Innovation Factory

CASE STUDY: AUTOMATED DEER DETERRENT SYSTEM (ADDS)

Transforming Rail Safety: A Success Story of the Automated Deer Deterrent System (ADDS)

INTRODUCTION

In recent years, train operators around the world have been faced with the growing number of wildlife incidents on railway tracks, which has become a major operational challenge. In particular, deer strikes have been disruptive and costly to UK rail industry. To tackle this growing problem Innovation Factory Limited worked alongside LNER's Innovation Team and the East Coast Partnership to develop the Automated Deer Deterrent System (ADDS), a state of the art solution to prevent deer from entering the rail tracks.

In this case study, the journey of Innovation Factory Limited is explored as it relates to challenges within the rail industry, ADDS as a solution, and the quantifiable success it has led to. This collaboration has not only saved millions in operational costs, but has also created a scalable solution that is a potentially critical tool in rail safety worldwide

A REVOLUTIONARY SOLUTION FOR WILDLIFE MANAGEMENT ON RAILWAYS

PROBLEM STATEMENT:

Over the past two decades, the UK's deer population has seen a dramatic increase, and in some areas population growth has doubled. Frequent deer incursions on railway tracks have resulted especially during mating and foraging seasons. These incursions are not just hazardous to the animals themselves, but also to the safety of rail operations and the financial stability of operators like LNER

LNER reported 37 deer strikes during the first eight rail periods of 2022, with 140 trains affected and over 3,329 delay minutes. More than a logistical inconvenience, these delays were. These strikes caused financial losses of more than £1.2 million, with the bulk of that coming from repair costs and lost train availability. The financial burden is compounded by the fact that deer strikes are traumatic for train drivers and cause major disruptions to the services available to passengers.

Fencing or deer whistles have failed as existing solutions and each deer strike is estimated to cause an average delay of 48 minutes. With the increasing number of incidents, and the inefficiency of these older solutions, a scalable, modern deterrent system was needed that would not only protect wildlife but also guarantee smooth railway operations.

Locations of 2 trial sites

SOLUTION:

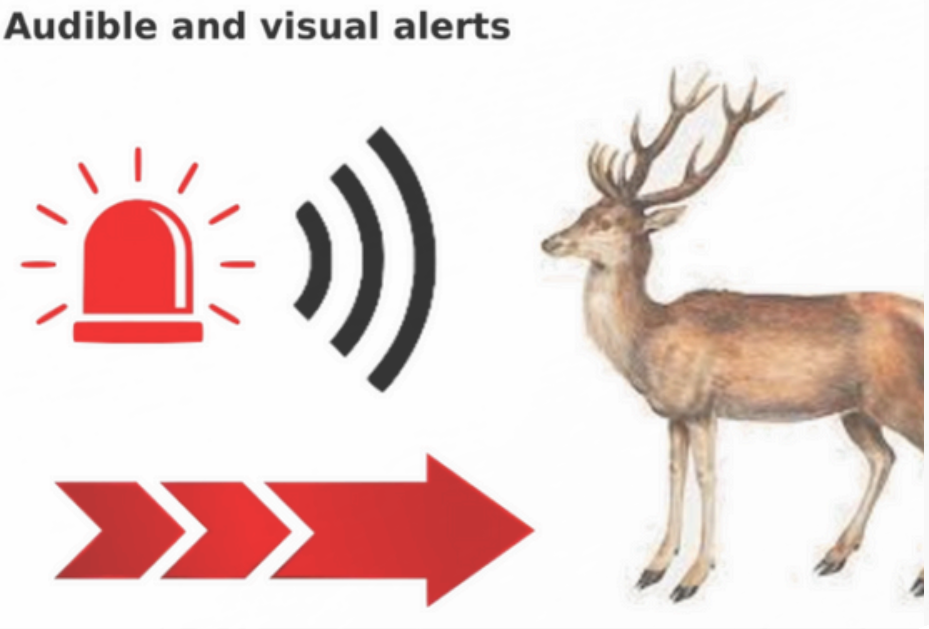
As a result of this urgent issue, Innovation Factory Limited teamed up with LNER's Innovation Team and the East Coast Partnership to produce the Automated Deer Deterrent System (ADDS). ADDS is a powerful wildlife management system that uses cutting edge technologies including artificial intelligence (AI), TinyML (Edge Machine Learning) and vision analytics to detect the presence of deer in real time and deploy non invasive deterrent measures.

Visually and audibly deterrents, such as flashing lights, ultrasonic tones, and alarms, are used by ADDS, which activate only when the system detects deer near the tracks. The specific deterrents are designed to be non harmful, but effective in preventing deer from approaching railway lines. ADDs incorporates real time AI powered detection to use the deterrents judiciously and not disturb other wildlife or the environment unnecessarily.

Flexibility and adaptability are a key aspect of ADDS. The system was deployed during the pilot trial along a one mile stretch of track south of Grantham, a known hotspot for deer incursions.

THE STEPS INCLUDE:

- 350 strategically placed camera sensors capable of detecting wildlife activity
- 350 deterrent devices, including a combination of flashing lights, ultrasonic sound emitters, and audible alarms
- 350 4G routers and receivers, facilitating seamless communication between system components



THE RESULTS:

The results of the ADDS pilot trial were remarkable with a success rate of 100%. During the trial period, the system successfully deterred an average of 130 deer per week, for a total of over 10,000 deterrent events. This intervention was 100% effective with no recorded deer strikes occurring after ADDS was installed on the Grantham section of the track.

