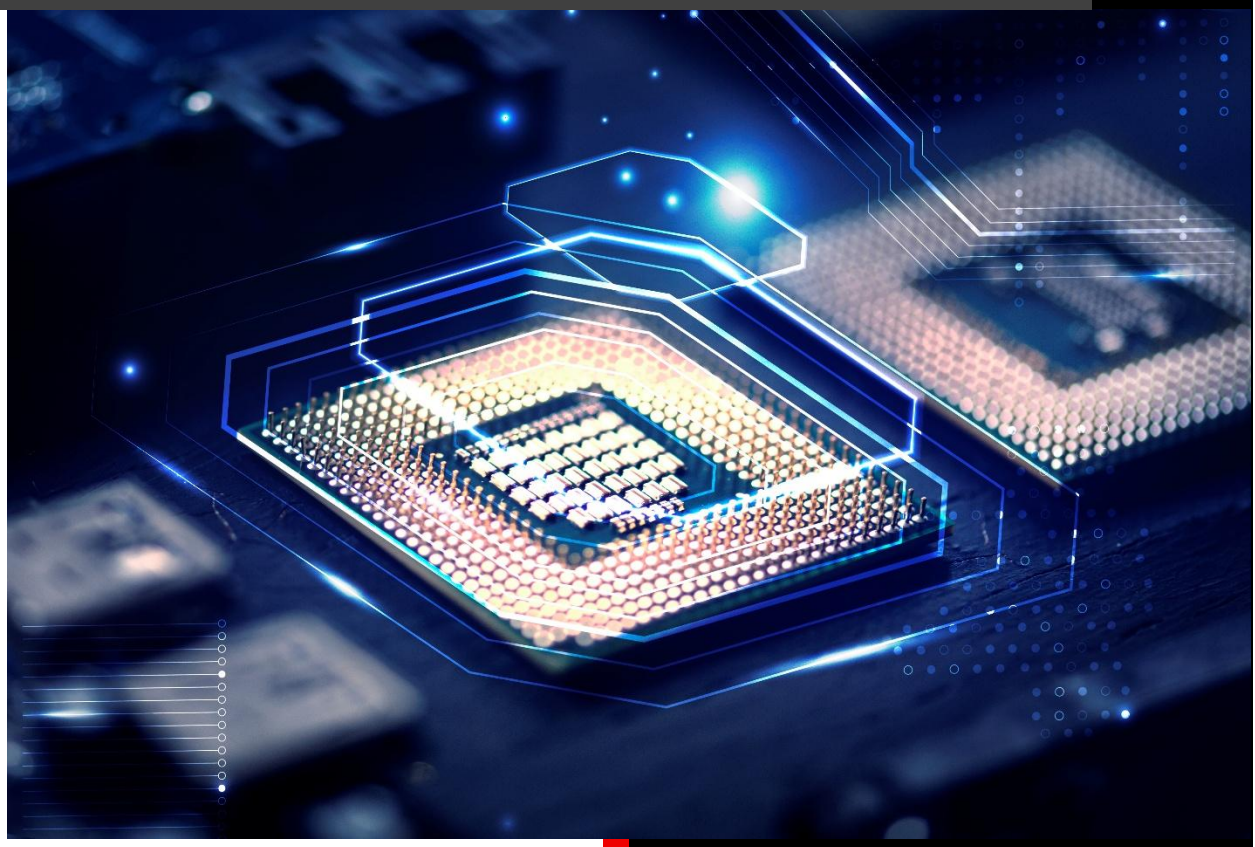
2026

Memory Constraints in Motion



A Report by

Safety Vision

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SAFETY VISION

Memory Constraints in Motion

How NAND & DRAM Shortages Are Reshaping Mobile Video Surveillance and Transportation Safety

By Safety Vision | March 2026

For over three decades, Safety Vision has partnered with transportation agencies and fleet operators to enhance safety, accountability, and operational confidence. Today, the industry faces a largely invisible but critical challenge: global NAND flash and DRAM shortages are reshaping system design, procurement strategies, and deployment timelines across every segment of mobile video surveillance.

