Automation in Temperature-Controlled Environments

A Digital Transformation Journey Modernizing Commercial Refrigeration

A leading food retailer embarked on a transformative journey to modernize its commercial refrigeration operations. With a focus on optimizing perishables storage management, the initiative aimed to ensure food safety, improve quality, and integrate sustainability into daily operations. The company sought to build a smart ecosystem designed to minimize waste, optimize processes, and deliver the freshest products to customers.

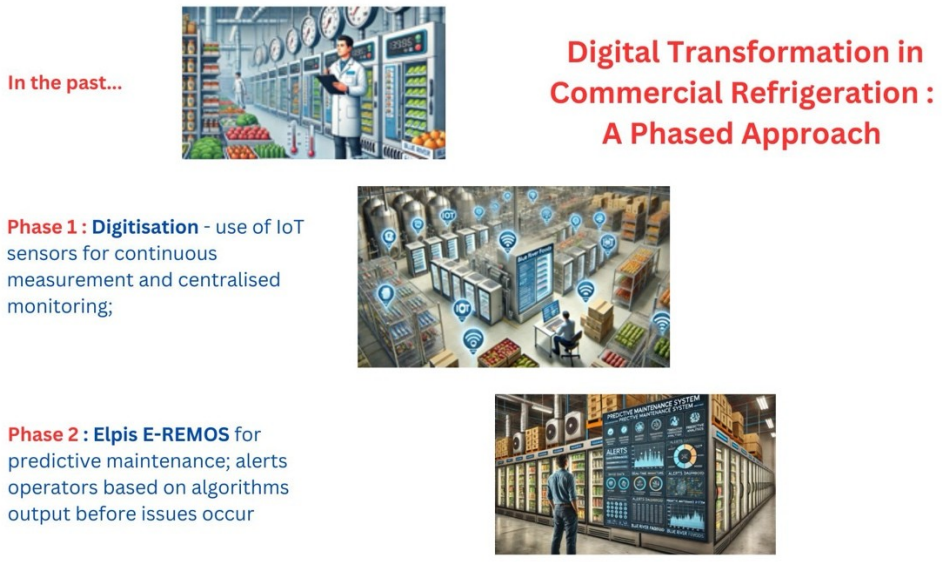
This innovative solution **by Elpis**, though implemented in food retail, has vast potential for other industries reliant on temperature-controlled environments, such as pharmaceuticals, healthcare, logistics, and manufacturing.

Refrigeration That Works Smarter

At the core of the retailer's operations are several cold storage warehouses, each spanning 4,000 square feet. These facilities house a wide variety of perishable goods such as cold cuts, meat, seafood, dairy, fruits, and vegetables. Each product requires precise storage conditions, divided into specialized zones:

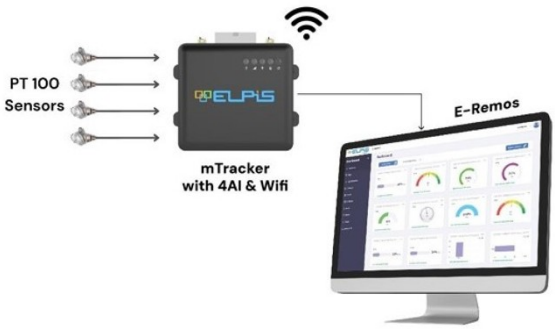
- **Chilled Foods:** Dairy and fresh produce maintained at 0°C to +5°C.
- **Meat and Seafood:** Stored at -2°C to -10°C.
- **Deep Freezer Goods:** Frozen items like ice cream preserved at -15°C to -18°C.

Maintaining proper storage conditions is critical, as the **temperature excursion rate** (percentage of time when storage temperatures deviate from the acceptable range) must remain near zero. Historically, temperature monitoring relied on manual checks, a process prone to delays, inaccuracies, and inefficiencies. Recognizing these limitations, the retailer partnered with **Elpis** to transition to a smarter, automated commercial refrigeration management system.



Phase 1: The First Step into Digital Transformation - From Analog to Digital

Elpis's phased solutioning focused on replacing outdated manual processes with leading-edge IoT and automation technologies.

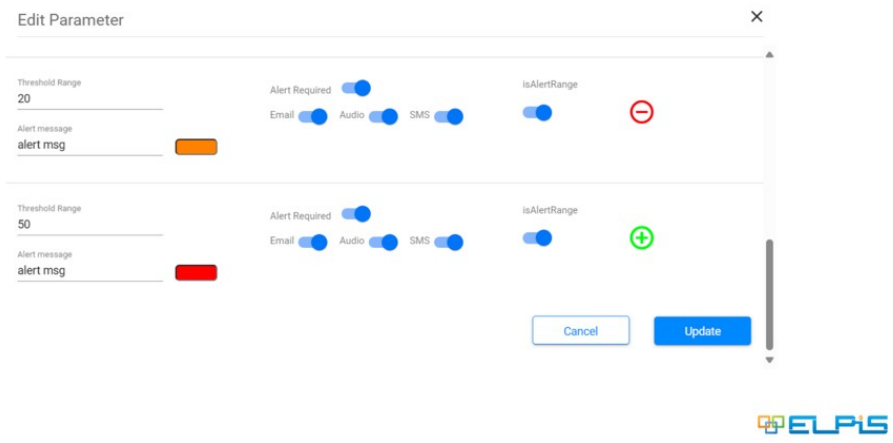


This included:

- **Real-Time Monitoring:** PT100 IoT sensors were installed across the storage zones to monitor ambient temperatures continuously and precisely.
- **Configurable Alerts:** Custom thresholds for each zone triggered real-time alerts via emails and messages, enabling rapid responses to temperature deviations.
- **Centralized Management and Data visualisation:** 4G connectivity allowed warehouse data to be monitored remotely via the Elpis **E-REMOS platform**, providing a centralized view of all facilities.
- **Data-Driven Insights:** The **E-REMOS platform** visualized data for immediate insights, making temperature management both proactive and efficient.

The outcome? A refrigeration system that operated smarter, reducing risks of spoilage and ensuring consistent, high-quality storage conditions.

Image : Customisable alerts definition for temperature ranges in different zones



Reaping the Benefits of Smart Refrigeration

The results of this transformation were clear and impactful:

- **Enhanced Food Safety:** Custom alerts and continuous monitoring ensured that perishables consistently stayed within safe temperature ranges, reducing temperature excursion rates to near zero.
- **Operational Efficiency:** By automating temperature checks, employees were freed from routine tasks and reassigned to more strategic roles.
- **Scalability:** The solution is scalable if the company wants to implement this across its 1,000+ warehouses, with centralized control without sacrificing quality.