Agile Development and Assessment

Examples from Practices

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Agenda

Challenges, Discipline, and Methods

- **Requirements Management**
  - Early and Continuous Engagement of the User (Section 804)
  - Requirement priority and traceable with clear linkage (SECDEF Report)
- **Development Methodology**
  - Allocation and Planning
  - Acquisition and Test Cycles
- **Assessment and Testing**
  - Integrated Testing
  - Risk Reduction, Letter of Observations
  - Return on Investment

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Bottomline Upfront

- **Current Products; requirements, architectures, priority lists, and criterion can be improved upon.**
  - Priorities, business processes, sprint capabilities, and measures of effectiveness and suitability trace-able and integrated as value-based, mission-driven gains.
- **User/Sponsor Engagement should be persistent.**
  - Better understanding of user expectations
  - Established set of critical operational activities-to-tasks necessary for practical test, evaluation, and certification criterion.
- **Agile is More Than A Software Process.**
  - Practices must extent to capability needs to address operational deficiencies. Agile principles requires more experienced team and unity of effort.

Incomplete upfront analysis leads to continual un-measureable progress, un-testable/ un-assessable evaluation objectives, and unmet expectations.

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Challenges

- **Process:** How is “Agile Development” compatible with DoD Acquisition Directives and documentation requirements
- **Team:** Earlier involvement by Test and Evaluation to identify shortfalls earlier, mitigate risk, and prevent testing issues
- **Resources & Capacity:** Limited resources for shorter testing cycles – Integrated Test and Evaluation
- **People:** Limited subject matter experts and need for training professionals
- **Technique:** Documentation, Backlog Management, Requirement Creep, and similar pitfalls
- **Risks:** Schedule compression, fix time within sprints and immaturity of authoritative mission threads

Discipline, Techniques, Method

- **Rules of the Road**
  - System Engineering discipline
  - Technique: Information Technology “Box”
  - Method: Agile Development and Testing

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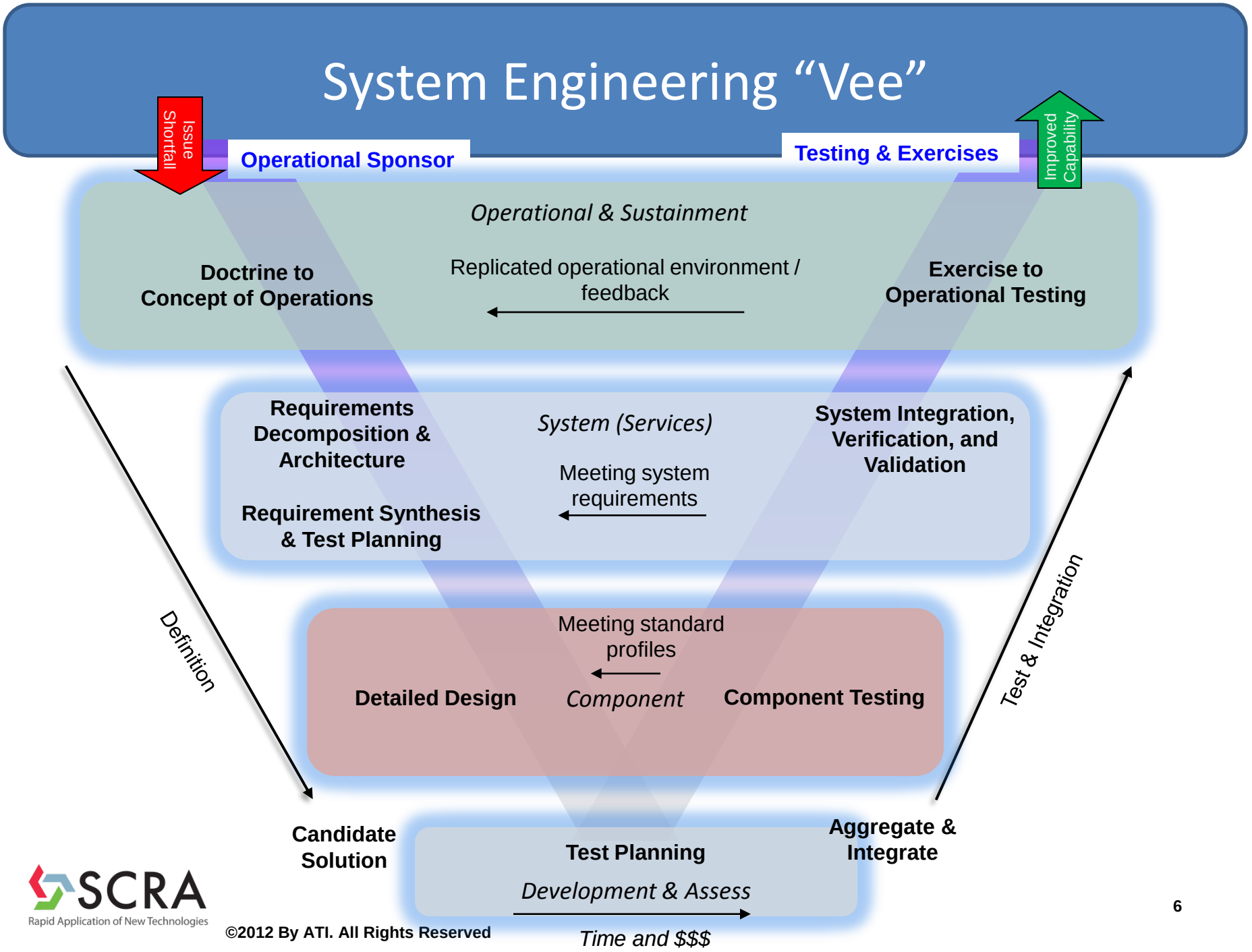
System Engineering "Vee"



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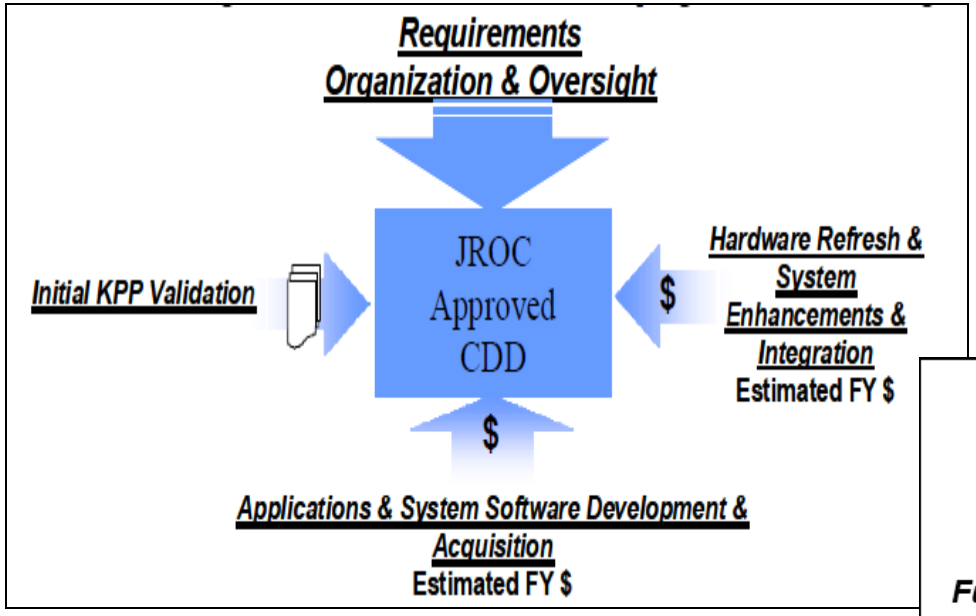
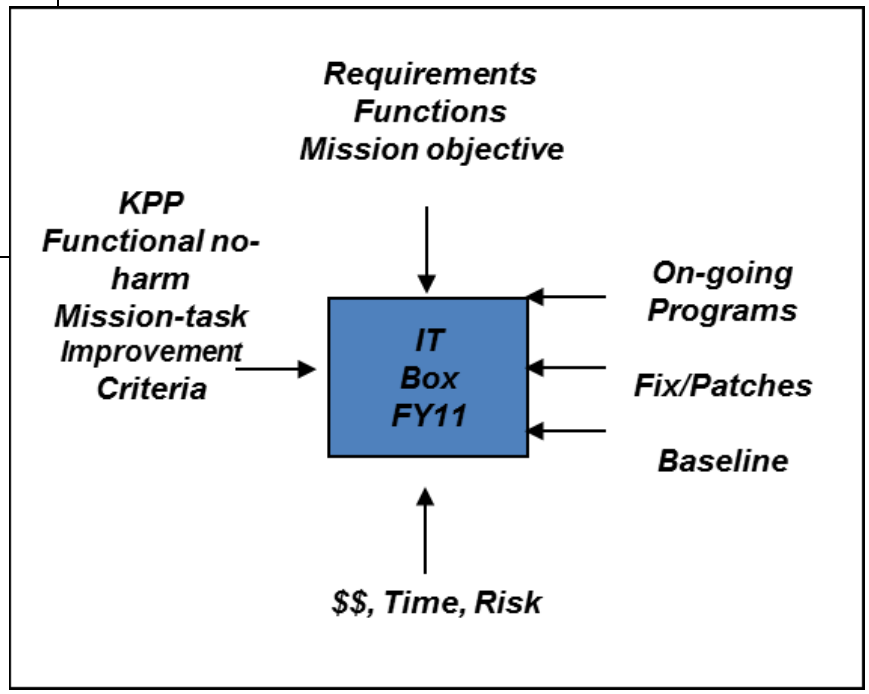
Information Technology (IT) Box





