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Execution, not Capacity, is the Real Bottleneck in Aerospace & Defense

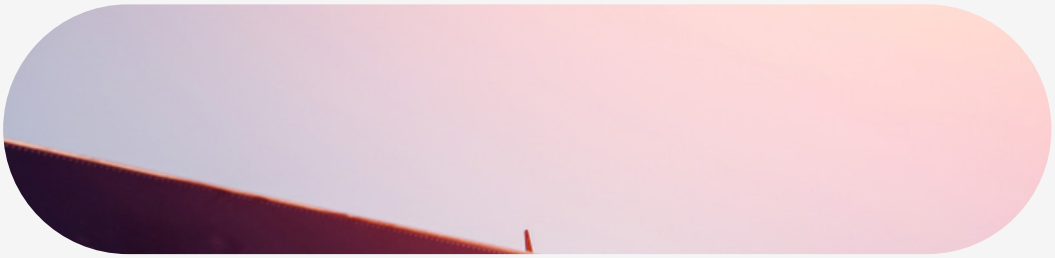
Why Manufacturing Orchestration is the Missing Layer

Key Takeaways **for A&D Leaders**

Industrial performance in aerospace and defense is no longer defined by how much capacity is installed, but by how consistently that capacity can be executed under variability.

Organizations that combine real-time orchestration with disciplined cross-functional execution can increase throughput, protect delivery commitments, and improve resilience without immediate CapEx.

- Prioritize execution stability over planning perfection. Better forecasts do not fix fragmented execution if material and priorities are still managed separately.
- Use orchestration to expose constraints early and strategically respond to disruptions. The goal is to prevent work from starting when it cannot flow through the system.
- Treat supplier coordination as part of execution, not a separate function. Parts availability must be managed upstream and continuously.
- Invest in technology and operating discipline. Visibility alone is not enough without governance, escalation paths, simulations.



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Executive *Summary*

Aerospace and defense organizations are under sustained pressure to increase throughput within constrained capacity. Demand has recovered and continues to grow, yet investment in additional capacity remains difficult to justify without firm orders. Supply chains remain fragile, variability has increased, and execution has grown more complex.

"The question has shifted from how quickly capacity can be added, to how effectively existing capacity can be optimized. Across the European sites I ran, the pattern was always the same: capacity was rarely the real constraint. The question was whether on Monday morning we knew what would block work on Thursday — and most of the time, we didn't."
Hamza Charrouf, Chief Customer Officer, Pelico.

Across operations, a consistent pattern emerges: work is launched without full material readiness, shortages are identified too late, and execution is continuously re-prioritized. Teams spend a significant portion of their time coordinating, reconciling data, and expediting parts instead of advancing work. Throughput does not increase in line with demand, despite available capacity.

This is the execution gap: the structural mismatch between what planning defines and what production actually delivers under variable conditions.

Manufacturing orchestration closes this gap. It creates a shared, real-time view of material, work in progress, and constraints, allowing organizations to detect issues early and align decisions across functions before flow is disrupted.

Sustained performance also depends on disciplined operating models: clear governance, cross-functional alignment, and structured coordination with suppliers. When these elements combine, execution stabilizes. Work starts with greater readiness, constraints are resolved earlier, and delivery commitments become more predictable.

Throughput increases, not because capacity is added, but because it is used more consistently.

Operational Context: **Ramp-Up Under Capital Constraints**

> *"CapEx is harder to justify ahead of firm orders."*

Aerospace and defense organizations are operating under sustained ramp-up pressure. Demand has increased following the post-COVID recovery and has not declined since in several segments. Delivery expectations are tightening, with customers pushing for shorter turnaround times (TAT) while maintaining competitive cost levels.

The supply chain has shifted from an extremely critical situation to gradual stabilization, but remains fragile and requires continued vigilance. Competition for certain spare parts continues to affect availability, particularly on systems such as engines. Administrative and customs constraints introduced during the recovery period continue to add complexity to operations.

Workload variability has increased. Activity remains highly seasonal in some environments, with peak periods where capacity reaches saturation, followed by off-peak periods with less stable demand. Customer requirements vary depending on context, directly affecting planning and execution.

