Making Acquisition Measurable
FY 2010 National Defense Authorization Act (NDAA) Section 804 Principles

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Agenda

- **Motivation**

- **Objective**

- **Early and Continual Involvement of the User**
  - Engaging with Users
  - Different Types of Users Targeted
  - Proposed User Engagement Program
  - Proposed User Engagement Metrics Categories
  - Proposed High Priority User Engagement Metrics

- **Best Practices Mapped to New IT Acquisition**

- **Relationships among Section 804 Principles**

- **Key Discoveries**

- **About Metrics Derivation**

- **Recommendations for Your Program Office**

- **Applying What We Learned to Developing a New System**
  - What is Composable Capability on Demand (CCOD ®)
  - Acquisition for Composable Systems

- **References**

Motivation

- **Department of Defense (DoD) was directed by Congress to design a new IT acquisition process**

  - Direction references Chapter 6 of the March 2009 Defense Science Board (DSB) Task Force Report on Policies and Procedures for the Acquisition of IT

  - The mandate targets four principles:

    - Early and continual user involvement

    - Multiple, rapidly executed increments or releases of capability

    - Early, successive prototyping to support an evolutionary acquisition

    - Modular, open systems approach (MOSA)

- **How will programs measure, monitor, and report adoption of the principles in the new process?**

  - Need a foundation for improving how acquisition performance is managed

    - According to the House Armed Services Committee Panel on Defense Acquisition Reform, a critical area of weakness is the lack of a formalized performance management methodology

*2010 National Defense Authorization Act (NDAA) Section 804, "Implementation of New Acquisition Process for IT Systems"

Objective

- **Help programs effectively measure, monitor, and report progress in achieving IT acquisition outcomes**

  - Desired impact:

