The Integrated Test Process – Planning Methods to Reduce Test Execution Time

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Agenda

- Test & Evaluation Challenges
- Addressing the Challenge
- Early Test and Resource Planning
- Integrated Test
- Benefits and Implementation Challenges
Test & Evaluation Challenges

- T&E community is facing challenges in planning and executing tests
  - Evolutionary Acquisition’s compression of development schedules (in some cases up to 4:1)
  - System-of-Systems complex Testing and Evaluation increases cost and time to test
  - Chief of Naval Operation’s initiative to streamline T&E
  - Large, execution-year test bills limit program flexibility
- Other service OTAs face same challenges

T&E must transform to remain relevant!
How do we address these challenges?

- Commander, Operational Test and Evaluation Force (COTF) Strategic Plan identifies several high value initiatives - Two identified below:
  - Early Test and Resource Planning
  - Integrated Test
- Issues also link to CNO T&E streamlining initiative
Early Test and Resource Planning

- Development of method and product to create a robust and detailed T&E Framework and associated resource requirements summary prior to MS-B.

- T&E Framework will be mission based
  - T&E Framework developed from Capability Development Document (CDD), System Threat Assessment Report (STAR), and Navy Mission Essential Tasks (NMETs)
  - Critical Operational Issues developed from mission areas
  - Will use common conditions and measures which marry with Fleet training community and sister service test organizations – allows for portability of data

- All test objectives traceable to capabilities documents
Test & Evaluation Framework

- First step is Mission analysis of system under test
  - Working group comprised of Program Manager, COTF, developmental testers, and the user representatives
  - Agreements on mission area, tasks, conditions, standards, Integrated Test Team composition and working rules
  - Documented in TEMP or MOA
- Missions areas for system under test ID’d from CONOPS/JMETs/CDD
- Testers will define variability of the mission areas
  - Variables determined by their impact to mission execution.
  - Example - SONAR for ASW mission: cold/warm water, deep/littoral water, bottom conditions, etc.
Test & Evaluation Framework (cont)

- Once variables defined, permutation matrices created using *Design of Experiments*. Vignettes built from these matrices.

- Vignettes will identify T&E requirements:
  - Test assets, required ranges, instrumentation needs, test limitations, M&S requirements
Mission Area - Suppression of Enemy Defenses NTA X.X.X

Subtask 1: Mission Planning Vignette
- Conditions:
  - Intel Source
  - Weapons choice
  - Threats

Subtask 2: SEAD Sortie Vignette
- Conditions:
  - Threat
  - Target Detection Method
  - Weapon Type
  - Environment (calm/gusty)

Subtask 3: Damage Assessment Vignette
- Conditions:
  - Threat
  - Collection Source
  - Environment
Test & Evaluation Framework

- Outputs from Framework:
  - Synergized matrix of OT objectives
    - OT objectives scrubbed for redundancy
    - Subset of test objectives identified as Integrated Test candidates
    - Subset of OPEVAL unique objectives
  - List of resources to execute objectives
  - List of M&S requirements, Test Limitations
  - OT&E Framework reviewed at specific events for adequacy
    - CPD issuance
    - Program restructuring
Integrated Test

- **Integrated Test (IT)**
- What is it? – method of performing concurrent CT, DT and OT uniformly over a continuum
- Will leverage the T&E Framework and similar DT test designs
- Development of a single Integrated Test Matrix between DT and OT

Goal is to eliminate redundant testing while still performing an adequate test
How will we do it?

- Utilize the Framework process discussed earlier and impose a similar process on all test activities
- Test Integrated Product Teams will merge objectives and identify synergies
- Common test matrix will capture the synergized DT/OT objectives
- TEMP will document workings of the ITT
- Test plan matrix reviewed periodically to ensure test objectives are being met – revised if necessary
IT Synergy Diagram
Benefits to Early Test Planning/IT

- Mutual understanding of all test requirements
- Potential for better integration with training community
- Identifies limitations and mitigation strategies early
- Early identification/correction of system deficiencies
  - What costs $1 to fix today costs $10,000 to fix tomorrow
- More efficient use of Navy (and Joint) test assets and resources
- Potential reduction to overall test time
Implementation Challenges

- Inclusion of contractors in the IT process
- Will the integrated test team have the resources available to be responsive to program changes?
- Cultural issues
  - How high are the stovepipes?
  - How willing are the ITT members (and those who externally influence them) to change their philosophies?
  - How does the program handle discovery of major anomalies?
- Configuration control of design
  - When is the system “good enough” to freeze?
  - What is “Production Representative”?
  - How much regression testing is needed?