INSTITUTE FOR AMERICAN MANUFACTURING & TECHNOLOGY

SIOP for Aerospace and Defense

Industrial Readiness in an Era of Strategic Competition

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From Forecasting to Readiness: Reframing SIOP for the Defense Industrial Base

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Executive Summary

The United States faces a widening gap between its stated defense commitments and the industrial capacity required to fulfill them. Decades of consolidation, offshoring, and procurement practices optimized for peacetime efficiency have left the defense industrial base structurally unprepared for the demands of sustained great power competition. The consequences of this gap are no longer hypothetical. When the Ukraine conflict demanded rapid ammunition scale-up in 2022, the United States was producing approximately fourteen thousand 155mm artillery rounds per month—barely sufficient for peacetime training. Nearly three years and billions of dollars later, production has reached only forty thousand rounds per month, still short of the hundred thousand round target. When the Army ordered seventeen hundred Stinger missiles in May 2022—the first order in two decades—Raytheon estimated thirty months to restart a production line that had been dormant since 2002, requiring the recall of retired engineers in their seventies to train new workers on Cold War–era manufacturing processes. These are not isolated anecdotes. They are symptoms of an industrial base that has lost the capacity to plan for, prepare for, and execute production at the scale and speed that strategic competition demands.

This white paper argues that a core element of the solution lies in an area that has received insufficient attention from both policy makers and defense industrialists: the discipline of Sales, Inventory, and Operations Planning, known as SIOP. In commercial industry, SIOP serves as the primary mechanism for aligning demand forecasts with production capacity, supply chain constraints, and financial objectives. It is the process through which organizations translate market signals into executable production plans. Yet in its conventional commercial form, SIOP is inadequate for the structural realities of aerospace and defense manufacturing.

Defense production does not operate on the assumptions that underpin commercial SIOP. Demand is not driven by market signals but by appropriations cycles, geopolitical contingency, and multi-year contract vehicles. Production volumes are low, complexity is high, and the supply base is fragmented, opaque, and in many cases dangerously consolidated. Surge capacity—the ability to rapidly increase output in response to strategic need—has been allowed to atrophy. Information sharing across the industrial base is constrained by classification, contractual silos, and institutional distrust.

The Institute for American Manufacturing and Technology proposes a Defense Oriented SIOP Framework—a readiness-first industrial planning doctrine for aerospace and defense manufacturing—that reframes SIOP from a forecasting and reconciliation exercise into an industrial readiness planning function. This framework is built around five integrated pillars: Demand Signals and Strategic Scenarios, Industrial Capacity Mapping, Constraint Identification and Stress Testing, Surge Readiness Planning, and

Policy Feedback Loops. Together, these pillars provide a structured methodology for assessing, planning, and maintaining the manufacturing readiness of the defense industrial base as a strategic national asset.

This paper maps the structural failure modes that make current planning approaches insufficient, presents the IAMT framework in detail, and offers concrete recommendations for industry, government, and policy institutions. The central argument is straightforward: in an era of strategic competition, industrial planning is not a back-office function. It is a matter of national security.

I. Strategic Context: Why SIOP Now Matters for National Readiness

The strategic environment facing the United States has undergone a fundamental shift. The post-Cold War era of uncontested American military superiority, which permitted the nation to optimize its defense industrial base for efficiency and cost reduction, has given way to sustained great power competition with peer and near-peer adversaries. The 2022 National Defense Strategy made this explicit, identifying the People's Republic of China as the pacing challenge and Russia as an acute threat, while acknowledging that the industrial underpinnings of American military power require urgent attention.

This shift matters for manufacturing in concrete, operational terms. The conflict in Ukraine has served as a real-time stress test of Western industrial capacity, revealing that the United States and its allies lack the production throughput to sustain high-intensity conventional warfare over extended timelines. Demand for 155mm artillery shells, Javelin and Stinger missiles, and a range of other munitions rapidly exceeded existing production capacity and exposed multi-year timelines for capacity expansion. These are not theoretical concerns. They are measured gaps between strategic requirements and industrial output.

The aerospace and defense sector operates under a set of structural conditions that distinguish it from any other segment of the American industrial economy. Production cycles are measured in years, not weeks. Capital investments require long lead times and are heavily dependent on government contracting decisions that are themselves subject to political uncertainty. The supplier base has consolidated dramatically, with single or sole source suppliers occupying critical nodes across major weapons programs. The workforce that possesses the specialized skills required for defense manufacturing is aging, and pipeline development has not kept pace with attrition.

