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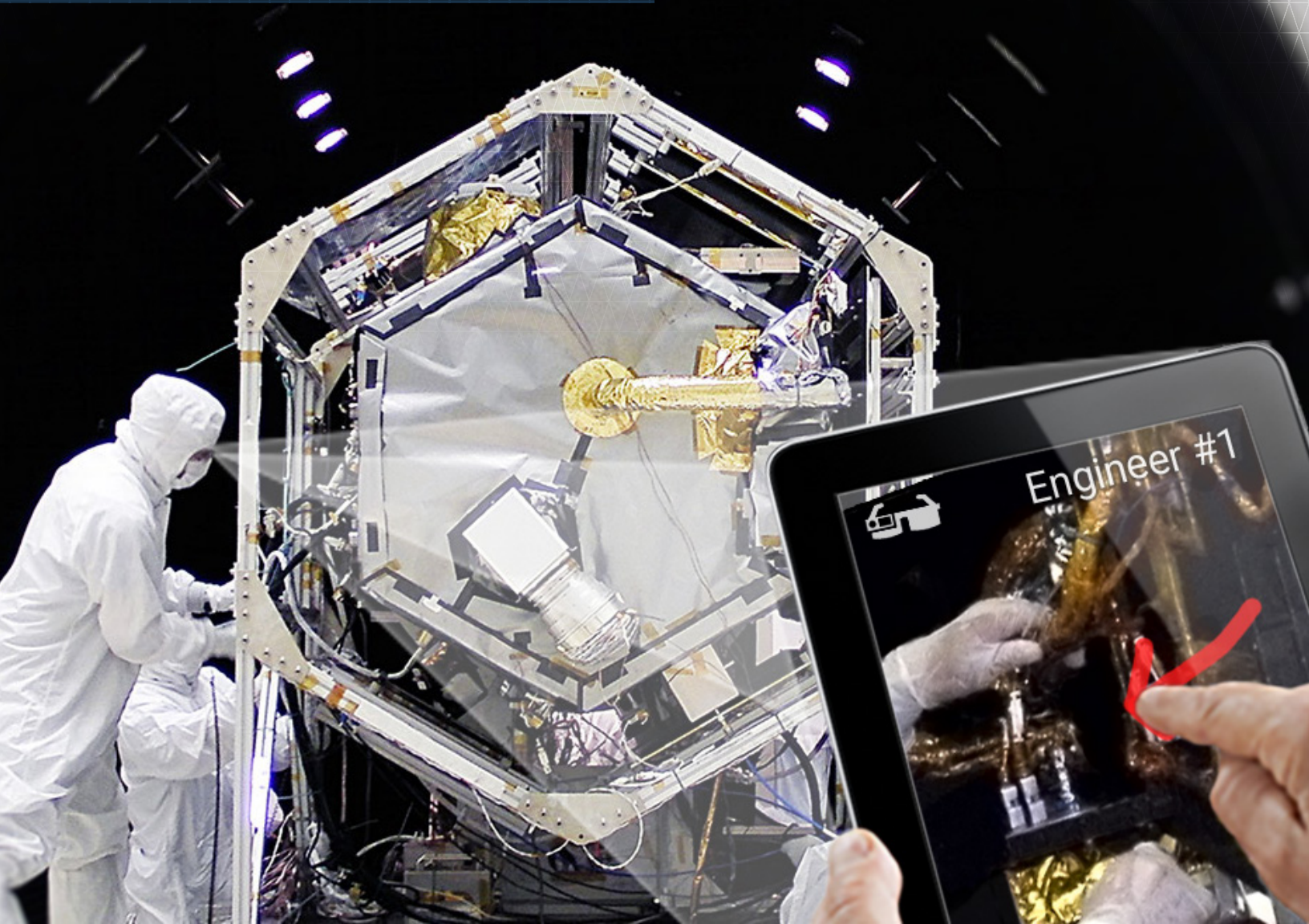
WHITEPAPER

SMART GLASS ADOPTION IN THE ENTERPRISE

Manufacturing, field service, training and compliance departments are looking to smart glasses for new efficiencies.

