Finding Discipline in an Agile Acquisition Process

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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

5a: control gained by enforcing obedience or order
   b: orderly or prescribed conduct or pattern of behavior
   c: self-control
Defense Acquisition Business Process

User Needs

Technology Opportunities & Resources

A
B (Program initiation)

User Needs

Technology Opportunities & Resources

Pre-Systems Acquisition

Technology Development

PDR

Materiel Development Decision

Engineering & Manufacturing Development

CDR

Post CDR Assessment

Systems Acquisition

Production & Deployment

LRIP/IO&T&E

Systems Acquisition

Post CDR Assessment

Defense Acquisition Business Process

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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*
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

Integrated Defense Acquisition, Technology, and Logistics Life Cycle Management System

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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

Acquisition Side

- Acquisition Strategy
- Info Support Plan
- Risks, Progress, Deltas
- ADMs, Requirements
- Plans, Risks, Progress, Deltas
- Development (IPT leads, contractors, testers)
- Oversight (PMO & Above)
- Oversight (PMO Chief Engrs & Below)
- Tech Management (PMO Chief Engrs & Below)
- Oversight/Insight

Operational/Execution Side

- CONOPS, Doctrine, Tactics, “KPPs”
- ICD, CDD
- Oversight (COCOMS, Base Cmdrs & Above)
- Materiel Mgmt (Logistics Mgt/Brigade & Below)
- Users (Maintainers, Users)
- TRD, Execution needs (log, training)
- Execution needs (maintenance & use)
- Oversight/Insight
Discipline in the New IT Acquisition Process

**Acquisition Side**

- **Acq Strategy, CONOPS, Info Support Plan**
- **Oversight** (PMO & Above)
  - Risks, Progress, Deltas
  - ADMs, Funding, Schedule, Cost, ...

**Tech Management** (PMO Chief Engrs & Below, Users)

- Plans, Risks, Progress, Demos, Releases
- Operational Architecture

**Development** (IPT leads, Iteration Teams, Users)

- Execution needs (maintenance & use)

**Operational/Execution Side**

- **Oversight** (COCOMS, Base Cmdrs & Above)
  - ADMs, Funding, Schedule, Cost, ...

- **Materiel Mgmt** (Logistics Mgt/Brigade & Below)

- **Users** (Maintainers, End Users)

- Oversight (KPPs, Doctrine, Tactics, ICD, CDD)

- Execution needs (log, training)

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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
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*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 Process

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 ?
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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