

Finding Discipline in an Agile Acquisition Process

Tricia Oberndorf
Mary Ann Lapham
Michael Bandor
Charles “Bud” Hammons

Software Engineering Institute
Carnegie Mellon University
Pittsburgh, PA 15213

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Outline

The Question

On “Rigor”

A New IT Acquisition Process

Discipline in the Existing Process

Discipline in the New IT Acquisition Process

Recommendations



The Question:

How can rigor be accomplished within DoD's new IT Acquisition Process?

- In particular: how can the new IT Acquisition Process maintain rigor similar to that found in today's traditional approach while still achieving the objectives of a more flexible, responsive process?



Rigor – What Do We Really Want?

Rigor:

1a (1) : harsh inflexibility in opinion, temper, or judgment : severity
(2) : the quality of being unyielding or inflexible : strictness

...

b : an act or instance of strictness, severity, or cruelty

2 : a condition that makes life difficult, challenging, or uncomfortable;

3 : strict precision : exactness <logical rigor>

4a obsolete : rigidity, stiffness

b : rigidness or torpor of organs or tissue that prevents response to stimuli

c : rigor mortis



Discipline, not Rigor

Discipline:

1 : *punishment*

2 : *a field of study*

3 : training that *corrects, molds,* or perfects the mental faculties or moral character

4 : a rule or system of *rules governing conduct* or activity

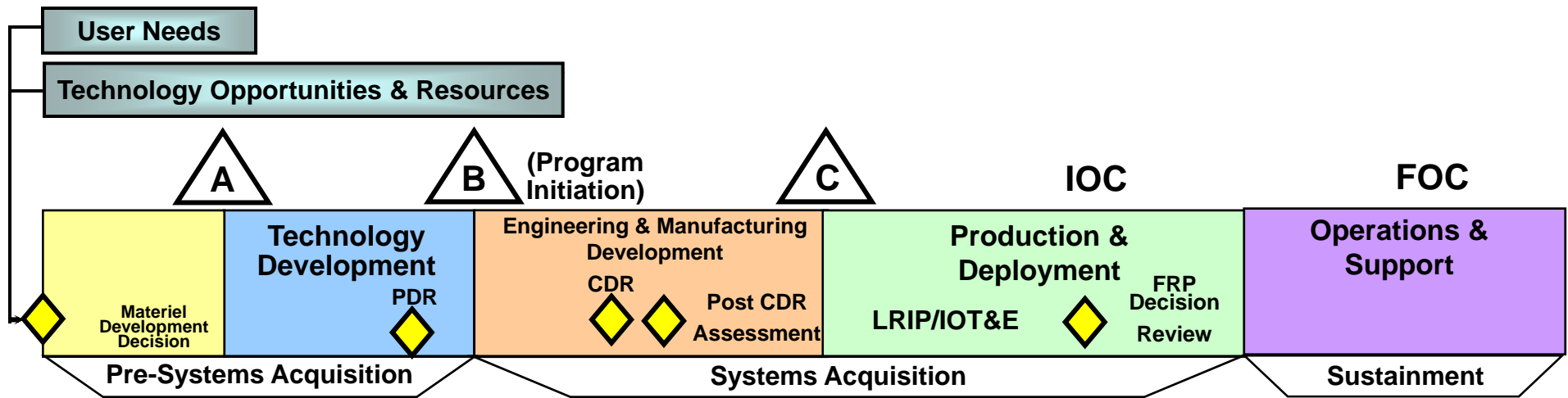
5 a : control gained by enforcing *obedience or order*

