इलेक्ट्रॉनिकी एवं सूचना प्रौद्योगिकी मंत्रालय
MINISTRY OF ELECTRONICS AND INFORMATION TECHNOLOGY

TechVerse

Driving Progress Through Innovation

C-DAC

- Exascale Computing Mission
- HPC-Quantum Mission
- Digital India RISC-V Mission
- Artificial Intelligence
- Strategic Technologies
- Cyber Security
- Healthcare
- Defence & Space
- Power & Energy

SAMEER

- 5G & 6G communication
- Medical Electronics Devices
- Atmospheric Instrumentation

C-MET

- Strategic Sector
- Power Electronics
- Smart IoT
- Electronics Material and Devices

- Create an impact in research at global level
- Address national challenges
- Offering solutions to advanced computing for human enhancement
- Realise research through industry synergization

DATE:	TIME:
JUNE 27TH & 28TH, 2025	10:30 A.M. TO 17:00 P.M.
VENUE: MANEKSHAW CENTRE AUDITORIUM, DELHI	

FREE ENTRY KINDLY REGISTER - techverse.cdac.in

BRANDING & COMMUNICATION / C-DAC PUNE/TECHVERSE 2025

Techverse will be showcasing various solutions from C-DAC, SAMEER and CMET.

Below is the brief information on the same.

- ***EXASCALE COMPUTING***
  The aim of this mission is to establish indigenous Exa-scale eco-system with innovative design, technologies and human resource to address compute requirements of the nation. C-DAC officers Rudra series of servers, Trinetra Scalable HPC Network etc under this category.

- ***HPC QUANTUM MISSION***
  Quantum is an emerging technology and India is establishing itself as a Global Leader in Quantum Technologies by 2030, driving Innovation, Economic Growth, and Societal Impact through Indigenous Development of Quantum Computing. C-DAC being the research organization in IT domain is focusing this area for research and has established its capabilities through quantum development in Communication, Command & control unit, Sensing Capabilities etc.

- ***DIGITAL INDIA RISC-V MISSION***
  C-DAC has developed VEGA series of microprocessors in soft IP form, viz. 32-bit single-core (in-order), 64-bit single-core (in-order & out-of-order), 64-bit dual-core (out-of-order), and 64-bit quad-core (out-of-order). These high performance processors are based on the open source RISC-V Instruction Set Architecture with Multilevel Caches, Memory Management Unit and Coherent Interconnect.

- ***SMART IOT***
  Development and Innovation of Indigenous Components for a Robust and Secured IoT Ecosystem Secured, AI Optimised & Dynamic (Adhoc/Unified) IoT Elements in terms of Chips and Systems, Sensors & Actuation, Firmware, Technologies and Networks/ Protocols.

- ***ARTIFICIAL INTELLIGENCE***
  Make Tribal languages/ Low resource languages accessible through NLP, Speech technologies, Build Large Language Models (LLMs) for Official/ Scheduled Languages of India to support regional contexts, dialects, scripts, Adapt LLM Technologies for various use cases, utility of LLM vs SLM (Large vs Small Language Model and many more work in AI.

- ***STRATEGIC TECHNOLOGIES***
  Key technologies and components for aerial and underwater Systems for enabling self-sufficiency and capacity building in India like Low-altitude airspace management for drone mobility infra, SMART and Intelligent Emergency Response System, Interoperable & Unified National Framework, Indigenisation & Secured solution for LEAs & Defence.

- ***CYBER SECURITY***
  Cyber security is one of the most essential area. C-DAC focuses on indigenous Software and Hardware Security & Distributed Trust Technologies for Monitoring, Deception, Detection, Protection, Forensics, Security Analysis & Certification of IT and OT Systems across Government & Critical Ecosystem.

- ***HEALTHCARE***
  Leverage AI, big data, blockchain, and digital twin for cost-effective, indigenous solutions in imaging, radiation planning, biosensing, and diagnostics to enhance accessibility, affordability, and precision. Build a Secure & Integrated Digital Healthcare Ecosystem.

- ***DEFENCE & SPACE***
  Develop mission-critical solutions to enhance national security and strategic capabilities.