- **Input:** *Requirement, Objectives, Resources, Environment*
- **Output:** *Scope to Resources, Expectations*

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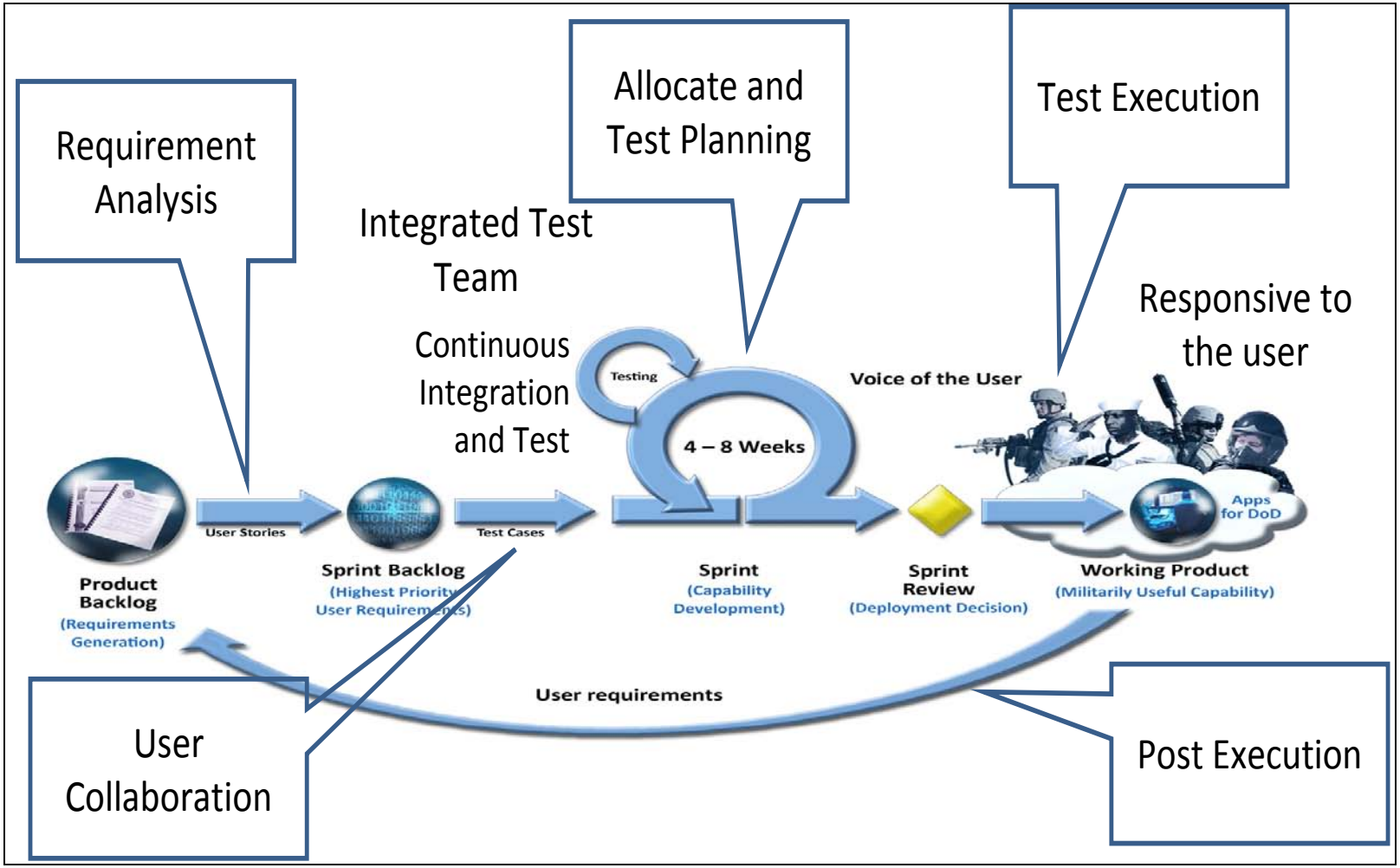
Agile Development and Testing



Adapted from many sources

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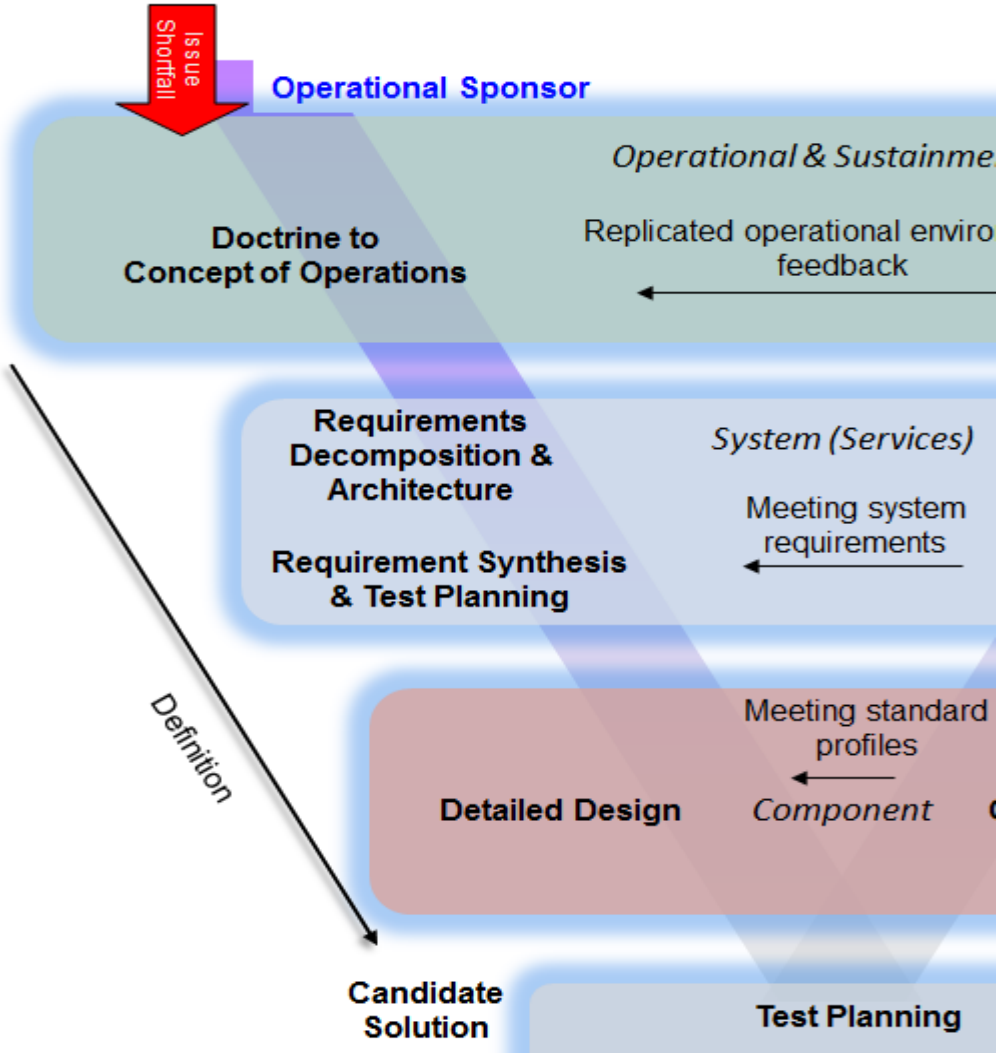
Requirement Management

- Right Requirement?
- Requirement Right?
- What does that mean?
- User expectation?



