Carnegie Mellon
Software Engineering Institute

Pittsburgh, PA 15213-3890

Introduction to the CMMI® Acquisition Module (CMMI-AM)

Module 1:
Background

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Agenda

Introduction

About this Course

The State of Acquisition Practices

Capability Maturity Model Integration

Introductions

Instructor introductions

Participant introductions

- name
- position
- expectations
  - What do you want to get out of this course?

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Course Objectives

To acquaint the PM and PMO staff involved with the acquisition of software intensive systems with the need for process and process management

- at the supplier
- At the acquirer

Provide an overview of the CMMI Acquisition Module

Provide an overview of process improvement methods

Course Contents

Module 1 – Background
Course information and Background

Module 2 – CMMI-AM and Project Management
Project Management process areas, goals, and practices

Module 3 – CMMI-AM and Engineering
Engineering process areas, goals, and practices

Module 4 – CMMI-AM and Support
Support process areas, goals, and practices

Module 5 – CMMI-AM Generic Practices

Module 6 – Using CMMI-AM

Module 7 – Summary and Conclusion

Course Schedule

Time	Topic
0800	Breakfast
0830	1 Background
0915	2 CMMI-AM and Project Management
1000	**Break**
1015	2 CMMI-AM and Project Management (cont'd)
1200	**Lunch**
1300	3 CMMI-AM and Engineering
1430	**Break**
1445	4 CMMI-AM and Support
1545	5 CMMI-AM Generic Practices
1615	6 Process Improvement
1645	7 Summary and Conclusion
1700	**Adjourn**

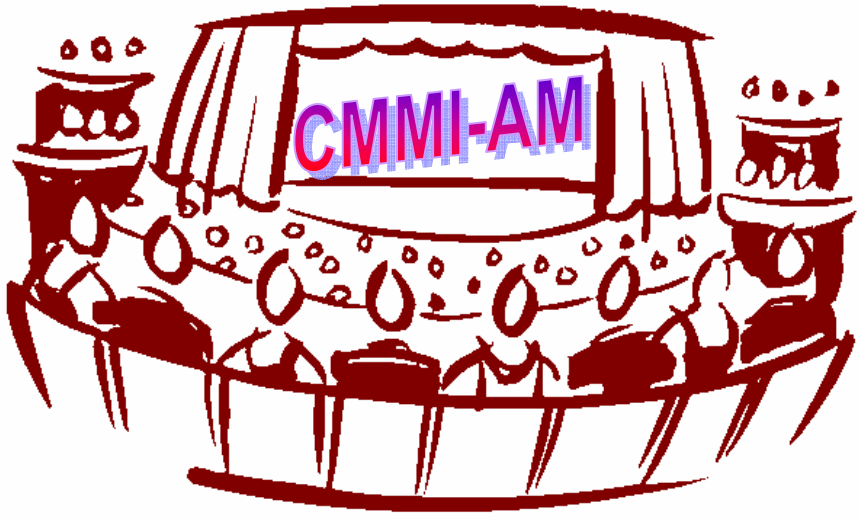
Audience

Program Managers (PMs)

Program Management Office (PMO) staff

- Engineering
- Contracts
- Logistics
- Finance
- Test

No prior knowledge of CMMI is required



Course Details

Course Approach

- Lecture
- Discussion
- Exercises

Course Materials

- Course Notebook
- CMMI-AM v1.1

Rules of Engagement

- Participate
- One person talks at a time
- Keep discussions to the point
- No attribution

Logistics

Rest rooms

Smoking rules

Breaks

Lunch

Phones

Messages

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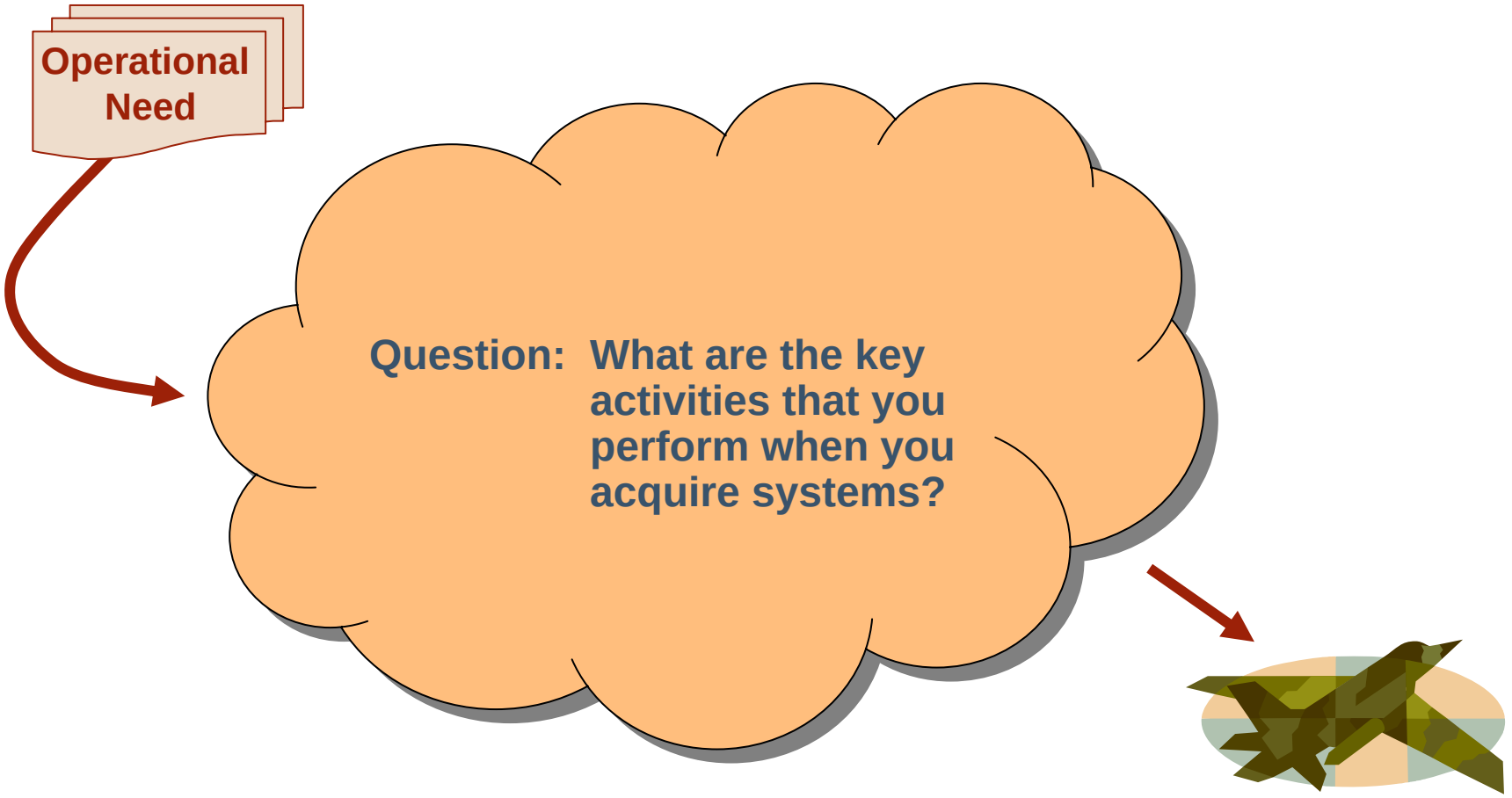
What is "Acquisition"