b : *orderly or prescribed conduct or pattern of behavior*

c : *self-control*



Defense Acquisition Business Process



Observations about Today's Process

Frequent underlying problems in programs using this model include

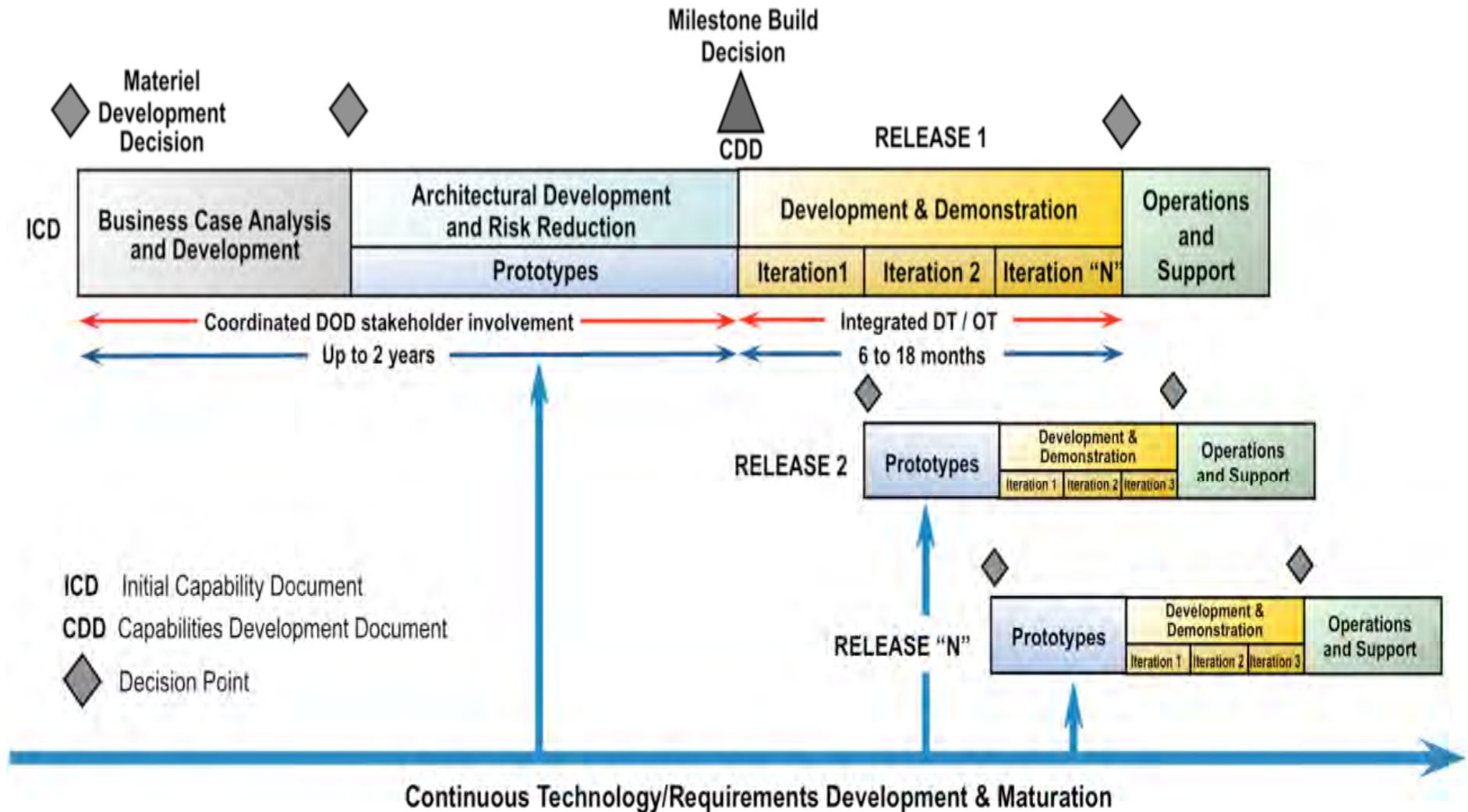
- lengthy gestation periods
- management of requirements
- failures in acceptance tests

Significant duration of typical program leads to heavy dependence on documentation to maintain “corporate memory.”

***The undesirable side effects of early decisions,
both technical and non-technical,
only become visible years later,
usually during integration and test***



