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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

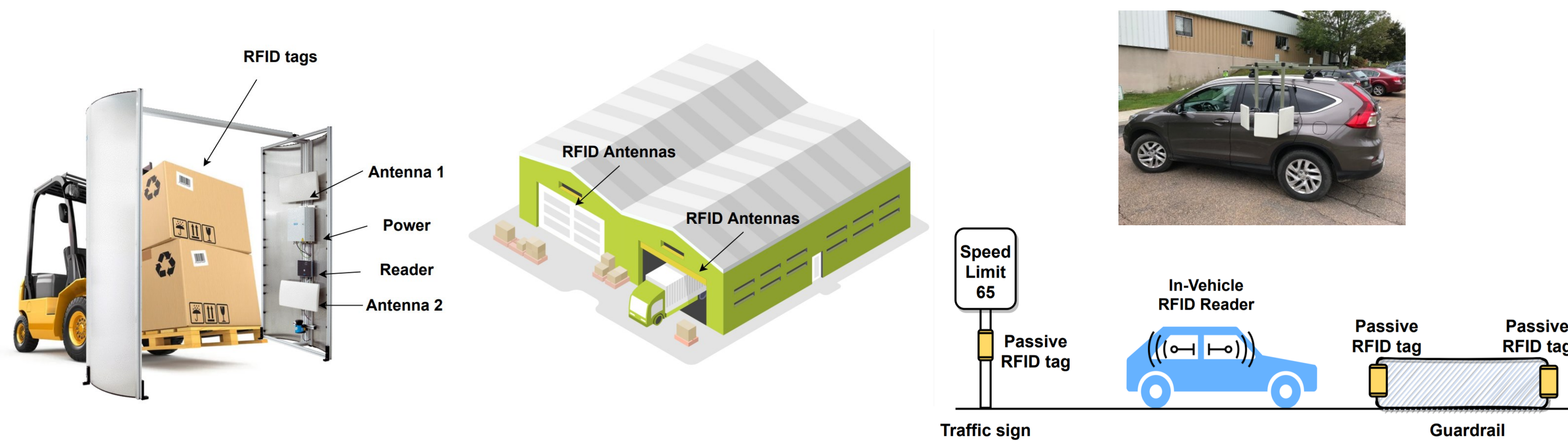


Figure 1. Possible scenarios of using RFID in transportation maintenance operations and asset management for inventory validation, tracking, and safety management.

In the system, passive RFID tags are attached to traffic assets, an RFID reader mounted on a survey vehicle or placed near a warehouse gate performs 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 asset attribute data. The database server can communicate with both stationary and handheld readers in real-time while maintain resilience to loss of internet connectivity by way of database replication and synchronization