The State of Acquisition Practice 1

The agencies assume the partnership arrangement absolves them of all acquisition management responsibilities…" [GAO 99]

Virtually all (Air Force) software-intensive systems suffer from difficulties achieving cost, schedule, and performance objectives. [GAO 92]

"I'd rather have it wrong than have it late." A senior manager (industry)

"The bottom line is schedule. My promotions and raises are based on meeting schedule first and foremost." A program manager (government)

Lack of robust systems engineering practices identified as critical factor in SBIRS-High problems. Lt. Gen. Brian A. Arnold, USAF, CDR, USAF/SMC (5/6/02 Aviation Week)

The State of Acquisition Practice 2

Is There an Acquisition Crisis?

Investigation of one acquisition program showed:

- System complexity and the program's lack of experience in procuring major systems caused serious cost growth.
- Program lacks systems engineering and program management expertise.
- Absence of requirements stabilization process.
- Program management does not enforce timely milestones, timelines, and deliverables.
- Program's lack of process control made assessment of technical risk impossible.
- Program's lack of short- and long-term budget tracking makes cost assessment nearly impossible.
- Program does not manage risk.

The State of Acquisition Practice 3

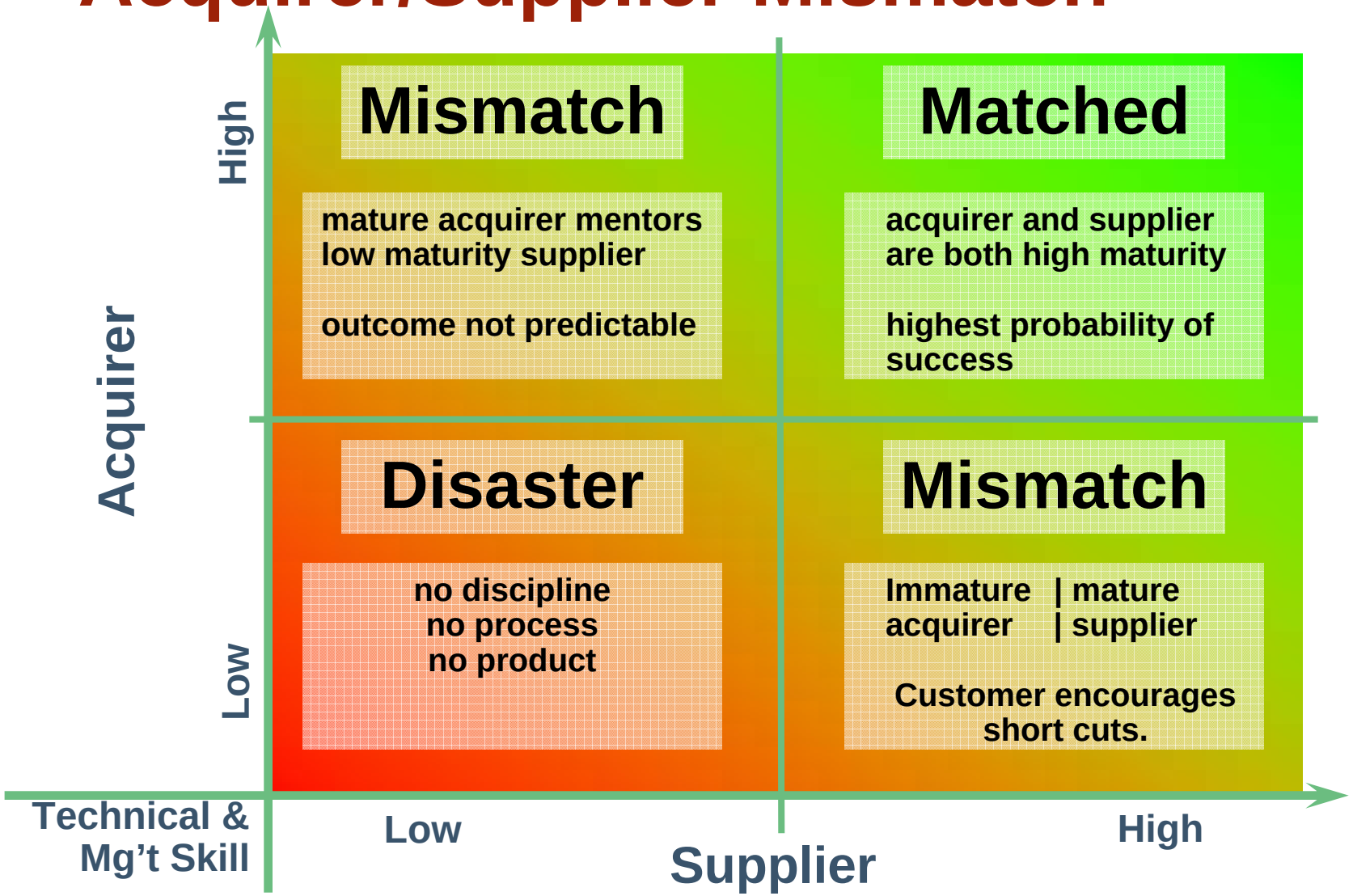
What's the Problem?

