![VERMONT AGENCY OF TRANSPORTATION]

FACT SHEET

RFID and Wireless IoT Technologies for Transportation Maintenance Operations and Asset Management

PROJECT TITLE

RFID and Wireless IoT Technologies for Transportation Maintenance Operations and Asset Management

STUDY TIMELINE

10/2021 – 03/2023

INVESTIGATORS

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KEYWORDS

Asset management
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More information about the VTrans Research Program, including additional Fact Sheets, can be found at: http://vtrans.vermont.gov/planning/research.

Introduction

Transportation asset management requires a reliable framework to maximize investment for long term sustainability, accountability, and performance, and to address public concerns about the health and safety of transportation assets. This requirement underlies transportation agencies' efforts to improve the operation of managing its transportation assets toward reducing the asset management cost and raising the volume and diversity of asset types supported. It calls for an automatic, uniform, and efficient mechanism to manage diverse assets such as construction tools, equipment, and infrastructure more strategically and systematically. Effective transportation asset management will allow transportation agencies to make data-driven decisions and balance many trade-offs between business needs and service operations.
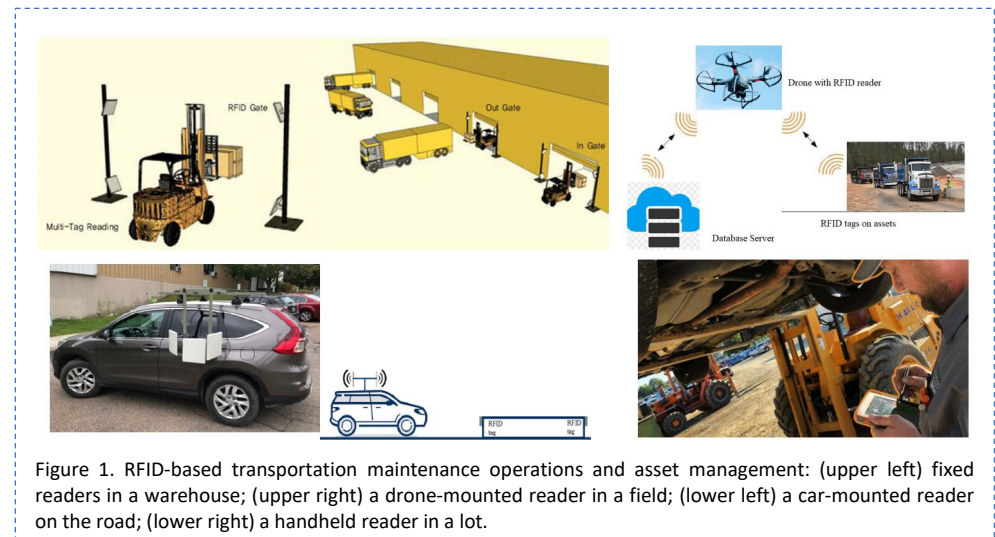

Figure 1. RFID-based transportation maintenance operations and asset management: (upper left) fixed readers in a warehouse; (upper right) a drone-mounted reader in a field; (lower left) a car-mounted reader on the road; (lower right) a handheld reader in a lot.

Methodology

We propose to explore radio frequency identification (RFID) and other wireless Internet of Things (IoT) technologies to develop a solution to automate efficient transportation maintenance operations and asset management. We will fulfill the following objectives:

- To study the specific features and needs of transportation maintenance operations and asset management.
- To investigate how RFID and IoT can be used for transportation maintenance operations and asset management and what the technical challenges for actual deployment and the corresponding solutions are.
- Develop an integrated system and create a test site for technology demonstration and benchmark.

Conclusions

Our system provides integrated, comprehensive, and efficient solutions to practical problems arising in various environmental and operational conditions. Extensive laboratory and field tests validate the system performance and functionality.

Potential Impacts and VTrans Benefits

A successful completion of the project will provide a powerful tool to improve the transportation maintenance operations and asset management efficiency, sustainability, accountability, and performance. It will help the agency with the decision-making and resource-allocation in the process of operating, maintaining, upgrading, and expanding physical assets through their lifecycle.