



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

Mr. Jeffrey Bobrow, Project Director, OPTEVFOR

Mr. William Wolters, OPTEVFOR

Mr Carl Ingebretsen, Wyle Laboratories

Mr. Gary Evans, Wyle Laboratories

Mr. Richard Schwenk, Wyle Laboratories



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)

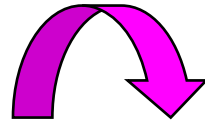
- Once variables defined, permutation matrices created using *Design of Experiments*. Vignettes built from these matrices.
- Vignettes will identify T&E requirements:
 - Test assets, required ranges, instrumentation needs, test limitations, M&S requirements



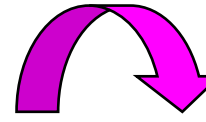
Mission Area Decomposition Example

Mission Area - Suppression of Enemy Defenses NTA X.X.X

Subtask 1

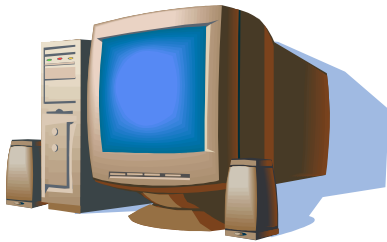


Subtask 2



Subtask 3

Mission Planning Vignette



Conditions:

- Intel Source
- Weapons choice
- Threats

SEAD Sortie Vignette



Conditions:

- Threat
- Target Detection Method
- Weapon Type
- Environment (calm/gusty)

