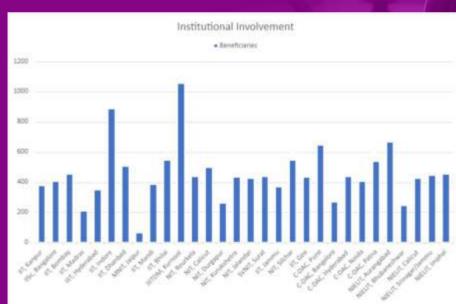
Training & Skilling

19 Bootcamps in Drone/UAS conducted by 7 Institutes marking partipation by 825 Students



SWAYAAN: CAPACITY BUILDING FOR HUMAN RESOURCE DEVELOPMENT IN UNMANNED AIRCRAFT SYSTEM











TECH ROLLOUTS

KOSHASHRI LAUNCHED BY HON'BLE MINISTER OF S&T



KoshaSHRI-Sanskrit Dictionary Article Authoring Tool (AAT) powered by crowdsourcing framework helps creation of new articles in a collaborative manner was launched on December 16, 2024 by Dr. Jitendra Singh, the Honorable Minister of Science and Technologyat the 5th anniversary celebration of the Science and Heritage Research Initiative (SHRI) at New Delhi.

TECH ROLLOUTS

INAUGURATION OF SOFTWARE AUGMENTED SIMULATOR FOR HANDS-ON EQUIPMENT KNOWLEDGE AND TRAINING (SASHEKT)



The SASHEKT system was inaugurated on December 13, 2024, at Signal School, Naval Base, Kochi. SASHEKT system was deployed at Signal School, Indian Navy. It is a cutting-edge Augmented Reality (AR) based Software Simulator, designed to enhance hands-on training experience for the Officers of Indian Navy.

TECH ROLLOUTS

LAUNCH OF MARINE MICROBIAL INFORMATION PORTAL



C-DAC in collaboration with the National Institute of Ocean Technology (NIOT), Chennai, has launched the Marine Microbial Information Portal (MMIP). This initiative, part of the Ministry of Earth Sciences' (MoES) Deep Ocean Mission, aims to document the diverse microbial communities found in India's Exclusive Economic Zone (EEZ) and beyond. The MMIP aligns with the United Nations Sustainable Development Goal 14 (SDG 14) and the Biodiversity Beyond National Jurisdiction (BBNJ) framework. The portal was officially launched during NIOT's 31st Foundation Day celebrations





INTERNATIONAL OUTREACH



Visit of Delegation from Santo Domingo, Dominican Republic

Delegation from Technological Institute of the Americas (ITLA), Santo Domingo, Dominican Republic led by Mr. Rafael Féliz, Director visited C-DAC, Delhi on October 22, 2024 for possible areas of cooperation between C-DAC & ITLA in the field of Education & Training.



Visit of Delegation from Ministry of Defence, Myanmar

Delegation from Ministry of Defence, Myanmar led by Brig. Aung Ko, Dy. HOD, Military Security Affairs Division (IT), O/o Chief of Military Security Affairs, Myanmar and Defence Cyber Agency (DCyA), Ministry of Defence, Government of India led by Col. Rajneesh Shukla visited C-DAC, Delhi on October 30, 2024. The objective of the visit was to explore the possibility of setting up of Cyber Security Training Centre in Myanmar, training of trainers in India and exchange of experts between Myanmar & India in the areas of Cyber Security, Digital Forensics and Malware Analysis.

INTERNATIONAL OUTREACH



Inauguration of India – Vietnam Centre of Excellence in Software Development and Training (CESDT)

Ambassador of India to Vietnam, H.E. Sandeep Arya inaugurated India – Vietnam Centre of Excellence in Software Development and Training (CESDT) setup by C-DAC Delhi at Posts and Telecommunications Institute of Technology (PTIT) in Ho Chi Minh on November 27, 2024.



