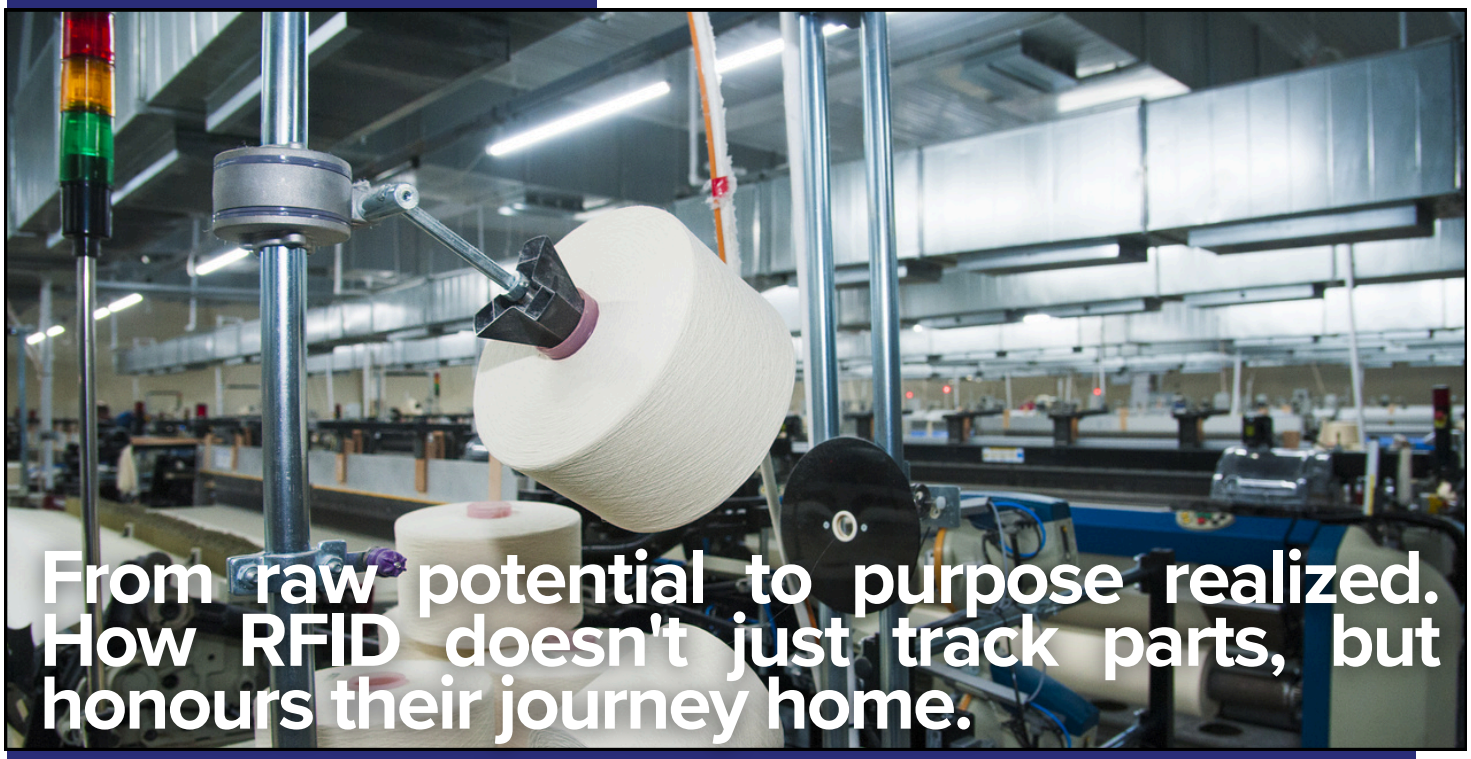
PRODUCTION & ASSEMBLY LINE MANAGEMENT

MANUFACTURING SOLUTIONS

OSIRIS TECHNICAL SYSTEMS



From raw potential to purpose realized. How RFID doesn't just track parts, but honours their journey home.

