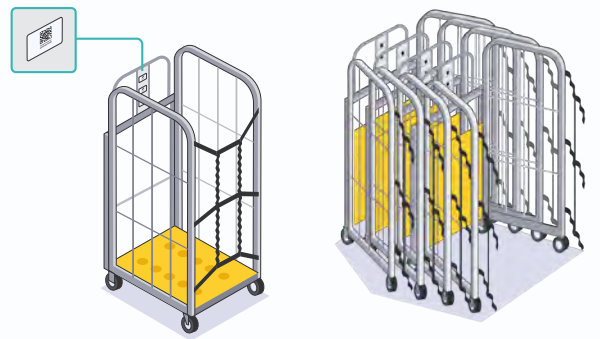




# Optimizing Mail Operations: Royal Mail Digitizes its Core Delivery Assets to Gain Unprecedented Visibility

With an eye to the future, the celebrated postal service adopts the Wiliot Intelligence Platform to speed delivery, achieve high quality of service, spur new products, reduce carbon emissions, and meet financial goals.



## Key Benefits

**Asset Location**

By gaining visibility into its vast fleet of rolling cages, Royal Mail optimized asset distribution across ~5,000 locations and enterprise customers, reducing the problem of missing cages, avoiding £m's in asset purchases.

**Vehicle Utilization**

As rolling cages are loaded into trucks, Royal Mail tracks which vehicles have underutilized capacity and optimizes performance. This translates into fewer trips with unused truck space.

**Network Flow Optimization**

By tracking rolling cages as they travel in trucks, Royal Mail can visualize more effective routes with departures better synchronized with workload, so mail gets to its destination with predictability and efficiency.

**Enhanced Quality of Service**

End-to-end visibility allows Royal Mail to increase customer trust by delivering items faster and more reliably while also giving customers with unprecedented visibility into their deliveries.

**Carbon Reduction**

Greater utilization of vehicles plus route optimization means Royal Mail can optimize labor, use less fuel and the new capability of reducing its carbon emissions.



## Executive Summary

**As part of its ambitious modernization plan, the United Kingdom’s Royal Mail has embarked on a three-phase effort to digitize its vehicles, facilities, and delivery routes to create end-to-end visibility throughout its vast network. Using revolutionary technology, Royal Mail can “see” its most important assets in real-time and use data to optimize operations.**

Royal Mail is accomplishing its visibility goals through deployment of the Wiliot Intelligence Platform, which connects the digital and physical worlds. The platform comprises a combination of smart tags and low-cost Bluetooth readers for turning “things” into agents of change through artificial intelligence and automation. It starts with IoT Pixels, which are battery-free, digital tags that deliver business insight without human intervention. These IoT Pixels are powered by radio waves and communicate constantly over industry-standard, ubiquitous Bluetooth.

At Royal Mail, phase one of its visibility initiative included applying IoT Pixels to its vast fleet of rolling “York” mail cages. Roughly 900,000 containers – 10 percent of which had previously been unaccounted for – are used to move billions of items annually, from sorting centers, to truck, to delivery office, and back, until the items are finally delivered to customers. The IoT Pixels communicate wirelessly and continuously to Bluetooth-enabled readers installed in Royal Mail vehicles, enabling tracking from loading, through transit, to unloading – all without scanning. Phase one has gone live, and Royal Mail is already seeing the benefits of asset visibility.

Phase two has started with the installation of Bluetooth-enabled readers within Royal Mail’s various sorting and distribution facilities. Staff can track cages as they move through various sorting and staging phases in the buildings – as well as in vehicles – enabling more granular visibility to unlock hidden problem areas and inefficiencies.

With this foundation, Royal Mail will apply the digital tags directly to parcels in the final phase, allowing them – and ultimately customers – to track individual shipments in real time. This will give customers with unprecedented visibility into their deliveries, enhancing trust and reliability by reducing instances of lost or delayed shipments, and providing a seamless delivery experience that sets a new standard for service quality. Because IoT Pixels also sense temperature and humidity, Royal Mail will be able to offer new delivery products in growing markets, such as shipping medical products, perishables, currencies, or high-value items with proof of proper, safe handling, and chain of custody.

