

3D UNIV+RSES for Manufacturing:

BRINGING FACTORIES TO LIFE WITH REAL-TIME PHOTOREALISM

• A NEW ERA OF
VIRTUAL TWINS

• WHY DOES
PHOTOREALISM
REALLY MATTER?

• INTRODUCING
3D UNIV+RSES

• HOW DOES DASSAULT
SYSTÈMES DO IT?

• USE CASE:
PHOTOREALISTIC BIW
FACTORY SIMULATION

• TAKING IT A STEP
FORWARD WITH
IMMERSIVE VR

• READY TO TAKE THE
NEXT STEPS?



A NEW ERA OF VIRTUAL TWINS

Quality engineers often cite the Rule of 10:1 every time a defect slips to the next phase in the value chain, the effort to correct it grows by roughly 10 times. Finding a clash while CAD-planning might be a \$1 change; catching it only after the cell is built can balloon to \$10; and noticing it once the line is running (or, even worse, after shipment) becomes \$100-plus in scrap, re-work, field service and warranty claims.

How can it be solved? By moving the entire factory—product, process and resources—into a **photorealistic** and **behavior-accurate** virtual twin that allows engineers to “fail fast, cheap and early”.

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WHY DOES PHOTOREALISM REALLY MATTER?

1



It surfaces million-dollar mistakes while they still cost pennies

2



Non-technical stakeholders make decisions faster—and say “yes” sooner

3



It kills expensive physical mock-ups

4



It drives sharper, safer operator trainings

5



It aligns globally dispersed teams in one “single source of visual truth”

6



It slashes the downtime bill that still cripples plants

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INTRODUCING 3D UNIV+RSES

In early 2025, Dassault Systèmes unveiled 3D UNIV+RSES – their seventh-generation virtual representation initiative. One of the key aspects of this initiative is to demonstrate how the **3DEXPERIENCE** platform can design, plan, and simulate manufacturing processes in a photorealistic, immersive environment. This technology enables robotics engineers and manufacturing executives to digitally perfect complex production lines before committing to physical changes, serving as a digital testbed for manufacturing innovation.



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HOW DOES DASSAULT SYSTÈMES DO IT?

DELMIA, a Dassault Systèmes brand, helps create the Virtual Twin of the entire factory, including product, process and resources, live on the **3DEXPERIENCE** platform so all teams work on the same model in real time.

The eight concrete steps to build a manufacturing virtual twin:



1. Consolidate all data

Funnel 2D, CAD, BOMs and laser scans into one PPR backbone.



2. Process Engineering

Transform the EBOM into an MBOM, sequence operations and lock product and process together.



3. Virtual Factory & Flow

Place machines, conveyors and aisles in 3D and run flow simulations to expose bottlenecks early.



4. Robotics & Automation

Drag any of the 2,000 + robot models into the scene, auto-generate collision-free paths and optimize cycle time and energy.



5. Machining & Additive

Simulate NC toolpaths or additive layers directly on the twin; design changes propagate automatically.



6. Ergonomics & Safety

Test reach, posture and human/robot clearances with digital manikins and ISO/RULA scoring.



7. Virtual Commissioning & Go-Live

Hook real PLC/robot code to the model, debug logic and train operators virtually, cutting on-site ramp-up to days.



8. Continuous Optimization

Stream live MES/IoT data back into the twin and rerun “what-if” scenarios as demand, tariffs or mix change—embodying the Gen-7 “Cycle of Life” principle.

By combining these steps with **3DEXPERIENCE**’s high-fidelity rendering, factories swap the pricey “build-test-fix” routine for a smarter “simulate-optimize-execute” workflow—guided by one photorealistic virtual twin.

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USE CASE: PHOTOREALISTIC BIW FACTORY SIMULATION

With **3D UNIV+RSES** and the **3DEXPERIENCE** advanced rendering engine, manufacturers can now explore a real-time, photorealistic virtual twin of a BIW factory.

Previously limited to basic shading, simulations now offer immersive realism with:

Reflective Materials

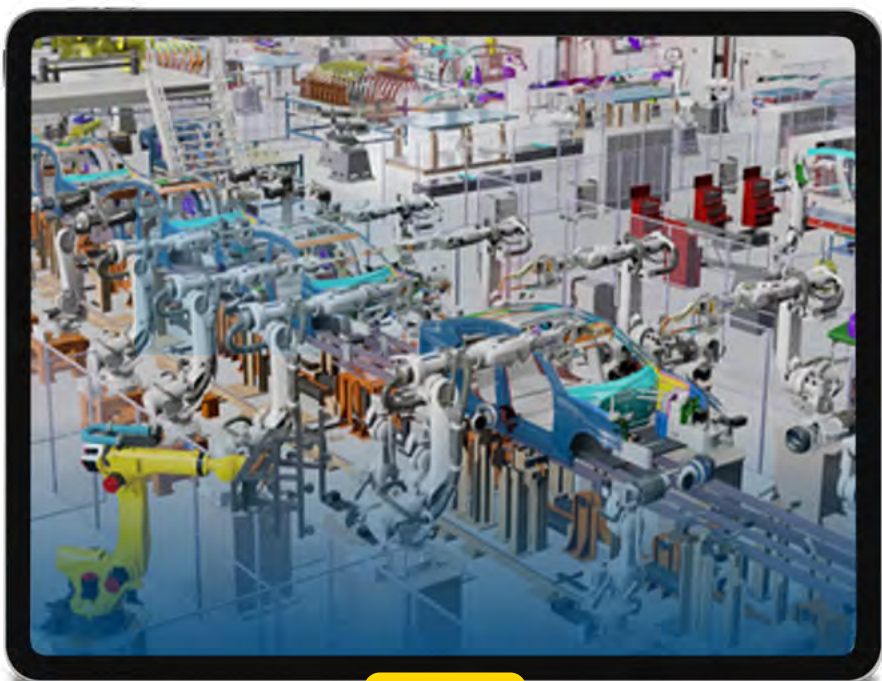
Steel panels reflect their surroundings dynamically

