NOTI HAIM
SYSTEM ENGINEERING AND PROJECT MANAGEMENT

Noti Haim

The Systems Engineer in Project ILS Activities

Architecting Long-Term Availability and Lifecycle Cost Reduction

The ILS Continuity Model

Integrated Logistics Support (ILS)

Design Phase

Embed safety, reliability, and Built-In Tests (BIT) directly into the product architecture.

Delivery Phase

Formulate maintenance policies, verify infrastructure readiness, and execute customer integration.

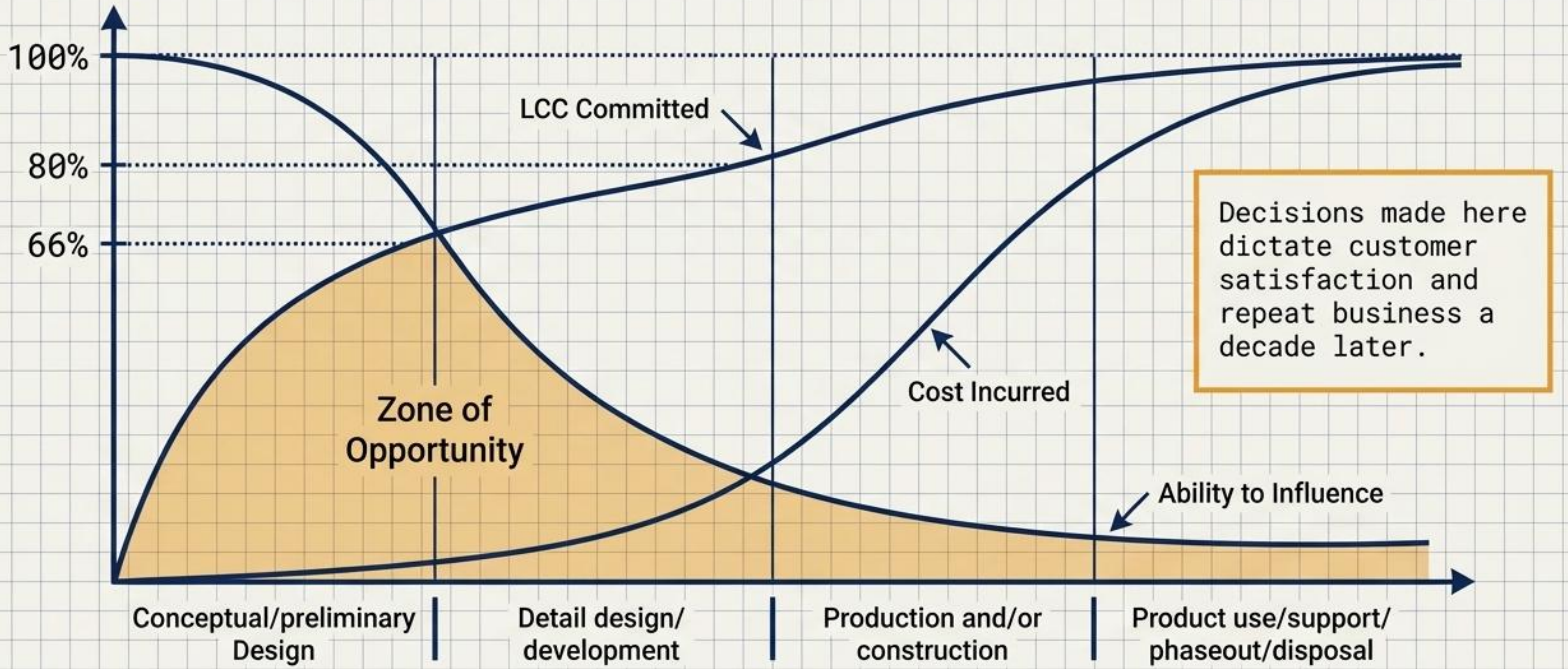
Sustainment Phase

Manage long-term spares, operational availability, and obsolescence over a 20+ year lifecycle.

