

**SEA** SUPPLIER EXCELLENCE ALLIANCE  
Accelerating Supply Chain Performance



**Technology Guide**





## Members

BAE Systems  
The Boeing Company  
Bodycote Thermal Processing  
Bombardier  
Cessna Aircraft Company  
Cristek Interconnects  
Dresser-Rand  
DRS Technologies  
Hamilton Sundstrand  
Hitco Carbon Composites  
Honeywell Aerospace  
Lockheed Martin Corporation  
Northrop Grumman Corporation  
Parker Aerospace  
Photo Etch Company  
Pratt & Whitney  
Roberts Tool Company  
Rockwell Collins  
Sikorsky  
Smiths Aerospace  
Textron  
United Technologies Corporation

## Supplier Advisory Council

Cristek Interconnects  
HITCO Carbon Composites  
Roberts Tool Company  
HiTEM  
Capo Industries  
Esterline Kirkhill Elastomers  
Orcon Corporation  
Crown Precision  
Capewell Components  
Photo Etch Company  
Perfekta  
Torotel Products

# The Supplier Excellence Alliance

## Accelerating supply chain performance

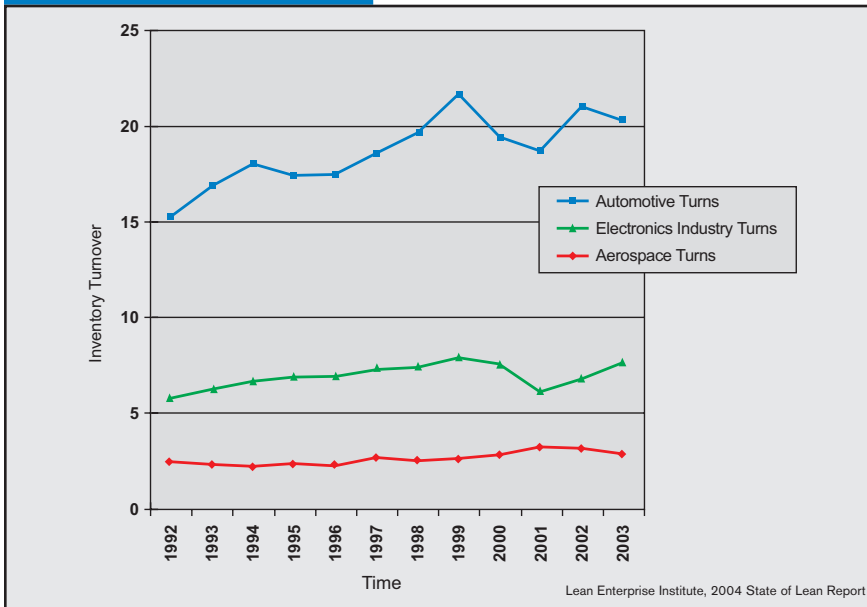
SEA is a non-profit alliance of aerospace and defense prime and tier-one contractors and leading sub-tier suppliers dedicated to transforming the aerospace and defense supply chain.

Prime-empowered and supplier-led, SEA helps develop a special breed of small and mid-sized production suppliers that perform at the highest levels and collaborate to produce integrated supply chain solutions. SEA suppliers are investing in building process management skills and mature processes. SEA suppliers are agile, adaptive, and aligned. These characteristics promote greater value for the end user – and result in improved bottom-line results and greatly expanded opportunities for new top-line business for suppliers.



