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"TELCOS MUST CUT LEGACY COSTS TO INVEST IN FUTURE TECHNOLOGIES"

VIKRAM PURANIK, GlobalLogic

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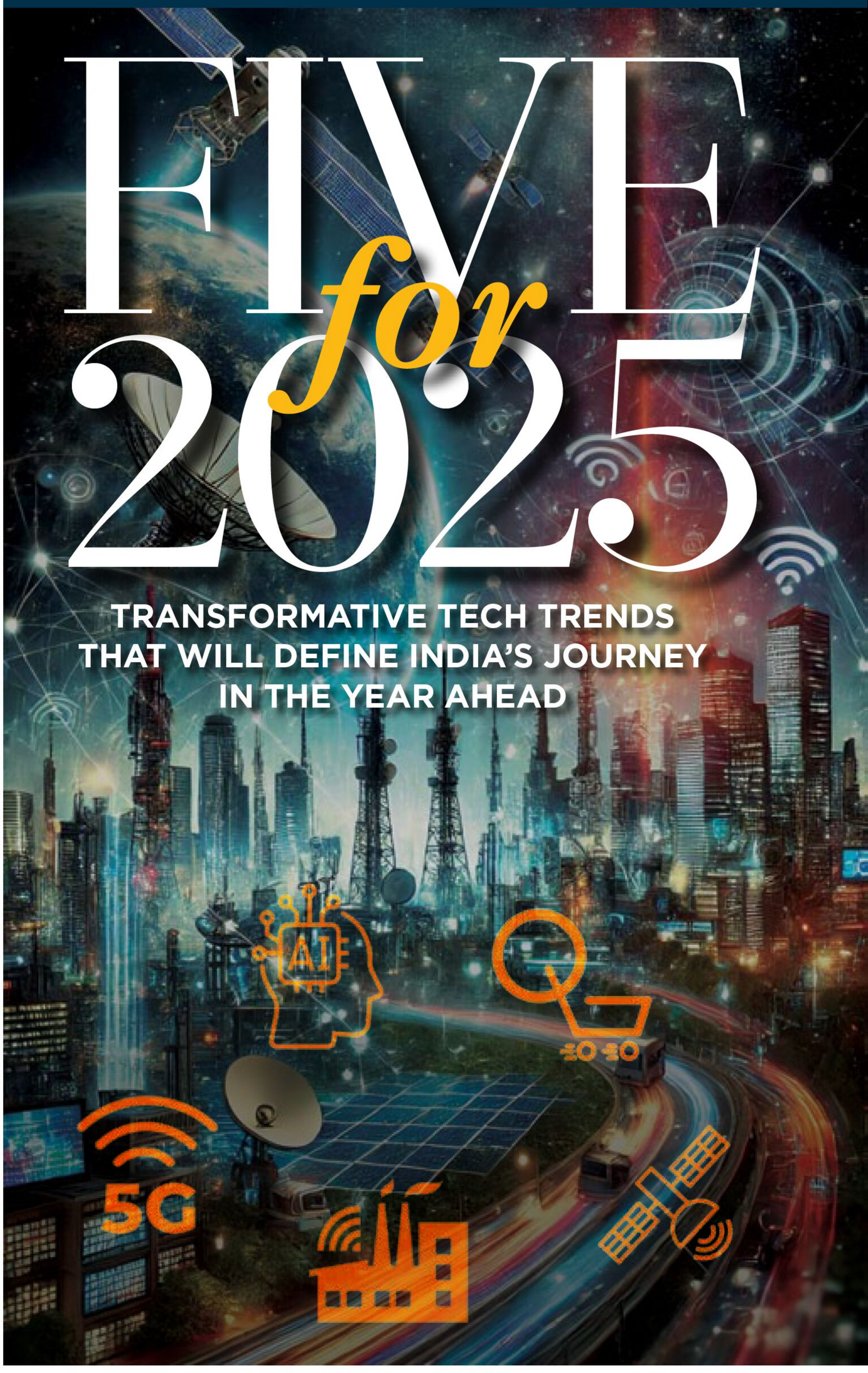