There are many. Among them,

- Evidence shows that an **acquirers management processes** and practices and resultant decisions can have a **negative impact** on the development processes of the supplier
- A **mismatch** in Acquirer/Supplier in terms of associated process capability and maturity can have **unpredictable** and even **disastrous results.**

And the challenges are increasing …

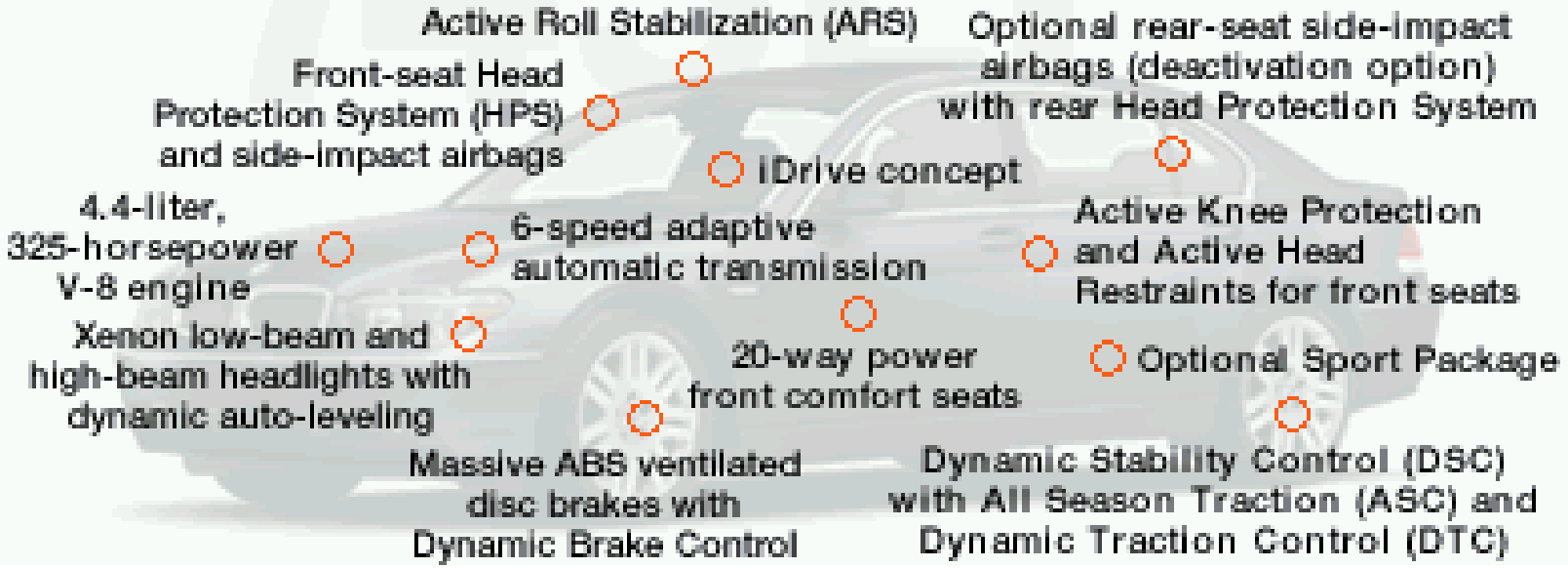
Acquirer/Supplier Mismatch



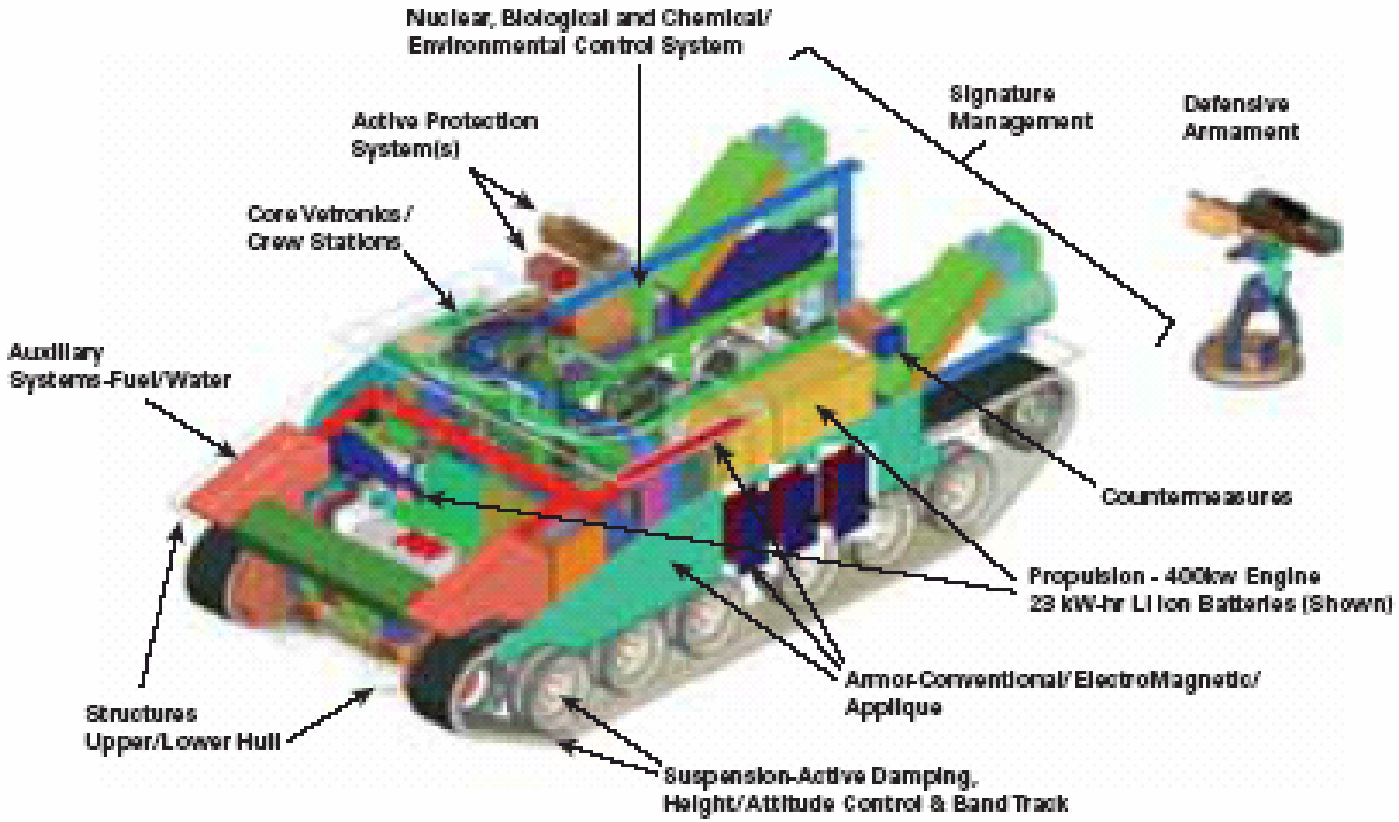
Complexity in Modern Systems

Many commercial products are the result of a complex mix of subcomponents engineered into a system

