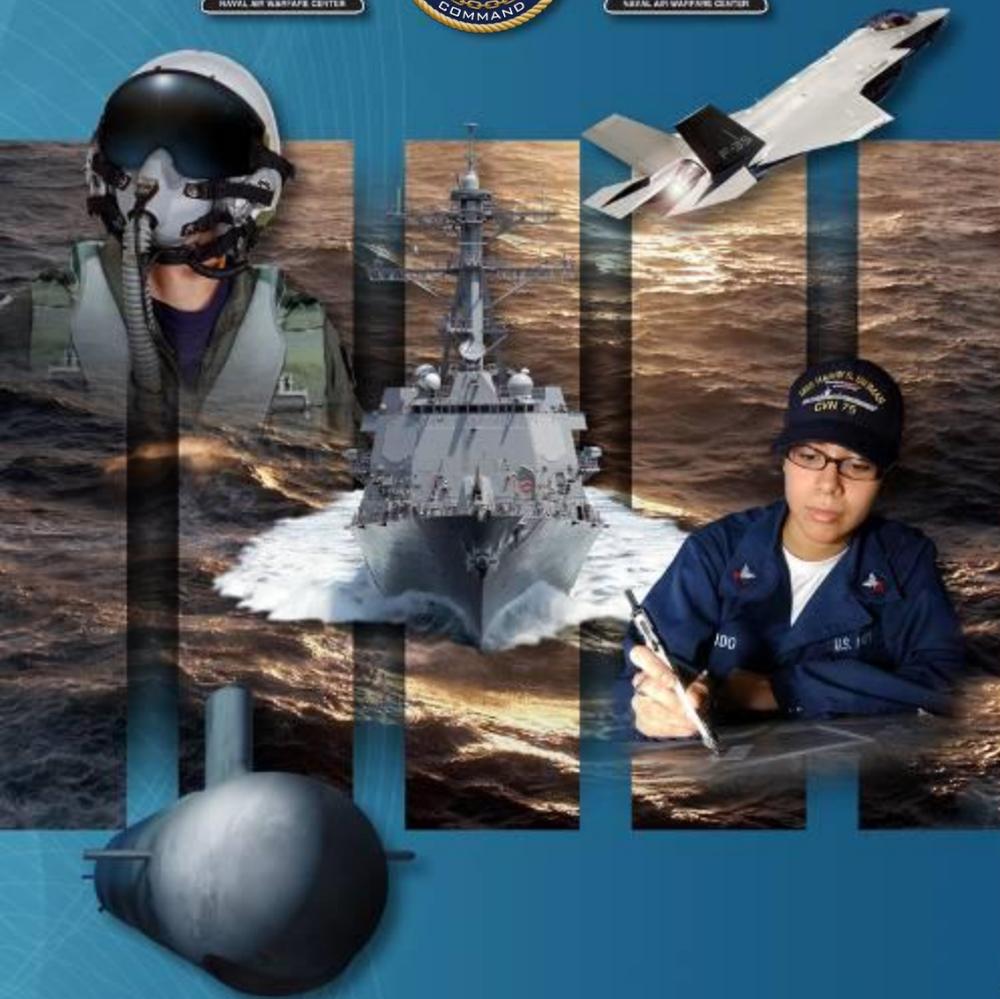


NAVAL AIR WARFARE CENTER  
TRAINING SYSTEMS DIVISION  
ORLANDO FLORIDA



# Industry Day NAVAIR T&E Process

NAWCTSD  
19 OCT 2015



# Developing T&E Capability in the Training Systems Domain



- Fiscal pressures are forcing a decrease from "in-platform" training resulting in an increased demand to use training systems for training and readiness
- Training systems T&E processes are evolving
  - Requires a shift in focus from Acceptance to Capabilities based T&E
  - Requires test plans and reports to support the Training System Technical Authority (AIR-4.6) with decision quality data to make certification recommendations for training systems