# Transforming an Industry

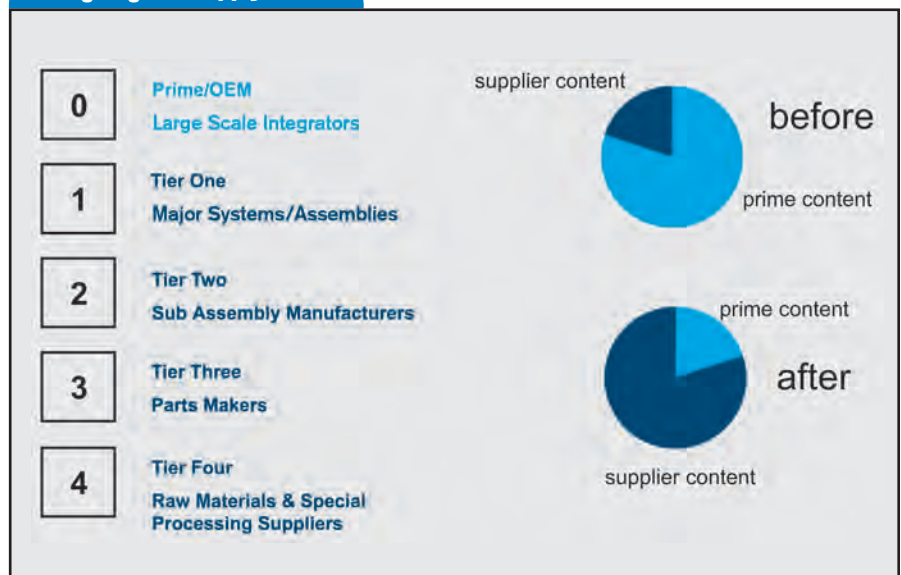
## Inventory Turns by Industry



Inventory turns has long been viewed as the indicator of how “lean” an industry has become. Our industry shows very little improvement over the last ten years. Although productivity has increased during the same period, we have failed to build a highly responsive, competitive U.S. supply chain.

Large primes/OEMs have articulated strategies to speed up production and outsource more of the production and design of new programs. This shortens development time and lowers the cost of production. To be effective, this strategy requires that suppliers at sub-tier 2-4 rapidly invest in the capability to increase performance and integrate operations. These integrated supply chains must achieve world class competitive performance to survive.

## Aligning the Supply Chain



# SEA Lean Enterprise System

The Lean Enterprise System (LES) combines operational, workforce, and leadership initiatives into a comprehensive approach that embodies lessons learned and best practices based on the experience gained by small and mid-size suppliers. The LES addresses the key practices for low-volume high-mix production.

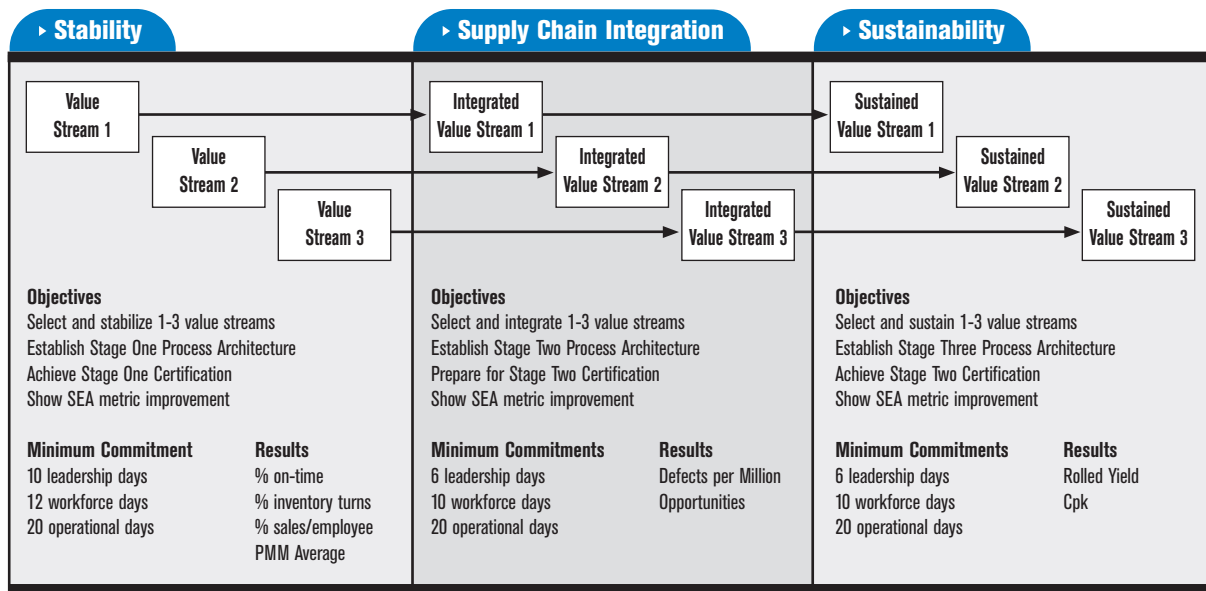
The LES also addresses the greatest problem encountered in building effective small and growing business enterprises - sustainability. Through a strong focus on process management and building an effective process management system within each company no matter how small, SEA aims to solve the underlying industry problem of low process maturity and low sustainability of critical supply chains.

