WORKING TOWARDS "LIGHTS OUT" FULFILLMENT

THE CONCEPT OF LIGHTS OUT AUTOMATION AND THE TECHNOLOGY BEHIND IT.

WHITE PAPER WRITTEN BY:

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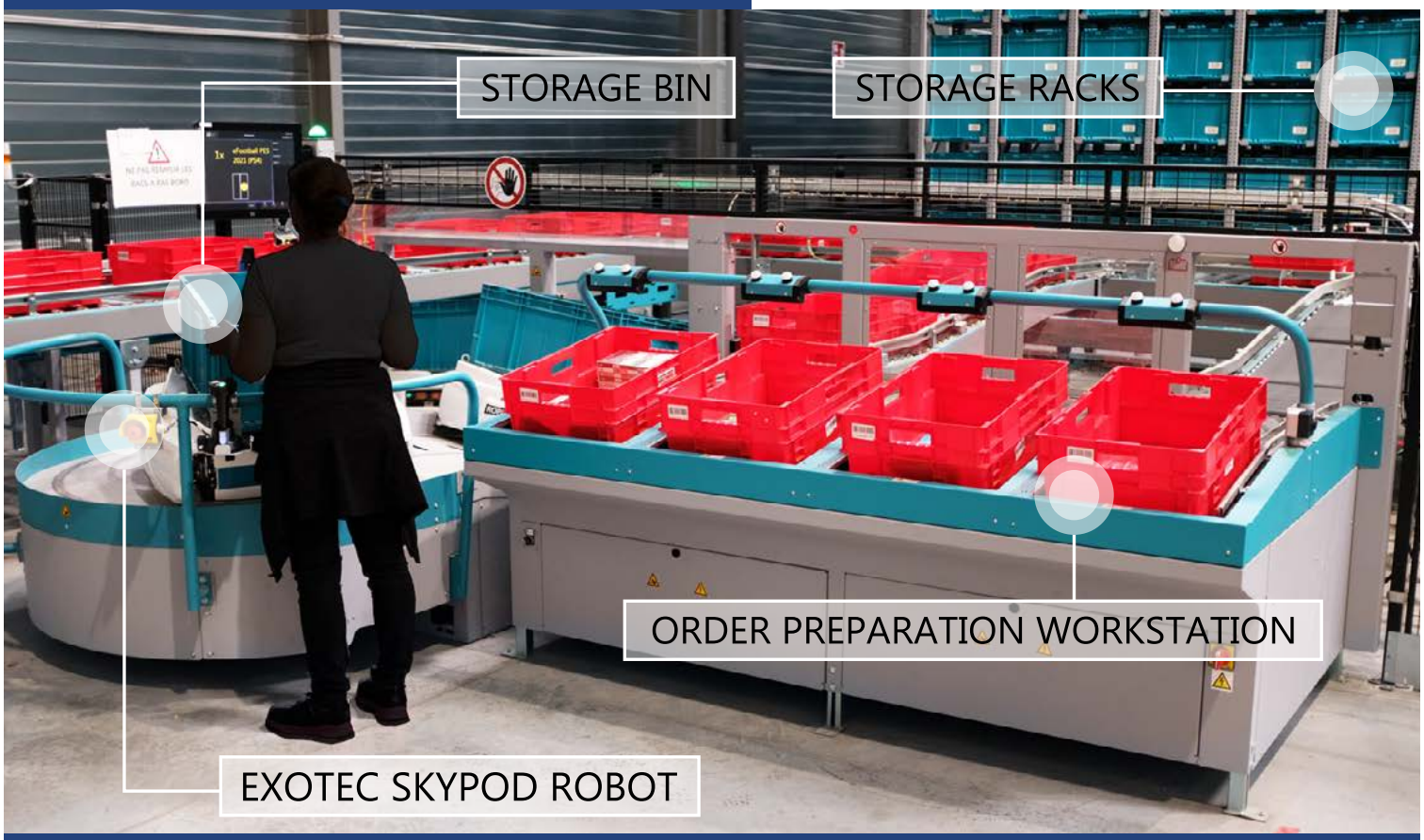
DEFINING THE LIGHTS OUT AUTOMATION CONCEPT

Forty-two years ago, I started working for a very large consumer-goods manufacturer, and I clearly remember sitting in a meeting and discussing "lights out manufacturing". The concept of a lights out manufacturing facility was evolving, and processes to achieve this were gradually improving. As the development in technology became more sophisticated, the ability to manufacture complex items without human intervention eventually became common practice.

A couple of years later I entered the world of material handling. Consultants and very progressive companies launched initiatives to define and create "lights out" for the fulfillment and distribution sector to benefit in the same manner as the manufacturing industry. That was in the late '70s and early '80s, and even at the turn of the millennium, the question remained, "Would it be possible to process work in distribution facilities without people, and have a true lights out distribution facility?"

