

# Customer Keynote



## **Freddie Gonzalez**

*Manager, Global Supply Chain*

*F/A 18 Programs*

*Northrop Grumman Aerospace  
Systems*





# Supplier Excellence Alliance (SEA) Conference



THE VALUE OF PERFORMANCE.  
**NORTHROP GRUMMAN**

July 26, 2012

Freddie Gonzalez  
Manager, F/A-18 Global Supply Chain Affordability



# Agenda



- Northrop Grumman Aerospace Systems Overview
- F/A-18 Program Overview
- EA-18G Growler
- F/A-18 Post Production Programs
- F/A-18 Program Execution
- Global Supply Chain F/A-18 Programs
- Affordability
- Summary
- Questions

# Northrop Grumman Aerospace Systems



- \$10.4B business
- 23,000 employees
  - 21,000 in California
- Prime contractor / major partner on large platform programs
  - Manned and unmanned aircraft
  - Space and missile systems
- Leader in technology innovation
- Large development programs
- World-class workforce

# Northrop Grumman Aerospace Systems Business Areas

**NORTHROP GRUMMAN**

## Unmanned Systems



## Military Aircraft Systems



## Space Systems



## Advanced Programs and Technology

# F/A-18 Programs at Aerospace Systems



## *Approximately 1050 People at 3 Sites*

- El Segundo, CA
  - Fabrication and assembly
  - C/D Center Barrel
  - Pylon
- New Town, ND
  - Wire harness
- St. Augustine, FL
  - EA-18G Kits
  - C/D Nacelle
- Bethpage, NY
  - AEA system integration
- Baltimore, MD (ES)
  - ALQ-218

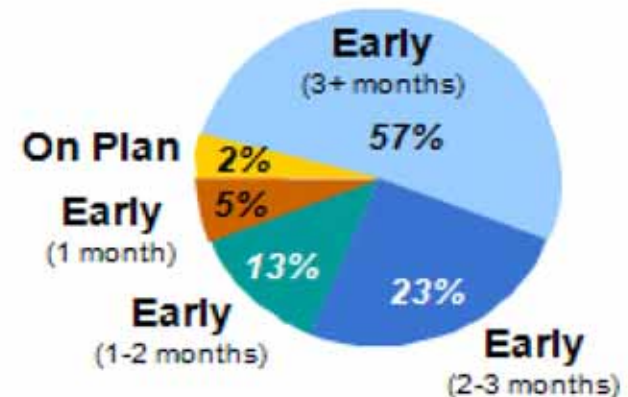


## Proven Delivery Performance

High confidence, known cost, on-time deliveries, low risk

- Proven program management and production delivery performance ...
  - Development and test program completed on schedule and within budget per the original contract
  - Every production delivery on schedule or ahead of schedule to the original contract
    - RAAF F/A-18F deliveries three months early
- Internationally recognized for program management excellence ...
  - Collier Trophy
  - Aviation Week and Space Technology Program Excellence Award

### Production Deliveries



Average: 83 calendar days early

**100% Delivery Performance**

Collier Trophy  
Recognized as the most significant achievement in aviation in 2001



Aviation Week & Space Technology Program Excellence Award  
Recognized in 2005 as a model Department of Defense acquisition program

*100% of Super Hornet deliveries have been on time or early*

# The F/A-18E/F Super Hornet Continues The Successful Hornet Tradition

Positioned for the Future,  
Operating Today

*F/A-18E/F designed to operate now ... designed to grow tomorrow*



## Super Hornet Block I

- Long range
- Increased survivability/lethality
- Improved carrier suitability
- Tanker
- Long-term growth
- Advanced mission computer and displays
- Advanced EW suite
- Advanced weapons
- Joint Helmet Mounted Cueing System
- Combat deployed

2002



## Super Hornet Block II

- Advanced pilot vehicle interface
- Advanced computing systems
- AESA radar
- MIDS
- ATFLIR
- AIM-9X
- IRST
- Network centric

2006



## EA-18G

- Electronic Attack
  - State of the art
  - Full-spectrum
- Self-escort capability
- Network centric

2009



## Future Super Hornet

- Spiral upgrade path to grow space threats and developing technology

2015 ...