Suppliers engaged in implementing the LES using the Roadmap are of primary interest to SEA. These suppliers are investing in their future and building a company to last, perform, and exceed customer expectations.

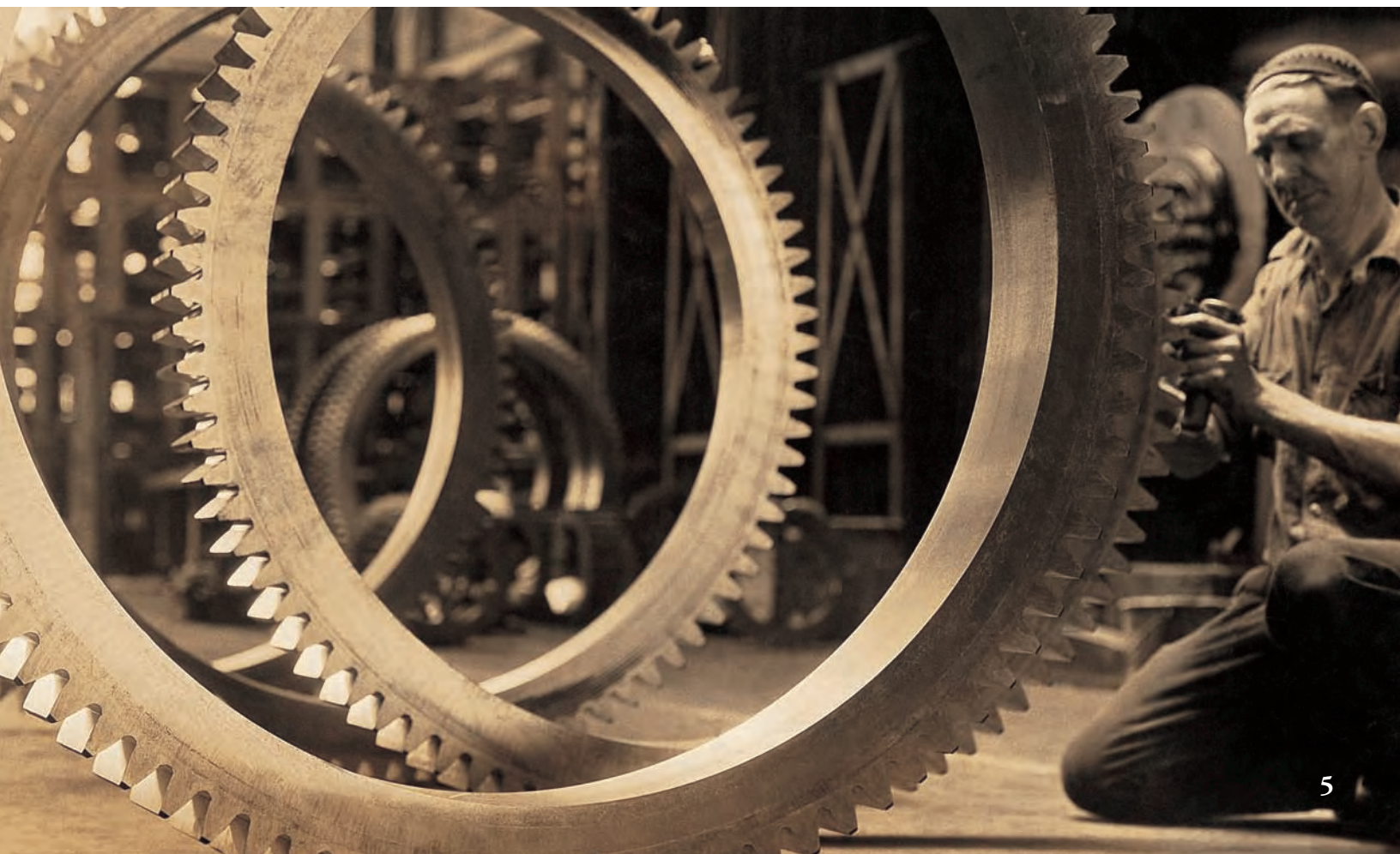
## The key elements of the Lean Enterprise System