Global NAND and DRAM shortages are arriving at the worst possible moment, just as transportation fleets accelerate adoption of AI cameras, driver monitoring systems, and connected safety platforms. AI infrastructure demand has diverted memory supply from edge devices, raising prices and extending lead times industry-wide. Memory prices are projected to rise 30 to 50 percent in 2026 due to AI demand and supply constraints,[1][2] lead times have expanded to 14 to 20-plus weeks,[3] and memory now accounts for up to 30 to 40 percent of system BOM costs.[4] For fleets of every kind, the practical result is a forced tradeoff between retention, resolution, and affordability.

> ***Memory shortages are accelerating a structural shift toward hybrid edge and cloud storage, event-based recording, data-efficient AI architectures, and Hardware-as-a-Service adoption.***

A New Data Reality in Transportation Safety

Mobile video surveillance has evolved far beyond simple recording. Modern systems support AI-powered driver monitoring, incident detection, and operational insights that improve safety outcomes in real time.[5] Transit agencies increasingly integrate video with fleet management to enhance safety and performance. At the same time, regulators, insurers, and the public are demanding more: higher-resolution video evidence, longer retention periods, comprehensive multi-camera coverage, and real-time incident access. Regulatory guidance reinforces these expectations for transit and school transportation alike.[6]

A Market Under Pressure

NAND flash and DRAM, once treated as commodity components, are now strategic resources with volatile pricing and limited availability.[7] The data tells a stark story.

Memory Market Indicators (2024 to 2026)

Indicator	2024	2025	2026 Forecast
DRAM price trend	Stable	+18%	+30 to 47%[1]
NAND price trend	-5%	+22%	+25 to 40%[2]
Lead times	6 to 8 wks	10 to 14 wks	14 to 20+ wks[3]
Inventory levels	12 to 15 wks	6 to 8 wks	2 to 4 wks[3]
AI server demand	baseline	+60%	+80%[5]

AI data centers consume a growing share of memory production, reducing availability for edge devices.[6]

Three forces are driving the shortage. The rapid expansion of AI workloads has made data centers the priority market for memory manufacturers, diverting supply from edge devices including mobile video systems toward enterprise infrastructure. The memory market is also highly concentrated, with a small number of manufacturers controlling the majority of DRAM and NAND production, which increases vulnerability to pricing volatility and strategic allocation decisions favoring higher-margin customers. Finally, ongoing transitions to advanced architectures such as higher-layer 3D NAND improve long-term efficiency but temporarily reduce production capacity, limiting the industry's ability to rapidly scale supply.[8]

Why Memory Is Central to Fleet Safety

NAND flash and DRAM are not interchangeable commodities in a mobile video system. They perform distinct and irreplaceable functions. NAND flash enables continuous recording, event buffering, and video retention when connectivity is limited, making it essential for fleets operating in rural or low-connectivity environments. Rising storage costs force a difficult balance between retention policies and budget realities.

Storage Requirements by Camera Resolution

Resolution	Cameras	FPS	30-Day Storage
720p	6	15	~3.3 TB
1080p	8	20	~7.6 TB
4K	8	25	~34.25 TB

DRAM, meanwhile, enables real-time edge processing, supporting multi-stream video, AI inference, and buffering during connectivity disruptions. As fleets adopt AI-driven safety features such as driver monitoring and collision avoidance, DRAM demand scales sharply.

DRAM Requirements by System Capability

Capability	DRAM Needed
Basic recording	1 to 2 GB
Multi-camera streaming	2 to 4 GB
AI driver monitoring	4 to 8 GB
Full ADAS analytics	8 to 16 GB

The Squeeze on Providers and Supply Chains

Memory now represents a substantial portion of system cost.[9] As NAND and DRAM prices rise, manufacturers must choose between absorbing costs and compressing margins, or passing increases to customers, resulting in higher system prices and intensified bid sensitivity in public-sector procurements. Extended lead times compound the problem, creating cascading delays in production, installations, and phased deployments that can jeopardize grant deadlines, compliance timelines, and contractual obligations.