DSB Report: New Acquisition Process for IT



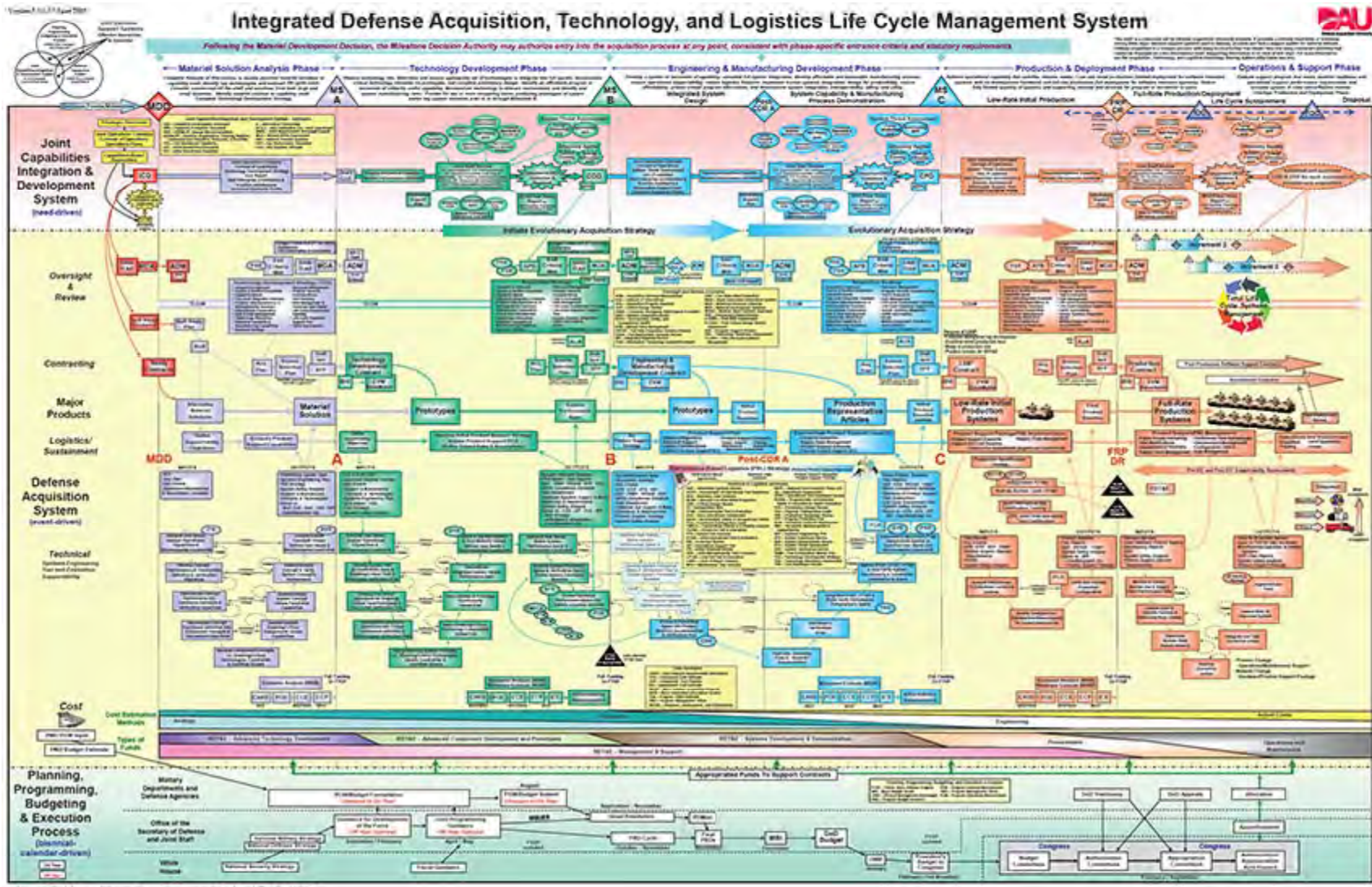
Tenets of a New IT Acquisition Process

Some key features of the new IT acquisition process:

- frequent, usable releases of capability
 - early, successive prototyping to support an evolutionary approach
 - deliver early and often
 - incremental and iterative development and testing
 - executable and testable product
- early and continual involvement of the user
- rationalized requirements
- modular, open systems approach with standard interfaces
- knowledgeable and experienced IT workforce
- flexible, tailored processes



Discipline in Today's Approach



Features of Today's Discipline

External scrutiny by decision makers

- mandated decision events (Milestones A, B, C, ...)

