

DEFENSE MANUFACTURING • OPERATIONAL EXCELLENCE

Large Defense Prime: From “Clean the Data First” to Decisions in Hours

A multi-week pilot put ProDex head-to-head with the incumbent tools across two large-defense-prime sites. ProDex won all seven use cases — and removed the months of data cleanup that usually must come first.

AT A GLANCE

2–8× Speedup across 7 use cases	4× Faster model build vs. incumbent (up to 16× scope-adjusted)	\$2.1M COPQ surfaced and categorized	42 ERP data errors caught in-place
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HIGH-MIX, LOW-VOLUME DEFENSE MANUFACTURING – PILOT SITE

INDUSTRY	Defense electronics and electromechanical assembly manufacturing
CUSTOMER	Large Defense Prime — manufacturing operations
USE CASES	Factory simulation, data integrity, root-cause analysis, and constraint-based scheduling across two manufacturing sites
PRODUCT USED	ProDex — AI-native discrete-event simulation, Advanced Planning & Scheduling, Data Insights, What-If Scenario Analysis

A Large Defense Prime set out to test whether a new approach to factory simulation could earn a place in its operational-excellence toolkit. Over a multi-week pilot across two manufacturing sites, the team ran ProDex head-to-head with its incumbent simulation tool and its existing planning stack. ProDex didn't just win on speed — it changed what the team had to do first.

Instead of a months-long data-cleanup project before any model could run, ProDex took the ERP data as-is, surfaced the errors itself, and was producing answers in hours. Across seven use cases it ran 2× to 8× faster than the team's prior methods, built the baseline model 4× faster than the incumbent apples-to-apples (up to 16× once scope-adjusted), and surfaced \$2.1M in cost-of-poor-quality hiding in data the team already owned.

“We didn't have to spend months cleaning data before we could model anything. ProDex worked with what we had, surfaced the gaps itself, and we were running real scenarios the same week.”

CONTINUOUS-IMPROVEMENT LEAD · LARGE DEFENSE PRIME

01 About the Customer

Large Defense Prime is one of the largest U.S. defense technology companies, supplying critical electronics and electromechanical systems to the U.S. Department of War and allied forces. The pilot ran across two of its high-mix, low-volume manufacturing plants — where routings run deep, demand is contract-driven, and traditional MRP plans against capacity the floor doesn't actually have.

02 The Challenge

At the first site, climbing contract demand and a growing backlog had outpaced the plant's planning approach. Production was scheduled through an MRP system that assumes unlimited capacity — so the schedules it produced weren't executable, and the gap between planned and actual kept widening. Three problems fed each other:

Unexecutable schedules

MRP planned against infinite capacity, with no constraint-based master production schedule to anchor it.

Dirty, incomplete data

Inconsistent routings, mismatched labor codes, legacy routings still in use, missing demand — the exact conditions that normally stop a simulation before it starts.

No fast way to test decisions

Weighing a material delay, a staffing change, or a disruption meant manual spreadsheet work, so scenario analysis took days the team didn't have.

The problem statements were blunt:

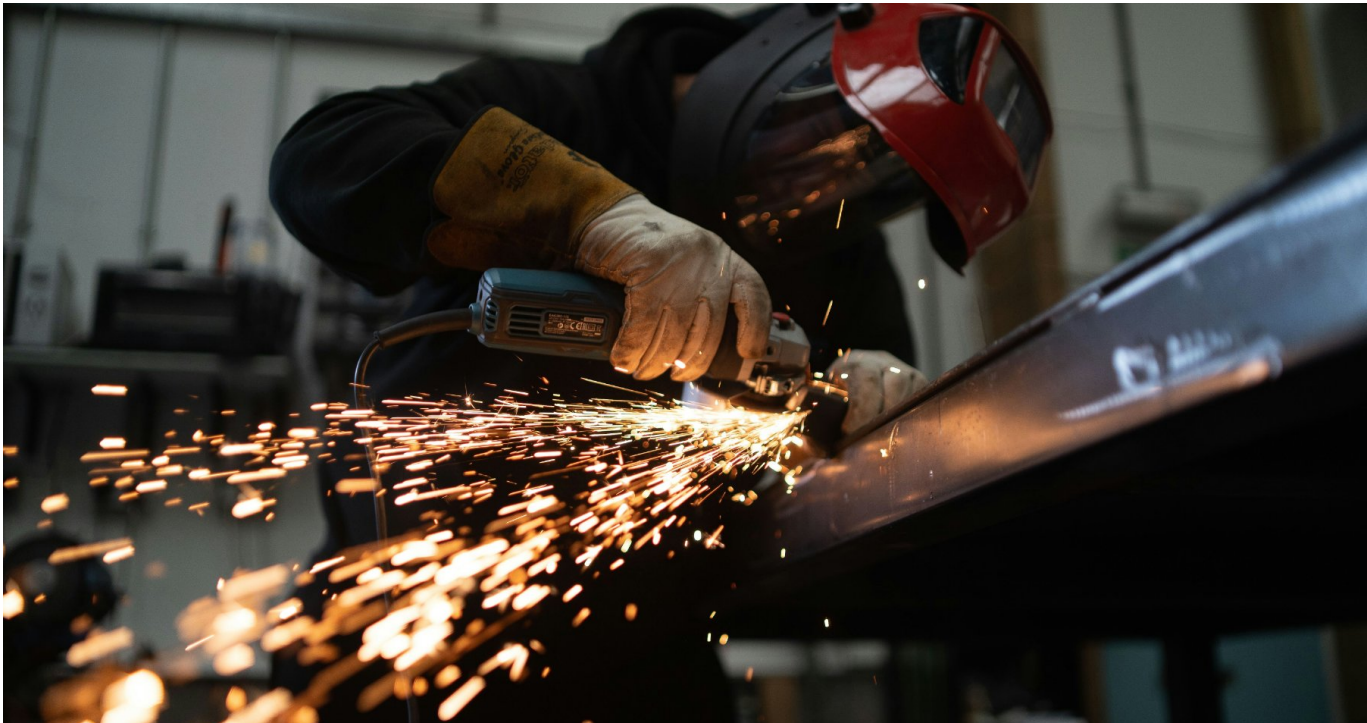
“Production / Operations: need an executable schedule that reflects real capacity, labor, and material constraints. Planning / Scheduling: need to evaluate the impact of disruptions — material shortages, PTO, delays — quickly and accurately. End customer: needs on-time delivery and predictable lead times.”