Production environments lose time and money through gaps in visibility. Parts sit in staging areas longer than necessary. Tools walk off between shifts. Work-in-process inventory accumulates in corners while production managers assume it's already moved downstream. Quality holds get mixed with approved stock.

The annual physical inventory count reveals discrepancies that have compounded for months.

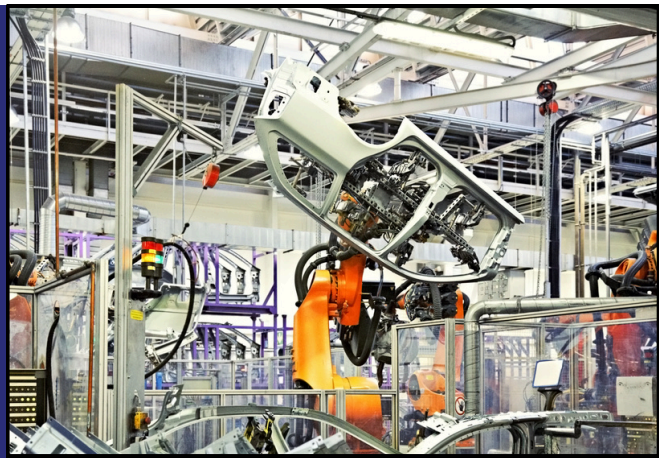
These aren't system failures - they're information failures. Manufacturing operations generate constant physical movement, but that movement often leaves no digital trace until someone manually scans a barcode or updates a spreadsheet.

Picture a manufacturing floor at dawn. Thousands of RTIs - pallets, bins, trolleys, cages - stand ready for another day's work. Each one has a story: the distances traveled, the products carried, the warehouses visited. Yet for most organizations, these stories remain untold, these assets invisible, their true value unrealized.

The reality is sobering: Millions of critical assets move constantly through supply chains, supporting operations large and small. Yet their precise locations, conditions, and availability remain mysteries. The true scale of assets in circulation is unknown.

The cost of this invisibility? Inefficiencies that compound daily, financial losses that accumulate silently, and opportunities that slip away unnoticed.

Gen 2x represents more than an incremental upgrade from traditional RFID standards. It's the difference between shouting into a crowded room and having a crystal-clear conversation.



Gen 2x Sets A New Rhythm in Manufacturing

In the complexity of modern production lines, where hundreds of components converge, where timing is measured in seconds, and where a single misplaced part can cascade into hours of downtime, manufacturers need more than visibility.

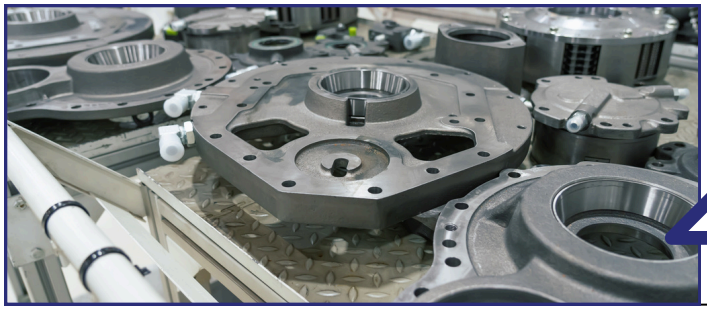
They need presence. They need to feel the pulse of every asset, every work-in-progress item, every component as it flows through the production ecosystem.

The answer lies not in traditional tracking methods that observe from a distance, but in technology that becomes part of the production journey itself - technology that breathes life into manufacturing intelligence.

This is where the silent revolution begins - not with louder machinery or faster conveyor belts, but with Impinj® Gen2v3 technology, an innovation that transforms each product into a living data point, each assembly station into a listening post, and each production line into a synchronized orchestra of manufacturing intelligence.

Traditional manufacturing tracking treats products as passengers - logged at checkpoints, recorded at transitions, observed from outside their journey.

Gen2v3 technology, built on the Impinj® platform, changes this fundamental relationship. It embeds intelligence directly into the product, creating what we might call "sensory manufacturing."



