



# AUGMENTED REALITY SOLUTIONS DRIVING BUSINESS RESULTS TODAY

## OVERVIEW

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Whether frontline workers are technicians performing various maintenance tasks or factory production teams completing assembly procedures, augmented reality training can accelerate onboarding new employees and upskilling experienced ones. Manufacturing and service-based companies in the industrial sector witness better efficiency and productivity while improving compliance to safety guidelines by providing workers with augmented work instructions and expert procedural advice from anywhere and at any time.

# MANUFACTURING AND SERVICE-BASED INDUSTRIES

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# TRAINING AND KNOWLEDGE TRANSFER

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## WORKFORCE AGILITY

Today, one out of every four workers in North America is approaching retirement. In fields with complex workflows and tasks, such as energy & utilities, manufacturing, and telecommunications, this presents an obvious issue and the need for successful training and knowledge transfer processes. Augmented reality (AR) is set to address these issues, increasing training efficacy and workflow efficiency. Currently, depending on the job's complexity, resource allocation, and time commitment, most training programs vary dramatically in quality and general effectiveness. Within an organization, this can create knowledge gaps that lead to wasted time and resources. This imbalance can also present quality and safety concerns for ill-prepared employees. Filling the void caused by a generation of skilled manufacturing talent retiring will require new approaches to onboarding and training employees. Building an agile workforce with AR solutions is one way to enable better reskilling and upskilling. Workforce agility enables businesses to gain competitive advantages with the seamless introduction of new products and processes.

First, **augmented off-site training** allows learners to become familiar with an accurate representation of their workspace without being physically in that environment. It increases the safety of workers having to learn in hazardous environments while reducing the costs associated with on-site training. AR's visual capabilities, combined with the flexibility of implementation and real-time adaptability, make it the most immersive and effective training method available.

# TRAINING AND KNOWLEDGE TRANSFER

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Immersion helps increase attention and retention levels, reduce repetitive training sessions, and accelerate employee return on investment (ROI). The secondary objective of immersion is better to capture the user's attention than traditional content. More awareness leads to higher retention rates and more robust engagement during and after the session. This engagement level can help boost employee morale and increase interest in the task at hand.



Second, AR also allows a more hands-on approach to learning through **on-the-job augmented training**. Workers follow step-by-step geo-registered 3D guides (i.e., locked to a physical object or the environment) through more complex and/or dangerous procedures. Augmented hands-on training allows learners to perform tasks as virtual experts teach them. In this way, workers' time to proficiency is largely reduced, preventing lost time for both trainers and trainees.

# TRAINING AND KNOWLEDGE TRANSFER

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A significant return on investment can be achieved by creating augmented instruction guides for your work procedures, whether for new workers, seasonal workers, or temporary workers, for whom a rapid ramp-up is expected and efficient use of time is essential. This way, workers can instantly contribute to the workforce.

## FLEXIBLE IMPLEMENTATION

AR devices' flexibility, which essentially includes infinite variability in content, environment and task handling, is unprecedented. As long as the content can be created - whether it is a 3D model, CAD drawing, instructional video, step-by-step instructions, or scanned documents - it can be included in an AR training workflow and benefit from AR's capabilities brings. Combining documents, videos, and geo-recorded 3D models (i.e., locked to a physical object or environment) in real-time was not possible before AR. Combining multiple content elements can help understand and retain instructions. It also shows how organizations looking to use AR can genuinely adapt their training to their needs and available resources. Existing content can often be used, reducing the time required to create a training program. If specialized content is required, existing authoring platforms such as DeepSight's DS Studio can be used. These factors combine to reduce training hours and dependence on traditional paper manuals.



# RISK MANAGEMENT

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## I-SEE-WHAT-YOU-SEE VIDEOCONFERENCING



Many technical problems cannot be solved on-site, leading to inefficient use of time and resources. Unresolved maintenance issues can also lead to severe machine damage. If delays occur in problem fixing, it will also increase machine downtime and production delays. Video conferencing using AR applications like DS Holo can help give a clear view to an expert working remotely to analyze and rectify issues as if they were on site. The tasks can be tricky, but a remote expert can still ensure worker productivity and efficiency by using environmentally-aware AR to add annotations that will appear directly in the worker's field of view in a "see-what-I-see" approach. A remote expert's presence is the support workers need in today's ever-changing manufacturing world.

