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## 3 Ways Augmented Reality Advances Assembly Operations

[ see page 3 ]

## Why Economic Uncertainty Demands A Real-Time Manufacturing Strategy

[ see page 11 ]



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# C o n t e n t s

OCTOBER / NOVEMBER 2025 | ISSUE 311

## INDUSTRY INSIGHTS

**03** 3 Ways Augmented Reality Advances Assembly Operations

**11** Why Economic Uncertainty Demands A Real-Time Manufacturing Strategy

Authored by Louis Columbus from Delmia, essentially argues that the days of expecting “business as usual” are over—economic uncertainty is now the permanent reality for manufacturers. Instead of just reacting to major events like pandemics or the Suez Canal blockage, successful companies are treating this constant change as an ongoing test of their digital maturity and operational readiness. The core message is that agility is a strategic asset; by investing in modern digital tools like Manufacturing Operations Management (MOM) systems (like DELMIA Apriso), manufacturers gain the crucial, real-time visibility needed to pivot instantly. This means they can quickly reconfigure production, source new materials, ensure compliance automatically, and ultimately turn uncertainty into a competitive edge that protects their margins and their customer trust. Let us know your thoughts and how you’re feeling at your own job shop.

As always if you have anything you’d like to see published here in the Gateway, please submit your 1,000+ word article to [chris@thegatewaymag.com](mailto:chris@thegatewaymag.com)!



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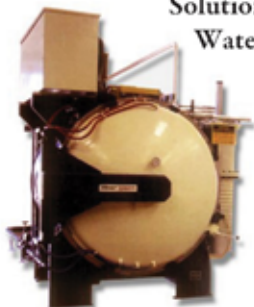
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## 3 WAYS AUGMENTED REALITY ADVANCES ASSEMBLY OPERATIONS

Augmented reality may not be present when considering manufacturing assembly lines. During the assembly phases, products and equipment are increasingly complex and subject to variable configurations, which are often difficult for operators to grasp. And the current methods and tools are neither always adapted nor simple enough to handle, reinforcing the difficulty of assembly operations.

Work assembly documentation is still too often in paper format and is not always readable, easy to maintain, and update. Moreover, complex assemblies can be difficult to understand, and the risks of errors due to wrong interpretations are high. Thus, it contributes to increased cycle times and potential non-conformities and does not support an efficient rise in your operators' skills or good traceability.

These challenges include:

- Time-consuming preparation time before and after execution
- Risk of errors due to misinterpretation of the tasks to be performed
- Complex increase in the competence of operators

Therefore, industries face productivity and quality issues in the context of a shortage of qualified technicians in specific sectors. However, there are very effective ways to meet these challenges, including technologies and software based on industrial augmented reality.

Wendy Mlynarek, DELMIA Strategic Business Development and Marketing Director takes a closer look at how augmented reality is playing a vital role in assembly operations.

## How augmented reality transforms assembly lines

Using AR in your factory brings many advantages that lead to an almost immediate ROI when deployed on the production line and in the proper use cases. For example, replacing your paper-based work instructions with AR-based 3D sheets allows you to solve many problems at different levels.

*Here's how:*

- By digitizing your assembly instructions and then projecting them directly onto the surface to be assembled, via a projection system and a camera, to have the right information at the right place at the right time, and to capture everything happening in real time.
- By deploying a solution composed of an industrial camera on a table that will display instructions on a screen to guide your assembly operations on individual parts and make them more reliable.
- By displaying digital instruction sheets via a tablet or equipping your operators with connected glasses such as hololens for example.

These technologies allow the information to be displayed directly on the element being assembled in real time so that the work information appears in the right place.



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### 1) Accompany the operators in their assembly tasks

With these solutions, you can efficiently guide your operators in their complex assembly tasks by overlaying work instructions in digital format directly on the product/equipment to be assembled.

You can say goodbye to the paper sheets and welcome digital and contextualized work instruction. The work performed by the operator during preparation, assembly, or machining procedures on complex equipment becomes intuitive, and technicians become more rapidly autonomous and achieve the “first time right” in short cycle times. The information displayed in RA can be so precise on the location of elements that it reduces the risk of error during assembly and improves your production’s quality.