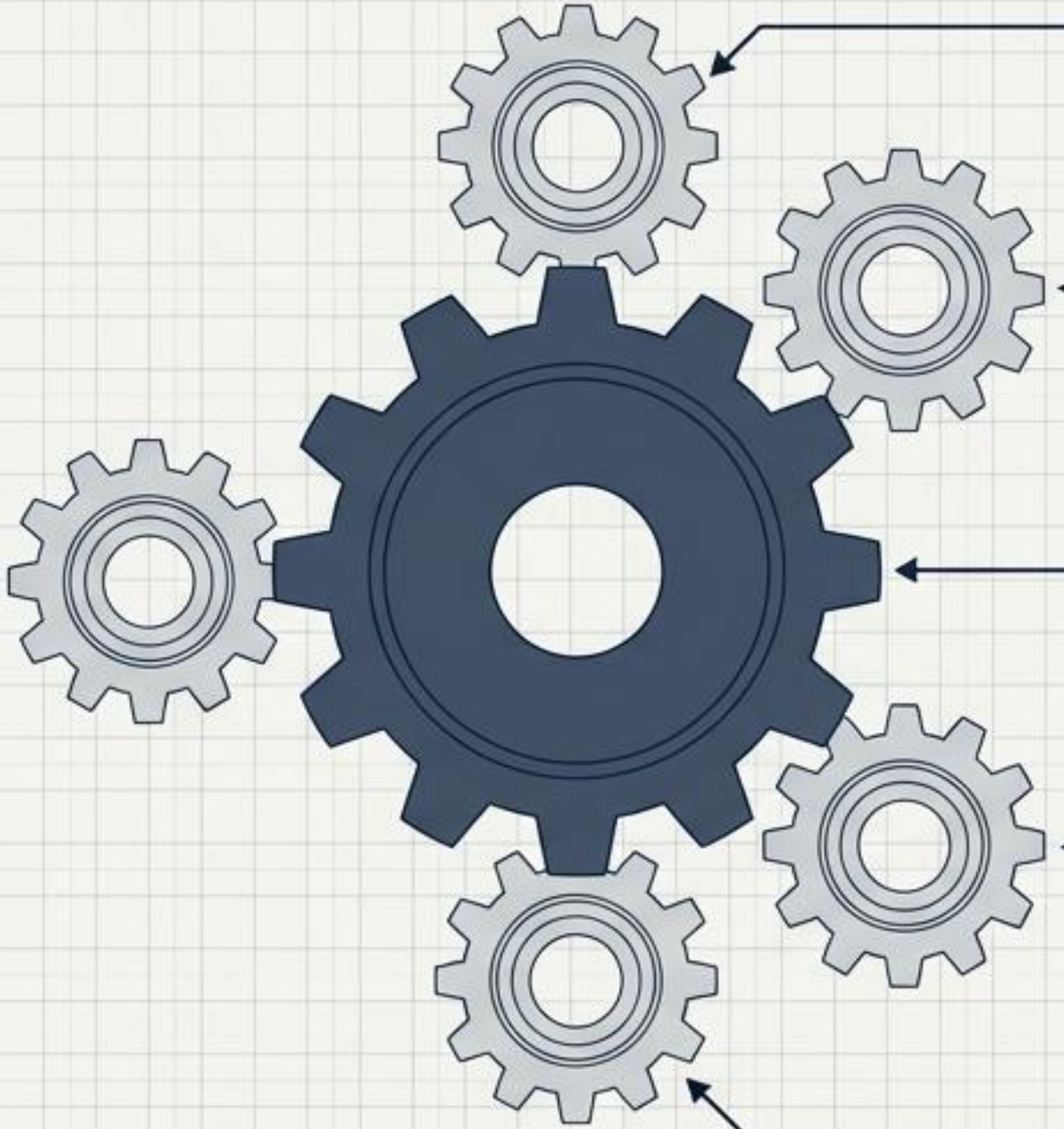
ILS is not a post-production afterthought; it is a core system requirement. The Systems Engineer bridges development, production, and field support to **maximize operational availability and secure repeat business.**

The Cost-Influence Paradox: Winning the Lifecycle Early

66% of Lifecycle Costs (LCC) are definitively locked in during the conceptual and preliminary design phases, long before those costs are actually incurred.



Integrated Engineering: The SE's Role



Product Design
Embedding physical maintainability.

Test Engineering
Developing BIT and specialized test equipment.

Systems Engineer (Technical Manager)
Orchestrates the integration of all technical disciplines to ensure long-term supportability and operational readiness.

Reliability Analysis
Defining environmental conditions and failure rates.

