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Letter from Editor

By: Scott St. John - Pipeline

Technology no longer merely assists us—it supercharges us. This is transforming industries, economies, and customer expectations. Consumers today expect instant, always-on experiences, whether they're streaming from a remote trail, interacting with an AI agent to negotiate a better rate, or communicating via satellite when terrestrial towers aren't available or fail. Enterprises now delegate real decision-making authority to autonomous agents that can close sales, reroute freight in real time, and restore networks faster than humans could. Society itself is being rewired: rural clinics instantly summon surgeons using holographic and surgical robots, factory floors operate with sub-millisecond robotic coordination, and entire economies swing on microseconds shaved from high-frequency trading algorithms.

The gift delivered to the end user is seamless and manifests itself as some kind of invisible technological magic. But the burden falls entirely on service providers and enterprises who must deliver that magic while hiding the complexity, cost, and risk from the customer who simply wants it to "work." That paradox—supercharging human capability while insulating people from the heroic engineering required—defines 2025 and threads through every contribution in this year-end Top Technology Trends edition of *Pipeline*.

A year ago, in our last Top Trends issue, we predicted 2025 would be the breakout year for agentic AI, quantum-ready networks, and ubiquitous satellite-direct connectivity. The predictions arrived faster and louder than expected: T-Mobile and Starlink delivered nationwide satellite texting months ahead of schedule, AST SpaceMobile launched its first commercial 5G satellites, Google's Willow chip demonstrated error rates low enough to make fault-tolerant quantum computing a reality, and EPB flipped the switch on the nation's first commercial quantum network in Chattanooga. Just to name a few.

Yet 2025 also delivered two chilling wake-up calls on the security front: the Salt Typhoon campaign, in which Chinese state actors lived undetected inside at least nine major U.S. carriers for months stealing location data and wiretap traffic, and the world's first large-scale cyberattack executed entirely by AI, when Chinese threat actors hijacked Anthropic's Claude Code chatbot to autonomously conduct espionage against thirty global entities—performing 80 to 90 percent of the work with almost no human input. Acceleration without security, we learned again, can be devastating. We must proceed and transform very carefully.

Pipeline's own 2025 coverage tracked the arc in real time: Cybersecurity Assurance unpacked the European Union's regulatory mandates, the push for zero-trust architectures in 5G cores, and AI-driven threat hunting amid rising supply-chain vulnerabilities; Mobile & Wireless chronicled the arrival of non-terrestrial ubiquity; the AI, Automation, and Analytics issue dissected the leap from generative to truly agentic systems; Network Transformation mapped the road to intent-based network operations; and Digital Customer Experience insisted none of it matters if the customer feels friction.

Agentic AI moved from curiosity to core infrastructure. Where generative models merely answered questions, today's agents take action—negotiating contracts, resolving complex tickets, and even defending networks autonomously. Gartner predicts 80 percent of customer-service interactions will be handled by autonomous agents by 2029, cutting costs by 30 percent while raising satisfaction scores. The same autonomy that delights customers can also be weaponized at machine speed—witness the Claude Code incident that proved agentic systems can replicate entire hacker teams with little effort.

Edge inference has quietly become the largest architectural shift since the cloud itself. A year ago, running trillion-parameter models required hyperscale data centers and terawatt-hour power budgets. Today, inference engines and specialized silicon push those models onto commodity, edge hardware, delivering single-digit-millisecond latency while keeping sensitive data on-premise. Privacy, regulatory compliance, and raw performance all improve simultaneously—turning the edge from a simple relaypoint into a game-changing, decision-making layer with little to no latency for consumer and enterprise applications.

Ubiquitous connectivity and pervasive mobility, something we coined and have been talking about for over five years, is no longer just a concept. 5G non-terrestrial networks have gone from PowerPoint to production: Starlink's direct-to-cell service is live nationwide in the US and Europe, AST SpaceMobile's BlueBird satellites beam broadband from orbit, and regulators worldwide are carving out spectrum for seamless satellite-terrestrial convergence. The result is that a miner in the Australian Outback or Arctic, and an oil tanker in the Atlantic, can now enjoy the same connectivity as a trader in Manhattan or a Silicon Valley tech company, indicating global IoT has become a viable industry use case.

Quantum has also left the laboratory and entered real-world deployments. Major organizations are running post-quantum cryptography pilots because the math is unforgiving, and the day quantum computers can break government-grade encryption—known as Q-Day—is fast approaching. Credible estimates place Q-Day in the 2030s, with some aggressive forecasts as early as 2028–2030 for weaker keys, according to the Global Risk Institute 2024 report. NIST, the NSA, and IBM all urge migration by 2035. Something we've been sounding the alarm on for years. In fact, "Harvest Now, Decrypt Later," as detailed by Palo Alto Networks, is already underway. Nation-state adversaries are stockpiling encrypted traffic today for decryption tomorrow. Couple quantum computing capabilities like Willow, with more indications of AI sentience and the evolution to Artificial General Intelligence (AGI), and AI leaders are joining together to raise the alarm—in an attempt to thwart a potential "human extinction event" as an unintended consequence of the unbridled or accidental development of "superintelligence."

Looking to 2026 and beyond, these converging forces paint a clear picture: AI is no longer a novelty—it is the primary operating system of business and daily life, running at quantum-ready speeds on edge hardware and orchestrated across a truly global, always-on fabric with very real risks. The connectivity divide is closing fast; rural communities, remote industries, and developing economies are gaining the same low-latency muscle once reserved for the urban elite. Yet every leap forward multiplies the attack surface and the stakes. The same agents that negotiate your mobile plan can be hijacked to negotiate ransomware demands; the same satellites that bring broadband to the outback can be weaponized to blind entire regions. The

future will belong to those who deliver the magic without ever letting the customer—or the adversary—see the strings. Vigilance, resilience, and ethical governance are no longer nice-to-haves; they are the price of admission to the next decade. And that's what makes this edition of *Pipeline* so important.

In this issue of *Pipeline*, Aliro underscores the importance of simulation for quantum network evolution to prepare for Q-day. Cynomi maps the new human-AI partnership that keeps security in human hands. Contributing editor Mark Cummings and Brian Case reveal how trillion-parameter LLMs can now run on modest edge hardware. Nokia proves optical-network automation is now survival-critical for sub-millisecond AI traffic. Alkira demonstrates how to simplify enterprise network management through abstraction, and DE-CIX confirms that latency is the new enterprise currency. ST Engineering iDirect shows how 5G satellite NTN finally delivers true always-on coverage for global IoT and Industry 4.0. Realtime Robotics spotlights robotic manufacturing use cases where robots reprogram themselves in real time. Amdocs argues marketing—not IT—must own the agentic customer interface, and TieTechnology calls for unified AI-CRM strategies to simplify CX across connectivity chaos. All that, plus the latest enterprise and communications news and more.

We hope you enjoy this edition of Pipeline—and that it equips you to deliver the next generation of invisible magic.

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