# International Centers of Excellence

- Investing in research and development
- Best of Industry from metallurgy, processes, composites, and aviation design
- The world teaches Boeing and the Hornet Industry Team



**Australia**

- Commonwealth Scientific Industry Research Organization (CSIRO)
- Queensland University of Technology

**Germany**

- Technical University of Munich
- Siemens
- Brotje
- EOS

**China**

- Tongji University
- Chinese Academy of Sciences
- Zhejiang University
- Xian Jiaotong University
- Beijing Institute of Aeronautical Materials
- Shenyang Casting Research Institute
- Tsinghua University

**Italy**

- CIRA
- IMAST

**Netherlands**

- KVE Composites Group
- Technical University Delft

**Russia**

- Boeing Technology Research Center (BRTE)
- International Science and Technology Center (ISTC)

**Singapore**

- Agency for Science Technology and Research

**Spain**

- Boeing Research and Technology Europe

**South Africa**

- Council for Science and Industrial Research (CSIR)

**United Kingdom**

- University of Sheffield – AMRC
- The Welding Institute
- Renault Formula 1
- Cranfield University
- Cambridge University
- QinetiQ

**India**

- Indian Institute of Science
- National Aerospace Laboratory
- Indian Institute of Technology

# True Multi-Role Flexible Air Power



## Unprecedented Multi-Mission War Fighting Capabilities

**Proven safety and survivability**

**Two-seat flexibility and de-coupled cockpits**



**Close Air Support**

**All-weather / day / night and long range**

**Fully fielded and integrated AESA radar**



**Maritime Strike**

**Fully qualified in all missions and roles**

**Qualified with 360 + weapons configurations**



**Air Superiority**



**Precision Attack**



**Tactical Tanker**



**Reconnaissance**



**Electronic Attack and SEAD/DEAD**

# Integrated 21st Century Technology



### Advanced Cockpits

Large displays for excellent situational awareness and intuitive controls for efficient crew operations

### Long Range

14,000 lb internal fuel, up to 13,000 lb external fuel, efficient engines and "buddy" tanking allows Super Hornets to reach everywhere



### Joint Helmet Mounted Cueing System (JHMCS)

Rapid air-to-air / air-to-ground target acquisition and engagement

### Active Electronically Scanned Array (AESA) Radar

Ten years ahead of the rest in range, resolution, reliability, survivability and target tracking capacity. Simultaneous air and ground tracking allows the aircrew to see first, shoot first.



### IRST

Long range passive air-to-air targeting



### Reconnaissance Digital Pod



### Twin Engine

Reliability, survivability and safety

### RCS Reduction

Planform shape/alignment edge mating, coatings, embedded antennae, low maintenance

### Large Weapons Payload

Eleven weapon stations provide maximum flexibility for air-to-air and air-to-ground weapons, reconnaissance pod and tanker pod



### Advanced Computing Architecture

Open architecture, large bandwidth high speed network, High Order Language software provide modern, scalable processing capability



Advanced Mission Computer

Digital Solid State Recorder



### Digital Network Connectivity

Voice, data and imagery via Link 16 Multifunction Information Distribution System (MIDS) and Digital Communication System (DCS)

### Agility and Flight Performance

Next generation aerodynamics, digital fly-by-wire flight controls and integrated engine control enable "care-free" maneuverability

### AIM-9X

with JHMCS and Super Hornet maneuverability, for close-in air combat dominance

### Advanced Tactical Forward Looking Infrared (ATFLIR)

Electro-optical, infrared, long-range, high resolution and highly integrated with AESA and JHMCS



# The Hornet Industry Team (HIT)



**Raytheon**



**NORTHROP GRUMMAN**

**BOEING**

- Industry and the customer forge the team
- Operations in over 100 countries
- Over 30 years of teamwork



**Leaders in Industry**

# EA-18G "Growler"

**NORTHROP GRUMMAN**



## EA-18G Merges Two Proven Systems

### Starts with Block 2 F/A-18F

- **Latest technology systems**
  - Active Electronically Scanned Array (AESA) radar
  - Fiber-optic data bus
- **Next-generation situational awareness**
  - Joint Helmet Mounted Cueing System (JHMCS)
  - Tactical Aircraft Moving Map Capability (TAMMAC)
- **Enhanced crew performance**
  - Independent crew station operation
  - Advanced mission computer and displays
- **Network-centric operations**
  - Digital Communication System (DCS)
  - Multifunction Information Distribution System (MIDS)

### The EA-18G



MSG06-069435-003c

### Integrates Latest Technology Electronic Attack Suite

- ALQ-218(V)2 receiver
- ALQ-99 tactical jamming pods
- Communication Countermeasures Set
- Satellite communications