FIGURE 1, EXOTEC GOODS-TO-PERSON SYSTEM

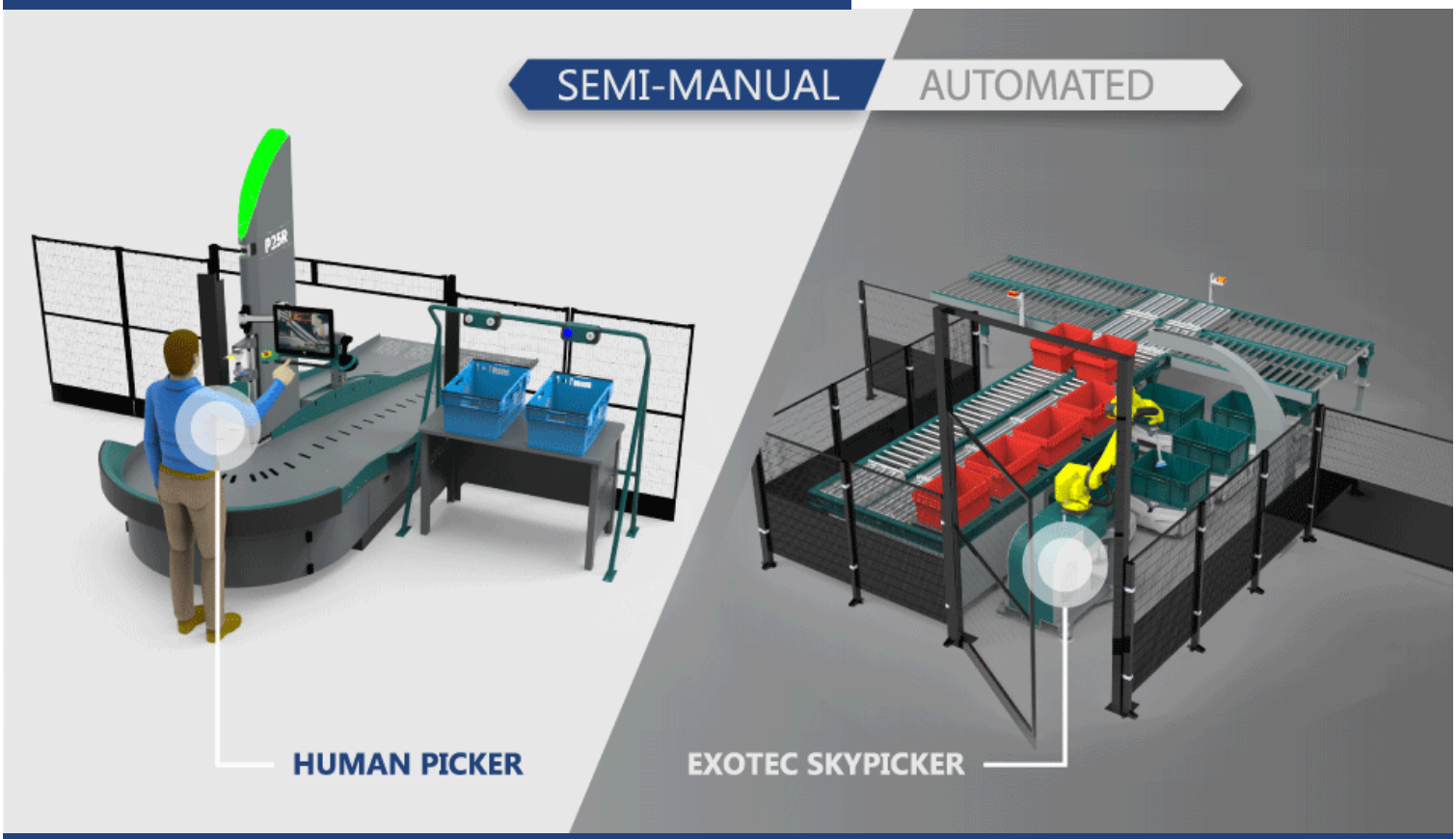


The Exotec Skypod System is an automated storage and order preparation system. The Skypod Robots can climb the multi-level storage racks and move three dimensionally to retrieve the storage bins.

LIGHTS OUT AUTOMATION TECHNOLOGY

What has seeking lights out processes provided along the way? It has driven labor out of the pick process by eliminating waste such as walking, and we are now addressing the other aspect of the pick process by automating the task time related to selecting the appropriate item. Advancements are being made regarding automated trailer unloading and loading. On-demand packing is driving efficiencies in numerous ways but ultimately eliminating the need for human intervention. The evolution of goods-to-person to goods-to-robot (Figure 2), usage of autonomous mobile robots (AMR) (Figure 3), huge gains in vision technology and software, as well as AI and deep learning has all spawned out of the search for lights out.