# RISK MANAGEMENT

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## SAFETY ALERTS

The skills gap is widening, and this loss of experience represents a unique safety risk for manufacturers. AR apps like DeepSight's DS Holo use wearable headsets to alert workers of possible dangers while completing specific tasks. AR headsets can connect to the vast machine information network and transmit it to trigger real-time alerts when a procedural step is riskier or contains potentially dangerous maneuvers. These real-time alerts can dramatically change workplace safety in manufacturing environments. For service workers deployed in the field, safety alerts are included within the holographic guides that the workers consult during their tasks. These alerts are then triggered when workers start a specific step within the procedure. Because the guides can be cached directly on AR headsets, on-the-field workers can access them anywhere, without access to the Internet and benefit from safety alerts to keep them safe at all times.

## HANDS FREE WORK

Using smart glasses, workers interact with augmented content in many different ways, including voice, gaze and gesture recognition. Wearable augmented reality devices are compelling because they deliver the correct information at the right time and in the proper format, directly into the workers' field of vision while leaving their hands free to work without interruption. Workers do not need to stop what they are doing to flip through a paper manual or tend to a device or workstation, which dramatically cuts down the time it takes to complete procedures. Also, the heads-up-hands-free approach to AR guides reduces the cognitive burden of learning every step of a procedure.

# ENABLING COLLABORATION

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## HUMAN CONNECTIVITY

The connectivity enabled by continuously evolving AR headsets represents a new ability for workers to connect and communicate with other connected systems. The value of wearable technology is growing exponentially in the era of IoT (Internet of Things). Machines and tools are now equipped with sensors, software, and other technologies to connect and exchange data with other devices and systems all the time. The level of connectivity achieved by current generation AR devices portends exciting machine learning capabilities for the future. AR is small, but it takes a significant part of the overall push for the enterprise markets' current IoT infrastructure.

Machine-to-machine communication (M2M) is the norm in manufacturing, but workers do not generally input data into the IoT workflow. Human-machine interaction is an increasingly important topic of discussion as AR bridges the gap between physical objects and workers while facilitating interaction between workers. The ability to get real-time measurements from a machine while interacting with it can dramatically improve situational awareness and safety. Each worker's input is another metric in the IoT pipeline and can be leveraged as such. The inefficiencies of a training regime and workflow are more readily recognized. Potential security risks are detected before an event occurs. AR adds a human element to IoT, and solutions like the DeepSight AR Suite will provide access to this new human-centric data.



# ENABLING COLLABORATION

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## REMOTE ACCESS

Remote expert assistance enables the remote workforce and the clients to communicate virtually and get assistance from specialists when they need it most. If a machine needs unplanned maintenance, subject matter experts will remotely instruct employees without ever having to leave their office. Businesses across manufacturing and service-based industries are already saving big on last-minute travel costs and reduced downtime.



# PROCESS DESIGN

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## PRODUCTION LINE PLANNING

Spatial visualization using AR allows for practical and accurate facility planning to reduce inefficient production layout risks. Realistic planning simulations also accelerate and support investment decisions, while step-by-step visualization of procedures guarantees the efficient use of personnel and optimal resource allocation.



## ACTIONABLE BACKLOG

Augmented reality solutions also leverage smart glasses to capture media files to ensure continuous frontline input on day-to-day processes and what is happening on the floor. Experts and design-focused employees can access the videos and photos captured by frontline workers to review procedures. Being able to capture issues and problems directly as they occur allows engineers to action product backlog faster.

# PROCESS DESIGN

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## PRODUCT ITERATION

Visualization is also the main activity of the design process. Design-focused employees typically envision and shape product and user experience concepts through sketching and CAD modelling in the early development stages. Designers effectively use these tools to create a 3D model and digital content. However, on paper or the computer screen, their concepts are disconnected from the realities of the physical world's scale and spatial context. Augmented reality design allows creators and engineers to take the idea off the screen and into the real world at scale. It is one thing to move the design out of the screen; it is another to see it in the actual usage context.

Businesses have seen tangible benefits of augmented reality design to evaluate concept alternatives. Augmented reality design can streamline development, especially when combined with other prototyping methods. AR drastically reduces business investment when making changes to the product design or reviewing specific procedures. Augmented reality solutions enable businesses to make changes and iterate rapidly and get valuable insight far sooner than traditional processes would.

# CONCLUSION

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There is still a lot to learn in the AR space, but the prospect of a workforce revolution is coming closer as time progresses. For new workers, manufacturing environments often present dynamic and demanding workflows, which can be eased by proper AR guidance. When required, complex machines and workflows are made simple by a visual overlay, step-by-step guidance, and remote expertise. With a smaller time commitment than usual, experienced employees' influence can be extended by AR assistance. With environmentally-aware wearable devices linked to a network, safety can also be improved across the board. Finally, there are enormous benefits of human metrics to an IoT ecosystem that few have yet realized. AR implementations might present high upfront and ongoing costs, but the ROI is tangible and positions the enterprises for success in the long term, just as much as the short term.