ICAP III EA-6B

Block II F/A-18F

TWO PROVEN SYSTEMS – ONE FLEXIBLE DESIGN

*THE VALUE OF PERFORMANCE.*  
**NORTHROP GRUMMAN**

# Global Supply Chain F/A-18 Programs

## Design, Procurement, Manufacturing and Support



### Suppliers for Support

- Spares, Repairs and Support of Above Hardware Training
- Tech Data
- Field Support

### Suppliers of Structural

- Center Fuselage
- Aft Fuselage
- Vertical Fins
- Center / Aft Fuselage Splice
- Centerline Pylon

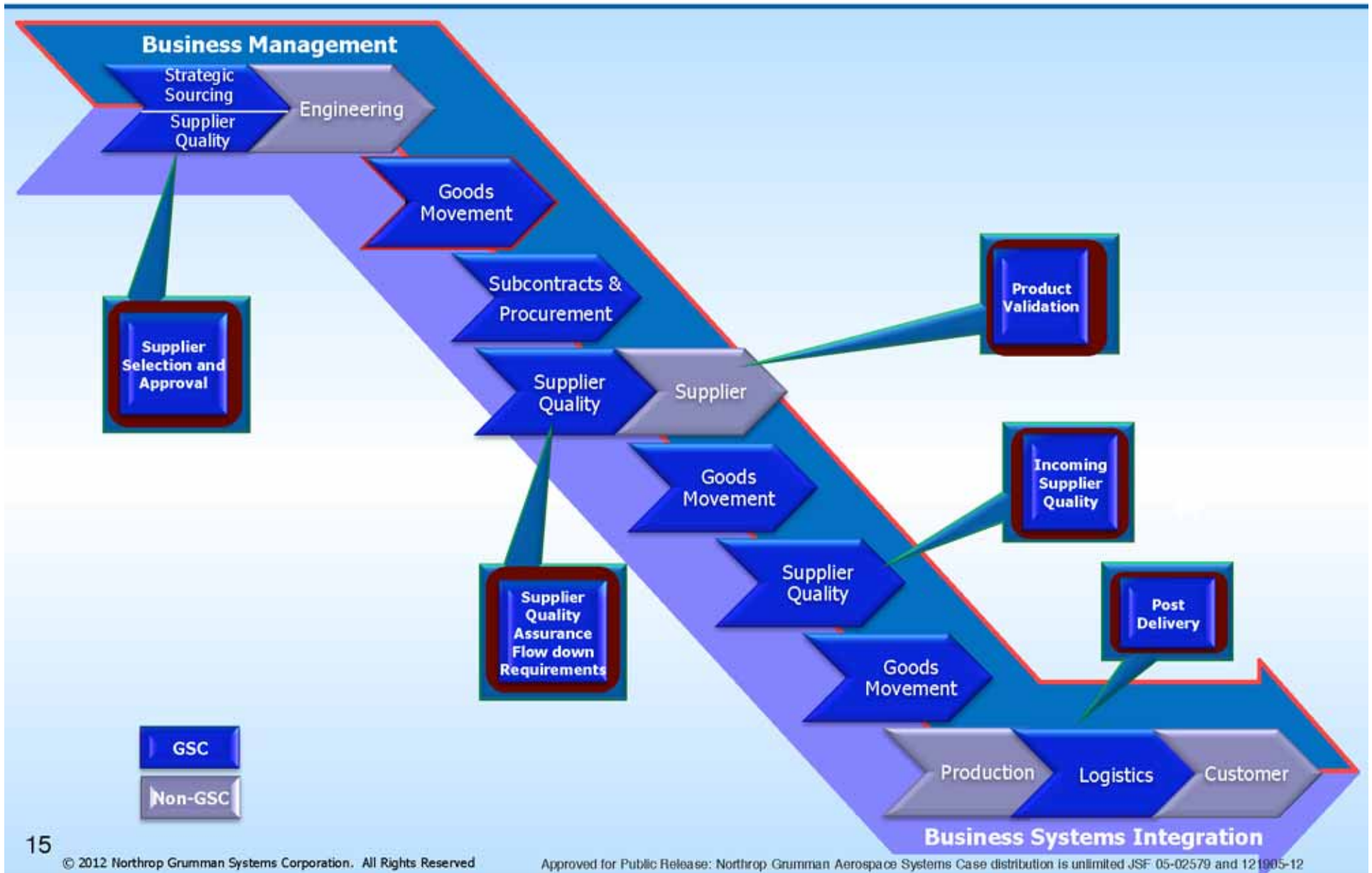
### Suppliers of Systems

- Hydraulics
- Fuel
- ECS (Air Conditioning)
- Fire Detection / Extinguishing
- Bleed Air Leak Detection
- Propulsion
- Secondary Power and Starting
- Mechanical Controls
- Antennas, Wiring, Lights