Against this backdrop, the planning mechanisms that govern how defense production is organized, sequenced, and aligned with demand have taken on new significance. Sales, Inventory, and Operations Planning—SIOP—is the discipline through which manufacturing organizations reconcile what they need to produce with what they are capable of producing. In commercial industry, SIOP is a mature, well-understood process. In the defense context, it is often either absent, rudimentary, or applied using commercial templates that do not account for the structural realities of the defense industrial base.

This paper contends that the absence of a coherent, defense-adapted SIOP framework represents a significant and underappreciated vulnerability in America's national security posture. Planning failures at the industrial level translate directly into readiness risk at the operational level. When the nation cannot produce what its strategy demands, at the volume and speed required, the strategy itself is hollow. SIOP, properly conceived and adapted for the defense context, is the mechanism through which this gap can be identified, measured, and addressed.

II. Limits of Commercial SIOP in the Aerospace and Defense Context

Sales, Inventory, and Operations Planning originated in commercial manufacturing as a cross-functional process for aligning demand forecasts with production schedules, inventory levels, and financial targets. In its mature form, SIOP provides a disciplined cadence through which sales and marketing inputs are reconciled with operations and supply chain capacity, producing an integrated plan that senior leadership can use for resource allocation and strategic decision-making. The process assumes certain structural conditions: that demand signals originate from market activity and customer behavior, that production can be scaled in response to those signals within reasonably predictable timeframes, that supply chains are visible and responsive, and that financial performance can be measured against plan on a regular cycle.

These assumptions, while valid for commercial manufacturing, break down in fundamental ways when applied to the aerospace and defense sector.

Structural Mismatches

Long development and production cycles. Major defense platforms—combat aircraft, naval vessels, missile systems, space launch vehicles—have development timelines measured in decades and production runs that extend across multiple budget cycles. A commercial SIOP model that operates on monthly or quarterly cadences cannot account for the multi-year lead times inherent in defense production. The gap between a demand signal, such as a new program of record or a supplemental appropriation, and the industrial capacity to respond to that signal may be five to ten years or more.

Low volume, high complexity systems. Commercial SIOP frameworks are optimized for environments where production volumes provide statistical regularity and economies of scale. Defense manufacturing operates at the opposite end of this spectrum. Production runs for major weapons systems are measured in dozens or hundreds of units, not thousands or millions. Each unit involves extraordinary complexity, proprietary processes, and exacting quality requirements. This means that variance in any single component or process can cascade through the production schedule in ways that high-volume environments do not experience.

Classified programs and information silos. Effective SIOP requires information transparency across organizational functions and supply chain tiers. In defense manufacturing, large portions of relevant programmatic, technical, and operational data are classified or restricted under International Traffic in Arms Regulations and other controls. This creates structural barriers to the kind of cross-functional and cross-organizational information flow that SIOP depends on. Planning processes that cannot see across these boundaries are inherently incomplete.

Contract-driven demand volatility. In commercial markets, demand fluctuations are driven by consumer behavior, competitive dynamics, and macroeconomic conditions. In defense, demand is driven by government appropriations, contract awards, and political decisions that can shift dramatically based on factors outside the control of the producing enterprise. Continuing resolutions, sequestration, program cancellations, and supplemental appropriations create a demand environment that is uniquely volatile and uniquely difficult to forecast using standard SIOP methods.

Consequences of Misapplication

When commercial SIOP frameworks are applied to defense manufacturing without structural adaptation, the consequences are predictable and well documented. Production plans are built on demand assumptions that do not reflect the volatility and discontinuity of defense procurement. Inventory strategies are optimized for cost efficiency rather than readiness, leaving critical components and materials in short supply when surge requirements emerge. Sub-tier supplier health and capacity are invisible to the planning process because the information architectures of commercial SIOP do not extend to the depth of supply chain required in defense. And perhaps most critically, the planning process treats each individual firm as an independent entity, when in reality the defense industrial base functions as an interdependent system in which a failure at any node can propagate across multiple programs and platforms.

The result is a planning discipline that gives the appearance of rigor without delivering the substance of readiness. The defense industrial base requires a SIOP framework that is purpose-built for its structural realities—one that begins not with demand forecasting but with an honest assessment of industrial capacity, and not with financial reconciliation but with readiness as the organizing objective.

The Current State of SIOP in Defense Manufacturing

In practice, Sales, Inventory, and Operations Planning within much of the aerospace and defense sector does not resemble the systemic, readiness-oriented discipline this paper advocates. In many firms, SIOP functions primarily as a rate-alignment mechanism tied to funded backlog rather than as a forward-looking industrial risk assessment tool.