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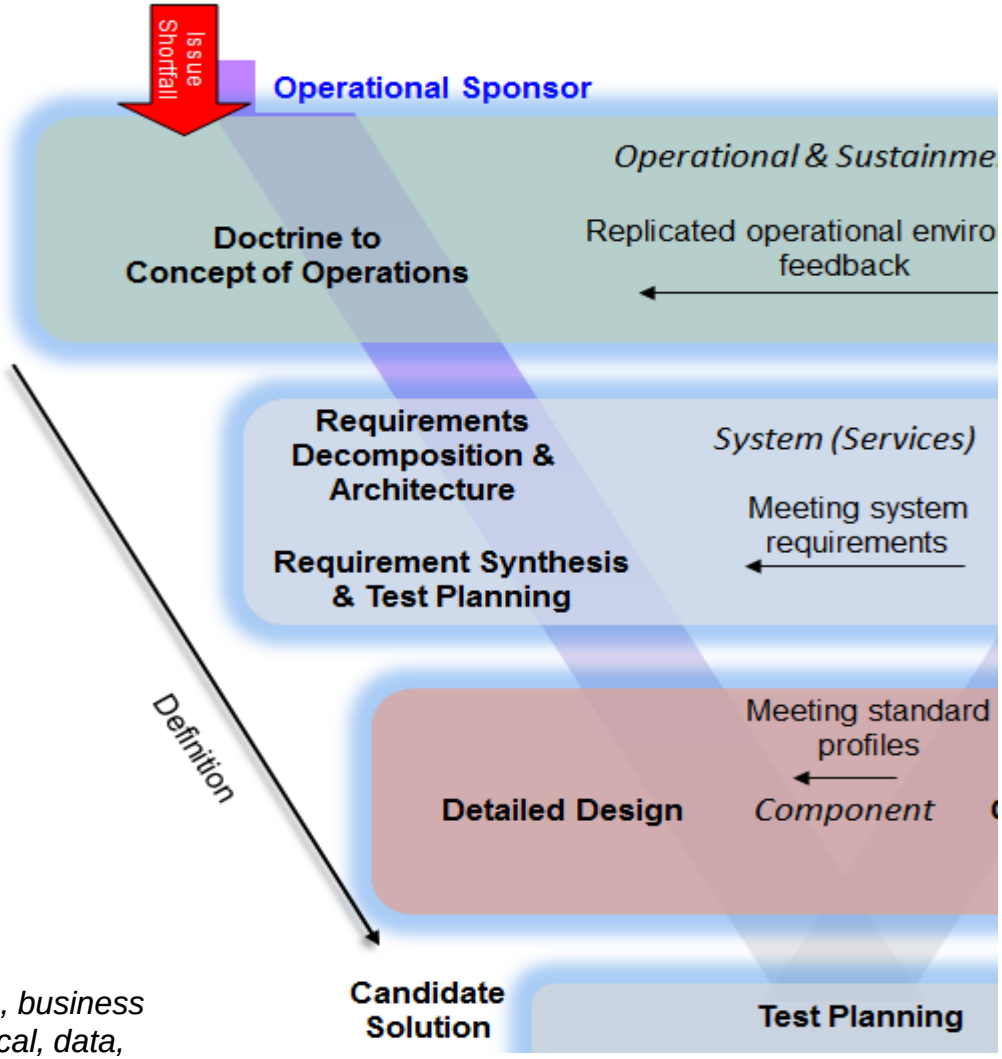
Requirement Management

Requirement Analysis

- User-Tester trace in terms of conditions and issue context (Domain-based)
- Developers interpret requirements into priority stacks with user feedback
- **Review against post-implementation reviews, discrepancies, and issue data bases (backlog requirements)**

User Collaboration

- Develop mission-based user stories (ATDD), improve quality through iterations
- Identify objective architectures* and implementation baseline
- **Iteratively conduct trade-off analysis and/or build conference: balance priority, feedback, and cost, schedule, acceptable risk.**



** Operational, reference, business process, system, technical, data,*

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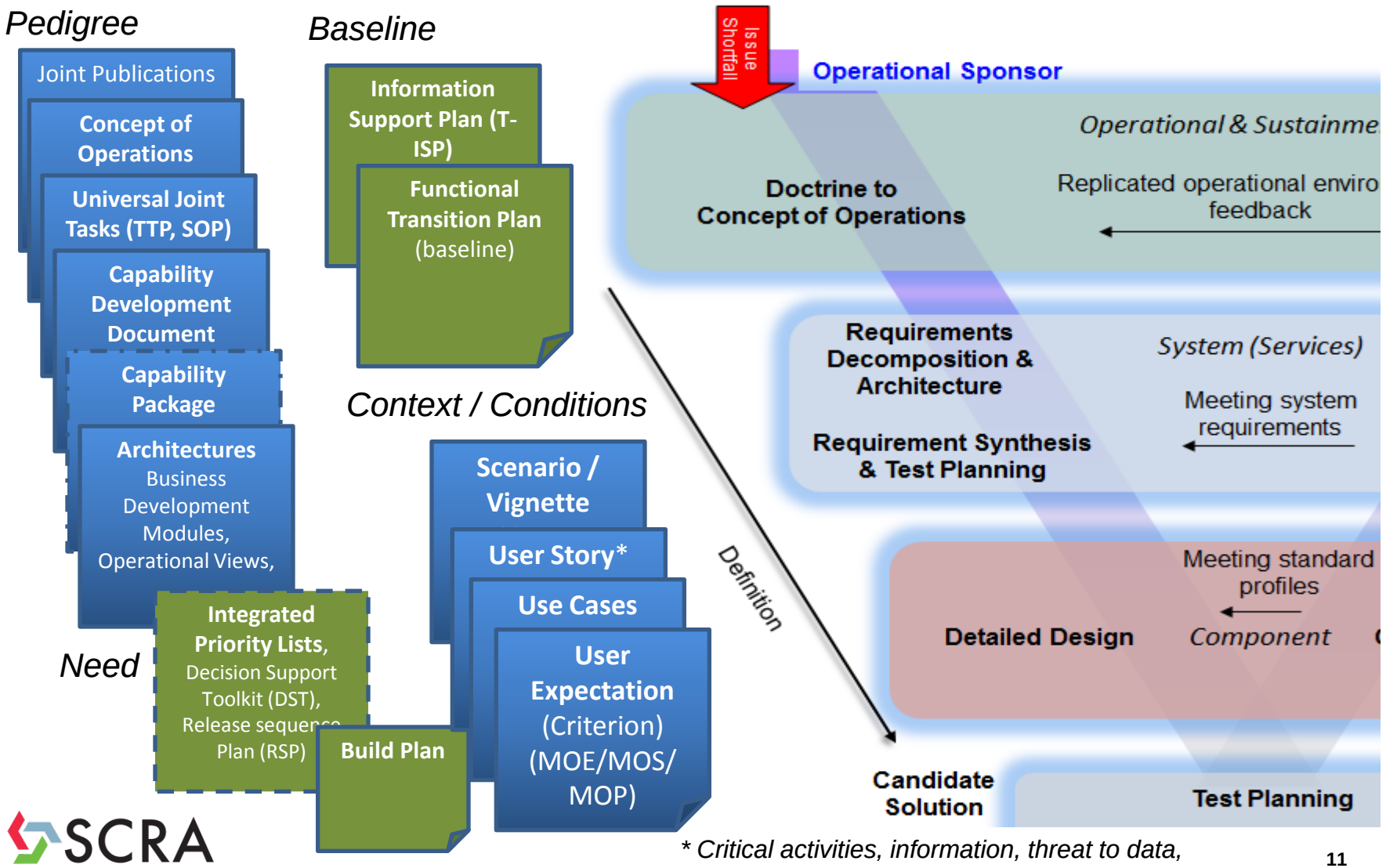
Requirement Management

Document Driven Process and Gates?