**Northrop Grumman El Segundo Manufacturing and Subcontract Management**

# GSC Elements and Interaction





# Supplier Management Process



# Supplier Quality Management Process Ensures Superior Supplier Quality

	Pre-Proposal / Recertification	Proposal		On-Contact
PHASE	SUPPLIER EVALUATION	SOURCE SELECTION	SUPPLIER PERFORMANCE OVERSIGHT	SUPPLIER RATING
TASKS	<ul style="list-style-type: none"> <li>• Quality Management</li> <li>• Financial Health</li> <li>• Capacity</li> <li>• Capability/Technical Maturity</li> </ul>	<ul style="list-style-type: none"> <li>• Supplier Quality/Mission Assurance Requirements</li> <li>• Program Specific Quality and Inspection Requirements</li> <li>• Acquisition Cost/Complexity</li> <li>• Past Performance</li> <li>• Supplier Assessment Matrix</li> </ul>	<ul style="list-style-type: none"> <li>• Product Verification and Validation</li> <li>• Supplier Monitoring</li> <li>• Corrective/Preventative Actions</li> <li>• Risk &amp; Opportunity Management</li> <li>• Subcontract Management Oversight Teams</li> <li>• Sub-tier Suppliers</li> </ul>	<ul style="list-style-type: none"> <li>• Supplier Performance Rating</li> <li>• Transactional Ratings</li> <li>• Subcontract Ratings</li> <li>• Rating Utilization</li> </ul>
OUTPUTS	Supplier Qualified to Perform Anticipated Work Scope	Purchase Order	Quality Product Delivery	Past Performance Data

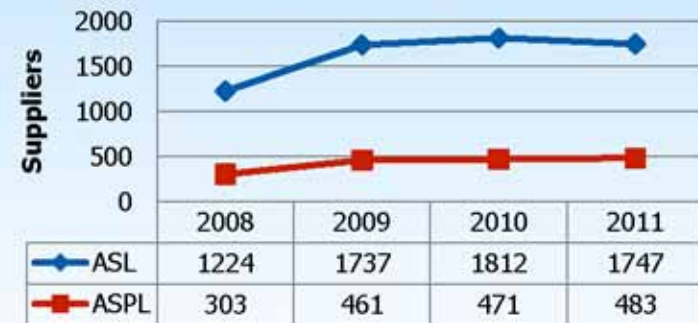
**Holistic Methodology Spans The Program Lifecycle**