Memory Share of Total System Cost

System Type	2023	2026 Forecast
Basic MVR	**12%**	**20%**
AI-enabled MVR	**18%**	**30 to 40%**
Edge AI camera	**10%**	**22%**

In response, manufacturers are deploying event-based recording, advanced compression codecs including H.265 and H.266, hybrid onboard and cloud storage models, and AI-driven data prioritization to maintain safety capabilities while optimizing memory utilization.

How Each Market Feels the Pressure

The impact of memory constraints cuts differently across the three primary markets Safety Vision serves: mass transit, school bus transportation, and commercial vehicle fleets.

For mass transit agencies, memory shortages may hinder their ability to retain video for investigations, meet regulatory requirements, and deploy new safety technologies.[10] Reduced storage limits retention; deployment delays leave agencies dependent on outdated systems; and rising hardware costs strain already-tight capital budgets. A 500-bus fleet that cost $3.75 million to equip in 2024 is projected to cost $4.8 million by 2026, a 28 percent increase. A 1,000-bus fleet faces a comparable jump from $7.5 million to $9.75 million, or 30 percent more (baseline: $7,500 per bus, 2024). Agencies are responding by exploring centralized storage, tiered retention policies, and cloud video management to offset onboard storage limitations.

Budget Sensitivity by School District Type

District Type	Upgrade Risk
Large urban	**Low**
Suburban	**Medium**
Rural	**High**

School districts face the sharpest equity challenge. Tight budgets and high public accountability make these agencies especially vulnerable. Reduced retention hinders investigations into student incidents or stop-arm violations, and budget constraints delay upgrades. Thirty states now authorize school bus cameras, reflecting growing recognition of their safety value. Memory-driven cost increases risk widening the technology gap between well-funded and underfunded districts, with rural districts at highest risk. Vendors are responding with SaaS subscription models, cloud and grant-supported deployments, and lifecycle refresh programs to reduce upfront costs.

For commercial vehicle fleets, the stakes include insurance and liability exposure. Onboard video consistently accelerates claims resolution, reduces fraudulent claims, protects drivers from false accusations, and lowers litigation costs. FMCSA now accepts video evidence in crash preventability determinations, allowing fleets to protect safety ratings and remove non-preventable crashes from their records. Without adequate video coverage, CSA scores may worsen and insurance premiums rise. When budget pressure forces fleets to reduce camera counts, lower resolution, or delay AI adoption, the result is reduced visibility into driver behavior and increased litigation exposure.

Fleet Tradeoffs Under Memory Constraints

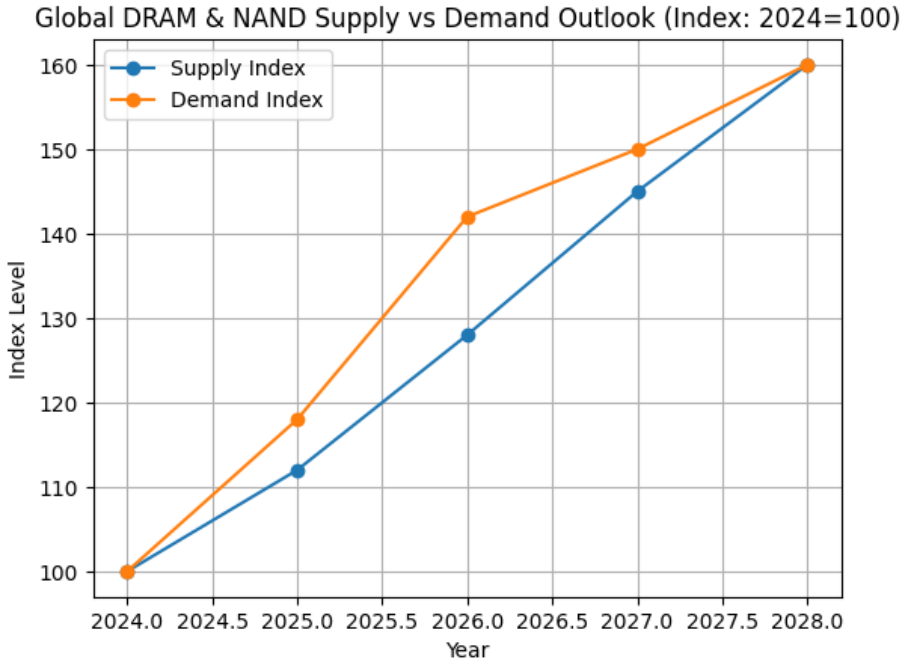
Constraint	Likely Response
Storage costs	Lower retention
DRAM shortage	Delay AI adoption
Budget pressure	Reduce cameras

