Closing the Industrial Skills Gap with Augmented Reality

Strategies for Solving the Expertise Resource Crisis Using Industrial Augmented Reality

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DIGITAL TRANSFORMS PHYSICAL

Facing the Industrial Skills Crisis

The challenge to keep and retain skilled workers is hardly new, but the skills gap has been accelerating in recent years. **By 2025, analysts anticipate over 2,000,000 skilled manufacturing jobs will go unfulfilled. Compare that to 600,000 unfulfilled jobs in 2011**.[1]

Pain points for industrial skills

Many fields are experiencing a shortage of professionals—particularly those with career-spanning expertise. Within industrial markets, there are several job functions across the value chain that are most affected, including:

Manufacturing

- Setup and changeover
- Assembly
- Operation
- Maintenance
- Inspection

Service

- Field Service Technicians
- Senior Service Experts
- Customer Support Specialists

The skills gap is more than just a retirement problem

While a retiring workforce is a primary driver, there are complex pressures making it difficult to maintain steady and skilled worker resources.

Skills Gap Pressures

- A lack of systems to produce new generations of skilled workers.
- Competition with other types of jobs.
- Continued global economic expansion means more jobs, in more locations.
- Physical assets requiring skills are becoming more complex and individualized.
- Training programs often rely on outdated paper-based systems that result in delays and inaccuracies.

Strategies for Closing the Skills Gap

There are three methods that companies employ to maintain their reservoir of skilled expertise:

SLOWING THE SKILLS DRAIN

Industrial Enterprises are facing the biggest skills shortage of the last 30 years leaving a talent gap related to technically skilled workers. In the next couple of years, Deloitte estimates that nearly 53% of the current manufacturing workforce will be eligible for retirement.

MAXIMIZING CURRENT SKILLS

Companies can also focus on methods to amplify the effectiveness and efficiency of current skilled workforce. This requires organizations to enable existing experts to do more, without increasing their workload—particularly as these experts approach retirement.

REFILLING THE SKILLS RESERVOIR

Long-term solutions require replenishing the reservoir of skills. 26.4% of field service technicians are contracted, but third-party solutions can be expensive, while negatively impacting customer satisfaction. Recruitment and in-house skills development yield better results, but come with a longer time-to-value.

How AR Fits into the Skills Gap Strategy

As assets become increasingly customizable and are utilized across a global value chain, methods to ensure competency and mastery become both more expensive and less effective. From printed manuals and training classes, to delivering experts on site, traditional methods provide diminishing returns. Meanwhile industrial augmented reality is quickly proving more effective.

What is industrial augmented reality?

AR technology provides users with a way to perceive and use digital data on top of their physical environments—thus augmenting reality with additional useful data. AR is consumed via hardware, (such as a tablet, smartphone or purpose-built AR wearables), to overlay digital information on top of physical assets and environments. AR software, like PTC's Vuforia products, recognizes the physical asset, and "locks" the digital information in a way that allows users to interact with the asset information three-dimensionally.

Why is industrial AR a game-changer?

Commercial AR and VR get the most press, but AR spending in industrial markets is expected to reach nearly $7B by 2024, dwarfing higher-profile markets like gaming and automotive. What's the reasoning?

AR proves its value—cost effectively

AR proof-of-concepts are easy to create and demonstrate value— investments are small and returns are rapid.

AR doesn't disrupt existing technology

AR exists in parallel to OT and IT technology, without disrupting existing infrastructure and investments.

AR requires a low technical hurdle

With the right tools, subject matter experts can create and refine effective AR content, with little to no coding experience.

AR can utilize existing digital assets

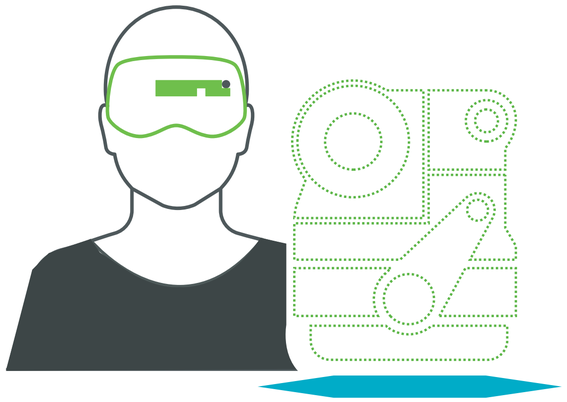
Repurposed CAD and other digital files created during the design of physical equipment can enrich AR experiences.

AR is flexible and extensible

AR experiences can easily be updated to reflect changes to products and procedures. AR is less dependent on translation requirements.

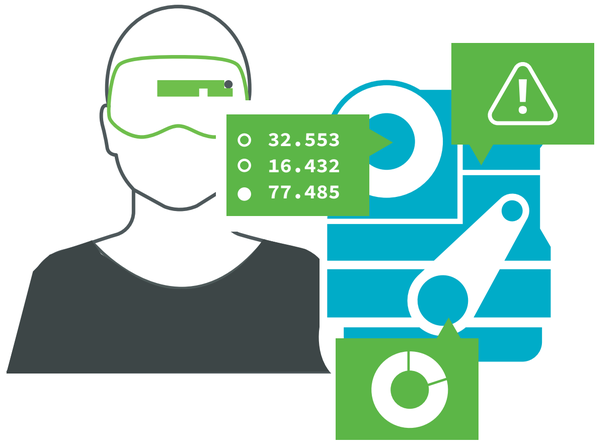
Relevant AR Industrial Applications

While AR experiences are highly customizable and evolving, three main application types have emerged as highly effective at closing the skills gap:



PRODUCT VISUALIZATION

AR product visualization applications utilize augmented overlays of information, and can even provide interactive digital twins of the physical assets themselves. Product visualization is most frequently used for training purposes and can replace more costly dedicated training labs or simulations. It can also reduce risk if training involves working in hazardous environments.