    - Increased agility

    - Reduced cost growth

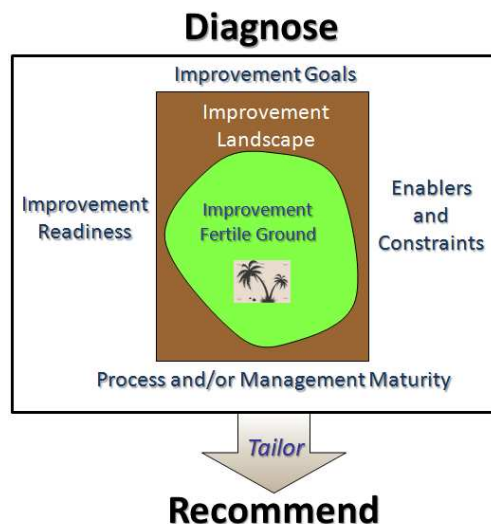   - Increased meaningful deliveries

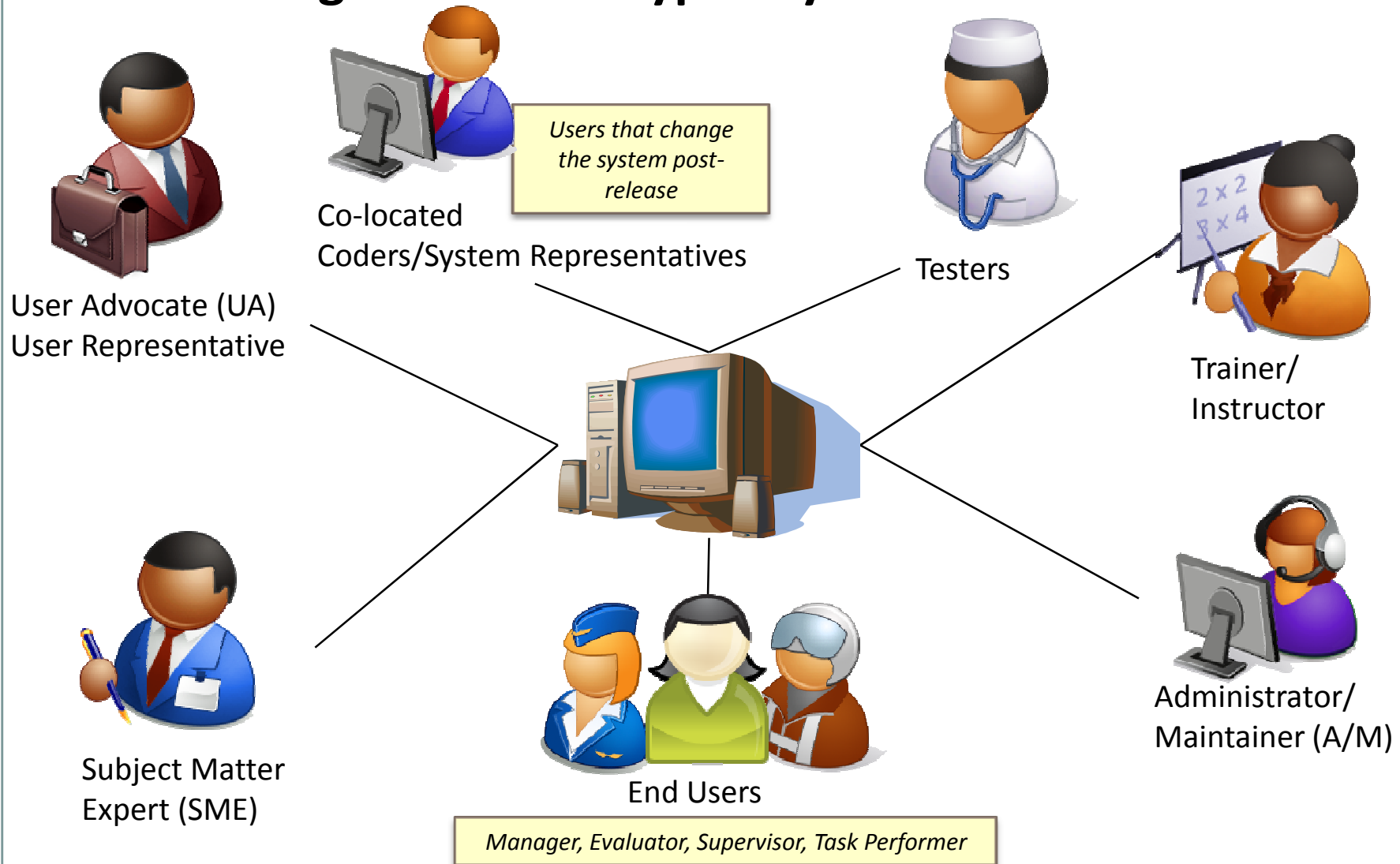Flexibility

and

Speed

- **Propose a diagnostic to help IT programs manage performance**

- **Accommodate tailoring**

Engaging with Users

- **Our focus was on Early and Continual User Involvement (UI)**
  - We first interviewed users across Federal government programs
- **What we heard from users during our interviews:**
  - "We liked it when they came to us, showed us a new capability and then returned with changes that we had suggested"
  - Developers should not be involved too early in the process
  - "The program office should come out and see the pain that we experience using the system; they would understand the requirement better"
  - "Users should also talk amongst themselves"
  - User representatives in the program office should come from the users' organization
  - "Consistency in interactions on a cadence that is predictable is important to obtaining desired capabilities"

Different Types of Users Targeted

- **We identified a number of different types of users with whom Program Offices typically must interact**

User Advocate (UA)
User Representative

Co-located
Coders/System Representatives

Users that change the system post-release

Testers

Trainer/ Instructor

Subject Matter Expert (SME)

End Users

Manager, Evaluator, Supervisor, Task Performer

Administrator/ Maintainer (A/M)

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Proposed User Engagement Program

- **Based on our investigations, we recommend key elements of a "User Engagement Program"**

Effective and Efficient User Engagement

Fundamental Leading Indicators:

(1) Are users engaging?

(2) Are the right users engaging with the right PMO reps?

(3) Are the right engagement approaches applied?

(4) Are the right events and issues driving the need to engage?

(5) Are user engagement feedback loops closed effectively and in a timely manner?

(6) Is the user engagement process enabled (resources, championship)?

