Defence Manufacturing Summit

01-02 May 2025: IIC Dwarka, New Delhi

Conference Agenda – Day I

Session	Session Focus
0800	Registration & Coffee
0855	**Welcome Remarks by Conference Chair:**
0900 – 0930	**Opening Session**
0930 – 1000	**Emerging Opportunities for Defence Manufacturing in India: 2025-2030** India's defence manufacturing sector presents a wide array of opportunities, driven by increasing domestic demand, modernization efforts, and the government's push for self-reliance through initiatives like "Atmanirbhar Bharat" (Self-Reliant India). The sector is growing rapidly, fueled by advancements in technology, foreign partnerships, and rising investments in indigenous defense capabilities.
1000 – 1030	**Ceramic Matrix Composites (CMCs) and Ballistic Composites in Defense Manufacturing** Ceramic Matrix Composites (CMCs) and ballistic composites mark a significant advancement in materials engineering, providing exceptional strength, thermal resistance, and lightweight properties that are essential for contemporary defense applications. These innovative materials are revolutionizing the creation of military equipment, ranging from armor systems to high-performance aerospace components.
1030 – 1100	**Nanocomposites in Defence Manufacturing: Transforming the Battlefield** Nanocomposites represent a revolutionary class of materials in defense manufacturing, combining nanoscale reinforcements with traditional matrices to deliver exceptional mechanical, thermal, electrical, and barrier properties. By leveraging the unique attributes of nanoparticles, nanocomposites are driving innovations in lightweight armors, advanced weaponry, and durable aerospace components.
1100 – 1115	Refreshment Break
1115 -1145	**Emerging Role of Smart Composites in Defence & Aerospace Manufacturing** Smart composites are materials that combine traditional composite structures (e.g., polymer, ceramic, or metal matrices reinforced with fibers) with embedded smart technologies, such as piezoelectric sensors, shape memory alloys, or nanomaterials. These features enable the material to sense, act, and adapt to environmental changes or external stimuli.
1145 – 1215	**Advanced Materials for Defence Power Electronics: Enabling Superior Performance** Advanced materials are vital for the next generation of defense power electronics, enabling superior performance, efficiency, and reliability. By integrating wide bandgap semiconductors, thermally conductive materials, and innovative composites, the defense sector can meet its growing demands for high-performance systems in increasingly challenging environments. As research and development continue, these materials will play an essential role in shaping the future of defense technology.
1215 – 1245	**Quantum Computing and Cryptography in Defense Manufacturing: Transforming Security and Efficiency** Quantum computing and quantum cryptography are rapidly becoming integral to defense manufacturing, offering revolutionary capabilities in secure communication, materials development, and operational optimization. By harnessing the principles of quantum mechanics, these technologies promise unparalleled computational power and cryptographic security, essential for addressing modern defense challenges.
1245 – 1315	**Quantum Computing for Material Simulation**

	Quantum computing is revolutionizing the way we simulate atomic-level material properties. As this technology progresses, it will significantly enhance our ability to discover innovative materials with outstanding characteristics, particularly for defense applications. Embracing these advancements will pave the way for breakthroughs that can strengthen our defense capabilities.
1315 -1400	Networking & Lunch
1400 -1430	**Quantum-Enhanced Simulations in Defence Manufacturing: Redefining Innovation and Efficiency** Quantum computing is emerging as a transformative force in defence manufacturing, enabling simulations of unprecedented scale and complexity. By leveraging quantum-enhanced simulations, defense manufacturers can achieve breakthroughs in materials design, optimization of manufacturing processes, and operational efficiency, ultimately strengthening national security capabilities.
1430 -1500	**AI-Driven Material Development for Defence Applications** Artificial Intelligence (AI) is playing a transformative role in the development of advanced materials for defence applications. By leveraging AI technologies, manufacturers can significantly accelerate the discovery, design, and optimization of materials used in critical defence systems, ensuring that they meet the rigorous performance, durability, and safety requirements essential for military and aerospace operations.
1500 – 1530	**AI-Enhanced Digital Twins in Defence Manufacturing: Revolutionizing Innovation and Efficiency** The integration of Artificial Intelligence (AI) with Digital Twin technology is transforming defence manufacturing, enabling the development of smarter, more efficient, and adaptive systems. By creating virtual replicas of physical assets and processes, AI-enhanced digital twins provide unprecedented insights into performance optimization, predictive maintenance, and strategic planning in the highly demanding defense sector.
1530 – 1600	**AI-Driven Sensors for Defence Manufacturing** In the highly demanding world of defence manufacturing, the need for real-time monitoring, predictive analytics, and enhanced decision-making has never been greater. AI-driven sensors are revolutionizing the sector by providing intelligent, autonomous solutions to monitor and manage critical systems and equipment. These sensors, powered by artificial intelligence, enable enhanced capabilities in asset management, condition monitoring, predictive maintenance, and quality control, making them essential for the modernisation of defence manufacturing operations.
1600 -1615	Refreshment break
1615 - 1645	**Autonomous Quality Control and Inspection in Defence Manufacturing** Autonomous quality control (QC) and inspection systems are transforming defence manufacturing by ensuring precision, reliability, and adherence to stringent standards. Leveraging advanced technologies such as artificial intelligence (AI), machine vision, robotics, and the Industrial Internet of Things (IIoT), these systems provide a more efficient and effective approach to quality assurance, critical for the defence sector's high stakes.
1645 -1715	**Rapid Prototyping and Customization in Defence Manufacturing** Rapid prototyping and customization are revolutionizing the defence manufacturing sector, enabling faster innovation, improved adaptability, and enhanced performance. These processes, which involve the quick creation of physical models or components using advanced manufacturing techniques, are crucial in a domain where precision, speed, and tailored solutions are paramount.
1715 – 1745	**Multi-Material Integration: Combining Different Alloys to Achieve Superior Hybrid Properties**