How the Industry Is Responding

Organizations across the supply chain are adopting proactive responses. On the procurement side, long-term supplier agreements and multi-sourcing strategies are becoming standard practice. On the technology side, providers are pursuing data efficiency through AI optimization, intelligent recording, and hybrid storage architectures that reduce memory dependence while preserving safety outcomes. Commercially, the shift toward Hardware-as-a-Service and subscription models allows fleets to spread costs over time and adapt to evolving requirements without large capital outlays.

The Road Ahead

Memory shortages are expected to persist near-term, with potential stabilization later in the decade as new fabrication capacity comes online. Long-term industry impacts include a permanent shift toward hybrid storage architectures, increased emphasis on data efficiency, and vendor consolidation among those unable to absorb sustained cost pressures.



Source: IDC. Worldwide Semiconductor Supply vs Demand Outlook, 2025 to 2026.

The innovation opportunity ahead lies in AI-driven compression and data prioritization, edge intelligence optimization, and emerging memory architectures. Organizations investing in efficiency and flexibility today will be better positioned for long-term resilience regardless of where the commodity cycle settles.

What Organizations Should Do Now

For mobile surveillance providers, the priorities are designing memory-efficient systems, expanding cloud and hybrid storage offerings, offering flexible lifecycle pricing models, and securing long-term supply partnerships.

For transit agencies and fleet operators, the immediate steps are re-evaluating retention policies, adopting hybrid storage strategies, locking pricing through long-term contracts, and prioritizing coverage for the highest-risk routes and vehicles.

For policymakers, the response should include targeted funding support for safety technology, a review of retention mandates in light of new storage realities, and active promotion of equitable technology access across agencies of all sizes and budgets.

Memory shortages represent a structural shift reshaping mobile video surveillance and transportation safety. Pricing will remain volatile throughout 2026 and likely beyond. The organizations that adapt through efficiency, hybrid architectures, and flexible business models will maintain safety outcomes despite supply constraints, while those that wait risk falling behind on both safety and cost.

The following section provides a summary of the direct impact on public transportation and key considerations for future planning.

Memory Constraints and the Future of Transportation Safety

Public transit agencies are advancing toward data-driven safety management, integrating AI-enabled video for situational awareness, accountability, and operational performance. At the same time, NAND and DRAM shortages are constraining the availability, cost, and retention capabilities of onboard video systems. For transit leaders, these constraints directly affect incident investigation, public trust, regulatory alignment, and Safety Management System effectiveness.

Video Has Become Foundational to Transit Safety

Video surveillance is now a core component of transit safety management, supporting incident investigation and root cause analysis, operator performance review and coaching, passenger security and threat deterrence, protection against false claims, and data-driven safety improvements. APTA recommended practices reinforce the importance of CCTV in incident investigation and evidentiary use. As agencies pursue Vision Zero goals and strengthen their Safety Management Systems, reliable video evidence is foundational to transparency and accountability.