FIGURE 2, GOODS-TO-PERSON VS. GOODS-TO-ROBOT



This figure depicts the Exotec Skypod System which, as stated in Figure 1, is a an automated storage and order preparation system. After retrieving the bin, the Skypod Robot takes the bin to the workstation to be picked. The semi-manual process relies on the Skypod Robots to retrieve the bins as well as a human picker who grabs the item from the bin and places it in the proper order bin. The advancement of technology and the continued effort to reach lights out automation has resulted in the Exotec Skypicker. The Skypicker completely replaces the need for a human picker. It is equipped with an articulating arm and can simultaneously prepare four orders.

FACILITY AUTOMATION CHALLENGES

While we have developed the technology and created automation for specific areas within a facility, the key to all of this is centered around integration. What does that mean? Metaphorically, it means taking the individual, automated puzzle pieces and fitting them together to form a completed puzzle, giving you a clear image. The ultimate end game is to make sure that each automated piece within a facility compliments and interfaces appropriately with each other thus forming a cohesive, automated solution.

Despite tremendous gains in technology, we have not completely solved the puzzle. This is due, in part, to many factors including day-to-day operations, capital requirements, technology advancements, environmental and cultural change, etcetera. Those continuing the effort to blend technologies to create a lights out warehouse or distribution facility should be embraced and supported in every way to encourage this growth. We will all benefit from it.

The question remains, "Are we at a point where we can truly accomplish a lights out distribution facility or warehouse?" In reality, plans do not always go as expected. These complex technologies consist of electro-mechanical components that are assembled into a working system which requires maintenance. This poses a challenge because self-repairing equipment does not currently exist to my knowledge. Lights out distribution facilities are rigid, and they like consistency. In fulfillment, things change rapidly on a day-to-day and season-to-season basis. With such rapid changes, human intervention is often required to perform tasks such as training robots or updating software. All of these challenges need to be considered when thinking about the practicality of achieving a facility with lights out automation.

FIGURE 3, AMRS FOR PALLET TRANSPORT

Autonomous Mobile Robots (AMR) are self-driving collaborative vehicles that navigate around people and objects without the need of a track. The flexibility of AMRs is endless. Interchangeable top modules allow for materials of different shapes and sizes. By using AMRs for automated pallet transport, employees' time can be repurposed from point-to-point transportation to focus on more value-added operations.

The MiR1000 (shown on the left) transports loads up to 1000kg. It navigates autonomously and chooses the most efficient route to the destination. The Nipper (shown on the right) autonomously transports loads up to 1000kg as well and can navigate through narrow spaces.

IMPLEMENTING AN AUTOMATED FACILITY AND ACHIEVING LIGHTS OUT

It starts with data, accurate forecasts, and a detailed understanding of what the result needs to satisfy. Cohesive solutions require definitive criteria that define the "why?", and without it, we should not even start the effort. The adage of "bad data in – bad result" is significantly more important in the search for a lights out warehouse. Simply put, automation is not flexible when trying to eliminate all humans from the equation, which ironically, is the intended purpose of automation. Therefore, the data and forecasts MUST be correct going in. Read the 16 Essential Warehouse KPIs that you should be tracking.

Once the data has been analyzed, and the design criteria has been established, it is imperative that an agreement is reached, top to bottom, within the organization that is undertaking the effort. Engage the design team, and review in detail the expectations of the effort. The next step is to develop the functional requirements document in which the overall effort will be defined. Upon completion, another round of approvals must be achieved. The effort will fail if buy-in and complete understanding is unclear.

THE IMPORTANCE OF AN INTEGRATOR

Most companies other than the behemoths do not have the resources to integrate the various systems on their own. If the desire is truly a lights out facility, it is necessary to partner with a material handling integrator that is experienced in all automated "puzzle pieces". A material handling integrator is a company that designs, engineers, and integrates all the individual puzzle pieces to form a unified process. (Figure 4).