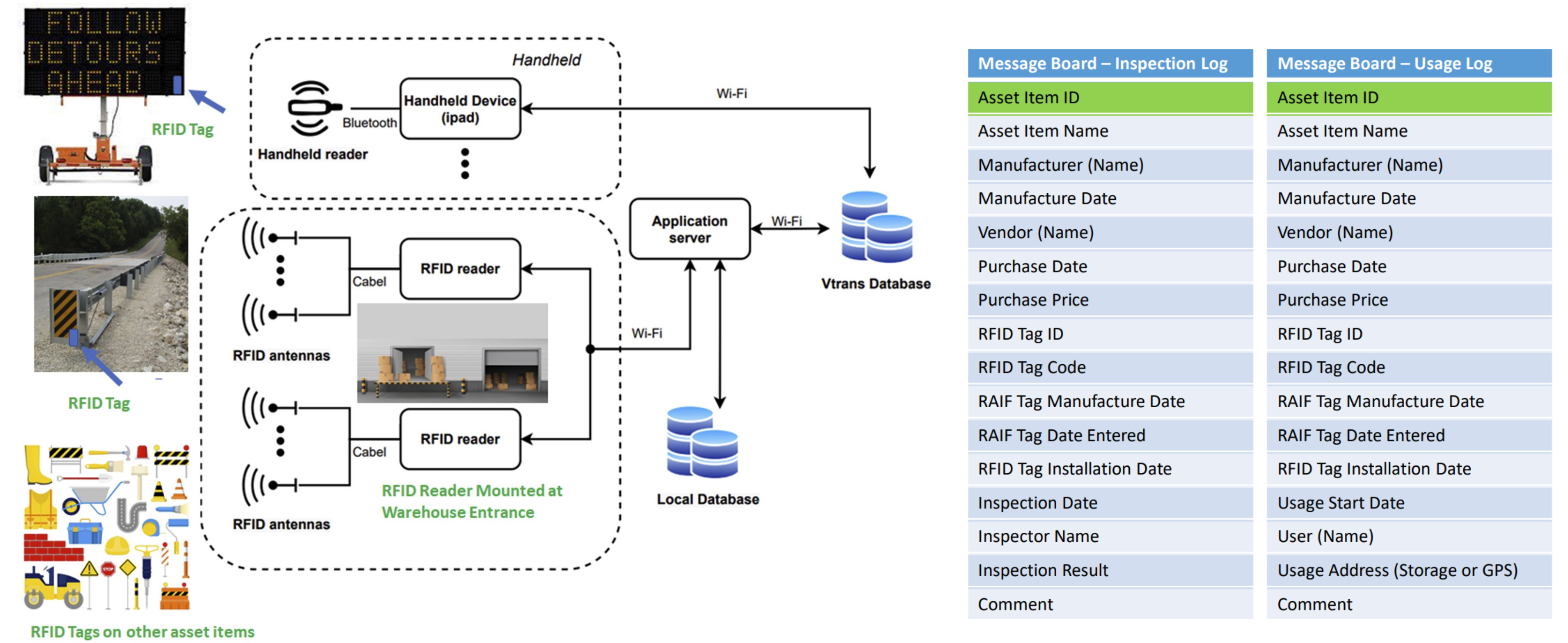


Figure 2. a) System configuration. b) Database schema.

Software

A software program is developed for transportation assets maintenance and management, including RFID readers operation, asset information interrogation, retrieving and editing information in the database attributes, etc.

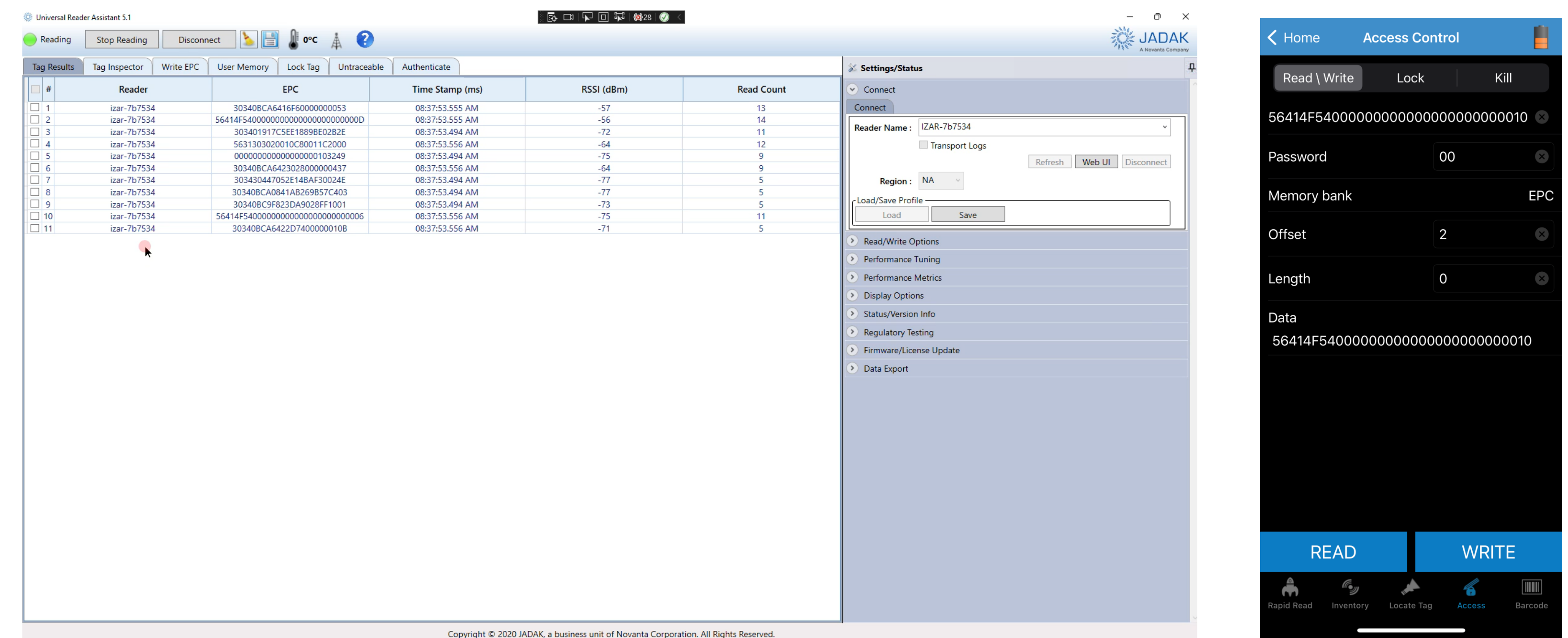


Figure 3. RFID tags inventory program GUI: a) stationary ready b) hand-held reader.

Acknowledgments

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