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Research objectives

- 1) To study the specific features and needs of transportation maintenance operations and asset management, which include asset types, asset attributes, asset, asset storage methods, maintenance operations and asset management requirements, management cost constraints, environmental settings, etc.
- 2) To investigate how RFID and IoT can be used for transportation maintenance operations and asset management and what are the technical challenges for actual deployment and the corresponding solutions.
- 3) Develop an integrated system and create a test site for technology demonstrations and benchmarks, which will be used to assess the feasibility of expanding the technology application to the entire State.

System Configuration

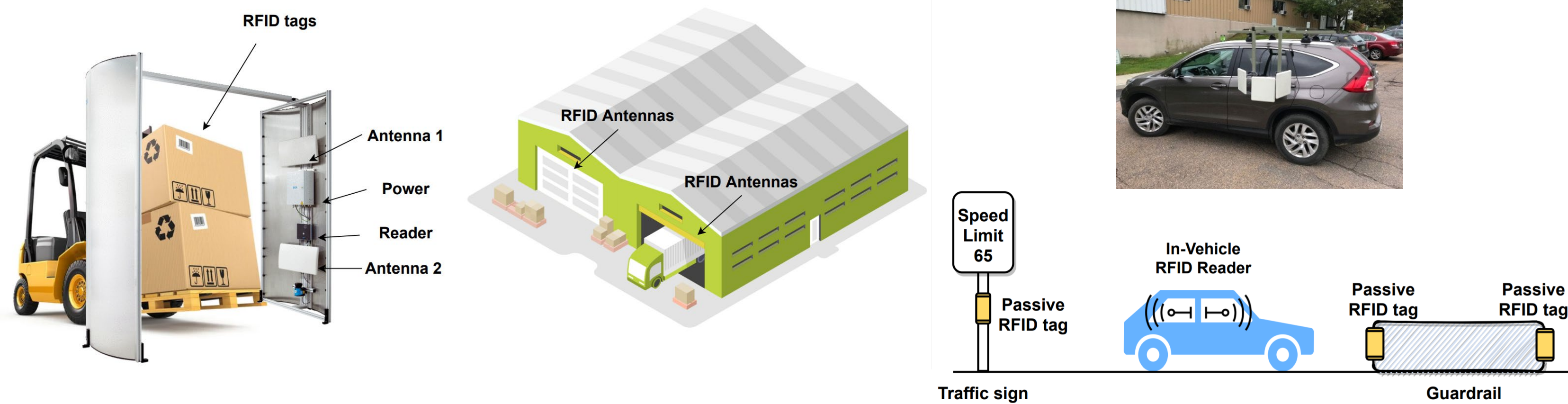


Figure 1. Different scenarios of using RFID in transportation maintenance operations and asset management for inventory validation, tracking, and safety management.

In the system, passive RFID tags are attached to transportation assets. RFID reader mounted on a survey vehicle or placed at the garage entrance gate perform asset tag interrogation and data processing. In addition, a handheld RFID reader is integrated into the system which can scan tags at a close range. Adding the handheld RFID reader renders the overall system more versatile for different operation scenarios. A remote database manages transportation assets attribute data.

