



# Process Authoring Made Seamless: Bridging Design Simulation to Real World Execution with Solumina MES

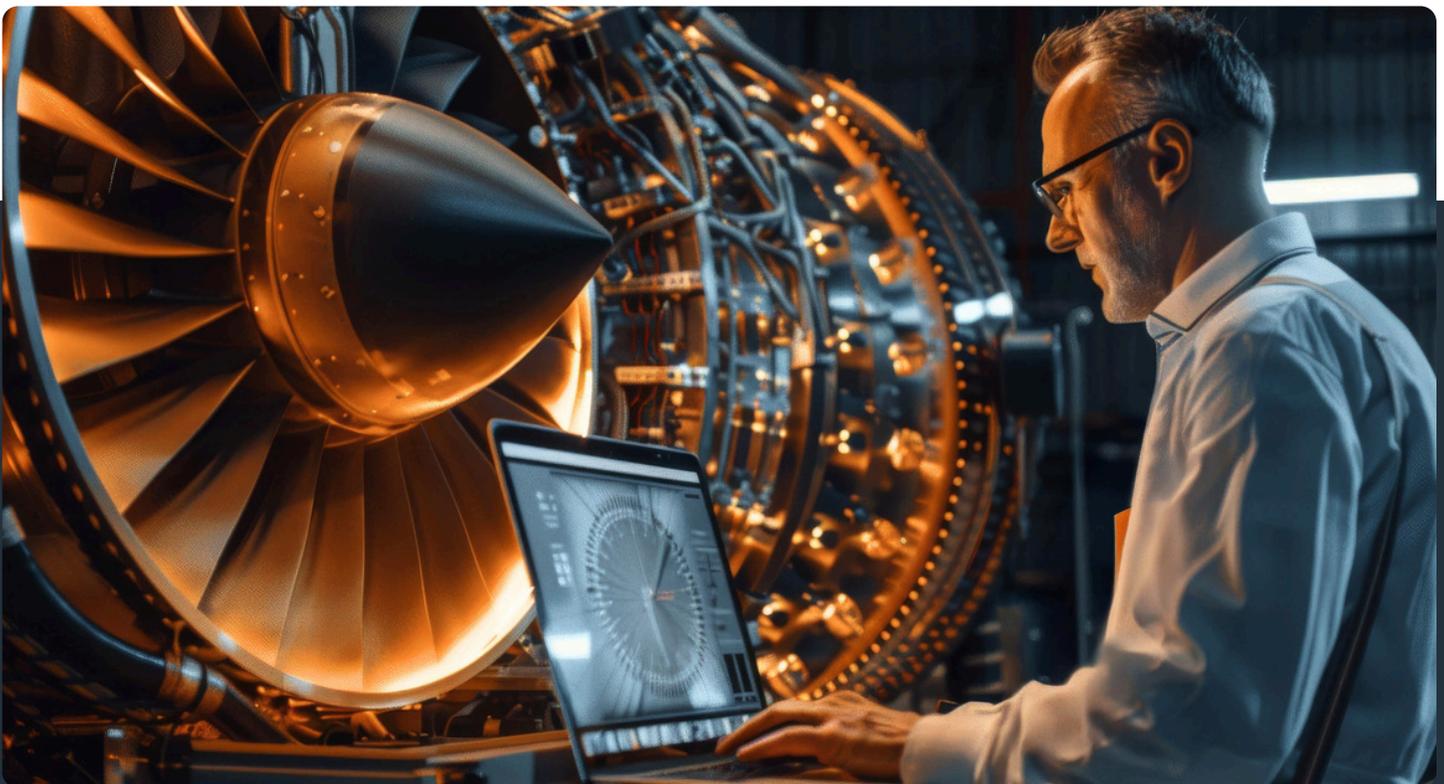
## ► Customer Profile

**iBase-t Customer:** Large Original Equipment Manufacturer

**Industry:** Aerospace and Defense Manufacturing

**Manufacturer's Primary Customer:** Department of Defense (DoD)

**Challenge:** Achieving efficient, scalable, and traceable process authoring amid complex product builds and evolving model-based enterprise (MBE) requirements.



## Introduction

In today's Aerospace and Defense landscape, success demands more than just innovation in design—it requires absolute precision in execution. Product Lifecycle Management (PLM) systems and Manufacturing Execution Systems (MES) each play essential roles in delivering that success. PLM excels in the virtual realm: enabling detailed product modeling, configuration control, and sophisticated physics-based simulations that guide engineering decisions. MES, by contrast, lives on the shop floor—tracking how parts are assembled and how efficiently work is performed, capturing all build data including non-conformances. Deviations must be resolved when theoretical models first meet real-world constraints.

These two systems don't compete—they complement each other. PLM manages and defines design intent for highly engineered products; MES manages and defines build instructions and maintenance execution process for high quality delivery. Together, they form a closed loop digital thread from design to sustainment. But for that thread to remain unbroken, both systems must lean into their strengths to function at their highest potential—and in harmony.

## The Situation

A leading aerospace and defense manufacturer invested heavily in its PLM platform to modernize and digitize process validation.

To support their new facility for advanced component manufacturing, the OEM adopted a PLM-based process definition tool offered by their PLM vendor, attempting to cover both process modeling and execution definition (instructions). They aimed to create a seamless link from engineering design to shop floor execution using a "Bill of Process" generated in the PLM system. The vision: leverage a single source where product designs and their corresponding manufacturing plans would live side-by-side.