This variability is not evenly absorbed across operations. Some component shops are saturated, while others remain underutilized due to missing parts or shortages of qualified technicians. Labor capacity is increasingly a limiting factor.

Investment in additional capacity is constrained. Capital expenditure decisions are harder to justify in the absence of firm orders, and greater attention is being paid to cash flow and investment capacity.

As a result, organizations are being asked to increase output without adding capacity.

The Execution Constraint: **Capacity Exists, Throughput does not**

Organizations are not operating without capacity. Installed assets, production lines, and repair capabilities are in place. In many cases, demand could be absorbed within the existing footprint.

The constraint is that this capacity is not fully usable.

Work does not flow continuously through operations. It starts, stops, and is re-prioritized as constraints emerge. The most common of these constraints is material availability. Missing parts are often identified only after work has already started, blocking progress at specific stations or gates. This leads to partially completed work accumulating in the system rather than moving to completion.

At the same time, execution decisions are made across disconnected functions. Planning, supply chain, production, and procurement operate with different information, updated at different times, often outside core systems. As a result, priorities are frequently redefined during execution, rather than stabilized ahead of time.

This fragmentation directly limits throughput. Teams spend a significant portion of their time coordinating, reconciling data, and expediting parts instead of advancing work. In some cases, up to 70% of operational bandwidth is consumed by these activities rather than execution.

The impact is visible across operations. Turnaround times extend not because of technical complexity or lack of equipment, but because work waits on material and coordination. Backlog increases as partially completed orders remain in the system. Delivery commitments become unstable, with dates shifting as new constraints are discovered.

In this context, increasing demand does not translate into increased output. Additional workload enters the system, but does not convert into completed work at the same rate.

Under these conditions, additional capacity does not resolve the constraint. Without control of execution, new assets are exposed to the same disruptions, and throughput does not increase proportionally.

Symptoms: How the Execution Gap Manifests

The execution gap is visible in day-to-day operations. It does not appear as a single failure point, but as a consistent pattern of disruption across planning, supply, and production.

Across aerospace and defense operations, this pattern is consistently observed during ramp-up and acceleration phases, particularly in complex MRO environments.

The most common symptom is missing parts identified too late. Work is launched without full material availability, only for shortages to be discovered at a gate or workstation. As a result, jobs stall after they have already consumed time and capacity, and partially completed work accumulates across the shop.

> *"The most visible symptom is missing parts discovered late, which block work already in progress."*
>
> Director of Industrial Performance, Aerospace Manufacturer

This leads to constant re-prioritization. As new constraints emerge, schedules are adjusted daily across functions. Planning, supply chain, and production teams are required to continuously realign, often based on incomplete or outdated information.

Execution becomes reactive. Teams spend their time escalating shortages, chasing parts, and reconciling data across systems and spreadsheets.

> *"We were in emergency mode, always wondering why deliveries were missed."*
>
> Customer Account Manager, Aerospace MRO

Over time, this mode of operation creates sustained pressure on teams. Coordination overhead increases, and decision-making slows as more time is required to establish a reliable view of the situation before acting.

The impact is directly visible in performance. On-time delivery becomes unstable, with frequent delays driven primarily by material shortages. Turnaround times extend as work waits in the system rather than progressing. Work in progress increases, along with backlog, as partially completed orders accumulate.

In parallel, inventory grows in the wrong places. Non-critical parts are available, while critical components remain missing. Expediting, overtime, and rework increase costs, while rushed decisions under pressure can affect quality.

Root Cause: **Planning Systems do not Control Execution**

Planning systems define intent, but they do not align execution.

Execution depends on factors that are not fully controlled within planning processes. Material availability, supplier reliability, and day-to-day operational constraints evolve continuously.

As variability increases, the initial plan diverges from reality shortly after work begins. Decisions shift away from the plan and are made within functions, each with partial information, often without a shared view of constraints across the organization. Supply chain reacts to shortages, production adjusts priorities, and planners revise schedules.

This separation between planning and execution creates a persistent disconnect. Planning defines what should happen, but it does not ensure that work can start with full material availability, nor does it coordinate how constraints are resolved once they appear.