AUGMENTED WORK AND TRAINING INSTRUCTIONS

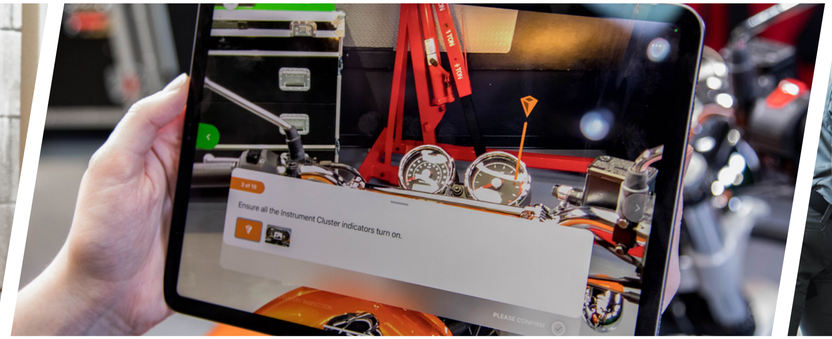
AR-guided instructions rely more exclusively on overlaying augmented reality content atop of physical assets in the workplace. AR-guided instructions can benefit workers across the experience/skill spectrum and are more focused on serving as a reference for either highly complex, customizable, or frequently changing assets.

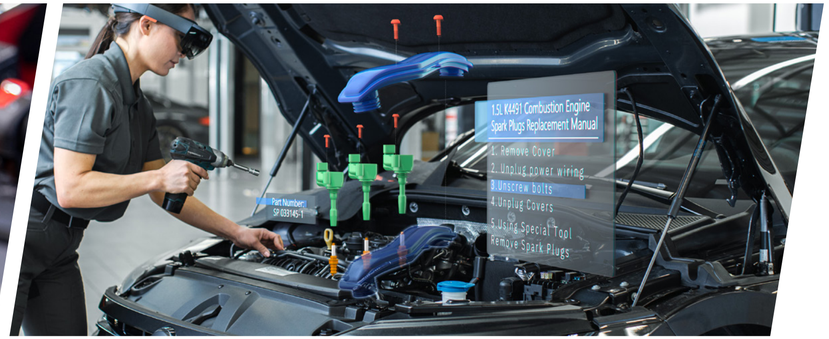
REMOTE ASSISTANCE

Remote assistance virtually connects experts and workers around a specific piece of equipment. Typically combining attributes of AR and video-chat with annotations from a remote expert, a shared-view of the work environment can be a highly effective, visual medium for collaboration and problem solving.

Closing the Skills Gap with AR

Augmented reality is proving to be highly effective at all three strategies for closing the industrial skills gap:





Using AR to slow the skills drain

- **Remote assistance** apps allow experts to share expertise, without physically having to travel on-site. This reduces the burden on senior experts, while retaining them longer as "virtual gurus."
- As experts reach retirement age, they can provide consulting on AR experiences using **product visualization** and **AR work instructions**. This turns their individual expertise into a shareable skills resource.

Using AR to amplify current skills

- **Remote assistance** reduces the cost of providing highly skilled support. By lowering costs, companies can direct skilled resources to help smaller, more remote customers.
- **AR work instructions** provides workers with nstruction, equipment status, and performance data while they're working. Newer workers can become effective in the field faster, with reduced risk of novice errors. It also benefits workers of all skill levels with step-by-step depictions of equipment and process customization.

Using AR to refuel the skills tank

- **Product visualization** has proven to build skills faster—from competency to mastery. Workers using AR learn faster, with improved retention.
- Coordination between **production visualization**-centric training, and on-the-job **AR work instructions** can further accelerate skills growth.
- **Remote assistance** can pair experts with newer workers more easily, allowing gurus to virtually act as mentors to junior workers.

AR Success Snapshots

Bretting's inefficient training and documentation were taking years for new hires to become proficient, and it was looking to was looking to reduce the time and cost of training and on-site service visits. By using PTC Vuforia, Bretting was able to:

- Lower documentation and training time by **50%** using **AR work instructions**
- **Reduce** number of service visits by **50%**

By authoring AR-based work instructions in PTC's Vuforia Studio, and experiencing them via Microsoft HoloLens 2 visors, Vectrona build their ACE-XR training solutions to fill training and readiness gaps for the U.S. Air Force. Here's how Vectrona turned AR into a real impact on their skills gap:

- **Improved** trainee learning retention.
- Trainees **progressed more quickly** to hands-on with the equipment
- Repeatable task training, **regardless of aircraft availability**

Building Your Own AR-Driven Solutions

Industrial organizations are acutely aware of the growing skills crisis; market leaders are increasingly embracing AR as a way of preserving skills and staying ahead of the competition. If you're interested in learning more about the role that AR can play at your organization, or how to get started building your own low-risk, high-reward AR solution, please view the following resources.

How AR Transforms Workforce Training

Many organizations are looking for ways to narrow the growing industrial skills gap. Read the eBook and learn how to transform your workforce training by transferring, retaining, and replacing years of expert knowledge using AR.

GET YOUR COPY →

Step into the Future of Work

Read this interview with VP and Principal Analyst at Forrester, J.P. Gownder, in which he examines the market drivers for AR technology and reveals exclusive insights about what AR could mean for your bottom line—and the future of work.

DOWNLOAD EBOOK →

Getting Started with Industrial AR

Like any industrial technology, AR requires proper planning, from proof-of-concepts to fully deployed solutions. This white paper will guide you through the critical steps for implementing successful AR projects that achieve the fastest possible ROI.

DOWNLOAD WHITEPAPER →

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