Demand inputs are typically derived from contracted production rates and near-term program forecasts. Long-lead procurement decisions are triggered by awarded contracts rather than by structured scenario analysis. Supply reviews focus predominantly on tier-one suppliers, with limited systematic visibility into sub-tier capacity, special process bottlenecks, or material constraints beyond immediate contractual obligations. Financial performance—cost absorption, margin protection, inventory control—remains the dominant metric of success.

This approach is rational within the incentive structures that govern defense manufacturing. Firms are accountable to shareholders, bound by contract structures, and constrained by regulatory cost treatment rules. They optimize against the demand signals and financial frameworks they are given. But the result is a planning process that is optimized for steady-state execution under funded conditions, not for industrial resilience under strategic stress.

In most cases, surge assumptions are not stress-tested against workforce qualification timelines, tooling availability, capital approval cycles, or multi-tier supplier constraints. Instead, surge is treated as an eventuality that can be managed reactively through expedited procurement, overtime labor, and supplier escalation. Recent experience has demonstrated that these assumptions are insufficient.

Recognizing the current state of defense SIOP is not an indictment of industry. It is an acknowledgment that existing processes were designed for efficiency and contractual alignment, not for sustained strategic competition. The Defense Oriented SIOP Framework proposed in this paper builds upon existing enterprise structures but reorients them toward readiness as the primary objective.

III. The Defense Industrial Base as a System of Systems

Public discourse about the defense industrial base tends to focus on the prime contractors—the large, publicly traded firms that serve as lead integrators on major weapons programs. This focus, while understandable, obscures the most important structural feature of the industrial base: it is a system of systems, in which the capacity to produce any given platform or munition depends on a deep, complex, and often fragile network of sub-tier suppliers, material producers, specialty manufacturers, and skilled workforce pools that extend far beyond the primes.

Mapping the Industrial Base Beyond Prime Contractors

The major prime contractors—Lockheed Martin, RTX, Northrop Grumman, Boeing, General Dynamics, and L3Harris, among others—serve as system integrators and final assemblers for the platforms that constitute American military capability. But the actual manufacturing content of these platforms is distributed across hundreds and in some cases thousands of suppliers operating at multiple tiers. The primes design, integrate, test, and deliver. The industrial base builds.

At the sub-tier level, the supply base includes specialty metal producers, precision machining shops, electronics and microelectronics manufacturers, energetics and propellant producers, composite fabricators, forging and casting houses, and a wide range of other firms whose products are essential to the final system. Many of these firms are small or mid-sized businesses. Many serve both defense and commercial customers, and their allocation of capacity between these markets is driven by commercial logic that may not align with defense readiness requirements.

Sub-Tier Fragility and Opacity

The fragility of the sub-tier supply base is one of the most consequential and least visible risks in the defense industrial base. Sub-tier suppliers often operate on thin margins, limited capital reserves, and uncertain demand from their defense customers. A supplier that loses a contract, faces a workforce shortage, or encounters a raw material disruption may exit the defense market entirely, leaving a gap that is difficult or impossible to fill on timelines relevant to production schedules.

Equally concerning is the opacity of sub-tier health. Prime contractors generally have visibility into their immediate, tier-one suppliers. Visibility below that level—into tier two, tier three, and beyond—is typically limited or absent. Government program offices have even less visibility. This means that critical vulnerabilities in the supply chain may not be identified until they manifest as production disruptions, at which point the options for remediation are constrained and costly.

Interdependencies and Cross-Program Risk

The defense industrial base is characterized by dense interdependencies. A single supplier may provide critical components to multiple weapons programs across multiple prime contractors. A sole-source producer of a specialty alloy, a particular class of semiconductor, or a specific energetic compound represents a shared vulnerability across every program that depends on that material. These interdependencies mean that a disruption at a single node can propagate across the industrial base in ways that are difficult to predict and difficult to mitigate without systemic visibility.

The Erosion of Surge Capacity

Surge capacity—the ability to rapidly increase production output in response to operational need—is a function of available production infrastructure, workforce, material supply, and the institutional knowledge required to operate production processes. Over the past three decades, each of these elements has been systematically reduced in the name of efficiency. Production lines that are not in active use are closed or repurposed. Workers with specialized skills retire or leave the defense sector. Tooling and fixturing are disposed of. Institutional knowledge of how to produce systems that are no longer in active production is lost.

The result is an industrial base that is optimized for steady-state peacetime production rates but lacks the capacity to surge in response to the demands of conflict. The assumption embedded in this optimization—that the nation will have sufficient warning time to reconstitute industrial capacity before it is needed—is no longer tenable in an era of potential rapid escalation.