	The integration of multiple materials, often referred to as multi-material integration, is a strategy employed in defence and aerospace manufacturing to develop components with superior hybrid properties. By combining different types of alloys, manufacturers can create materials that are stronger, lighter, and more durable, tailored to meet the specific needs of military applications. This approach leverages the strengths of each material while minimizing weaknesses, resulting in enhanced performance, improved resistance to extreme conditions, and greater adaptability to complex operational environments.
1745	Concluding remarks and end of Day 1

Defence Manufacturing Summit

01-02 May 2025: IIC Dwarka, New Delhi

Conference Agenda – Day II

Session	Session Focus
0800	Registration & Coffee
0855	**Welcome Remarks by Conference Chair:**
0930 – 1000	**Cloud-Based Digital Twins: Empowering Scalability, Collaboration, and Real-Time Access** Cloud-based digital twins are revolutionizing industries by offering scalable, collaborative, and real-time solutions for managing complex systems. In the realm of smart manufacturing, defence, and aerospace, these digital twins provide unparalleled efficiency and innovation opportunities, enabling organizations to stay ahead in a competitive landscape.
1000 – 1030	**Autonomous Predictive Maintenance in Defence Manufacturing** Autonomous predictive maintenance is revolutionizing the way defence manufacturers maintain critical machinery and equipment, ensuring peak performance and minimizing downtime. By combining the power of AI, machine learning, and IoT sensors, autonomous predictive maintenance systems predict equipment failures before they occur, allowing manufacturers to optimize maintenance schedules, improve operational efficiency, and extend the life of costly military assets.
1030 -1100	**Collaborative Robots (Cobots) in Defence Manufacturing** Collaborative robots, or cobots, are transforming defence manufacturing by enabling seamless collaboration between human operators and robotic systems. Unlike traditional industrial robots, cobots are designed to share workspaces with humans, enhancing productivity, precision, and safety in complex and high-stakes environments like defence manufacturing.
1100 -1130	**Advanced Logistics Solutions for Defence Production** As modern defence systems become increasingly complex, the demand for innovative logistics solutions is rising. This includes automated supply chain management systems, advanced distribution networks, and effective maintenance solutions. Manufacturers have the opportunity to develop technologies that enable the tracking, monitoring, and efficient management of military assets across different domains.
1130 – 1200	Refreshment Break
1200 -1230	**Iterative Prototyping in Defence Manufacturing** Iterative prototyping is a crucial process in defense manufacturing, allowing for continuous improvement and refinement of complex systems and components. By creating and testing successive versions of a prototype, manufacturers can identify flaws, optimize designs, and ensure that the final product meets stringent operational, performance, and regulatory requirements.
1230 -1300	**Zero Trust Supply Chains in Defence Manufacturing**

	Zero trust supply chains in defense manufacturing represent a paradigm shift from traditional trust-based models to a more secure, resilient, and transparent approach. This model operates on the principle of "never trust, always verify," ensuring that every entity, system, and transaction within the supply chain is continuously authenticated, authorized, and monitored.
1300 -1400	Networking Lunch
1400 -1430	**Supplier Diversification for Supply Chain Resilience** Supplier diversification is a strategic approach in defence manufacturing to reduce dependency on a single source or limited number of suppliers. This practice enhances resilience, promotes innovation, and mitigates risks such as supply chain disruptions, geopolitical challenges, or economic instability.
1430 -1500	**Autonomous Systems R&D Opportunities in Indian Defence Sector** **Unmanned Aerial Vehicles (UAVs)**: Development of combat drones and surveillance platforms. **Autonomous Underwater Vehicles (AUVs)**: For maritime reconnaissance and mine detection. **Collaborative Robotics**: Human-machine teaming for advanced operational capabilities. All present opportunities for industry to collaborate with primary producers
1500 -1530	**Directed Energy Weapons (DEWs): Opportunities for Private Industry in India** Directed Energy Weapons (DEWs), such as laser weapons, microwave weapons, and particle beam systems, are emerging as game-changing technologies in modern defense systems. These weapons provide precision targeting, cost-effective operations, and versatile applications for defense and security forces. India's focus on indigenizing defense production and advancing military technology presents significant opportunities for private industries in the DEW segment.
1530 – 1600	**Latest Developments in Thermal Protection Systems (TPS)** Thermal Protection Systems (TPS) are critical for safeguarding spacecraft, hypersonic vehicles, re-entry vehicles, and other advanced aerospace and defence platforms against extreme temperatures. Recent advancements in TPS technology focus on improving material properties, manufacturing methods, and integration capabilities to address modern engineering challenges.
1600 -1630	Refreshment break
1630 -1700	**Ablative Materials for Product Resilience** Enhanced resin-based ablative materials offer superior thermal resistance and controlled ablation rates, reducing mass and improving performance for re-entry vehicles. New composite ablative materials, such as carbon-phenolic and silica-phenolic composites, balance thermal resistance with lightweight properties.
1700 -1730	**Future Trends in Simulation for Defence Manufacturing** Cloud-based simulations for greater accessibility and scalability with cloud-based platforms for collaborative simulations. Real-Time simulations for enhanced capabilities to simulate and adjust manufacturing processes in real time. AI-Integrated Simulations for optimizing designs, processes, and systems autonomously. Multiphysics simulations for combining thermal, structural, and electromagnetic simulations for comprehensive system analyses.
1730	Concluding remarks and end of conference