Supplier Audits at Raytheon Missile Systems [RMS]

Materials, Processes & Producibility [MP&P]
RAYTHEON MISSILE SYSTEMS [RMS]
Sudhir Bafna
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Supplier audit perspective from non-quality function participant
Speaker

- Senior Principal Engineer in Materials, Processes and Producibility Department in RMS-Tucson
- Polymers/Plastics/Rubbers Subject-Matter-Expert
- Rubber Engineering Lead for SEAC
- ASQ CQA since 1994; CQE since 1995
- Worked as Senior Quality Associate responsible for audits & raw material specs at Huntsman Polymers TX from 1998-2001
- Participated in ~30 supplier audits in last 5 years
RAYTHEON CORPORATION

- Technology and innovation leader specializing in defense, security and civil markets
- 2013 sales [$24 billion]
- 73,000 employees
- **Vision:** To be the most admired defense and aerospace systems company through our world-class people, innovation and technology
- Sells products & services in 80 countries
- Offices in 19 countries
- Revenue outside USA: 26% of 2012 total
- Listed on NYSE for 62 years; symbol “RTN”
HISTORY

- Founded on 7 July 1922 as American Appliance Company by Vannevar Bush, Laurence Marshall & Charles Smith
- 1st innovation: S-gas rectifier tube; eliminated expensive batteries powering home radios
- World War II
  - Supplied 80% of magnetron tubes in US & British radars
  - Sea Going SG Microwave Radar on ships
- Percy Spencer discovered microwave cooking
- 50’s-60’s
  - Lark missile knocked test drone out of air
  - New generation: Sparrow & Hawk
HISTORY [contd.]

- Apollo to the moon
  - Built computer that guides space vehicles
  - Microwave tube transmitted radio & TV signals

- Vietnam Era
  - AIM-7F Sparrow
  - Hughes Tube-launched Optically-tracked Wire-guided [TOW] anti-tank missile

- Persian Gulf War
  - Patriot intercepted Iraqi Scuds; 1\textsuperscript{st} hostile ballistic missile intercept
DIVISIONS

- **MISSILE SYSTEMS**: world's premier missile maker, providing defensive and offensive weapons for air, land, sea and space, including interceptors for U.S. ballistic missile defense. The business also builds net-enabled battlefield sensors and includes Raytheon UK.

- **INTEGRATED DEFENSE SYSTEMS**: specializes in air and missile defense, large land- and sea-based radars and systems for managing command, control, communications, computers and intelligence (C4I). It also produces air traffic management systems, sonars, torpedoes and electronic systems for ships.

- **SPACE & AIRBORNE SYSTEMS**: builds radars and other sensors for aircraft, spacecraft and ships. The business also provides communications and electronic warfare solutions and performs research in areas ranging from linguistics to quantum computing.

- **INTELLIGENCE, INFORMATION & SERVICES**: provides cybersecurity products and services. It also offers a full range of training, space, logistics and engineering solutions for government and civilian customers.
Raytheon Missile Systems [RMS] - Tucson

- RMS headquartered in Tucson
- Largest private employer in Southern Arizona
- Locations: Huntsville, AL; East Camden, AR; Tucson, AZ; Rancho Cucamonga, CA; Louisville, KY; Albuquerque, NM; and Farmington, NM., Oklahoma, Texas, United Kingdom
- 14,000 employees [22% of total]
- $6.6 billion [29% of total]
- Started in Tucson in 1951 as Hughes Aircraft Company

Missile Systems is about 25% of entire corporation
Raw Materials & Suppliers

- 2012 Annual Report
  - “dependent upon the delivery of materials by suppliers, and the assembly of major components and subsystems by subcontractors”
  - “must comply with specific procurement requirements which may, in effect, limit the suppliers and subcontractors”
  - “In some instances….dependent on sole-source suppliers”

- Many parts come pre-installed in assemblies
- Hence, supplier quality is critical
Ashton Carter Memo 9/14/2010

Ashton Carter, the Under Secretary of Defense for Acquisition, Technology & Logistics, sent memo to all Acquisition Professionals

17-page letter covers five key areas
- Target affordability and cost growth
- Incentivize productivity and innovation in industry
- Promote real competition
- Improve trade craft in service acquisition
- Reduce non-productive processes and bureaucracy
“Raytheon's supply chain is quickly becoming a competitive differentiator and strategic advantage for the company. It is an integral part of our focus on delivering strong operating performance for our shareholders and the best value for our customers. Initiatives such as our center-led and cross-functional approach to supplier selection and centralized procurement enable Raytheon to maximize supplier-partner relationships while minimizing variation and risk in our supply base. In addition, an enterprise services approach harnesses the collective strength of Raytheon efficiently while at the same time moving us forward with speed and agility.”