As a result, execution becomes dependent on local decisions rather than coordinated action. The organization reacts to disruptions instead of anticipating them.

This limitation becomes more visible under capital constraints. When additional capacity cannot be added easily, performance depends on how effectively existing operations are aligned and adjusted in real time. Planning accuracy alone does not translate into improved throughput if execution remains fragmented.

In this context, the challenge is not to produce better plans, but to ensure that execution stays continuously aligned with reality.

The Missing Layer: **Manufacturing Orchestration**

The gap between planning and execution is not caused by a lack of systems or data. It reflects the absence of a layer that connects them during daily operations.

Planning defines what should happen. Execution reflects what is happening. The missing element is the ability to realign the two continuously as conditions change.

Manufacturing orchestration is the execution layer between planning and production. It sits between planning and execution systems such as APS, supply chain planning tools, and MES. Planning systems define intent. Execution systems manage work at the workstation level. Orchestration brings coherence across material, capacity, priorities and functions before and during execution, ensuring that work can proceed without interruption.

It operates on a connected data foundation to establish a shared view of material, work in progress, and constraints, allowing organizations to detect issues early and coordinate decisions across functions.

Material gaps can be identified before work is launched, rather than after it has already started. Priorities can be adjusted based on current constraints instead of being repeatedly redefined during execution. Planning, supply chain, and production operate from the same information, reducing the need for constant reconciliation.

Execution shifts from reactive to anticipatory. Work starts with a clearer understanding of material readiness, and constraints are addressed before they stop flow. It ensures plans can be executed under variable conditions.

The impact is visible in throughput. Existing capacity is used more consistently, with fewer interruptions caused by missing parts and fragmented decision-making. This is critical under capital constraints, where performance depends on how effectively material, capacity, and priorities are aligned in real time.

Operating Model in Practice: **Technology and Transformation Together**

Manufacturing orchestration does not operate in isolation. Its impact depends on how it is embedded into daily operations.

Aligning material, capacity, and priorities in real time requires more than a shared view of data. It requires coordinated decision-making across functions, with clear ownership and consistent ways of working. Without this, the same fragmentation that limits execution persists, even with better visibility.

Cross-functional synchronization becomes the foundation of execution. Planning, supply chain, production, and procurement must operate from shared priorities and respond to constraints in a coordinated manner, rather than adjusting independently.

> *"Alignment among all stakeholders is required to fully leverage installed production capacity."*
>
> Louis Catala, Partner, EFESO

In environments with high variability, execution cannot rely on static plans alone. It requires structured mechanisms to manage change as it occurs. This includes regular alignment on priorities, shared visibility on critical constraints, and clear escalation paths for resolving issues such as parts shortages or supplier delays.

Supplier coordination is also part of this model. Material availability depends on close, ongoing interaction with suppliers, including anticipation of shortages and centralized follow-up on critical parts. In some cases, long-standing relationships with OEMs are used to secure allocations and reduce exposure to disruptions.

Execution performance is therefore not only a function of tools, but of how decisions are made and coordinated. Organizations that sustain higher output without additional capacity are those that combine real-time visibility with disciplined execution practices.

Manufacturing orchestration provides the shared real-time view of constraints and priorities. Sustaining its impact requires structuring how information is used, through governance, alignment, and execution discipline.

Together, they ensure that decisions are taken early, based on current conditions, and consistently applied across the organization.

Case Studies: Three Angles on the Same Constraint

Case 1: Throughput Constrained by Late Material Availability

A global aerospace manufacturer and MRO provider faced increasing pressure to ramp up output as service volumes grew. Capacity was sufficient, but execution remained unstable. Orders in progress frequently stalled on missing parts, with work frequently blocked by missing parts and late signals.

Turnaround times exceeded 100 days, and backlog extended to several months. A significant share of revenue remained tied up in work in progress, waiting on material availability. Daily operations required constant re-prioritization, with teams relying on spreadsheets and manual updates to manage execution.

> ***"Parts shortages were the main bottleneck of the business."***
>
> SVP Operations, Aerospace Services Division

The organization introduced manufacturing orchestration to align material, work in progress, and priorities in real time. This made it possible to identify shortages earlier, coordinate actions across functions, and stabilize execution.