Workforce Constraints

The skilled manufacturing workforce is the most difficult element of industrial capacity to reconstitute. Machinists, welders, composites technicians, electronics assemblers, and other skilled tradespeople require years of training and experience to reach proficiency. The defense manufacturing workforce is aging, and the pipeline of new entrants is insufficient to replace attrition, let alone support expansion. Workforce constraints are not a future risk; they are a present constraint on production capacity across the industrial base.

IV. Structural Failure Modes in U.S. Aerospace and Defense Manufacturing

The vulnerabilities described in the preceding section are not abstract. They manifest as specific, identifiable failure modes that recur across programs and across the industrial base. Understanding these failure modes is essential to designing a planning framework that can anticipate and mitigate them.

Single Point of Failure Suppliers and Geographic Concentration

A significant number of defense-critical materials, components, and processes are supplied by single or sole-source providers. In some cases, these providers are the only firms in the United States—or in the world—capable of producing a particular item. The loss or disruption of any such provider immediately affects every program that depends on its output. Geographic concentration compounds this risk. When multiple critical suppliers or production facilities are located in the same region, a natural disaster, infrastructure failure, or other localized disruption can simultaneously affect multiple supply chains.

Long Lead Components and Material Bottlenecks

Many defense systems depend on components and materials that have lead times of twelve months or more. Specialty metals, castings, forgings, and certain classes of electronics are among the most commonly cited long-lead items. When production plans change—whether due to increased demand, program restructuring, or supplemental funding—the production system cannot respond faster than the longest lead time in its supply chain. Material bottlenecks, particularly in areas such as titanium, rare earth elements, and specialty energetics, represent persistent constraints that are not amenable to short-term solutions.

Capacity Constraints Below Tier One

The most consequential capacity constraints in the defense industrial base frequently reside below the tier-one supplier level. Small and mid-sized firms that produce specialty components, perform critical processes such as heat treatment or plating, or supply raw materials in defense-specification grades often operate at or near capacity. Because these firms are not visible to centralized planning processes, their capacity limitations are discovered only when they become bottlenecks. By that point, the options for mitigation are limited.

Contracting and Funding Misalignment

The federal contracting and appropriations process is structured around annual budget cycles, multi-year procurement authorities, and contract vehicles that were designed for administrative efficiency rather than production continuity. The result is a persistent misalignment between how funds are authorized, appropriated, and obligated, and how production must be planned, sequenced, and executed. Continuing resolutions prevent new contract starts. Award timelines do not align with supplier lead times. Production rate assumptions embedded in budget projections may not reflect actual industrial capacity. These misalignments inject uncertainty into every level of the production planning process.

Data Fragmentation

Perhaps the most pervasive failure mode is the fragmentation of data across the industrial base. No single entity—neither the Department of Defense, nor any prime contractor, nor any industry association—possesses a comprehensive, current picture of the capacity, health, and constraints of the defense industrial base. Program data is siloed within program offices. Supplier data is siloed within prime contractors. Capacity and workforce data is held by individual firms that have neither the incentive nor the mechanism to share it in a manner that supports systemic planning. This data fragmentation is not a technical problem. It is a structural feature of how the industrial base is organized, governed, and incentivized.

V. The IAMT Defense Oriented SIOP Framework

The Institute for American Manufacturing and Technology proposes a comprehensive reframing of SIOP for the defense industrial base. This Defense Oriented SIOP Framework moves beyond the commercial model of forecast reconciliation and establishes industrial readiness as the organizing principle of the planning process. The framework is designed to be adopted by individual firms, implemented across supply chain tiers, and supported by government policy—not as a replacement for existing enterprise planning systems, but as a strategic overlay that addresses the structural gaps identified in the preceding sections.

Reframing the Objective: From Forecast Accuracy to Industrial Readiness

Commercial SIOP measures success primarily by the accuracy of demand forecasts and the alignment of production plans with financial targets. The IAMT Defense Oriented SIOP Framework redefines the primary objective: the purpose of planning is to ensure that the industrial base can produce what the national defense strategy requires, at the volume and speed required, across a range of plausible strategic scenarios. Readiness—not forecast accuracy—is the metric that matters.

Core Pillars of the Framework

The IAMT framework is structured around five integrated pillars, each of which addresses a specific dimension of the planning challenge.

Pillar 1: Demand Signals and Strategic Scenarios

In commercial SIOP, demand signals originate from sales pipelines, customer orders, and market forecasts. In the defense context, the relevant demand signals include programmatic requirements from the Department of Defense, allied procurement plans, potential contingency operations, and strategic scenarios that may require rapid production increases. This pillar establishes a structured process for translating these diverse demand signals into production planning inputs.