Most DoD weapon and information systems are *at least* this complex



Weapon System Complexity



FCS Manned Ground Vehicle concept

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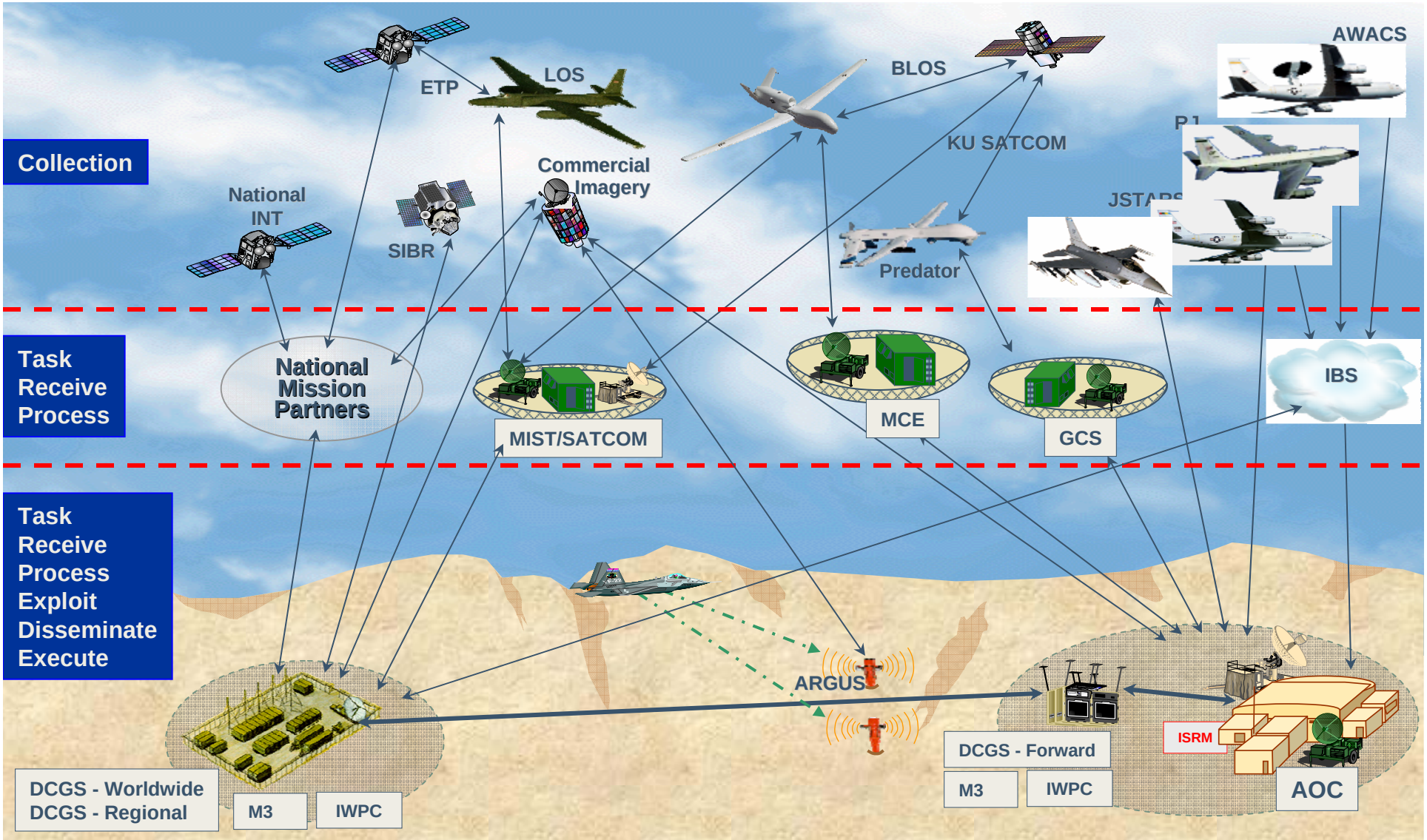
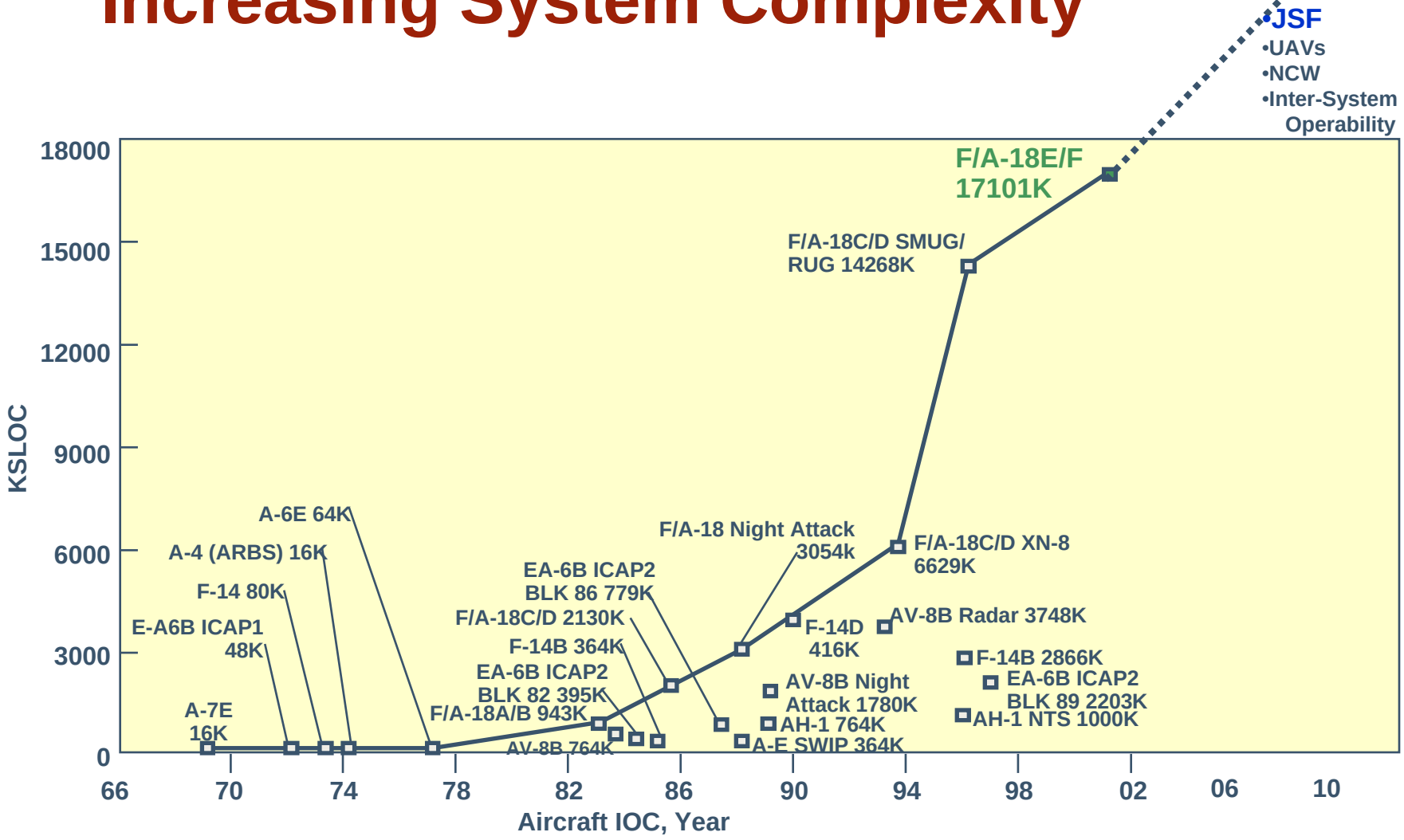
System of Systems Complexity

