

# Lessons in Integrating Non-Engineering Organizations with Engineering Using the CMMI<sup>SM</sup>

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Northrop Grumman Corporation

# Topics

- **Overview Of Our Organization And Process Improvement History**
- **Organizational Scope**
  - Different Views
  - Restricted Scope For Materiel
- **Shared Vision**
  - Our Definition
  - Shared Vision Flow-down
- **Organizational Process Areas**
  - Integrating Them
  - Supporting Infrastructure
- **Checking The Extent Of Integration**
- **Continuing To Grow**
- **Summary Of What We Learned**

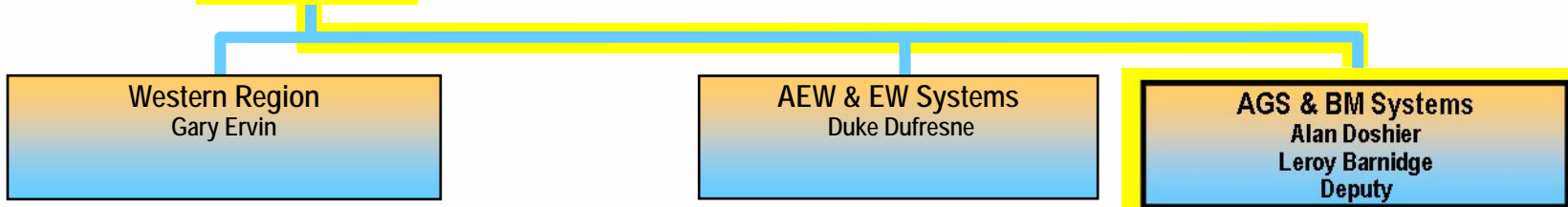
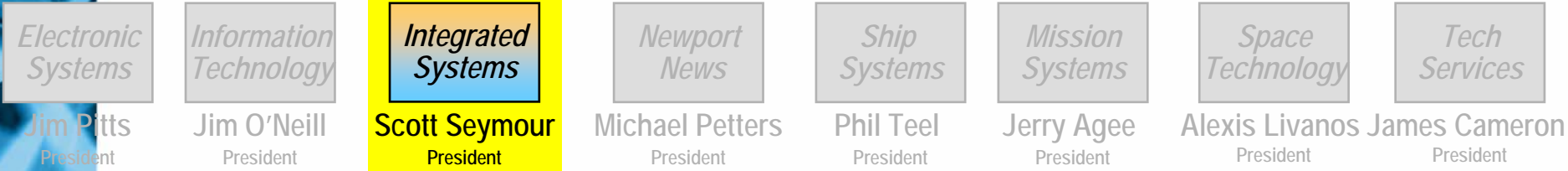
# Corporate Overview

- **Comprehensive business portfolio to address the defense and government markets**
  - Systems integration
  - Military aircraft
  - Unmanned aerial vehicles
  - C4ISR
  - Defense electronics
  - Information technology and networks
  - Naval shipbuilding
  - Space and missile defense
- **2005 sales of \$30.7 billion**
- **125,000 people; 50 states; 25 international countries**
- **Headquartered in Los Angeles, CA**





# Northrop Grumman Integrated Systems



Global Hawk	Fire Scout	F/A-18	B-2
N-UCAS	Targets	F-35	MP-RTIP
Hunter		Space	FSS

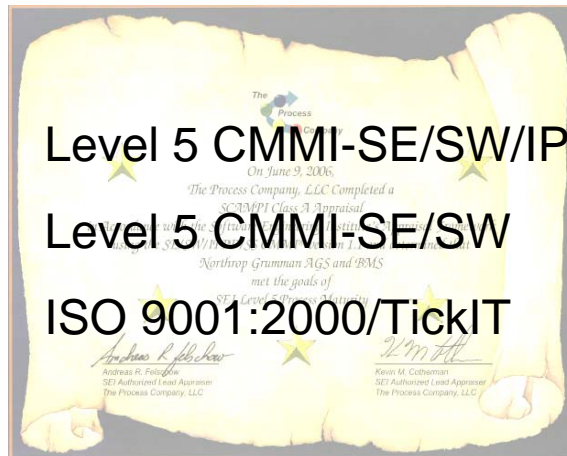
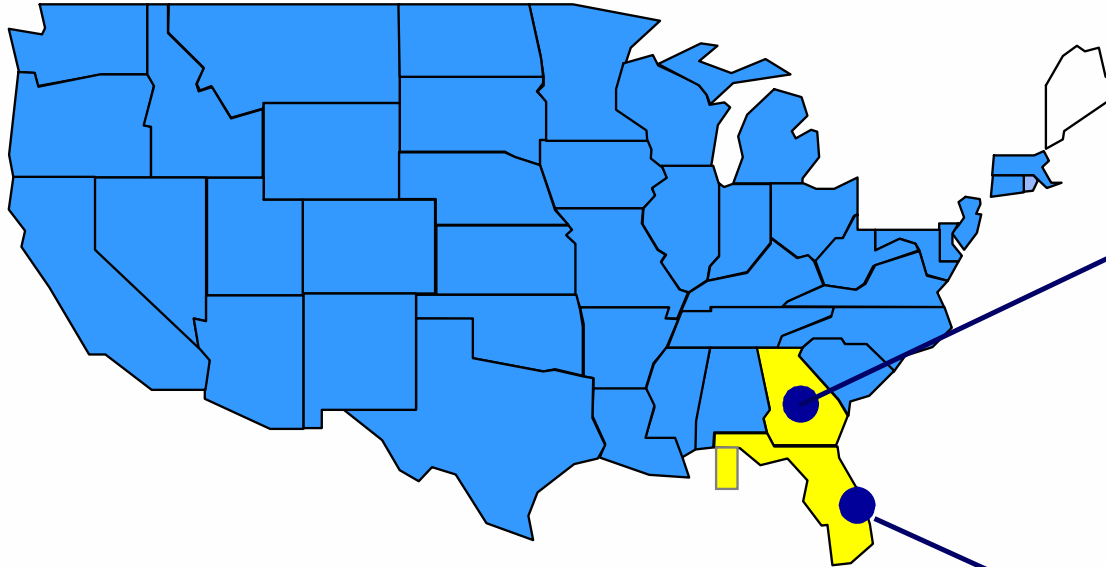
E-2C/AHE	EA-6B
EA-18G	ICAP III