Rather than relying on a single demand forecast, the framework requires organizations to plan against multiple strategic scenarios—including peacetime steady state, elevated tension with increased procurement, and high-intensity conflict requiring maximum surge. Each scenario generates a distinct set of production requirements, and the planning process must assess the industrial base's ability to meet each.

Pillar 2: Industrial Capacity Mapping

The second pillar addresses the most fundamental gap in current planning: visibility into actual industrial capacity. This requires a systematic effort to map production capacity across the supply chain, extending beyond tier-one suppliers to the sub-tier firms that represent the true production constraints. Capacity mapping must include not only physical plant and equipment, but also workforce availability, material supply, tooling, and the institutional knowledge required to execute production processes.

The IAMT framework proposes that capacity mapping be conducted as a continuous, structured activity rather than a periodic exercise. Capacity data should be maintained as a living baseline that is updated as conditions change, enabling planning processes to work from current rather than historical information.

Pillar 3: Constraint Identification and Stress Testing

With demand scenarios and capacity maps established, the third pillar provides the analytical discipline for identifying where constraints exist and how they would manifest under stress. This involves systematic comparison of production requirements against available capacity at each tier of the supply chain, identification of single points of failure, assessment of material availability and lead times, and evaluation of workforce sufficiency.

Stress testing applies each demand scenario to the capacity baseline and identifies the points at which the industrial base would fail to deliver. These failure points—whether they involve a specific supplier, a particular material, a workforce skill set, or a piece of capital equipment—become the focus of mitigation planning. The value of this pillar lies in its ability to make hidden vulnerabilities visible before they manifest as production crises.

Pillar 4: Surge Readiness Planning

The fourth pillar directly addresses the erosion of surge capacity. Surge readiness planning requires organizations to develop, maintain, and periodically exercise plans for rapidly increasing production output. This includes identifying the specific actions required to activate dormant capacity, onboard additional workforce, secure additional material supply, and implement accelerated production schedules.

Critically, surge readiness planning must account for the time required to execute each of these actions. A surge plan that assumes instantaneous capacity expansion is not a plan; it is an aspiration. The IAMT framework requires that surge plans include realistic timelines for capacity activation and identify the investments—in warm production lines, workforce retention, material reserves, and tooling preservation—that must be made in advance to enable surge when it is needed.

Realistic surge planning must begin with time-based constraints that cannot be compressed through management intent alone. The qualification of a skilled aerospace machinist or welder may require twelve to twenty-four months of training and supervised production experience before independent certification. Special process facilities—such as heat treatment, plating, or composites curing operations—often require six to twelve months for certification or recertification under applicable standards. New casting or forging tooling cycles can extend nine to fourteen months from design to first article approval. Long-lead specialty materials may carry procurement timelines exceeding twelve months even under stable conditions.

These constraints are structural, not procedural. They are embedded in workforce development pipelines, certification regimes, capital investment cycles, and material supply chains. A surge plan that does not incorporate these timelines into its modeling is not a readiness plan; it is a rate increase aspiration disconnected from industrial reality.

Effective defense-oriented SIOP therefore requires explicit documentation of activation timelines for each critical constraint. Only by identifying how long it takes to expand capacity at each node can policymakers and industry leaders determine what must be funded and preserved in advance of crisis.

Pillar 5: Policy Feedback Loops

The fifth pillar connects the industrial planning process to the policy environment in which it operates. Many of the constraints identified through the planning process—contracting structures, funding mechanisms, regulatory barriers, classification policies—are not within the power of individual firms to resolve. They require policy action. The IAMT framework establishes a structured mechanism for communicating planning insights to government stakeholders in a form that can inform policy decisions.

This feedback loop operates in both directions. Policy decisions—new procurement authorities, funding commitments, regulatory changes—must be incorporated back into the planning process as they are made. The goal is to create a continuous cycle in which industrial planning informs policy and policy in turn enables more effective industrial planning.