But in practice, the PLM vision was 'over leveraged', and after years of implementation and millions in cost, they learned that the solution could only support component manufacturing (machining)—not assemblies. This forced the OEM to adopt a second tool (stitched into the PLM) for assembly planning, leading to a fragmented, multi-tool environment.

## The Challenges

- **Fragmentation of Systems:** The PLM vendor stitched together third-party acquisitions to cover various needs within process definition (i.e. various types of data collections, inspection plans, manufacturing sampling rules, FAI/ PPV) . Integration proved to be fragile, heavily customized, and brittle with each new release—forcing regression testing cycles that delayed progress by months, if not years.
- **Inability to Execute on the Shop Floor:** Even with process plans built in the PLM, the OEM could not easily execute orders directly from those plans. Instead, they required complex, custom-built integrations to pass data into Solumina for actual execution. Some use cases required manual intervention. This added cost, complexity, and data fidelity risk.
- **Lack of UUID and Digital Thread Readiness:** PLM systems struggled to implement UUIDs (universally unique identifiers) for dimensions, parts, and assemblies—key to enabling the digital thread. The first release with partial capability was years away, and only for component characteristics. In comparison, Solumina is designed to seamlessly integrate with models of all maturity levels—legacy, current, and future—whether they include UUIDs or not.

## The Turning Point

Faced with ballooning costs, operational delays, and internal friction, the OEM began to reevaluate. Conversations with Solumina product experts revealed a clear path forward:

- Why wait for your PLM to someday support full process definition and execution, when Solumina already does? It is purpose-built for aerospace and defense manufacturing, and capable of supporting the reality of a hybrid model-based and non-model-based shop floor.
- Solumina offers full process definition in one system, and native integration with its Manufacturing Execution System (MES) and Supplier Quality Management (SQM). No stitched tools. No brittle customizations. No guesswork.

## An Integrated Approach

- **End-to-End Authoring to Execution:** In Solumina, the process planner manually links 3D model objects, product and manufacturing information (PMI), and BOMs directly to the work instructions.
- **Leveraging PLM and MES Strengths:** PLM tools excel at simulating the nominal —and when real-world variables like human behavior, machine variation, and environmental conditions come into play, only an MES can capture and control what actually happens on the shop floor.
- **Version Stability and Rapid Upgrades:** Solumina architecture and a cohesive ecosystem streamlines upgrades as the platform advances.
- **Lower TCO and Faster ROI:** Solumina's out-of-the-box capabilities eliminate the need for heavy IT integration, expensive third-party tools, and long learning curves.

***CAD views can be created/saved by a process planner and viewed by a technician with a shop floor order***

## The Results

By transitioning process definition into Solumina, the OEM achieved:

1. Reduced complexity with one platform for planning and execution.
2. Faster time to value, avoiding multi-year roadmap delays from PLM.
3. Readiness for digital thread continuity, including support for future UUID-based models.
4. Improved quality and traceability, with native handling of BOMs, 3D models, and process data.
5. Operational agility, with the ability to pivot quickly across programs, products, and plants.
6. Lower total cost of ownership and intense customizations across the product lifecycle.



*"With Solumina, we eliminated the disconnect between planning and execution. For the first time, our process plans flowed directly into the shop floor without needing custom integrations or manual intervention. It's a seamless handoff—from engineering intent to actionable work instructions—which has improved traceability, reduced errors, and accelerated our builds."*

**– Director of Manufacturing Operations**

## Moving Forward

In highly regulated, high-stakes industries like aerospace and defense, the stakes for the execution design scope of process authoring are too high to leave to systems that aren't purpose-built. The promise of an all-in-one PLM-led strategy was attractive but ultimately unfit for execution on the shop floor.

By moving to Solumina, this manufacturer didn't just find a workaround—they found the right solution.

Let PLM tools do what they're best at—simulation, modeling, design. Let Solumina handle what it's built for: translating the simulated process design into executable work instructions with always-on compliance and quality measures.



## About iBase-t

iBase-t is the global leader in cloud software for the aerospace and defense industry. Committed to innovation, customer success, and product excellence, iBase-t ensures digital continuity across manufacturing, quality, and maintenance, repair, and overhaul (MRO) operations on a global scale. iBase-t's Solumina Manufacturing Operations Platform is a cloud-native solution that establishes a digital ecosystem to drive innovation and improve operational performance for the most critically complex manufacturers. iBase-t customers include Lockheed Martin, Northrop Grumman, GE Aerospace, Rolls Royce, Pratt & Whitney, and Textron.

The Solumina Manufacturing Operations Platform by iBase-t consists of an integrated suite of MES, SQM, and MRO solutions. Designed for complex, highly regulated discrete manufacturers who seek to digitally transform their operations, Solumina connects manufacturing operations, quality, and sustainment management in a seamless flow of data across the value chain and product lifecycle.

The Solumina Manufacturing Operations Platform creates the technology infrastructure manufacturers need to harness advances in model-based functionality like PMI continuity, Assisted Engineering Changes and augmented reality guidance for the workforce, IIoT connectivity for equipment, new levels of intelligence for decision making, and higher levels of customer and supply chain collaboration.

Learn more at  
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