Engagement Program

User Involvement Risk Reduction
Functionality Risk Reduction
Data/Information Verification

Goals, Impact & Value Expectations

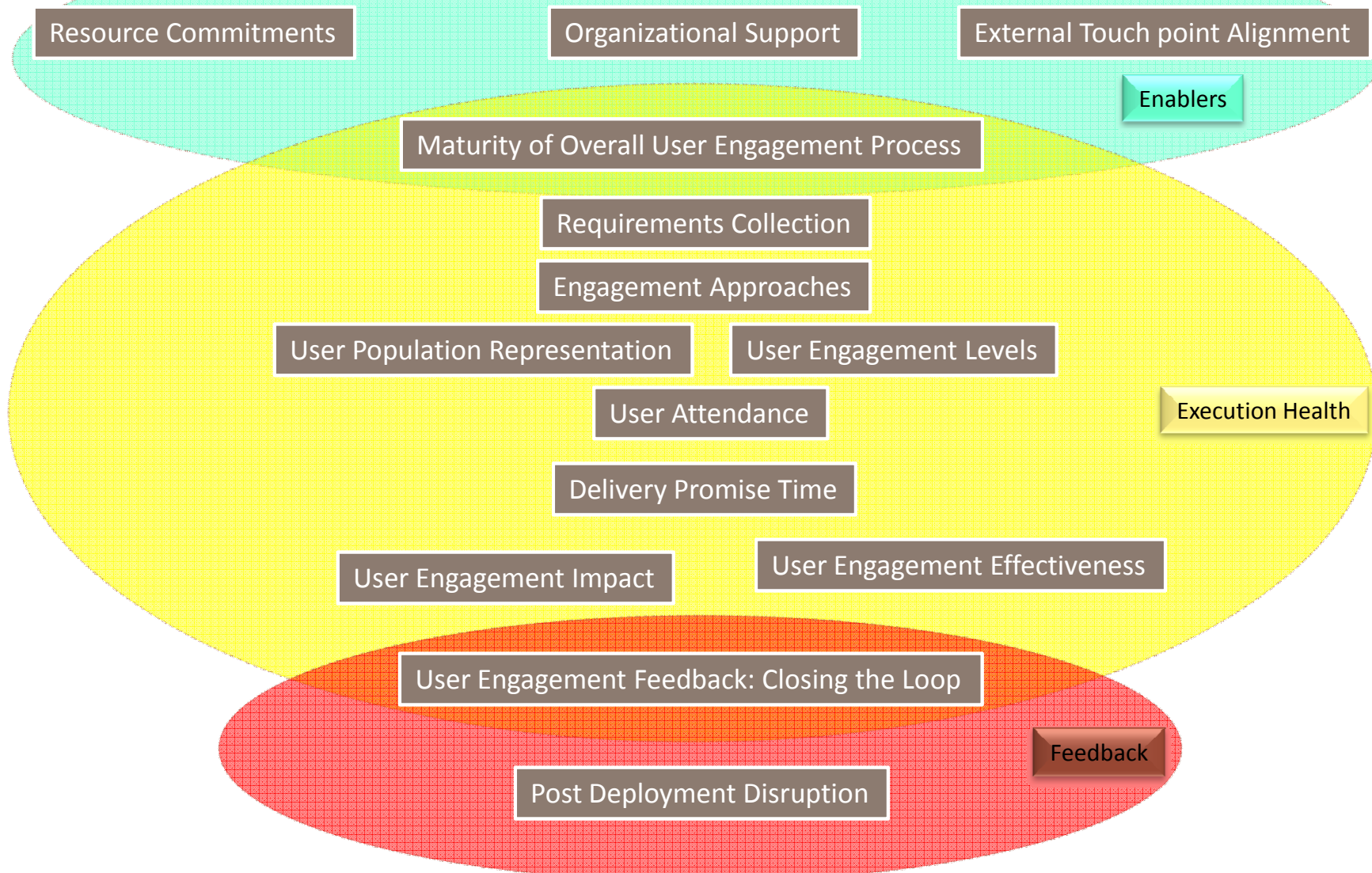User Representation

Commitments & Relationship Mgt

Engagement & Communication Methods

Processes & Plans Alignment and Tracking

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Proposed User Engagement Metrics Categories

- **Proposed metrics categories fall into three key measurement areas: enablers, execution health, and feedback**

Resource Commitments

Organizational Support

External Touch point Alignment

Enablers

Maturity of Overall User Engagement Process

Requirements Collection

Engagement Approaches

User Population Representation

User Engagement Levels

User Attendance

Execution Health

Delivery Promise Time

User Engagement Impact

User Engagement Effectiveness

User Engagement Feedback: Closing the Loop

Feedback

Post Deployment Disruption

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Proposed High Priority User Engagement Metrics

- **The most meaningful metrics for assessing current user engagement progress and impact will vary, but we suggest that Program Offices consider the following process-, financial-, activity-, and outcome-oriented metrics**