What ProDex had to prove:

- Constraint-based scheduling that reflects real capacity, labor, and material limits
- Scenario analysis fast enough to evaluate disruptions on demand
- A **≥60% cut** in planning cycle time
- No multi-month cleanup first — work with the data as it is

03 What We Built

ProDex is an AI-native simulation and planning platform: upload your existing data and its agent builds a discrete-event model you can interrogate and run scenarios against — in hours, not months. For a Large Defense Prime, that meant ingesting bills of material, routings, work-center capacity, production orders, material netting, and labor standards straight from the ERP and the team’s project-accounting system — over **150,000 production confirmations** across many product families — and normalizing them inside the platform instead of demanding a clean dataset up front. On-site Gemba observations validated sequencing, queue behavior, and rework loops so the model matched the floor, not just the system of record.



ROUTINGS RUN DEEP – PRODEX INGESTS THE FLOOR’S REAL SEQUENCING

The build itself was the first proof point:

TASK	PRODEX	INCUMBENT (EST.)	SPEEDUP
Data collection	4 hrs	12 hrs	3×
Model creation	20 hrs	80 hrs	4×
Current-state analysis	4 hrs	12 hrs	3×
Experimentation (per scenario)	20 min	60 min	3×
KPI creation	5 min	30 min	6×

A NOTE ON MODEL SCOPE

The incumbent's 80-hour estimate is based on a comparable build of a model roughly one-quarter the size of what ProDex built. The 4× speedup above is the apples-to-apples read. If we assume the incumbent's effort scales linearly with model size, the scope-adjusted comparison on model creation is closer to **16×**. We flag the linear-scaling assumption explicitly — simulation effort often compounds with complexity, so 4× is the conservative read and 16× is the upper bound.

The incumbent approach also required extensive manual ERP cleanup before a model could be built; ProDex normalized the same data directly, and scenarios ran through a chat-based interface instead of hand-coded logic.



CONTRACT-DRIVEN DEMAND, DEEP ROUTINGS, CONSTRAINED CAPACITY

04 What the Model Found

Seven use cases across two sites — every one faster than the team's traditional tools, by 2× to 8×:

USE CASE	TRADITIONAL	PRODEX	SPEEDUP
Data-integrity review	12 hrs	4 hrs	3×
Hidden-factory root-cause analysis	12 hrs	3 hrs	4×
Value-stream mapping	8 hrs	2.5 hrs	3.2×
Schedule level loading	16 hrs	6 hrs	2.7×
Staffing scenario planning	8 hrs	4 hrs	2×
Area / workstation planning	6 hrs	2 hrs	3×
Kaizen pre-planning	8 hrs	1 hr	8×

Behind the multipliers, the findings that mattered:

It found the errors no one had time to look for.

Loading the data as-is, ProDex Data Insights surfaced **42 inaccuracies** in the site's ERP — routing errors, mismapped labor codes, legacy routings, missing demand — and closed them as part of modeling, not as a separate project.

It put a number on the hidden factory: \$2.1M.

A focused deep-dive ranked the real drivers of factory loss and categorized \$2.1M in cost-of-poor-quality. Cutting that rework in half is the equivalent of roughly **five full-time operators** of recovered capacity — labor already paid for, surfacing in data the team already had.

It turned a blank-sheet VSM into a five-minute starting point.

Using a high-volume part, ProDex generated a first-pass current-state value-stream map in minutes, cutting VSM event time more than 3× so the event could spend its hours improving, not collecting baseline data.

It made an unexecutable schedule executable.

ProDex leveled MRP demand against real capacity and produced manufacturing-order dates in 4 hours — close to 3× faster than the manual method.

It let the team test changes on the model, not the floor.

Against a validated baseline, what-if scenarios on staffing, efficiency, and rework ran 2× faster than the team's previous manual approach, and demand-backed modeling sized a workstation area to its true peak — replacing an MRP guess with a defensible number.

It compressed a day of Kaizen prep into an hour.

ProDex built the value-stream and capacity model for an upcoming event in one hour instead of a full day (8× faster), and showed that targeted improvements could hit the same throughput in two shifts instead of three.

The throughline: ProDex removed the most expensive precondition of factory simulation — the cleanup project — and that, more than any single use case, is what let one pilot deliver seven analyses in the time a traditional tool delivers one.

05 Outcome

In a few weeks, Large Defense Prime had validated, reusable models for both sites and a quantified improvement backlog — \$2.1M in COPQ, a 3× faster VSM, achievable schedule dates, a demand-backed workstation plan — all from data it already had, clearing the charter's **≥60% planning-cycle-time goal**.

Leadership recommended expanding the pilot across the broader operational-excellence rollout. Every model is a live artifact, re-run as new ERP data, demand, or staffing shifts — no rebuild required.

06 What's Next

The validated models become the baseline the team builds on — extending constraint-based scheduling, root-cause analysis, and scenario planning from two pilot sites into a wider operational-excellence program, with data integrity, supply-chain root cause, and flow implementation sequenced next.