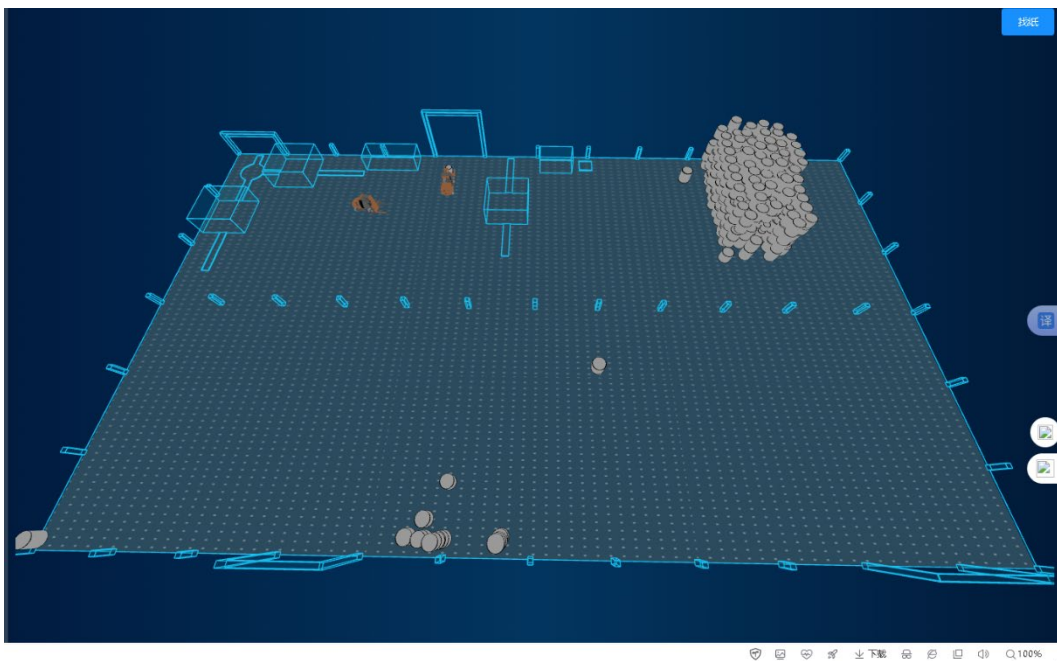


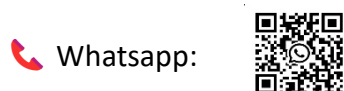
# 3D Positioning Warehouse System for Paper Roll Storage

## Forklift Scanning & 3D Positioning System

*Optimized for Paper Mill Warehouses | Precision Positioning | Operational Efficiency | Cost-Effective Intelligence*



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## Transform Your Paper Roll Warehouse Operations

Integrate UWB 3D Positioning, Smart Scanning, and Intuitive 3D Visualization to eliminate blind storage, reduce labor costs, and boost inbound/outbound efficiency by over 50%.

*Custom-built for paper logistics needs*

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### 1: Why Our 3D Positioning Warehouse System?

The Pain Points of Traditional Paper Roll Warehousing

- Random paper roll placement leads to time-consuming locating during outbound
- High labor costs for warehouse management and manual inventory checks
- No real-time inventory visibility or batch expiration reminders
- Inefficient stacking and low warehouse space utilization
- Disconnected data flow with enterprise ERP/MIS systems

Our Solution: A Game-Changing 3D Positioning Warehouse System

Combining the core advantages of automated storage and retrieval systems (AS/RS) with the flexibility of traditional warehousing, our system is designed for **customers with limited investment and site constraints**—delivering AS/RS-level intelligence at a fraction of the cost.

Core Benefits

- ✓ **3D Precision Positioning:** UWB technology tracks every paper roll's XYZ coordinates in real time
- ✓ **Reduced Labor:** Eliminates dedicated warehousing managers for inbound checks; one forklift driver completes end-to-end operations
- ✓ **Intelligent Inventory:** Graphical expiration reminders for FIFO (First-In-First-Out) compliance
- ✓ **Efficient Inbound/Outbound:** Guided storage location suggestions and color-coded outbound 3D models for fast picking
- ✓ **Full Data Integration:** Seamless sync with ERP/MES/WMS for unified enterprise data management
- ✓ **High Space Utilization:** Optimized stacking guidelines (5-5.5m max height) and random storage support
- ✓ **24/7 Visibility:** 3D visualization of the entire warehouse for real-time inventory and equipment monitoring

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## 2: Core Technology & System Architecture

Foundation: UWB Ultra Wide Band 3D Positioning

Our system uses UWB technology to calculate the spatial position of forklifts (and the paper rolls they carry) via triangular positioning with **≥3 UWB base stations**. Algorithms convert forklift XYZ coordinates to precise paper roll positions—*accuracy you can rely on for blind storage elimination*.

