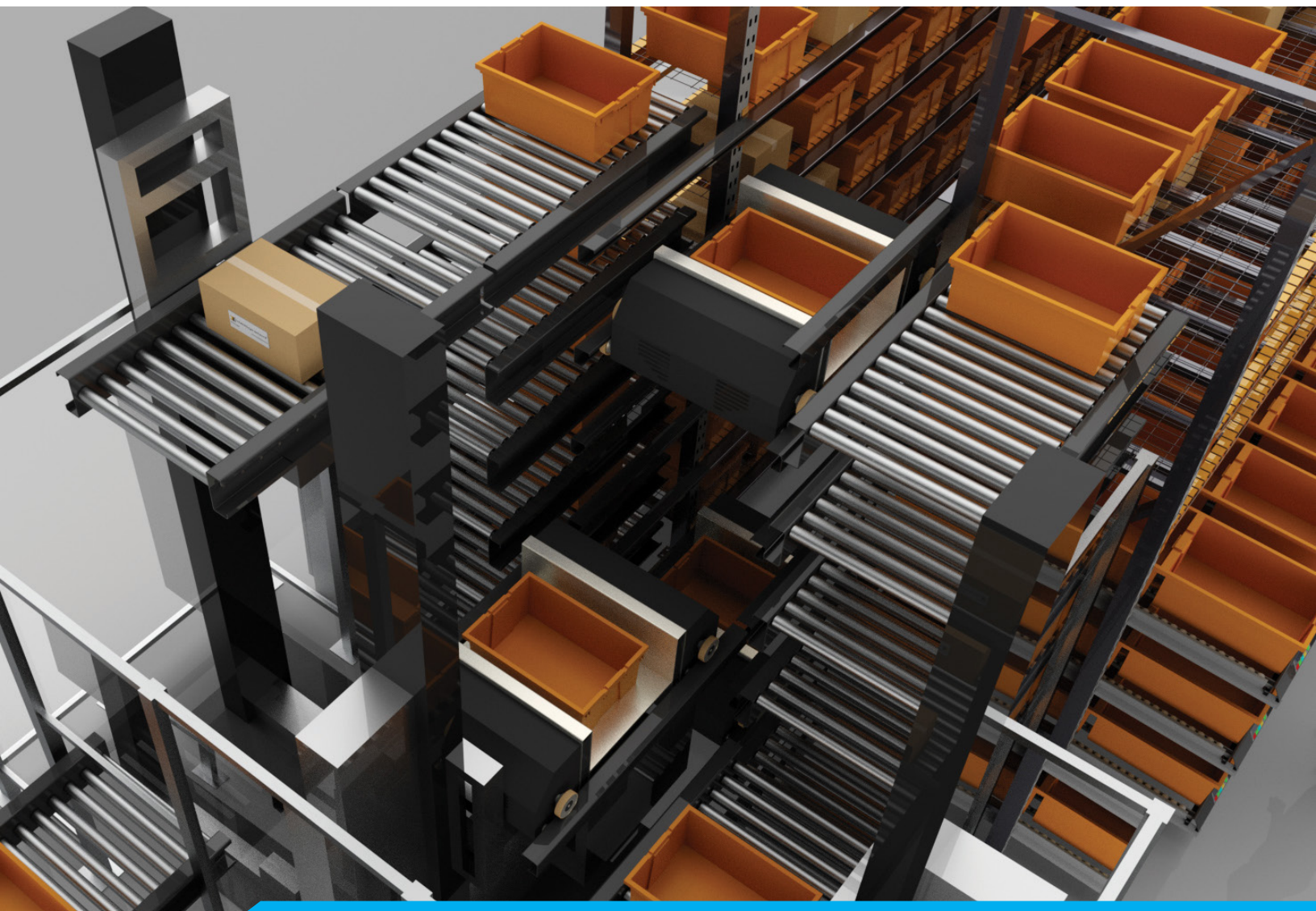


# What to consider for a successful AS/RS investment

Find the right technology and system supplier for optimized flexibility, throughput and operational efficiency



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*By Tom Meyers, senior product manager, integrated systems, Intelligrated*

## Demand for AS/RS and the rise of shuttle technology

Automated storage and retrieval systems (AS/RS) started out storing and handling heavy pallet loads for farmers in the 1960s. Fast-forward 50 years and the popularity of AS/RS has grown considerably, as the technology has evolved from agricultural applications into a powerful tool to serve manufacturing and distribution operations.