# Conversion Model

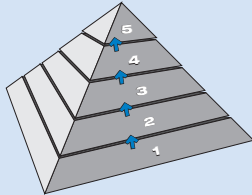


This Model guides suppliers through the three stages of the Conversion: Stability, Supply Chain Integration, and Sustainability. Suppliers may elect to use the services of a SEA Authorized Service Provider to accelerate the process, develop internal experts for organic implementation, or use a combination of both approaches. The Conversion process described above may take three to five years or more to implement. Each supplier retains control over its rate of investment, its method of implementation, and the speed of their journey.



# Roadmap to Process Maturity

How we implement the SEA Lean Enterprise System



## Process Maturity Levels

- 5 The process shows continuous positive trends and benchmarks world-class
- 4 The process is under process control, is analyzed, and improved using data
- 3 The process has certified trainers and is standardized
- 2 The process has been documented to the work instruction level
- 1 The process has been identified, defined, and has an owner

	▶ Stage 1	▶ Stage 2	▶ Stage 3
	Stabilization	Supply Chain Integration	Sustainability
Leadership & Culture	<ul style="list-style-type: none"> <li>▪ 1.1.1 Strategic Planning Process</li> <li>▪ 1.1.2 Leadership Communication Process</li> <li>▪ 1.1.3 Organizational Performance Review Process</li> <li>▪ 1.1.4 Continuous Improvement Management Process</li> <li>▪ 1.1.5 Workforce Development Integration Process</li> </ul>	<ul style="list-style-type: none"> <li>▪ 1.2.1 Goals Deployment &amp; Review Process</li> <li>▪ 1.2.2 Values Deployment Process</li> <li>▪ 1.2.3 Supply Chain Integration Process</li> </ul>	<ul style="list-style-type: none"> <li>▪ Organizational Learning Process</li> <li>▪ Organizational Assessment Process</li> </ul>
Workforce Development	<ul style="list-style-type: none"> <li>▪ 2.1.1 Job Skills &amp; Cross-Training Certification Process</li> </ul>	<ul style="list-style-type: none"> <li>▪ 2.2.1 Team Problem-Solving Process</li> <li>▪ 2.2.2 Corrective Action Process</li> <li>▪ 2.2.3 Continuous Improvement Process</li> </ul>	<ul style="list-style-type: none"> <li>▪ 2.3.1 Team Self-Management Process</li> <li>▪ 2.3.2 Statistical Control Process</li> </ul>
Operational Excellence	<ul style="list-style-type: none"> <li>▪ 3.1.1 Kaizen Process</li> <li>▪ 3.1.2 6S Visual Workplace Process</li> <li>▪ 3.1.3 Quick Changeover/SMED Process</li> <li>▪ 3.1.4 Material Management Process</li> <li>▪ 3.1.5 Production Planning Process</li> </ul>	<ul style="list-style-type: none"> <li>▪ 3.2.1 Flow-Based material Process</li> <li>▪ 3.2.2 Mixed Model Cell/Line Design Process</li> <li>▪ 3.2.3 Lean Suggestion Process</li> <li>▪ 3.2.4 Total Productive Maintenance Process</li> </ul>	<ul style="list-style-type: none"> <li>▪ 3.3.1 Design of Experiments Process</li> <li>▪ 3.3.2 Design to Cost Process</li> <li>▪ 3.3.3 Six Sigma Projects process</li> <li>▪ 3.3.4 Six Sigma Design Process</li> <li>▪ 3.3.5 Design for Manufacturability Process</li> </ul>