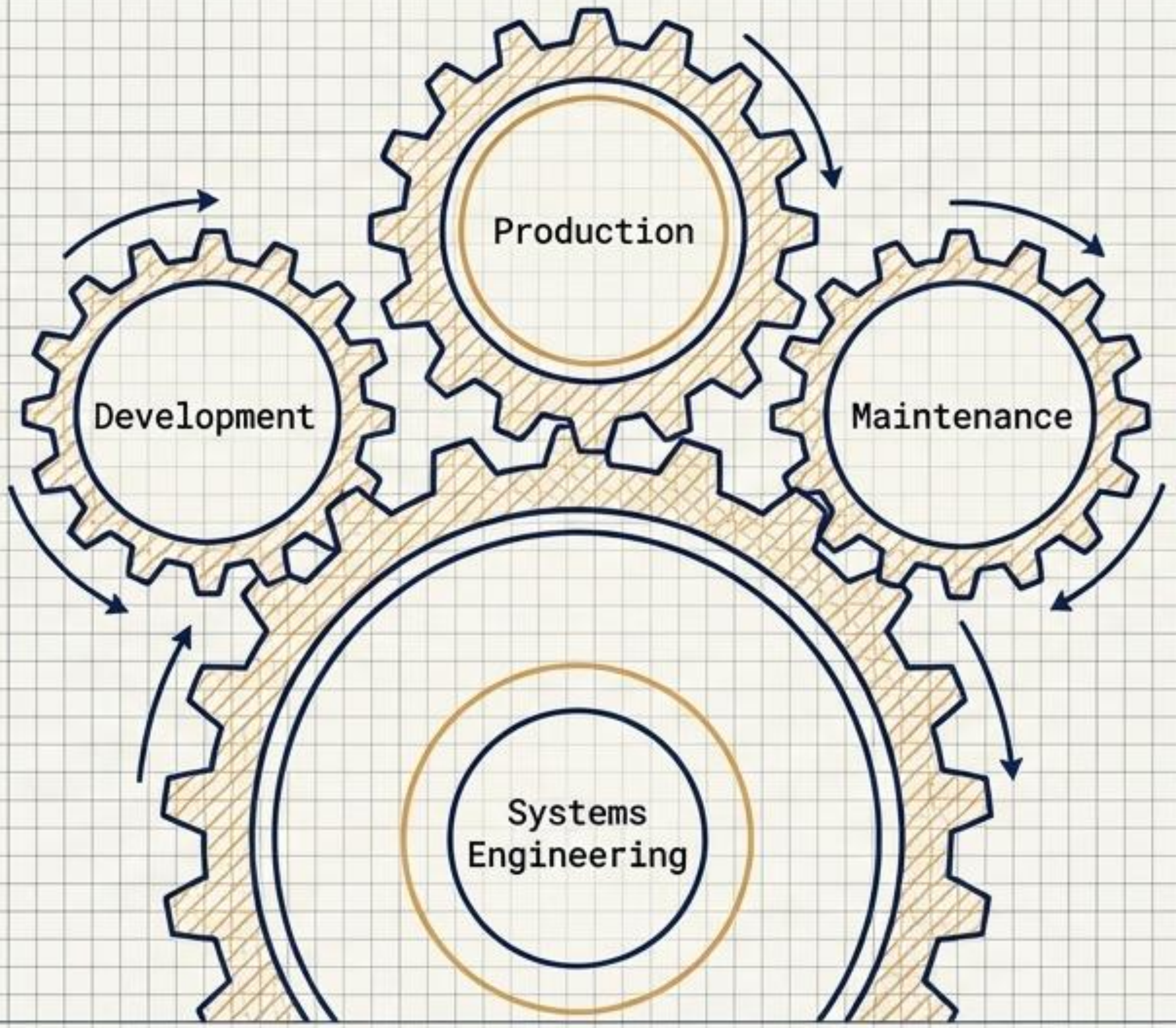
Maintenance Strategy
Formulating policy based on MTTR and availability targets.

Note on Integration

Integrated engineering ensures maintenance is orchestrated alongside production, preventing silos where manufacturing prioritizes output over long-term supportability.

Integrated Engineering: The Mechanical Dependency

Maintainability and manufacturability must be integrated into System Design Reviews from Day 1. Design for manufacturing is design for maintenance.



If one stops, they all stop. The production floor is the maintenance floor—integrate their requirements into the core system design.

Diagnostic Matrix: Maintenance Strategies

Reactive (Breakdown)	Preventive	Predictive (Condition-Based)
Trigger: Fix upon failure. **Attributes:** Low initial engineering cost. Extremely vulnerable to unpredicted downtime. Highly problematic for safety-critical systems.	**Trigger:** Time or usage-based replacement. **Attributes:** Guarantees high availability. Financially inefficient (forces the replacement of perfectly good parts). Strongly disliked by customers; must be minimized in design.	**Trigger:** Machine learning / System behavior forecasting. **Attributes:** The optimal balance. High availability with zero wasted parts. Requires extensive design-stage data integration.

Real-World Example Node

Example: If a FLIR system's cooling cycle takes longer than the established baseline, predictive algorithms flag an imminent failure before breakdown occurs.