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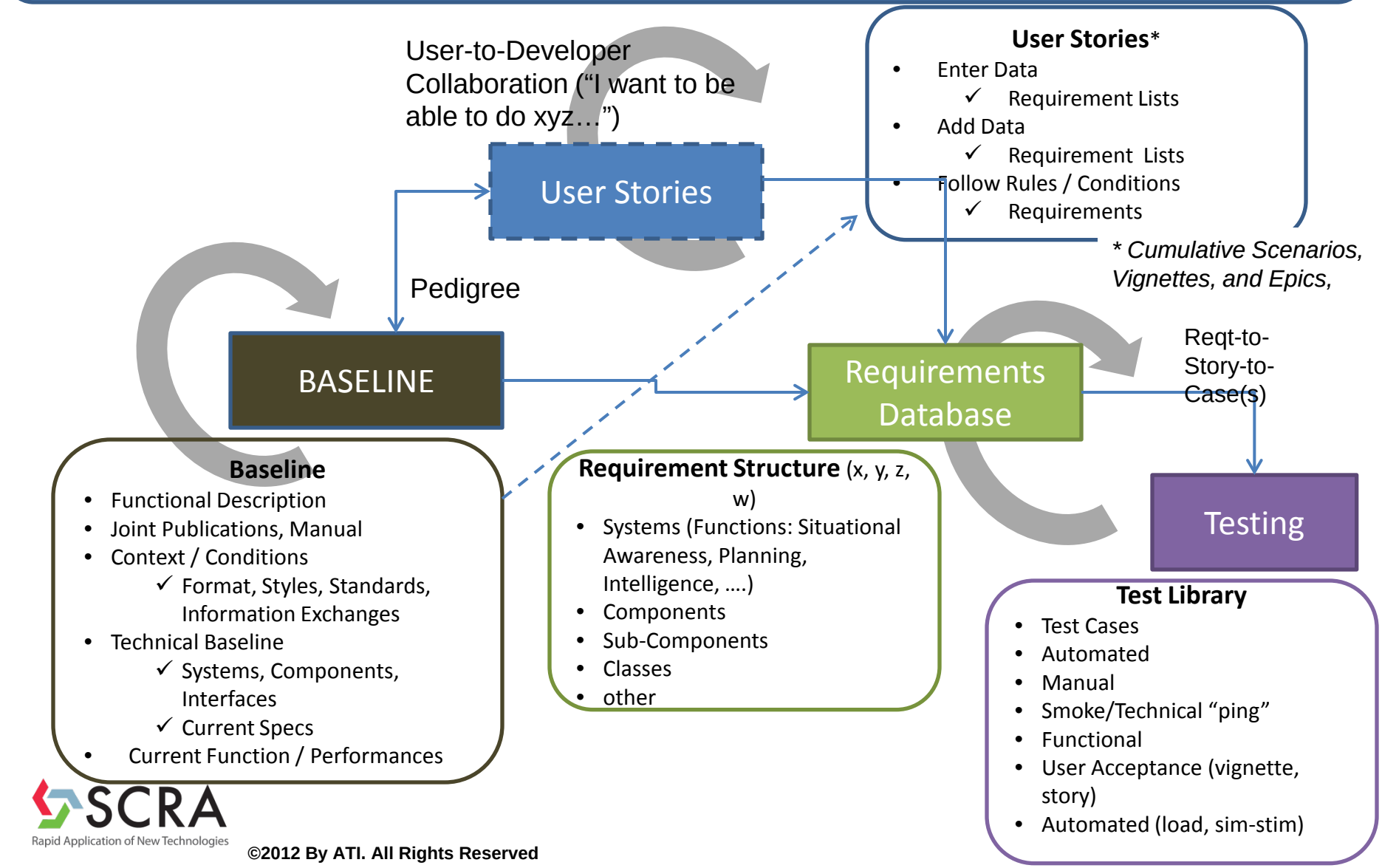
** Critical activities, information, threat to data, information, network, redundancy, impact*

Requirement Development and Management

Traceable-Driven – Recommendation #1



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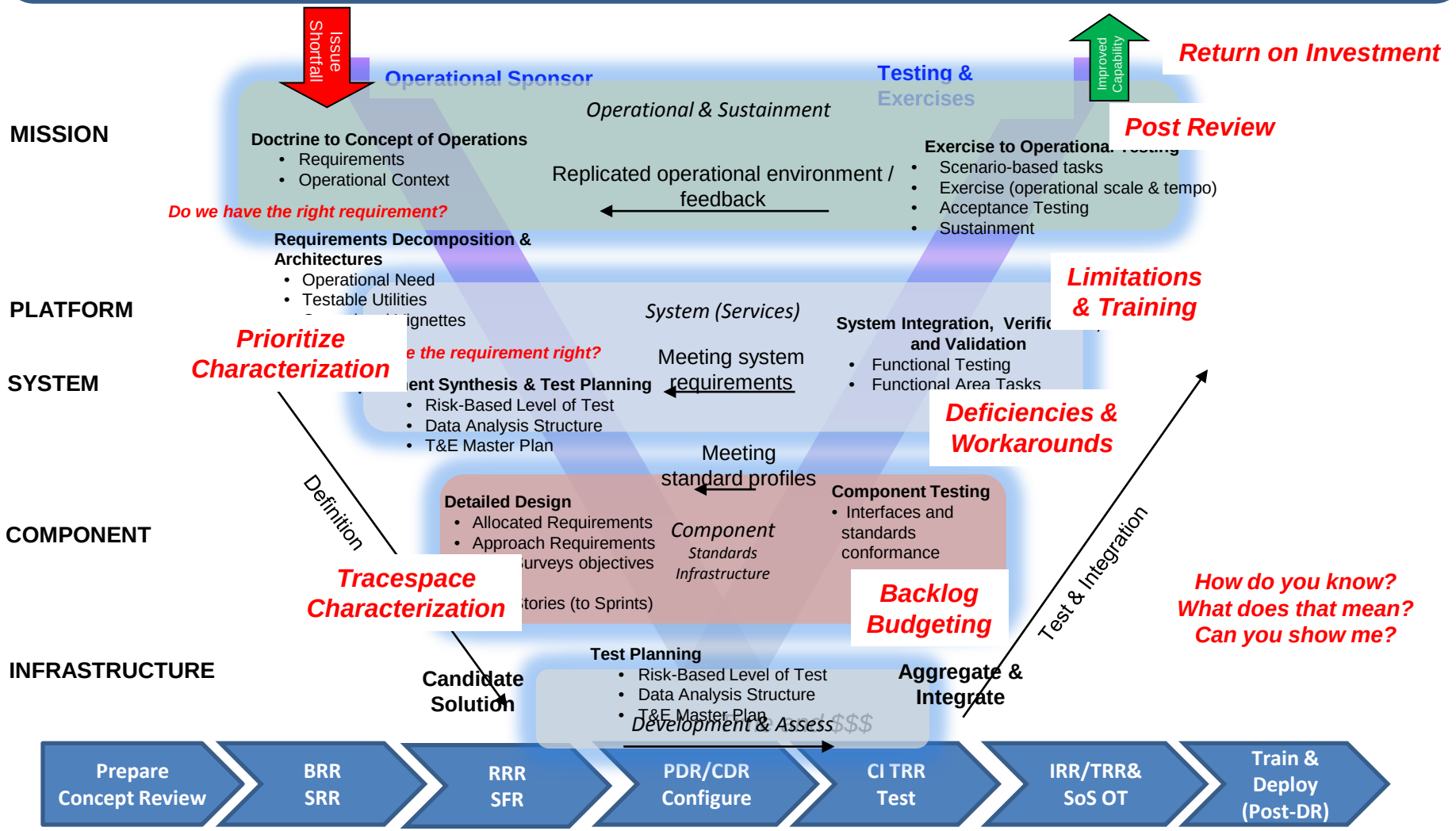
Integrated Review/Audit Process

Recommendation#2: Conduct more challenging reviews/audits



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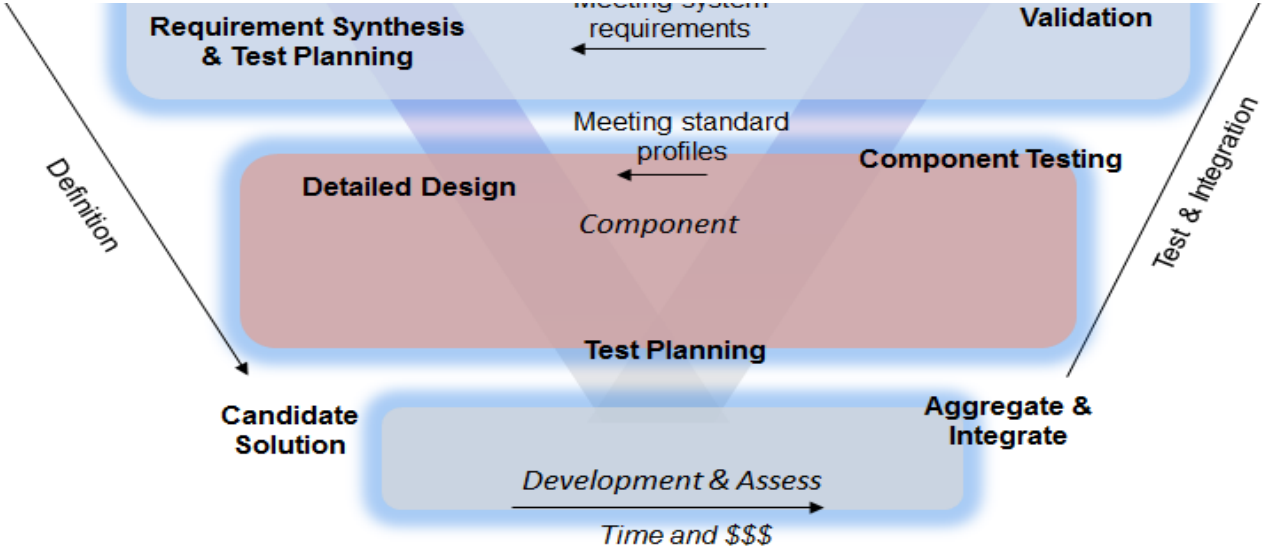
Agile Development and Scope



- Highest Priority? Limited resources to improvements
- Trade-space to meet expectations?
- Incremental useful capability / utility? Maintenance versus improvement?
- Criteria to meet integrated testing criteria?