FIGURE 4, THE IMPORTANCE OF AN INTEGRATOR

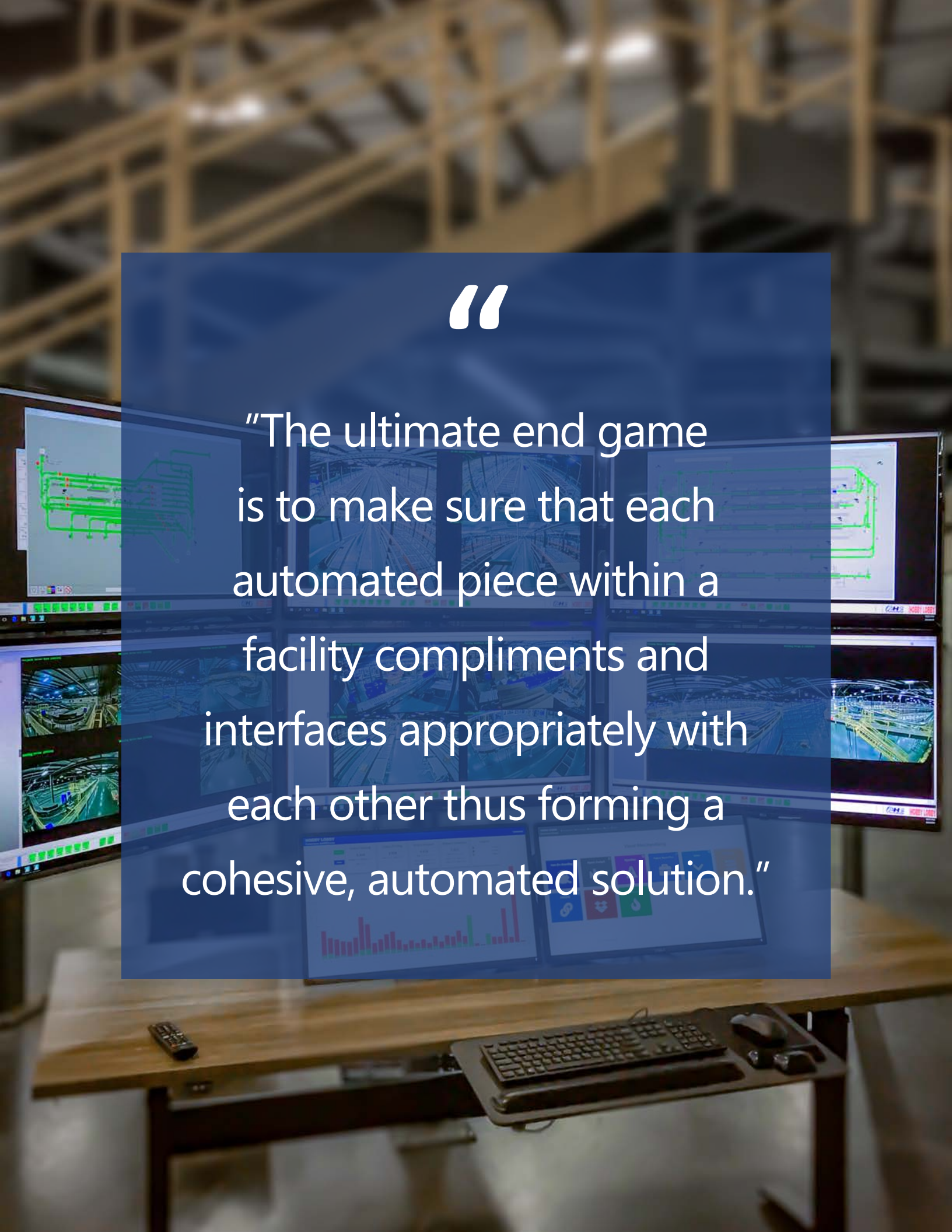
An integrator has the knowledge and expertise to combine many different individual technologies into one cohesive solution. Understanding the strengths of each individual component creates a synergistic, optimized design.

WHY CHOOSE AHS AS YOUR INTEGRATION PARTNER

AHS partners with our clients throughout their entire project lifecycle. As an extension of your team, AHS delivers assurance that not only do we understand your needs, but we have responsibility for the design, project financials, implementation, system commissioning, training, and monitoring the expected return on investment.

For more than 45 years, we have been combining the power of creative design with a strategic selection of equipment manufacturers to create best-in-class fulfillment and distribution solutions.

SCHEDULE A DEMO



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“The ultimate end game is to make sure that each automated piece within a facility compliments and interfaces appropriately with each other thus forming a cohesive, automated solution.”

SUMMARY

In summary, the quest to achieve lights out automation has benefitted the distribution and fulfillment sectors of the supply chain. It will continue to drive lower costs and quicker response which will benefit us all. The question of pursuing a lights out distribution facility is an individual choice. It comes with risk, but, if successfully implemented, great reward.

FIGURE 5, CAJA ROBOTIC SYSTEM

Caja Robotics' two types of specialized robots work synergistically to optimize the goods-to-person system. As the Lift robot can reach high and the Cart robot can move fast, each of them is assigned suitable tasks to constantly move bins between workstations and shelves.

WHAT'S NEXT?

Are you ready to start assessing improvement opportunities or ways to increase capacity within your distribution network? Our specialized team will work with you to understand your business targets, develop a customized plan specific to your company, and put the appropriate systems and technologies in place to help your facility optimize its processes. Contact us to discuss solutions for your facility.

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