In today's distribution landscape, brick-and-mortar locations no longer keep excess inventory in back rooms and the popularity of home delivery keeps reaching new heights. Stores receive an increasing amount of split-case orders, and the e-commerce wave cements the shift from full pallets to more frequent, smaller-quantity orders.

Effectively serving this demand requires AS/RS technology designed to handle high volumes of smaller, lighter loads in cartons, trays, totes or bins. Shuttle systems have emerged as the next generation of AS/RS technology due to their storage volume, speed and flexible, scalable layout configurations. Although auto store and mini-load systems are also capable of serving the order sizes and quantities of contemporary distribution demands, shuttle systems offer significant throughput advantages of **5-10 times greater than other AS/RS technology.**



Just as technology and business demands change, so do other market conditions. With current increases in the minimum wage and an aging, shrinking industrial workforce, automated systems offer a viable solution to handle growing order volumes. They reduce labor resources spent on dirty, dull or dangerous tasks, while increasing accuracy and throughput capacity. Additionally, operations must cope with increasing land costs, especially near expanding urban centers. These costs incentivize implementing technology to consolidate facility footprint by growing up, rather than out.

This white paper, the first installment in a series of AS/RS materials from Intelligrated, outlines the important factors for companies to consider when evaluating and adopting shuttle technology in current market conditions.

AS/RS technology	How it works	Load type	Throughput capability	Best-suited applications
<b>Unit load</b>	Maximum one crane per aisle, serving all storage levels	Pallets		Wholesale distribution - pallet loads, agricultural storage
<b>Carousel</b>	Series of bins revolving on an oval track	Bins		E-commerce distribution - goods-to-operator order fulfillment; sequencing and buffering
<b>Mini-load</b>	Generally one crane per aisle, serving all storage levels	Trays, totes or cartons		E-commerce distribution - goods-to-operator order fulfillment; sequencing and buffering
<b>Shuttle</b>	Several shuttles serve a single aisle	Trays, totes, cartons or bins		E-commerce distribution - goods-to-operator order fulfillment; sequencing and buffering

