DS DELMIA

3DEXPERIENCE®

IMPROVE MATERIAL FLOW IN AUTOMOTIVE MANUFACTURING

Leverage an integrated solution to bridge the gap between warehouse and production management.

Inceptra®

DS DASSAULT SYSTÈMES

THE MODERN AUTOMOTIVE INDUSTRY LANDSCAPE

Transportation and Mobility manufacturers are now operating in a landscape that is ever-changing and more complex than ever. With the climate change agenda taking center stage globally and the increasing demand for electric vehicles (EV), automotive and battery producers are under pressure to transform their global operations.

This has sparked heated competition between companies racing to out-innovate each other. They know that the first to introduce to market a fully autonomous vehicle will be able to capture the greatest market share and cement their position as an industry leader.

However, most organizations are held back from maximizing their full potential in this race as they struggle with:

1	2	3	4	5
Managing growth while maintaining market share on a five-year trajectory	Dealing with labor shortage	Addressing ongoing supply chain disruptions	Paper-based tracking resulting in waste, errors and non-value-added work	Poor inventory management and low visibility

Beyond that, the landscape has also been reshaped by geopolitical events, climate-related hazards and public health crises—which adds another layer of complexity that best-in-class manufacturers have turned into opportunities by leveraging the right solution.

In this white paper, discover how to:

Provide accurate inventory replenishment synchronized to real-time activities on the shop floor	Increase visibility to improve responsiveness to inventory issues driven by supply chain disruptions	Reduce or eliminate inventory buffers and obsolescence	Improve traceability while maintaining efficiency and throughput	Remain cost-effective while accelerating efficiencies

INDUSTRY TRENDS AND BUSINESS DRIVERS IN TRANSPORTATION & MOBILITY

AGILITY

Automotive manufacturers are under constant pressure from customers for product diversity and new mobility options delivered at an increasing pace. What is needed are solutions that enable manufacturing businesses to produce and deliver at a customized level with efficiency and speed. To meet these modern day demands, companies need to embrace flexibility and agility throughout their value chain.

BETTER QUALITY ASSURANCE

In their quest to accelerate profitable new opportunities, manufacturers must still ensure quality and adhere strictly to global and local requirements—all while keeping costs low.

Besides this, with customers calling for a shorter time-to-market, great importance is placed on achieving first-time-right quality, which also results in scrap reduction.

LOWER COSTS

While it may not be impossible to achieve all the demands and capabilities listed down so far, checking all these boxes simultaneously means exponential costs. Companies must now choose between absorbing these costs or transferring them to their customers unless they implement a solution that enables them to remain cost-effective.

PUSHING THE BOUNDARIES OF INNOVATION

With the accelerating demand for electric, connected and autonomous vehicles, manufacturers will need to embrace advanced creative design, shared intelligence, systems engineering and multi-domain collaboration.

THE KEY TO SUSTAINABLE GROWTH

As we see a shift in consumer demand from mass production to mass customization, the deployment and successful implementation of best practices across multiple sites globally has become more crucial than ever.

There is a pressing need for improved visibility, efficiency and control of manufacturing production and operations, within and across global/local plants. Monitoring target cycle times and adopting a "Design Anywhere, Manufacture Anywhere" model are key points to managing and future-proofing growth successfully.

THE WORKFORCE GAP

Post-Covid, all industries, especially manufacturing are currently facing these issues:

- A significant number of older workers are retiring, leaving behind a skills and knowledge gap

- A sharp increase in employee turnover due to high job demand and a much smaller available workforce

- An increase in manufacturing complexity due to the demand for mass customization with a corresponding increase in new employee on-boarding time

- A job in manufacturing is viewed in a negative and antiquated light

HOW DELMIA HELPS COMPANIES DRIVE OPPORTUNITIES IN TRANSPORTATION & MOBILITY

Every day, the shop floor experiences unplanned events such as missing parts, non-conformances and machine breakdowns. These disruptions disturb operations and hinder efficiency—translating into increased lead times and Work in Process (WIP) inventory levels, as well as increased "just in case" inventory in raw materials and components.

That's why DELMIA's integrated solution targets one of the weaker links in the value chain: the gap between production and warehouse management.

