

Transforming rodent control: Remote monitoring and the future of pest control

A case study of a data-driven rodent management pilot program

By Tom Jackson, Matt Medici and Ryan O'Day | June 2024





Transforming rodent control: Remote monitoring and the future of pest control

A case study of a data-driven rodent management pilot program

By Tom Jackson, Matt Medici and Ryan O'Day | June 2024

Executive summary

The adoption of new technologies, including data-rich, connected feeds powered by the Internet of Things (IoT), is transforming many industries, and Pest Control is no exception. This new approach moves the industry away from traditional, reactive and labor-intensive methods towards proactive, more precise strategies driven by data. By leveraging sensor technology and applying real-time data analytics, IoT solutions offer enhanced accuracy, efficiency and effectiveness in rodent control, as well as important benefits in terms of environmental sustainability and the allocation of labor. The pilot program for Aardvark Pest Management of Philadelphia aimed to evaluate the effectiveness and feasibility of using sensor technology in pest management. The specific objectives were to monitor and detect rodent activity accurately and in real-time, to provide comprehensive data insights into rodent behavior and environmental factors, to assess the effectiveness of sensor-based interventions in reducing rodent populations, to optimize resource allocation, response times and software effectiveness based on sensor data, and to enhance customer satisfaction through a proactive, data-driven approach. The nine-week study reduced rodent activity at two sites:

Site 1: Full-service cafeteria and kitchen setting in a major urban university campus. Rodent activity decreased by 56%, from an average of 41 instances per week to 18 instances.

Site 2: Busy kitchen and cafeteria in a large urban hospital. Rodent activity decreased by 39%, from 23 instances per week to 14 instances.

The adoption of IoT-based remotely monitored rodent control offers multiple benefits for Aardvark's commercial customers. It enhanced effectiveness through early detection and timely interventions, provided a more effective use of Aardvark Pest Management technicians, freeing them to spend more time on preventative assessments and actions and on deepening their customer relationships. It provided the peace of mind that comes from a customer knowing that their location is continuously monitored and being serviced by environmentally sustainable pest management. Remote monitoring minimizes the need to deploy chemical pesticides and reduces fuel consumption and carbon emissions by shifting the criteria for driving to a customer site from monthly or weekly "bait box" inspections to actual detected and verified rodent activity.

Offices in:

Philadelphia

Boston

London

Geneva

Pune

Introduction: Digital transformation comes to Pest Control

In an era marked by technological innovation and digital transformation, traditional industries are undergoing profound changes, and the Pest Control industry is no exception. Today, the technological disruption and innovation that swept through the Banking, Communications, Corporate and other sectors in decades past is beckoning Pest Control Operators (PCOs) with the promise of more efficient and sustainable operations, labor savings and new business models. The advent of Internet of Things (IoT) technology, algorithmic software as well as Artificial Intelligence and Machine Learning (AI/ML), a new frontier in Pest Control has revealed itself, promising to revolutionize the way we detect, monitor, and manage pest infestations of all kinds.

This is the context of this detailed examination of a field deployment of remote monitoring rodent control solutions, in this case **Microshare's EverSmart Rodent**,¹ and the integration of IoT-derived data into a fast-paced, long-established PCO.



The pilot by **Aardvark Pest Management**, conducted between March and June 2024, highlighted the challenges and benefits in shifting from reactive, manual approaches to proactive, data-driven strategies. By harnessing sensor data technology to software capable of real-time data analytics, the pilot demonstrated that Pest Control professionals can now obtain unprecedented levels of precision, efficiency, and effectiveness in combating rodents while minimizing environmental impact and optimizing resource utilization.

In this document, we provide a technological overview of the IoT-based EverSmart Rodent solution, compare its impact to traditional methods and explore the multitude of benefits that flow from its deployment at scale to the PCO's end customers.

Pilot objectives

The objective of the Aardvark pilot program was to assess the efficacy and feasibility of utilizing sensor technology in pest management practices. Through the deployment of sensors in designated areas, the program aims to:

1. Monitor and detect pest activity accurately and in real-time, enabling proactive rodent control measures.
2. Collect and provide data insights into rodent behavior, population dynamics and environmental factors influencing infestations.
3. Evaluate the effectiveness of sensor-based interventions in reducing rodent populations and minimizing damage to property.
4. Optimize resource allocation and response times by leveraging sensor data to prioritize areas requiring immediate attention.
5. Enhance customer satisfaction and retention by offering a proactive, data-driven approach to rodent control, thereby minimizing pest-related disruptions, attrition and environmental impact.

By achieving these objectives, the pilot program seeks to validate the potential of sensor technology in changing traditional rodent control strategies, ultimately leading to more efficient, sustainable, and cost-effective pest control solutions.

