



Optimizing Warehousing & Logistics Operations with Vuzix Smart Glasses

Warehouse Operations & Logistics Today

Over the last 20 years, we have seen considerable advances in Warehouse Management Systems— guided picking, mapping for forklift operators, and data-entry systems that have vastly reduced the need for spreadsheets and forms. While many thought that robots would have taken over by now, there are too many factors involved to be able to leave warehouse operations entirely to machines, and human workers still remain essential. But humans can make mistakes, and studies show that picking errors can cost as much as \$300 per error to correct when shipping to customers and many thousands when affecting the manufacturing process. The quest for perfection and improved productivity in warehouse management continues.

The Rising Cost of Errors

As shipping costs rise and import/export restrictions tighten, errors become more expensive. Errors in stocking, picking or shipping result in returns, and returns involve additional time spent on documentation, accounting, re-stocking and customer service. Return shipping has to be paid for, then the order has to be done over again.

The average picking error rate of a trained picker is 1% to 3%. That sounds low, until you calculate the cumulative cost over a month. As noted, studies show that the per-error cost is \$50 to \$300, or a reduction in profitability of 11% to 13%. Add the fact that errors can mean loss of customer goodwill and the need to minimize errors becomes even greater.

New Automation: Robots & Drones

While many warehouse operators are staying with more traditional systems, others are incorporating Autonomous Technology (AT), finding that it generally improves efficiency and reduces errors. AT takes two forms: mobile robots and unmanned aerial vehicles or drones. Automated Guided Vehicles, or Autonomous Mobile Robots (AMRs) are robots which carry or tow loads. They are in common use worldwide—Amazon, for example, has 100,000 robots working in its warehouses. They are controlled by computers and use on-board navigation systems, laser guidance and RFID scanning, so they don't need to actually 'see' anything. They can turn within a small

radius and navigate around obstacles, which reduces product damage, aisle traffic and human injury. And they can take on hours of tedious work while freeing up people for higher-value tasks.

Drones

Drones are currently not as widely accepted as robots, largely due to cost and concerns about human safety. Drones are controlled by human operators, or by navigation software that is built-in or Wi-Fi enabled. Sensors ensure anti-collision and safety—if they detect an obstacle, or the Wi-Fi connection lapses, drones will automatically stop flying and hover. They can count inventory, access an item's precise location, recognize images, inspect labels, take and send photos, and detect tagging mistakes. They can do this fifty times faster than people, and they save human workers hours of searching, walking, climbing and scanning.

Obviously, Autonomous Technology (AT) is of great benefit in warehousing & logistics management—it helps increase efficiency and accuracy, and reduces costly errors. But its success depends on human performance. AT works perfectly if there are no errors anywhere else in the supply chain, and if the people interacting with it make no mistakes. AT helps to easily find problems, but only after mistakes have been made. AT provides information, but humans will have to interpret it. AT performs tasks, but people have to complete the job.

Despite predictions that they would 'take over,' we now know that, for at least the next few decades, robots and drones will create and facilitate efficient working relationships between man and machine. However, due to high capital costs, and an average five-year return on investment, it will still be some time before the majority of warehouses are heavily automated.



Mobility in Warehousing & Logistics

Whether or not warehouse owners automate, it remains true that worker mobility and being hands free is key to the efficient operation of any warehouse. Most operators have achieved mobility through the use of various types of technology, the smartphone being the most common. Others use clipboards, tablets and scanners; and some have rolling carts outfitted with printers and laptops.

The downside to these types of systems is that they don't reduce in-aisle time for workers, and don't reduce congestion. Plus they're hardware-intensive—hardware is expensive, often fragile, needs maintenance and is usually hand-held. And this is where wearable technology comes in.

Wearables, or Smart Glasses, connect workers to machines and enterprise management software—hands-free. They can deliver full interaction and communication, including images and audio, between workers, managers and software.

Augmented Reality & Object Recognition

Augmented Reality (AR) superimposes, or overlays, audio, text, images and video on what we see, as we see it, blending computer generated virtual components with reality. It achieves this through the core technologies of machine visions for object and character recognition.

People are easily able to recognize and identify many different objects, even when partially obstructed from view. Machines



can't do that, but machine vision enables devices to see their environment and OCR enables devices to scan and process barcodes, serial numbers and tags.

Hands-Free Image, Video & Audio Capture

Smart Glasses are equipped with high-definition video cameras and noise cancelling microphones. This allows the user, with a simple touch, gesture or voice command, to instantaneously capture unique pictures, video, and audio, without taking his hands off his task.

The wearer can ask questions, and be answered. They no longer have to fill out

forms or spreadsheets because Smart Glasses record everything they do; and their every action becomes content, which can then be stored in the device's onboard memory, uploaded to a cloud database, or streamed to a supervisor.

Smart Item Management with Smart Glasses

Smart Glasses are particularly useful in picking, as the wearer never has to refer to a printed pick or count sheet—it's right in front of their eyes. They can provide real time feedback to ensure correct picks are made and inventory counting can be done on the fly while picking. If they spot an error,

they can instantly ask a question or refer to other documents—and so can their supervisor, at the same time. Workers can give voice confirmation of order completion, talk to colleagues at the loading bay, scan return tags. Forklift operators can use Smart Glasses outfitted with system guidance for navigation; so can security teams.

Does this technology make a difference? Very much so. In the case of GH Health-care, a warehouse worker receiving a new picklist completed the task 46% faster than with the company's traditional systems.



VUZIX M4000™
SMART GLASSES

Next-Generation Mobility in Warehousing & Logistics: Vuzix M-Series Smart Glasses

Vuzix Smart Glasses combine Artificial Intelligence, Augmented Reality and Machine Vision to provide real-time visual and audio references, and decision-making support, for the people who wear them. These functions, and the depth and scope of information that can be included, make Vuzix Smart Glasses an indispensable operations tool. They are easy to operate, they allow users to work with both hands while correctly completing tasks, and they deliver real-time information and communication.

Smart Glasses provide a much-improved user experience over clipboards, binders and hand-held devices, all of which can slow order completion. The innovation lies in putting information in employees' line of vision, when they need it.

Vuzix Smart Glasses Enable:

- Hands-free access to information in the form of a HUD (step-by-step instructions, diagrams, videos);
- Real-time, see-what-I-see communication (for remote collaboration and support from a technician or supervisor);
- Hands-free, point-of-view corporate documentation (audio and visual);
- AR overlays for vision picking, instructions, and remote support and communication (audio and visual);
- Computer Vision for object and character recognition (for scanning codes, text, numbers, step verification, task completion).

These capabilities are essential for delivering effective work-place improvements for warehouse and logistics employees.

Vuzix Smart Glasses Solutions

VUZIX M400™



- First Smart Glasses 8 Core 2.52Ghz Qualcomm© XR1 Platform
- OLED display
- 2-12 hours of operation based on external battery choice
- Auto-focus camera with up to 12.8 megapixels and 4K 30fps video
- Various comfortable mounting options
- Integrated speaker with up to 97db output
- USB, Wi-Fi, and Bluetooth connectivity
- IP67 certification against water and dust

VUZIX M4000™



- First Smart Glasses 8 Core 2.52Ghz Qualcomm© XR1 Platform
- See-through Waveguide optics
- 2-12 hours of operation based on external battery choice
- Auto-focus camera with up to 12.8 megapixels and 4K 30fps video
- Various mounting options available for comfort
- Integrated speaker with up to 97db output
- USB, Wi-Fi, and Bluetooth connectivity
- IP67 certification against water and dust