

## WHITE PAPER 4 Success Stories: Improving Manufacturing Efficiency & Quality with Laser Projection Systems.

In the manufacturing sector, every step in the production process is another opportunity to save time and money. By precisely projecting a beam of laser light onto surfaces, laser projection systems efficiently guides manufacturing operations, enabling cost-saving solutions in multiple applications such as ply lay up, paint masking, assembly, and placement of components to quality inspection and reverse engineering tasks. *Learn how four manufacturers gained measurable, valuable improvements.*

Positioned as a leader in laser projection systems with over 31 years of experience, Virtek Vision International, provides flexible solutions to improve productivity while simplifying complex manufacturing processes for customers.

Virtek® serves customers in many sectors of the manufacturing economy, including the aerospace and composites sectors, heavy equipment fabrication, prefabricated construction, sheet metal, heavy transport and wind industries. ISO certified across all platforms, Virtek works not only with top OEMs — including the world’s top ten aerospace companies — but also develops flexible solutions for smaller businesses. Virtek has the breadth and depth of experience necessary to guide customers to the best solution.

The pioneer in laser projection, Virtek is also an innovator in the field today. Its unique patented technology includes the first laser projection system with integrated vision: the [Virtek Iris™ 3D with Vision Positioning System \(VPS\)](#). The latest technology comes loaded with a smaller, faster scanning system, improved portability, and FlashAlign™ — a new feature eliminating manual target alignment — Iris 3D with VPS reaffirms Virtek’s position as the global leader in laser technology.

With engineering simplicity and laser precision, Virtek’s laser systems improve production efficiency, speeding up the fabrication process while reducing defects. Labor costs are lowered as operators complete more work in the same time frame. And material expenses are reduced as rework is minimized due to fewer errors and flaws.

TAI was the first customer in Europe to install and put into production the VPS as part of an early adopter program. “We are very familiar with laser technology and its benefits and began the journey with Virtek with their LaserEdge® solution for several projects over a decade ago. We felt it was a natural progression to move to the new Iris™ platform with the new state of the art vision- based laser technology when we had a need for a new project,” said Türker Dölek, composite production chief, Turkish Aerospace Industries (TAI) Inc. “We are seeing significant benefits with the flash align

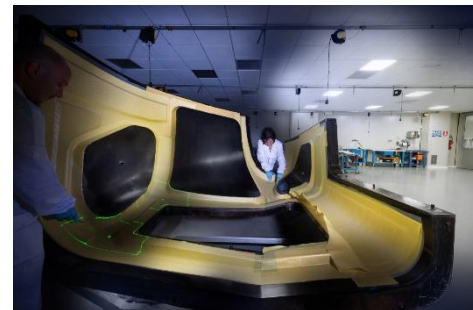


Figure 21: The Virtek Laser Projection Systems guiding the operator through the lay-up process. Source: PlyForm Composites



Figure 2: The Virtek Iris 3D system significantly advances laser-guided assembly with new integrated vision technology, innovative FlashAlign functionality and superior laser-line visibility. Source: Virtek Vision

feature saving time during alignment as well as the systems are demonstrating an increase in throughput resulting in cost savings.”



### ***Precise Positioning for Welded Assembly***

Virtek’s Iris™ Spatial Positioning Systems, such as the [Virtek Iris SPS](#), guides technicians through the assembly process by drawing a laser outline to indicate the three-dimensional position of an assembly piece. Iris SPS eliminates manual measuring, marking and fitting by projecting laser templates a full 360 degrees around even the largest work piece. Part position is taken directly from CAD data for exact as-designed placement. By referencing the most current CAD file, product design changes are easily accommodated, eliminating costly delays caused by the need to create new templates for every revision.

The system locates the exact placement area for assembly on even the most complex weldments, eliminates errors caused by using incorrect reference points on the part and automatically compensates for any movement of the Iris system or the work piece by re-positioning the projection.

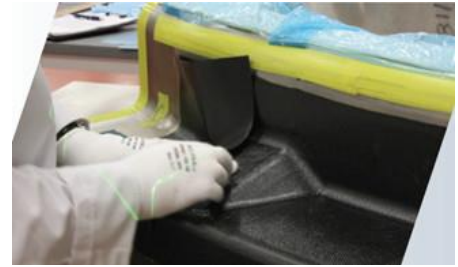
Companies such as Komatsu America, eliminated defects in assembly by as much as 95% using Iris™ Spatial Positioning System. Komatsu was seeking to reduce errors in manufacturing, while at the same time increasing their throughput and efficiency to enable them to meet increased demand. They were using aluminum templates to guide workers in welding brackets, stand-offs and studs on large mining truck frames. These templates were costly to manufacture, design and redesign. By implementing Virtek’s Iris Spatial Positioning System (SPS), Komatsu eliminated templates and significantly accelerated their assembly process.

Assembly of steel or wood panels is accelerated by the [Virtek LTG®](#). This product projects a laser template of the panel members onto the work surface, clearly illuminating the locations of studs, headers, sheathing, nailing patterns, subcomponents, openings and inserts with an accuracy of  $\pm 1.6$  mm (1/16 inch). Visualizing the final product allows workers to achieve higher throughput and improved quality.