Business Results	<ul style="list-style-type: none"> <li>▪ 4.1.1 Inventory Turns</li> <li>▪ 4.1.2 Sales/Employee</li> <li>▪ 4.1.3 On-Time Delivery</li> <li>▪ 4.1.4 PMM Average</li> </ul>	<ul style="list-style-type: none"> <li>▪ 4.2.1 Defects Per Million Opportunities</li> </ul>	<ul style="list-style-type: none"> <li>▪ 4.3.1 Rolled Yield</li> <li>▪ 4.3.2 Cpk</li> </ul>
Exit Criteria	<ul style="list-style-type: none"> <li>▪ Master Plan</li> <li>▪ Strategic Goals and Champions</li> <li>▪ Trained Process Owners</li> <li>▪ Certified Master Trainers</li> <li>▪ Work Instructions</li> <li>▪ Training Guides</li> <li>▪ Training Plan</li> <li>▪ Balanced Scorecard</li> <li>▪ Stage One Processes at Level 3</li> </ul>	<ul style="list-style-type: none"> <li>▪ Master Plan</li> <li>▪ Department &amp; Individual Objectives</li> <li>▪ Recognition program</li> <li>▪ Cell Configurations</li> <li>▪ Mixed Model Lines</li> <li>▪ Workforce Certifications</li> <li>▪ Supplier Partnerships</li> <li>▪ Stage Two Processes at Level 3</li> </ul>	<ul style="list-style-type: none"> <li>▪ Master Plan</li> <li>▪ Organization Assessment Report</li> <li>▪ Organizational Learning Plan</li> <li>▪ Benchmark Study</li> <li>▪ Process Control Plans</li> <li>▪ Corrective Action System</li> <li>▪ Improvement Cycles</li> <li>▪ Stage Three Processes at Level 3</li> </ul>

## Stages of the Roadmap

Suppliers implementing the Roadmap will establish senior Champions for each of the three "tracks" and Process Owners for each of the eleven Stage One processes. They will achieve Level Three Process Maturity in order to pass the SEA Stage One Audit.

**Master Plan** - in the first few weeks of SEA engagement, the management team performs an assessment with the assistance of SEA consultants to determine the current performance level of most processes. From that assessment, a customized plan is created to address where to begin in the three-stage model for implementation.

**Exit Criteria** - This band describes the outputs produced from the work in each stage.

### Stage One - Stabilization

Suppliers operating in this range will need to focus on building a sustainable foundation for continuous improvement. When this stage is ignored, improvements are difficult to sustain.

