VUZIX®

View the Future®

OPTIMIZING WAREHOUSING & LOGISTICS OPERATIONS WITH VUZIX SMART GLASSES

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1 Introduction: 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.

Detroit warehouse circa 1930s.

Warehousing and logistics became semi-automated in the 1950s.

Many large warehouses and shippers are using drones to improve automation.

A. Disrupting Factors in Warehousing & Logistics

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.

B. 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 Healthcare, a warehouse worker receiving a new picklist completed the task 46% faster than with the company's traditional systems.

2 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 fordelivering effective work-place improvements for warehouse and logistics employees.

Augmenting Warehousing & Logistics

Product variation, inadequate training methods, and incomplete work instructions that slow down employees are common issues negatively impacting warehousing and logistics operations.

With an ergonomic wearable form factor that enables wearers to focus on complex tasks, and user-experience functions that enhance quick knowledge capture, Vuzix Smart Glasses promise to help warehouse operators improve expediting systems, and move employees through their tasks in a faster, more efficient manner.

When navigating the increasingly crowded enterprise hardware market, two things stand out in Smart Glasses: wearability and ruggedness. Workers cannot properly concentrate if the device is uncomfortable and/or ill-fitting, and the device has to be able to stand up to a wide variety of conditions and wearer behavior.

The Vuzix M-Series Smart Glasses are the most wearable and ergonomically versatile on the market. With multiple functional mounting options and an array of ingenious accessories, they can be worn by anyone, regardless of which eye is dominant, and whether or not the employee is wearing prescription glasses, a cap, or a hardhat.

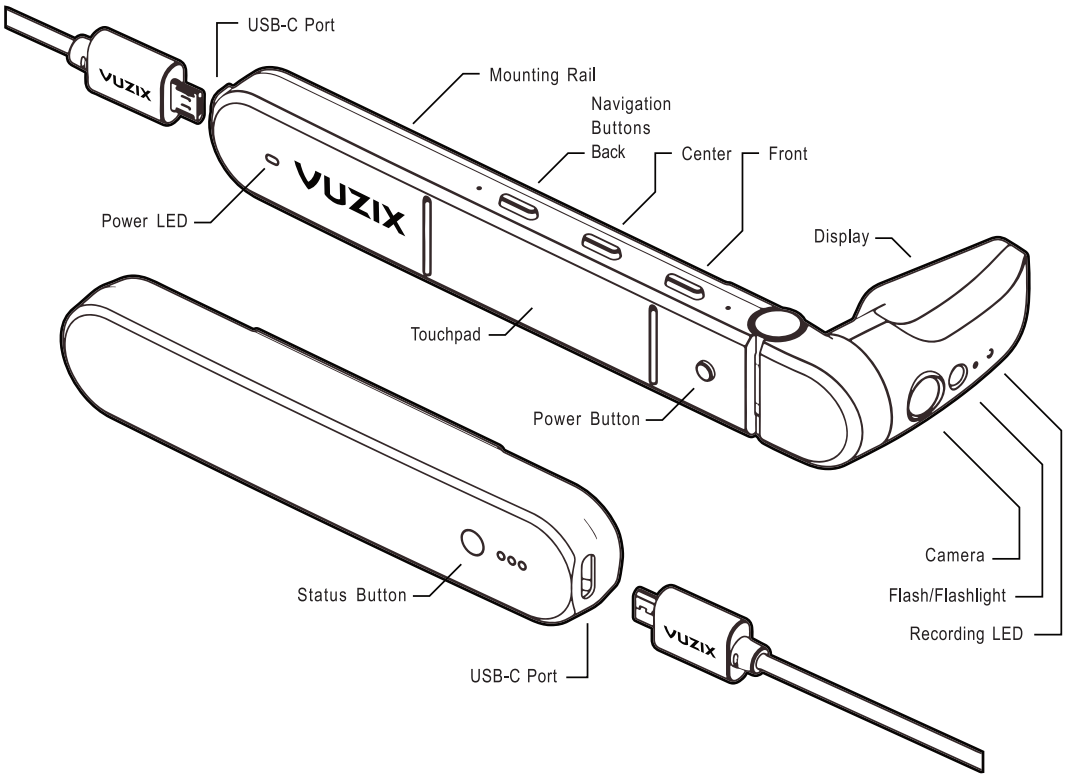
State-of-the-Art Warehousing & Logistics: Next-Generation - Vuzix M400 Smart Glasses

Vuzix M400 Smart Glasses provide most of the features and capabilities of a modern smartphone, in a hands-free wearable device. Bluetooth 4.0 connectivity allows them to pair with Android devices or connect wirelessly with Wi-Fi. Integrated head-tracking provides an angle of current view for unprecedented situational awareness.