E-10A	E-8C JSTARS	NATO AGS	ADVANCED BM CONCEPTS
MINE COUNTERMEASURES			

*Premier Aerospace and Defense Systems  
Integration Enterprise*

**NORTHROP GRUMMAN**

# AGS&BMS Major Sites



Level 5 CMMI-SE/SW/IPPD/SS 6/06

6/06

Level 5 CMMI-SE/SW 4/05

4/05

ISO 9001:2000/TickIT 9/04

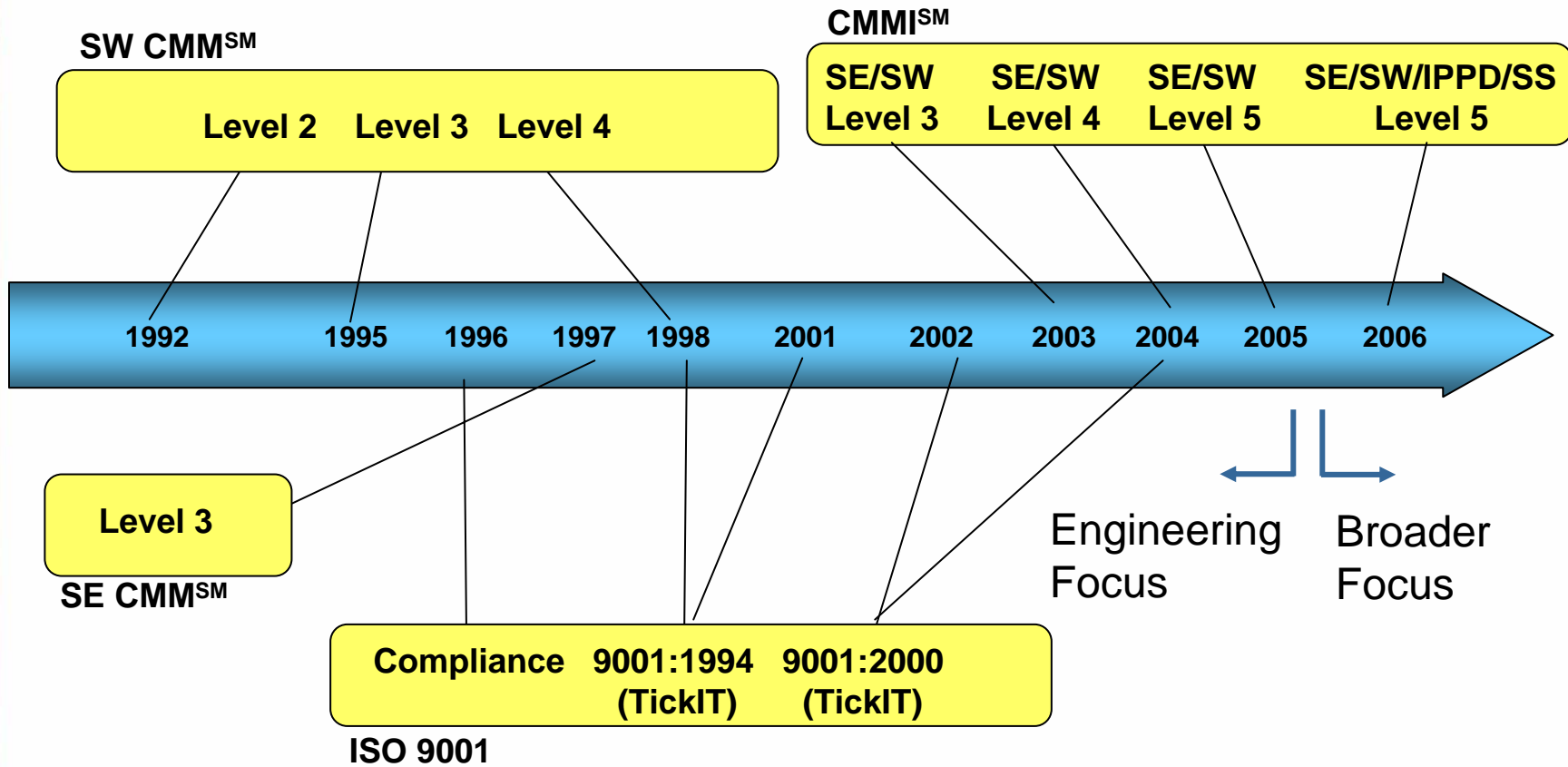
9/04



Sys. Integration

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# Process Improvement History



# Expand Your Organizational Scope

- **Benefits seen in software engineering were expanded into systems engineering**
- **Why not expand these benefits into other areas?**