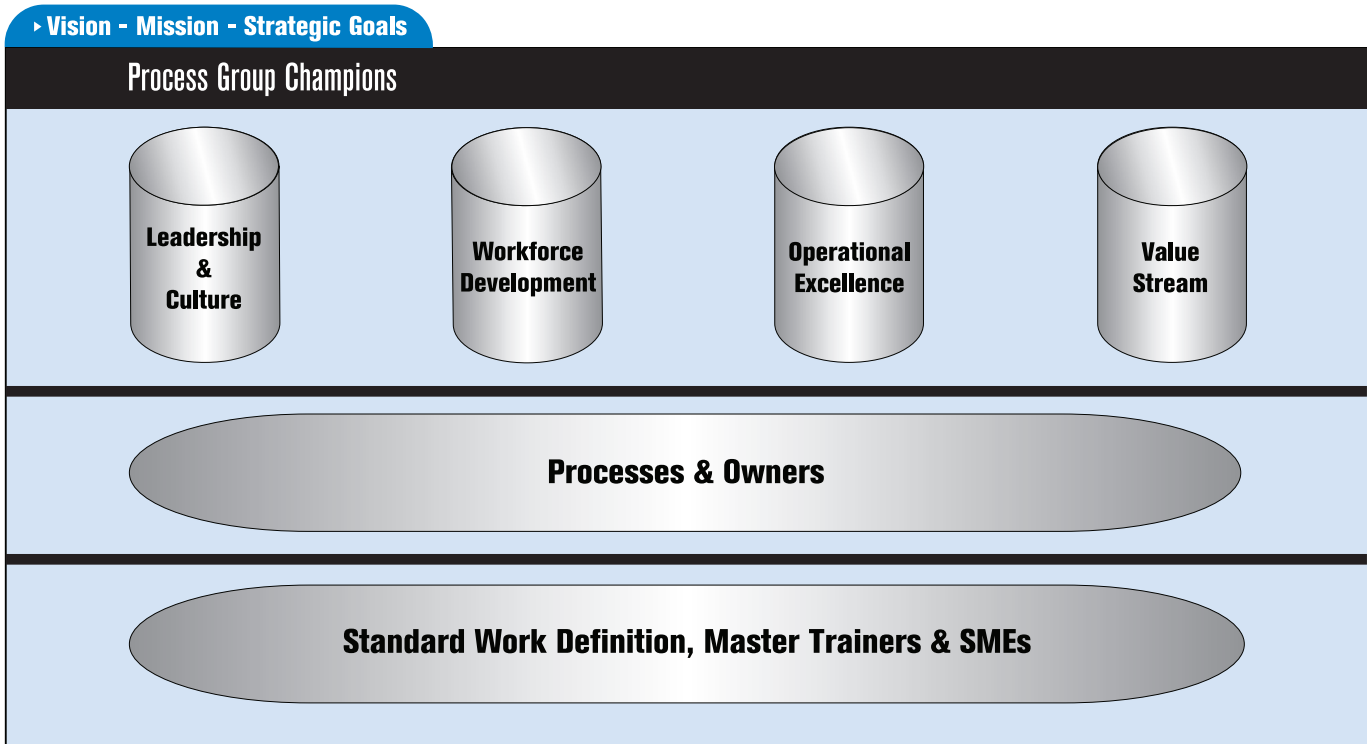
### Stage Two - Supply Chain Integration

In this stage, focus is placed on developing advanced supply chain alliances that reduce lead time and cost while improving quality.

### Stage Three - Sustainability

Suppliers operating in this range have very mature processes with high-value-added content and very little waste. This phase concentrates on establishing higher levels of process control, implementing Six Sigma where appropriate, and establishing review cycles to ensure continuous improvement.

# Process Architecture



## Champion Responsibilities

1. Lead the improvement efforts for one of the SEA "Tracks" or for an operational value stream.
2. Select the right metrics to measure improvement.
3. Provide support and resources for process owners; review progress.
4. Set the pace of improvement projects, i.e., one per month, two per month, etc.
5. Remove organizational barriers to improvement.
6. Create and implement a change management plan (i.e., reward, recognition, communication, involvement, planning).

## Process Owner Responsibilities

1. Define the process: value-stream map the process; ensure that everyone knows who owns the process and who should receive feedback.
2. Document the process: develop job aids and work instructions.
3. Standardize the process: train those who work in the process; audit adherence to the standard work instructions.
4. Establish a control plan; establish the use of statistical tools to manage and improve the process; establish corrective action triggers.
5. Establish benchmarks for world-class performance; coach team to report out progress.

## Master Trainer Responsibilities

1. Develop and maintain work instructions; job aids
2. Develop and maintain training materials
3. Provide training, cross-training and certification
4. Support kaizen events
5. Audits and performs quality checks



Accelerating Supply Chain Performance

## **Supplier Excellence Alliance**

2062 Business Center Drive  
Suite 225  
Irvine, CA 92612  
(949) 476-1144 ext. 339

[www.seaonline.org](http://www.seaonline.org)