Research by

AREA | Augmented
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Modern enterprises are seeing rapid changes with the development of new technology. While some human practices can be replaced by streamlined processes, robotics, and automation, it is impossible for these advances to supplant humans entirely. Enterprises recognize the greatest benefit when invaluable human input is made better through advanced technology, specifically wearables such as smart glasses. Smart glasses, and the assisted reality software that drives them, actually digitizes the last analog component of the enterprise—the human.

A recent study of operations executives conducted by Augmented Research Enterprise Alliance (AREA) and commissioned by Vital Enterprises, reveals that momentum is steadily building toward enterprise adoption of smart glasses technology. While many industries could benefit from implementation, enterprises in the aerospace, automotive, life sciences and manufacturing sectors are proving to be the earliest adopters with clear advantages to gain.

The greatest initial challenge for every new technology is implementing it in a way that add valuable functionality for an enterprise. The same holds true with smart glasses technology and software adoption.

As departments integrate this new technology, they recognize how it quickly exceeds the capacity of previous technology to meet their evolving needs. Specifically, these industries realize how it can enhance activities that require collaboration, detailed instructions, regulated procedures and extensive quality assurance. Once implemented, smart glasses functionality makes business processes faster, safer and higher quality.

45% of businesses claim that a need for increased productivity is the major factor driving smart glasses adoption, while 31% cite a need for reduced errors and rework as their most pressing concern.

This increased value can be easily seen in the aerospace manufacturing environment, where tight quality controls dictate a need for precise tools and a non-existent margin of error. In this arena, as well as many others, smart glasses technology can reduce costs, while at the same time increase production.

EXAMPLE

A technician is tightening bolts on a satellite. These bolts are located in a confined space and must be tightened to the exact torque, as specified by the engineers. In the absence of smart glasses, this technician would tighten the bolt and then move out of the space to wait for a QA witness to verify the torque, wasting precious time and resources.

With smart glasses, the technician can instantly view the required torque and check off completion hands-free, at which point a photographic log of the work is automatically sent to a remote quality witness for inspection. Waiting time for verification and wasteful redundancy can be reduced by a factor of ten.

63.64% of respondents report that reducing or eliminating idle and wait time is a key driver to adoption of smart glasses technology.

In addition to this increased efficiency, smart glasses also deliver ROI by reducing risk, enhancing quality, meeting production targets, streamlining processes and reducing costs.

Businesses are demanding smarter tools and processes, and AREA research shows that smart glasses technology is a key factor to achieving the goal of economic advantage. According to the survey, of the businesses surveyed, 42% of respondents say they will implement smart glasses technology within the year, and another 38% predict adoption in 2-3 years. This paper explores the reasons behind the drive toward adoption.

Smart Glasses Reduce Risk

Smart glasses technology reduces human error and as a result, lowers the risk of liability and failure. It also enhances safety by facilitating audits and root-cause analysis.

Injuries, accidents and lawsuits are some of the priciest—and most unanticipated—costs a business can incur. Smart glasses technology decreases the number and severity of these unplanned events in several key ways:

- 1. Analytics & Tracking Capabilities:** These built-in platform tools make work auditable and protect an enterprise from compliance infractions. They can track individual task times, potential bottlenecks in workflow and location of all employees and equipment via geo-locations and Bluetooth. Compliance requirements are easily satisfied with automatically generated history reports that can be viewed by time, employee and division.
- 2. Ambient & Glanceable Display Software:** Unlike tablets that require a shift in visual focus and at times, a hands-on approach, smart glasses puts critical information directly in front of workers. It enables two-way communication with co-workers for streamlined task management and improved decision making. Intelligent display options deliver only information that is relevant to the task at hand, and an ambient display simplifies work processes through real time notifications and active information.
- 3. Customizable Workflow Engine:** Enterprise managers can preload smart glasses technology with contextual info for specific tasks and workflows. Replacing manual paper processes, smart glasses delivers rich, multi-media, multi-dimensional information at each stage of the task. If changes arise, they can be pushed synchronously to the entire organization.
- 4. Video and Audio Communication Capabilities:** Smart glasses technology and software connects teams in real time. With two-way audio, two-way video, integrated telestration and the ability to pause and rewind a live feed (similar to DVR), employees and managers gain amplified ways to communicate with precision and ease.
- 5. Enterprise Security Features:** Information security is a critical concern of all enterprises, and smart glasses technology has the ability to protect sensitive data during and after transmission. With user authentication at the individual and session level, IP address whitelisting, peer-to-peer SSL secured messaging and the enablement of secure Wi-Fi, smart glasses adhere to rigorous modern security requirements and can evolve to meet advanced future demands.