Bill Swanson
Chairman and CEO [retired 2014]
Raytheon Company
SEAC

- SEAC = Strategic Enterprise Aligned Commodities
- Corporation wide program
- Drive procurement from division level to corporate level: economies of scale
- Consolidate supplier base
  - In plastics & rubbers, going from 800+ to 16 for new programs
  - 700+ suppliers had 3-year sales of < $10,000
- About 26 SEAC corporate-wide teams for commodities such as connectors, CCA, machining, etc.
- Company-wide agreements [price, T&Cs]
- Preferred Suppliers subject to qualifying audit
- Legacy procurement for existing programs remains unchanged
What is RESA?

RESA (Raytheon Enterprise Supplier Assessment)

- **Definition** - Enterprise process and tool for assessing supplier’s capabilities which promotes educated and informed supplier decisions.

- Supply Chain, Mission Assurance, Program Management, and Engineering together perform team assessments to make better supplier decisions and mitigate supplier risk.

- There are eight assessment checklists that Raytheon utilizes to proactively mitigate supplier risk.

- Deployment – RESAs are performed by the all RTN divisions with a cross-functional team consisting of Program Management, Supply Chain, Mission Assurance, and Engineering.

- Enterprise Supplier Risk Tool (ESRT) is a supplemental tool to identify suppliers with risk concerns & determine which RESA to perform to proactively mitigate risks.
RESA Chapters

- 0: assess Quality Management System for compliance to standards; when no 3rd part registration [ISO-9000, etc.]
- 1: New supplier; Initial Total Business Assessment for potential supplier
- 2: Existing supplier; If supplier can meet new requirement
- 3: Total Business Assessment [TBA]; health of new supplier; before approving supplier
- 4: Pre-work Authorization Review; contractual requirements alignment
- 5: Post-Award Review; compliance to requirements prior to producing 1st piece
- 6: Periodic TBA; health of existing supplier
- 7: Product & Process Verification [PPV]: assess key processes

Types of RESA audits
Example of Chapter-1

- New injection molding supplier in Minneapolis
- Multi-disciplinary team: Supply Chain, Quality, Engineering
- Multi-division team: All divisions represented
- One-day audit
- Overview; difficult to assess processes in depth with large team and limited time
Example of Chapter-2

- Objective: Determine if existing gasket supplier should be added to Preferred Supplier List
- Multi-disciplinary team: Supply Chain, Quality, Engineering
- One-day audit
- Difficult to assess processes in depth
- Required return visit

Existing supplier audit example
Example of Chapter-7

- Objective: Determine if existing seals supplier quality system robust enough for Supplier Managed Inventory
- Multi-disciplinary team: Supply Chain, Quality, Engineering
- 2-3 day audits; sometimes multiple locations
- In-depth assessment of processes
- Continuing surveillance every year
- Pronounced improvement in 3 years

Detailed process audit example
Benefits of RESA audits

- Data drive decisions
- Improved communications
- Reduced Risk
- First hand assessment of supplier compliance
- Process Improvements
- Information sharing across divisions
- Supplier alignment across divisions, leading to supplier base consolidation
SHARP

- One intra-net tool to archive & document audit reports
- Available across enterprise & all divisions
- Has 12,183 entries for Raytheon Corporation; 6120 for RMS; as of 8-28-14

Tools & Resources
  - Data Analysis capabilities [Pareto charts, etc.]
  - Track action items
Lessons Learned

- PPV required for in-depth supplier quality & process assessment; drives supplier improvement
- PPV provides assurance that elimination of receiving inspection by moving to Supplier Managed Inventory does not increase risk unacceptably
- Availability of resources & appropriate functional personnel with audit expertise a challenge
- 1-day audits insufficient to thoroughly review supplier processes

Properly planned audits can result in cost reduction
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