Specialized Program on Artificial Intelligence in Spanish

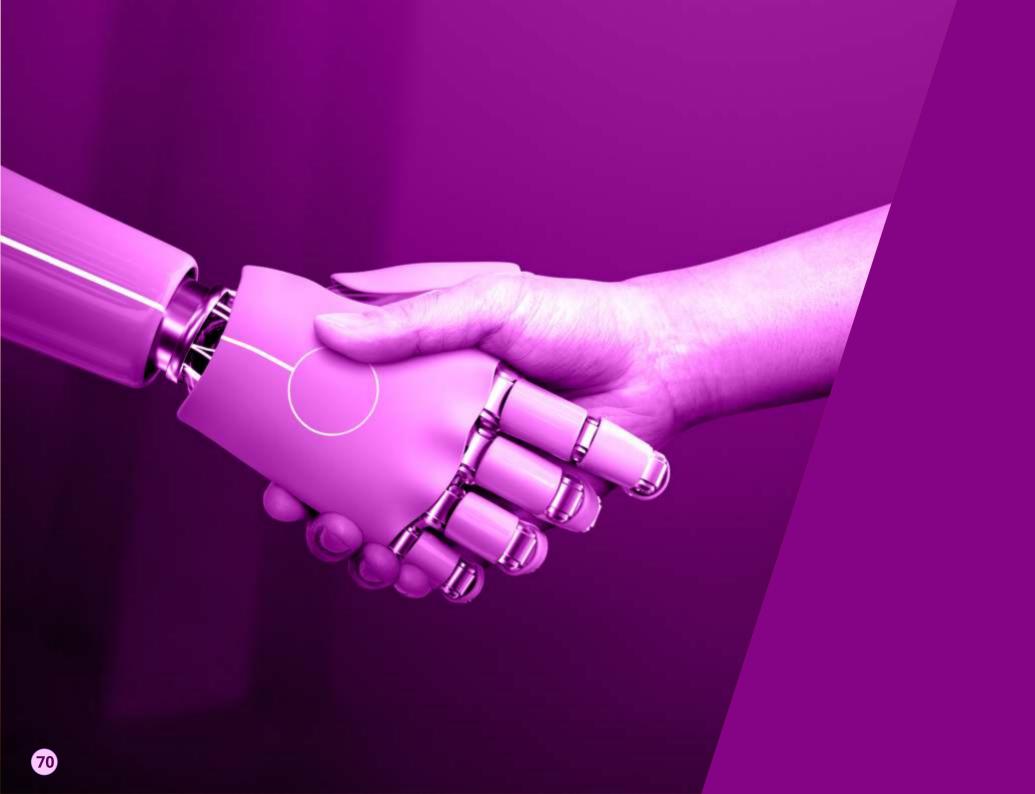
C-DAC, Noida organised a Specialised Programme in Artificial Intelligence in Spanish for 22 members from ARGENTINA, CHILE, COLOMBIA, COSTA RICA, EQUATORIAL GUINEA, GUATEMALA, NICARAGUA, PANAMA, PARAGUAY, PERU, TUNISIA, VENEZUELA during November 20, 2024 to December 03, 2024. The program was designed to provide comprehensive insights and practical experience in Fundamentals of Artificial Intelligence, Deep Neural Network & Al Trends and Computing Platforms etc. It was offered under ITEC scheme of Ministry of External Affairs, Govt. of India.

INTERNATIONAL OUTREACH



ITEC Training Programme on VLSI Chip Design: Sand to Silicon

C-DAC Mohali executed a specialized training programme entitled "VLSI Chip Design: Sand to Silicon" from December 4-16, 2024. Under the auspices of the Indian Technical and Economic Cooperation (ITEC) programme, sponsored by the Ministry of External Affairs, Government of India, this comprehensive course catered to 15 participants hailing from nine diverse nations, including Myanmar, Algeria, Uzbekistan, Ghana, Mauritius, Argentina, Papua New Guinea, Ethiopia, and Zimbabwe.







