Resiliency in a Rapidly Evolving Food Supply Chain

Managing In-Transit Disruptions with Visibility through Real-Time Cargo Monitoring

SENSITECH

A Carrier Company

Executive Summary

As the food industry responds to evolving global demands, supply chains are being disrupted with ever-increasing complexity and rapidly changing challenges. As a company in this industry, you may be finding it difficult to maintain high standards of product quality while attempting to improve logistics performance, control costs, operate more efficiently and increase customer satisfaction.

That's where resiliency, driven by visibility from real-time cargo monitoring, comes in. When you have automated processes that drive insights on your product as it travels through the supply chain, you can take proactive measures to address disruptions with speed and flexibility. With the ability to respond proactively and in-the-moment, you have the power to take back control of your supply chain, manage business effectively and deliver high-quality goods.

This white paper provides insights into why real-time visibility from cargo monitoring is so critical and how it can can help you drive better decision making and even eliminate in-transit issues, especially when it's automated. It will also explore the role of Internet of Things (IoT) sensor data and advanced analytics in cargo monitoring, and how they facilitate better management of your supply chains. In addition, the paper provides you with an inside glimpse into how a food distributor used insights from sensor data to execute continuous end-to-end improvement that resulted in increased product quality and significant cost savings.

Real-Time Visibility Is Now a Business Necessity

When cargo is in transit, late departures, driver shortages, extended wait times at borders, extreme weather and other events can occur without warning and cause costly and untimely disruptions, especially for temperature-sensitive products. You may also have other issues affecting in-transit cargo—such as droughts, labor strikes, political disruptions, or like in recent months, a pandemic.

Your internal quality assurance, transportation and logistics departments strive to ensure the least amount of impact when any kind of disruption occurs, but they most likely need to depend on internal operations and third-party supply chain partners to do so. Given the fast-paced nature of the supply chain, it can be challenging for your team to manage quality and compliance, especially when there are multiple partners and internal hand-offs as your product ships from its origin to a final destination. Any disruption along the way can create variability that challenges how well your suppliers maintain best practices and manage quality or logistics problems.

For instance, if your suppliers or internal distribution center operators do not report issues or exceptions when they happen, your teams can't proactively control problems. They need a way to identify, predict, control and even eliminate the known and unknown issues that could compromise product integrity. That's where real-time visibility from cargo monitoring comes in.

Insights Into the Product Journey are Critical

A cold-chain monitoring solution delivers real-time, in-transit cargo data to address issues in the moment. Data collected by IoT-based sensors can be analyzed for precise visibility into the location and condition of your shipments at any time.

Disruptions can be managed as they are happening, allowing you to pivot as needed with the critical information that offers visibility into questions such as:

- **Where** is my cargo right now?
- **What** condition is it in?
- **When** will it be delivered, and are any delays expected?
- **How** can I take action to manage a current issue?

Mitigate Risk with In-The-Moment Data

Operationalizing real-time information can help you make proactive decisions that can reduce the impact of disruptions and challenges in your supply chain like these common ones here.

COSTLY TEMPERATURE EXCURSIONS

When temperature-sensitive cargo is transported, partners and employees assume responsibility for maintaining the quality and value of the product as it is packaged, stored and shipped. Without in-depth visibility into how well product temperatures are controlled in each in-transit segment, unseen temperature excursions could compromise your cargo and cause costly consequences.

LACK OF SUPPLY CHAIN COMPLIANCE

As your cargo travels, there are service-level agreements (SLAs), standard operating procedures (SOPs) and key performance indicators (KPIs) that help your partners and internal staff assure product quality and on-time deliveries. A lack of visibility into the location and condition of your cargo at any given moment could prevent you from managing the expectations of these agreements, and result in costly excursions or delays.

HIGH INSURANCE PREMIUMS

Because of a heavy reliance on a variety of suppliers, contractors and handlers, you may be required to pay high insurance premiums to protect investments in the cargo. For instance, if the refrigeration equipment of a logistics provider broke down and caused product to be compromised, replacing it may be cost prohibitive for your company without insurance.