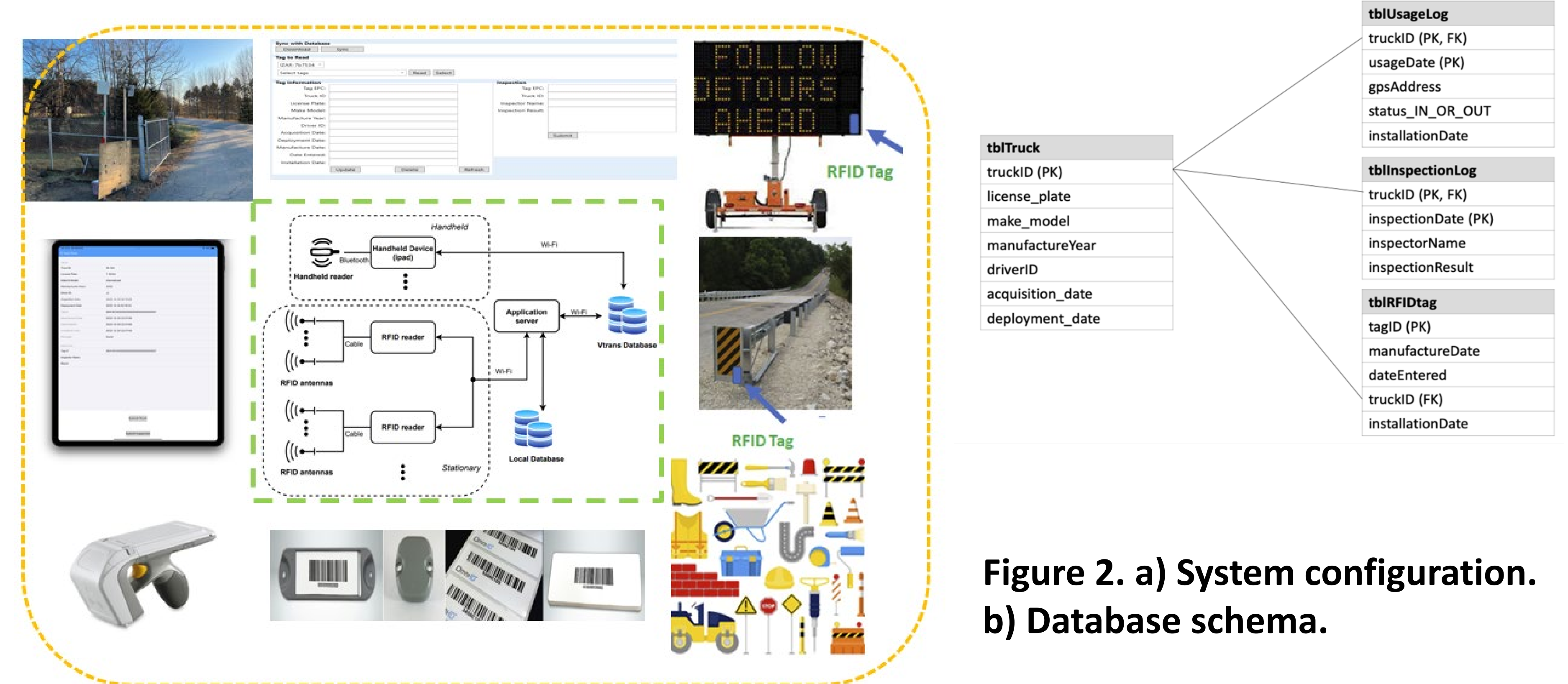


Figure 2. a) System configuration. b) Database schema.

Software

A software program is developed to operate the traffic assets management system, including the RFID readers management, scanned RFID tag information retrieving from the database, editing database assets attributes, etc.

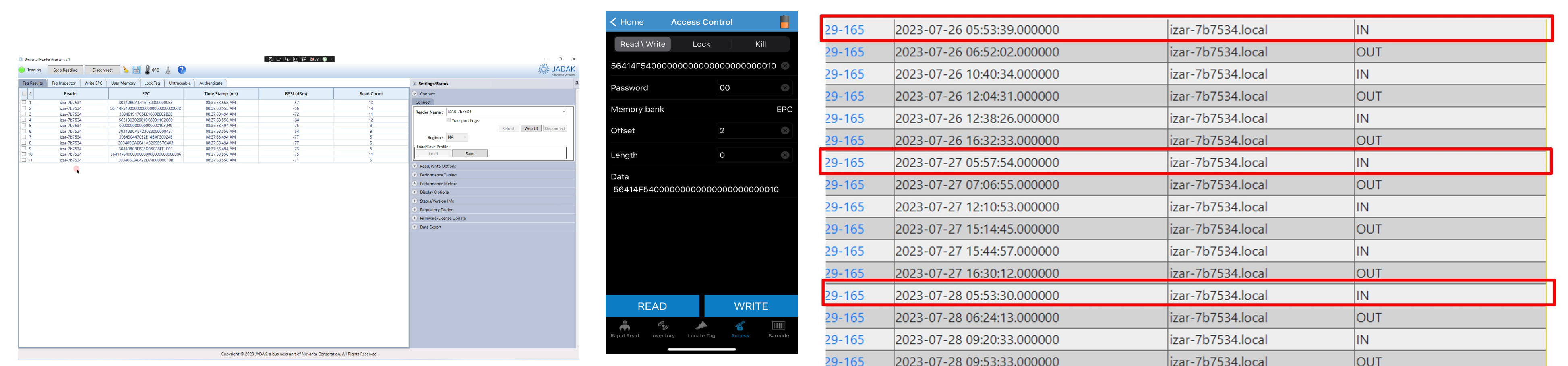


Figure 3. RFID tags inventory program GUI: a) stationary ready b) hand-held reader.

Potential Impacts and VTrans Benefits

- Automating maintenance operations and asset management workflows and processes.
- Integrating with other data platforms and various accounting systems to provide accurate and real-time data to optimize resource allocation and facilitate decision making.
- Improving supply chain visibility to allow better tracking original suppliers and manufacturers of various assets.

Acknowledgments

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