- **Expectation was that expanded scope would yield progressively greater process awareness and benefits**
- **Initial expansion was**
  - The rest of engineering beyond systems & software
  - Materiel - to bring in supplier sourcing practices
  - Program Management - to bring in IPPD practices

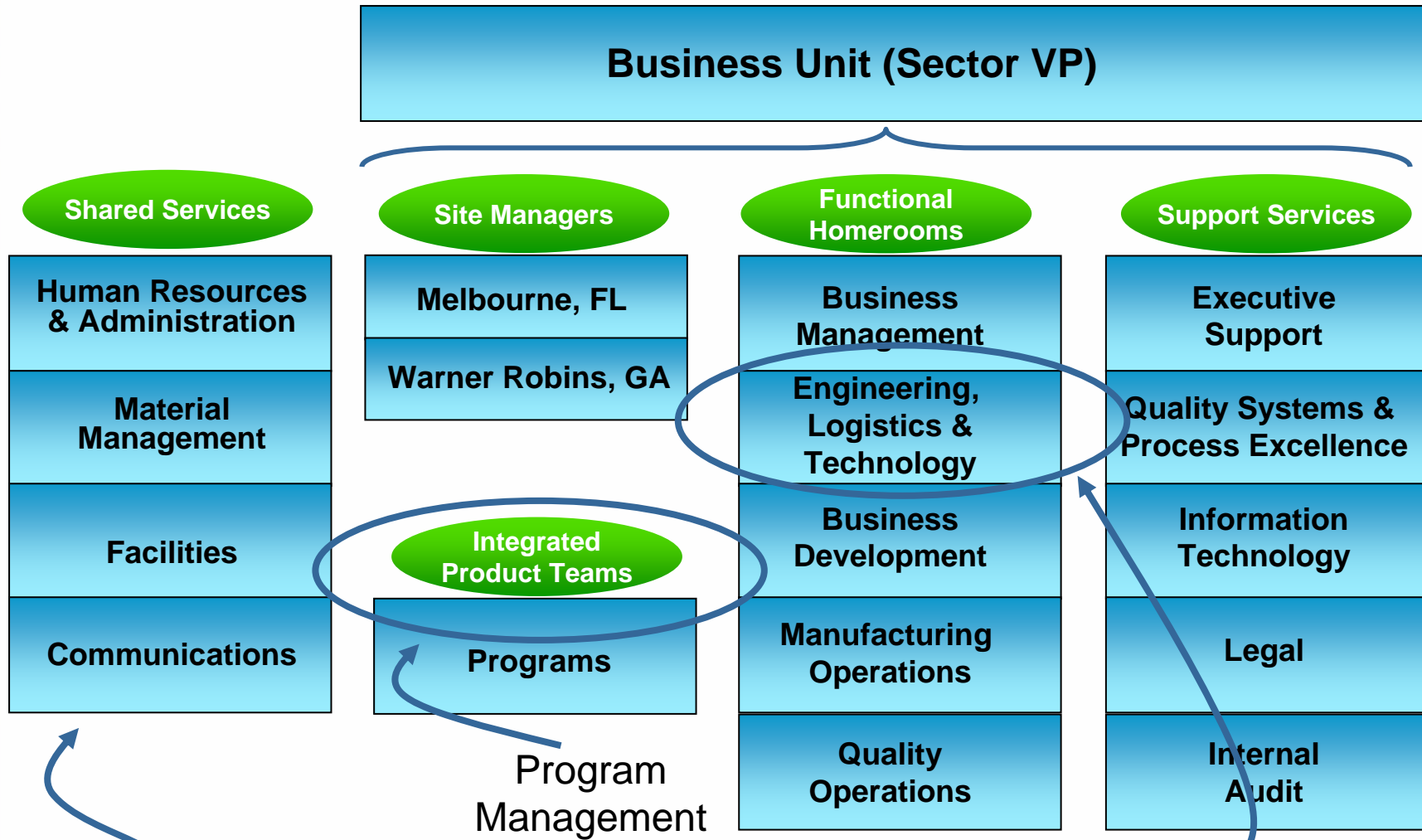
# Organizational Scope

- **When the model was SE/SW - the organization was “engineering”**
- **When non-engineering departments are included, what does the term “organization” mean?**
- **Be careful in using the term “organization” - the CMMI has requirements for the “organization”**