How This Framework Differs from Traditional Enterprise SIOP

Dimension	Commercial SIOP	IAMT Defense Oriented SIOP
Primary Objective	Forecast accuracy and financial alignment	Industrial readiness across strategic scenarios
Demand Inputs	Market signals, customer orders, sales pipeline	Strategic scenarios, contingency requirements, allied demand
Supply Visibility	Tier-one suppliers, internal operations	Multi-tier mapping including sub-tier and raw materials
Planning Horizon	Monthly to quarterly cadence, annual outlook	Multi-year scenarios aligned with program and budget cycles
Risk Assessment	Financial variance, demand deviation	Constraint stress testing, single point of failure identification
Surge Consideration	Capacity utilization optimization	Explicit surge readiness planning and investment
Governance	Internal cross-functional alignment	Cross-organizational alignment including government stakeholders

Governance and Cadence

The IAMT Defense Oriented SIOP Framework operates on a cadence that reflects the realities of defense planning. A quarterly strategic review assesses the demand scenario landscape and updates assumptions. A semi-annual capacity and constraint review updates the industrial capacity baseline and refreshes stress test results. An annual surge readiness assessment evaluates the current state of surge plans and identifies required investments. Ad hoc reviews are triggered by significant events—new contract awards, geopolitical developments, supply chain disruptions—that materially alter planning assumptions.

Governance of the process must extend beyond the boundaries of any single firm. Effective defense-oriented SIOP requires structured engagement between prime contractors, sub-tier suppliers, and government program offices. The framework proposes the establishment of Industrial Readiness Councils at the program or portfolio level, bringing together stakeholders from across the supply chain to review planning outputs and coordinate mitigation actions.

VI. Operationalizing Defense Oriented SIOP Across the Industrial Base

A framework that cannot be implemented is an academic exercise. The value of the IAMT Defense Oriented SIOP Framework depends on its practical adoption by the firms, government agencies, and supporting institutions that constitute the defense industrial base. This section addresses the principal challenges and enablers of operationalization.

Information Sharing and Policy Constraints

The most significant barrier to defense-oriented SIOP is the fragmentation and restriction of information. Effective planning requires data that crosses organizational, contractual, and classification boundaries. Current policy and practice create structural barriers to this information flow. Firms are reluctant to share proprietary capacity and cost data with competitors or customers. Classification regimes restrict the dissemination of programmatic information. International Traffic in Arms Regulations and export control requirements add further constraints.

Overcoming these barriers does not require eliminating necessary protections. It requires creating mechanisms—trusted intermediaries, aggregated data structures, classified planning environments—that allow relevant planning information to flow to the entities that need it without compromising proprietary or national security interests. Several models for such mechanisms exist in other domains and can be adapted for industrial planning purposes.

Integrating Primes, Sub-Tier Suppliers, and Government

The IAMT framework requires integration across three principal stakeholder groups, each of which operates under different incentives, constraints, and planning horizons. Prime contractors must extend their planning visibility below the tier-one level and incorporate sub-tier capacity into their production planning. Sub-tier suppliers must be brought into the planning process as active participants rather than passive order-takers. Government program offices and acquisition authorities must align their contracting and funding actions with the production realities that the planning process reveals.

This integration will not happen organically. It requires deliberate structural enablement—contractual provisions that require supply chain visibility, government-funded tools that support capacity reporting, and policy frameworks that incentivize collaboration over opacity.

Digital Infrastructure and Data Visibility

The technical infrastructure for defense-oriented SIOP must support the collection, aggregation, and analysis of production data across organizational boundaries. This includes digital tools for capacity reporting, supply chain mapping, constraint modeling, and scenario analysis. Several initiatives across the

Department of Defense and industry are developing elements of this infrastructure, but they remain fragmented and lack a common architecture or data standard.

The IAMT framework recommends the development of a common data model for defense industrial capacity reporting—a standardized set of metrics and formats that enables capacity data from diverse sources to be aggregated and compared. This data model should be designed with both unclassified and classified variants to accommodate the full range of programs and suppliers.

Workforce Development Alignment

Production planning that does not account for workforce availability is incomplete. The IAMT framework integrates workforce development pipelines into the capacity planning process, treating the skilled manufacturing workforce as a strategic resource that must be planned for with the same rigor as capital equipment and material supply. This means incorporating workforce projections—including attrition, training pipeline throughput, and geographic mobility—into capacity assessments and surge readiness plans.

Practical Adoption Pathways

The framework is designed for phased adoption. Firms can begin by conducting internal capacity assessments against a defined set of demand scenarios and identifying their most significant constraints and single points of failure. This initial assessment requires no external data sharing and produces immediate planning value. Subsequent phases extend the process to include sub-tier supplier engagement, cross-organizational constraint analysis, and participation in Industrial Readiness Councils. Government adoption can proceed in parallel, beginning with pilot programs at the program or portfolio level and expanding as the value of the approach is demonstrated.

VII. Policy Implications for Government and Defense Stakeholders

The structural challenges facing the defense industrial base cannot be resolved by individual firms acting alone. Many of the most consequential constraints—contracting structures, funding mechanisms, classification policies, and the absence of systemic visibility—are artifacts of government policy and practice. Effective defense-oriented SIOP requires a policy environment that enables, incentivizes, and in some cases requires the planning behaviors the framework describes.