"I am Engine Component 847392. I completed heat treatment 47 minutes ago. I've been waiting at Station 7 for 12 minutes. My next required process is precision drilling. I need to reach that station in 18 minutes to meet production timing."

Embodied Intelligence

Manufacturing isn't just about speed, it's about certainty. The certainty that every component has a witness, every step has a record, and every finished product has earned its completeness.

Each tag becomes a micro-sensor, capable of:

Authentic Cryptographic Identity

Every component carries an unforgeable signature, a digital fingerprint that cannot be cloned or counterfeited. In an age where counterfeit parts can compromise entire production runs, this authentication becomes the foundation of manufacturing trust

Environmental Awareness

Temperature fluctuations during curing processes. Humidity levels in moisture-sensitive assembly. Time elapsed since critical process steps. The tag doesn't just identify - it witnesses, records, and remembers the conditions that shape product quality.

Spatial Intelligence

Through advanced signal processing and phase-based positioning, the system doesn't merely know where a component is - it understands its orientation, its proximity to other components, and its readiness for the next assembly stage.

Temporal Precision

Timestamps at nanosecond resolution create an indelible record of each process step, enabling true genealogy tracking and providing forensic-level detail for quality investigations.

Parts as Synchronized Swimmers: Work-in-Progress

Picture a complex assembly line: hundreds of components arriving from multiple suppliers, dozens of work cells performing specialized tasks, multiple production shifts handling different product variants.

Without real-time intelligence, this becomes an exercise in controlled chaos - clipboards, manual scans, periodic counts, and the ever-present question: "Where is everything, and what state is it in?"

Now imagine each component announcing its presence continuously...

This isn't fantasy - it's the reality of Gen2v3-enabled production intelligence.

Station-Level Orchestration

Each assembly station becomes a center of awareness:

Automatic Material Calls

As work cells consume components, the system anticipates needs and triggers material replenishment before operators realize they're running low. The production line breathes naturally - inhaling materials, exhaling completed assemblies, never gasping for resources.

Quality Gate Intelligence

When a component arrives at a quality checkpoint, the system already knows its complete history: which machine produced it, what parameters were used, how long each process took, and what environmental conditions it experienced. Quality decisions become data-driven, instantaneous, and irrefutable.

Error Prevention Through Presence

Wrong component approaching an assembly station? The system knows before human hands touch it. Process steps out of sequence? Immediate alert. Missing critical process completion? Production stops before defects are built in.

The Moment of Truth - Assembly Verification

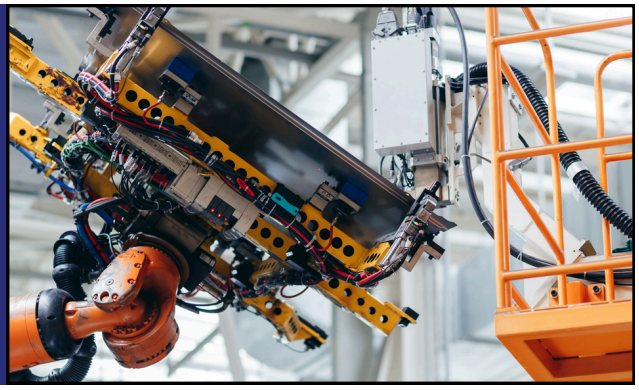
In complex product assembly - automotive components, aerospace systems, medical devices - the question isn't just "what parts are present?" but "are the correct parts, in the correct quantities, assembled in the correct sequence?"

Gen2v3 technology enables simultaneous multi-tag reading at speeds exceeding 1,000 tags per second. In practical terms: as a completed assembly moves through a verification portal, the system reads every single component in milliseconds, comparing the actual build against the engineering bill of materials.

The result? Zero defect assembly verification. No manual counting. No clipboards. No assumptions. Just certainty.

The factory floor is a river of intention, and every current we create ensures that what begins together, arrives together - a promise kept in motion.

The Intelligence Layer



Beyond Seeing: Understanding

Data gains value when it becomes insight. The manufacturing intelligence platform processes millions of tag reads daily, turning raw data into understanding:

Production Flow Visualization

Real-time digital twins show current and future component locations, enabling managers to conduct flow rather than manage data.