# AGS & BM Systems



Reports To Management Above The Business Unit

Engineering Disciplines

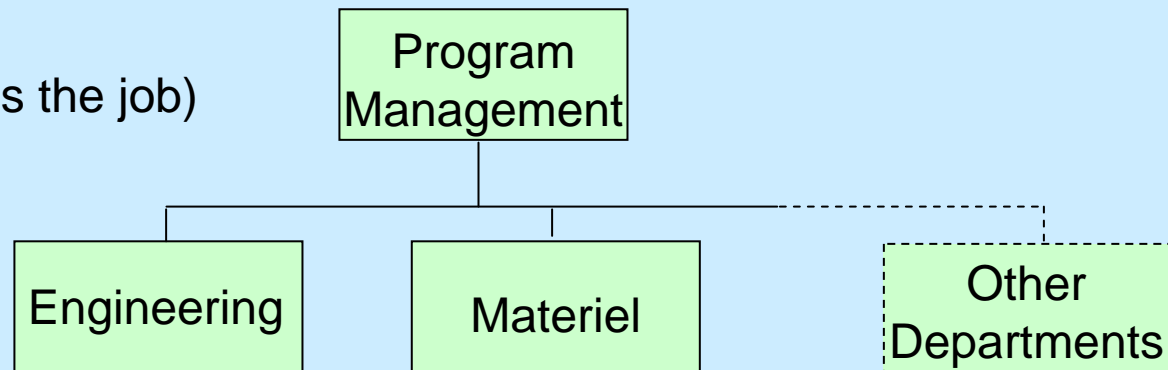
# Organizational Scope - Different Views

- What is your organizational scope?
- How do you want it portrayed?

Organizational view (all departments are equal - maybe)



Project view  
(PM manages the job)



# Restricted Scope for Materiel

- **The Business Unit is the organization being appraised**
- **Materiel is IN SCOPE**
  - Materiel is considered part of organization for project-type process areas (mostly SAM, MA, ISM, PI and IT)
  - Generic practices (e.g., defined process, plans, resources, responsibilities, training, manage configurations, relevant stakeholders, monitor and control process, review status, objectively evaluate adherence)
- **Materiel is OUT OF SCOPE**
  - Materiel is not considered part of organization for organizational process areas (OPF, OPD, OT, OEI)
  - Materiel is not considered part of organization for “organizational” generic practices (e.g. organizational policy, collect improvement information)

# Shared Vision

- It's the “organization's” shared vision - not just engineering
- How “high” up in the organization do you go?
- How do you get it flowed down?
- How low in the organization do you flow the shared vision?



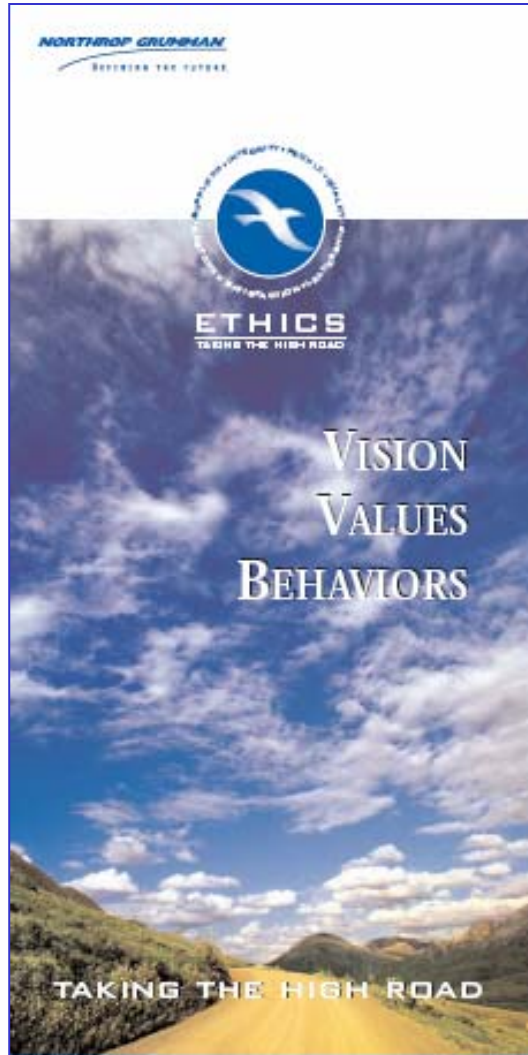


# Shared Vision - Our Definition

**Our “shared vision” consists of our business objectives with an associated set of expected values and behaviors.**

- **The business objectives are defined at a high level for corporation and are flowed down and decomposed for the sector, business area, projects/teams and individuals**
- **The set of values and behaviors are defined at the corporate level and flowed down “as is” to the sector, the business level and ultimately to every individual at Northrop Grumman**

# Corporate Shared Vision



## OUR VISION

Our vision is to be the most trusted provider of systems and technologies that ensure the security and freedom of our nation and its allies. As the technology leader, we will define the future of defense—from undersea to outer space, and in cyberspace.