What Memory Constraints Mean in Practice

AI and cloud computing expansion is driving unprecedented semiconductor memory demand. Data centers now consume a growing share of NAND and DRAM production, contributing to rising storage costs, extended lead times, reduced onboard retention capacity, and delayed fleet deployments. The key question for transit agencies is not whether to deploy video, but how to ensure reliable retention and access in a constrained environment.

When retention capacity is reduced or deployment is delayed, agencies face limited investigative capability, increased dispute resolution challenges, reduced transparency, and erosion of public trust. Video systems integrated into Safety Management System frameworks support hazard identification, performance monitoring, corrective action tracking, and continuous safety improvement. Memory constraints that limit retention or delay deployment directly hinder effective safety data collection.

AI-enabled video provides real-time insights including operator distraction detection, passenger conflict monitoring, and platform safety alerts. Deployment delays slow progress toward Vision Zero. And rising memory costs may force tradeoffs between system coverage, retention duration, resolution, and AI capabilities. Smaller agencies may be disproportionately affected, widening safety technology disparities. Equitable access is essential to consistent safety outcomes nationwide.

> ***The key question for transit agencies is not whether to deploy video, but how to ensure reliable retention and access in a constrained environment.***

Video as a Compliance and Liability Asset

APTA guidance requires CCTV systems to support incident investigation and evidentiary needs. Video evidence is critical for resolving passenger claims, protecting operators from false accusations, supporting legal defense, and reducing litigation costs. Reduced retention or incomplete coverage increases liability exposure and weakens an agency’s position in both regulatory and legal proceedings.

Four Strategic Responses for Transit Leaders

The first priority is evidence retention. Agencies should evaluate retention policies to ensure critical footage is preserved despite storage constraints. Tiered retention policies, event-based recording, and cloud archiving for critical incidents all help maximize the value of available storage.

The second is hybrid storage architecture. Combining onboard recording with cloud archiving reduces onboard storage requirements, extends retention for the most critical incidents, and improves accessibility for investigations and audits.

Third, agencies should integrate video into their Safety Management System and broader data strategies. Alignment with safety data infrastructure enables performance benchmarking, risk trend analysis, and proactive safety interventions that compound over time.

Fourth, transit leaders can advocate for sustainable safety funding by working with policymakers to recognize video systems as essential safety infrastructure, support technology modernization funding, and promote equitable access across agencies of all sizes.

Building for Resilience

Future-ready transit safety systems will emphasize intelligent data prioritization, AI-driven event capture, hybrid storage architectures, and scalable cloud infrastructure, enabling agencies to maintain safety outcomes despite supply challenges. Memory constraints underscore the importance of designing systems that can adapt to evolving supply conditions rather than depending on a fixed hardware configuration.

Transit safety is a shared responsibility among agencies, technology providers, policymakers, and communities. Safety Vision remains committed to partnering with transit agencies to deliver resilient, intelligent solutions supporting transparency, accountability, and public trust.

Together, we can ensure every passenger Arrives Safe.

SOURCES & ENDNOTES

1. IDC, Global Memory Shortage Crisis (Dec 18, 2025). Global memory shortages driven by AI demand and supply reallocation. https://www.idc.com/resource-center/blog/global-memory-shortage-crisis-market-analysis-and-the-potential-impact-on-the-smartphone-and-pc-markets-in-2026/

2. Deloitte, 2026 Semiconductor Industry Outlook (Feb 5, 2026). Forecasts memory price increases and prolonged supply tightness. https://www.deloitte.com/us/en/insights/industry/technology/technology-media-telecom-outlooks/semiconductor-industry-outlook.html

3. The Register, DRAM & NAND Price Surge Forecast (Feb 2, 2026). TrendForce projects DRAM up 60%, NAND up 38%. https://www.theregister.com/2026/02/02/dram_prices_expected_to_double/