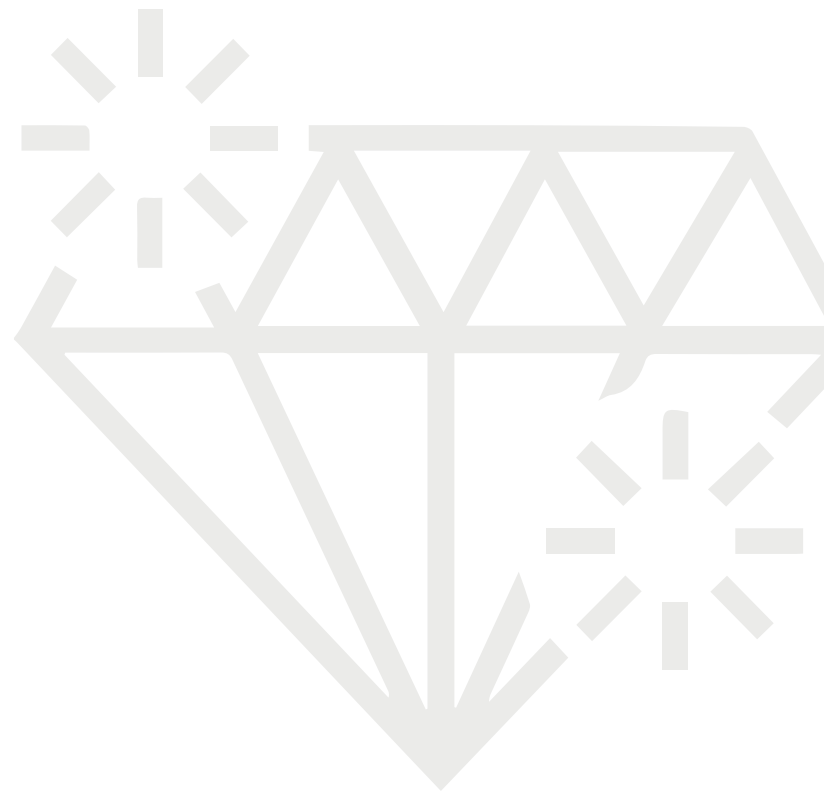
Of businesses surveyed, 90% claim that the ability to verify and record work processes through smart glasses would assist in compliance requirements of their organization.



Smart Glasses Improve Quality

By remotely enabling expert support and supervision, smart glasses technology and software can facilitate controlled workflows and auditable snapshots of completed work.

- 1. Reduced Visual Clutter:** Smartglass technology offers glanceable and intelligent display options that deliver only information that is relevant to the current tasks. The software enables two-way communication with co-workers to enhance task management and decision making.
- 2. Verifiable Real-time Workflow Instructions:** Ambient display capabilities simplify work processes with notifications and active information in real time. By delivering context-appropriate information for specific tasks, smart glasses ensure consistency with repeatable processes, and wireless delivery of instructions can be given to workers within the appropriate context. Each step is recorded and made verifiable against regulations or governance mandates.
- 3. Workflow Tracking:** With smart glasses technology, processes can be sourced for root cause analysis. The software platform categorizes work components and enables a detailed review of completed tasks to produce a comprehensive, time-stamped audit trail for root cause analysis of errors when they occur.
- 4. Continual Learning Platform:** Using big-data analytics, the smart glasses platform offers built-in workflow improvements. Previously unrecognized inefficiencies and system bottlenecks can be revealed and flagged for future improvement. Predictive analytics can even foretell future bottlenecks, enabling managers to pre-emptively engineer solutions to solve problems before they arise.