- ***POWER & ENERGY***
  Driving innovation in Power Electronics in sustainable Energy Technologies, Electric Machines and Drives, Higher frequency power conversion, Wireless power transfer, Magnet less Electric motor, PE, Motor integration, High Voltage Engineering (Health), Renewable Energy, Power management for Exascale computing, High speed drives (Automotive)

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- ***MEDICAL DEVICES***

1.Linear Particle Accelerator (Linac)
SAMEER's Medical division developed India's first compact 2.998 GHz electron linac for medical use, producing 52+ stabilized tubes. This innovation stems from Prof. R. V. S. Sitaram's 3 MeV linac at TIFR.

2.Magnetic Resonance Imaging (MRI)
Launched in 2014, SAMEER's IMRI-SCAN-ERA mission is developing India's first 1.5T MRI system, with key modules integrated and initial imaging achieved. The Indian Magnet is in its final phase, with plans for large-scale manufacturing with nine industries.

3. Optical Coherence Tomography(OCT)
Optical Coherence Tomography (OCT) uses infrared light for high-resolution, non-invasive imaging, revolutionizing in vivo diagnostics. Widely used in ophthalmology, it is now expanding across medical fields.

4.High Energy Linac (HEL)
India's first 30 MeV high energy and high beam power electron Linac for radioisotope production for medical applications.

5. Self-Contained X-Ray Blood Irradiator System
With MeitY's support, SAMEER is developing AERB-approved X-ray blood irradiators to prevent TA-GVHD in immune-compromised patients.

6.6-Channel 100W CW Broadband (400MHz-1.0GHz) Microwave Source For Hyperthermia Treatment
The installation and commissioning of a cutting-edge 6- channel,100-watt continuous-wave (CW) microwave source was successfully completed at IIT Madras.

- ***ATMOSPHERIC INSTRUMENTATION***

1. ST RADAR
SAMEER built the world's first 212.5 MHz ST Radar at Gauhati University with 576 antennas, advancing atmospheric monitoring and weather forecasting. It also serves as a research platform for atmospheric science and RF technology.

2. Millimeter Wave Radiometer
The ground based MMW Radiometer, designed and developed at SAMEER is an atmospheric remote sensing instrument. This instrument is designed to provide continuous temperature and humidity profiles from surface to 10 km height with good accuracy. The temperature and humidity profiles are estimated by measuring the atmospheric emission from the pressure broadened molecular rotational lines of water vapour and oxygen in the microwave region.

3. Phased Array Doppler SODAR
SODAR is a versatile instrument used for Atmospheric Boundary Layer (ABL) studies and for environmental applications at the height range of 10 m to 1000m from the ground surface. This system transmits the acoustic pulses into the atmosphere and receives the back scattered acoustic echoes.

4. Advanced Digital Ionosonde
A new high - frequency sweeping radar or digital ionosonde system has been designed and developed.

This type of radar is used for monitoring ionospheric conditions for high-frequency band and trans-ionospheric communications like Global Positioning System signals. Additionally, it has been one of the oldest but still relevant tool for research in the field of ionosphere.

- ***INDUSTRIAL APPLICATIONS***

1.Microwave System For Bamboo Straightening And Bending
SAMEER developed and integrated microwave subsystems with a 5 kW source, optimizing power and exposure for bamboo processing. The system was installed at IWST, Bengaluru, for straightening and bending applications.

2.Brix
Brix is a measurement of sugar solution concentration and is required in many food processes including sugar production, fruit juice processing, soft drink production etc.

3. Microwave disinfection system
A microwave disinfection system is a technology that uses microwave energy to disinfect or sterilize various materials, surfaces, or objects. Microwaves are electromagnetic waves that can penetrate the materials they interact with, causing them to heat up rapidly. This heat can be used to kill or deactivate microorganisms, such as bacteria, viruses, and fungi, effectively disinfecting surfaces or items. Its mainly used for hospital biological waste .

