项目文档

# Functional Requirement

Requirement ID Requirement Statement  
ASSET-TRACK-001 The system shall track the location, status, and usage of all assets in real time.  
ASSET-TRACK-002 The system shall support the definition and management of different asset types, including high-value equipment, consumables, and shared-use resources.  
ASSET-TRACK-003 The system shall allow users to assign and reassign assets to departments or individuals.  
ASSET-TRACK-004 The system shall enable the scheduling and logging of maintenance tasks for assets.  
ASSET-OFFLINE-001 The system shall permit field staff to access and update asset data while offline.  
ASSET-OFFLINE-002 The system shall automatically synchronize asset data with the central database when internet connectivity is restored.  
ASSET-OFFLINE-003 The system shall detect and resolve data conflicts (e.g., concurrent updates) during synchronization.  
ASSET-OFFLINE-004 The system shall provide a review interface for pending changes before synchronization.  
ASSET-CONSUM-001 The system shall monitor consumable stock levels and expiration dates.  
ASSET-CONSUM-002 The system shall generate alerts for low stock and items nearing expiration.  
ASSET-CONSUM-003 The system shall allow users to reorder consumables based on predefined stock thresholds.  
ASSET-ALERT-001 The system shall send in-app notifications for routine alerts.  
ASSET-ALERT-002 The system shall send email or SMS alerts for critical or urgent issues.  
ASSET-ALERT-003 The system shall allow configuration of alert thresholds based on asset type and urgency.  
ASSET-BOOKING-001 The system shall sync with organizational calendars to manage shared-use resources such as meeting rooms.  
ASSET-BOOKING-002 The system shall prevent double-booking of shared-use resources by reflecting real-time availability.

# External Description

# 5. Constraints  
  
## 5.1 Regulatory/Legal Constraints  
  
- \*\*CON-R-001\*\*: The system shall comply with all applicable data privacy regulations (e.g., GDPR, CCPA) when storing and transmitting user and asset data.   
 - \*\*Priority\*\*: Must Have   
 - \*\*Rationale\*\*: To ensure that the system is legal to use and protects user privacy, especially when handling sensitive asset data.   
 - \*\*Source\*\*: Derived from SRL 4.5 Security Requirements   
 - \*\*Acceptance Criteria\*\*: The system shall be audited for compliance with GDPR and CCPA, and demonstrate encryption of data in transit and at rest using TLS 1.2+ and AES-256.   
  
- \*\*CON-R-002\*\*: The system shall not require users to provide any personal data that is not necessary for asset management or alerting functionality.   
 - \*\*Priority\*\*: Should Have   
 - \*\*Rationale\*\*: To minimize data exposure and align with privacy-by-design principles.   
 - \*\*Source\*\*: Derived from SRL 4.5 Security Requirements   
 - \*\*Acceptance Criteria\*\*: The system shall allow configuration to disable non-essential data collection and shall provide a privacy impact assessment (PIA).   
  
## 5.2 Hardware Constraints  
  
- \*\*CON-H-001\*\*: The system shall be compatible with Android and iOS smartphones and tablets to support field staff.   
 - \*\*Priority\*\*: Must Have   
 - \*\*Rationale\*\*: Field staff often operate in remote locations and require mobile access.   
 - \*\*Source\*\*: Derived from SRL 5.1 Mobile Devices   
 - \*\*Acceptance Criteria\*\*: The system shall be installed and run on Android 9.0+ and iOS 14.0+ devices without compatibility issues.   
  
- \*\*CON-H-002\*\*: The system shall be compatible with Windows, macOS, and Linux machines with modern web browsers for desktop access.   
 - \*\*Priority\*\*: Must Have   
 - \*\*Rationale\*\*: To ensure accessibility for all user classes, including administrators and department managers.   
 - \*\*Source\*\*: Derived from SRL 5.1 Desktop Devices   
 - \*\*Acceptance Criteria\*\*: The web application shall load and function correctly in Chrome 85+, Firefox 80+, Safari 14+, and Edge 85+ on all mentioned platforms.   
  
- \*\*CON-H-003\*\*: The system shall be deployed on a cloud-based server infrastructure (e.g., AWS, Azure) with scalable storage and compute capabilities.   
 - \*\*Priority\*\*: Must Have   
 - \*\*Rationale\*\*: To ensure system scalability and availability as asset data grows.   
 - \*\*Source\*\*: Derived from SRL 5.1 Server Infrastructure   
 - \*\*Acceptance Criteria\*\*: The system shall be deployed on AWS or Azure with the ability to scale horizontally and vertically as needed.   
  