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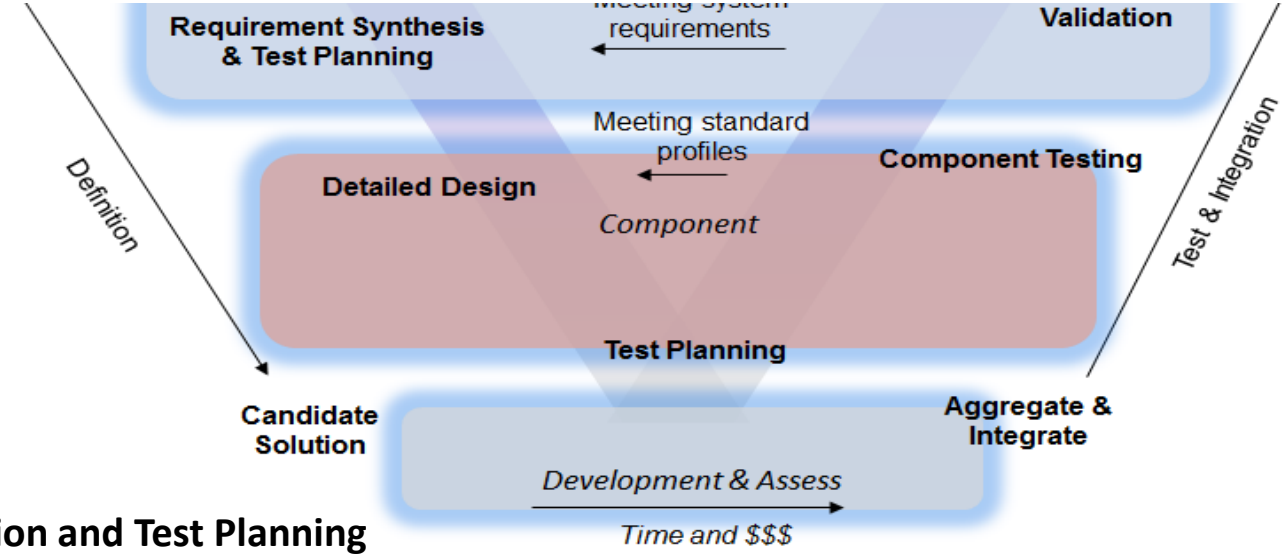
Agile Development and Scope



Allocation and Test Planning

- Perform user-developer-program manager exchanges to translate requirements as optimal achievable sprint packages (i.e., scrum activities)
- Transforms and allocates requirement into sequential development sprints based upon technical maturity, complexity, and useful functionality for incremental releases
- Align requirements, test objectives, and sprint-specific user cases within the annual cycles
- Develop **criteria for cumulatively increase useful utility and meeting priority objectives**
- Shape test cases to support integrated testing objectives (Standards, Information Assurance, Function, Technical, User Acceptance)

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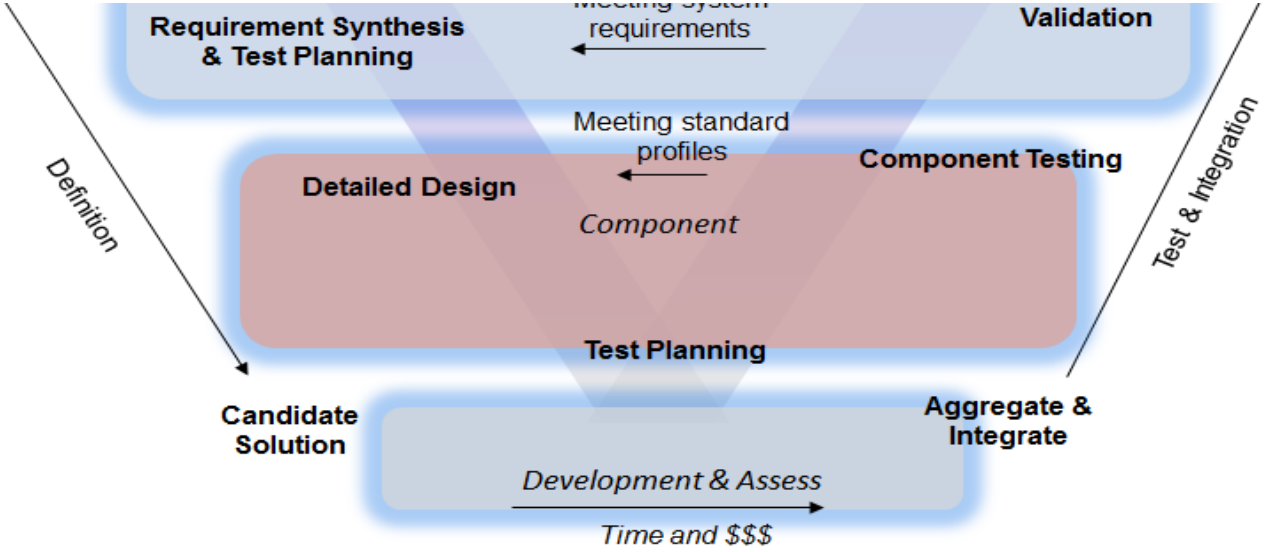
Agile Development and Scope

Formal Process and Document Driven Process?

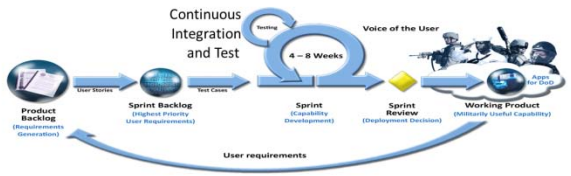


Objective Priority

- Capability Release Plan
- Standard Implementation Guides

*Strategy**

- Test and Evaluation Strategy
- Risk Plan



Events

- Test Concept Papers
- Mission-driven architectures (Mission threads, Mission Sequential Events List, …

* *Oversight*

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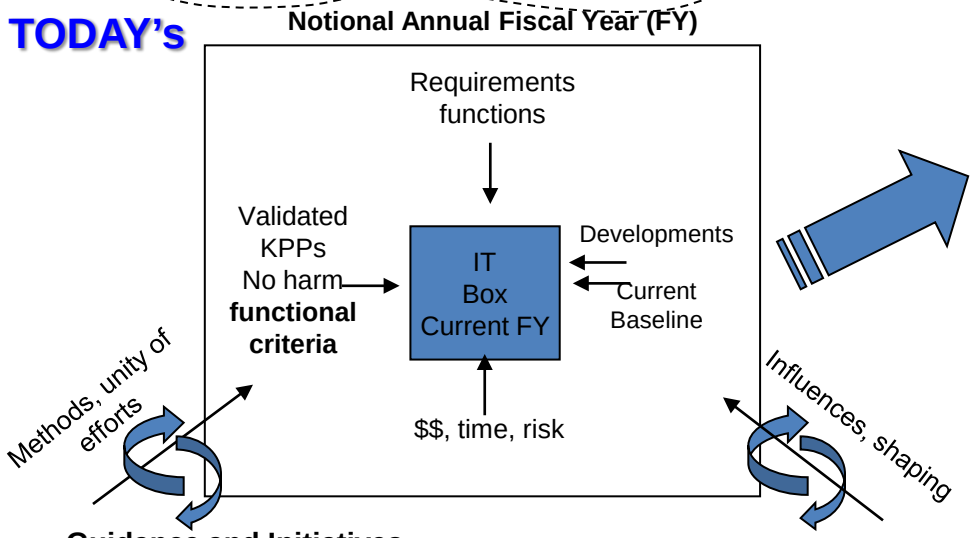
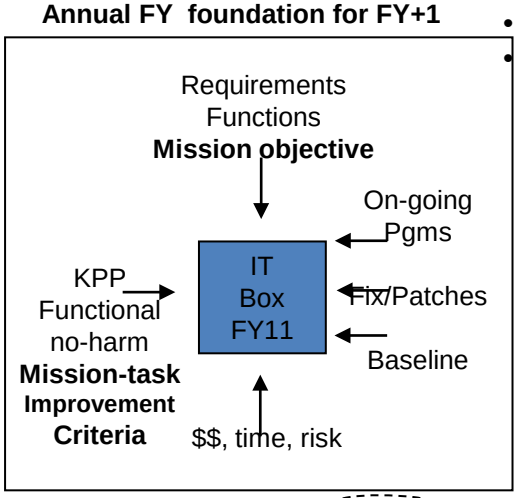
Annual Success Objectives Secures Tomorrow's Mission-Based Successes (scope-focused) – Recommendation #3

Content and **Constructs** (usage patterns, functional business processes, schema, service behavior and interaction patterns, technical performances, etc.) objectives

Progressive events
- Risk Reduction
- Assessment
- Limited objective
- Integrated testing

TODAY's





Guidance and Initiatives
- Agile IT Process
- Do-No-Harm performance and utility
- Integrated Testing
- Sustain and Incremental improvements

Enablers
- Joint experimentations
- Synchronizing programs
- Exercise cycles
- Distributed Test Capacities

Context and Orchestration of services/systems to **mission-tasks** metrics (MOE) **utility**.