**WE WILL:**

- Conduct ourselves with integrity and live our Company Values
- Deliver superior program performance
- Foster an internal environment of innovation, collaboration, and trust

In so doing, Northrop Grumman will become our customers' partner of choice, our industry's employer of choice, and our shareholders' investment of choice.

## OUR BEHAVIORS

**ONE:**  
Live the Company Values  
We all have the company values listed on the back of our badge—Quality, Customer Satisfaction, Leadership, Integrity, Flexibility, Suppliers, Integrity must characterize everything we do. We want everyone who comes in contact with us to know that we do things the right way at Northrop Grumman. We don't take shortcuts.

**TWO:**  
Focus on Operating Excellence  
Northrop Grumman is very well positioned strategically. We must focus on program performance to deliver on the full operating and financial potential of our company.

**THREE:**  
Act With Speed  
Northrop Grumman is a much larger company today than we were. With this increased size comes the challenge of operating in a timely fashion. We must avoid bureaucratic delays. We must be agile enough to act faster than our competitors. This "small company" behavior has characterized Northrop Grumman all along and it can be our most competitive advantage.

**FOUR:**  
Communicate Openly  
We want good news to travel fast and bad news to travel even faster up the line. We need to be mindful of the importance of honestly communicating problems as well as breakthroughs. The sooner we communicate a problem, the easier it is for us to marshal our company's resources to solve it.

**FIVE:**  
Collaborate Across the Company  
Northrop Grumman power comes from the talented people who make up our company. By cooperating and sharing our knowledge with each other, we can make our company even stronger.

## OUR VALUES

**WE VALUE NORTHROP GRUMMAN PEOPLE...**  
We treat one another with respect and take pride in the significant contributions that come from the diversity of individuals and ideas. Our continued success requires us to provide the education and development needed to help our people grow. We are committed to openness and trust in all relationships.

**WE TAKE RESPONSIBILITY FOR QUALITY...**  
Our products and services will be "best in class" in terms of value received for dollars paid. We will deliver excellence, strive for continuous improvement and respond vigorously to change. Each of us is responsible for the quality of whatever we do.

**WE DELIVER CUSTOMER SATISFACTION...**  
We are dedicated to satisfying our customers. We believe in respecting our customers, listening to their requests and understanding their expectations. We strive to exceed their expectations in affordability, quality and on-time delivery.

**WE PROVIDE LEADERSHIP AS A COMPANY AND AS INDIVIDUALS...**  
Northrop Grumman's leadership is founded on talented employees effectively applying advanced technology, innovative manufacturing and sound business management. We add more value at lower cost with faster response. We succeed through our competence, creativity and teamwork.

**WE ACT WITH INTEGRITY IN ALL WE DO...**  
We are each personally accountable for the highest standards of behavior, including honesty and fairness in all aspects of our work. We fulfill our commitments as responsible citizens and employees. We will consistently treat customers and company resources with the respect they deserve.

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# Shared Vision Flow-Down



# Performance Monitoring Process (PMP)

- **Yearly defined tasks, projects, & goals identified (including requirements, schedule, cost, quality) - evaluated at least three times throughout the year**
- **Ethical conduct evaluated - Adherence to company standards of conduct; behavior and decisions are consistent with Northrop Grumman Values**
- **Work style characteristics evaluated including**
  - Collaboration/Teamwork
  - Process Improvement
  - Interpersonal Skills
  - Leadership (Managers Only)
- **Leadership competency (for managers) evaluated, including**
  - Acts Ethically
  - Builds Teams and Relationships
  - Treats People with Respect, Including Customers, Suppliers, and Competitors
  - Collaborates Effectively