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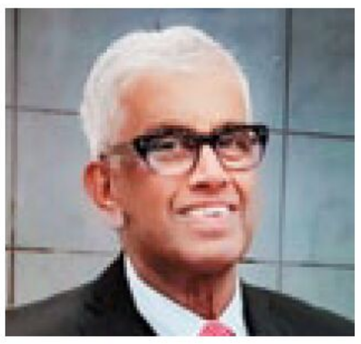

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Defining the pathways of next-gen digital networks

5G, edge computing, satcom, and green tech will continue to shape communication networks into sustainable, future-ready, innovative ecosystems

BY DR BIJAL SANGHVI

The communications and digital infrastructure landscape is witnessing rapid transformations driven by the acceleration of next-gen technologies. Key trends in telecom, broadcasting, satellite communications (satcom), and the broader space ecosystem are reshaping industries, redefining connectivity, and paving the way for unprecedented digital integration. This article will explore the most influential trends impacting these sectors, emphasising the roles of digital infrastructure and engineering adaptation.

THE EXPANSION OF 5G AND THE POTENTIAL OF 6G

The rapid deployment of 5G is revolutionising global communications, enabling unprecedented speed and low

> Implementing edge infrastructure requires novel engineering solutions, including advanced hardware operating autonomously in harsh environments.

With satcom integration, industries can improve operational visibility and data insights, enabling a level of oversight and automation never before possible.

latency for transformative applications. As industries embrace real-time analytics, autonomous systems, and immersive experiences, 5G lays the groundwork for a more connected future. At the same time, 6G research promises an even greater leap in connectivity, requiring significant upgrades to infrastructure and engineering approaches to unlock its full potential.

5G momentum and challenges: The rollout of 5G has unlocked high-speed, low-latency connections that enable advanced applications like real-time video analytics, autonomous vehicles, and immersive virtual experiences. However, challenges remain, such as infrastructure costs, interoperability, and last-mile connectivity, especially in rural areas.

Preparing for the 6G era: With 6G research already underway, early projections promise speeds 50 times faster than 5G, along with new possibilities like integrated sensing and communication. This shift requires massive spectrum allocation, hardware, and digital infrastructure upgrades.

EDGE COMPUTING DRIVING DECENTRALISED SYSTEMS

The surge in IoT devices and data-heavy applications drives the need for edge computing, which processes data closer to its source. By decentralising computing power, industries can reduce latency, enhance data privacy, and improve bandwidth utilisation. This shift demands innovative engineering solutions to create resilient and autonomous systems capable of operating in diverse and challenging environments.

Decentralising systems with edge computing: As IoT and data-heavy applications increase, edge computing is enabling decentralised processing closer to data sources, reducing latency and improving bandwidth use. Industries like healthcare, manufacturing, and retail benefit from faster response times and enhanced data privacy.

Engineering solutions for edge infrastructure: Implementing edge infrastructure requires novel engineering solutions, including advanced hardware operating autonomously in harsh environments, resilient data processing systems, and improved network management.

SATELLITE COMMUNICATIONS FOR REDEFINING CONNECTIVITY

Satellite communications are redefining connectivity possibilities, bridging the digital divide in remote and underserved regions. Low Earth Orbit (LEO) satellites can deliver fibre-like broadband speeds, transforming access to education, healthcare, and economic opportunities. Satcom integration with IoT applications further unlocks potential in the agriculture, logistics, and energy sectors.

Expanding global broadband access: LEO satellites are revolutionising global Internet access, especially in remote and underserved regions. These satellites deliver broadband connectivity on par with fibre networks, making it viable to connect remote geographies.

Satcom's role in IoT and remote operations: Satellite-based IoT applications can transform agriculture, logistics, and oil and gas sectors. With satcom integration, industries are experiencing improved operational visibility and data insights, enabling a level of oversight and automation never before possible.