With DELMIA, a digital thread runs throughout the chain, connecting and improving the inbound material flows, line-supply and outbound material flows.

It coordinates production orders and manufacturing bills of material with inventory management inside plants and across the supply chain, which includes:

- ☑ **Work in Process (WIP)**
- ☑ **Raw materials**
- ☑ **Purchased parts from suppliers warehoused on-site or off-site**
- ☑ **Semi-finished inventory residing at a feeder production line or work cell**

Manufacturers can now gain full visibility into orders, inventory, resources and quality status—all consolidated and easily accessible on the same platform. The solution also alerts and alarms operators when issues arise—providing optimal decision support and increasing responsiveness to disruptions.

This seamless workflow is known as material synchronization, a term trademarked by DELMIA to empower companies to fully master the production process with the following capabilities.

1   ELIMINATE INVENTORY BUFFERS AND OBSOLESCENCE

The solution supports pull-based (demand-driven) and one-piece flow production. Parts are either made one at a time or in small batches when there is demand— eliminating buffers, shortening lead times and reducing the amount of scrap in the event defects or non-conformances are found. This unlocks Just in Time manufacturing.

In addition, the solution supports multiple inventory management techniques for different types of inventories as well as Engineering Change Management to prevent obsolescence. This includes:

- **First In, First Out (FIFO)**
- **Kanban**
- **Product-specific kitting**
- **Revision controlled inventory**
- **Inventory with short shelf life or time sensitivity requirements**

2   JUST IN TIME AND SEQUENCE (JIT/JIS) MANUFACTURING

The system first generates the pull signal and tasks from the final assembly—giving operators oversight into all the inventory and materials required. Then, through business processes, the solution determines the timing, sequence and individuals needed for performing the tasks.

Material flow automation ensures that the sub-assemblies and right parts arrive at the right time at the right place and in the right sequence for production/assembly to begin immediately with no downtime in between.

REAL-LIFE VALUE OF IMPLEMENTING DELMIA

A tractor manufacturer and agricultural equipment company switched its final assembly line management to JIS and increased the number of models produced from 8 to 16. This marked a 100% increase in models with no increase in inventory.

A manufacturer of automotive seating and automotive electrical systems supplies 1,400 seats daily within 40 minutes of ordering and provides JIT delivery with no finished goods (FG) inventory on hand and minimal raw materials.

AUGMENTED REALITY: A CATALYST FOR GROWTH

Imagine if you could democratize knowledge across the shop floor, ensuring the right information is delivered to the right person at the right time in a form that is meaningful to frontline workers.

DELMIA's new Augmented Experience solution can make it happen with an immersive real-time application. AR/ VR is a natural extension of 3D-based manufacturing engineering and industrial engineering, providing the visual representations needed to connect engineering with the shop floor.

Augmented work instructions reduce time, error and operational latency between departments while converging the virtual models with real-world operations—consequently, driving up the quality of work, productivity and customer experience.

3   LEAN MANUFACTURING

DELMIA provides the technology needed to drive lean manufacturing principles and achieve manufacturers' sustainable and profitable goals. Not only can organizations embrace a paperless system now, but they can also follow the best practices provided by Lean organizations such as the Kanban framework.

All stakeholders will have full real-time visibility and control over the material flow within the supply chain. This reduces excess inventory, overstocking and avoids shortages.

4   ACCURATE INVENTORY REPLENISHMENT

Multiple sub-assembly and material kitting operations are synchronized with the main assembly processes in real time. This allows manufacturers to coordinate material replenishment based on the production status and material handling requirements needed to fulfil production orders.

Manufacturers can also configure business rules into the system to ensure accuracy and full control. For example, a user may only request a specific material issue to the production line based on a change in the production schedule. This cuts down material handling and delivery errors as well as prevents the wrong material from being issued.

REAL-LIFE VALUE

A company which specializes in diesel and alternative fuel engines and generators leveraged DELMIA and is now able to synchronize 10,000 kits to drive the production of 350 engines daily. They were also able to reduce the rework on line by 75% and reduced line stoppage and excess WIP.