Process-oriented — Maturity level of user engagement process

Outcome-oriented

Financially-oriented — # funded user engagement activities

Promised delivery date deviation

Activity-oriented
- % events conducted in user environment
- % user issues for which disposition has been communicated to user
- # scheduled requirements-related events/phase
- % of engagements where appropriate users and PMO representatives are present
- % engagements that are conducted using the appropriate engagement method

Ratio of accepted vs. rejected requirements

Legend:

Leading Indicator

Lagging Indicator

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About Metrics Derivation

- **Not everything that can be measured necessarily should be measured**

- **It is easy to identify metrics; it is much harder to identify the value of those metrics in demonstrating improvement progress and impact**

- **Context must be provided for metrics recommendations:**

  - Why this metric?
  - Method to measure and units of measure
  - Interdependencies and strength of interdependencies
  - Importance of metric to characterization of outcome achievement
  - Level of confidence that metric effectively communicates progress toward achievement of outcomes
  - Key perspectives of health characterized by the metric

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Applying Metrics Derivation Lessons

- **For example,**

> % of engagements where appropriate users and PMO representatives are present

- ○ Why this metric?
  - ✕ Our investigations-to-date strongly suggest that key outcomes associated with acceptance of requirements and adherence with delivery schedules are strongly influenced by the % of engagements where the right users and PMO reps are present

- ○ Method to measure and units of measure

$$\left(\frac{\text{\# of engagements during the specified timeframe in which the most appropriate users and PMO reps are present}}{\text{\# of user engagements during the specified timeframe}} \right) \text{ X } 100$$

- ○ Interdependencies and strength of interdependencies
  - ✕ On a scale of weak to strong influence, this metric is strongly influenced by "maturity level of user engagement process"
  - ✕ Moderately influenced by "% events conducted in user environment"

- ○ Importance of metric to characterization of outcome achievement
  - ✕ On a scale of slightly to very important, this metric is moderately important to achievement of key outcomes associated with acceptance of requirements and adherence with delivery schedules

- ○ Level of confidence that metric effectively communicates progress toward achievement of outcomes
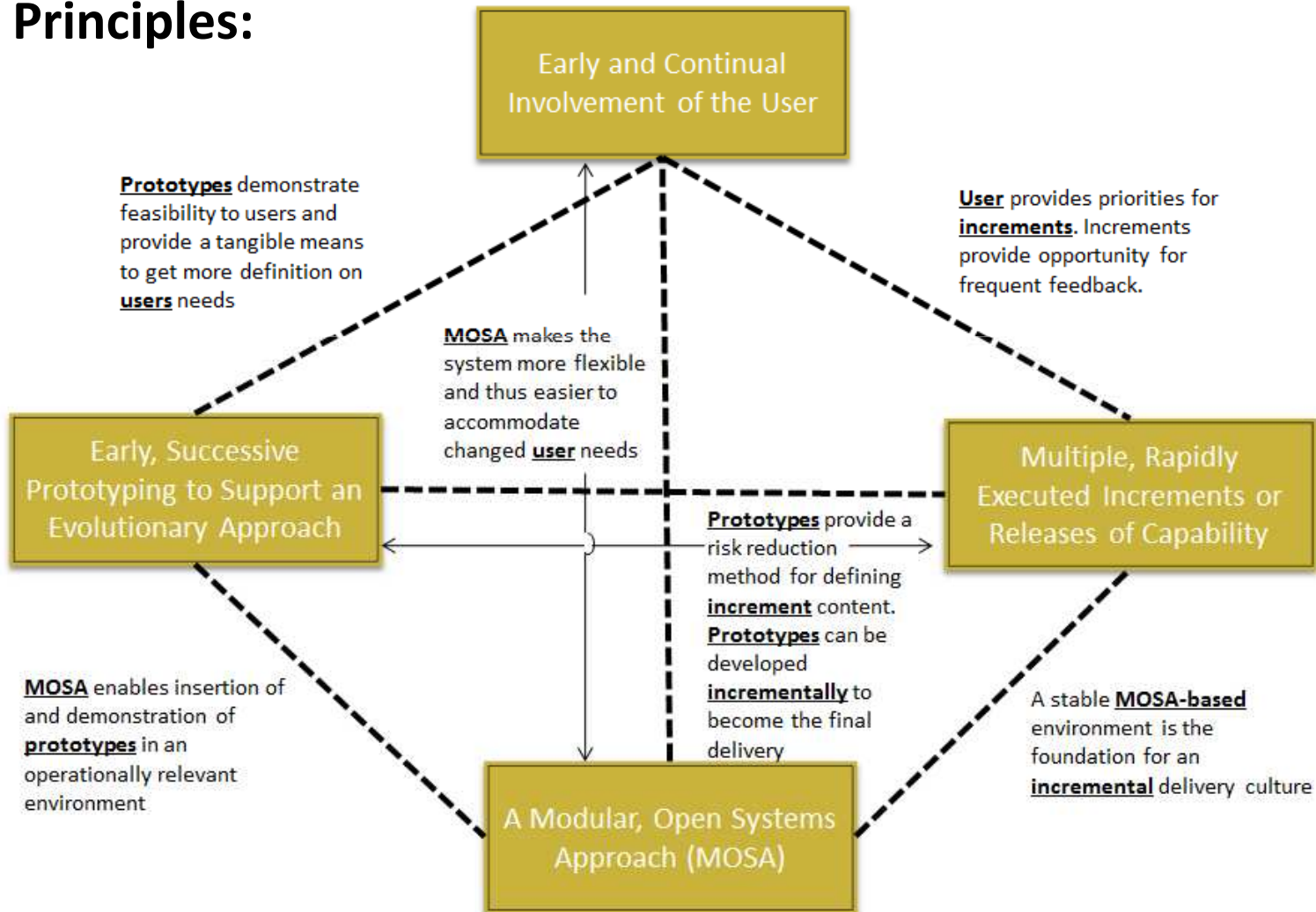 - ✕ On a scale of 1 to 100, with 100 meaning extremely confident, we are 75% confident that this metric communicates progress toward achievement of outcomes