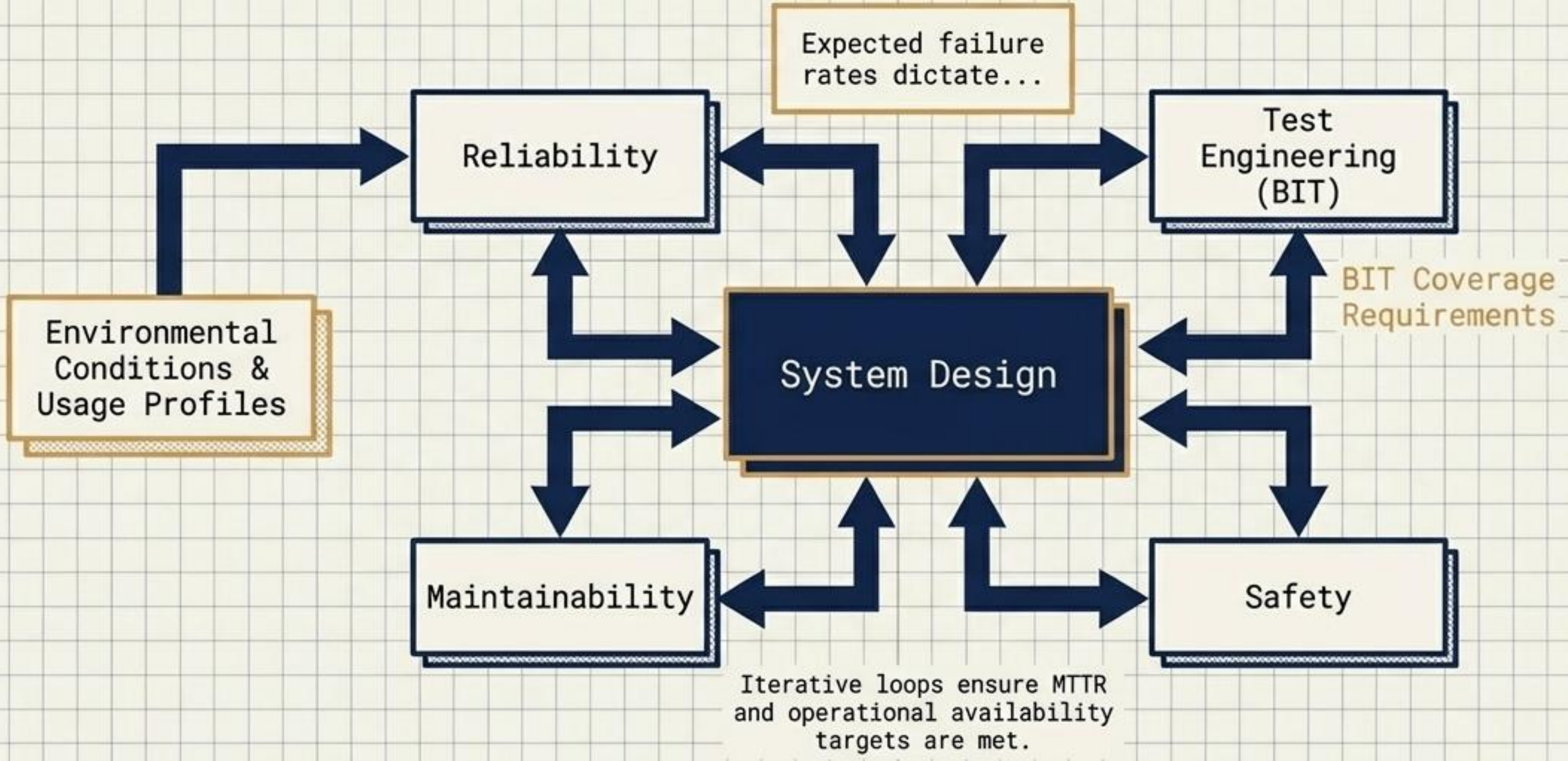
Diagnostic Matrix: Defining the Maintenance Strategy

Strategy	Cost to Implement	System Availability	Safety Risk
Reactive (Breakdown) Trigger: Fix when broken.	●	○	○
Preventive (Scheduled) Trigger: Time/usage-based. Strongly disliked by customers.	○	●	●
Predictive (Condition-Based) Trigger: Machine Learning/Behavioral (e.g., FLIR cooling times).	◕	●	●

The Gold Standard. Requires deep data infrastructure and extensive operational usage databases built during development.