Parts shortages fell by 29% in 8 weeks and up to 72% within 12 weeks at MRO deployments — down from a baseline where 64% of delivery delays were shortage-driven and 37% of revenue was blocked. Turnaround time was cut by ~30%, past-due orders dropped by 52%, and clear-to-build status rose from 60% to 85% (exceeding the 75% target) as WIP declined and flow improved.

Execution moved from reactive firefighting to a more stable and anticipatory model.

> ***"We've gone from emergency mode, wondering why deliveries were missed, to thinking ahead and asking what needs to be done to deliver."***
>
> Customer Account Manager

Case 2: Capacity Imbalance Across a Multi-Site Network

Revima operates multiple industrial sites supporting aerospace components. Demand is increasing across key product lines, with capacity approaching saturation in some areas, particularly for landing gear, while other parts of the network remain underutilized.

The challenge is not only to increase output, but to balance workload across sites and activities while maintaining turnaround time performance. Demand varies by platform, and material availability differs across components. Landing gear operations face fewer shortages, while APUs remain more constrained due to parts availability.

At the same time, portfolio expansion requires maintaining a broad service offering while preserving flexibility and efficiency in production.

In this context, ramp-up depends on cross-functional planning optimization and alignment across sites, suppliers, and internal teams. Supplier relationships, particularly with OEMs, play a critical role in securing parts availability and maintaining flow.

The constraint is not limited to physical capacity. It lies in how demand, material, and resources are coordinated across the network.

> *"Extending acceptance criteria, combined with repair solutions, allows teams to maintain turnaround time objectives."*
>
> Executive VP, Programs & Strategic Development, Revima

Case 3: Execution Instability Under Seasonal Demand Variability

Czech Airlines Technics operates in a highly variable production environment, with strong seasonal demand patterns. During peak periods, capacity reaches saturation and physical space becomes a constraint. Off-peak periods introduce different challenges, with less predictable workloads and shifting customer profiles. Operators respond to this seasonality through customer portfolio balancing and diversification of project types, including lessor and transitional work.

Planning performance depends heavily on context. For known customers and familiar configurations, execution is more predictable. For new customers or unfamiliar work scopes, variability increases, leading to more unforeseen events and disruption to plans.

Labor capacity adds another constraint. Scaling the workforce is limited by certification requirements and training timelines, making rapid adjustments difficult.

To manage these conditions, execution relies on anticipation and coordination. Preparation teams work to secure parts upstream, and decisions are based on experience, customer knowledge, and close coordination with suppliers.

Under these conditions, maintaining stable turnaround times depends on how effectively planning, material, and execution are aligned, less on expanding capacity.

Throughput without *Expansion*

> *"Throughput increases when flow is controlled, not when capacity is added."*

When the execution gap is closed, operations do not rely on additional capacity to increase output. They use existing assets more consistently, with fewer interruptions and less variability.

Work starts with material availability understood upfront. Clear-to-build becomes the condition for launching work, reducing the accumulation of partially completed orders. Constraints are identified earlier, allowing teams to act before they disrupt execution.

Material, capacity, and priorities remain aligned during execution. Decisions are based on current conditions, not outdated plans, which limits the need for constant re-prioritization. Planning, supply chain, and production operate from the same view of constraints, reducing coordination overhead.

Flow stabilizes. Work progresses through operations without repeated stoppages caused by late shortages or conflicting priorities. Turnaround times become more predictable, and delivery commitments are maintained with greater consistency.

Teams shift away from manual coordination and data reconciliation. Time is redirected toward resolving constraints and advancing work. Cross-functional collaboration becomes structured rather than reactive, with shared ownership of execution outcomes.

This stability changes how performance is generated. Throughput increases because capacity is used continuously, not because capacity is expanded. Backlog is reduced as work completes at a steady rate, and work in progress declines as fewer orders remain blocked in the system.

Under capital constraints, this becomes the primary lever for improvement. Performance depends on the ability to maintain flow and protect delivery commitments using the assets already in place.

Strategic *Imperatives*

Sustaining throughput without additional capacity requires a shift in how execution is managed. The following imperatives define the conditions under which operations can maintain flow under constraint.