# Organizational Process Areas

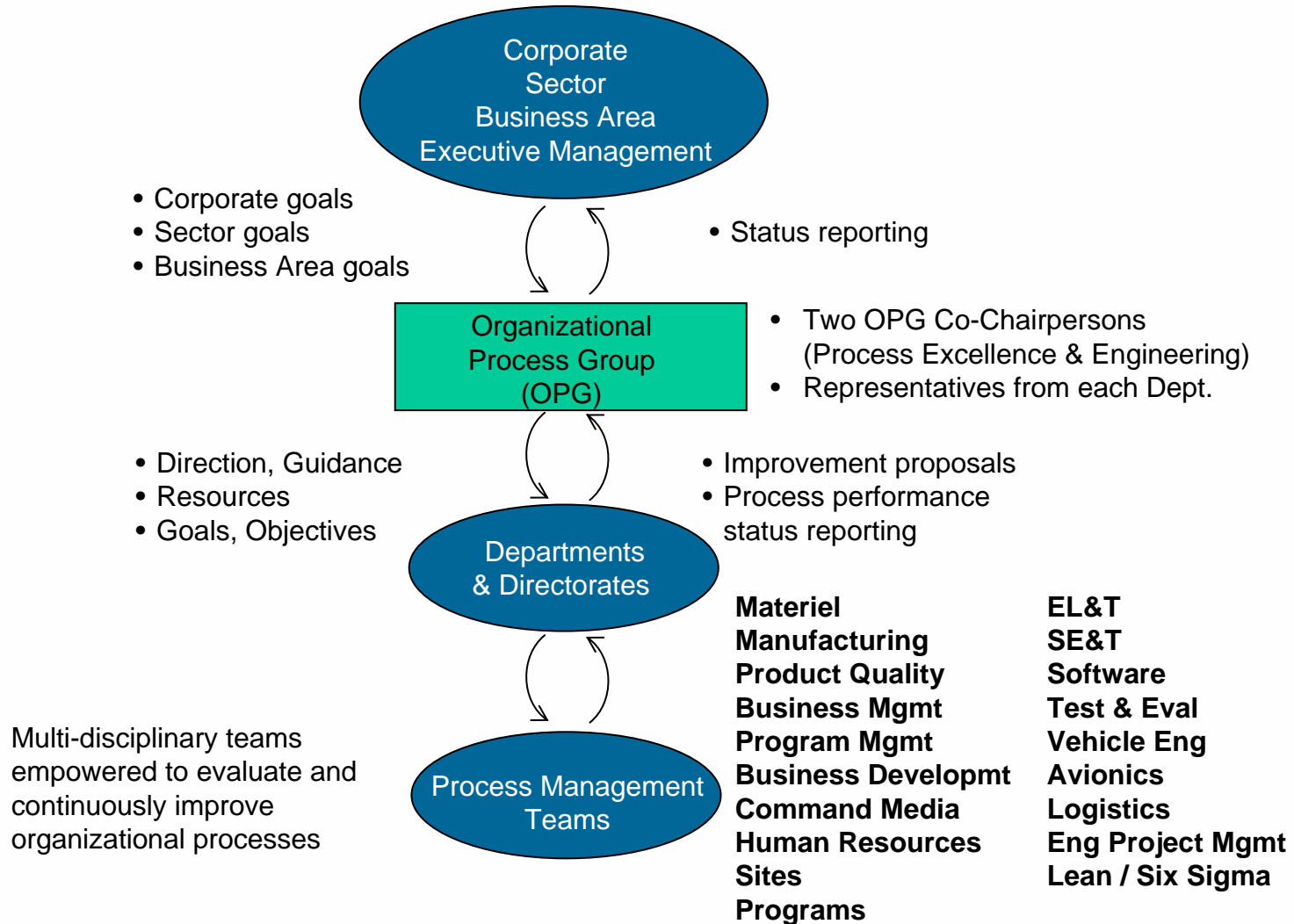
- You need to map the CMMI<sup>SM</sup> organizational requirements onto the organization you have identified as within scope
- You need to determine if and to what degree different parts of the “organization” need to be integrated



# Organizational Process Areas

- **Is there an integrated approach to the CMMI<sup>SM</sup> organizational process areas?**
  - OPF - Process improvement activities (are we leveraging improvements across the organization?)
  - OPD - Process assets (common repository?)
  - OT - Training (one training plan or multiple?)
  - OEI - Integrated Work Environment (is it really integrated?)
  - OPP - Performance Baselines (how do they “flow up” or “combine”?)
  - OID - Improvements & Innovations (how are they selected across the “organization”)
  - GP 2.1 Organizational Policy (does it cover the whole “organization”)
  - GP 3.2 Collect Improvement Information (is it shared across the “organization”)

# Integrating the Organizational Processes



# Is Your “Organization” Really Integrated?

- Are there any “feel good” metrics you can check?