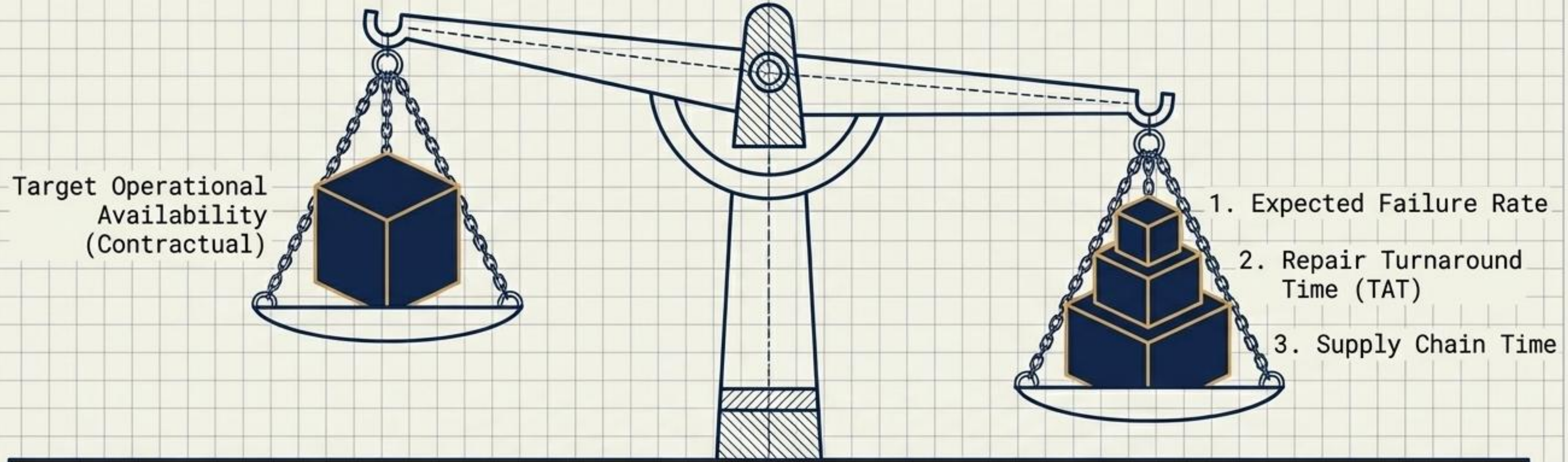
The Systems Engineer as Orchestrator

The SE serves as the technical hub, managing an iterative feedback loop between supporting analytical disciplines and the core product design.



Spares Optimization: The Availability Equation

Spares inventory is the physical buffer against low reliability. Engineering failure equates directly to company financial loss.



Low Reliability = Financial Penalty. Failure to meet intrinsic reliability metrics frequently triggers contractual obligations to provide additional customer spares at zero cost.

Logistics Optimization: Spares Calculation

Contractual Availability
The baseline availability requirement dictated by the client agreement.

Turnaround Time (TAT)
The repair duration driven by the chosen maintenance concept.

Expected Failure Rate
Statistical calculation derived from reliability data and operational profiles.

Supply Chain Lead Times
The delivery lag calculated for replacement components.

Optimal Spares Allocation
Achieving maximum contractual availability at the absolute lowest cost.

