

# COMPARATIVE ANALYSIS

## 6 River Systems Order Picking Algorithms vs Leading WMS

### INTRODUCTION

A significant benefit of 6 River Systems' solution lies in its ability to **minimize associate walking through advanced algorithms**. Below is an analysis of data shared by one of the world's largest global logistics companies comparing 6RS's order picking algorithms to those of a Warehouse Management System recognized by Magic Quadrant as an industry leader for over 10 years running.

## OPERATIONAL PROFILE

### ORDER PROCESSING GUIDELINES:

- **Timeframe:** 34 days of order data
- **Volume mix:** three simulation models based on high, average, and low cartons per wave per day
- **Picking assumption:** each wave must be picked complete before moving on to subsequent waves
- **Stop definition:** all picks from both sides of an aisle (not specific to a bin)
- **Pick path:** serpentine, 1-way aisles with 2-way cut-throughs
- **Payload:** Chucks and carts carried same number of containers
- **Picking type:** batched single-line-single-unit orders

### WAREHOUSE DETAILS:

- 94k ft<sup>2</sup> (337'x280')
- 38 full-length aisles, 280 ft long (long aisle)
- 152 segmented aisles, 64 ft long (short aisle)
- 5 ft wide aisles with one way traffic
- 4 ft bay depth (2 ft each side)
- 8 ft wide cut-throughs with two-way traffic flow
- Chuck meeting points at each aisle end cap

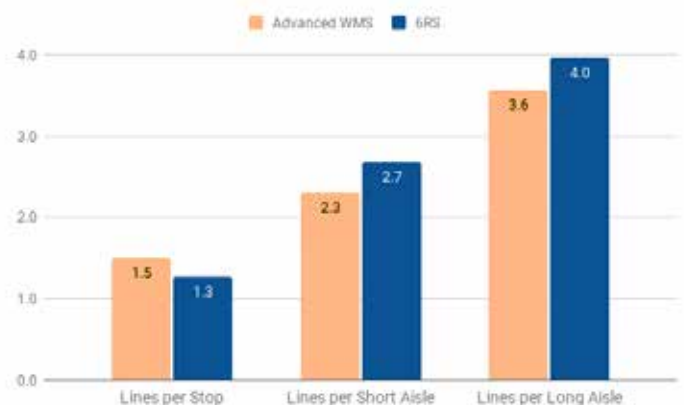
## RESULTS

### Optimized Travel: 20% fewer aisles visited per cart trip



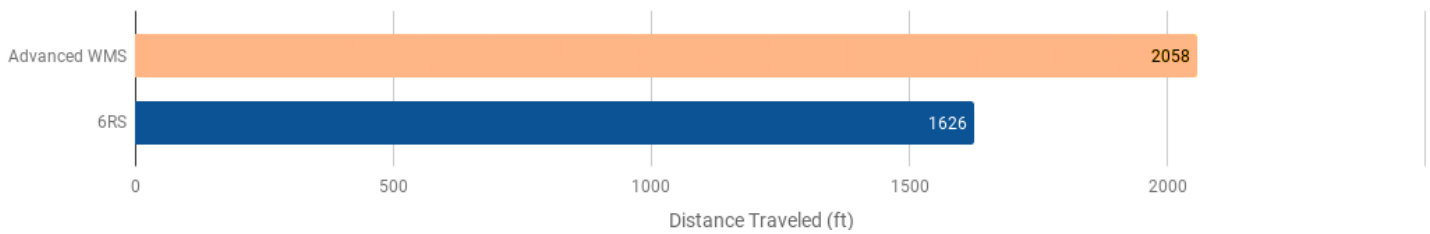
**Figure 1.** To complete the same work, on average, Chucks traveled down 22% fewer aisles and guided pickers to an 18% tighter grouping than the WMS.

### Improved Productivity: 18% more lines picked per aisle trip



**Figure 2.** Where the customer's WMS focused solely on maximizing lines picked per stop, 6RS looked to maximize both lines picked per stop and lines picked per aisle to yield the best possible performance.

## Reduced Travel: 21% fewer feet traveled per cart trip



**Figure 3.** The net benefit of 6RS’s algorithms in this study is that picking associates walked 21% less distance to complete the same work. It is important to note that this reduction in travel is only the in-aisle benefit of the 6RS algorithms; there is additional benefit from removing the “long walks” between task locations via autonomous travel, as well as reduced time between tasks due to the directed workflow from the Chucks.

## ANALYSIS

### WHY DID 6 RIVERS SYSTEMS’ LOGIC PERFORM BETTER?

#### 1. Real-Time Allocation

WMS algorithms often assign work to carts as part of the waving process. If an order is added to the system one minute after the previous wave, it won’t be considered for cart assignment in that wave, no matter its relevance to that previous wave. 6RS’ software, on the other hand, is waveless. It defers the assignment of orders to Chucks until the cart build process. The 6RS algorithm looks in real time at all available orders, evaluating SKU commonalities, and assigns work with the highest density pick path while honoring order priorities and SLA requirements.

#### 2. Distance-based Pathfinding

WMS providers typically seek to optimize total bins visited during cart build where 6RS algorithms seek to minimize both bins and aisles visited. 6RS maintains a cloud-based map of the pick area which includes x/y/z coordinates of every pick location. This map is crucial in aiding the allocation algorithm to determine precise relative distances of all pick locations when assigning work to a Chuck. Once orders are assigned to the Chuck, it uses the map to lead the picking associate along an optimal path. The associates do not need to know the best way to get from pick to pick: the path is already optimized for them. This directed approach is especially useful for new associates who are unfamiliar with the warehouse and its inventory.

#### 3. Cart Building

WMSes tend to build carts by order types - a singles batch cart, a batch/sort cart, a discrete pick cart, etc. 6RS allows for a mix of containers on Chuck which increases SKU commonalities across order types, increasing pick density.

#### 4. Dynamic Zoning

Traditionally, a cart is either picked complete by a single picker or can be handed off across static zone boundaries in the warehouse. These methods can lead to either walking great distances or underutilizing pickers in “dead zones.” Leveraging Chuck’s autonomous travel capabilities, 6RS algorithms can deploy dynamic zones. This means that, at each pick location, the system evaluates whether it’s more efficient to have the current picker walk to the next pick or work with a nearby, second Chuck. Meanwhile, the first Chuck travels autonomously and meets another associate close to that next pick location. In large footprint warehouses, this significantly reduces the total walking by picking associates.

#### 5. Traffic Management

6RS mitigates congestion by keeping a constant eye on the traffic throughout the warehouse. If there is a “hot” aisle with lots of traffic and picking activity, the system’s logic will avoid sending more Chucks to the already congested aisles. As an additional benefit, inventory managers no longer need to re-slot items to manually manage congestion on a monthly or quarterly basis.

## CONCLUSION

While a modern user interface and autonomous travel are obvious benefits of collaborative mobile robot systems like Chuck, 6 River Systems’ advanced mapping and allocation algorithms often provide an even larger opportunity to improve efficiency over current order picking operations, even those leveraging advanced WMSes.