Detect constraints before they stop flow

Material shortages, supplier delays, and capacity conflicts must be identified before work is launched or disrupted. Late discovery leads to stalled work and re-prioritization. Early detection allows corrective actions to be taken while flow is still intact.

Align decisions across functions in real time

Planning, supply chain, and production cannot operate on separate timelines or information. Execution depends on a shared view of constraints and coordinated decision-making. Without this alignment, priorities shift during execution and instability persists.

Integrate suppliers into execution

Material availability is not controlled internally. It depends on continuous coordination with suppliers, including anticipation of shortages and structured follow-up on critical parts. Supplier-related risks must be managed as part of execution, not treated as external events.

Shift effort from coordination to execution

A significant portion of operational time is often spent reconciling data, updating spreadsheets, and aligning across functions. Sustained performance requires reducing this overhead so teams can focus on resolving constraints and advancing work.

Stabilize execution under variability

Demand fluctuations, changing customer requirements, and supply disruptions are structural conditions. Execution models must absorb this variability without constant re-planning. Stability comes from maintaining alignment as conditions change, not from improving forecast accuracy alone.

Combining Technology **and Execution Discipline**

Closing the execution gap requires both a structural execution layer and the operating discipline to act on it. Neither is sufficient on its own.

Manufacturing orchestration provides the foundation for alignment. It establishes a shared, real-time view of material, work in progress, and constraints, allowing decisions to be based on current conditions rather than delayed or fragmented information.

On its own, visibility does not change execution. Impact depends on how decisions are made, coordinated, and sustained across functions.

This requires clear governance, cross-functional alignment, and consistent execution practices. Planning, supply chain, and production must operate from the same priorities, with defined decision-making processes and escalation paths to resolve constraints early.

Supplier coordination is part of this model. Material availability depends on structured follow-up, anticipation of shortages, and integration of suppliers into execution processes.

In practice, combining an execution layer with disciplined operating models allows organizations to act on constraints as they emerge, rather than reacting after flow has been disrupted.

Pelico provides the orchestration layer that enables real-time alignment of material, capacity, and priorities. EFESO supports the design and implementation of the operating model required to sustain this alignment in daily operations.

Together, they enable organizations to maintain flow, protect delivery commitments, and increase throughput without relying on additional capacity.

Execution as *Industrial Discipline*

Ramp-up is no longer constrained by access to capacity alone. It is constrained by the ability to execute under conditions of variability, supply chain fragility, and cross-functional complexity.

Planning systems remain necessary, but they do not ensure that work can proceed as intended. As conditions change, performance depends on how effectively material, capacity, and priorities are aligned in real time.

This shifts the focus from planning accuracy to execution discipline.

Throughput is not determined by how much capacity is installed, but by how consistently that capacity can be used. When execution is fragmented, additional assets are exposed to the same constraints, and performance does not improve.

Organizations that sustain higher output without additional investment do so by maintaining control of flow. They detect constraints early, align decisions across functions, and resolve issues before they disrupt execution.

Manufacturing orchestration provides the execution layer required to support this model. Combined with structured governance and cross-functional alignment, it enables organizations to operate with greater stability under variable conditions.

In aerospace and defense, this is becoming a defining capability. Industrial performance depends on the ability to execute reliably, protect delivery commitments, and sustain throughput without relying on continuous capacity expansion.

Contact our Experts

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Hamza is Chief Customer Officer at Pelico, leading customer operations and heading the company's aerospace, defense, and MRO accounts. He spent his career in aerospace operations, holding supply chain, operations excellence, and P&L roles across European sites at UTC Aerospace Systems and Collins Aerospace.

Louis Catala

Louis is partner and head of Aerospace & Defense Europe at EFESO. With more than 20 years of experience, he is a results- and impact-driven operations and digital executive known for successfully driving transformation programs from strategy through to execution.

Pelico is the manufacturing orchestration platform for real-time execution across complex production environments. We help leading OEMs, MRO providers, and Tier 1 suppliers navigate volatile supply chain dynamics by surfacing issues, coordinating execution across functions, and keeping delivery performance on track.

www.pelico.ai

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