TOMORROW'S

* Minimize re-work, re-engineering, and life-cycle costs

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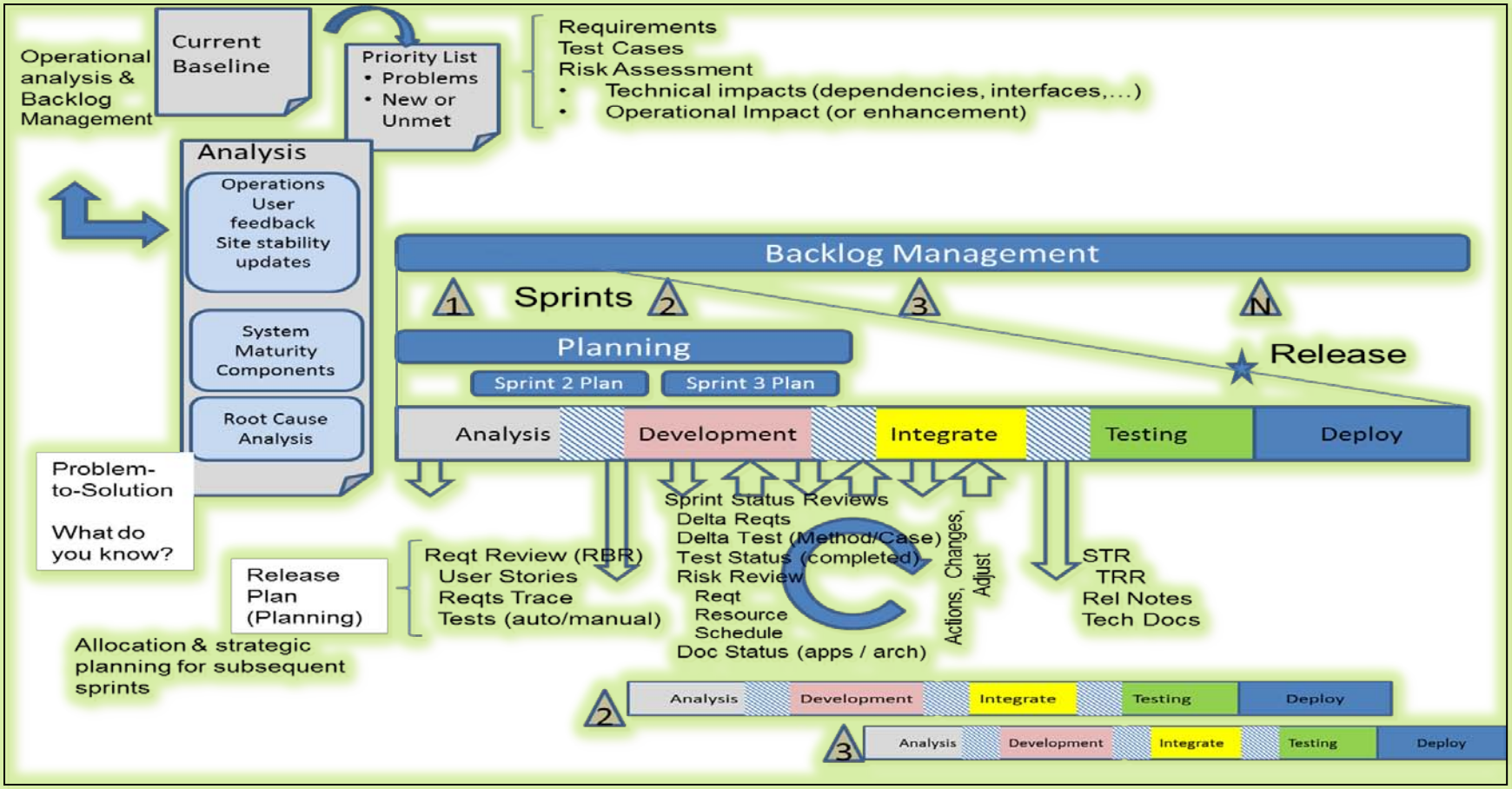
Synchronize Sub-Processes

Concurrent Planning and Responsive – Recommendation #4

Improve integration of 'agile development' with tactical/strategic planning and backlog management



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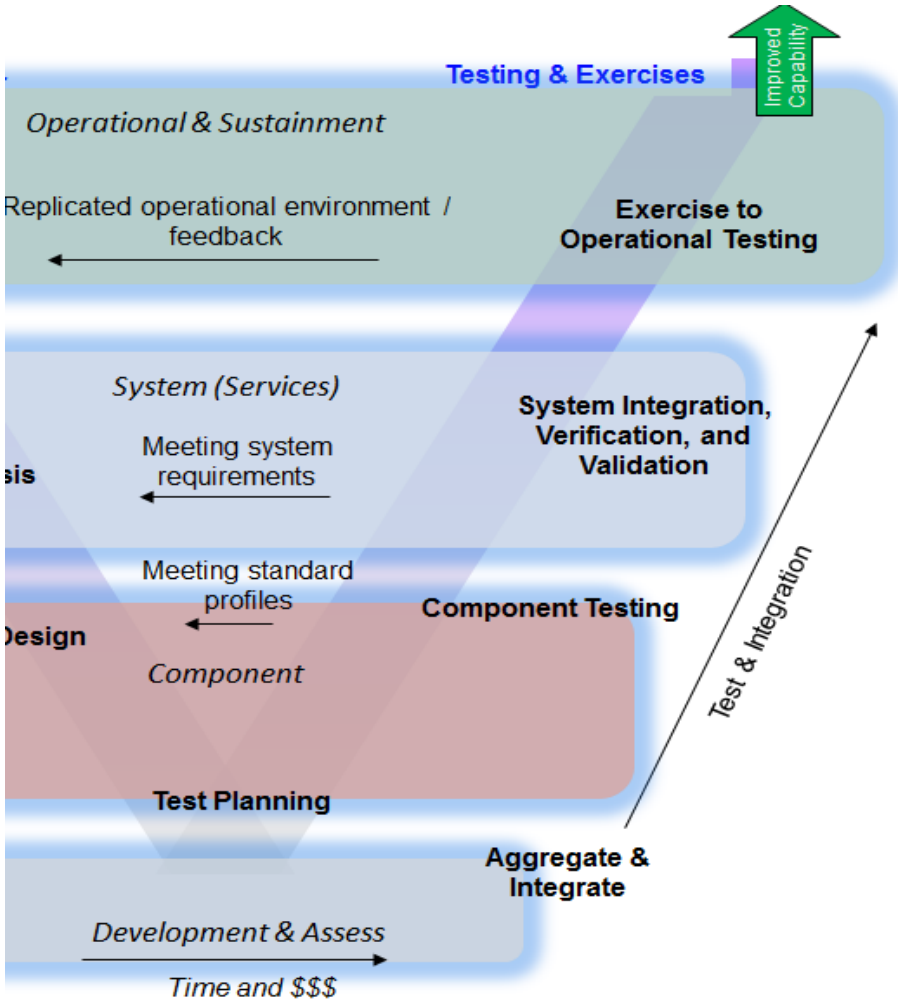
Assessment and Testing



- Risk-based testing?
- Representative users? Environment?
- Full and meaningful reciprocity?
- Return on Investment