# Re-Tooling How We Test



Requirement changed to T&R Credit

## NASMP Objectives (Policy msg 18 Apr 06)

- **Provide guidance on:**
  - **Simulator requirements development**
    - Tell acquisition community precisely what Fleet needs the simulator to do (based on T&R matrix)
  - **Framework for evaluation of delivered simulators**
    - Does the delivered simulator produce what we paid for?
  - **Provide priorities for upgrades/spiral development**
    - Where will we get our best bang for the next buck?
- **Optimize use of simulation across all T/M/S “based on what technology can deliver”**
- **Cost-effective generation of unit level T&R**
- **Participation in FST through NCTE connected simulators**

NASMP – Naval Aviation Simulation Master Plan

T&E criteria changed to Capability

## Legacy Testing Methodology

*Did we “build it right?”*

- Test against specification (acceptance testing)
- Fleet aircrews involved for limited validation of capability (structured “free play”)
- Reporting - Results of Test Procedures

## Meeting the Future

*Did we “build the right thing?”*

- More focus on the capability(s) to meet readiness requirements
- Early Fleet participation required (START\* process)
- Testing traceability to Mission Front End Analysis
- Certification requires robust Test Planning and Reporting to support Tech Authority Recommendation

\* START - Systematic Team Assessment of Readiness Training

**Goal is to deliver a “Training System” that Meets the Training and Readiness Capability Requirements of the Fleet**



# The Tester's Perspective



- Customers
  - Program Manager, System Engineers, Users/Fleet, Industry team (OEMs/developers)
- Products
  - Input to SPEC and Requirements Documents
  - Test Strategies
  - TEMP's, Test Plans, Test Procedures, Test Cards, Test Reports
- Concerns
  - Well defined / testable requirements
  - SPECs
  - Acquisition Strategy
  - Test Resources
    - Technology SMEs (Visual, Aero, Instructional System Designers, Interoperability)
    - Test SMEs (Test Pilots, Instructor Aircrew, Fleet Project Teams)
  - System Production Baseline
  - System Test Configuration Management
  - Providing decision quality data for Customers



# Why perform T&E?



**“A rigorous and efficient Test and Evaluation (T&E) program provides early knowledge of developmental and operational issues.” ...**

**“The T&E principles and practices apply to all acquisition programs regardless of size or cost...”**

*Defense Acquisition Guidebook 28 June 2013, Chapter 9.0.1*

**T&E provides data and information to assist the program manager with managing risks involved in developing, producing, operating, and sustaining systems and capabilities.**



# Types of T&E



- Two Basic types - Developmental T&E and Operational T&E
  - Developmental T&E (DT&E) is performed in the factory and/or on site by both industry and the government. DT is used to demonstrate how well the system meets technical requirements
  - Operational T&E (OT&E) is conducted by COMOPTEVFOR to ensure that the system meets the validated requirements of the user in realistic environments and scenarios. OT focuses on operational effectiveness and operational suitability.
- For Training Systems....
  - Functional Verification (Specification Compliance)
  - “Capabilities Based” Testing/Validation (Mission Based Scenarios)



***Integrated Testing is the Goal  
(DT/OT/Industry)***



# Test Planning



- Work with AIR-4.6 (SE) to review contractor developed test procedures (Specification Compliance)
- Develop NAVAIR 3960 test plans to test training capability (Capability/Mission Based Testing) – *In Progress*
  - Determine if the training system accurately models the weapon system and the external environmental affects
  - Test the capability to meet the Learning Objectives and ensure adequate measures (ISD, users) – *In Progress, few trial programs*
- Determine the necessary test personnel to meet the test objectives, i.e., HX-21, VX-23, AIR-5.1.2, 5.1.6, 5.1.8, 4.6, Fleet Instructors, Fleet Project Teams, etc.