In addition, the M400s include the Qualcomm® Snapdragon™ XR1 platform, the first dedicated XR platform designed to accelerate high-quality video, audio and interaction on Smart Glasses.

The Vuzix focus on wearability and ergonomic form factor, combined with the power of the Snapdragon XR1, drives Smart Glasses performance and functionality to the next level.

The Vuzix M400 Smart Glasses are ruggedized against water, dust and dirt, and operate via voice, button-press, and gesture controls. All of this allows warehouse personnel to get more done in less time.



Vuzix M400 Smart Glasses: Specifications & Features

TECHNICAL SPECIFICATIONS[1] OPTICS

- Display resolution: nHD color display
- Display type: OLED
- Aspect ratio: 16:9
- Field of View (diagonal): 16.8 degrees, equivalent to a 5 in. mobile device screen seen at 17 inches
- Brightness: > 2000 nits
- Contrast: > 10,000:1
- 24-bit color with true black
- Supports left or right eye use

SYSTEM

- 8 Core 2.52Ghz Qualcomm XR1
- 6GB LPDDR4 RAM
- 64GB internal flash memory
- Android 8.1 OS
- OS and apps OTA upgradeable
- MDM available from multiple partners

CERTIFICATIONS

- IP67
- Drop safe to 2 meters

UNIVERSAL M-SERIES RAIL FOR VARIOUS MOUNTING OPTIONS

- Vuzix M-Series Rail Eyeglass frames without lens (standard)
- Weighs less than 3 oz.
- Eyeglass frames with lens
- Safety glasses
- Hard hat mount
- Headband mount
- Peltor headphone mount

BATTERY

- 135mAh internal battery supports hot swapping of external batteries
- 1000 mAh head-worn USB-C external battery with 3-level LED indicator
- Can be powered by 3rd-party USB battery packs in place of head-worn battery
- 2 – 12 hours of operation based on external battery choice

CONTROLS

- 3 control buttons
- Voice control – customizable and supports multiple languages
- 2 axis touchpad with multi-finger support

AUDIO

- Integrated speaker (up to 97db output)
- Triple noise-cancelling microphones
- BT audio: HSP / A2DP

CAMERA

- Up to 12.8-megapixel stills
- Up to 4k30 video
- Improved auto-focus (PDAF)
- Improved optical image stabilization
- LED flash/scene illumination
- Barcode scanning

CONNECTIVITY

- USB 3.1 Gen 2 on USB Type-C
- Wi-Fi 2.4/5Ghz 802.11 a/b/g/n/ac
- Bluetooth 5.0 BR/EDR/LE

INTEGRATED HEAD TRACKER

- 3-degree of freedom head tracking
- 3 axis gyro
- 3 axis accelerometer
- 3 axis mag/integrated compass

GPS

- GPS / GLONASS

Compare all Vuzix products here:
www.vuzix.com/products/compare-vuzix-smart-glasses

[1]*Specifications are subject to change*

3 The Future of Vuzix M-Series Smart Glasses in Warehousing & Logistics

Technological advancement, data analytics, and artificial intelligence are revolutionizing the way corporations manage inventory systems, whether the changes take place in the office, on the road, or on the warehouse floor.

The last piece of the puzzle is warehouse workers: in order for a warehouse to run efficiently, its workers have to be efficient. Given the benefits involved in hands-free work, technology that delivers that capability is key.

Vuzix M-Series Smart Glasses connect human workers with smart machines, critical knowledge sources, and each other. They are rapidly replacing hand-held devices, phones and paper, and apply to all warehouse functions. How revolutionary a hands- free, heads-up form factor is cannot be overstated. The use of Vuzix Smart Glasses facilitates significant gains in operational efficiency, and significant reductions in errors.

Within the smart glasses sector, the Vuzix M-Series stands out. Its ergonomic design, range of capabilities, software partnerships and device accessories have earned Vuzix a 20-year success record. In addition to hardware design and production, those years of experience include thousands of conversations, pilot programs and deployments with Fortune 1000 companies. Today, Vuzix Smart Glasses are among the most widely deployed devices across the globe, digitally transforming businesses in the widest variety of use cases for any single wearable device.

To learn more about improving existing workflows and opening new opportunities for your business with Vuzix M-Series Smart Glasses, visit: www.vuzix.com

A new dawn arrives at the headquarters and production facility of the world renown Vuzix smart glasses and augmented reality manufacturer in Rochester NY, USA.

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