## Application considerations

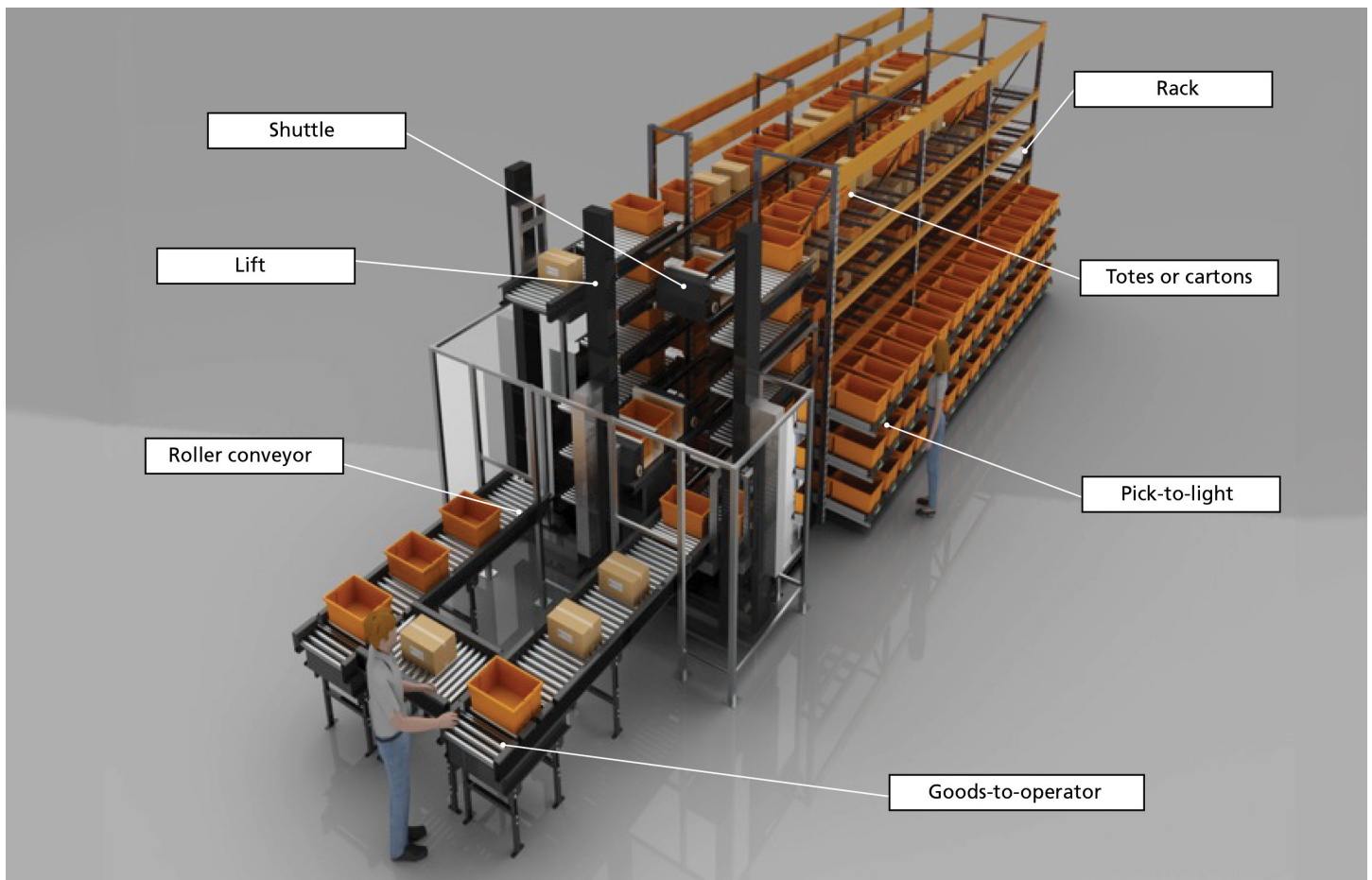
Without automation, filling higher quantities of smaller orders means more pickers traveling through a distribution center (DC). Eventually, at about 3,000 orders per hour, operations hit a tipping point in which foot traffic clogs thoroughfares and operations hit a productivity plateau. Rather than just refining manual processes, highly automated systems and fulfillment workflow modifications work together to deliver necessary increases in speed and accuracy. AS/RS enables different, more effective methodologies to solve the challenge of high-throughput e-commerce fulfillment.

Implementing AS/RS reverses the flow of picker-to-product by bringing goods to operators. This eliminates travel time that can account for as much as half of a picker's time, and allows labor to be more productive,

enabling operations to fulfill more orders per hour. Furthermore, shuttle systems are configurable to maximize efficiency based on operational needs, strategically releasing product in sequence for truck unloading, mixed-load pallet building or grouping similar orders together for faster fulfillment.

Shuttles are also valuable for their flexible handling characteristics, featuring gripping mechanisms compatible with a variety of product types, sizes and weights in cartons, totes, trays or bins. This flexibility also pays off in manufacturing operations, which can use shuttles to buffer incoming raw materials for later processes, or kitting operations to release parts packages for assembly.