Accurate Shadows

Robot arms cast lifelike, moving shadows

Lighting Effects

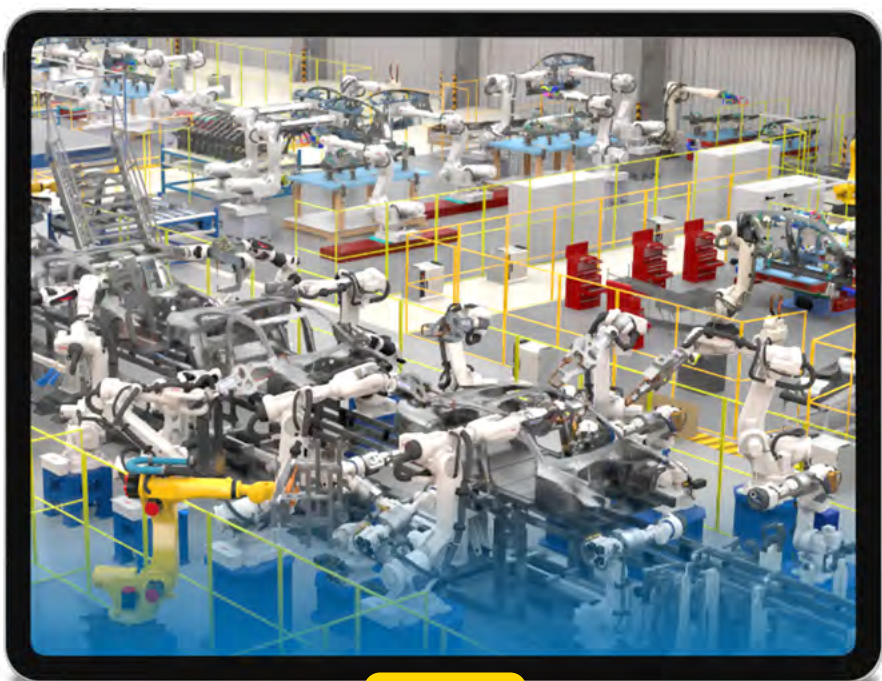
Skylights and fixtures replicate real factory lighting



Before

Pre-integration render:

Accurate robot geometry displayed with basic shading and minimal lighting detail



After

Post-integration with the 3DEXPERIENCE rendering engine:

Photorealistic visuals with dynamic reflections, realistic shadows, and immersive factory lighting

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Benefits



1

Better Spotting of Issues

Subtle layout flaws—like reflections on sensors or glare from overhead lights—become obvious in a life-like digital environment but might be overlooked in a plain CAD view.



2

Training & Ergonomics

When everything looks and behaves like the real world, you can *train* operators in the VR environment with more natural movement and better coverage of safety scenarios.



3

AI Model Training

The synthetic data generated can be used for AI Model training.



4

Immersive VR for Validation, Collaboration & Safety:

3D UNIV+RSES incorporates immersive VR, allowing engineers and operators to explore the factory.



5

Communication Power

Executives and customers “see” the final line as if it were already constructed, easing buy-in and sign-off.

TAKING IT A STEP FORWARD WITH IMMERSIVE VR

Photorealistic rendering is powerful on a 2D monitor, but **3D UNIV+RSES** goes even further by supporting **immersive Virtual Reality (VR)**. Using a VR headset, you can **step into** the factory at full scale and see the machines from an operator's vantage point.



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This ability transforms manufacturing workflows in four major ways:

1



Early Process Validation

- Engineers can test the reachability of a robot, the line-of-sight for sensors, or part clearance in real scale.
- Any mistakes or inefficiencies are caught *before* they exist physically.

2



Enhanced Collaboration

- Multiple people—regardless of location—can participate in a shared VR session.
- They all see the same life-size environment, reducing misunderstandings and speeding up consensus.

3



Safety & Risk Assessment

- Collision detection is improved when you can physically perceive proximity to a moving robot arm.
- VR scenarios allow for “what if?” emergency drills without risking real injuries.

4



Ergonomics & Human Factors

- Using digital human avatars, you can confirm whether a worker can comfortably operate next to the robot, or if overhead tasks require awkward posture.
- By tackling these issues virtually, companies save time, reduce injury risk, and often boost throughput.
- Immersive VR training systems can bridge the gap between on-site operators and remote experts.

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If you want to test the waters, you can request a demo from Dassault Systèmes to see how a 3D UNIV+RSES-based solution might look in your plant.

If you're already on the **3DEXPERIENCE** platform with DELMIA Robotics, consider extending your workflows into VR or exploring advanced multi-robot features to streamline commissioning.

If you're an executive planning a new line or retool, use 3D UNIV+RSES to evaluate concepts quickly, gather operator feedback in VR, and make data-driven decisions that stick.

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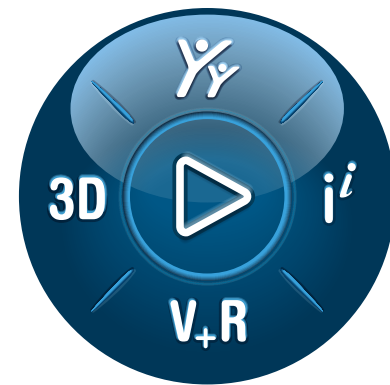
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For more information, visit: **www.3ds.com**



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Virtual Worlds for Real Life



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