DRDO leads thematic session on ‘Semiconductors & Next-Generation Chips’ and showcases advanced technologies at ESTIC 2026

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Defence Research and Development Organisation (DRDO) participated in the Emerging Science, Technology and Innovation Conclave (ESTIC) 2026 held at Bharat Mandapam, New Delhi from October 27 to 29, 2026. The conclave with the theme ‘Creative Minds, Catalysing Science, Empowering Society’, was inaugurated by Prime Minister Shri Narendra Modi and was jointly organised by 12 ministries/departments under the guidance of the Principal Scientific Adviser to the Government of India. The event showcased cutting-edge research, deep-tech breakthroughs, and thought provoking discussions with Nobel Laureates, global experts, policymakers, and emerging leaders - igniting a new era of scientific leadership.

DRDO, as one of the key organisers, led the thematic session on ‘Semiconductors & Next-Generation Chips’. Chaired by Distinguished Scientist and Director General, Electronics and Communication Systems (ECS) Dr BK Das, the session brought together eminent leaders from the industry, academia, indigenous chip-development ecosystem and defence electronics.



A panel discussion, moderated by Dr BK Das, was also organised as part of the session, with Distinguished Scientist and Director General (Micro Electronic Devices, Computational Systems & Cyber Systems) Dr Sheena Rani among the panellists. The discussions explored emerging developments in semiconductor technologies, purpose-built Artificial Intelligence (AI) System-on-Chips (SoCs), intelligence at the silicon edge and the evolving microprocessor landscape. The session also highlighted DRDO's evolving role in enabling industries and start-ups to develop game-changing solutions, accelerate next-generation chip design and strengthen indigenous core technologies.

The DRDO Outreach Stall at ESTIC 2026 showcased key initiatives, achievements, research programmes and contributions of the Ministry of Defence towards science, technology and innovation. It featured a diverse range of indigenous technologies developed by DRDO laboratories, including advanced communication systems, quantum technology prototypes, extreme-cold-weather clothing, PRABALA female full-body protector, passive and powered exoskeletons, portable hybrid energy management systems, high-power pulse laser diodes and scramjet engine technology.

DRDO also participated in the Thematic and Departmental Exhibitions at the conclave. At the thematic exhibition on ‘Semiconductors and Next-Generation Chips’, DRDO showcased its achievements in two critical semiconductor technology domains: Monolithic Microwave Integrated Circuits (MMICs) and Infrared Focal Plane Arrays (IRFPAs), developed by the Solid State Physics Laboratory (SSPL), Delhi.

Gallium Arsenide (GaAs) and Gallium Nitride (GaN)-based MMICs, along with Multi-Chip Modules (MCMs), displayed at the exhibition have been employed in several strategic missions. These technologies serve as essential building blocks for advanced radar systems and Electronic Warfare (EW) applications. The IRFPAs, on the other hand, serve as the sensing elements or 'eyes' of tactical missiles, enabling target detection and tracking during the terminal phase through Imaging Infrared (IIR) seekers. The exhibits covered a broad range of infrared technologies, including Short-Wave Infrared (SWIR), Mid-Wave Infrared (MWIR) and Long-Wave Infrared (LWIR), demonstrating DRDO's extensive indigenous capabilities in advanced semiconductor technologies.

Other notable DRDO exhibits included scramjet engine technology and neuromorphic accelerators, highlighting breakthroughs in complex and emerging technological domains. The exhibition also featured advanced communication systems, Quantum Random Number Generators (QRNGs), protective equipment, exoskeletons, portable hybrid energy management systems, Photonic Integrated Circuits (PICs) and laser proximity sensors.

Semiconductor technology is a critical enabler of national sovereignty, economic strength and digital security. It plays a pivotal role in advancing the vision of Viksit Bharat by 2047 and Aatmanirbhar Bharat by strengthening indigenous technological capabilities. From communication devices and advanced sensing systems to sophisticated defence platforms, semiconductor chips determine the performance, efficiency and reliability of modern technologies. Beyond chip manufacturing, technological self-reliance requires comprehensive capabilities in chip design, fabrication, testing, industrial-scale production and resilient supply chains.

India aspires to emerge as a globally competitive, dependable and technologically self-reliant semiconductor powerhouse by 2047, with leadership in selected next-generation chip technologies. This vision encompasses the development of a vibrant and sustainable semiconductor ecosystem, generation of high-value employment opportunities and delivery of inclusive societal benefits.

Over the years, India's strategic defence laboratories and specialised semiconductor foundries, including SSPL, Gallium Arsenide Enabling Technology Centre (GAETEC), Semiconductor Technology and Applied Research Centre (STARC) and Semiconductor Laboratory (SCL), have developed specialised competencies in Gallium Arsenide (GaAs), Gallium Nitride (GaN), Micro-Electro-Mechanical Systems (MEMS) and mature silicon process technologies.

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