

Aerospace Sustainable Manufacturing Workshop:

Breakout Discussion: Supply Chain Risk Management

The complexities of aerospace supply networks, along with the growing threats of diminishing resources and potential disruptions to sustainable manufacturing at product, process and system levels, present both an imperative and an opportunity for improved risk assessment, avoidance, mitigation and economic opportunities. There are multiple aspects of this challenge, including: 1) the management of risk and uncertainty in the production of parts and components, the management of processes, and the integration of components into products/systems, 2) the protection of critical supply of foundational raw materials from those anyone could intentionally disrupt and cause harm, 3) the protection of supplies and supply chains from the impact of natural calamities such as storms, floods, natural resource shortages, fire or from terroristic actions and plans, and 4) the economic opportunities that can be identified within supply chains that are operating sustainably such as materials management/material efficiencies/recycling/reuse.

The objective of this breakout discussion is to discuss and then address both strategic and tactical risks and opportunities relating to issues impacting the aerospace industry and its global and domestic supply chains. This discussion will be designed to provide specific recommendations on projects, models and activities that can be pursued to understand and manage the risks and opportunities involved in a wide range of aerospace products and parts/components that utilize critical materials such as rhenium, beryllium, or titanium. Importantly, the discussion will address life-cycle thinking and needed approaches to address and manage those risks and opportunities from life-cycle planning to end-of-life management.

At the workshop, the group will assess the needs for improvement in supply chain management, and will propose approaches and solutions to meet the needs. The solutions will be grouped and prioritized, and a list of potential projects that can be pursued will be developed to address the prioritized issues.

Brainstorming Notes

- * Aerospace supply chain issues are critical
- * Specialized/regulated materials: \$2M & 2 years to swap out materials
- * Difficult industry to manage materials, demand peaks & valleys
- * Risk of change
- * Need for tools to increase capability for supply chain risk analysis
- * Operational vs disruptions (unknown unknowns)
- * A weak link is **Demand Planning**
- * Custom manufacturing
- * Global Supply Chain Forum; literal interpretation of supply chain management
- * Managing relationships; 8 key business processes; IT support

- * Visibility in lower tiers makes it difficult to get a closed loop
- * SC impact huge to human health & environment protection
- * DLA- mapping
- * No one has a good handle on tier 3,4
- * What are the strategic & tactical options available?
- * Two drivers in aerospace – weight & rate
- * IT implications for SC security
- * Demand planning
 - capacity aspects
 - coordination of I/O, demand, supply, capacity information
- * Increased visibility
 - bring together disparate databases
 - do we know where our WIP is?
 - other aspect is Supply Network Mapping (finding blind spots in the SC)
- * SC resilience as a business imperative
- * Data analytics
 - get disparate systems to talk to one another, get value from data
 - improve business insights
- * Collaborative supply chain relationships
 - Perception, value suppliers most who come with solutions to problems before we become aware they are problems,
 - Right-sizing of relationships
- * Identify sustainability aspirations for aerospace
- * Condition-based monitoring
 - predict near term & long term materials needs
 - smart responsive manufacturing
- * How to get SMEs smarter and more collaboratively linked
 - create OEM/SME collaboration

- * Johnson Controls trying to drive energy efficiency down the supply chain; created a nonprofit, going out to help SME's identify opportunities to increase energy efficiency, E3 program –help SME's (can be a good model to follow)
- * E3 is a general protocol, but specialization for aerospace may lead to better results. Unique processes for unique industries.
- * Where is the aerospace industry going in the next 20 years? Who is thinking about this question? Identify trends.
- * Vision to make circular economy work for aerospace? Voluntary Sustainable materials management (encompassing all the resources).
 - o How do you operationalize metrics?

Issues Summary

Primary:

- *IT security in SC context
- *SC resilience & sustainability
 - mentoring & education perspective
 - Supplier support E3
- *Operational risk vs. disruption management
 - Data analytics in SC
- *Global materials management

Other:

- *SC network mapping
- *Collaborative SC relationships

Project Ideas

Project (A) Title

IT security in supply chain context

Project Objective

Develop a supply chain framework and protocol for data security in a collaborative environment for the aerospace industry.

The Need (Gap)

Facilitate collaborative protection of data upstream and downstream.

Project Deliverable(s)

Framework and protocol

Demonstration with industry test-bed

Project (B) Title

SC resilience & sustainability in the aerospace industry

Project Objective

Create a process that facilitates timely recovery from disruptions to the supply chain that impact the aerospace industry's ability to deliver products and services.

The Need (Gap)

There is presently no activity in the aerospace industry that addresses the opportunity for supply chain resilience and sustainability recognizing challenges facing the industry such as regulatory mandates and other business requirements.

Project Deliverables

Create a user-friendly management tool for aerospace companies that will help them address vulnerabilities and capabilities within their supply chain model.

Develop a mentoring and education program targeted at the aerospace industry supply chain that could emulate a targeted program like EPA's E3 program to improve the resiliency and sustainability.

Simulation demonstrations using industry test-beds

Project (C) Title

Global materials management

Project Objective

The Need (Gap)

The aerospace industry and its suppliers have materials being sent to solid waste or hazardous waste treatment facilities and landfills. These could be recovered, reused, or sold to reduce purchasing of materials or create a revenue stream.

Project Deliverable(s)

Create a pilot project in the aerospace industry to address materials management challenges and opportunities

Selected Project Title: Resilience and Sustainability in the Aerospace Supply Chain

Workflow:

Development of a secure interoperable framework; Information security framework – link to sustainability & resilience

- interoperable framework for data sharing across disparate systems on an as-needed basis for sustainable manufacturing performance management in the supply chain
- what data?
 - Product design
 - Environmental/sustainability (metrics)
 - Contractual
 - Social
 - Other
- AS9100 Standard

Identifying Risks

- Disruption Management (Unknown-unknowns)
 - Business continuity planning
 - Study recovery of Japanese automotive industry to tsunami/earthquake
- Operational Risk Management
 - Sole-source suppliers
 - Changing regulatory requirements
 - ex REACH/ROHS/WEEE

Investigate current capability

Identify adaptability opportunities in the aerospace supply chain

- Business continuity planning

- Voluntary and non-mandated regulatory responses
 - ex (compliance becomes a strategic advantage inside g)
- Material management activities/projects

Develop systems to quantify the total value of pursuit of opportunity for protection and recovery management

- Return to norm; minimize time to recovery
- Leverage opportunities; can be better for gaining business

Develop the capability to map the supply chain and assess risk and resilience readiness

Team Composition

- SMEs (have OEMs identify): mfg.com, NCDMM, TechSolve
- MRSI, DOE, Homeland Security, DoD, EPA EnergyStar,
- UK, tOSU

Next Steps

- 1) Outline
 - 2) Ask for people who want to be a part of the project
 - 3) White paper
 - 4) Broad Agency Announcement (BAA) search for funding vehicles
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