Establishment of C-DAC Centre of Excellence (CoE) at MCTE, Mhow

The Military College of Telecommunication Engineering (MCTE), on behalf of the Indian Army, and the Centre for Development of Advanced Computing (C-DAC), Ministry of Electronics & Information Technology (MeitY), formalized a strategic partnership through a Memorandum of Understanding (MoU) signed on November 25, 2024 to establish a Centre of Excellence (CoE) at MCTE, Mhow. This initiative is designed to accelerate research and development in cutting-edge technologies tailored for military applications.





Uttar Pradesh Cyber Safety and Security Awareness Week

Information Security Education and Awareness (ISEA) project in collaboration with Dr. A.P.J. Abdul Kalam Technical University APJAKTU, Lucknow organized the Uttar Pradesh Cyber Safety and Security Awareness week from December 19 - 24, 2024 with support from Uttar Pradesh State Police Department.



AWARDS





C-DAC Thiruvananthapuram received the United Nations Inter-Agency Task Force on the Prevention and Control of Non-communicable Diseases (NCDs) award for 2024. This award was given in recognition of the activities in implementing NCD screening of Tribal Population in Wayanad District of Kerala through the project 'Digitally Connected Tribal Colonies'. This project is funded by MeitY, Govt. of India and State Tribal Development Department, Govt. of Kerala and is being implemented with the support of Regional Cancer Centre, Thiruvananthapuram Kerala.



CISO DESK

- The implementation of C-DACSIEM has been successfully completed across all 12 C-DAC centres. The integration of the Syslog server with critical devices at these centers is currently in progress.
- As part of National Cyber Security Awareness Month (NCSAM) during October 2024, various activities were carried out including taking an information security pledge, online workshops, and competitions at each center.
- Actions have been taken for the various threat incidents reported during the period.
- 22 Training/Awareness/ Lectures/ Webinars etc. were conducted during the period.

CIO DESK

The team of CIO along with designated NIOs from each Centre is working to streamline various processes and explore and deploy the systems to do the ease of service delivery of Shared IT Services within C-DAC. Some of the actions undertaken by the CIO group are highlighted below:

Project Management Tool

• The Project Management Tool has been installed and implementation of the same is in progress.

• Single Sign On (SSO)

- Significant progress was made in the development of Single Sign-On (SSO) and Single Logout (SLO) APIs which were integrated with C-DAC's LDAP system.
- Unified Dashboard for seamless access of the various C-DAC's Shared (internal) IT services (SITS), was developed.

Asset Management

- Asset Management system is updated with assets across all C-DAC centres.
- New features as per ISMS requirement and maintaining single database are being implemented.

Shared Services 1.0

- Operational procedures for SITS 1.0 have been documented in detail, ensuring standardized processes across Centres.
- A thorough evaluation of HCI and non-HCI infrastructures was carried out, leading to the decision to adopt HPC Rudra-based infrastructure.

Why?

Purple is a dynamic and adaptable color often linked to creativity, luxury, and wisdom; however, its application in design necessitates thoughtful attention to accessibility. To promote inclusivity, purple should be combined with contrasting shades to comply with the Web Content Accessibility Guidelines (WCAG), which stipulate a minimum contrast ratio of 4.5:1 for standard text and 3:1 for larger text. Although purple is typically easily identifiable by most individuals, those with color vision deficiencies, including red-green color blindness, might mistake it for similar colors like blue or gray. Consequently, designers should not depend solely on purple to communicate essential information, and should instead integrate additional elements such as text labels, patterns, or icons. Moreover, the specific shades of purple selected are important—light purples may not provide enough contrast against white backgrounds, while darker purples could blend in with black or other deep colors. Achieving a balance in contrast, utilizing accessibility assessment tools, and accounting for the diverse spectrum of users are crucial steps in the design process.