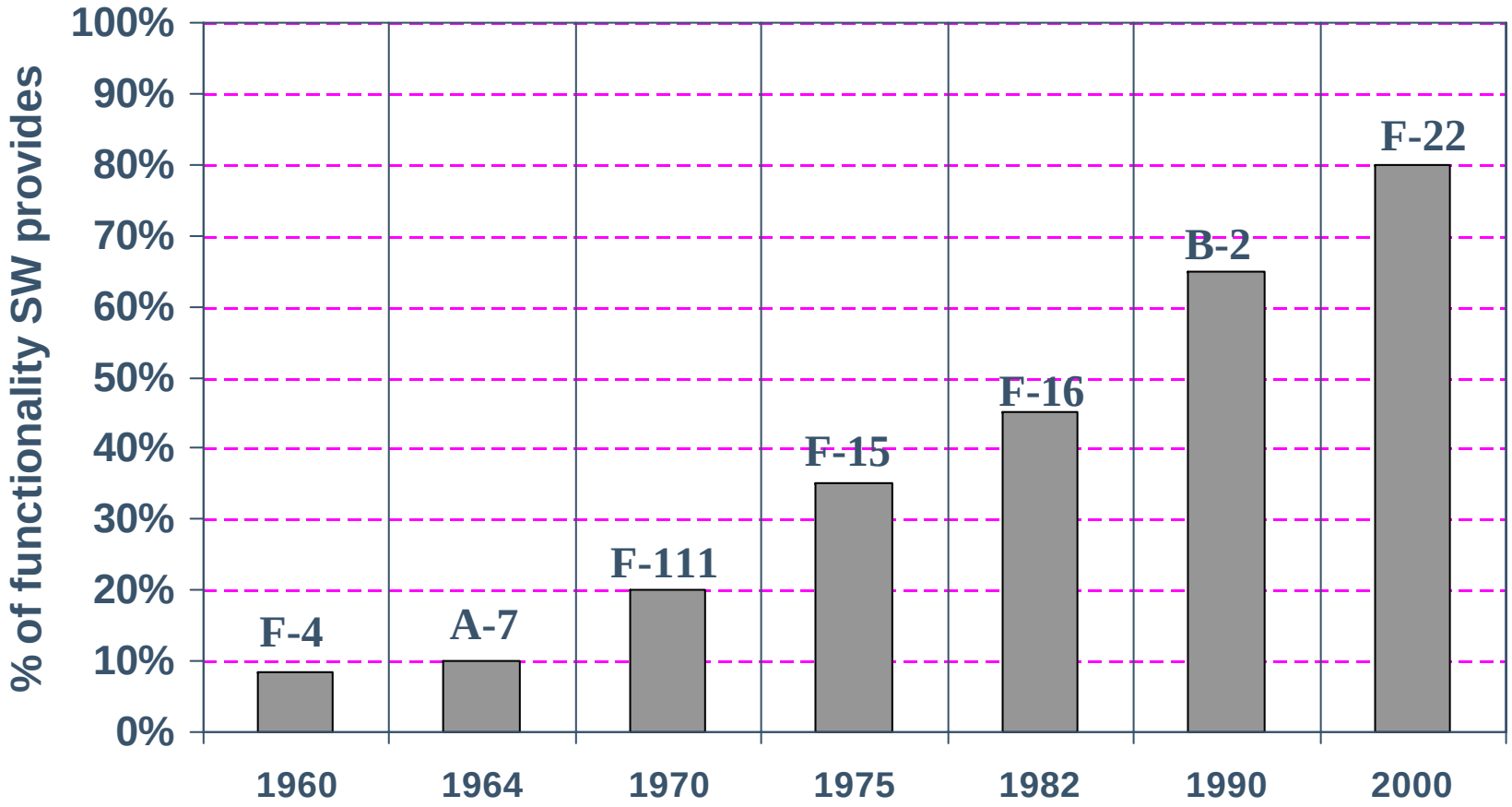


CMMI®

Increasing System Complexity



Functionality Provided by Software in DoD Systems is Increasing



Ref: Defense Systems Management College

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What Can Be Done?

Based on the premise that

The quality of the product is governed largely by the process used to create the product

We could improve the Supplier's process and practices

- But the developers have a head start (CMMI-based improvement programs are widespread)

We could improve the Acquirer's processes and practices by:

- increasing the visibility of the acquirers contribution to program success
- defining, implementing, measuring and evolving effective acquisition processes and practices

Why Focus on Process?

Process provides a constructive, high-leverage focus...

- **as opposed to a focus on people**
  - Your work force, on the average, is as "good" as it is ***trained*** to be.
  - Working harder is not the answer.
  - Working smarter, through process, is the answer.
- **as opposed to a focus on *technology***
  - Technology applied without a suitable roadmap will not result in significant payoff.
  - Technology provides the most benefit in the context of an appropriate process roadmap

How Do You Want to Work?

- Random motion – lots of energy, not much progress
- No teamwork - each person goes his own way
- Frequent conflict
- You never know where you'll end up

- Directed motion – every step brings you closer to the goal
- Coordinated efforts
- Cooperation
- Predictable results

Process can make the difference

What's the Alternative?

Progress, if any, is the result of individual heroics

- No hero = no progress
- New hero = start over

Diverse and parochial methods for every effort

- Lack of predictability - how = f(who, when)
- Lack of cooperation - Heroes often don't work well together
  - "Be reasonable. Do it my way!"
  - No sharing of "lessons learned"
- Continual retraining - Which method will you train

Why is Process Important?

Because process failure can be catastrophic

Process failure can result from:

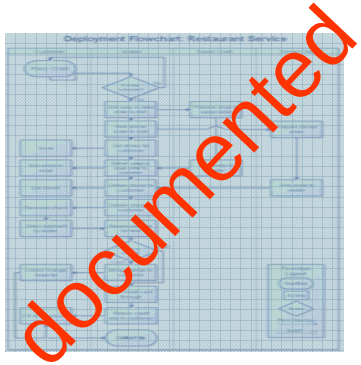
- Improper implementation
- Lack of discipline
- Noncompliance
- Poor execution

Petrobras oil platform

- Significant construction cost savings from bypassing rigid QA processes
- Sunk before commissioning

Microsoft
werPoint Presentati

Characteristics of Effective Processes



simple

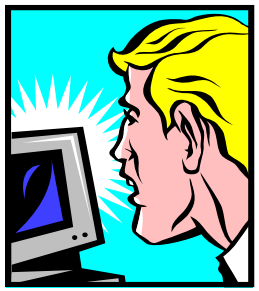
enforced

trained

measurable

flexible

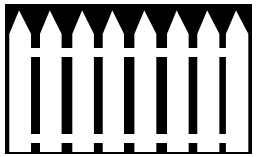
practiced



supported

STABLE

Well-defined gates



CMMI in a Nutshell

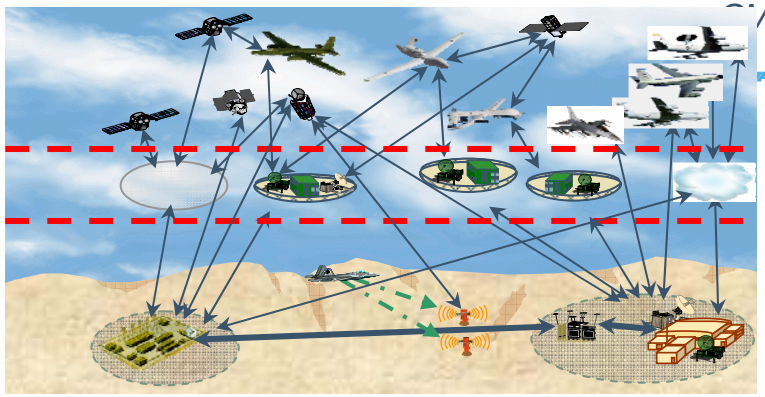
CMMI provides guidance for improving an organization's processes and ability to manage the development, acquisition, and maintenance of *products* or *product components*.