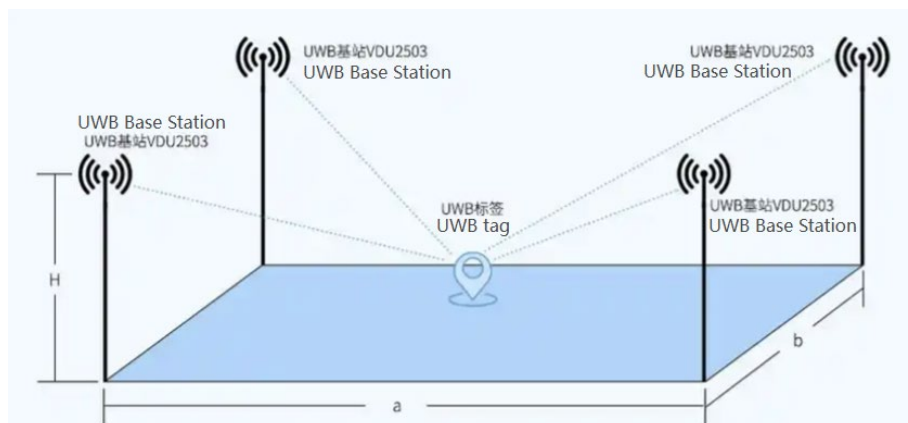
Four-Tier System Architecture

A robust, scalable structure for seamless data flow and operation:

1. **Perception Layer:** UWB positioning base stations/tags, auto code scanners, on-board PDAs (captures real-time data)
2. **Transmission Layer:** Wi-Fi/Ethernet, POE switches, routers (secure, high-speed data transfer)
3. **Calculation Layer:** UWB positioning engine, TCP/UDP servers, database (core data processing and coordinate conversion)
4. **Application Layer:** Monitoring terminals, on-board APP, 3D visualization display (user-friendly operation and management)

Key Hardware Customization

- **UWB Base Stations:** Installed on roof steel structure for optimal signal
- **Forklift Modification:** On-board PDA, UWB positioning antenna, auto code scanner (with laser guiding & distance measurement)
- **Power Supply:** 24V direct take for electric forklifts; mobile lithium batteries for internal combustion forklifts

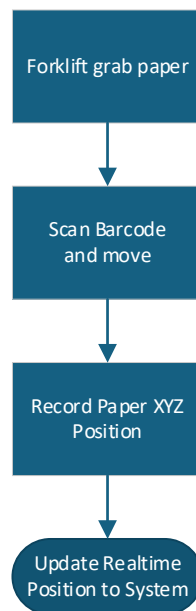


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### 3: Key Operational Processes

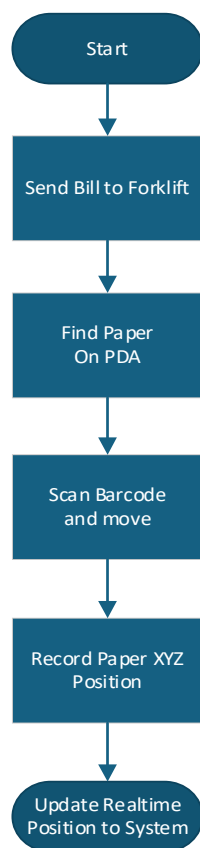
#### Streamlined Inbound Process (One Forklift Driver, End-to-End)

1. Forklift approaches paper rolls; auto code scanner scans 2 barcodes simultaneously
2. System records forklift XYZ coordinates and converts to paper roll start position via algorithm
3. On-board PDA displays paper roll specs and **recommends optimal storage locations** per warehousing rules
4. 3D model updates in real time—*inbound closed loop completed without extra management*



## Intuitive Outbound Process

1. Warehouse manager sends outbound list to on-board PDA
2. System **highlights matching paper rolls in a special color** on the 3D warehouse model (by spec/barcode)
3. Forklift driver picks paper rolls per guided 3D positioning
4. After loading, system syncs with WMS to **automatically write off outbound inventory**