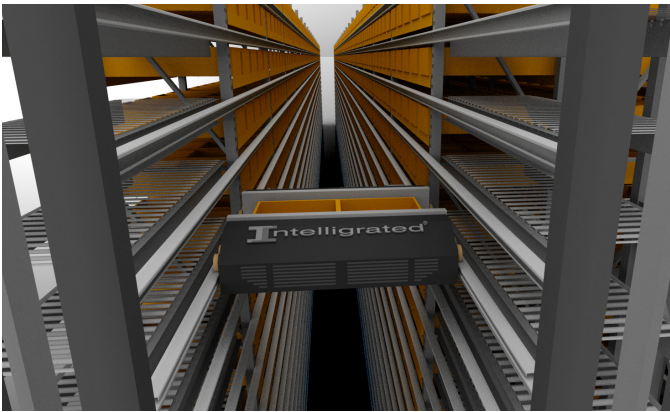
## The vendor partnership

Implementing an AS/RS shuttle system is a big investment, with an average two-year ROI and annual sales of \$50 million typically required to justify the capital expenditure. With an investment of such magnitude, the scale of the project makes for a long-term partnership, rather than a typical vendor-customer relationship, placing a premium on integration experience and support capability.

Asking the right questions during the RFP process helps companies choose the right vendor and set themselves up for a successful installation. Does the vendor have experience integrating other large, multimillion-dollar systems?

Do they have a reputation for stability and seeing projects through to success?

Highly automated systems often run 12-16 hour days and can keep even longer operating hours during peaks. With tight shipping deadlines and minimal margin for error, operations cannot afford unexpected down time. Managing the risk of unplanned downtime requires reliable equipment. This means a system that can be easily maintained, and 24X7 vendor support with fast repair times to minimize unplanned downtime in the event of an issue.



## Integration and scalability

Systems integration requires not only physical connections but also significant virtual links. All order data flows from a DC's WMS to the AS/RS control software that decides how to sequence and release products from storage. The control software's sequencing rules and system parameters are customized based on unique project and customer requirements, placing significant value on cooperation from client IT resources for a successful integration.

The efficiency of the overall system design streamlines the initial installation and also plays an important role to enable system scalability as order volumes and storage requirements increase over time. Modular designs allow for phased implementations, enabling operations to strategically schedule installations for minimal disruption, adding capacity as business needs evolve.

Shuttle systems have scalability advantages over other AS/RS technology thanks to their overall system framework and the shuttles themselves. Lifts at the end of aisles enable multiple levels to share a single shuttle, with the flexibility to add additional units as throughput demands increase. The shuttles are available with a range of different load handlers, enabling them

to handle different product types and storage depths to maximize density, from single- to quadruple-deep storage. The modular design of the racking and storage framework enables the addition of new levels and aisles to accommodate growth in storage demand.

## Operational advantages build the business case

AS/RS presents a multifaceted business case. The goods-to-operator workflow can more than double labor productivity, as it eliminates the travel that accounts for up to 60 percent of a picker's time. The increased space utilization and storage density per square foot takes advantage of unused cubic volume in a facility and can prevent operations from moving or building a new facility. Accuracy is an inherent piece of using shuttles to move inventory, and even as the system executes more complex applications like sequencing and buffering, extensive scanning and automated checks ensure virtually error-free operation.

Shuttles hold key advantages in throughput capability and layout flexibility against other types of AS/RS technology. With a shuttle operating on each row, 10-15 shuttles can serve the same area as a single crane in a comparable miniload system, depending on the height of the storage aisle. This results in greater overall throughput and quicker access to individual stock locations. Finally, the modular design of the shuttle system's storage framework enables it to accommodate physical obstructions inherent to the building, such as beams or lights, far more efficiently than other set ups by simply building around them. By contrast, a mini-load or auto store system requires a more rigid, cubic structure that can't adapt to building shape or other physical obstructions.



## The right type of technology, built for the demands of today and tomorrow

The impact of e-commerce and the evolving labor pool continues to grow, requiring supply chain initiatives to enhance labor productivity and push overall output to new heights. When properly implemented, AS/RS, specifically shuttle systems, offer the most flexible, efficient and productive solution for high-volume fulfillment operations. Realizing this benefit requires careful in-depth planning and a capable vendor equipped to provide system design, integration and ongoing support necessary for a successful long-term partnership.

For more information, visit [www.intelligrated.com](http://www.intelligrated.com) or email [info@intelligrated.com](mailto:info@intelligrated.com).