### 2) Accelerate the development of your technicians’ skills

Let’s go back to our paper-based work instructions. When a new operator arrives in your factory and has to handle workflows for the first time, chances are that he will be quickly overwhelmed because of their complexity.

As a result, you have a higher risk of human error and a long and time-consuming learning curve for your teams.

Augmented reality technology will allow your operators to follow step-by-step work instructions in the field for each assembly task.

For example, paint paths can be projected directly onto the surface to guide operators during painting activities in a guidance operation for painting operations. In addition, these instructions can be adapted to allow a perfect understanding of the operators: color code, drawings, pictures, etc.

In other words, getting to grips with the processes is simplified and boosts the skills of your operators.

### 3) Improve the working comfort of your operators

Finally, an AR solution well integrated into your teams’ work environment can allow assembly operators to perform their tasks in a more intuitive and user-friendly way – even completely hands-free when the chosen hardware device allows so. To do this, you can very well use a projection system or HoloLens. Still, above all, you should select the equipment best suited to the ergonomics/environment of the workstation that will host the augmented reality solution.

For example, in the case of an assembly on a large flat panel with multiple elements to be mounted, the most suitable solution would be a projection system that displays the steps to follow directly on the structure.

As you select the instructions to be displayed according to the operation, you can also include important safety information to reinforce it, as safety is a crucial issue in production sites.



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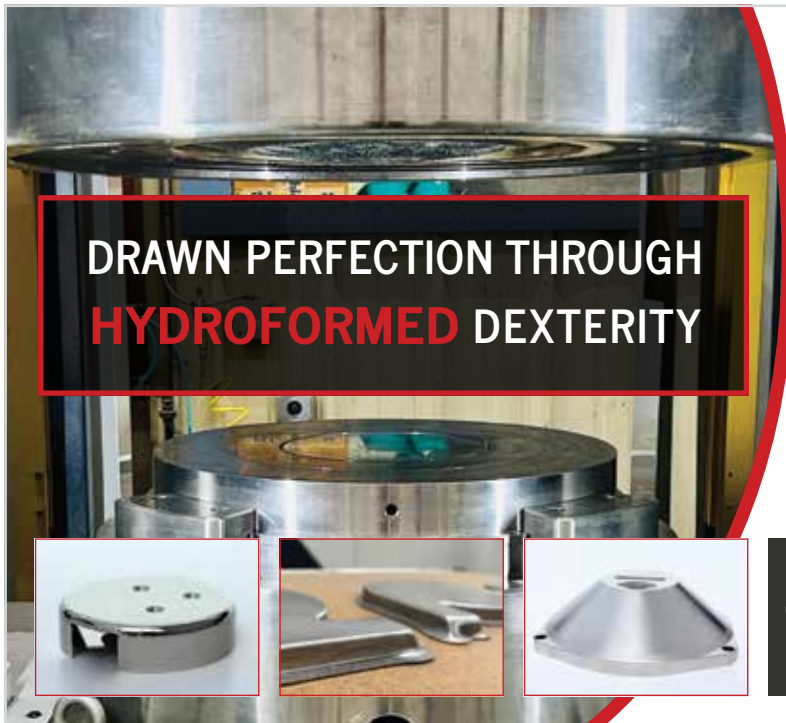
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## Examples of AR use cases in a production context

There are many use cases where AR can bring value in a production context in an industry, such as:

- Production of large flat surfaces
- Assembly of fasteners on complex equipment
- Replacement of paper templates
- Assembly in a pre-production context
- Cables and harnesses positioning



## The benefits of AR on your industrial assembly line

In light of everything you have just read, remember that augmented reality technology in a manufacturing context can help achieve operational excellence and respond to the many challenges you may face.

The list is not exhaustive, but with AR you can:

- Reach “**first time right**”
- Reduce your **cycle** and **preparation times**
- Accelerate the development of **operators’ skills**
- Reduce the **error rate**
- Significantly increase the **production rate**

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*This article is written by Wendy Mlynarek, who has over 25 years of experience in marketing manufacturing solutions globally. She is a Strategic Business Development Director at Dassault Systèmes for the DELMIA brand, supporting Aerospace & Defense and the Virtual Twin Experience Marketing for Manufacturing Operations program.*