# Aerospace Sector Supply Base Overview

## Approved Supplier List Breakdown



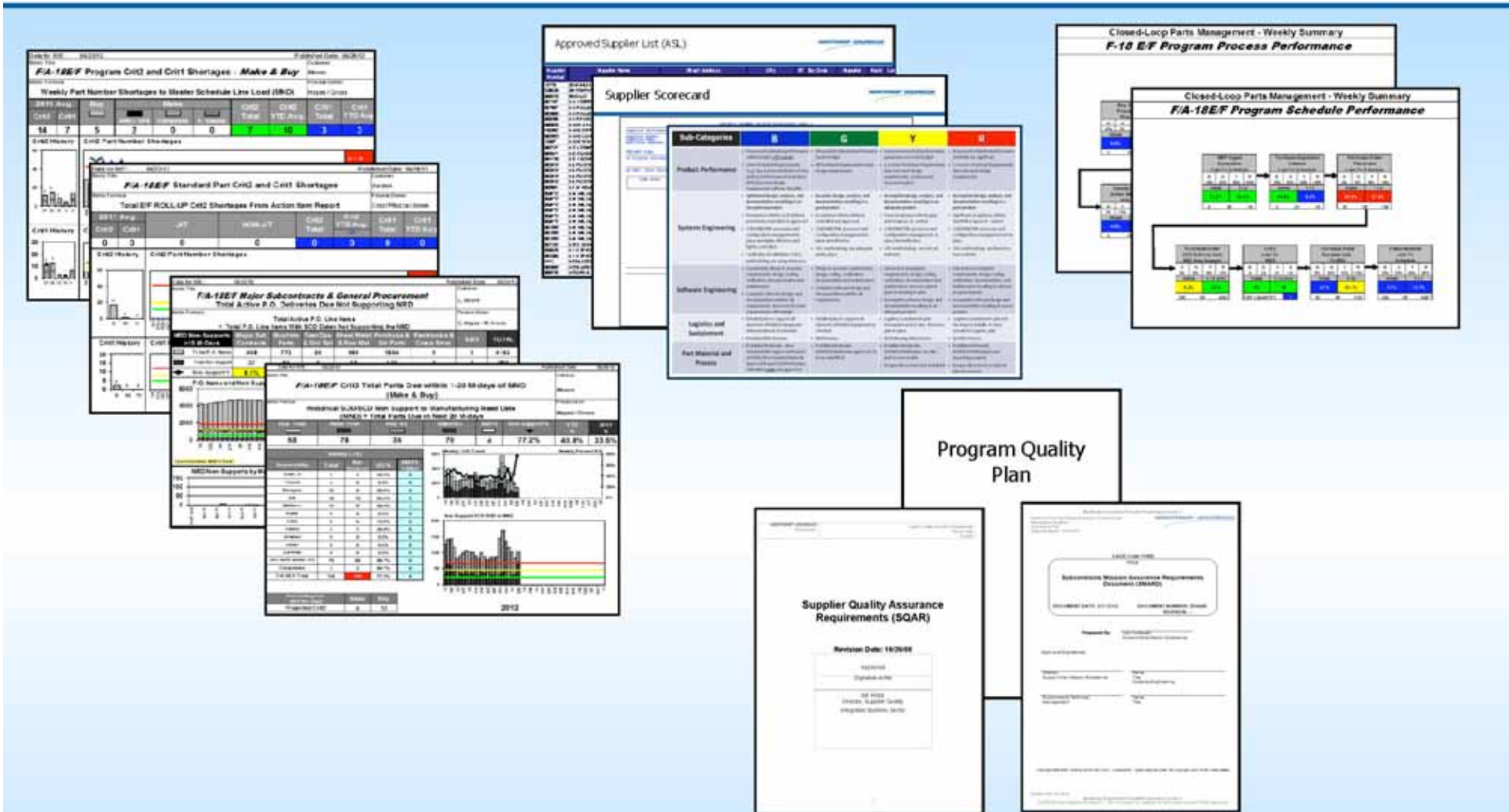
## Approved Suppliers Approved Special Processors



	Open Line Items	% of Total
Preferred	3,044	6.24%
Platinum	25,444	52.18%
SSI	4,463	9.15%
<b>Delegated</b>	<b>32,951</b>	<b>67.57%</b>
Non-Delegated	15,812	32.43%
Grand Total	48,763	100.00%

**Drive Purchase Orders to Our Best Suppliers**

# Global Supply Chain Management



Effective Metric Management = Key to Success

# Dr. Ashton Carter

## Deputy Secretary of Defense



- September 14, 2010: Better Buying Power: Guidance for Obtaining Greater Efficiency and Productivity in Defense Spending
- November 3, 2010: Implementation Directive

### Target Affordability and Control Cost Growth

- Mandate Affordability as a Requirement
- Drive Productivity Growth Through Will Cost/Should Cost Management
- Eliminate Redundancy Within War Fighter Portfolios
- Make Production Rates Economical and Hold them Stable
- Set Shorter Program Timelines and Manage to Them



# Affordability Imperative



- Affordability - now more important than ever
- Our companies and programs growth/survival depends on it!
- Leave no stone unturned to generate initiatives
- Engage your customers and your suppliers
- Address touch hours and above the shop floor
- Be relentless in execution



**Affordability is a Mandatory Requirement in Today's Fiscal Environment**



**Wes Bush**  
President and CEO  
Northrop Grumman Corp.

We can choose to stand on the sideline and wait to see how things work out, or we can roll up our sleeves and do what we do best. As an industry that prides itself on innovation, we need to create the new solutions that answer the demands of those who use our systems, and those who pay for them.

April 12, 2011  
27<sup>th</sup> National Space Symposium



**Affordability is in Our Hands**

# Summary



- Affordability...Affordability...Affordability
- Parts delivery / quality
- Foreign Object Detection and Elimination
- Process adherence

## **Highlights**

- ✓ *Continued Excellent Performance*
- ✓ *Diverse, experienced workforce*
- ✓ *Right Team in place*



***THE VALUE OF PERFORMANCE.***

***NORTHROP GRUMMAN***