Ultimately, this ubiquitous deployment of the Wiliot platform represents a major step toward the future of Royal Mail.



***We can now focus on minimizing disruption and ensuring the most accurate on-time deliveries. Better for our people, and better for our customers.***

**Alistair Cochrane**  
Chief Operating Officer,  
Royal Mail



## Introduction

With a storied legacy that dates back more than 500 years, Royal Mail, the United Kingdom's national postal service, has its eyes firmly on the future. To compete with e-Commerce shippers and others, it's been important for Royal Mail to innovate and adapt.

Royal Mail has already modernized logistics and made technological improvements to meet consumer demand. Now, perhaps unsurprisingly, the inventor of the world's first postage stamp is adopting stamp-sized computers to revolutionize its operations and gain unprecedented visibility into its vast delivery network.

As part of its modernization efforts, Royal Mail has adopted ambient Internet of Things (IoT) technology from Wiliot to transform the way they track assets and items. By using Wiliot's breakthrough digital tagging, Royal Mail can operate more efficiently, manage costs, lower carbon emissions, enhance quality of service, and enter new markets.

## Challenge

Royal Mail's delivery network is vast and complex. Understanding how efficiently it's operating at any point in time requires visibility, enabled through digital technology. This includes "seeing" where its assets are located, when mail will arrive at its next destination, where bottlenecks may exist, and whether its trucks and facilities are running efficiently.

Visibility on the scale of Royal Mail is especially challenging. With roughly 1,000 sites and thousands of vehicles handling more than one billion parcels a year, only a scalable, cost-effective, automated tracking solution would do.

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***We needed to know what was happening in our network in order to run it more effectively. That is why we wanted to track assets and items.***

**Nathan Preston**  
Technology Director for Strategy,  
Innovation & Data, Royal Mail



## Solution

Royal Mail is the world's first postal company to use the Wiliot Intelligence Platform to monitor the indoor location and geolocation of core delivery assets in real time. The platform is based on stamp-sized digital tags that, when affixed to Royal Mail delivery assets, automatically communicate their location and condition through low-cost Bluetooth-enabled readers installed in various parts of the network.

In the first of a three-phase Wiliot deployment, Royal Mail tagged about 900,000 rolling delivery cages that they used to transport parcels around the country. Due to the low cost, the company applied three IoT Pixels per rolling cage for redundancy and reliability. Royal Mail accomplished the tagging in mere months.

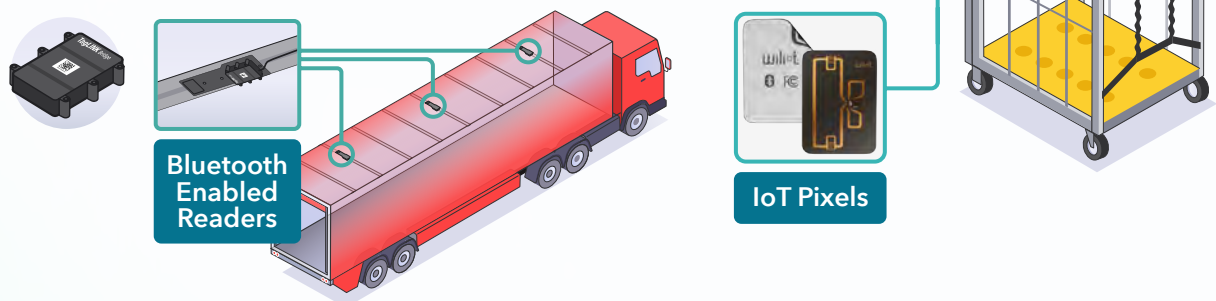
These cages are loaded onto delivery trucks and driven between Royal Mail facilities. Depending on the size of the vehicle, each truck is outfitted with two to three Bluetooth-enabled readers, with up to six when a double-decker vehicle is used. These energize the IoT Pixels and receive data from them, forwarding it to the cloud for analysis.