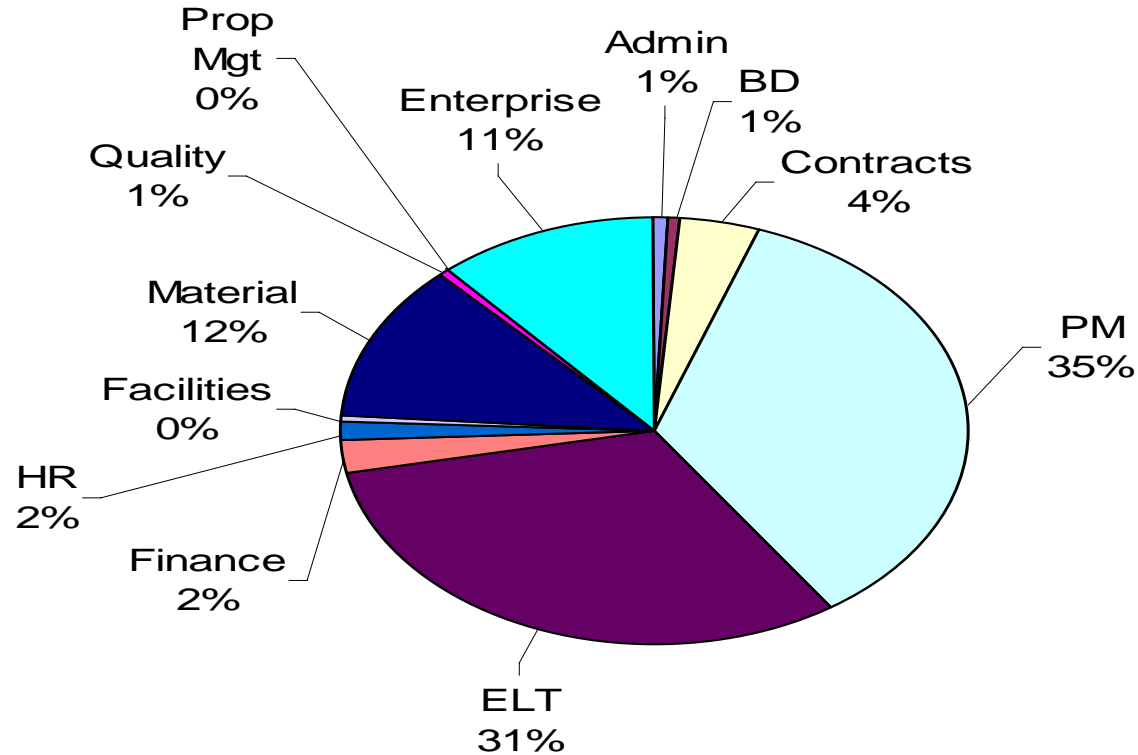
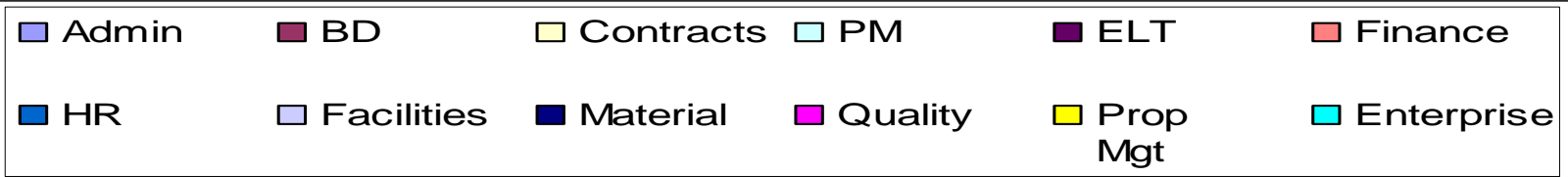


# Procedure Distribution



Procedure Data												
Admin	Bus Dev	Contracts	PM	ELT	Finance	HR	Facilities	Material	Quality	Property Management	Enterprise	Total
4	6	11	35	75	2	7	2	25	2	1	16	186

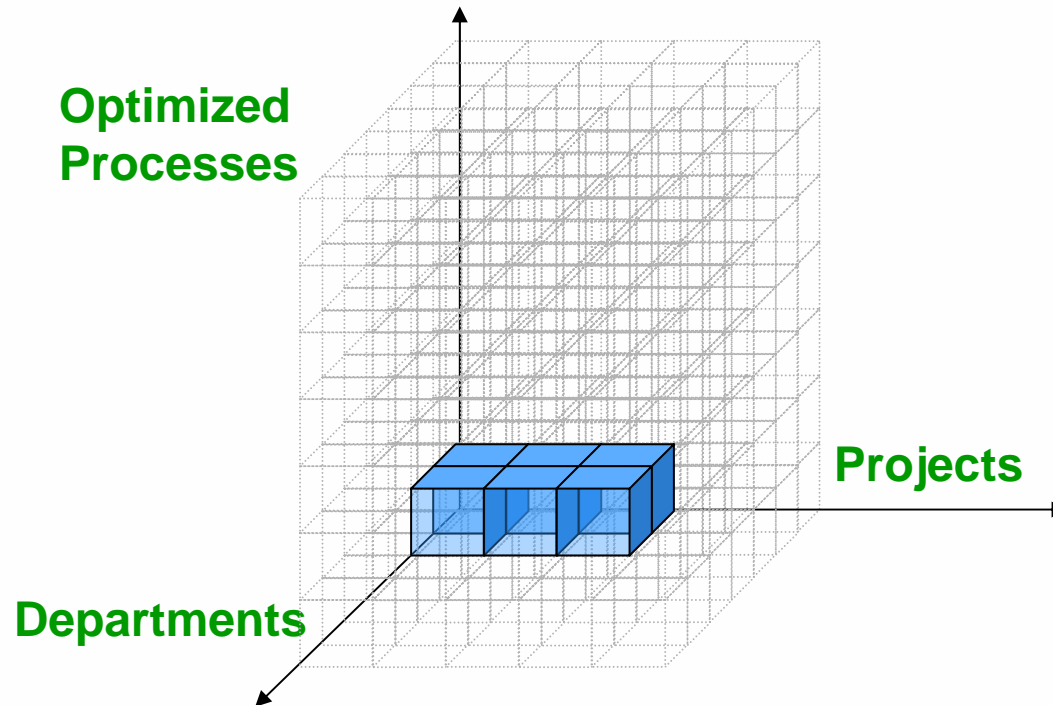
# Artifact Distribution \*



Artifact Data												
Admin	Bus Dev	Contracts	PM	ELT	Finance	HR	Facilities	Material	Quality	Property Management	Enterprise	Total
23	27	129	1157	1030	79	50	14	397	19	3	374	3302