- ○ Key perspectives of health characterized by the metric
  - ✕ Key perspectives of health characterized by this metric include effectiveness of user engagements and efficiency associated with obtaining user feedback

- **We then explored the relationships between Early and Continual User Involvement and the other three NDAA Section 804 Principles:**

Early and Continual Involvement of the User

Prototypes demonstrate feasibility to users and provide a tangible means to get more definition on **users** needs

User provides priorities for **increments**. Increments provide opportunity for frequent feedback.

MOSA makes the system more flexible and thus easier to accommodate changed **user** needs

Early, Successive Prototyping to Support an Evolutionary Approach

Multiple, Rapidly Executed Increments or Releases of Capability

Prototypes provide a risk reduction method for defining **increment** content. **Prototypes** can be developed **incrementally** to become the final delivery

MOSA enables insertion of and demonstration of **prototypes** in an operationally relevant environment

A stable **MOSA-based** environment is the foundation for an **incremental** delivery culture

A Modular, Open Systems Approach (MOSA)

Best Practices Mapped to IT Acquisition *(per DSB Report)*

Best Practices Mapped to New IT Acquisition Lifecycle Phases	Business Case Analysis and Development	Architectural Development and Risk Reduction	Development & Demonstration	Operations & Support
Early and Continual Involvement of the User				
Voice of the customer	✔	✔	✔	✔
Customer relationship management supported by customer communications management	✔	✔	✔	✔
Customer satisfaction enabled by enterprise feedback management	✔	✔	✔	✔
Collaboration management	✔	✔	✔	
User-centered design & Usability			✔	
Customer service				✔
Multiple, Rapidly Executed Increments or Releases of Capabiltiy				
Capability Maturity Model Index (CMMI) - Acquisition (AQ)	✔	✔	✔	✔
CMMI-Development			✔	
Incremental iterative development (planning & execution)	✔	✔	✔	
Early, Successive Prototyping to Support an Evolutionary Approach				
Demonstration of applicable technology	✔	✔		
Demonstration of design possibilities		✔	✔	
Demonstration of requirements fulfillment		✔	✔	
MOSA				
Establish Enabling Environment	✔	✔	✔	
Employ Modular Design		✔	✔	
Designate Key Interfaces		✔	✔	
Use Open Standards		✔	✔	
Certify Conformance			✔	

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Key Discoveries

- **Government program application of some DSB-recommended principles** *(e.g., Multiple, Rapidly Executed Increments or Releases of Capability)* **is more advanced than for other principles** *(e.g., Early and Continual Involvement of the User)*

