This presentation contains forward-looking statements. Actual results may differ materially from results anticipated in the forward-looking statements. These and additional risk factors are described from time to time in the Company’s filings with the Securities and Exchange Commission, including its Report on Form 10-K for the year ended December 31, 2012.
1. Overview of Aerospace Raw Materials Supply Chain

2. Review key factors that influenced the Aerospace Raw Material Supply Chain evolution over last couple decades

3. Present Evolutionary Model

4. Future Supply Chain Evolution
1. Overview Aerospace Supply Chain

Manufacturing Flow

Tier 4
Raw Material to Mill Products

Tier 3
Forging, Machining & Part Manufacturing

Tier 2
Sub-Assembly Manufacture & Minor Systems Integration

Tier 1
Major assembly and Systems Integration

OEM’s

Traditional Tier Levels are increasingly integrated today
Traditional Mill Products Overview

Mining/Refining
- Elements/Master Alloys

Raw Material
- Revert/Recycle

Melt/Remelt

Hot Working
- Conditioning/Finishing
  - NDT, Lab, Certification

Mill Products Forms
Supply Chain Early Characteristics

Consistent Fundamentals:
- Advanced Material Science Technology
- Advanced Equipment & Process Technology
- Significant Capital Investment
- Absolute Product Quality, Reliability & Compliance

Pre-1990’s to early 90’s general characteristics:
- Largely transactional business relationships (PO to Order)
- Domestic orientated, less exporting
- Minimal supply chain linkages

Pre to Early 90’s Supply Chain experienced:
- Significant swings and frequent lead-time fluctuations
- Unpredictable and Unreliable delivery performance
- Significant Demand and Supply Imbalances
Long-Term Airbus and Boeing Forecast*
(Actual 1990-2012, Forecast 2013-2035)
Supply Chain Bullwhip Effect

Bullwhip Effect Definition:
An extreme change in the supply position upstream... generated by a small change in demand downstream... Inventory can quickly move from being backordered to being excess. This is caused by the serial nature of communicating orders up the chain... The bullwhip effect can be eliminated by synchronizing the supply chain. Source: APICS Dictionary Online Edition
Capacity & Scheduling Management Impact

100%

7 Day Operation

Efficiency Loss

5 Day Operation

0%

Capacity Level Rate

Capacity Step Change
Basic Demand vs. Supply Balances

### Balanced
- **Demand**
  - Orders
  - Forecast
- **Supply**
  - Inventory
  - Capacity

### Strong Demand- Limited Supply
- **Demand**
  - Orders
  - Forecast
- **Supply**
  - Inventory
  - Capacity

### Low Demand- Excess Supply
- **Demand**
  - Orders
  - Forecast
- **Supply**
  - Inventory
  - Capacity

#### Supply Chain Impact
- ✓ Lead-times in-sync
- ✓ Delivery Reliable
- ✓ Commercial balance

- ➢ Long Lead-times
- ➢ Poor Delivery Results
- ➢ Commercial imbalance

- ➢ Short Lead-times
- ➢ Poor Delivery Results
- ➢ Commercial imbalance
Aerospace Product & Process Life Cycle

Emerging Markets driving an overall Industry Growth Stage
Evolution Model Aerospace Raw Materials Supply Chain

Supply Chain Development
- Horizontal and Vertical Integration

Past
- 1990: End of Cold War, World Wide Web
- 1995: 6-Sigma, Theory of Constraints
- 1995: Lean Initiatives
- 2000: S&OP Planning, ERP Systems
- 2000: Globalization, Y2K
- 2005: Procurement Strategies, Closed-Loop Recycling
- 2005: Capital Investments, LTA/Directed Buys
- 2010: New Process Technologies, Automotive Model
- 2010: New Platforms & Materials, Readiness Audits

Present

Aerospace Business Cycles (& other markets)
- Supply vs. Demand Balance

- 1990: End of Cold War
- 1995: World Wide Web
- 2000: Y2K
- 2005: 9-11, Rising Fuel Cost
- 2010: SARS
- 2010: Emerging Markets, Global Recession
- 2010: Green Technologies

Theory of Constraints ERP Systems LTA/Directed Buys
Evolution Impact to Improve Supply Chain Performance

Stage 1 (1990’s): Internal Focus
- Reduced lead-time fluctuations
- Improved delivery performance
- Limited impact to Demand vs. Supply balance

Stage 2 (2000’s to present): External focus
- Stable lead-times for partner customers
- Improved delivery performance
- Demand vs. Supply more balanced through supply chain

Supply Chain has Evolved to:
- Global network
- Linked Tier levels
- Innovative Material Technologies
- Innovative Process Technologies
- Emerging Market Regions

Much more work to do yet!
The Evolving Supply Chain in Aerospace Raw Materials

Future Evolutionary Influences Aero-Raw Materials

Supply Chain Evolution

- Elemental Raw Materials
- Process Technologies
- Commercial Space Travel
- Global and Domestic Energy Costs
- Global Growth, sequestration, fiscal budgets, austerity programs
- Conflicts/Wars
- Geopolitical Impacts

Aerospace Business Cycles (& other markets)
- Supply vs. Demand Balance

Present 2013

Future 2035

Courtesy of Hanna Barbera