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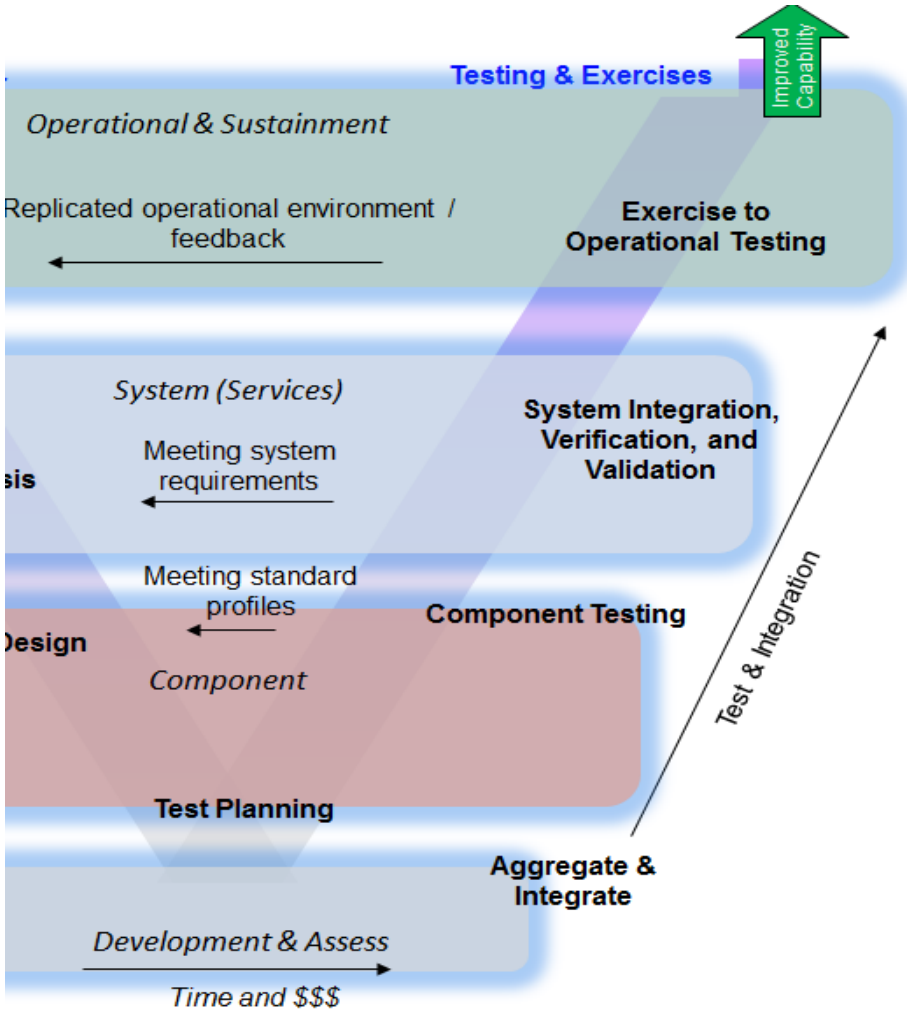
Assessment and Testing



Assess and Testing

- Execute an integrated test team (inclusive of all disciplines)
- Conduct *risk-based testing* based on successively increased functionality with desired test robustness
- Conduct testing in conjunction with other venues
- **Mature towards automated or standardized test plan and reports (full and meaningful reciprocity)**

Post Execution and Sustainment

- Provide evidential recommendations to acquisition, information assurance, interoperability, and fielding
- **For incident reports**; (1) Determine **operational-based impact**, root-causes, and qualify limitations; and (2) Assess if the backlog requirement is sufficiently important to impact next sprint
- Review lesson learned; including the network, tools, and processes for continual improvements

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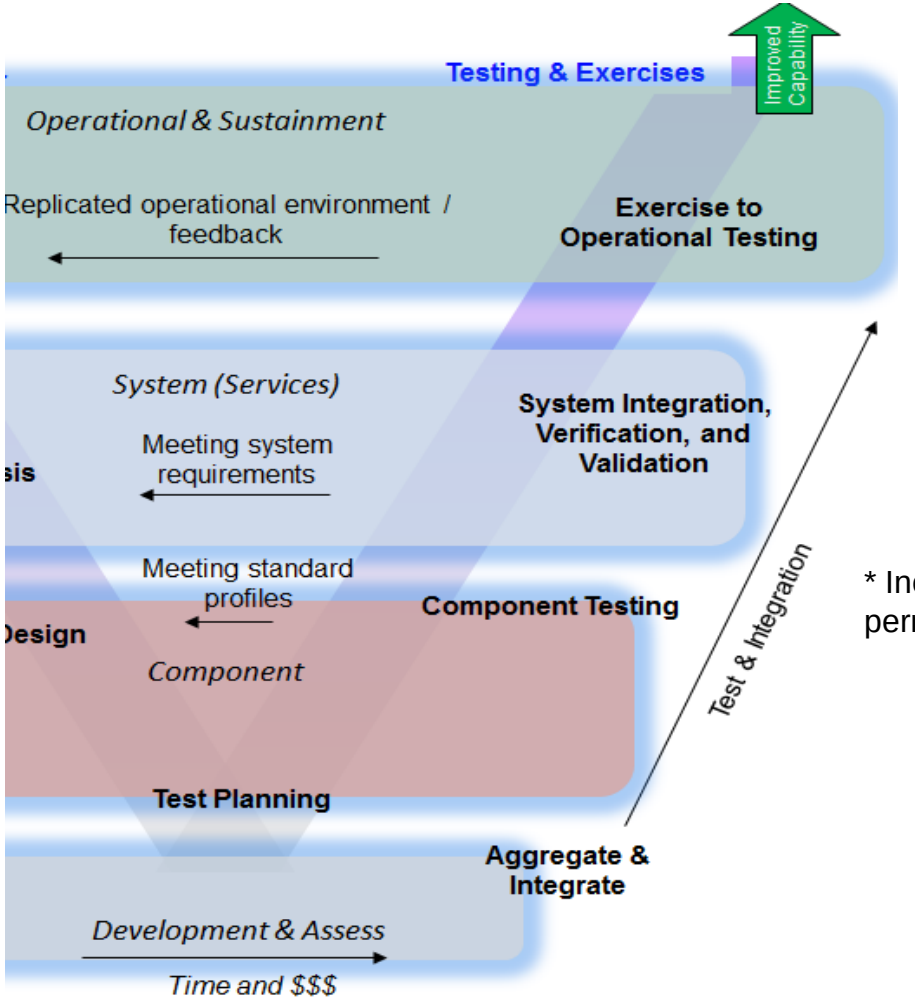
Assessment and Testing

Test Planning and Capacity limited tempo?



Planning

- Test Plan
- Detailed Test Cases*
- Instrumentation & Data Collection Plans
- Stimulations, Simulation Planning

Reporting

- Risk Reduction Analysis
- Letter of Observations
- Quick Look Reports
- Test Reports (and limitations)

* Inclusive of usage, permissions, and restrictions

Relevance

- Training templates
- User Surveys (master sequence event listings, scenario, vignettes)

Sustain

- Lessons Learned
- Feedback
- Post Implementation Reviews

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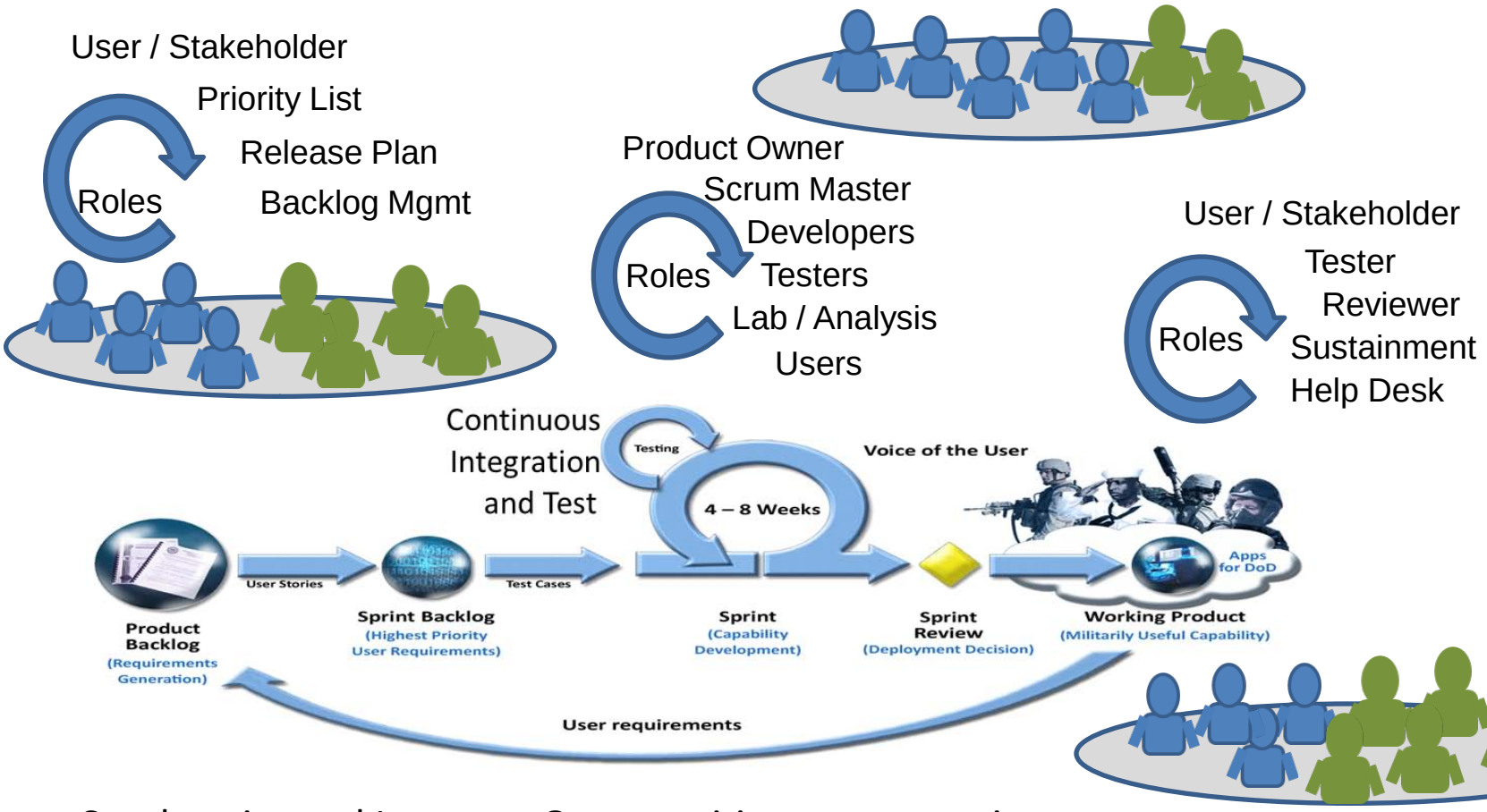
Invest in Efficiencies and Experienced Resources – Recommendation #5