- **Considerable performance data is typically collected; should investigate its effectiveness for IT Acquisition programs**

- **Standardized methods within the DoD for selecting acquisition program metrics and monitoring performance could not be identified**

- **Measuring adoption of the principles will require considering program circumstances**

- **The four DSB-recommended principles within NDAA Section 804 are not necessarily the only important principles**

- **Need to share a common understanding of how the acquisition principles link to desired outcomes**

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Recommendations for Your Program Office

- **Provide additional venues for users to communicate with procurement professionals (acquirers and developers)**

- **Let users know where their system program office is and how to provide good ideas to them**

- **Plan to align in situ capability development sessions with program increment planning to reduce requirements ambiguity**

- **When many systems deploy to a location, conduct a system environment study to determine impacts on user productivity**

- **Formulate an alliance with operating agencies to help alleviate non-performance of systems when deployed**

Applying What We Learned to Developing A New System

USING HIGH CONTACT USER ENGAGEMENT METHODS, SUCH AS GAMING, TO DEVELOP ACQUISITION STRATEGIES FOR COMPOSABLE CAPABILITIES ON-DEMAND (CCOD®)
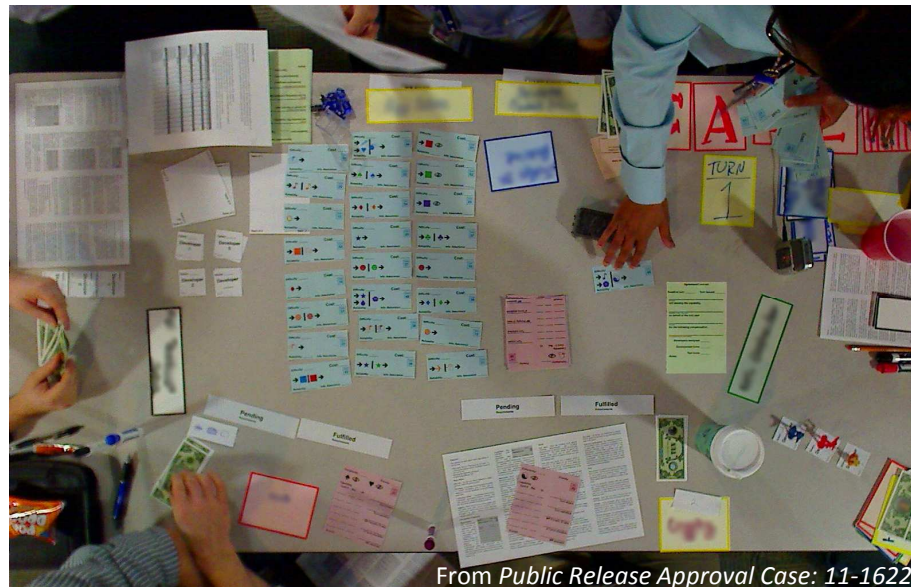
From *Public Release Approval Case: 11-1622*

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What is Composable Capability on Demand (CCOD ®)

- **A set of technical abilities that will enable DoD and civilian users to dynamically assemble and employ elements of the C4ISR enterprise**

- **Will allow the non-technocenti to adapt their enterprise according to the nature and scale of the mission**

- **Not a system**
  - CCOD consists of resources that can be formed or re-formed as needed
    - These resources are embedded within a distributed hybrid (fixed and mobile) infrastructure environment, that may not be locally provisioned

- **Draws mission information from traditional and nontraditional data sources to enhance situation awareness, collaboration, social networking, and decision support**

- **Will rely on a composable computational and network infrastructure for mission assurance**

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Acquisition for Composable Systems

- **Goal: Engage with various users of a proposed process to acquire and sustain composable systems**

- **Activities** [*]

  - Proposing acquisition approaches to achieve CCOD® objectives

  - Constructing games highlighting particular aspects of proposed CCOD® acquisition, and conducting exercises with Subject Matter Experts (SMEs) so that we can assess the value of the games for learning and evaluating acquisition effectiveness

  - Creating an environment to enable CCOD® acquisition game play:
    - Tabletop exercises
    - Electronic gaming in a distributed and asynchronous fashion

  - The environment may then be extended to experiment with a wide variety of acquisition processes with participation from many different stakeholders

[*] From *MITRE Public Release Approval Case: 11-1622*

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