Smart Glasses Help Meet Production Targets

Smart glasses technology provides instant, glanceable task information at the point of work. It lets team members collaborate instantly and delivers process analytics to enterprise managers to optimize productivity.

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1. Dashboard Visualization: Real time work process signals are received by the platform and then analyzed to produce a single, integrated dashboard. Signal data can be visualized in graphs and values, allowing intuitive management of complex processes from a central location.

Smart glasses dashboards differentiate signals into multiple levels of data. This elevation and stratification enables data drill-down capabilities from general to highly specific. Role-based access controls ensure that the right people see the right data with different viewing levels according to access level.

The dashboard tool makes it easier to respond to changes in production demand, while predicted future changes can be modeled to reveal potential impact. Workflow instructions and controlled checkpoints can also compress production timelines.

2. Telestration Feature: Remote team members can access bi-directional communication via illustration. Even while in the field or out of the factory, they can have immediate feedback. This smart glasses capability enables two-way communication and allows remote managers to troubleshoot and manage the line. Problems can be resolved in real time as experts identify and resolve issues immediately.



Smart Glasses Enable Process Improvements

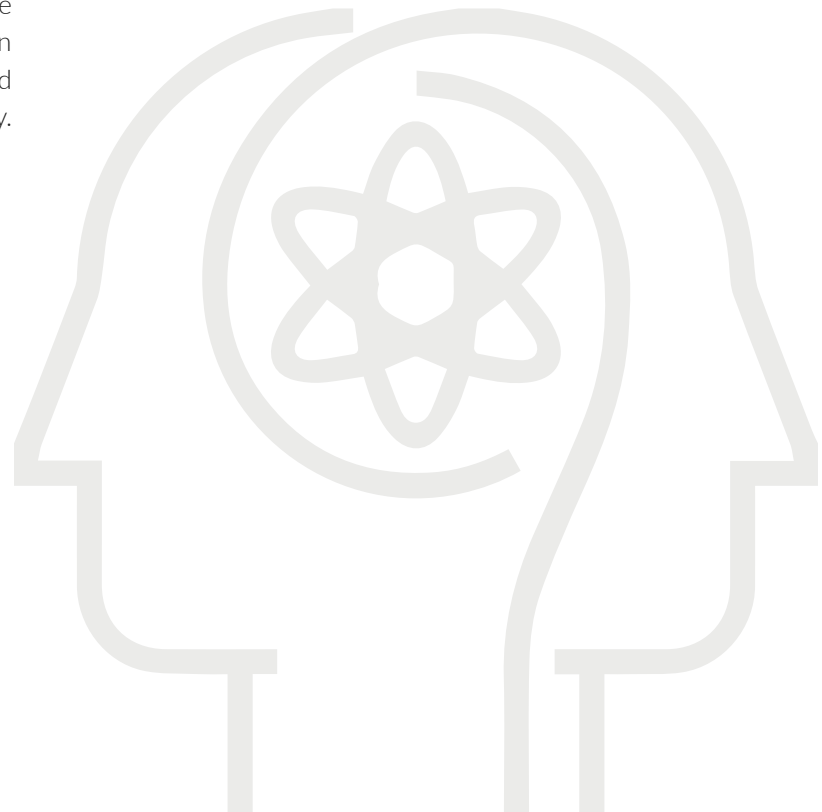
Process efficiencies are discovered when individual workers all have access to essential information and teams can collaborate at the point of work. These efficiencies can then be refined and expanded across organizations to improve overall enterprise performance.

In short, smart glasses technology reduces the amount of time it takes to do the work, eliminating wait time and improving efficiency with glanceable instructions and helpful content videos.

1. Dashboard Advantage: The dashboard visualization is a multi-faceted tool with many residual benefits. In addition to helping companies meet production goals, it also enables process improvements. With graphs and values generated by analyzed signal data, complex processes can be seen from a central location.

From this different vantage point, inefficiencies can be recognized and corrected and management is made more intuitive. Escalation policies intelligently reveal information throughout an organization as business policy dictates, and real time workflow updates are communicated simultaneously.

