Accelerating India's Defence Innovation Ecosystem to 2047

In a recent address to the Trombay Colloquium audience (on January 15, 2025) on the topic 'R&D in Defence Sector', the Secretary, DDR&D and Chairman, DRDO, Dr. Samir V. Kamat, articulated several key advancements and strategic initiatives undertaken by India in the defence sector and allied domains. Some of the key talk snapshots are presented here.

1 Global Context and Technology Evolution...

India is emerging as an important pole in the transitioning multi-polar world. Technology obsolescence has accelerated dramatically, shortening from 15+ years to just 3 years. Warfare has expanded beyond traditional domains of land, air, and sea to include space, cyber, information, and psychological warfare. This shift presents unique challenges for India, which studies indicate is among the most targeted countries in the cyber domain.

2 Current Status of Defence Self-Reliance...

India has achieved self-reliance in missile systems and platforms through DRDO's efforts. The country is largely self-sufficient in radar systems and has made significant progress in SONAR technologies. However, domestic semiconductor manufacturing remains limited to 180 nm chips, with advanced chips still sourced from overseas. Defence exports reached Rs. 20,000 crore last fiscal year, with a target of Rs. 50,000 crore set for the year 2028.

3 Defence R&D Ecosystem...

India's defence innovation operates through a three-tier system: basic research by academia, applied R&D by DRDO, and production by industry partners. DRDO technologies have reached a Technology Readiness Level (TRL) of 8, indicating systems tested and validated in relevant environments. Better organizational synergies are needed to avoid duplication of efforts and maximize the impact of R&D resources.

Dr. Samir V. Kamat

4 Civil-Military Fusion...

The civilian sector currently leads in AI and communication technologies adoption. DRDO is working to adapt these civilian innovations for military applications. Promoting defence exports is considered essential for building a viable domestic defence ecosystem. This civil-military fusion approach is identified as a key factor for India's future defence technological competitiveness.

5 Skill Development Initiatives...

Educational initiatives include defence-focused academic courses such as M. Tech in Defence Technology and internship opportunities for students in DRDO laboratories. There's recognition that the education system needs revision to foster R&D aptitude from school level. These skill development efforts are crucial for creating the human capital necessary to drive innovation in India's defence sector.

6 Future Defence Technology Priorities...

Priority areas include Underwater Domain Awareness, Space Situational Awareness, Cyber Defence, Quantum Communication, Advanced Medium Combat Aircraft development, hypersonic missiles, indigenous aero engines, advanced sensors, and Electromagnetic Aircraft Launch Systems. Critical enabling technologies include AI/ML, stealth technology, semiconductor materials, and advanced manufacturing. R&D spending currently stands at less than 5% of the defence budget, significantly below the 10-20% spent by China and the US. Increasing this investment is essential for achieving complete self-reliance in the defence sector by 2047.