

2020 Canadian ITS R&D/Innovation Award

The 2020 Canadian ITS R&D/Innovation Award recipient is “**A real-time Multi-Modal Traffic Monitoring System based on 3D Lidar Technology**” submitted by Blue City Technology. Blue City is a start-up founded in Q2-2018 based in Montreal, Canada. The idea was based on more than six years of research and development as a part of the founder’s Ph.D. thesis at McGill University on the traffic management and monitoring field. They launched their MVP in November 2019, which resulted in the deployment of two sensors by the City of Montreal. It was a crucial step in testing their technology during the winter in Montreal and under the snow, rain, cold weather, and different lighting conditions. The sensor has shown no failure since then. The project has been funded through governmental supports, prizes, and initial pre-seed investments from two different organizations. The technology has been trusted by many cities including Montreal and Cote-Saint-Luc (QC), Kelowna (BC), Contra-Costa County (California), New York, Sydney in Australia, etc. and researchers from Columbia University, Rutgers, University of British Columbia, and private sectors in the smart city market, including Rogers, Microsoft, etc.



Blue City Technology has developed an AI-powered software solution integrated with Lidar sensors to monitor traffic networks, generate real-time traffic data, analytics and predictions, suitable for all weather and lighting conditions. Thanks to their sophisticated software based on deep-learning algorithms and the reliability of Lidar technology, their solution works in various weather and lighting conditions, including snow, rain, shade, and intense sunlight. This reliable performance creates a unique advantage over any camera-based solutions in the market.

The company’s core technology includes a novel distance measurement technology called Lidar to create a real-time 3D perception of the area in front of the sensor and a sophisticated AI-based algorithm to process 3D data and to detect vehicles, cyclists and pedestrians, classify them, and extract their trajectories. The algorithm is capable of processing the 3D lidar data in real-time on a small computer (edge processing) located at the traffic cabinet. This addresses the challenges of camera-based solutions that require expensive high bandwidth internet connections to process the data on more powerful computers elsewhere. This solution generates data that typically requires the installation of a combination of sensing technologies (radar, loop detector, camera, and push buttons). Traffic data, generated by the sensors installed at intersections, is sent to the traffic light’s computer, which uses the data to optimize the lighting schedule so that traffic can flow efficiently. This data is also sent to the cloud to be aggregated for use in transportation studies and simulation software used by city engineers. These engineers use the results to prioritize and plan infrastructure projects.

Blue City’s SaaS platform uses real-time data generated by sensors and analyzes the trajectory data of road users with surrogate safety analysis: finding near-misses for vulnerable road users and create a safety index to identify high-accident-risk intersections in real-time. Their platform generates comprehensive reports about the movement of the road users, including the number of the red-light runners, the percentage of the time a crosswalk is used by the pedestrians, the efficiency of the intersection in term of serving road users, and many other important metrics for the city planners. While these metrics vary in different hours of the day, week, and month, weather and lighting conditions can also affect those. The platform provides a unique feature of monitoring those metrics over time, continuously and fully automated. The platform automates all processes for city planners to collect data and generate analytics faster and at a lower cost. The perception algorithm can detect and report incidents in real-time to city emergency departments for faster and more efficient response. They have developed a machine learning-based approach to predict the behavior of road users



approaching the intersection to identify the risk of an accident and share this information with other road users over V2X and 5G communication protocols to improve the safety of road users.