Controlling and reducing costs while improving quality is a given in any part of a business—but the lack of visibility into your cold chain can ultimately result in higher financial burdens across your entire organization.

Comprehensive Data Capture Nets Broad Insights

Cargo monitoring is a core foundation of a visibility program that helps organizations collect, manage and analyze supply chain data so you can improve product quality and operational efficiency. The intelligence derived from this visibility can also help increase compliance, reduce labor costs, improve response time, decrease product loss and develop better supplier relationships.

The data capture part of a visibility program is critical. IoT sensor devices that travel with your cargo throughout the entire in-transit journey can provide you with a wealth of information as they capture data right down to the item level.

These devices provide a hands-free, low-labor and low-cost way to generate real-time data on location, temperature, light and humidity. The data can then be converted into valuable insights using cloud-based analytics that drive actionable facts and enable better decision making.

For example, when a sensor detects a temperature excursion, it automatically sends an alert so you and your team can proactively intervene to make adjustments or activate an exception-based receiving process. Notifications on location data can also be automated so you and your customers are alerted when shipments arrive, depart or are delayed.

Fast, Intelligent Insights Guide Smart Decision Making

The end-to-end visibility and unprecedented intelligence from cargo-monitoring data can provide benefits such as:

GREATER TRANSPARENCY

Gain insights into the location of your cargo is and its condition in real time, increasing your ability to respond quickly and reduce inventory waste.

IMPROVED RISK MITIGATION

Respond to issues in the moment before they become critical so you can manage disruptions while mitigating losses and improving customer satisfaction.

INCREASED EFFICIENCY

Know the location and condition of your cargo so you can better triage and manage through exceptions, saving time and labor costs.