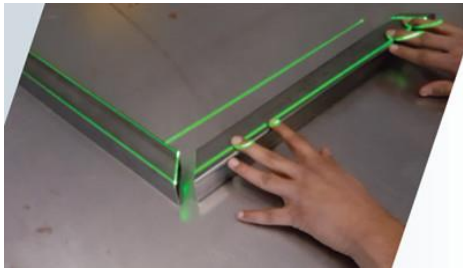
### ***Composite Ply Layup***

Virtek’s laser systems are used extensively in the manufacture of composite parts for the aerospace industry, providing the high precision required in the ply layup process. ATK Aerospace Structures, a major player in the fabrication of aerocomposites for some of the biggest commercial and military aircraft programs, utilizes the [Virtek LaserEdge®](#) system at the output of its Automated Stiffener Forming Machines used to manufacture aircraft stringers and frames. The laser system assists operators with positioning and placement of composite plies.

Virtek's laser projection systems also assist the production process for components of the most advanced military fighter aircraft in the world. Terma Aerostructures, a world leader in the manufacture of precision composite aerostructures and components, uses Virtek laser projection systems during fabrication of composite panels for the F-35 Joint Strike Fighter. The systems ensure high final part quality by guiding the layup process via laser templating, helping bonding technicians place each layer with a high degree of accuracy and consistency.



**Figure 43:** The Virtek LaserEdge eliminates the use of physical templates by projecting a laser outline onto work surfaces, improving the productivity of layup processes by as much as 50 percent. Source: Virtek Vision and Terma Aerostructures



**Figure 54:** The Virtek Trussline system projects a laser template of the truss onto the work surface, making pre-fabricated wood and steel truss manufacturing so easy that even less experienced workers are instantly productive. Source: Virtek Vision

### **Wood and Steel Truss Construction**

Virtek also offers products that assist builders in the pre-fabricated construction industry. [Virtek TrussLine®](#) allows even the most complex wood and light gauge steel trusses to be assembled in minutes. The system traces a laser outline of the truss to be built onto the work surface, highlighting the position and shape of all truss joints and connector plates. By eliminating the need for measuring, squaring and stringing, set up and changeover time is reduced by up to 70 percent and productivity is increased by up to 25 percent.

### **Quality Inspection**

Looking at the entire production process, laser technology can improve more than just the initial positioning and placement of components. One of the most important steps in manufacturing occurs after fabrication is complete, when part quality is verified. Virtek's laser systems can enhance this segment of the process too. The company's inspection systems use lasers to measure the accuracy of two-dimensional parts, and formed parts ensuring quality control.

Winston Industries LLC, a custom metal fabricator, installed a [Virtek LaserQC®](#) system to verify the accuracy of its fabricated parts, inspecting the first piece of every work order passing through its fabrication cell. This non-contact precision

inspection system employs lasers to capture more than 500 data points per second, comparing finished parts with the original CAD files and generating a report detailing any deviations from tolerances.



**Figure 6:** The Virtek LaserQC is a rapid inspection system for the sheet metal and gasket fabrication industry that uses lasers to ensure accuracy and quality control. Source: Virtek Vision

Accurate to within +/- 0.05 mm (0.002 inches), the system pinpointed errors immediately on the shop floor, reducing scrap and rework and improving profitability. With over \$30 million of sheet work annually, Winston achieved an internal scrap rate of just 0.77 percent of sales. The machine was even perfect for reverse engineering parts that came to Winston with no prints.

In addition, LaserQC generates detailed inspection reports validating fabricated part quality to facilitate clients' compliance with the reporting requirements of standards and methodologies like ISO, Total Quality Management (TQM), Six Sigma and lean manufacturing.

### ***Improved Bottom Line and Superior Service***

Virtek's easy-to-use laser projection systems increase production efficiency and reduce errors, improving manufacturer's bottom lines. Its laser positioning systems improve throughput and quality by providing precise laser templating that simplifies and accelerates part placement and assembly. Furthermore, Virtek's inspection systems quickly identify quality issues, significantly improving throughput by completing full part inspections in minutes without the need for high skilled labor.

Virtek's offering consists of more than just sales of leading-edge laser assisted projection and vision systems. The company's global service team is available to provide lifetime support on all products throughout the ownership experience. While Virtek builds a superior product, the Service Team is there to provide support if something breaks and goes above and beyond to provide solutions that maximize customer production. Available service options include free phone support, consulting services, proactive maintenance programs plus on-demand services and flexible service agreements customized to meet customer requirements.

Virtek helps its customers beat the status quo through innovation to excel in today's competitive business environment. Virtek is continuously innovating the most intelligent vision and laser projection solutions configured to help customers' businesses thrive.

*#seethingsdifferently* with Virtek.

[Contact your local Virtek representative](#) today or visit [www.virtekvision.com](http://www.virtekvision.com) for more information.

# ***VIRTEK***

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