4. S&P Global Market Intelligence, DRAM Price Acceleration (Jan 28, 2026). Traditional DRAM forecast to rise 100%+ YoY. https://www.spglobal.com/market-intelligence/en/news-insights/research/2026/01/ai-memory-boom-squeezes-legacy-dram-supply-pushing-prices-higher

5. BISi Research, Global RAM Shortage Analysis (Jan 5, 2026). DRAM up 171% YoY; shortages expected through 2027 to 2028. https://bisi.org.uk/reports/global-ram-shortage-and-price-hikes-causes-consequences-and-market-outlook

6. Everstream Analytics, Global Memory Chip Shortage Risk Report (2026). Up to 70% of production shifting to AI data centers. https://www.everstream.ai/risk-centers/global-memory-chip-shortage-worsens/

7. Sourceability, Memory Shortage Driving Higher Costs (Jan 28, 2026). Pricing pressure and buyer impact across industries. https://sourceability.com/post/the-memory-shortage-is-driving-higher-costs-for-buyers-and-consumers

8. HP Earnings Commentary via PC Gamer (Feb 26, 2026). Memory now ~35% of PC system cost. https://www.pcgamer.com/hardware/memory/hp-warns-that-memory-now-makes-up-around-35-percent-of-the-cost-its-pcs-double-that-of-a-year-ago/

9. Reuters, TrendForce Price Forecast (Feb 2, 2026). DRAM prices expected to rise up to 95% in Q1 2026. https://www.reuters.com/technology/trendforce-sees-chip-prices-surging-90-95-q1-previous-quarter-2026-02-02/

10. Barron's, AI Memory Demand Surge (Feb 23, 2026). DRAM and NAND up 62% and 40% in early 2026. https://www.barrons.com/articles/micron-samsung-stocks-memory-chip-ai-risks-c5e101df

11. Reuters, Smartphone Market Decline from Memory Costs (Feb 26, 2026). Memory price surge driving device cost increases and market contraction. https://www.reuters.com/business/media-telecom/smartphone-market-set-biggest-ever-decline-2026-memory-price-surge-idc-says-2026-02-26/

12. Global Memory Supply Shortage Overview (Updated 2026). Structural reallocation toward AI infrastructure driving long-term shortages. https://en.wikipedia.org/wiki/2024%E2%80%93present_global_memory_supply_shortage

INDUSTRY SOURCES

APTA. (2011). Recommended practice for CCTV systems in transit applications. https://www.apta.com/wp-content/uploads/Standards_Documents/APTA-IT-CCTV-RP-001-11.pdf

Everstream Analytics. (2026). Global memory chip shortage worsens. https://www.everstream.ai/risk-centers/global-memory-chip-shortage-worsens/

FTA. (2021). Inward- and outward-facing audio and video recordings for transit safety. https://www.transit.dot.gov/sites/fta.dot.gov/files/2021-08/FTA-Report-No-0200.pdf

FTA. (2023). AI and vision-based systems for transit safety. https://www.transit.dot.gov/sites/fta.dot.gov/files/2023-10/FTA-Report-No-0256.pdf

NCSL. (2025). School bus safety laws and camera adoption. https://www.ncsl.org/resources/details/with-new-tools-and-tougher-laws-school-bus-rides-get-safer

NHTSA. (2024). Illegal passing of school buses report. https://stnonline.com/news/nhtsa-releases-report-on-nationwide-illegal-school-bus-passing-laws/

NHTSA. (n.d.). Reducing illegal passing of school buses. https://www.nhtsa.gov/school-bus-safety/reducing-illegal-passing-school-buses

NTSB. (2018). School bus safety recommendations. https://www.ntsb.gov/Advocacy/SafetyIssues/Pages/School-Bus-Safety.aspx

NASDPTS. (2025). Illegal passing survey results. https://www.schoolbusfleet.com/news/annual-nasdpts-survey-highlights-danger-of-passing-school-buses

Passenger Transport. (2025). Advanced video surveillance in transit. https://aptapassengertransport.com/revolutionizing-u-s-transit-with-advanced-video-surveillance-and-ai/