"We've looked at this challenge for many, many years and until now it's been cost-prohibitive to track at this scale when you're talking about 8,000 vehicles and 900,000 cages," says Nathan Preston, Technology Director for Strategy, Innovation & Data at Royal Mail. "Battery-free IoT Pixels change the economics of tracking. They drastically reduce the cost of tagging each asset. They're also scalable. Tagging 900,000 assets is itself challenge, but looking ahead, we handle 1.2 billion parcels per year. With Wiliot's tags, we can start tagging individual items to produce unique, itemized tracking."

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**We've looked at this challenge for many, many years and until now it's been cost-prohibitive to track at this scale...**

**Nathan Preston**  
Technology Director for  
Strategy, Innovation & Data,  
Royal Mail





## Key Areas of Focus

By adopting Wiliot's scalable, cost-effective tracking technology, Royal Mail is focusing on three areas of its delivery network: gaining asset visibility in vehicles, then buildings, then into the movement of individual parcels.

### Phase 1: In-Vehicle Visibility

Before implementing the Wiliot platform, Royal Mail could track its vehicles, but couldn't tell what was in them, namely, the rolling cages they used to transport mail. In fact, it was a constant challenge to ever know exactly how many roll cages they owned and where they were as they traveled between the many Royal Mail and enterprise customer sites. By the company's own estimates – gleaned over the course of implementation – they couldn't account for 10 percent of its rolling cages before adopting Wiliot's technology.

In the first phase of deployment, now largely complete, Royal Mail tagged its rolling cages with IoT Pixels and installed Bluetooth-enabled readers in roughly 8,000 vehicles of various types and sizes. Once tagged and communicating via these devices, the digitized cages allowed staff to monitor their location throughout the country and take action as necessary. With this data, an alert could be sent when a rolling cage is loaded onto the wrong trailer, avoiding potential delays.

As data derived from the IoT Pixels is uploaded to the cloud, then Royal Mail can merge it with other data to create new business insights. For instance, the capacity of the various vehicles sizes can be compared with the actual number of cages loaded to analyze efficiencies in distribution. This visibility into its fleet of vehicles supports data-driven journey planning, helping optimize asset capacity, vehicle availability, and timing. By incorporating this data into fleet planning, Royal Mail can better fill and route its vehicles to avoid wasted or sub-optimal journeys, while also predicting availability and improving resource allocation across the network.

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***There will be no assumptions or manual checks required anymore. [We have] visibility of both individual items and the entire network flow.***

**Alistair Cochrane**  
Chief Operating Officer,  
Royal Mail



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**Alert: Mis-sort**

Move from Lane 25 to Lane 32

## Phase 2: In-Building Visibility

Royal Mail is currently extending the Bluetooth-enabled readers to its distribution facilities, starting with its two largest hubs, and broadening to roughly 400 sites by the end of 2025. As they currently do inside Royal Mail's delivery vehicles, these devices inside its buildings will allow staff to track rolling cages as they're filled with parcels, moved throughout the facility, and prepared for loading into vehicles. With this added visibility, Royal Mail can monitor the flow of assets in real-time, ensuring that the roll cages are moving efficiently through sortation, to the loading dock, and eventually onto vehicles. Site managers can also track end-to-end processing times and receive alerts for non-moving assets or delays within sortation processes.

In-building visibility is important because it creates real-time truth about the location and utilization of assets, as well as workflow efficiency and compliance. While in-vehicle visibility can tell Royal Mail when cages have arrived or left a facility, allowing them to infer their location with a high degree of certainty, in-building visibility creates a more granular picture of those assets.

Royal Mail can tell if one or more cages have been inadvertently mislocated. They can match the actual capacity of available cages at a location to incoming or outgoing volume. Such insights allow them to uncover service and quality issues and enjoy a far more detailed and accurate picture of its cage inventory.

"Everything that leaves a site, leaves in a cage, but not everything arrives in a cage," says Nitin Kamboj, Head of Strategy for Digital Supply Chain at Royal Mail. "Better resource planning 'under the roof' helps manage the inflow and outflow and avoid adverse impacts downstream."

At its two super hubs, Royal Mail has combined containerization technology with data from the Wiliot platform to understand what parcels have been loaded into which tagged cages. This is the beginning of the most granular level of visibility, which will allow Royal Mail to offer customers advanced, item-level tracking throughout the delivery network.