## 5.3 Interface Constraints  
  
- \*\*CON-I-001\*\*: The system shall support integration with Microsoft Exchange, Google Calendar, or similar platforms for managing shared-use resources.   
 - \*\*Priority\*\*: Must Have   
 - \*\*Rationale\*\*: Shared-use resource management relies on real-time calendar data to prevent double-booking and ensure accurate scheduling.   
 - \*\*Source\*\*: Derived from SRL 5.2 Calendar Integration   
 - \*\*Acceptance Criteria\*\*: The system shall connect to Microsoft Exchange and Google Calendar APIs and reflect real-time availability for shared-use resources.   
  
- \*\*CON-I-002\*\*: The system shall provide an API for third-party integration for data migration tools.   
 - \*\*Priority\*\*: Should Have   
 - \*\*Rationale\*\*: Facilitates integration with existing systems and tools for asset and inventory data.   
 - \*\*Source\*\*: Derived from SRL 5.2 Data Migration Tools   
 - \*\*Acceptance Criteria\*\*: The system shall expose a RESTful API for importing and exporting asset data in CSV, Excel, or JSON formats.   
  
## 5.4 Design and Implementation Constraints  
  
- \*\*CON-D-001\*\*: The system shall use a relational or NoSQL database for storing asset and user data.   
 - \*\*Priority\*\*: Must Have   
 - \*\*Rationale\*\*: To ensure data consistency and scalability for asset tracking and inventory management.   
 - \*\*Source\*\*: Derived from SRL 5.2 Database   
 - \*\*Acceptance Criteria\*\*: The system shall be configured with PostgreSQL, MySQL, or MongoDB as the primary database with no data integrity issues.   
  
- \*\*CON-D-002\*\*: The system shall implement local data storage (e.g., SQLite) for offline functionality.   
 - \*\*Priority\*\*: Must Have   
 - \*\*Rationale\*\*: Field staff must be able to access and update asset data without an internet connection.   
 - \*\*Source\*\*: Derived from SRL 5.2 Local Data Storage   
 - \*\*Acceptance Criteria\*\*: The mobile app shall store data locally using SQLite and synchronize with the central database when connectivity is restored.   
  
- \*\*CON-D-003\*\*: The system shall implement conflict detection and resolution logic for synchronization.   
 - \*\*Priority\*\*: Must Have   
 - \*\*Rationale\*\*: Ensures data consistency when multiple users make offline changes.   
 - \*\*Source\*\*: Derived from SRL 4.4 Data Integrity and Synchronization   
 - \*\*Acceptance Criteria\*\*: The system shall detect and resolve conflicts automatically or provide a review interface for manual resolution.   
  
- \*\*CON-D-004\*\*: The system shall support role-based access control (RBAC) to manage user permissions.   
 - \*\*Priority\*\*: Must Have   
 - \*\*Rationale\*\*: To protect sensitive data and ensure users can only perform actions relevant to their role.   
 - \*\*Source\*\*: Derived from SRL 4.5 Security and Access Control   
 - \*\*Acceptance Criteria\*\*: The system shall enforce RBAC with at least five user roles (Field Staff, Inventory Manager, Administrator, Department Manager, General Staff) and prevent unauthorized access.   
  
## 5.5 Other Constraints  
  
- \*\*CON-O-001\*\*: The system shall provide in-app notifications and support for email/SMS alerts for asset status updates.   
 - \*\*Priority\*\*: Should Have   
 - \*\*Rationale\*\*: To ensure timely communication with users regarding asset availability, maintenance, or stock levels.   
 - \*\*Source\*\*: Derived from SRL 4.4 Data Integrity and Synchronization and SRL 4.5 Security and Access Control   
 - \*\*Acceptance Criteria\*\*: The system shall display in-app notifications and allow configuration of email/SMS alerts for critical issues.   
  
- \*\*CON-O-002\*\*: The system shall not require any proprietary hardware beyond standard mobile and desktop devices.   
 - \*\*Priority\*\*: Must Have   
 - \*\*Rationale\*\*: To reduce deployment and maintenance costs and ensure compatibility across a wide range of user devices.   
 - \*\*Source\*\*: Derived from SRL 5.1 Hardware Requirements   
 - \*\*Acceptance Criteria\*\*: The system shall run on standard Android, iOS, and desktop platforms without requiring any additional hardware.   
  
- \*\*CON-O-003\*\*: The system shall be developed using a modern software stack that supports cross-platform deployment and rapid updates.   
 - \*\*Priority\*\*: Should Have   
 - \*\*Rationale\*\*: Facilitates efficient development, testing, and deployment across web and mobile platforms.   
 - \*\*Source\*\*: Derived from SRL 2.2 Major Capabilities and SRL 5.2 Software Requirements   
 - \*\*Acceptance Criteria\*\*: The system shall be built with a stack that supports web, mobile, and offline synchronization (e.g., React Native, Flutter, or similar).