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

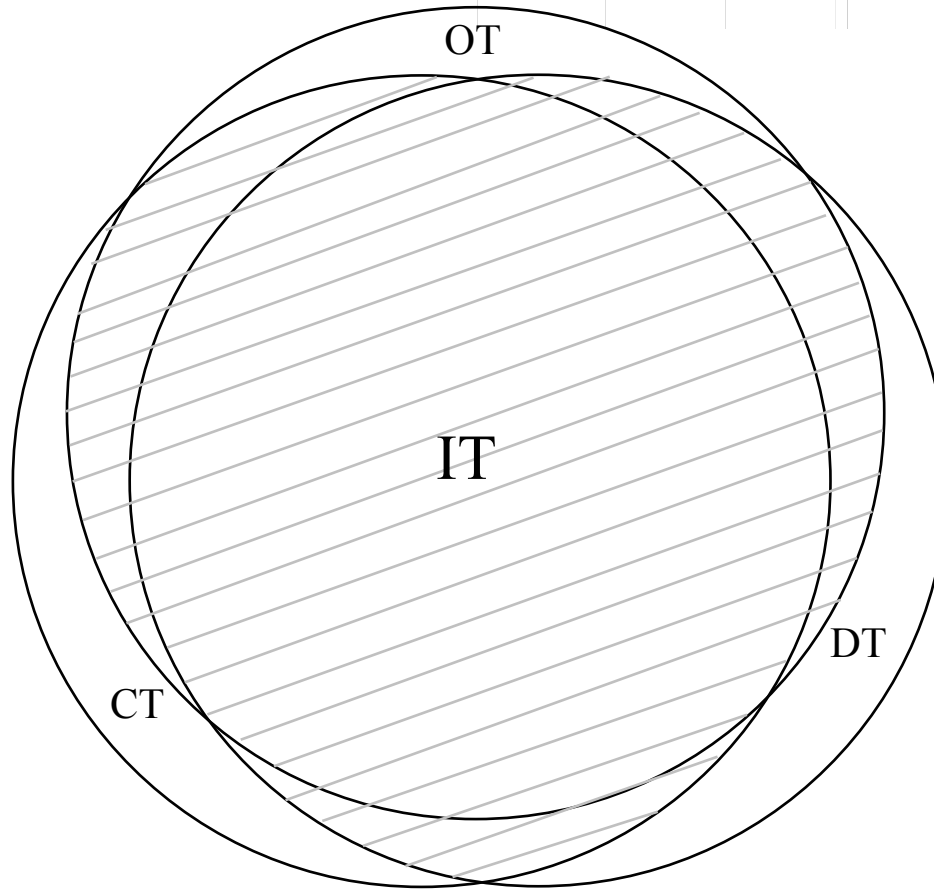


Integrated Test Approach

- 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

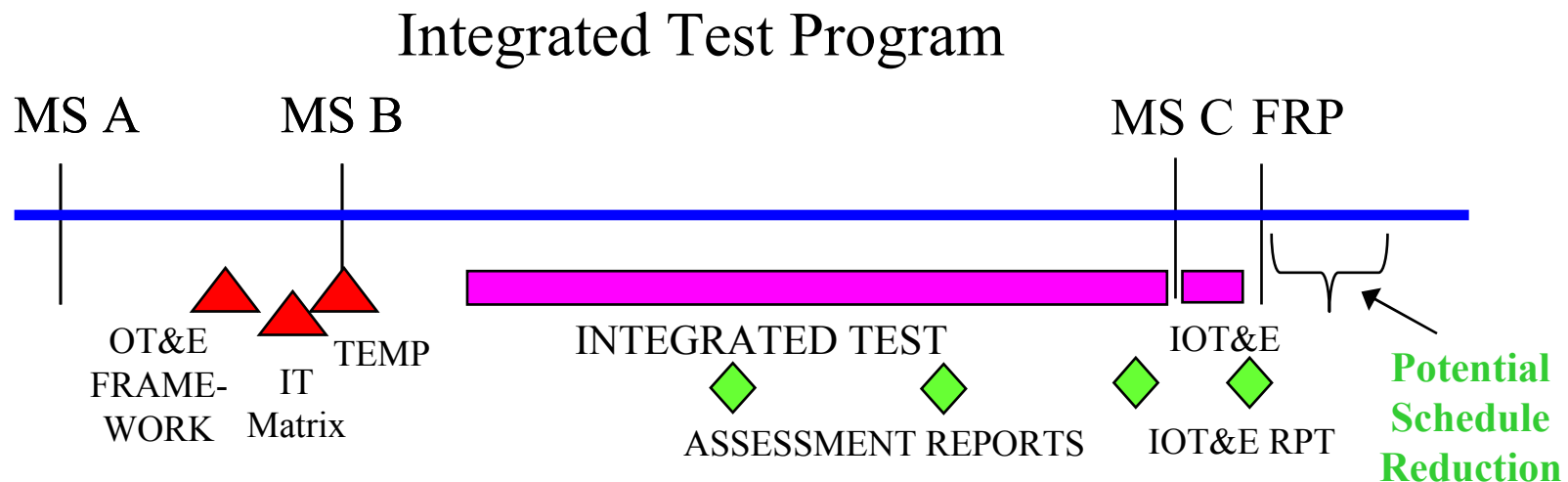
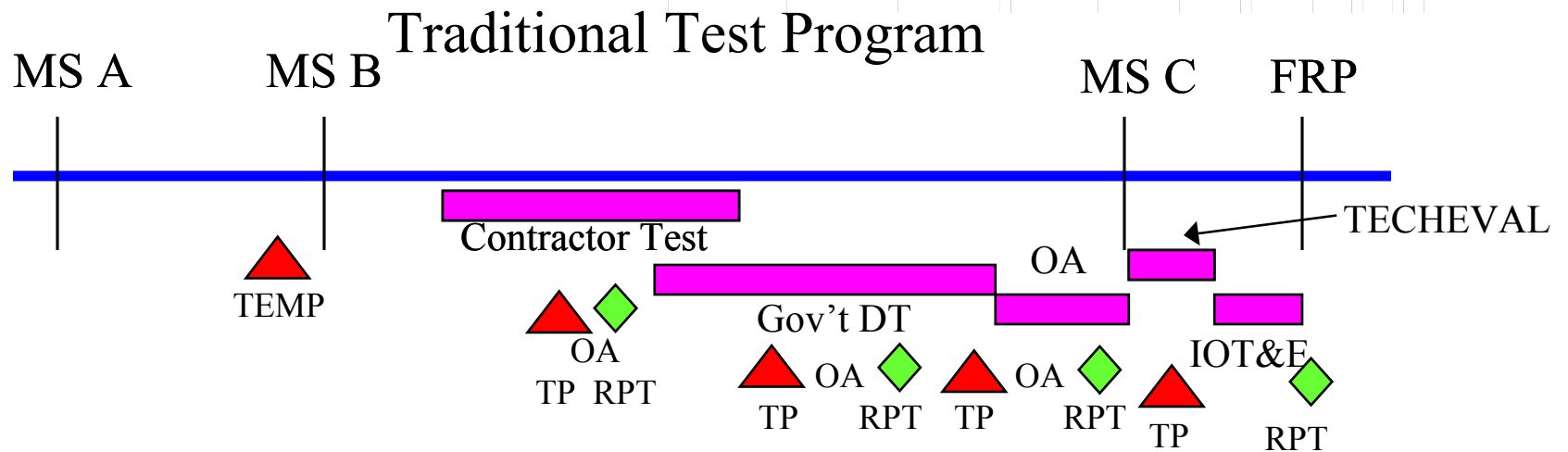


IT Synergy Diagram





Integrated Test Timeline Comparison





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?