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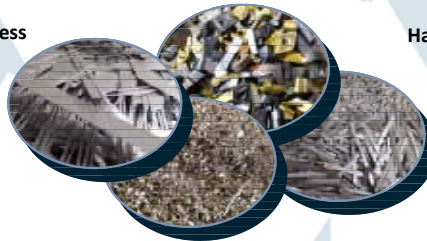
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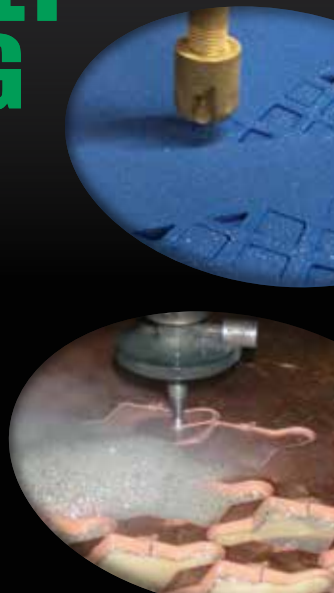
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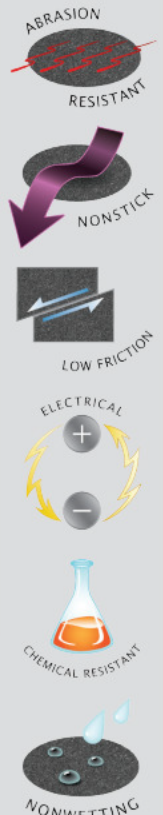
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## WHY ECONOMIC UNCERTAINTY DEMANDS A REAL-TIME MANUFACTURING STRATEGY

The following feature was penned by Louis Columbus, a senior industry marketing manager at Delmia. Louis explores the current, ominous landscape of the economy and how to strategically proactively plan for disruption and remain productive. As we all know, it's never enough to just expect that we'll show up to the shop and conduct "business as usual" day in and day out.

Challenges are inevitable. But even in the face of uncertainty, we can plot a more seamless course in remaining nimble and able to transition in the face of change with minimal negative effects. This ability to remain nimble and face challenges head on sets up an opportunity to instill bolstered trust in the eyes and minds of those that are hiring us to produce product(s) for them.

Make no mistake about it, we realize that this collective statement is easier said than done, but Louis has presented us with an interesting dialogue to consider as we put plans in place to minimize downtime. Without further ado... Here we go:

Proactive manufacturers now treat economic uncertainty not as isolated incidents, but as ongoing tests of their operational readiness and digital maturity.

Global manufacturers have always navigated disruption, but today's economic uncertainty has evolved into an ongoing operational reality. Unanticipated events—such as pandemics, natural disasters, or sudden supply chain disruptions—can rapidly escalate costs, interrupt supplier networks, and reshape global operations virtually overnight.

For automotive, aerospace, industrial equipment, and electronics manufacturers, such disruptions are becoming constant rather than occasional challenges. Maintaining competitiveness now requires immediate visibility into unfolding situations, coupled with operational agility to respond swiftly and effectively.

## Economic Uncertainty as a Continuous Catalyst for Change

Today's manufacturers regularly encounter unexpected disruptions, each uniquely testing organizational resilience. Recent history vividly illustrates how swiftly economic uncertainty can impact operations:

- The COVID-19 pandemic severely disrupted global supply chains, forcing manufacturers to rapidly pivot sourcing strategies and production plans.
- The Fukushima disaster significantly impacted automotive and electronics supply chains, exposing vulnerabilities arising from regional dependencies.
- Brexit compelled swift realignment of supplier networks and operational footprints across Europe.
- The Suez Canal blockage highlighted the vulnerability of global logistics, causing extensive shipment delays and economic disruption.

Proactive manufacturers now treat economic uncertainty not as isolated incidents but as ongoing tests of their operational readiness and digital maturity.

## Agility as a Strategic Asset: Lessons Learned

During the 2008 global financial crisis, a prominent powertrain manufacturer confronted severe cost pressures. Despite stringent budget constraints, the company prioritized the deployment of DELMIA Apriso across more than 30 manufacturing sites globally.

This strategic investment quickly proved valuable. Within 42 months, all 32 targeted plants became fully operational on DELMIA Apriso. During a quality containment event shortly thereafter, the system rapidly identified a critical defect, enabling quick corrective actions that prevented a costly recall and saved over \$1.6 million. DELMIA Apriso also ensured compliance with Automotive Industry Action Group (AIAG) traceability standards, safeguarding brand reputation and customer trust.