Offices in:

Philadelphia

Boston

London

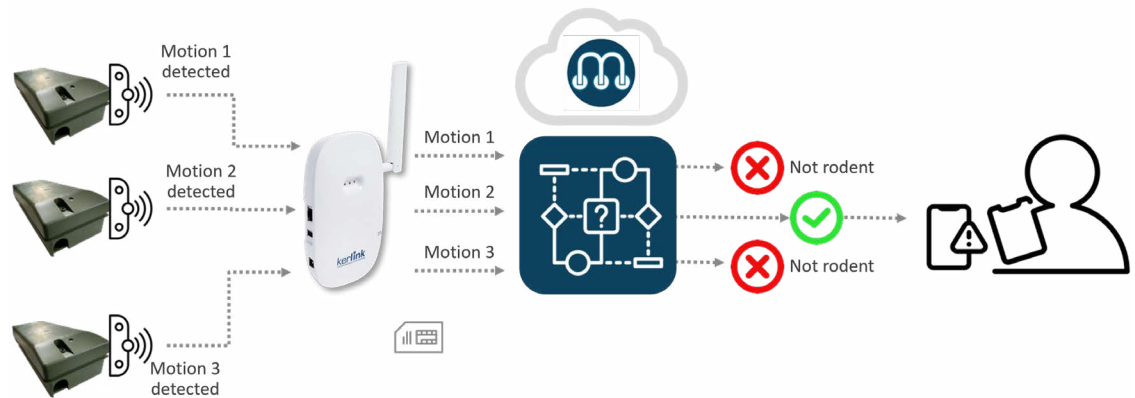
Geneva

Pune

Technology overview

The IoT solution employed in the pilot program, **EverSmart Rodent**, integrates advanced sensor technology and custom software design with contemporary rodent management practices. Motion sensors were strategically placed in areas prone to infestation, allowing for continuous data collection. This data was then transmitted over a dedicated, secure wireless network (LoRaWAN)ⁱⁱ to a central software suite where it underwent real-time analysis. This process enabled Pest Control professionals to access data and dashboards remotely via smart phones, facilitating timely and informed interventions. Automated alerts filtered through an incident algorithm were sent to mobile devices, ensuring swift awareness of emerging rodent pressure. The system's proactive management capabilities allowed for early detection and the implementation of preventative measures and exclusion interventions that derived directly from the data provided.

This marriage of sensor data and analytical, algorithmic software is at the heart of the beneficial disruption that remote monitoring offers.



Conventional rodent control requires regular site visits to inspect bait boxes and look for droppings or other evidence of rodent activity. This work typically means rolling a truck or van on regular, scheduled rotations. Because they are effectively “blind” and not sparked by any transmitted data evidence of rodent activity, in many cases, such visits amount to an inefficient expenditure of time and fuel.

They also represent a less-than-optimal way to preempt rodent infestation. Additionally, even in cases where infestation is detected manually during a site visit, no historical data exists to help diagnose the cause of the activity or suggest when the problem began, from which direction it originated, or whether time of day, weather or some other factors are at play.

The remote monitoring marriage of deployed sensors – both in bait boxes and outside them in rodent transit areas – and algorithms designed to filter out false positives and to distinguish rodent activity from other types of movement – ensures maximum possible accuracy.



Sensor captures mouse in transit space at Site 2

Findings and Analysis

During the period of the nine-week remote monitoring rodent control study (March 31-May 31, 2024) two sites were tested: The first (Site 1) is in a large university cafeteria in an urban setting consisting of 17 Victor Tin Cat traps with retrofitted with PIR sensors. The second (Site 2) is a hospital cafeteria in an urban setting consisting of 19 Victor Tin Cat traps with retrofit sensors.

Offices in:

Philadelphia

Boston

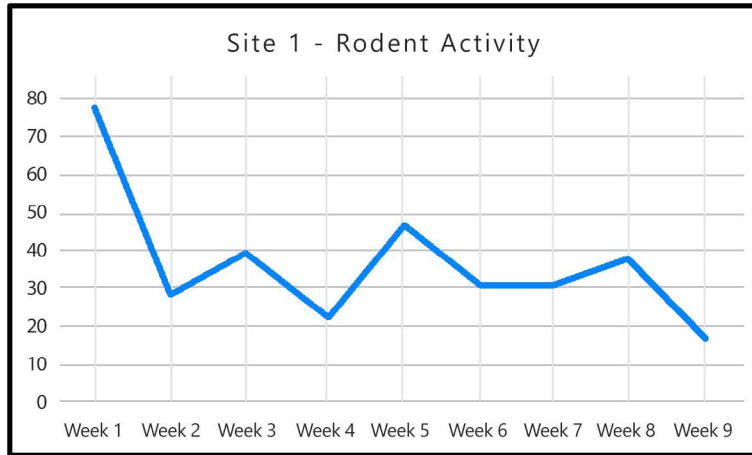
London

Geneva

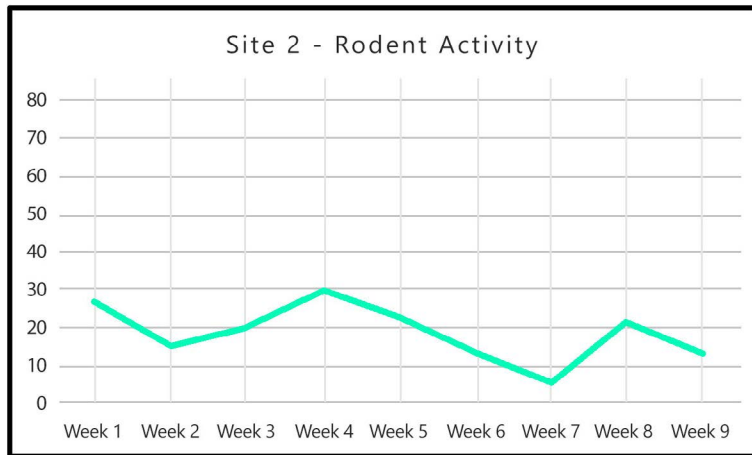
Pune



For Site 1, we observed an average activity of 41 instances per week during the first four weeks of the study. Over the next four weeks, the average activity decreased to 36 instances per week. In the final week, activity dropped to a low of 18 instances, marking a 56% decline.



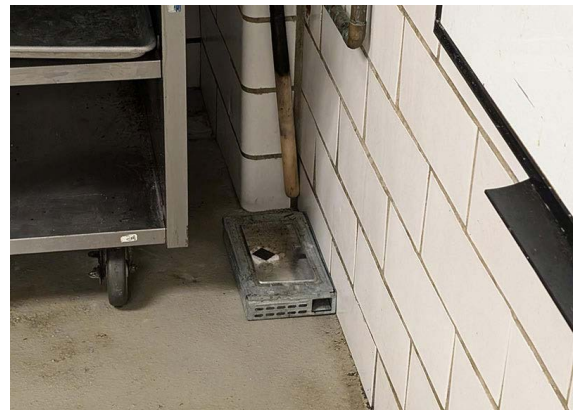
For Site 2, the average activity was 23 instances per week for the first four weeks. During the subsequent four weeks, this average decreased to 16 instances per week. In the last week, activity fell to 14 instances, representing a 39% decline. The data provided insights for the PCO to act and has likely improved the performance results. There were a series of actions taken during this time, including the inspection/evaluation of high traffic areas caught by the sensors, that led to the finding of entry points for the rodents that have been now filled with PestPlug steel wool.



Offices in:
Philadelphia
Boston
London
Geneva
Pune

The key to the declining activity was the keen interest the Aardvark technicians showed in referring to and then interpreting the data. Receiving data will not, in and of itself, solve anything. The data must be looked at and acted upon.

The corrective actions Aardvark Pest Management took were resetting of the traps that were triggered, identifying entry points and sealing the active areas around the most active traps. The entry points identified by sensor data helped to prevent further intrusion and aided in devising a more comprehensive control strategy. Sealing these entry points denied rodents access to the site, reducing the likelihood of further infestation. Through continuous monitoring, Aardvark Pest Management was able to confirm the effectiveness of these exclusion methods and helped the PCO adjust strategies as needed.



Sensor-retrofitted Tin Cat trap on Site 1

Aardvark Pest Management was also able to make recommendations to the customer for environmental modifications based on the preventative actions taken the after analyzing EverSmart Rodent data and conducting follow up inspections. Modifying the environment reduced harborage opportunities and further discouraged infestation. By continuously analyzing the data, Aardvark found patterns of rodent behavior it had not previously anticipated, creating for a diagnostic capability that drove proactive adjustments to optimize their pest control efforts.