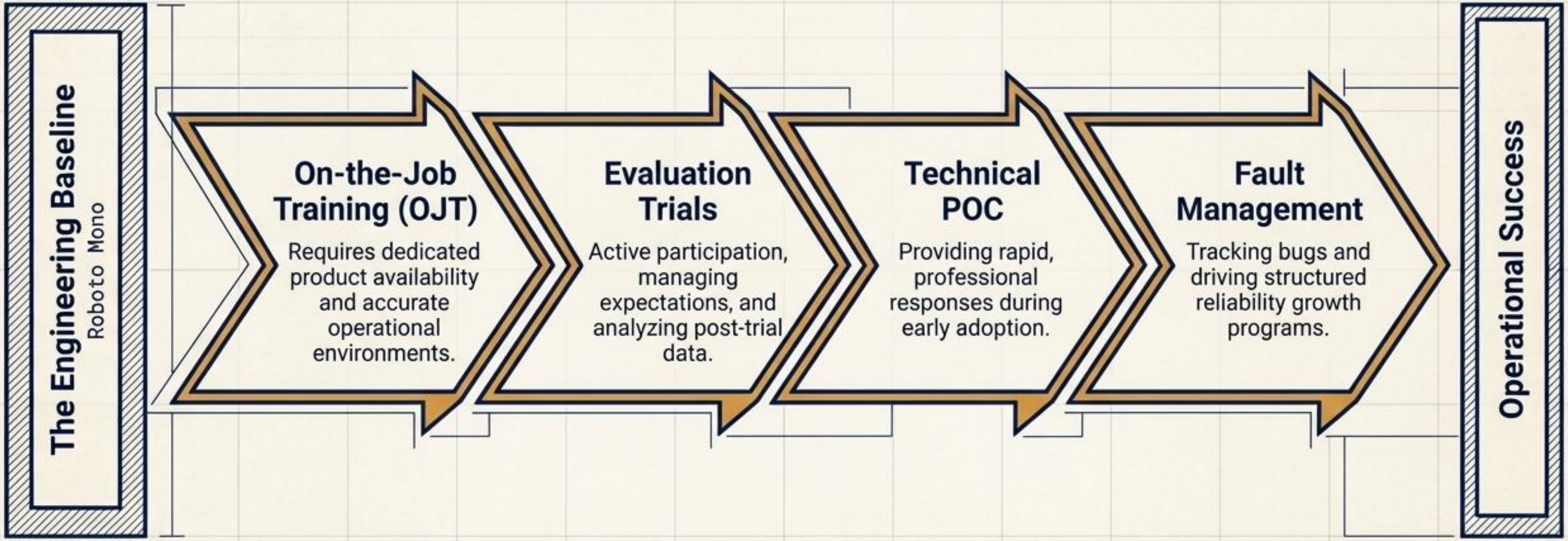
⚠ **Warning:** Poor reliability design directly penalizes the manufacturer. Failure to meet availability targets contractually forces the free provision of additional spare parts to the client.

Logistics Optimization: Infrastructure & Deployment

Infrastructure & Deployment Readiness
1. Facilities & Storage Defining precise structural requirements for system housing and secure spare parts storage.
2. Specialized Equipment Identifying heavy lifting tools, handling gear, and specific test benches required for local maintenance.
3. Personnel Parameters Mapping the manpower and prerequisite technical skills required at customer sites.

Strategic Goal: Utilize the customer's existing infrastructure wherever possible to reduce friction, or actively assist in constructing dedicated, bespoke operational environments.

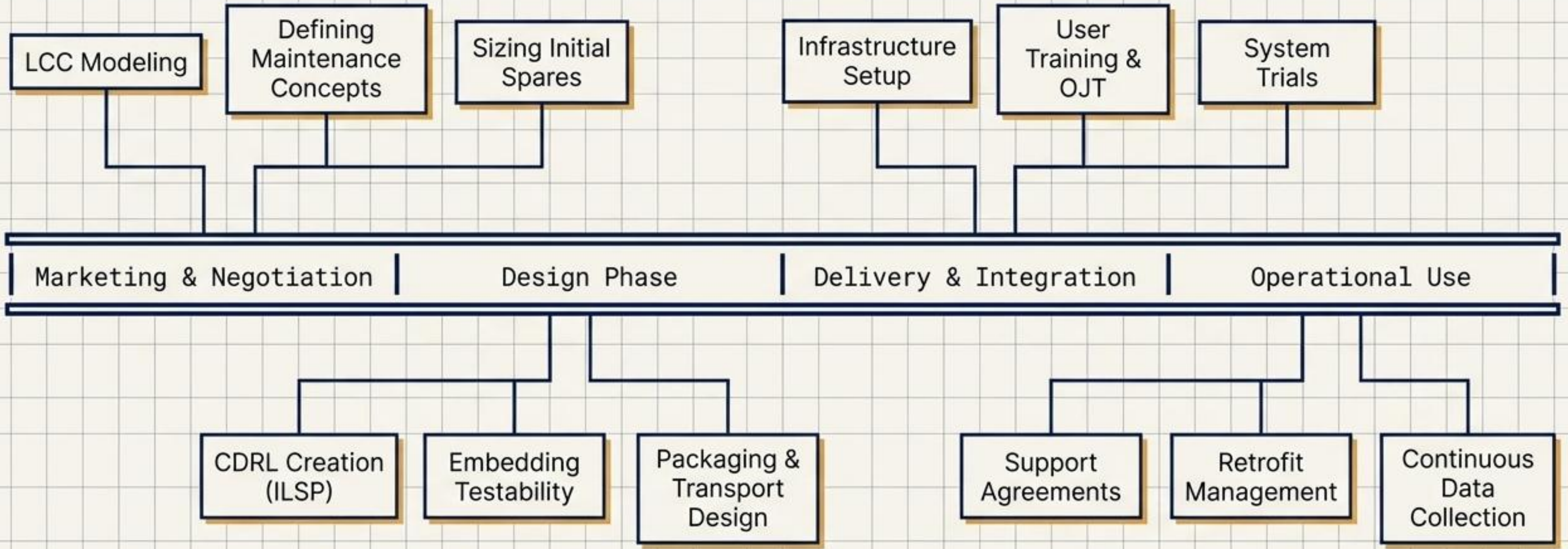
Implementation: Engineering the User Experience



Customer perception is reality. A flawlessly engineered product fails without orchestrated user implementation.