Predictive Bottleneck Detection

Machine learning analyzes flow patterns, predicting slowdowns with enough warning to prevent impacts.

Quality Correlation Analytics

The system quickly identifies specific machines and conditions causing quality issues, reducing root cause analysis time from weeks to minutes.

Resource Optimization Intelligence

The system uncovers underutilized tooling, idle operators, and friction-causing product variants, revealing optimization opportunities.

The Impinj® Advantage

Why Gen2v3 Represents a Technological Inflection Point

Untethered Cryptography

Gen2v3 offers secure, verifiable communication with cryptographic capabilities, transforming tagged components.

Sensor Integration Without Compromise

Supports sensor data transmission while maintaining fast read speeds, enabling components to report experiences.

Interference Resilience

Gen2v3 ensures reliable communication despite metal, noise, and movement challenges.

Future-Ready Architecture

Extensible design for future needs without replacing infrastructure.

The Business Transformation

Measurable Impact, Meaningful Change

Production Throughput

Improvements: 12-18% increase in capacity by eliminating delays, reducing search time, and removing errors.

Quality Cost Reduction

Defect detection before assembly cuts rework costs by 60-80%. Genealogy tracking enables targeted recalls, reducing costs significantly.

Cycle Time Optimization

Cycle times drop 15-25% as bottlenecks are removed, and errors are caught early.

Traceability Compliance

Automated traceability in regulated industries ensures audit readiness and eliminates manual records.

The Human Element

Technology Serving People, Not Replacing Them

In this vision of intelligent manufacturing, technology doesn't displace human expertise - it amplifies it:

Operators become Conductors

Freed from manual tracking, scanning, and data entry, operators focus on what humans do best: quality judgment, process improvement, and problem-solving. Technology handles presence and position; humans handle purpose and optimization.

Maintenance becomes Proactive

Maintenance technicians no longer chase breakdowns or follow fixed schedules - they respond to actual usage patterns and predicted needs. Their expertise focuses on prevention rather than emergency response.

Quality becomes Forensic

Quality engineers gain unprecedented investigative power. Every component's complete journey remains accessible, enabling root cause analysis that was previously impossible. Quality becomes a science of continuous improvement rather than post-production inspection.

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The Ripple Effect - Beyond Manufacturing

When Production Intelligence Extends Its Reach

The intelligence embedded during manufacturing doesn't stop at shipping dock:

Field Service Knowledge

Products arrive at customer sites with complete production history. Field service technicians access genealogy data instantly, enabling faster diagnosis and ensuring replacement parts match original specifications precisely.

Warranty Intelligence

When warranty claims arise, manufacturers instantly access production conditions, assembly details, and supplier information. Legitimate claims process faster; fraudulent claims become immediately apparent.

End-of-Life Responsibility

As products reach end-of-life, embedded component information enables precise material recovery, proper hazardous material handling, and efficient recycling processes. Circular economy principles become operationally practical.

The Vision Forward

Manufacturing as a Living System

The future of manufacturing isn't about faster machines or more automation - it's about creating living systems where information flows as naturally as materials, where problems surface before they impact production, and where every decision rests on foundation of complete, real-time truth.

Gen2v3 technology represents more than a tracking solution. It represents a philosophical shift: from manufacturing as mechanical process to manufacturing as intelligent ecosystem, from products as physical objects to products as digital-physical entities, from management by reaction to management by anticipation.

The RFID tag, in this vision, truly becomes the heartbeat of commerce - a persistent pulse that begins when components enter production and continues until the product completes its useful life. It's a heartbeat we can hear, a rhythm we can trust, and a foundation on which we can build the future of manufacturing.

Beginning the Journey

Every transformation begins with a single step. For manufacturing production and assembly line management, that step is choosing to listen - to hear the heartbeat of your production line, to understand the rhythm of your assembly processes, and to bring intelligence to every component flowing through your facility.

The technology exists. The methodology is proven. The results are measurable.
The question isn't whether this transformation is possible.

The question is: when will you choose to feel the heartbeat of your manufacturing operations?

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