White Paper



The cost of operational fragility

Why modern manufacturing demands an unbreakable backbone

MOTOROLA SOLUTIONS

Protecting plant uptime at scale

In modern manufacturing, production halts the second frontline communication drops. With factories burning up to $39,000 every minute in unplanned downtime[1], unreliable voice is not simply an inconvenience — it is an operational vulnerability that threatens uptime, compromises worker safety and exposes facility perimeters.

While enterprise broadband push-to-talk (PTT) is indispensable for scaling digital workflows and connecting distributed teams across the enterprise, physical plant realities — including dense metallic machinery, electromagnetic interference and high-noise production bays — demand resilient voice communications. High-stakes manufacturing cannot rely solely on commercial devices or public wireless signals for frontline life safety and instantaneous line halts.

Modern operations demand an unbreakable backbone: anchoring core operations to a dedicated private radio network while scaling broadband PTT across roaming teams to eliminate single points of failure, communication silos and operational blind spots.



Expand reach without expanding risk

With 30 to 50 percent of potential productivity left unrealized by manufacturers who delay digitizing their operations[2], operational leaders face continuous pressure to accelerate digital transformation. Broadband PTT supports this by extending voice and rich multimedia capabilities onto smartphones, tablets and rugged handhelds over cellular and Wi-Fi, enabling live equipment diagnostics, real-time performance data and mobile work order management.

However, as facilities grow more automated and interdependent, modernizing the plant requires navigating four key operational realities:

→ Expanding data requirements

Digitizing workflows requires continuous data exchange across dense structural bays, placing unprecedented demands on daily operational networks.

→ Escalating costs of unplanned downtime

In high-speed production environments, a single frontline delay can halt an entire facility, pushing unplanned downtime costs as high as $2.3 million per hour[1].

→ Surging workplace safety and compliance risks

Slips, trips and hazardous exposures remain leading industrial threats[4]. Delayed distress alerts in dead zones endanger personnel and trigger increasingly severe regulatory penalties.

→ Rising yard security and logistics risks

Cargo theft losses averaging $273,990 per incident[4] leave unstaffed yard perimeters and storage bays exposed due to disconnected workflows between automated sensors, security patrols and logistics personnel.

Scaling digital workflows without securing frontline voice leaves operations exposed to costly bottlenecks. High-stakes manufacturing demands an integrated architecture that anchors critical production to private radio network certainty while scaling broadband PTT across the entire facility footprint.



Eliminating vulnerability at industrial scale

Modern industrial manufacturing cannot rely on single-path communications to safeguard continuous production. While broadband PTT powers data-rich applications and mobile collaboration, containing downtime costs requires a dedicated physical transmission channel engineered for reliable frontline voice. High-stakes manufacturing demands a clear operational division of labor: dedicated private radio networks protect the physical plant floor, while broadband PTT scales mobile reach across distributed teams.

Both public cellular and Wi-Fi rely on shared commercial towers and external power grids. During localized power failures or physical emergency events, commercial network availability degrades rapidly. Conversely, a dedicated private two-way radio network operates completely independent of external infrastructure, ensuring instant, sub-second voice delivery even during a total facility power outage.

Unifying both into an unbreakable backbone eliminates systemic operational fragility

→ Zero single points of failure

Production operations maintain low-latency, off-grid voice certainty directly at the machine core. Emergency line halts and critical clearance commands execute in sub-seconds, unaffected by commercial carrier disruptions or power grid outages. Concurrently, broadband PTT scales digital diagnostics and mobile logistics across roaming personnel and support teams without competing for frontline voice bandwidth.

→ Zero communication silos

Volatile atmospheres and heavy production bays demand certified hardware engineered to cut through more than 90 dBA ambient noise. When incidents strike, distress alerts cut through heavy machinery noise and automatically bridge across enterprise talkgroups, reaching relevant personnel like floor leads, safety officers and off-site managers on smartphones and tablets instantly.

→ Zero operational blind spots

Critical boundaries, from unlit perimeter fences and raw material yards to subterranean vaults, remain under continuous, proactive oversight. Automated security feeds and cross-facility talkgroups empower teams to intercept physical intrusions, manage restricted access and neutralize containment hazards before disruptions breach production zones.