Why Industrial Planning Cannot Be Left Solely to Individual Firms

Individual defense firms plan for their own production requirements within the scope of their contracted programs. They do not, and cannot, plan for the industrial base as a system. No single firm has visibility into the full network of interdependencies, shared suppliers, and cross-program constraints that define the base's aggregate capacity. No single firm has the authority or incentive to make investments in surge capacity, workforce development, or sub-tier supplier resilience that benefit the base as a whole rather than its own competitive position. System-level planning requires system-level governance.

The Defense Oriented SIOP Framework therefore distinguishes between enterprise-level and system-level responsibilities. Enterprise-level responsibilities—internal capacity mapping, production scheduling, sub-tier supplier health monitoring, and workforce planning—are the obligation of individual firms and can be implemented within existing corporate planning structures. System-level responsibilities—cross-program demand aggregation, industrial base-wide constraint identification, surge capacity coordination, and policy feedback—require government coordination, because no individual firm can observe or manage these dynamics. The Department of War, through the Office of Industrial Base Policy and the proposed Industrial Readiness Councils, must serve as the integrating authority for system-level planning. Neither firms nor government can implement this framework alone; both must execute their respective responsibilities within a shared planning cadence.

Policy Levers

Standing Capacity Support

The current approach to defense industrial capacity treats it as a variable cost to be minimized in peacetime and surged in crisis. This approach systematically degrades the nation's ability to surge when needed. The alternative is to treat certain categories of industrial capacity—particularly in critical munitions, specialty materials, and low-density production capabilities—as standing national assets that are maintained regardless of current production demand. This requires dedicated funding mechanisms, such as expanded use of the Defense Production Act authorities, industrial base sustainment appropriations, and warm-line production agreements.

Financial Treatment of Readiness Capacity

A central obstacle to readiness-oriented industrial planning is financial treatment. Under prevailing accounting and contracting structures, unused capacity is typically treated as inefficiency. Idle plant capacity increases overhead absorption rates. Excess labor reduces margin. Under certain conditions, underutilized facilities may generate costs that are not fully recoverable under Federal Acquisition Regulation (FAR) guidelines. Fixed-price contract structures further discourage the maintenance of slack capacity that is not directly tied to funded production.

These financial realities create rational behavior. Firms minimize excess capacity because they are penalized for maintaining it. From a commercial perspective, this discipline is sound. From a national security perspective, it creates structural fragility.

If surge capacity is to be preserved as a strategic asset, its financial treatment must change. Readiness capacity—whether in the form of warm production lines, retained skilled labor, preserved tooling, or maintained supplier throughput—must be treated as an allowable and funded cost of national defense rather than as overhead inefficiency. Mechanisms such as Industrial Base Sustainment appropriations, expanded Defense Production Act authorities, advance procurement funding for long-lead items, and explicit readiness provisions within multi-year procurement contracts provide pathways for doing so.

Without alignment between financial treatment and readiness objectives, defense-oriented SIOP will remain aspirational. Firms cannot be expected to maintain capacity for contingencies that neither contracts nor cost structures recognize. Readiness must be priced, funded, and governed as deliberately as any other element of force structure.

Supplier Visibility Requirements

Government contracts currently provide limited visibility into the sub-tier supply chain. Expanding supplier visibility requirements—through contract provisions that require primes to report on sub-tier supplier health and capacity—would provide the data foundation needed for systemic planning. These requirements must be designed to minimize compliance burden while maximizing planning utility, and should be supported by government-provided tools and data infrastructure.

Incentives for Domestic Production Resilience

The economic incentives facing defense suppliers do not consistently reward resilience. Firms that invest in excess capacity, workforce retention, or supply chain diversification bear costs that their competitors who optimize solely for efficiency do not. Policy interventions—including preferential contracting for firms that demonstrate readiness capacity, tax incentives for domestic production investment, and cost-sharing arrangements for surge preparation—can realign incentives with national readiness objectives.

Contracting Reforms

The defense acquisition and contracting system was designed for a different strategic era. Multi-year procurement authorities, which provide the production stability that industrial planning requires, remain underutilized. Contract structures that penalize firms for maintaining excess capacity discourage readiness investment. The gap between appropriations timelines and production lead times creates persistent planning uncertainty. Targeted contracting reforms—including broader use of multi-year procurement, advance procurement funding for long-lead items, and contract structures that explicitly value readiness—would materially improve the effectiveness of defense-oriented SIOP.