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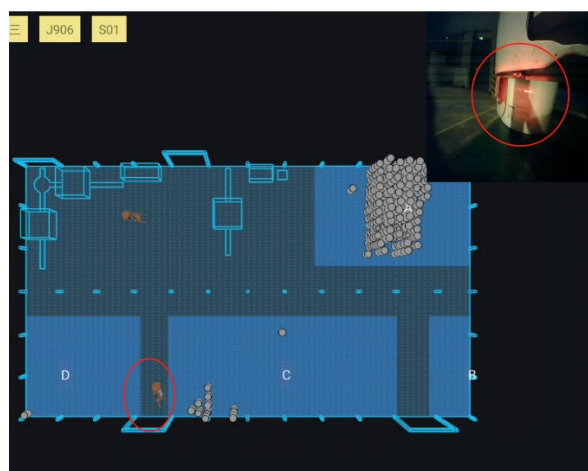
#### 4: Powerful Software Functions (Background + On-Board)

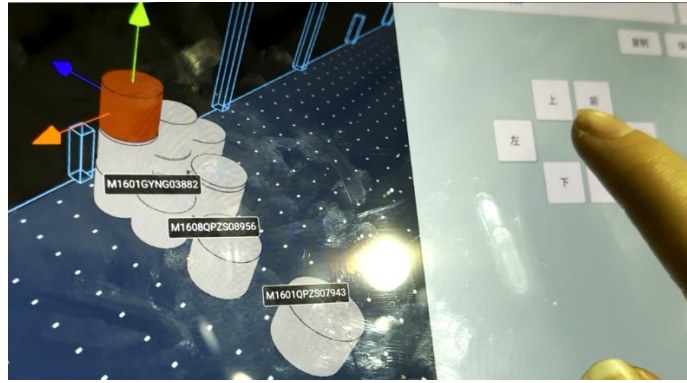
##### Background System: The Command Center

- **Map Management:** Edit/update warehouse maps; real-time base station status (green=online, red=offline/faulty)
- **Forklift & Product Management:** Full lifecycle management of forklifts (tagging/positioning) and paper rolls (specs/position/inventory)
- **Third-Party Integration:** Seamless sync with ERP/MES/WMS for unified data flow
- **Reporting & Analytics:** Custom queries for inventory, inbound/outbound details, efficiency, and storage location adjustments
- **3D Visualization:** Real-time 3D rendering of all paper stacks—identify discrepancies at a glance
- **UWB Positioning Engine:** Core location service for forklifts; auto-updates product position/status for inbound/outbound

##### On-Board APP (Android Tablet—Forklift Cab Operation)

- **One-Click Scanning:** Auto barcode/QR code reading
- **Real-Time Positioning:** Live forklift XYZ coordinates and paper roll position tracking
- **3D Warehouse Visualization:** Mini 3D model on the go—no need for office terminal checks
- **Smart Paper Roll Locating:** Filter and highlight needed paper rolls (by spec/size) on 3D map; tap for detailed info (weight, width, barcode, etc.)
- **Manual/Automatic Modes:** Flexible manual inbound/movement for special operations





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## 5: Project Specifications & Installation

### Warehouse & Hardware Specs (Customization)

- **Warehouse Dimensions:** m (L) \* m (W) \* m (H) (clear height)
- **Paper Roll Stacking:** Marked grid areas; 5-5.5m max stacking height
- **UWB Base Station Layout:** horizontal spacing and vertical spacing
- **Forklift Modification:** forklifts (electric/internal combustion) fully customized with on-board equipment

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## 6: Why Choose Us?

### Our Competitive Edge

- ✓ **Cost-Effective:** AS/RS intelligence without the exorbitant construction costs and strict site requirements
- ✓ **Customized:** Tailored for paper roll warehousing—solves industry-specific pain points (random placement, FIFO compliance, etc.)
- ✓ **Easy Operation:** Intuitive on-board APP and background system—minimal training for forklift drivers/warehouse staff
- ✓ **Scalable:** Modular hardware/software—easily expand for larger warehouses or more forklifts
- ✓ **Reliable Support:** Full technical guidance for installation, maintenance, and system updates



### We Solve Your Paper Roll Warehousing Challenges—Permanently


Eliminate blind storage, reduce labor costs, boost efficiency, and gain full inventory visibility—**transform your warehouse into a smart, efficient hub for paper logistics.**


## Contact Us

*For a customized quote and on-site survey*

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