



*Keeping It Real*

# How to Enhance Training, Cut Costs with Virtual Reality

Manufacturers are always on the lookout for advanced techniques and tools that will accomplish the seemingly impossible trick of accelerating training's effectiveness while paring its costs. And now increasing numbers of leading manufacturers, including Lockheed Martin, are seizing upon the amazing power of virtual reality (VR) to amplify the efficiency of their training.

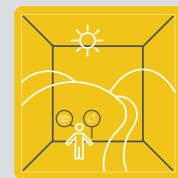
# Training: Pain & Strain for Manufacturers

In 2015, training costs in the United States jumped a distressing 14.2% to reach \$70.6 billion across all industries, reports [Training Magazine](#). In particular, training expenditures beyond instructors for travel, facilities and equipment doubled to \$28.7 billion. And when training is tied to heavy, delicate or costly equipment, instruction for the installation, maintenance and repair of equipment imposes its own enormous costs and risks. Those problems include:

- Training often must occur in set locales where machinery is situated, resulting in significant travel costs, especially in our global era.
- Instruction on machinery can pose health risks to inexperienced trainees but also endangers precious equipment that can be damaged by a single human error. No wonder that AMOCO [uses virtual reality](#) to train drivers how to handle challenging weather conditions, such as icy roads or fog.
- Tying up equipment or even shutting down production facilities to enable hands-on training can seriously disrupt manufacturing or services.
- Training on machinery in one locale greatly limits the number of individuals that can be taught at any one time by individual instructors.

It's no surprise that manufacturers are seeking innovative, often high-tech training solutions. In fact, **58% of all training for companies small or large in 2015 involved elements of online instruction** and computer-assisted training, Training Magazine reports.

Yet nothing can replace the impact of learning on actual equipment. The human brain learns best when training approximates real life in terms of the actual physical mechanics, the sequence of necessary steps and even the muscles one needs to install equipment and resolve issues safely and effectively. Practical activity sparks understanding, information retention and skill development, and it cannot be duplicated by lectures, presentations, interactive computer programs or videos.



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*Your palms get sweaty, your muscles tense. That is how you really remember it, by the feeling of it, and that's what virtual reality can create over any of the standard training tools.”*

– Sandra Bergmeir,  
Solutions Architect  
at [WorldViz](#)



# Conquering Reality for Better Training:

## How manufacturing innovators are leading the way in exploiting VR and its training power.

Practical interaction with equipment in training simply cannot be replaced ... **until now!** Virtual reality—which creates a remarkably vivid sense of immersion in a physical space with the ability to manipulate simulated objects—severs training from dependence on actual equipment with all its attendant risks and costs.

### Lockheed Martin: Accelerating Mission Readiness with VR

[Lockheed Martin](#)—a global aerospace, defense and advanced technologies company—delivers training as a core part of its business. Indeed, no company supplying mission-critical machinery can avoid this responsibility. Each year, the company delivers instruction to nearly 50,000 students across the globe.

Embracing its training mission, Lockheed Martin recognizes that lives and money hang in the balance. Whether training pilots, soldiers, mechanics, or engineers, the closer their training approximates real life, then the more likely they will respond quickly, confidently and correctly when real-life problems erupt.

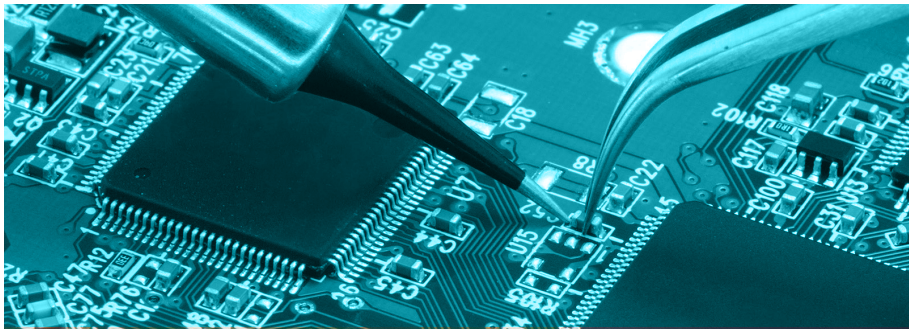
Real life, yes, but when you are training for combat missions, aircraft launches, or to resolve complex mechanical issues, neither man nor million-dollar machinery can be put at risk. So Lockheed Martin deploys a remarkable variety of advanced training technologies—from constructed physical environments and computer simulations to fully 3-D virtual reality immersions. In fact, virtual reality became so important in product design and training, they created the [Collaborative Human Immersive Laboratory](#) (CHIL) where they use WorldViz virtual reality software, among other VR technologies,