“DELMIA Apriso provided real-time visibility exactly when economic uncertainty demanded agility (...) It not only controlled costs—it protected our reputation.”

This experience highlights an essential truth: operational resilience is rooted in digital systems explicitly designed for rapid adaptability and comprehensive visibility.

## Real-Time Visibility: Anticipating Disruption Before Impact

In periods of economic uncertainty, immediate operational visibility becomes indispensable. Manufacturing Operations Management (MOM) provides comprehensive visibility for those that use the system—from supply chain inputs through manufacturing execution.

When sudden disruptions impact critical components or raw materials, MOM solutions that are integrated seamlessly with manufacturing ERP software—immediately identifies impacted Bills of Material (BOMs), at-risk orders, and available alternative inventories. Pricing adjustments, shipment acceleration, or sourcing alternatives can then occur rapidly, mitigating financial impacts before they escalate.



## Rapid and Confident Production Reconfiguration

Economic uncertainty frequently necessitates swift adjustments in sourcing or production plans. Modern MOM systems usually support rapid reconfiguration of production workflows without extensive IT intervention.

If key materials unexpectedly become scarce or cost-prohibitive, purchase orders and production plans can be redirected instantly. Shop-floor instructions update automatically, maintaining quality checks and ensuring continuous operational accuracy. These solutions can be integrated digital framework unifies product data, supplier networks, and operational processes, enabling immediate adjustments without manual interventions or delays.

## Making Compliance Predictable and Routine

Shifting economic conditions often elevate compliance management from administrative tasks into strategic operational necessities.

MOM automates compliance tracking throughout the lifecycle of materials and assemblies. The system proactively alerts stakeholders to emerging compliance issues, automatically generating accurate documentation from verified operational data. This reduces errors, streamlines compliance activities, and ensures compliance processes remain routine rather than reactive.



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## Unified Visibility: Turning Data into Decisive Action

Manufacturers with global supply chains urgently need integrated visibility. Solutions like DELMIA Apriso serves as an operational manufacturing control tower software, consolidating procurement, production, logistics, and compliance data into a unified view.

When disruptions occur—such as pandemics, natural disasters, or unexpected supplier failures—manufacturers can instantly assess operational impacts:

- What immediate financial implications will result?
- Should production shift regionally or globally?
- How quickly can alternative suppliers or materials be sourced?

While competitors struggle with delays, manufacturers who have invested in modern MOM systems are able to execute contingency plans immediately, preserving margins, protecting commitments, and sustaining customer trust.

## Preparing for Continuous Economic Uncertainty

Economic volatility has become permanent. The critical challenge facing manufacturers today is not whether disruptions will occur, but how swiftly and effectively they respond.

By deeply embedding MOM software within their operations, manufacturers create a resilient foundation capable of immediate responsiveness. Such capability transforms economic uncertainty from operational risk into strategic advantage.

In today's manufacturing environment, readiness is less about predicting specific disruptions and more about comprehensive preparation. Well implemented MOM solutions ensure that manufacturers remain consistently prepared, responsive, and resilient—no matter what uncertainty tomorrow may bring.



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*"Of all the things I've lost, I miss my mind the most." – Ozzy Osbourne*

## Mastercam Enhances Direct Customer Support with the Acquisition of Key Assets of QTE Manufacturing Solutions

*CAD/CAM Leader Acquires Longtime Channel Partner to Strengthen Local Customer Support and Service Delivery*

TOLLAND, Conn.- Mastercam, the world's leading CAD/CAM software provider and part of the Sandvik Group, announced today the completion of a strategic acquisition to strengthen its market presence across the Midwestern part of the United States. The company has acquired key assets of QTE Manufacturing Solutions, a longtime Channel Partner with nearly four decades of CAD/CAM industry expertise.

This acquisition integrates QTE's extensive regional knowledge and customer relationships directly into Mastercam's operations, enhancing customer support and service delivery across this key market.