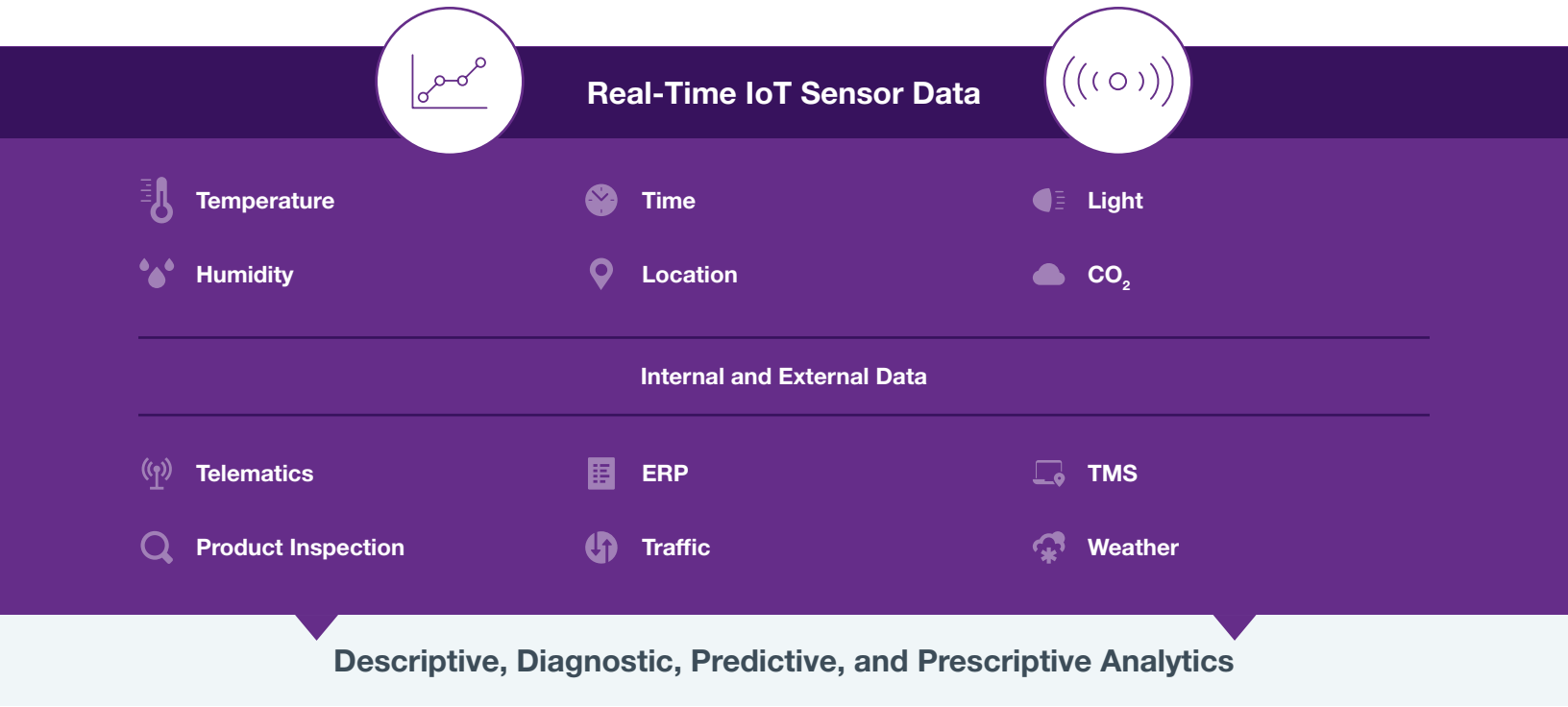
BETTER COLLABORATION

Work more effectively with suppliers, carriers and employees on longer-term compliance issues for continuous improvement while protecting your brand and reputation.

Data Analytics—The Enabling Force Behind Supply Chain Intelligence

Cargo monitoring sensors collect large volumes of data including temperature, location, humidity, light and other condition data. It all can be aggregated and processed in real time with prescriptive, descriptive and predictive analytics that are powered by machine learning and artificial intelligence. The resulting intelligence drives the in-depth visibility you need to understand where your cargo is in the moment and its condition.

Your in-transit data can also be integrated with related internal and external data sources to provide you with a more comprehensive view of your cargo and its journey. For example, the data can be combined with internal data from your supply chain, transportation, enterprise resource planning (ERP) and logistics systems. External data sources can be integrated to provide an even broader view of your cargo's transport through insights into factors such as movement, traffic, fuel consumption, weather and other environmental factors.



Comprehensive Insights in One Integrated View

From a single, integrated view of all this data on a cloud-based visibility platform, you and your company can now intuitively drill down to gain deeper insights and identify root causes of issues to reduce short- and long-term risks.

Anyone in your enterprise with supply chain responsibilities—from executives to quality, logistics, transportation and security managers—can securely access the data they need, whenever they need it, from wherever they are, via any device that is convenient in the moment. These managers can drill down by role and get the specific insights they need to proactively address challenges unique to their individual responsibilities, enabling them to make critical decisions in real time, rather than after the fact.

Taking Back Control of Your Supply Chain

With comprehensive visibility, your teams—quality assurance, transportation and logistics—now have the ability to:

- **Monitor** cargo at all times while in route to get a comprehensive, global view of where your product is in the moment, evaluate its condition, and understand its expected arrival.
- **Access** cargo data at different levels of granularity at any time, down to the individual item level, whether your cargo is on a pallet, in storage or on the last mile of its journey.
- **Make** opportune decisions on the fly with real-time alerts to improve product quality and logistics performance in the moment.
- **Manage** delays and issues in real time with actionable insights to enable proactive changes and rapid remediation that optimizes operations and helps to avoid risks.
- **Collaborate** with multiple enterprise stakeholders and suppliers in each phase of your product's journey to identify risks and minimize costly shipping interruptions, product damage or quality issues.
- **Optimize** standard operating procedures and business processes with historic and real-time data and predictive analytics.
- **Analyze** longer-term supply chain issues and risks for end-to-end continuous improvement while providing a better return on investment. Assure the highest degree of regulatory compliance and improving overall supply chain performance.