- Synchronize and Leverage Opportunities, as appropriate
- Multi-Disciplined and Experienced Resources, as possible

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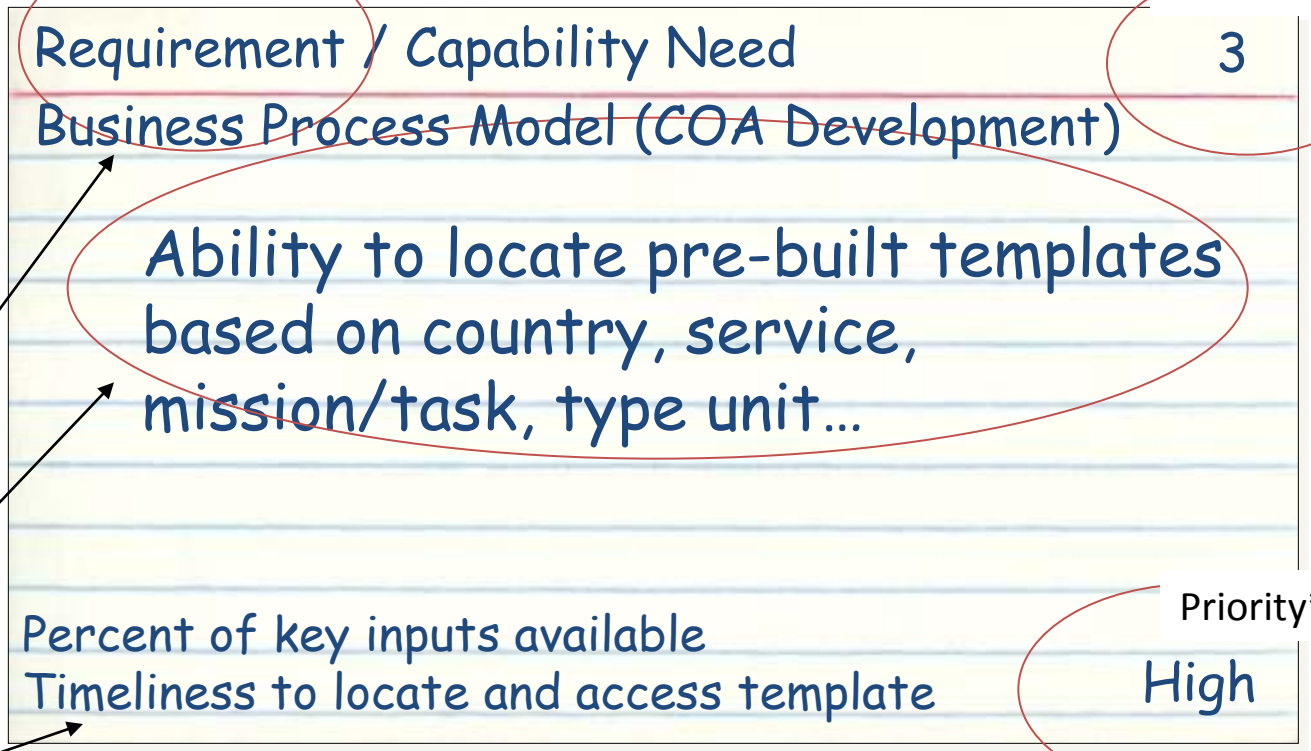
Build Test / Assessment Cards Thorough Traceability – Recommendation #6

Intent: Take function-based test cards and trace to operations to reflect capability need-driven acceptance, relevant to operations***



Traceability Link to Priority mgmt tools (DST/RSP)

Traceability to Joint Planning & Execution Architecture reference

Subset from Story Description, Capability Package

UJT, MOE/ MOP, or criteria to pass

* Risk management score based on # dependencies, priority, mission impact level, risk analysis in JC2 S&M, TISP, or other risk identification group

** Based upon aggregate scoring and/or priority numbering

*** In aggregate provide same basis of information to architectural-driven, test fidelity mission threads (i.e., OV/BPM relevant critical activities to operational expected outcome). Intent to 'bring together' critical acceptance data within an agile practice.

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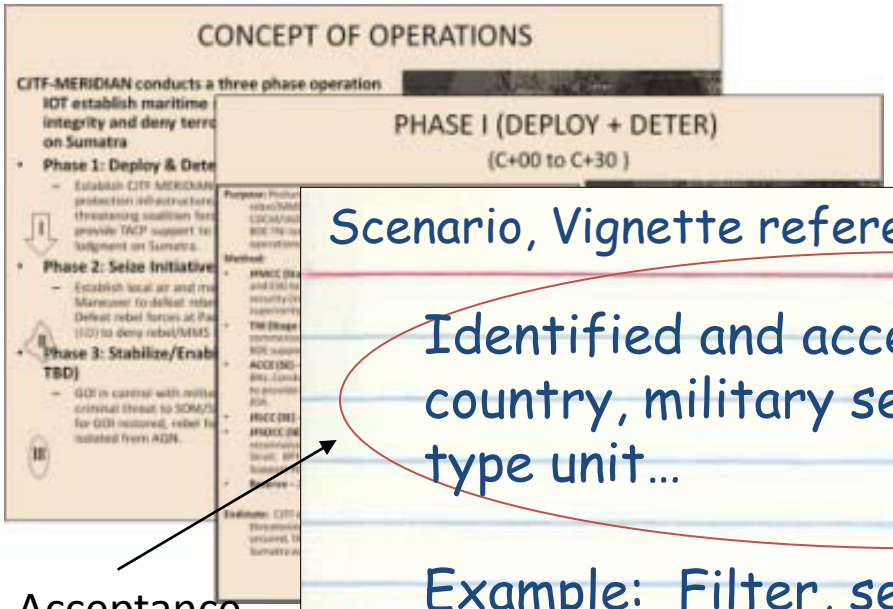
Build Test Cards

Rec # 6 cont'd. Operational Context to Meet Expected Accomplishment

Sponsor started with mission-driven context (vignette) to determine enabling functions and tools



Scenario, Vignette reference #

Identified and access xyz templates by country, military service, mission/task, type unit…

Example: Filter, select, compare xyz COA to abc plan (expected outcome)

In given vignette: accessed "n" templates within "time"
Modified, Create, …
Access and Compared ….

Acceptance Criteria

Acceptance Tests

Assessment Cards built deck (or aggregate into MSEL) for given functions/activities to demonstrate

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Surveys written to Capability Need Statement –
Example Derived from NRID into Questionnaire – Recommendation #7

NRID #	NRID Description	Requirement Satisfaction Statement	Perspective
310.1	Provide insight into national, theater, and tactical collection tasking and activities; assess to Collection Management information (planned collection, collection accomplished, requirement satisfaction, collection parameters, etc.,)		
		IST provides US Army Tactical Units access to Collection Management information (planned, accomplished, requirements satisfaction, collection parameters, etc; via interface with PRISM	IST Users
		IST as employed in JFEWE provides the Collection Manager at the AOC with insight into tactical collection tasking and activities by providing visibility of tactical ISR assets	Collection Manager
General Questions for the Collection Management Lead:			
….			
(3)	Approximate number of deliberate collection requirements submitted during JFEWE		
(4)	IST as employed in JFEWE provides the Collection Manager at the AOC with insight into tactical collection tasking and activities by providing visibility of tactical ISR assets		
(5)	IST provides US Army Tactical Units ability to more efficiently and effectively interface and collaborate with theater and JTF Collection Manager elements to generate collection requirements via interface with PRISM		

____Strongly Agree ____Agree _____Agree, but reservations ____Disagree

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Conclusions: Few considerations

- Requirement Management - Stay on Focus
  - Answer-driven
- Development Methodology - Incremental useful capability-driven
  - Event-driven within cycles
  - Budget ‘allowance’ for requirements, schedule, fix
- Assessment and Testing: Integrated Testing
  - Multi-disciplined
  - Experienced over Quantity

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