Operational expectations documented in the Initial Capabilities Document (ICD) and Capabilities Development Document (CDD) artifacts

- informal English language specifications

Numerous *plans* to document both business and technical approaches

- by program offices and contractors
- from management of technology to deployment

Documentation of *processes with compliance audits*

- ensuring that processes are followed

Financial *performance reported against plan* (earned value)

Identification and management of *risks*



Key Elements of Today's Process

Requirements: key artifacts used to

- govern development
- form the basis of major reviews
- orchestrate product evaluation, user acceptance, sell-off

Systems engineering documentation:

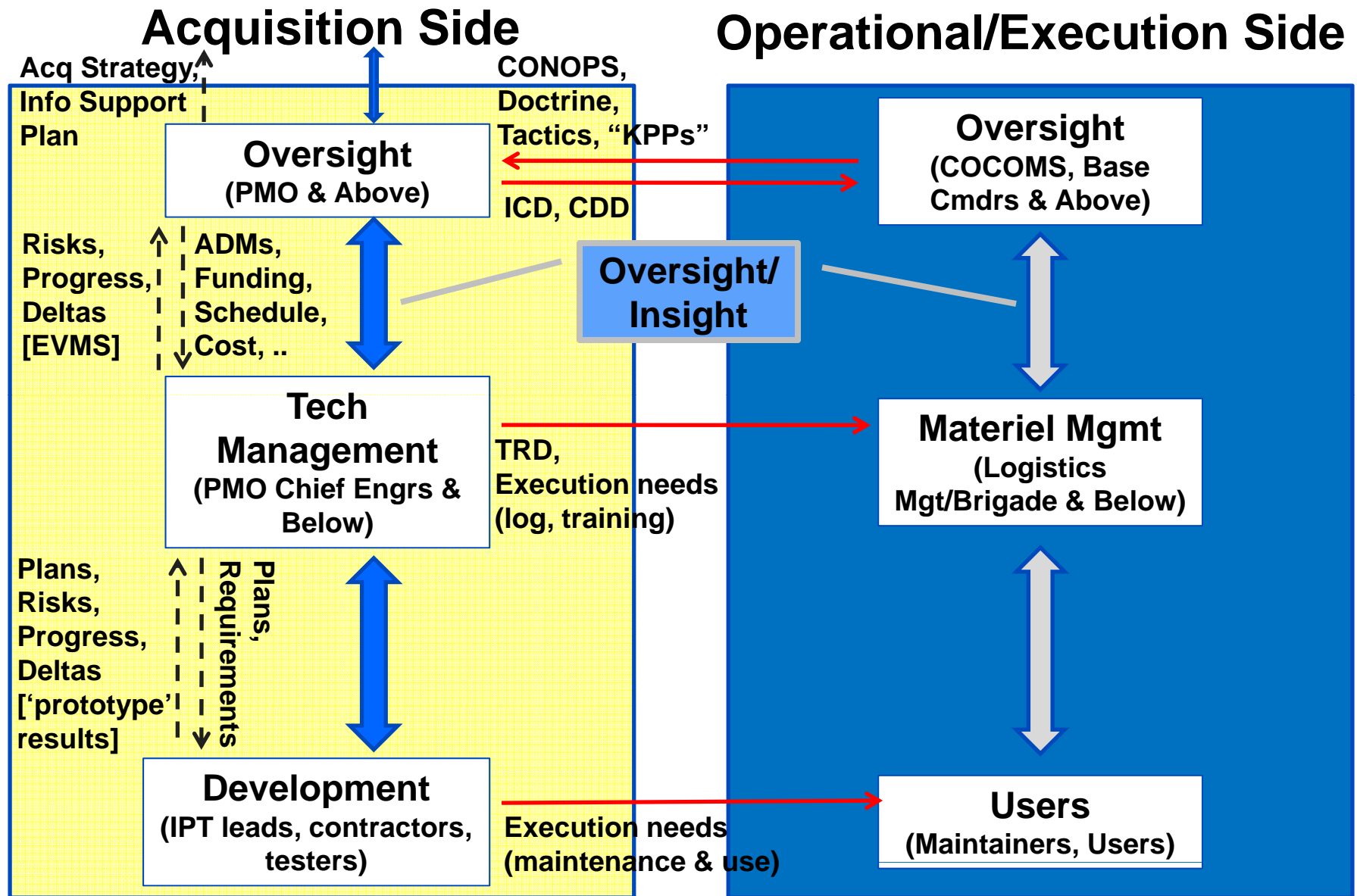
- Subject Matter Experts (SMEs) at various levels
 - act in part as advocates for their *perception* of user expectations
- users sporadically involved (e.g., attend reviews) until field trials and acceptance testing