CMMI places proven approaches into a structure that

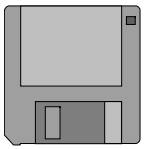
- helps your organization examine the effectiveness of your processes
- establishes priorities for improvement
- helps you implement these improvements

Improving processes for better products

Focus of CMMI



CMMI is applied here



SW-CMM is applied here

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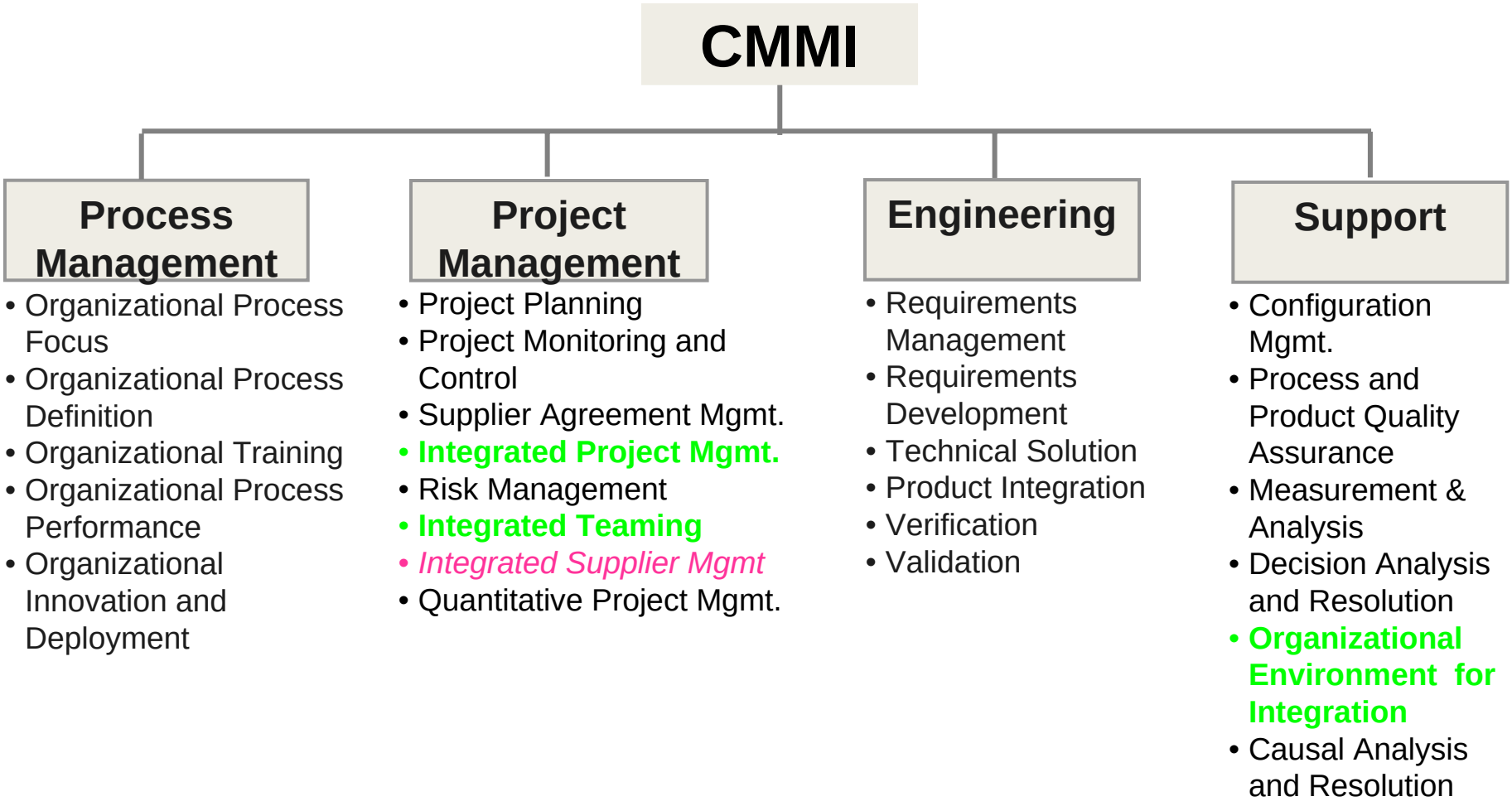
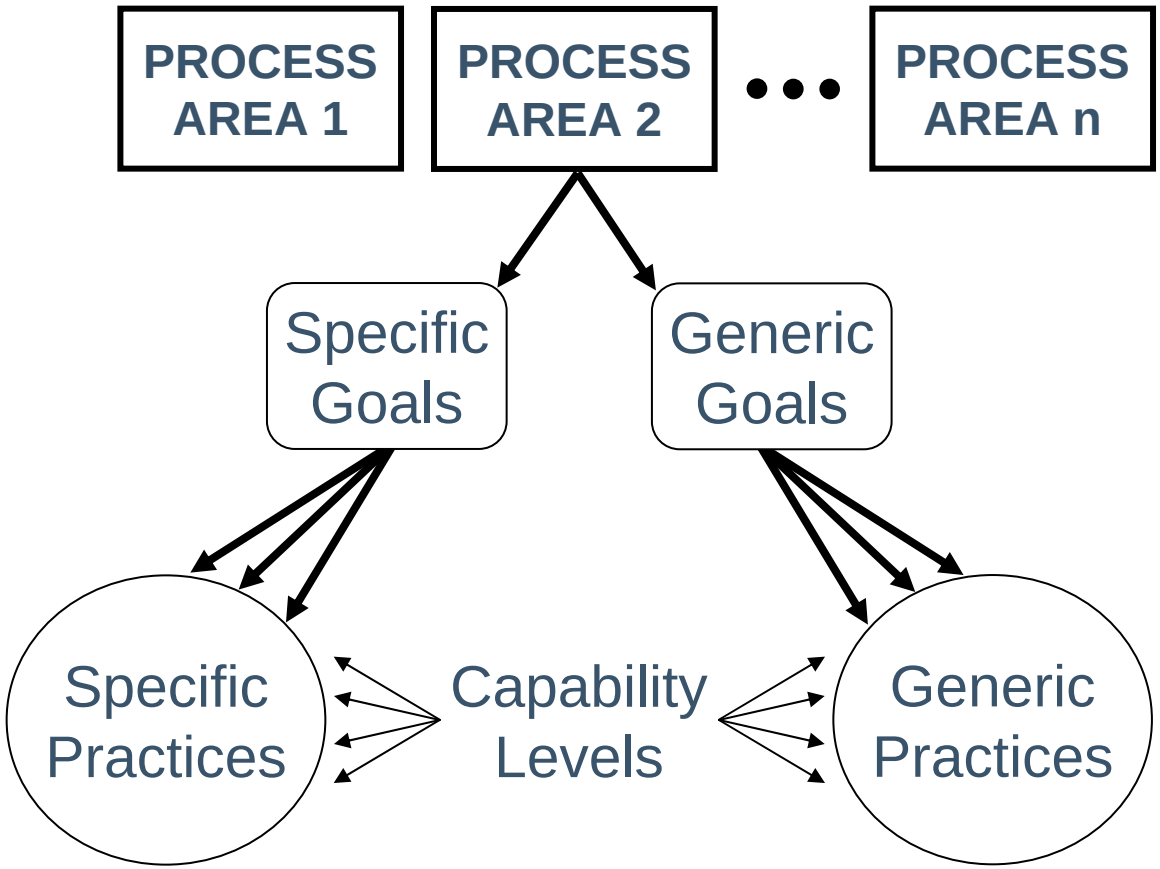
CMMI®