- ***NEXT GEN TECH 5G/6G***

1. 5G
An Intelligent reflecting Surface (IRS) was designed, simulated and optimized by individually optimizing the design of element unit cell, its phase control mechanism and control software for beam shaping

2. 6G: THz Testbed with Orbital Angular Momentumand Multiplexing
SAMEER Kolkata and IIT collaborated to develop a 6G high-speed communication link at 280 GHz, featuring OAM-based multiplexing with a novel antenna system

3. Elliptic Lens Antenna at J-band
A pair of homogeneous lens antennas with an elliptic outer profile and spherical inner profile were indigenously designed and developed using the in-house facilities at SAMEER

4.Prime Focus Reflector Antenna at D-band
A prime focus reflector antenna was developed at D-band. The objective was to demonstrate beam-steering by mechanical means.

5.D-band Slotted Waveguide Array Antenna
A highly efficient linearly polarized slotted waveguide array antenna at D-band was designed and developed.

6. High speed wireless data link using OAM principle at mmWave frequency band
An 8×8 planar array antenna at 28 GHz was designed for OAM system demonstration, serving as the basic building block of a Uniform Circular Array (UCA). It was used in the Transmitter and Receiver sections of an OAM data link.

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- ***EMI/EMC/EMP TESTING AND CONSULTING***

1. EMI/EMC Test Measurement
SAMEER's EMC Division excels in EMI/EMC testing, design consultancy, and compliance for global standards. With six advanced labs and a Customer Care Cell, it ensures industry support and customer satisfaction.

2. Evaluation of Indigenous Electrical Heavy Weight Torpedo (EHWT) and Advanced Light weight Torpedo (ALWT)
SAMEER conducted EMI/EMC evaluation of EHWT subsystems per MIL-STD 461, implementing retrofits to meet compliance requirements.

3. Establishment of MIL STD Testing Laboratory at SAMEER – CEM, Chennai
Newly established EMC test laboratories, SAMEER Chennai.

4. Axle Counter Compatibility Test For Kolkata Metro
Axle Counter compatibility test for Kolkata Metro (OEM: M/s Medha Servo Drives) was carried out. The test set-up for carrying out Axle Counter Compatibility test is developed at SAMEER-Mumbai.

5. Intentional Electromagnetic Interference(IEMI)
SAMEER's UWB facility tests electronic system immunity to high-intensity EM pulses, achieving 13 kV/m at 10m for IEMI studies and compliance testing.

6. Electromagnetic Pulse(EMP) FACILITY
India's largest outdoor EMP test facility generates 50+ kV/m, supporting MIL-standard compliance for defense and civilian systems up to 40 tons.

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- ***ADDITIVE MANUFACTURING & ELECTRONICS PACKAGING***

  Indigenous developed product (Metal/ceramic/semiconductor powders/filaments and inks) for the Additive Manufacturing/3D printing and protype 3D printed devices (antenna and rechargeable battery), RFID tags, Photosensors with materials preparation and 3D printing facility at C-MET Pune. LTCC Materials & Technology for ceramics packages and testing. Microwave substrates and absorber materials.

- ***MATERIALS FOR ENERGY GENERATION AND STORAGE***

  Indigenous development of Li-ion battery materials (all chemistries) and protypes with the battery fabrication and testing facility at C-MET Pune. Graphene and aerogel supercapacitor development at C-MET Trissur.

- ***SEMICONDUCTOR MATERIALS***

  6H n-type and semi-insulating silicon carbide single crystal boules and wafers for power electronics and military radars, Hafnium for aerospace alloy and GATE oxide applications, Ultra-high pure materials such as Ga, Ge, Cd, Te and Zn for semiconductor applications, ZnTe and CdTe single crystals for Tera Hertz applications.

- ***SENSORS & ACTUATORS***

  Materials development for various sensors and IoT based sensors, actuators, Wearable sensors for breast cancer detection, MEMS and Bionic Sensors, Lead free X-ray absorbing materials & medical aprons etc.

- ***QUANTUM, GRAPHENE & 2D MATERIALS***

  Focused R & D and capacity building facility for Graphene, 2D and quantum materials & technology.

- ***E-WASTE & ROHS-***

  Environmentally benign recycling technologies for PCBs, Li-Ion batteries, Silicon solar cells, and Permanent magnets. Consultancy services to recycling industries, Start-ups incubation, Skill development programme, RoHS testing and compliance.