Benefits for the End Customer

- 1. Enhanced Effectiveness:** Early detection and timely interventions can reduce property damage and improve health and safety. An infestation prevented is a great deal less costly to deal with than one which takes root.
- 2. Risk Mitigation:** Preventing extensive infestations means avoiding sometimes expensive remediation costs, minimizing property damage and reducing the likelihood of reputational damage or risks to a License to Operate for those in regulated industries like food services, pharmaceuticals, restaurants and hospitality. All were relevant in the two sites tested.
- 3. Improved Convenience:** Remote monitoring capabilities enhance customer convenience, avoiding the need for customers to provide access to the site for review. Only less frequent on-site visits need be scheduled.
- 4. Peace of Mind:** Continuous monitoring provides 24x7x365 assurance that rodent activity will be detected when it occurs rather than days or even weeks later during routine scheduled visits
- 5. Environmental Sustainability:** Reduced use of chemical pesticides promotes environmentally friendly practices. Similarly, as the PCO adjusts routing and site visits to comport with actual rodent activity rather than rote scheduling to check bait boxes, less fuel is consumed and less carbon is emitted. In green parlance, the customer creates less Scope 3 carbon emissionsⁱⁱⁱ with remote monitoring, an increasingly important matter for large commercial clients sensitive to Environment, Social and Government (ESG) ratings.
- 6. Improved Customer Experience:** Proactive strategies that reduce rodent activity equates to a better overall service and higher customer satisfaction.

Conclusion

The nine-week pilot, at its core, dramatically reduced rodent activity on both sites. With relative ease, the PCO adopted and integrated valuable IoT-generated activity data into its operational cadence, learning and quickly adjusting to the new visibility that the technology provided. Adoption of an IoT-based rodent management solution offered numerous tangible benefits for the PCO and well as its large commercial end customers. These include enhanced effectiveness through early detection and timely interventions, cost savings on rodenticide and fuel, and improved convenience and accuracy with remote monitoring capabilities. Customers also gained the peace of mind of knowing that their properties were continuously monitored. Furthermore, tailored reporting ensures that customers can access valuable data-driven insights, empowering them to make informed decisions about pest management, including changes to their property to reduce harborage and access points. As the industry continues to evolve, remote monitoring sets a new standard for efficiency, effectiveness and customer satisfaction in rodent control.

The authors, who also helped deploy and oversee the Aardvark pilot, are all Microshare employees. They are Tom Jackson, Chief Strategy and Business Development Officer, Matt Medici, Senior Manager, Client Services, and Ryan O'Day is a Customer Success and Fulfillment Manager at Microshare. You can direct questions about this white paper to them via sales@microshare.io



Offices in:

Philadelphia

Boston

London

Geneva

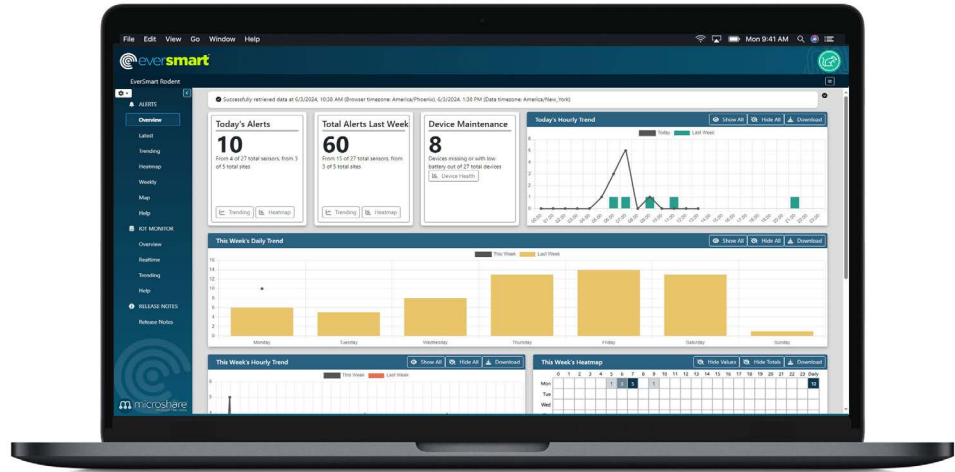
Pune



ⁱ EverSmart Rodent from Microshare: <https://www.microshare.io/eversmart-rodent/>

ⁱⁱ LoRaWAN networks: The LoRaWAN® specification is a Low Power, Wide Area (LPWA) networking specification designed to wirelessly connect battery operated 'things' to the internet in regional, national or global networks, and targets key Internet of Things (IoT) requirements such as bi-directional communication, end-to-end security, mobility and localization services. More from the LoRa Alliance.

ⁱⁱⁱ Scope 3 carbon emissions: <https://www.carbontrust.com/our-work-and-impact/guides-reports-and-tools/what-are-scope-3-emissions-and-why-do-they-matter>



EverSmart Rodent on laptop display

Thank you

For more information visit us on the web at www.microshare.io

Offices in:
Philadelphia
Boston
London
Geneva
Pune



Philadelphia



London



Geneva



Boston



Microshare® Inc.
PO Box 4389
8225 Germantown Ave
Phila, PA 19118-9997