5   BETTER TRACEABILITY AND QUALITY ASSURANCE

Using labels, electronic tags and automatic tracking technologies (RFID, barcodes and more)—all materials are scanned and validated each time they are received and transported. This ensures the quality, traceability and genealogy of all components are accounted for and continuous throughout the plant and assembly process.

6   MINIMIZE SHIPPING AND RECEIVING ERRORS

Deliver a superior customer experience by leveraging DELMIA's capabilities for real-time error proofing for print, packaging and labeling inventory in shipping and receiving. DELMIA can also ship in sequence based on a specific order set required by the customer demand signal.

CAN YOUR SOLUTION SUPPORT DIFFERENT MANUFACTURING MODELS?

DELMIA supports:

- ✓ **Make to Stock (MTS)**
- ✓ **Build to Order (BTO)**
- ✓ **Configure to Order**
- ✓ **High volume/low mix**
- ✓ **Low volume/high mix**

WHY DO WE NEED A WAREHOUSE MANAGEMENT SYSTEM (WMS)?

There are two major gaps in a traditional environment where ERP or WMS manages materials and a typical Manufacturing Execution System (MES) / Manufacturing Operations Management (MOM) system is used in a production environment:

- **A typical WMS or ERP does not provide visibility when it comes to WIP and operation status on the production floor which leads to higher inventory costs and lower productivity**

- **A traditional MES solution does improve visibility in WIP and operation status on the production floor but does not provide insight into component and raw material inventory, completed sub-assemblies or finished goods—which results in lower productivity and increased material handling costs in the case of disruptions**

By integrating the traditional MES functionality and a manufacturing-based WMS solution in a single platform, manufacturers gain complete visibility across the entire materials process—from receiving through production and shipping.

THE PROVEN VALUE OF AN INTEGRATED SOLUTION

Synchronizing materials and logistics with the shop floor in real time unlocks the following benefits:

24-45%
reduction in inventory

25%
increase in throughput/ productivity

Significant quality and safety improvements

WMS AS A STAND-ALONE SYSTEM IN A PRODUCTION ENVIRONMENT IS INSUFFICIENT

WMS in a warehouse is focused on receiving, internal movements and shipping. However, for a warehouse to effectively support manufacturing, the complexities multiply. It must:

1

Provide multiple supply and line replenishment methods

2

Manage buffers on the shop floor based on actual production

3

Be able to support sub-assembly areas in support of final assembly

4

Track packaging materials especially returnable containers

Having WMS as an inherent part of your MOM solution fills the gaps and enhances a manufacturer's capabilities—making this an effective, sustainable business model to support a complex manufacturing environment.

THE REAL-LIFE VALUE OF IMPLEMENTING DELMIA

A wide range of automotive manufacturers have implemented DELMIA to transform industry challenges and trends into business opportunities.

To better illustrate the true value and benefits of material flow control derived from using an integrated planning and optimization platform—here are two case studies.

AUTOLIV

Autoliv, a Fortune 500 Tier 1 supplier of airbags and safety systems to all major automotive OEMs worldwide, wanted to improve quality, material flows, traceability and drive consistent, lean continuous improvement across all of its manufacturing plants.

Autoliv also wanted to improve and harmonize its operational and commercial business processes into one integrated platform.

Upon implementing DELMIA, they were able to:

- ✅ **Gain better visibility into materials, workflows and processes**

- ✅ **Improve productivity**

- ✅ **Enhance global traceability**

- ✅ **Standardize global process**

To learn more, read the full customer story.

ALSTOM

Alstom is a multinational rolling stock manufacturer in the rail sector, offering high-speed trains, metros, monorails, trams, turnkey systems, services, infrastructure and more.

With so many moving parts, they were looking to gain greater visibility, synchronization and control over their manufacturing shop floor processes that run global operations.

With DELMIA, they were able to:

- ✅ **Better guide employees with the system's clear set of instructions and task sequencing**

- ✅ **Closely monitor all activities to ensure tasks are performed correctly and compliant to standards**

- ✅ **Gain real-time visibility and information to improve decisions and reaction times**

- ✅ **Develop a better quality assurance program**

To better visualize the benefits of the solution, watch this video.