The Role of Congress and the Department of Defense

Congress plays a decisive role in shaping the policy environment for industrial readiness through its appropriations, authorization, and oversight functions. Congressional support for standing capacity maintenance, sub-tier visibility mandates, and acquisition reform is essential to enabling the planning framework this paper describes. Within the Department of Defense, the Office of the Under Secretary of Defense for Acquisition and Sustainment, the service acquisition executives, and the Defense Logistics Agency all have roles to play in establishing the governance structures, data standards, and programmatic support required for defense-oriented SIOP.

Industrial readiness is not a problem that can be solved by any single office or authority. It requires coordinated action across the legislative and executive branches, in partnership with industry, informed by the kind of structured, data-driven planning that the IAMT framework provides.

VIII. Recommendations

For Industry

1. Institutionalize readiness-oriented SIOP as a strategic planning function distinct from and complementary to standard enterprise SIOP. Assign executive ownership and establish a regular cadence of scenario-based planning reviews.
2. Invest in sub-tier supplier visibility by extending capacity mapping below the tier-one level. Develop structured mechanisms for collecting and maintaining sub-tier capacity, health, and risk data as a continuous operational activity.
3. Develop and maintain surge capacity playbooks that define the specific actions, timelines, investments, and dependencies required to increase production output for each critical program. Exercise these playbooks periodically to identify gaps and validate assumptions.
4. Engage actively in cross-organizational planning forums, including Industrial Readiness Councils, to share constraint information, coordinate mitigation efforts, and align production plans across the supply chain.
5. Integrate workforce development projections into production planning, treating skilled workforce availability as a first-order capacity constraint with the same planning rigor applied to capital equipment and material supply.

For Government

1. Treat SIOP as an industrial readiness instrument by establishing requirements and incentives for defense-oriented planning at the program, portfolio, and enterprise levels across the defense industrial base.
2. Establish national-level capacity mapping as a standing function within the Department of Defense, supported by common data standards, classified and unclassified data environments, and integration with programmatic and acquisition planning.
3. Align funding mechanisms with production realities by expanding the use of multi-year procurement authorities, advance procurement for long-lead items, and industrial base sustainment appropriations that maintain critical capacity independent of current production demand.
4. Implement supplier visibility requirements in defense contracts, requiring prime contractors to report on sub-tier supplier health and capacity, supported by government-provided data infrastructure to minimize compliance burden.

5. Reform contracting structures to explicitly value readiness by incorporating readiness metrics into source selection criteria, eliminating contract provisions that penalize excess capacity, and developing cost-sharing mechanisms for surge preparation investments.

For Policy and Research Institutions

1. Continue independent mapping and analysis of industrial bottlenecks across the defense supply chain, with particular attention to sub-tier suppliers, sole-source dependencies, and critical material supply chains.
2. Support longitudinal analysis of defense manufacturing capacity, workforce trends, and surge readiness to provide the empirical foundation for evidence-based industrial policy.
3. Develop and publish open-source analytical tools and methodologies for capacity mapping, constraint analysis, and scenario-based stress testing that can be adopted by firms and government agencies across the industrial base.

Conclusion: From Planning Discipline to Strategic Asset

The argument of this paper is grounded in a straightforward premise: the United States cannot execute a strategy that its industrial base cannot support. When industrial capacity does not exist, strategy is aspirational rather than executable. The evidence is no longer hypothetical. Artillery production took three years and billions of dollars to triple—and still has not reached its target. Missile production lines required the recall of retired engineers to restart manufacturing processes that no active worker knew how to perform. Shipbuilding capacity cannot support the Navy's stated force structure requirements. These are not isolated procurement failures. They are symptoms of an industrial base that lacks the planning discipline to anticipate, prepare for, and execute production at strategic scale.

The IAMT Defense Oriented SIOP Framework provides that discipline. By reframing the objective from forecast accuracy to industrial readiness, extending visibility from prime contractors to the full depth of the supply chain, and connecting industrial planning to policy through structured feedback loops, the framework transforms SIOP from a reconciliation exercise into a strategic instrument. The framework is designed for phased adoption, implementable within existing institutional structures, and aligned with the real levers of authority that govern defense production.

Defense-oriented SIOP is not a back-office function. It is a strategic asset—one that the nation can no longer afford to neglect.

About the Institute for American Manufacturing and Technology

The Institute for American Manufacturing and Technology (IAMT) is a policy research organization dedicated to strengthening America's manufacturing capacity and technological competitiveness. Through independent analysis, strategic frameworks, and engagement with industry and government stakeholders, IAMT advances coherent industrial policy for manufacturing and national security. For more information, visit iamt.org.

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