CASE STUDY

End-To-End Control and Resiliency in Action

For the perishable food industry, temperature control of products while in transit is imperative for enabling the delivery of high-quality products. It is also critical for ensuring global compliance, improved logistics and higher standards of excellence.

Recognizing this, one of Sensitech's long-time customers, a food service distribution company, wanted better visibility and end-to-end control over its cold chain.

The company's supply chain includes domestic and international suppliers, carriers, internal operations and food service customers. The numerous hand-offs and overall logistics, from the time product leaves its point of origin until it's delivered to customers, are complex to manage.

The customer wanted a flexible solution that could be integrated into the company's existing systems and business processes while reducing complexity and improving overall operations.

Infrequent, Paper-Based Reports Were Not Enough

Historically, the company managed quality control through paper-based static reports, which made it difficult to collaborate or discover insights on cold chain trends until after the fact. It was time consuming to collect and process any data it had, and frustrating to be unable to resolve issues as they occurred. Quality and logistics teams couldn't react quickly and correct issues such as temperature excursions or missed delivery commitments when they happened, which often resulted in costly inefficiencies.

Real-Time Intelligence Enables Better Decision Making

To improve its existing processes and optimize the performance of its operations, the company took advantage of Sensitech's advanced cold chain solutions to implement a comprehensive cloud-based visibility platform.

Sensitech's platform aggregates data from several of the customer's databases that store real-time and historical data from temperature monitoring devices and provides stakeholders across the company with:

- A single, centralized location for all data with secure access anytime, anywhere
- Rapid delivery of temperature data in real time
- Interactive data access, allowing team members to drill down and react in a fast, efficient manner
- Timely reports and real-time views specific to user roles, with greater insights for individual responsibilities
- Deep and broad visibility, with comprehensive analytics for better decision making
- Continuous improvement through in-depth reporting with intelligence that drives corrective actions

The company is now easily capturing real-time data in a hands-free, cost-efficient way that isn't dependent on individuals to log information, which reduces unreliable and inconsistent data quality. Employees have critical real-time insights that can drive in-the-moment operational decisions, along with intelligence that provides trends on all internal and external supply chain participants, making it easier to manage KPIs and SOPs.

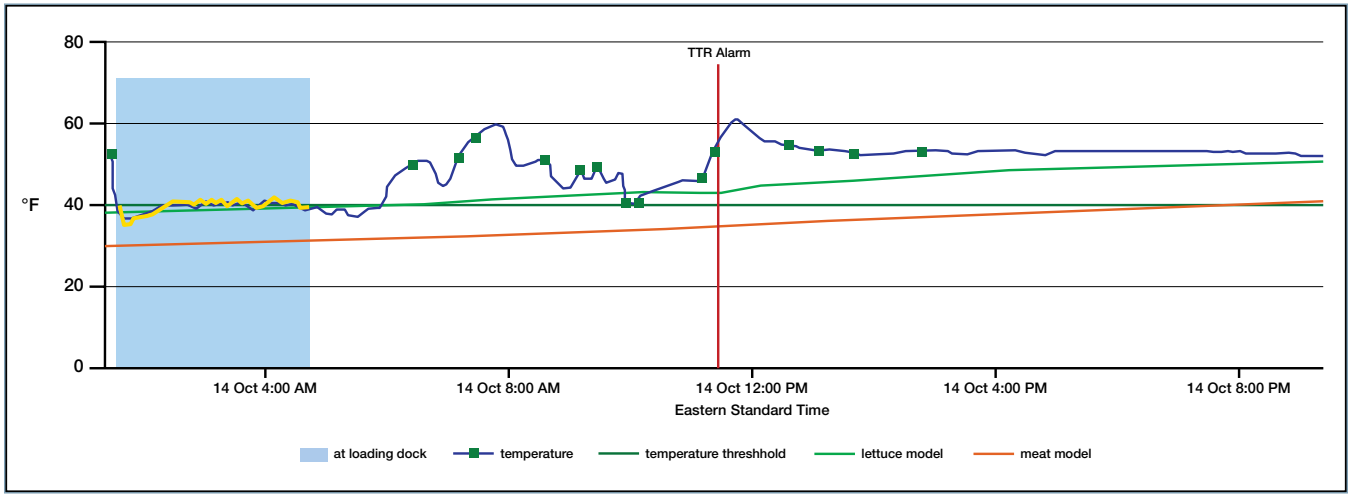
Predictive Analytics: Simulated Product Temperature