## Phase 3: Parcel-Level Visibility

Thanks to the scalability of the Wiliot solution, Royal Mail plans to tag individual parcels. Such granular visibility would enable greater accuracy in delivery operations, allowing Royal Mail to minimize the impact of delays caused by misplaced or misrouted parcels. It would also allow Royal Mail to offer tracking services to customers.

"This has been a key part of our journey with Wiliot," says Kamboj. "Making it commercially viable for customers to have live visibility into deliveries."

In addition, because Wiliot provides temperature and soon humidity sensing, not only can they communicate a parcel's location, they can provide important data about its handling. This will allow Royal Mail to enter new, growing markets, like the delivery of medical supplies and perishable food.



## Results and Findings

Royal Mail is analyzing data generated by three million IoT Pixels deployed on rolling cages. Initial results fall into several categories.

### 1. Locating the Cages

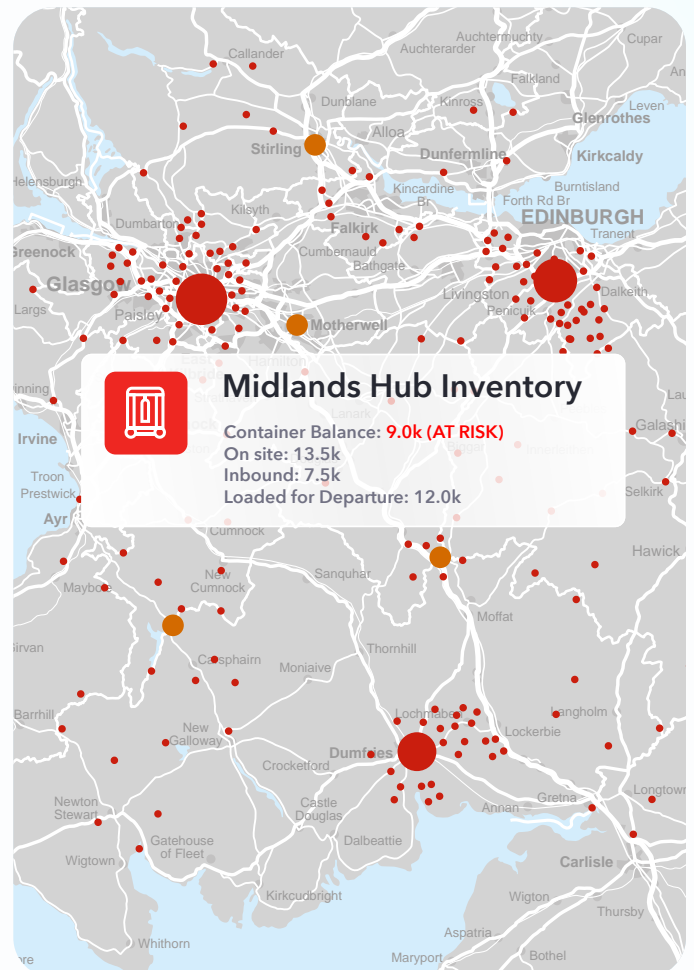
When Royal Mail began tagging its rolling cages, manual estimates of the number were about 720,000. As cages moved through the network, they were pulled aside at one of several sites for tagging, then returned to circulation. In roughly six months, Royal Mail has tagged more than 900,000 cages – and counting.