It's important to understand the consequences of even a single deer strike, to really understand the financial and operational impact. Each incident costs £56,000 to repair and 48 minutes of delay. ADDs prevented four potential deer strikes during the trial, saving LNER 192 delay minutes and £224,000. Financial savings were complemented by a saving in terms of reliability of service and customer satisfaction in that there were fewer delays and disruptions to rail services.

In addition, the ADDS trial was a success which received a lot of media attention. It was featured in more than 200 publications and broadcast outlets, from Sky News and LBC to an estimated audience of more than 65 million people. This national coverage helped to raise ADDS awareness and placed Innovation Factory Limited on the map as an innovator in rail safety technology, paving the way for future collaboration with other rail operators.

ADDS ACHIEVED 100% SUCCESS, DETERRING 10,000+ DEER AND REVOLUTIONIZING RAIL SAFETY WITH ZERO STRIKES AND SEAMLESS OPERATIONS.

NEXT STEPS:

The ADDS trial has proven to be a game-changer in deer strike prevention. The East Coast Partnership has endorsed the system, leading to its expansion to other high-risk areas, such as Little Bytham, where the installation has already reduced strikes. The last recorded deer strike in this area occurred on January 29, 2024.

Further development of ADDS will focus on allowing deer to cross railway lines safely. One avenue of exploration is using sounds to guide deer toward safe crossing points, such as farmers' bridges and underpasses. This could further mitigate the impact of railway lines on natural wildlife movements.

Next steps for ADDS involve not just expanding its reach but also evolving its capabilities. The integration of sound-based guidance systems will transform railway lines into wildlife-friendly corridors, guiding deer toward safe crossing points while maintaining uninterrupted rail operations. This pioneering approach not only enhances safety but also promotes harmony between infrastructure and the natural environment. By reducing the impact of railways on wildlife movements, ADDS sets a new benchmark for sustainable rail safety solutions.

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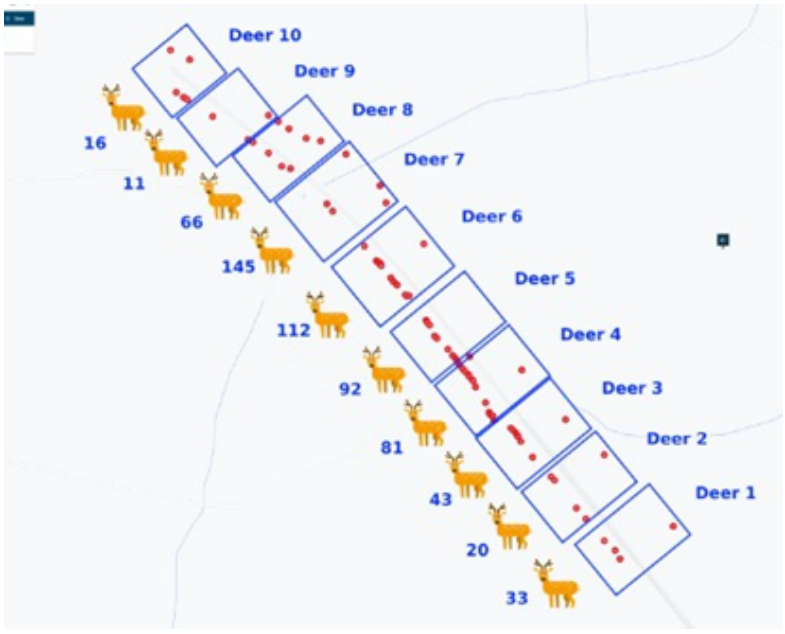
BROADER IMPACT AND FUTURE APPLICATIONS:

Following the success of the ADDS pilot, Innovation Factory, LNER & the East Coast Partnership are looking to deploy the system to other high risk areas. One such location already with ADDS is Little Bytham, where deer strikes have already been reduced to zero. This is the last recorded deer strike in the region and adds further weight to the effectiveness of ADDS in reducing wildlife related risks on railway lines.

Innovation Factory is now looking at how the system could be improved to allow deer to cross railway lines safely. The most promising development is the use of sound based guidance to lead deer to safe crossing locations, i.e. underpasses and farmers' bridges. This innovation would minimize disruption to wildlife movement while preserving the railway's integrity of operations.

ADDS technology also can be applied to other rail safety issues. ADDs have also found interest with train operators who want to use them to prevent not just wildlife incursions, but also trespassing and cable theft. This versatility makes ADDS a multi functional safety solution that can be used to address a wide variety of operational hazards.



CONCLUSION:

This is a game changing innovation which tackles a key challenge for UK rail industry. ADDs has shown how it can prevent deer strikes, reduce delays and save substantial operational costs, through collaboration between Innovation Factory Limited, LNER and the East Coast Partnership.

Its success during the 18 month trial shows the potential for this outside of the UK and globally. Innovation Factory has developed a scalable, adaptable solution using state of the art AI and machine learning technologies to protect both wildlife and railway operations, by adopting.

This case study also points out the potential benefits of innovation in rail safety. ADDS has now set a new benchmark and with further development it is set to become an integral part of the rail infrastructure around the world. This pioneering project has cemented Innovation Factory Limited's position as a leader in technological innovation, able to deliver impactful solutions to real world challenges.

Finally, ADDS is not a reaction to a problem, but rather the future of rail safety: an economically, operationally, and environmentally sustainable, scalable, and effective solution to protect wildlife and continue to protect railway operations.

ADDS: WHERE CUTTING-EDGE INNOVATION MEETS WILDLIFE PROTECTION—DELIVERING 100% SAFETY, 0% DISRUPTION

+44 7528643220 www.innovfactory.com almojarkesh@innovfactory.com