Reviews:

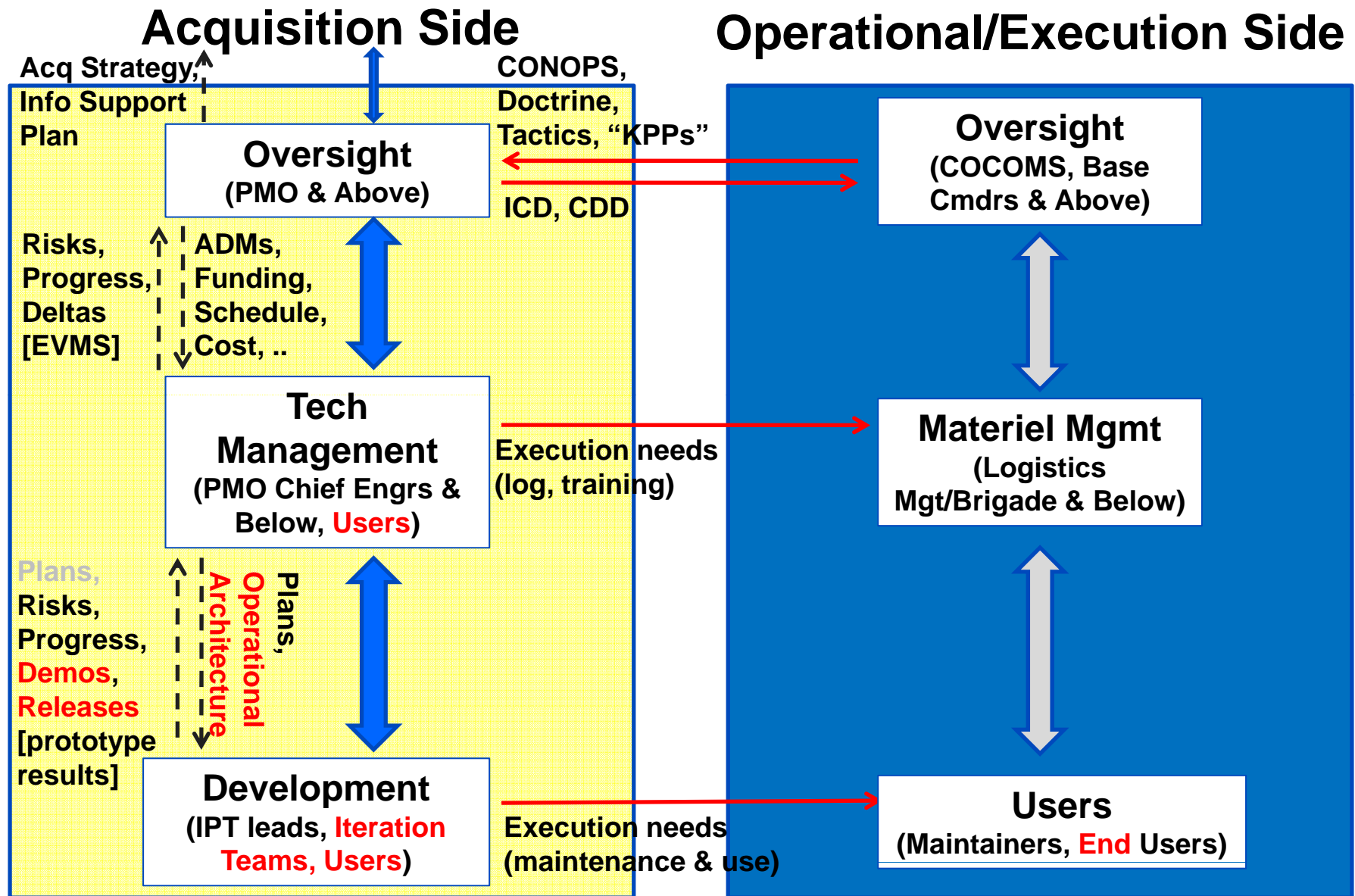
- progressively more detailed evaluations of information about product(s)
- synchronized with major decision points to provide basis for decision makers to appropriately intervene to influence development.