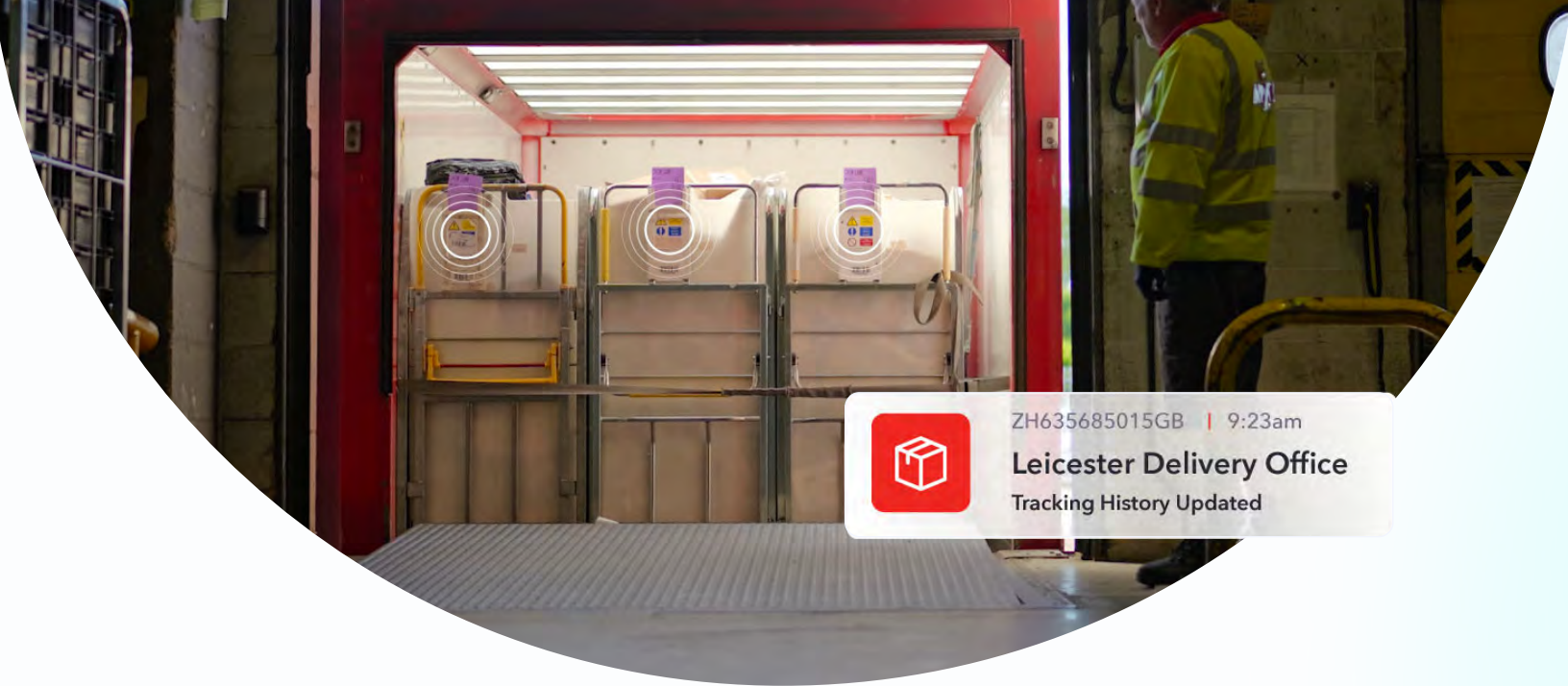
This is significant. A new rolling cage costs Royal Mail about £200 (\$260 US), meaning through the process of bringing each rolling cage online, Royal Mail gained automated visibility of more than £20,000,000 worth of this critical asset.

“The most basic, important application of this platform is answering, ‘Where are the assets?’” says Preston. “We have certain spots that used to be black holes for these cages. And they’re not cheap, so having a better picture of our inventory means we aren’t buying new ones.”

Moreover, during peak delivery times such as the holidays, when enterprise customers require cages at their sites to load parcels, Royal Mail is better able to deliver the right number of cages to the right places. After the peak season surge, it can ensure it receives the correct number in return.

“The most important win of the project so far has been making sure we’re controlling and distributing the flow of assets more effectively,” Preston says. Since, Royal has been able to avoid millions of pounds (£) in asset purchases.





## 2. Asset Allocation

If any facility in Royal Mail's delivery network runs out of roll cages, operations would come to a standstill. That makes allocation of cages throughout the network extremely critical.