Securing the foundation while pursuing digital transformation

Surviving modern industrial pressures requires an engineered architecture that treats communication and physical security as a single, hardwired operational engine. Leading industrial enterprises deploy a unified two-pillar infrastructure stack engineered for zero vulnerability:

The architecture of site resilience

→ Resilient communications backbone

The foundational transmission layer that fuses dedicated private radio networks with broadband PTT into a single resilient communications fabric. Private radio anchors frontline operations with absolute control, unmatched reliability and sub-second off-grid voice certainty, while broadband PTT bridges disparate device ecosystems, connecting distributed teams, logistics operations and facility leadership into synchronized talkgroups.

→ Connected safety and security ecosystem

The integrated perception layer that links AI-powered video analytics, perimeter access control turnstiles and environmental sensors directly into the communications backbone. Detected breaches, equipment temperature anomalies and perimeter events are instantly converted into automated text-to-speech voice dispatches routed directly to frontline radios and mobile teams.



Bridging unbreakable voice with enterprise mobility

While dedicated private radio networks establish an uncompromising voice foundation on the plant floor, broadband PTT extends real-time collaboration and data across the entire operational footprint. Unifying these technologies eliminates communication boundaries without compromising floor safety or network resilience.

Rather than choosing between frontline reliability and enterprise reach, uniting private radio networks and broadband PTT delivers three essential operational capabilities:

→ Uncompromising voice continuity

Anchors the physical plant floor to dedicated private radio networks, ensuring critical line-halt commands and emergency dispatches never drop, buffer or fail during commercial network congestion or facility power outages.

→ Enterprise-wide team collaboration

Bridges device and network divides by uniting rugged plant radios with smartphones, tablets and mobile handhelds into one synchronized talkgroup fabric across the entire operational footprint.

→ Foundation for automated security

Acts as the live dispatch engine that hardwires AI video security, touchless access control and environmental sensor data straight into frontline voice channels — turning physical alarms into instant audio dispatches to resolve operational blind spots before disruptions escalate.

Securing your operational future

Operating with unmanaged single failure points or communication silos leaves modern facilities exposed to costly line stoppages, safety risks and perimeter blind spots. Audit your plant's operational resilience baseline by exploring these diagnostic questions with your leadership team:

Executive diagnostic assessment

1. Coverage & structural vulnerability

→ Do physical dead zones in subterranean vaults, blast walls or dense machinery bays leave frontline personnel isolated during production incidents?

2. Incident latency & network reliability

→ When critical emergencies or line stoppages occur, can leadership broadcast instant alerts across every team without cloud buffering or network queuing?

3. Environmental & acoustic compliance

→ Are frontline devices certified intrinsically safe for combustible dust and chemical vapors, and engineered to cut through machinery noise?

4. Ecosystem interoperability

→ Does a physical security breach or machine hazard trigger instantaneous voice dispatches directly to response teams, or remain trapped on disconnected screens?



Powering safer, more resilient industrial operations

Motorola Solutions creates technology ecosystems engineered to protect personnel, secure physical perimeters and provide reliability and control for continuous operational uptime across high-stakes industrial environments.

By integrating dedicated private radio networks with broadband PTT, we deliver a flexible, resilient communications backbone. Layered with AI video security and access control, our ecosystem empowers manufacturers to eliminate single points of failure, remove communication silos and resolve operational blind spots.

Protect your workers. Secure your facility. Guarantee your uptime.

Find out more about strengthening your manufacturing operations.

References

[1] Siemens

[2] Bain & Company

[3] U.S. Bureau of Labor Statistics

[4] CargoNet



To find out more about how to audit and strengthen your facility's operational resilience baseline, connect with our team at: **motorolasolutions.com/manufacturing/resilientcomms**

MOTOROLA SOLUTIONS

Motorola Solutions, Inc. 500 West Monroe Street, Chicago, IL 60661 U.S.A. **motorolasolutions.com**

MOTOROLA, MOTO, MOTOROLA SOLUTIONS and the Stylized M Logo are trademarks or registered trademarks of Motorola Trademark Holdings, LLC and are used under license. All other trademarks are the property of their respective owners. ©2026 Motorola Solutions, Inc. All rights reserved. 10-2026 [PC01]