Model of As-Is Discipline



Discipline in the New IT Acquisition Process



Highlighted Differences

- The content of the information flows
- Deltas include
 - familiar items (deviations from plans and requirements)
 - use cases deferred to future iterations/releases, based on experience in a given iteration/release
- Demonstrations and formal Releases provide feedback
- Use cases:
 - take the place of functional requirements
 - give actionable specification of behavior as well as the context
 - provide direct mapping to testing and evaluation

The central role formerly served by requirements is replaced by the *Operational Architecture*.



The Operational Architecture

A structured representation of:

- doctrine, tactics, and CONOPS
- the set of use cases that formally characterize behavior of the envisioned system in operational terms
- quality attributes that characterize performance and other system-level characteristics of the envisioned system
 - beyond the functions the system will perform, e.g., security, reliability
- the range of technology to be employed
- constraints such as mandated standards

Evolves

- through the information and experience gained in each iteration
- across multiple releases
- becomes the living information about the system context



Discipline in the New IT Acquisition Process₁

External scrutiny by decision makers at mandated decision events as well as the end of iterations and releases

- short duration of iterations and releases provides feedback to decision makers on choices they personally made, enabling corrective actions

Operational expectations:

- well-formed use cases more detailed than typical CDDs
 - retains context and fine points influencing the behavior
 - more likely to be directly usable by development team
- Operational Architecture more actionable explication of user expectations, constraints, quality attributes

Plans and compliance audits

- frequent sprints of much shorter duration require less elaborate plans
- compliance audits replaced by regular delivery of executable capability



Discipline in the New IT Acquisition Process₂

PLUS

Personnel

- time-constrained iterations force personnel from all disciplines/roles to work together repeatedly
 - amplifies experience in executing all parts of development cycle together, from up-front systems analysis to test, integration, and deployment

Deltas

- use case deferrals, shortfalls, test deficiencies are in domain-relevant language of end users and decisions makers
 - avoids translation from technical to domain terminology



Bottom Line

When we speak of discipline, we are advocating the creation of a more disciplined mechanism (structures + processes) to:

- describe user expectations
- enhance communications between user and acquisition/developer communities
- acknowledge there is of necessity an evolving understanding of what is operationally required

❖ *The Operational Architecture is the key set of artifacts that document the results of the employment of this mechanism.*

❖ *The processes and mechanisms establish the ongoing interaction among players in the user and acquiring organizations.*



Recommendations

- Conduct effort to take this approach down to the next level of detail
- Make some additions to the proposed process:
 - Begin each iteration with an architecture segment
 - Assess architecture and potential extensions/revisions
 - Begin each release cycle with a reassessment of the business case
 - Capture what has changed in system context and environment
- Revise the culture
 - Organizational structure, rewards systems, communication style, decision-making style, staffing model (roles, team make-ups, etc.)
- Look for personnel with special traits
 - Self-starters, team players, multiple roles, communicators, adaptable
- Institute new training
 - Assists with culture change
- Resolve issues in customer interaction
 - Access to true end users is an essential element of the new process



QUESTIONS ?



Contact Information

Mary Ann Lapham

Senior Member of Tech Staff
Acquisition Support Program
412-268-5498
mlapham@sei.cmu.edu

Tricia Oberndorf

Senior Member of Tech Staff
Acquisition Support Program
412-973-3459
po@sei.cmu.edu

U.S. Mail

Software Engineering Institute
Customer Relations
4500 Fifth Avenue
Pittsburgh, PA 15213-2612
USA

Web

www.sei.cmu.edu



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Acronyms

CDD: capabilities development document

CDR: critical design review

COCOMS: combatant commanders

CONOPS: concept of operations

DAU: Defense Acquisition University

DSB: Defense Science Board

DoD: Department of Defense

DT: developmental test

EVMS: earned value management system

FOC: full operational capability

FRP: full rate production

ICD: initial capability document

IOC: initial operational capability

IOT&E: operational test and evaluation

IPT: integrated product team

IT: information technology

KPP: key performance parameter

LRIP: low rate initial production

OT: operational test

PDR: preliminary design review

PMO: program management office

SME: subject matter expert

TRD: technical requirements document