CMMI - Continuous SE/SW/IPPD/SS



Structure of CMMI 1



For CMMI-SW/SE

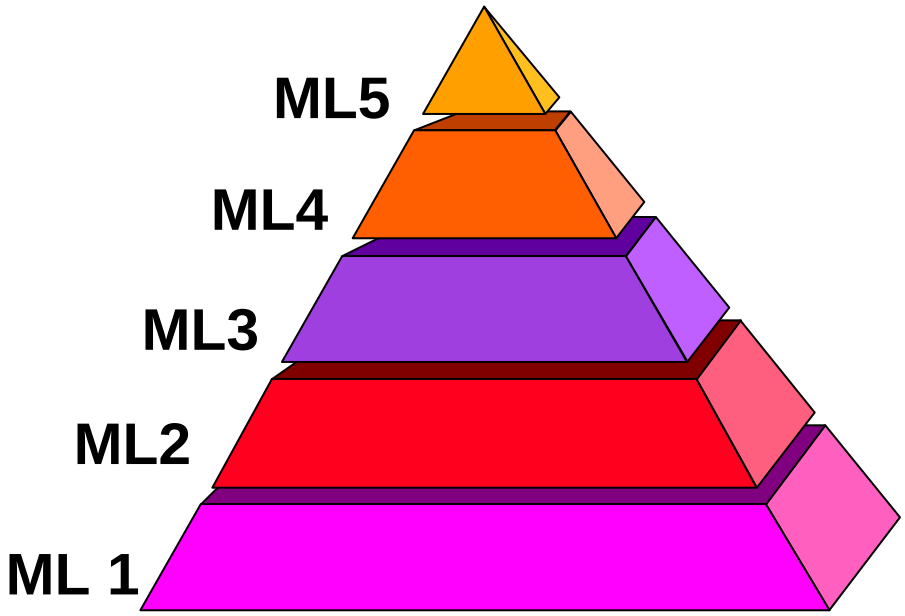
22 Process Areas

157 Goals

539 Practices

Perspectives on Maturity

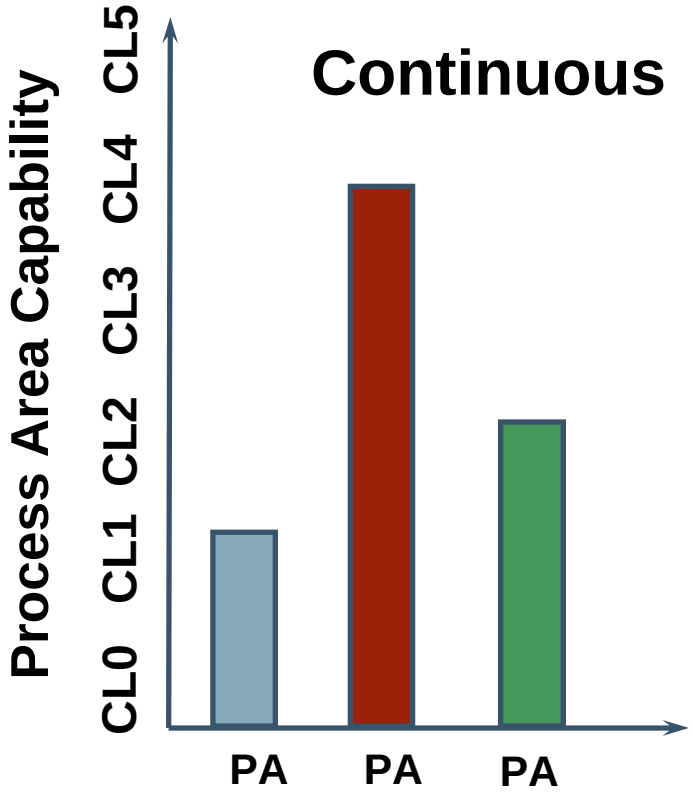
Staged



Organization-Focused

. . . for an established set of process areas across an organization

Continuous



Process-Focused

. . . for a single process area or a set of process areas

CONTRACTOR AND PROCESS

What Levels Tell Us

Levels are good indicators of *potential organizational performance*

They describe how the next project *could perform* based on a sampling of existing projects

Capability Levels and Maturity Levels reside at the organizational level (corporation, major division) and are not an indication of how any individual project *is performing*

Note: Sometimes a project is large enough to be considered an organizational unit (e.g. JSF, C-17)

Summary

Acquisition is a challenging multi-disciplinary effort occurring in a difficult environment, and demands for greater capabilities and increasing complexity are adding to this challenge.

Capable performance by **BOTH** the acquirer and the supplier are essential to program success

A focus on **PROCESS** at the acquirer and at the supplier can help.

CMMI is a **proven** and **widely accepted** process improvement model