Lifecycle Mapping: From Negotiation to Disposal

ILS is a continuous companion, actively shaping requirements long before metal is cut and managing reality long after delivery.



The Lifecycle Application: Operational Use & Obsolescence

Continuous Feedback Loop to Engineering

Phase 2: The 20-Year Horizon

Delivery & Assimilation

Assisting with physical infrastructure setup, executing On-the-Job Training (OJT), and stabilizing the operational baseline.

Active Sustainment

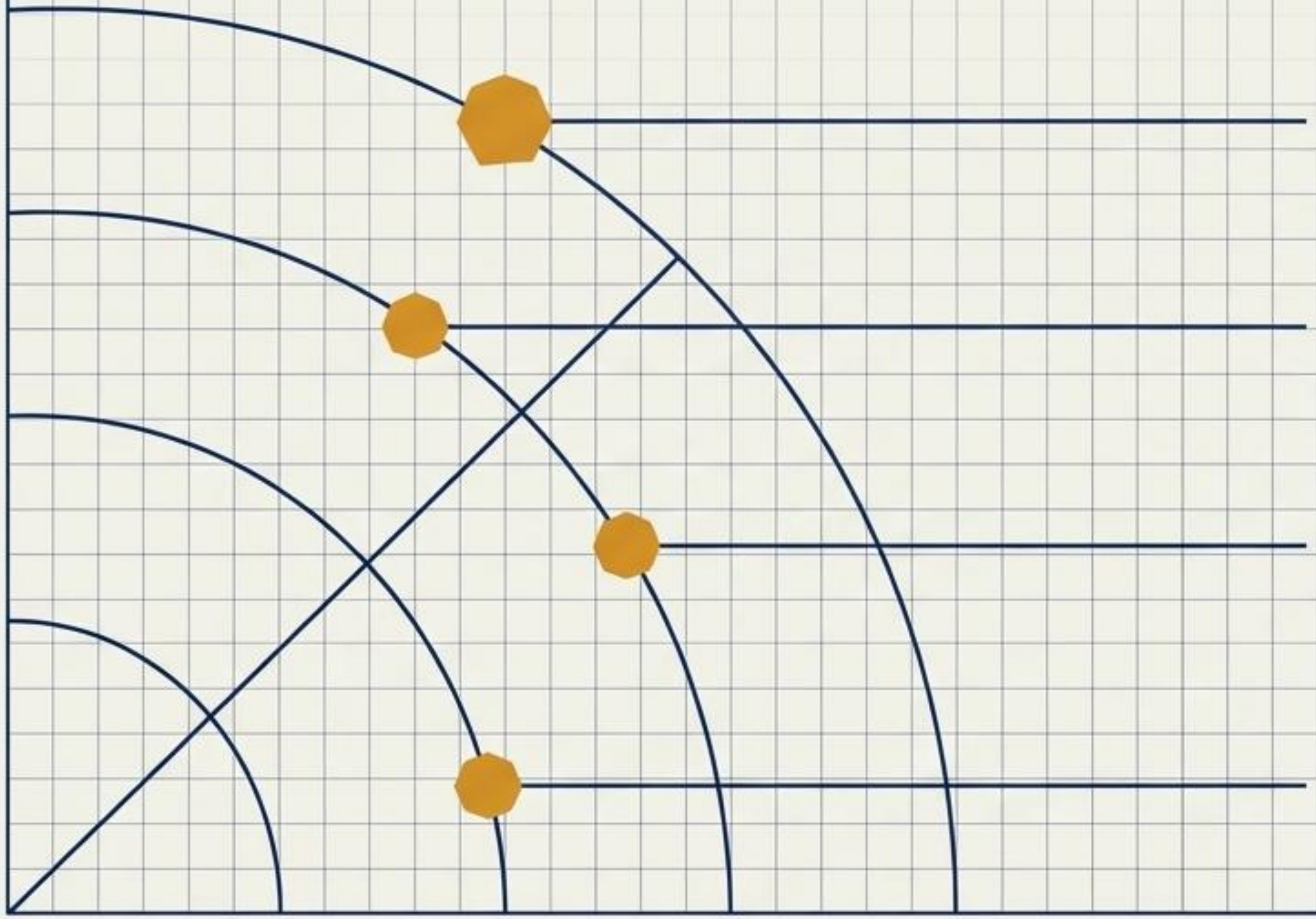
Managing strict Service Level Agreements (SLAs), executing the spares pipeline, and tracking continuous reliability data via bug management.