# Growing the Capability

*What happens after Level 5 . . .*

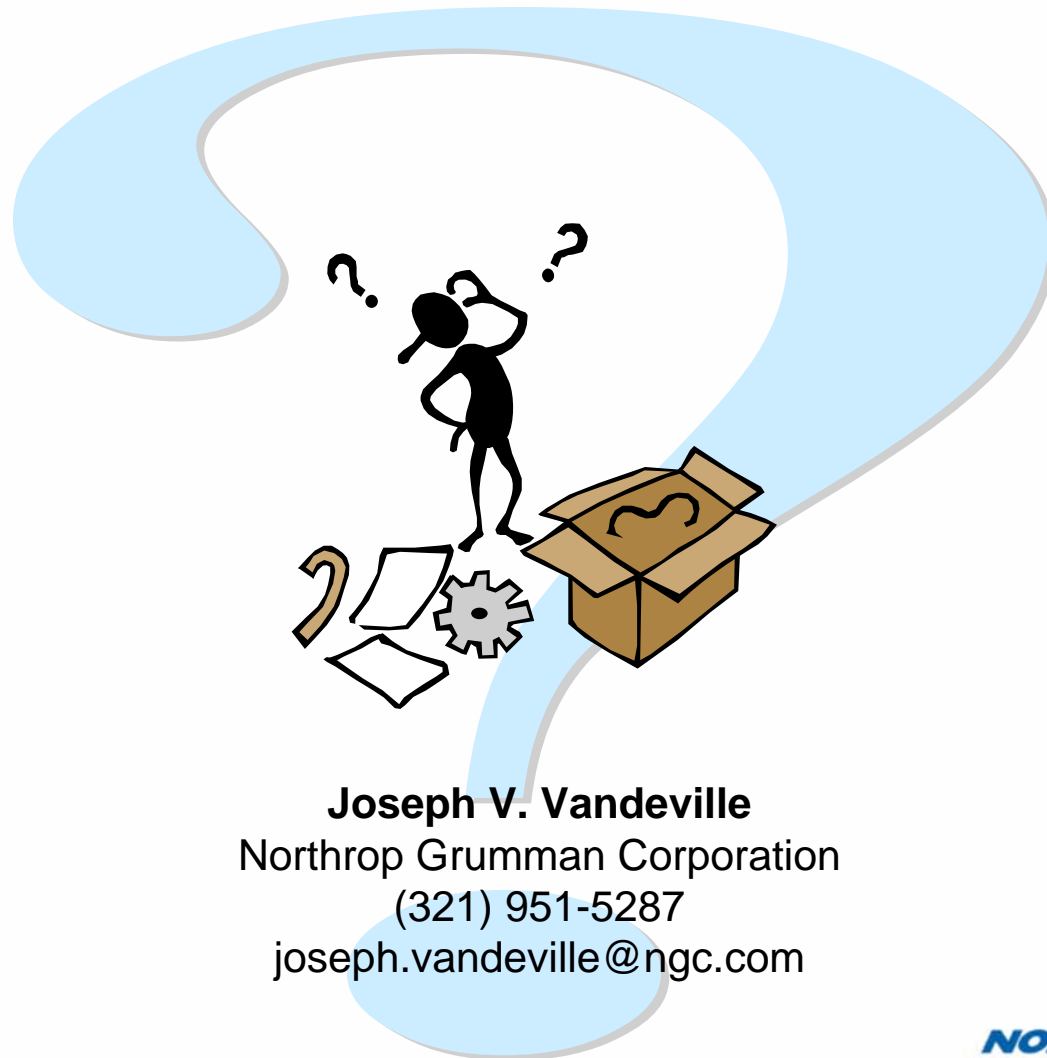


*. . . You Keep Improving*

# Summary

- **Don't be afraid to expand CMMI<sup>SM</sup> usage outside of engineering**
- **It may be easier to satisfy CMMI<sup>SM</sup> practices as you move outside of engineering**
- **Many non-engineering departments have excellent process capability - you can learn from them**
- **Executive management will likely be strong supporters of expand organizational scope**
- **Practitioners (especially project personnel) will likely be strong supporters - they recognize that many departments are needed to successfully develop products**
- **You may find redundant processes that can be streamlined and interfaces that can be improved**

# QUESTIONS



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