to streamline manufacturing processes and improve affordability.

In 2013, for example, Lockheed Martin signed a \$253 million contract with the Royal Saudi Air Force to deliver an F-15SA pilot and maintenance training system. For its aircraft maintenance component, Lockheed Martin will provide virtual systems to enable training without the actual aircraft. The systems include basic maintenance, landing gear and arresting hook, armament, flight controls and jet fuel starter trainers.

“Simulation and training innovations are being used to accelerate mission readiness,” says [Darin Bolthouse](#), manager of Lockheed Martin’s Collaborative Human Immersive Laboratory. The result, declares [Jim Weitzel](#), VP of training solutions for Lockheed Martin’s Mission Systems, is “a cost-effective program since the appropriate level of technology is applied to meet the training objectives.”



## Microprocessor Manufacturing: Too Large, Delicate and Costly

Manufacturers of equipment for the production of computer chips combine exceedingly expensive machinery with extreme sensitiveness. Their photolithographic machines – costing roughly \$10 million – whip out microscopic semiconductors at the rate of 15,000 units per hour yet must operate in sterile environments.

How can you train new skilled workers on million-dollar machines and risk your investments with a simple slip of a tool?

In 2014, a large company in the semiconductor industry seized upon virtual reality as a solution to its training quandaries. Beyond the costly risks to its photolithographic machines, the firm releases new models every one-to-two years in order to stay up to date with technical innovations in the microchip industry. Consequently, its training program must be global and constant.

With the assistance of WorldViz partner [Archidimex](#), the manufacturer successfully set up a virtual reality training program that emulated its semiconductor production equipment containing over 10,000 parts. Built on the company's CAD designs, the VR training program entails 60 separate workflows and is typically accomplished by groups of four trainees, the optimal number for group interaction and participation. Instruction can actually start on simulated machines before the next-generation is available.

The VR training, reports Archidimex, created an educational experience “comparable to physical product training, but in a risk-free and fun-to-use environment.” The firm estimates that four-fifths of its complex trainings can be done using virtual reality. In addition to sheer reduction of costly risks, virtual reality delivers the added benefit of accelerating training by an “amazing 80%.”



## Summary

Training is critical part of every manufacturing process. But with costs rising, manufacturers are pursuing new, often high-tech solutions to hold down training expenses and ensure safety. For learning effectiveness, however, nothing can replace the practical experience of repeated training on actual machines. Only hands-on instruction gives technicians the skills and complete confidence to resolve mechanical issues quickly and effectively. That's why leading manufacturers are exploring the cutting edge of technology today and increasingly embracing virtual reality for its ability to deliver safe, cost-effective, true-to-life training.

## About WorldViz:

WorldViz is the industry leader in immersion-ready virtual reality (VR) solutions. WorldViz's patent-pending interactive visualization and simulation technologies are deployed across 1500+ Fortune 500 companies, academic institutions and government agencies. WorldViz's core products are Vizard, the premier development platform for professional VR application design, and VizMove, the world's only enterprise-class VR software and hardware solution. WorldViz also offers PPT, a high-precision wide-area motion tracking system, as well as professional consulting and content creation services. WorldViz technology enables users to replace

physical processes with immersive virtual methods. Applications range from design visualization and industrial training to interactive education and scientific research. [www.worldviz.com](http://www.worldviz.com)



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