One of the benefits of a visibility platform like Sensitech's is the ability to take advantage of analytics that use artificial intelligence. For instance, Sensitech created several product-temperature simulation models that used predictive analytics to help the customer:

- Predict and avoid potential problems by simulating product temperatures for any point between a shipment's departure and arrival using historical or hypothetical data.
- Make timely product disposition decisions on questionable loads in order to salvage a greater amount of product.
- Improve day-to-day operations and resolve critical issues proactively, instead of reactively, based on the model's simulations.

The models can be used for any completed trip and include ambient and simulated product temperature data for every reading captured during the trip. The distributor can also create a product temperature simulation for hypothetical scenarios or specific events.

The distributor used one of these models when multiple products were exposed to a temperature abuse event over the course of several hours at a distribution center. As seen in the graphic here, such a model includes two simulated product temperature lines based on two different models (one for high-density products and one for low-density products). The blue line shows the ambient temperature data.



This data helped the food safety and quality assurance teams identify when product was compromised, enabling them to make intelligent and timely product disposition decisions and salvage some of the product.

The company can now react faster and more effectively to drive continuous improvements, which not only improves food safety and product quality, but also increases the cost effectiveness of its temperature-sensitive supply chain.

Granular Visibility Anywhere, Any Time

With the help of its cargo monitoring, predictive simulation models and other in-transit intelligence, this customer is able to make enterprise-wide operational and logistics improvements. Now, everyone in the company that is authorized—executives, regional directors and managers of supply chain, food safety, product quality assurance, transportation, warehouse, receiving and maintenance—can have secure access to the specific data they need, whenever they need it. Here are a few examples of how this works.

BETTER FACILITY COMPLIANCE

With aggregated data and insights on cargo at each facility, the cold chain personnel can now:

- Identify temperature abuse situations that may arise from power outages or malfunctioning equipment in a particular facility so corrective actions can be taken before any costly damages occur.
- Review historical data and evaluate employee performance in each facility against KPIs, such as proper and timely use of temperature sensors.
- Verify if SOPs were followed in the collection of critical data for cargo shipments.
- Determine if corrective actions, such as disposal of compromised product, were required on specific shipments and if they were completed efficiently and effectively.

GREATER FOOD SAFETY

The distributor has a program that proactively evaluates safe handling statistics, such as alarm percentages. With historical data, the company can compare performance between one fiscal year and the next to identify areas where operational improvements can be made.

IMPROVED DRIVER PERFORMANCE

Knowing the important role that drivers play in the management of product compliance, the company continually evaluates driver performance. The distributor can track when and how often corrective actions are needed by tracking driver statistics.

Overall, the company now has a more resilient and responsive end-to-end supply chain through real-time visibility and data analytics.

Conclusion: Real-Time Visibility Delivers

Utilizing a real-time cargo monitoring solution can have a significant impact on product quality, compliance, costs and risks.

With deep and informative insights, companies are now identifying, predicting, controlling and even eliminating the known and unknown challenges and risks that often arise in their supply chains and compromise product quality while in transit.

To learn more about Sensitech's end-to-end cargo monitoring solutions and cloud-based visibility platform, contact:

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About Sensitech

Sensitech Inc. is a global leader in delivering supply chain visibility solutions. Our innovative monitoring products and services help to maintain the quality, integrity and security of our customers' valuable products at every step in their journey, all around the world. For 30 years, leading companies in the food, pharmaceutical, industrial, consumer goods and other industries have relied on Sensitech to help protect their products—and their bottom lines.

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