

Drive.  
Detect.  
Determine.

## Overview



The City of Markham partnered with Visual Defence to improve service level and regulatory compliance.



The project initially started with one ROVER device and was expanded to five devices once the system was proven effective.



The city reported \$36,400 in operational efficiencies per device and a boost of over 400% in pothole reporting output.



The City of Markham has gained national recognition and won several awards for its use of ROVER, including Good Roads and IDC.

## Problems

The city's road maintenance system prior to working with ROVER was experiencing several points of inefficiency. Pothole reporting was time consuming, required frequent stops and was error prone as potholes were often missed due to time restrictions.

## Case Study

# Markham, ON



## Challenges

The City of Markham houses over 350,000 residents and includes a road network of approximately 2,200 lane km (1,370 miles). Due to this large infrastructure and traffic volume, road failures occur regularly. These include potholes, cracks, damaged signs, debris and other deficiencies. The city aimed to better comply with the province's Minimum Maintenance Standard.

1

Prior to using ROVER, the city relied on staff and civic reporting to discover new potholes and road deficiencies.

2

Potholes reported by staff were logged using pen and paper — a slow, inefficient and error prone process.

3

Staff were focused on prioritizing tasks due to the time constraints of stopping.



**Having this device capturing the pothole location can save them (inspectors) time from stopping and having to mark down the location. It also eliminates human error."**

- Alice Lam, Director of Operations  
City of Markham



## Solution

In February 2020, the City of Markham initiated a pilot project, partnering with Visual Defence to develop the artificial intelligence solution, ROVER. The project aimed to help the city increase road safety and compliance with Ontario's Minimum Maintenance Standards (MMS).



ROVER is deployed through the use of a smartphone running Visual Defence's intuitive AI software, making it reliable and easy to use.



The proprietary windshield mounting system secures ROVER enabled devices to the patrol vehicle, creating a seamless experience.

Once installed, ROVER AI finds potholes and other road deficiencies automatically as the patrol vehicle drives. Any detected incidents are then uploaded to the cloud and become accessible immediately, providing city staff with real-time actionable data on road conditions.

ROVER's built in privacy feature blurs any licence plates, faces and other personal information that is captured. This allows the city to easily use the data collected by ROVER in public settings.

- The ROVER technology was introduced at an initial meeting to describe it and explore its benefits.
- A pilot program was initiated to evaluate ROVER and collect feedback from the city.
- ROVER devices were installed in patrol vehicles and city staff were trained on the app and platform.
- Visual Defence and the City of Markham improved the technology to better serve the city's needs.
- The single device pilot was deemed successful, leading the city to expand to a total of five devices.

## Results

As one of the first cities to partner with Visual Defence for the ROVER program, the City of Markham was able to collect valuable and measurable data about road deficiencies. The city realized tangible benefits including:



ROVER has helped the city greatly improve road safety by addressing priority incidents. This has significantly reduced risk and liability for the city, and reduced the number of reports.



The city has experienced an increase of up to 400% in road deficiency reporting (depending on road / traffic conditions), and has significantly increased productivity, efficiency and accuracy.

ROVER was also able to help the city increase maintenance efficiency by reducing the number of stops during patrol, scheduling road repairs more efficiently, increasing pavement lifecycle with timely repairs, and measuring service levels better.

City patrollers are now able to focus on driving and pothole locations are automatically logged on the cloud. On average, the city has saved \$36,400 per ROVER device per year and has won several awards.

Some of the awards the city has won for its innovative use of ROVER include the OGRA John Niedra better practices award, as well as the IDC Smart Cities North America award for their approach to road maintenance and safety. Additionally, the City of Markham was showcased in several prominent webinars and interviews, most notably on CBC News.