*Strengthening Market Leadership Through A Proven Partner*

QTE Manufacturing Solutions, founded in 1985, has evolved from performing tool and fixture design for the aerospace industry into a leading CAD/CAM solutions provider serving manufacturers across Missouri, Kansas, Tennessee, Arkansas, Oklahoma, and Southern Illinois. The St. Charles, Missouri-based company has been recognized as a top-performing Mastercam maintenance retention Channel Partner and operates as a certified Mastercam training center, providing specialized solutions to industries ranging from aerospace to automotive and beyond.

"This acquisition represents a transformative step in elevating the customer experience through enhanced local support and service capabilities," said Russ Bukowski, President of Mastercam. "By bringing the deep regional expertise and established relationships of QTE Manufacturing Solutions directly into our operations, we're delivering on our commitment to provide manufacturers with immediate, localized technical support, and solutions tailored to their specific regional manufacturing needs. This direct customer relationship

model gives Mastercam a significant competitive advantage and ensures our customers receive the most responsive, expert service in the industry.

*Delivering Superior Local Customer Support Through Direct Operations*

The acquisition represents Mastercam's commitment to providing unparalleled local customer support and service excellence as a key market differentiator. By transitioning from a traditional channel partner model to direct operations in the Midwest market, Mastercam can now offer customers immediate access to technical expertise, accelerated problem resolution, and customized training programs delivered by in-market specialists who understand local manufacturing requirements and industry practices.

This direct customer relationship approach aligns with Mastercam's broader growth objectives of combining organic innovation with strategic acquisitions to expand market reach and enhance customer service capabilities. As part of Sandvik's intelligent manufacturing portfolio, Mastercam continues to advance connected manufacturing processes and provide comprehensive support to manufacturers worldwide.

***For more information, contact Melanie Frenkel, Sr. Media Director, Berkeley Communications, phone: 760.421.7719, or email: [Melanie.Frenkel@berkeleypr.com](mailto:Melanie.Frenkel@berkeleypr.com).***



## CO2 Laser Lenses For Cutting Precision Seals

PROVIDENCE, R.I., – Laser Research Optics has introduced a line of field-replacement CO2 laser lenses for use in cutting precision seals, gaskets, and other parts from silicone, rubber, PTFE, and other materials where high accuracy tolerances within microns are often required.

Laser Research CO2 Lenses come in sizes from 0.5" to 1.0" O.D. and include focal lengths from 1.0" to 2.0" and are offered with dual-band anti-reflective coatings to aid in system alignment. Capable of laser cutting complex geometries for manufacturing precision seals, gaskets, and other parts, it leaves smooth, clean edges that need little or no post processing.

Ideally suited for replacement by users to prevent downtime, Laser Research CO2 Lenses fit most popular lasers including Amada®, Coherent®, Cincinnati®, Epilog®, Mazak®, Synrad®, Trumpf®, and Universal® lasers. These optics meet OEM and ISO-10111 specifications and are in-stock for immediate shipment.

Laser Research CO2 Laser Lenses are priced according to configuration and quantity. Delivery is from stock within 24-hours from receipt of order.

For more information contact:

Laser Research Optics

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## Solar Atmospheres Increases Capacity with Additional All-Metal Hot Zone Furnace



Hermitage PA, November 4, 2025 – This installation marks the second all-metal hot zone vacuum furnace added to the climate-controlled processing area at Solar Atmospheres' Hermitage, Pennsylvania facility. The new system significantly expands the company's capacity to heat treat highly sensitive materials such as precipitation-hardened stainless steels, nickel-chrome-based superalloys, titanium, and niobium.

Engineered for precision and performance, the furnace incorporates strategically placed isolation valves, an oversized main valve, a high-capacity diffusion pump, and a polished stainless-steel chamber. Together, these features create an ultra-clean processing environment that meets the stringent demands of the aerospace and medical industries. Capable of achieving vacuum levels below  $5 \times 10^{-6}$  Torr, the system ensures bright, contamination-free results.

Michael Johnson, Sales Director at Solar Atmospheres of Western Pennsylvania, stated: "The all-metal vacuum furnace plays a critical role in delivering the purest possible processing environment. This level of cleanliness and control results in pristine end products that meet the most demanding industry standards. We're proud to partner with the engineers at Solar Manufacturing to bring this advanced technology to fruition."

*For additional information about Solar Atmospheres, contact Mike Johnson at 855-934-3284 x2223, email at mikej@solaratm.com, and visit us at solaratm.com.*



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