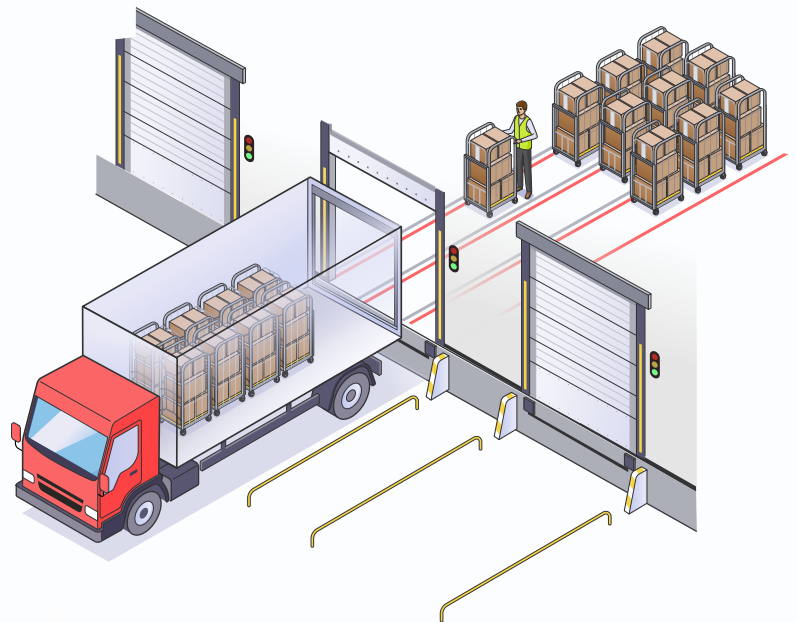
With Wiliot's platform, Royal Mail now enjoys real-time inventory of cages by site, including how many cages are in-route to a site and how many cages are leaving. They know how many are in use, how many have been dropped off at enterprise customer sites, and how many are in storage.

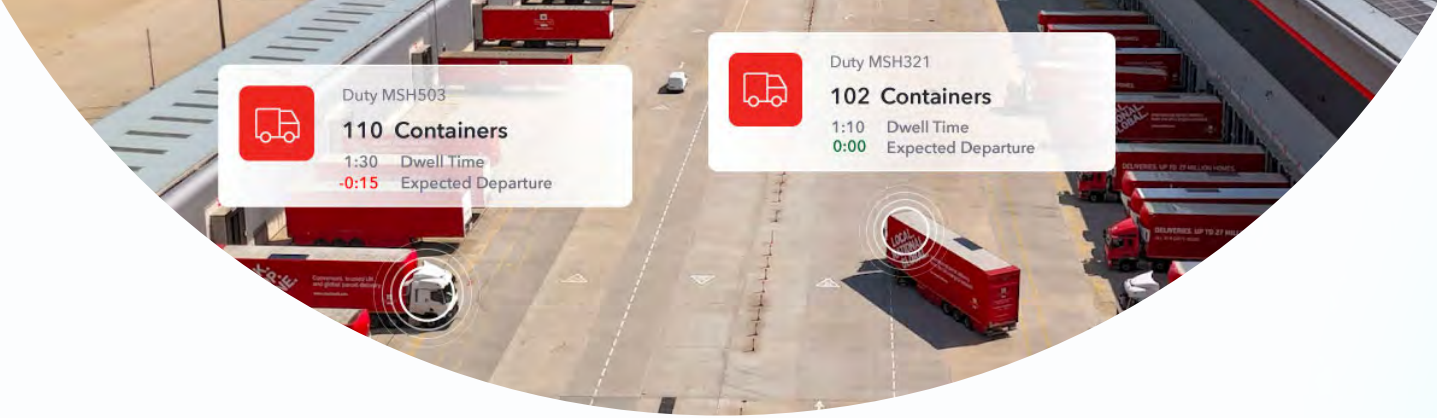
This data helps operators resource-plan based on actual versus assumed cage counts, resulting in better roll cage allocation - dynamically, on-the-fly based on demand.



***With Wiliot's innovation, all containers can be accounted for – the exact quantity loaded or unloaded at each stop, and back to the facilities that need them. This ensures all parcels always have a container ready for them.***

**Alistair Cochrane**  
Chief Operating Officer,  
Royal Mail





### 3. Transport Utilization

Wiliot-enabled in-vehicle visibility has allowed Royal Mail to focus on what and how much is actually being loaded into its fleet of trucks. If a truck leaves a distribution hub with half the number of cages it can hold, Royal Mail can see this and develop ways of improving efficiency. If it returns empty, or mostly empty, meaning now the hub may be low on usable cages, they can plan for more strategic cage collection along the return route.