CLOUD-NATIVE TELECOM ARCHITECTURES ADVANCING AGILITY

Telecom operators are transitioning to cloud-native architectures to create more agile and scalable networks. These systems replace traditional hardware-driven approaches with containerised and software-defined solutions, accelerating service rollout and improving efficiency. Engineering teams are at the forefront, focusing on security, microservices, and seamless network management to support this shift.

Transitioning telecom to Cloud-native models: Telecom operators increasingly adopt cloud-native technologies, transitioning away from traditional hardware-driven approaches. Cloud-native network functions (CNFs) and software-defined networking (SDN) enable more agile and scalable networks.

Engineering telecom solutions for efficiency: Engineering teams are focused on containerisation, microservices, and data security to support this shift. This architecture improves network efficiency and supports faster service rollout and streamlined updates.

Energy-efficient data centres, low-power networking hardware, and renewable energy sources are becoming integral to future-proofing communications.

BROADCASTING, OTT, AND CONTENT DELIVERY INNOVATIONS

The rise of OTT platforms has transformed content consumption patterns, emphasising personalised and on-demand experiences. Advanced content delivery networks (CDNs) and adaptive streaming technologies are essential for meeting growing audience demands. Engineers are now focusing on reducing latency, ensuring robust content security, and delivering high-quality streaming experiences to consumers worldwide.

OTT platforms dominating content consumption: OTT platforms have transformed content consumption, with personalised, on-demand services becoming the norm. Advanced content delivery networks (CDNs) and adaptive streaming technologies are now essential to meeting audience demand.

Latency and security in streaming technology: To ensure smooth streaming and prevent piracy, engineers are implementing robust content protection methods, reducing latency through enhanced CDN infrastructure, and prioritising data security across platforms.

SUSTAINABILITY AND GREEN TECH IN DIGITAL INFRASTRUCTURE

As digital infrastructure expands, sustainability has become a critical priority. Energy-efficient data centres, renewable energy sources, and circular engineering practices are reshaping the industry's environmental impact. From reducing e-waste to optimising power consumption, the push for green tech is essential to building a future-proof and sustainable communications ecosystem.

GreenTech priorities in digital infrastructure: The digital infrastructure industry increasingly focuses on sustainable practices. Energy-efficient data centres, low-power networking hardware, and renewable energy sources are becoming integral to future-proofing communications.

Circular engineering reducing e-waste impact: Engineers are designing hardware that is easier to upgrade, repair, and recycle, reducing e-waste. The adoption of cloud computing also aids sustainability by maximising resource use and optimising power consumption.

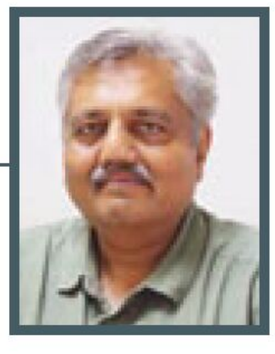
THE SPACE ECOSYSTEM'S ROLE IN COMMUNICATION

The space ecosystem is evolving from exploration to integral support for digital infrastructure on Earth. Satellite constellations now play a vital role in communication, climate monitoring, and remote sensing. The industry faces engineering challenges, from minimising space debris to creating resilient, long-lasting satellites that meet the demands of a connected and sustainable future.

Space systems supporting Earth's connectivity: Once the exploration domain, the space ecosystem is now an integral part of Earth's digital infrastructure. Satellite constellations support an array of applications, from communications to climate monitoring.

Engineering sustainable, resilient satellites: Building resilient, low-power satellites that can withstand extreme space conditions while ensuring minimal space debris is a major focus. Advanced materials and autonomous repair systems are on the horizon to enhance the sustainability and longevity of space-based assets.

As the world advances toward 2025, communication technologies and digital infrastructure are setting the stage for a more interconnected, sustainable, and efficient world. Each trend underscores the importance of collaboration between telecoms, digital infrastructure providers, and engineers to achieve these ambitious goals. With continuous adaptation and innovative solutions, these sectors will meet emerging demands and shape the future of global connectivity and digital experience.



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