- 2. Built-in Variance Tracking:** Smart glasses tools, like variance tracking, detect bottlenecks and ensure consistency. Enterprises can ensure that their processes adhere to compliance standards and can focus on improvement by correcting previously unrealized inefficiencies. Instead of putting out figurative fires, managers can use these tools to preemptively troubleshoot issues before they become major problems.
- 3. Constant Improvement:** With immediate feedback and constant two-way communication between remote employees and managers, enterprises can always be culling for process insights. This access allows business to continuously re-engineer processes, improve production, and streamline practices to capture the greatest efficiency.



Smart Glasses Reduce Costs

Smart glasses technology optimizes workforce resources by making employees more efficient, revealing production bottlenecks, and reducing the need for costly re-work. These combined factors produce a convincing overall ROI.

- 1. Critical Path-Tracking:** Real time work process signals are received by the platform and analyzed by an integrated dashboard to optimize workforce resources. This visual representation can catalyze the efficiency of the existing labor force and reveal bottlenecks that compress production times.
- 2. Remote and Just-in-time Training:** Smart glasses technology makes enterprise expertise more ubiquitous and timelier. Intelligent display options deliver only the necessary information at the exact moment when it is needed. It is contextually accurate to reduce confusion, error and superfluous information.

Guided and trained by remote experts, enterprises can hire lower skilled workers to perform specialized tasks. They can save money with reduced labor costs and allocate their most skilled workers to strategic projects.

When employees and workers need an “expert” collaborator and do not have smart glasses, 90% of respondents report that they use the phone and 75% also use e-mail, both options that increase downtime and the possibility of miscommunication and error.

- 3. Instructions at the Point of Work:** Within smart glasses technology, multi-dimensional information is transmitted and received at each stage of the task. Replacing the inefficient manual paper process, enterprises can pivot and adapt, pushing necessary changes to the entire organization simultaneously.

- 4. Process Optimization:** With the help of smart glasses technology and software, managers can see which employees are particularly skilled at certain processes and can then allocate their workforce resources accordingly. A connected workforce offers greater flexibility, with everyone having simultaneous access to the same information.
- 5. Reduced Training, Reduced Waste:** Smart glasses technology reduces overall production defects and lowers rework and scrap costs. With back-end task tracking and automated checklist monitoring, defect volumes can be significantly reduced.

77.5% of survey respondents said that the ability to speed up tasks via step-by-step instructions at the point of work is a key driver to smart glasses adoption. In addition, 68.18% cite the need to accelerate uncommon or complicated activities with precise instructions is key. 59.09% state that access to remote support through two-way video communication is an essential need as well.

This powerful technology also shortens the training time for new hires. These employees become productive contributors more quickly, alleviating the stress and cost associated with high turnover rates, seasonal hiring and business growth requirements.

Conclusion

Businesses can leverage wearable glasses and assisted reality to connect workers in distributed manufacturing environments to their enterprise's knowledge resources. Critical information and support is available right at the point of work on hands-free glanceable displays. This new paradigm of information flow achieves unprecedented real time process visibility for operations managers, workers and companies. The result is higher production, reduced error and more efficient operations.

Smart glasses are a key component in modern manufacturing environments, production labs, clean processing operations and engineering organizations. Smart glasses streamline production, reduce risk, improve quality and help to control costs. Now is the time for B2B enterprises to consider implementing smart glasses technology for enhanced processes and maximized ROI.

About Vital Enterprises

Based in San Francisco, California, Vital Enterprises provides advanced software solutions that turn wearables into invaluable productivity tools for complex manufacturers. It empowers operations executives and their workforces to collaborate seamlessly to exceed production targets, reduce risk, and reduce costs. Vital delivers advanced capabilities such as hands-free, glanceable work instructions, real-time video and audio communication, and customizable workflows.

For more information, please visit www.vital.enterprises or contact the team at team@vital.enterprises or 650-394-6486.

About AREA

The Augmented Reality for Enterprise Alliance (AREA) is the only global member-driven trade organization focusing on reducing barriers to, and accelerating the smooth introduction and widespread adoption of Augmented Reality by and for professionals.

The AREA helps companies in all parts of the Augmented Reality ecosystem to achieve greater operational efficiency through the smooth introduction and widespread adoption of interoperable AR-assisted enterprise systems.