By combining Wiliot-enabled tracking data in the cloud with Royal Mail’s other data, like which parcels are in each roll cage or network plans, utilization can be further optimized. For example, they can determine whether an early or later departure have a capacity smoothing or service impact. They use process of “duty match,” to answer questions like, “Did the planned departure/arrival times, truck routes, and assets delivered match with reality?” From there, Royal Mail can generate new intelligence from visibility data.

For example, the efficiency of on-time mail distribution throughout the UK requires detailed scheduling; For a truck to complete a delivery on-schedule, it frequently must leave at a specific time – whether or not its load is optimal.

With in-vehicle visibility, Royal Mail can see whether a truck has been loaded to near-capacity before a scheduled departure. If it’s leaving a facility half-full in order to maintain its schedule, operations can begin to model alternatives that still ensure on-time delivery while optimizing truck utilization.

“In all, there are about 50,000 vehicle journeys a week,” says Preston. “If any are running at low capacity, it’s an ineffective journey. This solution allows us to optimize our fleet, including the number of vehicles. And at the sites where people are filling the trucks, it helps improve logistics efficiency.





#### 4. Carbon Reduction

In-vehicle visibility allows Royal Mail to assess the routes each truck takes throughout the delivery network. Sending a full, smaller truck along a shorter route helps maximize efficiency and reduce fuel consumption. Similarly, ensuring one optimally utilized truck does the job of two underutilized vehicles can demonstrably cut carbon emissions.

Royal Mail has pledged to be “net zero” by 2040 and understands that its Wiliot-enabled visibility is critical to achieving that sustainability goal.

In the future, Royal Mail will be able to share granular details, including carbon emissions per parcel, so customers can understand the environmental impact of their deliveries.

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***Understanding the emissions of a journey means knowing about the vehicles, the distance, and the amount of mail in them. With that data, we can begin to make recommendations that will reduce the carbon footprint of a journey significantly.***

**Nitin Kamboj**  
Head of Strategy for Digital Supply Chain,  
Royal Mail



## Conclusion

*Wiliot's Intelligence Platform is proving an important part of Royal Mail's modernization efforts. By enabling end-to-end visibility throughout its delivery network, Royal Mail can discover new opportunities for efficiency in distribution.*

*Starting by digitizing critical assets – their 900,000-plus rolling mail cages – Royal Mail saw immediate ROI. Simply by “seeing” all their cages in real time, Royal Mail was able to avoid costly replacements and better position the cages across the UK to ensure mail distribution and delivery never lagged. When the now-visible assets were loaded onto Royal Mail's fleet of vehicles, they were able to improve vehicle utilization—reducing trips with unused truck space—and better synchronize departures with workload, ensuring that mail reaches its destination with greater predictability and efficiency. Royal Mail have since reduced the amount of fuel consumed and its annual order of new roll cages, cutting costs by millions of pounds (£).*

*Because Royal Mail found the Wiliot platform to be highly scalable, they are continuing their modernization by extending visibility into its various facilities, in preparation for visibility on a per-parcel basis in the future. By digitizing parcels, customers will be able to track their location in real time. And because Wiliot provides temperature and humidity sensing, markets such as medical suppliers will be able to send sensitive products using Royal Mail and know definitively that they've been properly maintained along the way.*

*In the end, such end-to-end visibility allows Royal Mail to continue delivering exceptional customer service while taking steps toward achieving their net zero goals. The Wiliot platform gives Royal Mail the tools needed to deliver faster, safer, and more environmentally sustainable services and solutions.*



**See the deployment in action!**



**Visit [www.wiliot.com](http://www.wiliot.com)  
to learn more**

### About Wiliot:

Wiliot's real-time visibility empowers businesses from retail and logistics to processing and manufacturing, with responsive, more robust supply chains and on-site operations. By automating the tracking, monitoring, and management of goods—both in transit, and throughout facilities—Wiliot ensures that everything is where it should be and in the right condition.

Without any added labor or new processes, this omniscient view of your operations maximizes efficiency, reduces waste, and ensures inventory accuracy, all while lowering costs and meeting customer demands.