Obsolescence & Upgrades

Monitoring obsolete parts, ensuring backward compatibility, and initiating profitable retrofit programs built upon infrastructure prepared during the original design phase.

The 20-Year Horizon: Surviving Long-Tail Frictions

Designing a system is easy; keeping it alive and profitable for two decades in a dynamic business environment requires profound foresight.



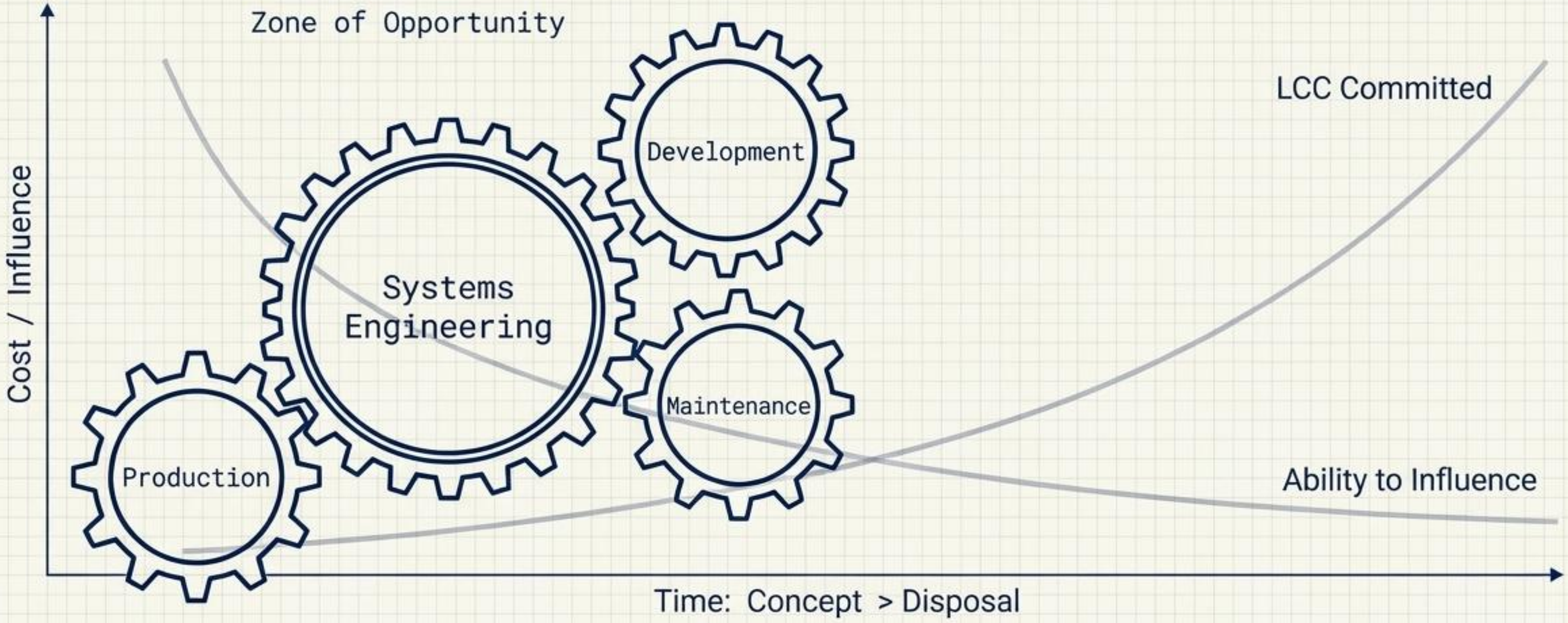
Obsolescence: Managing obsolete parts and backward compatibility for future upgrades.

Unfunded Expectations: Customers demanding immediate, rapid support without active maintenance contracts.

Manufacturing Friction: Production facilities naturally prioritizing lucrative new manufacturing over tedious legacy maintenance.

The 20-Year Commitment: Sustaining complex technology and preserving legacy knowledge over generational timelines.

Synthesis: Engineering the Repeat Customer



> ILS is inextricably woven into Systems Engineering from initial negotiation to final disposal. Flattening the lifecycle cost curve through integrated early design is the ultimate driver of long-term customer loyalty.