THE PROVEN VALUE OF IMPLEMENTING DELMIA

-30%
Cycle time

-50%
Production premium freight

-25%
Material handling staff reduction

-35%
Inventory

X2
Number of models built with...

0%
increase in on-site inventory

THE FUTURE OF TRANSPORTATION & MOBILITY

Ensuring business continuity in such a complex and volatile landscape means being able to improve quality, facilitate sustainable innovation and cater to customization demands—all while remaining cost-efficient.

Closing the gap between production and warehouse with real-time material synchronization enables this.

DELMIA is designed to help automotive manufacturers achieve their goals of driving agility and efficiency to unlock operational excellence—making it the strongest link in their value chain.

WHO WE ARE

3S DELMIA

Dassault Systèmes' DELMIA, powered by the **3D**EXPERIENCE platform, helps industries and service providers connect the virtual and real worlds of value networks to collaborate, model, optimize and perform. DELMIA provides solutions to leverage the virtual world of modeling and simulation with the real world of operations to provide a complete solution to value network stakeholders from suppliers to manufacturers, logistics and transportation providers, as well as service operators and the workforce.

Inceptra

Inceptra supports engineering and manufacturing organizations with best-in-class solutions to digitally design, simulate, produce, and manage their products and processes, enabling enhanced innovation and productivity.

As the largest Platinum partner in North America, Inceptra is dedicated to Dassault Systèmes' product development software portfolio, complementary solutions, and related services, including training, implementation, integration, support, consulting, and automation services. For more information, please visit Inceptra.com.

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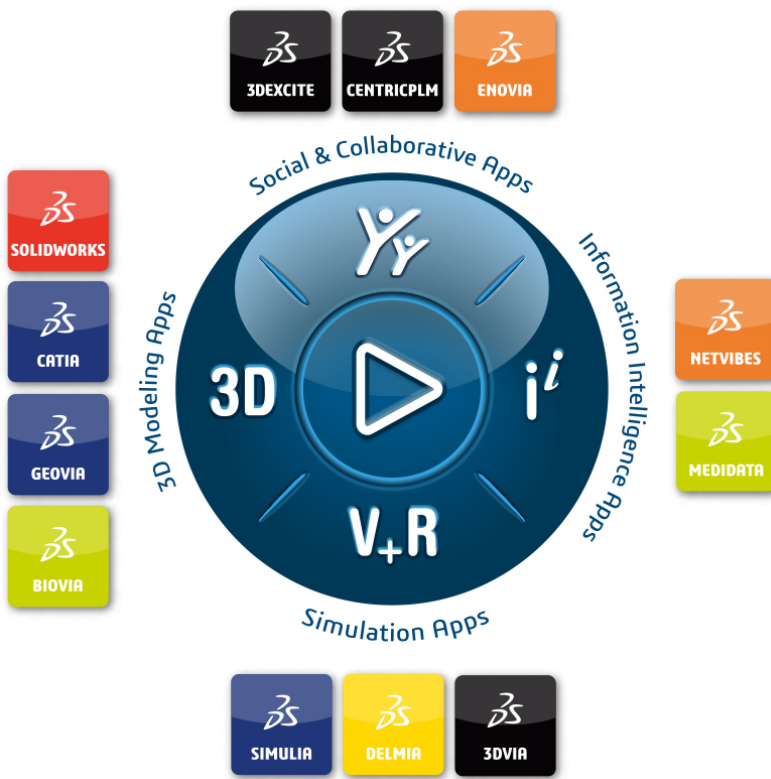
Our **3D**EXPERIENCE® platform powers our brand applications, serving 11 industries, and provides a rich portfolio of industry solution experiences.

Dassault Systèmes, the **3D**EXPERIENCE Company, is a catalyst for human progress. We provide business and people with collaborative virtual environments to imagine sustainable innovations. By creating 'virtual experience twins' of the real world with our **3D**EXPERIENCE platform and applications, our customers push the boundaries of innovation, learning and production.

Dassault Systèmes' 20,000 employees are bringing value to more than 270,000 customers of all sizes, in all industries, in more than 140 countries. For more information, visit **3ds.com**.

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