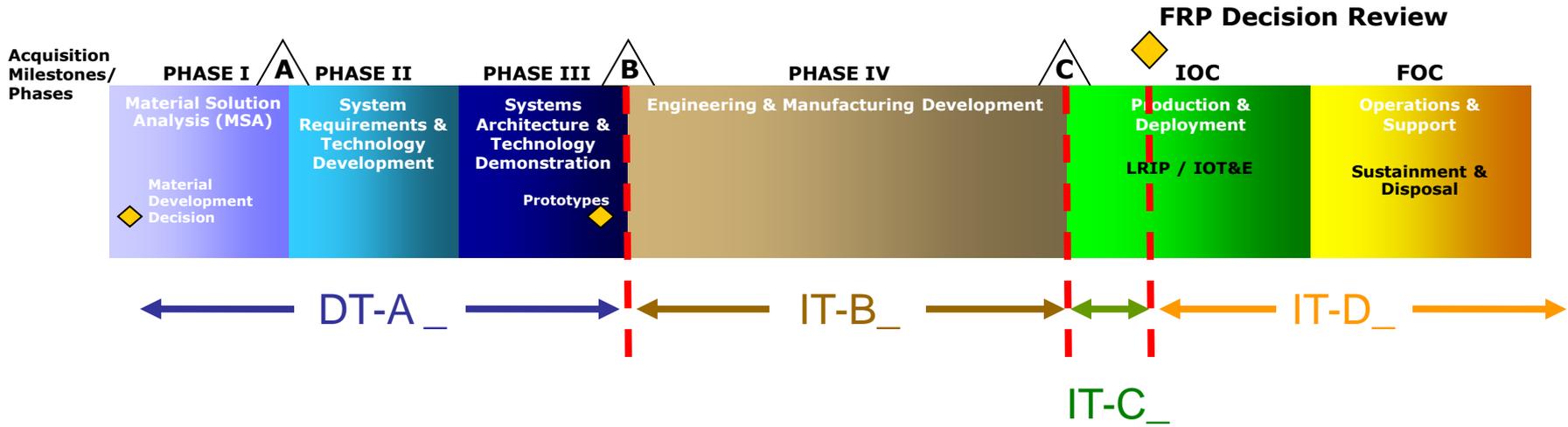
# Test Phase Nomenclature



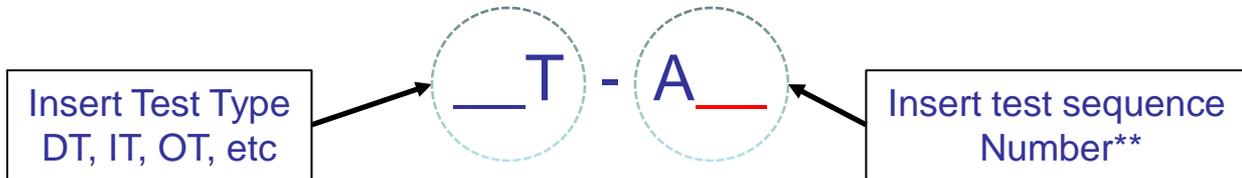
- NAWCTSD changed the test phase titles to align with DoD and DON nomenclature
- Test phase titles are labeled as Developmental Test (DT), Integrated Test (IT), or Operational Test (OT)
- The majority of training system test phases will be DT or IT unless its an ACAT program with COMOPTEVFOR involved that will require OT
- The first test phase starts at “1” such as DT-C1 regardless of the scope of the test
  - The test phase title does not indicate test location
- The test phase name doesn’t correlate to test objectives, the test objectives for each phase is documented in the Acquisition Strategy or TEMP
- The test phase also includes the location of the test phase in the acquisition cycle such as post milestone A, B, C, etc.



# Test Phases in Acquisition



## Example:



\*\* There are no rules for numbering sequence except for formal OT periods, although each Test Type is numbered independently \*\*  
 \*\* T&E WIPT develops test phases and documents it in the Acquisition Strategy or TEMP \*\*



# So *WHY* does this Matter?

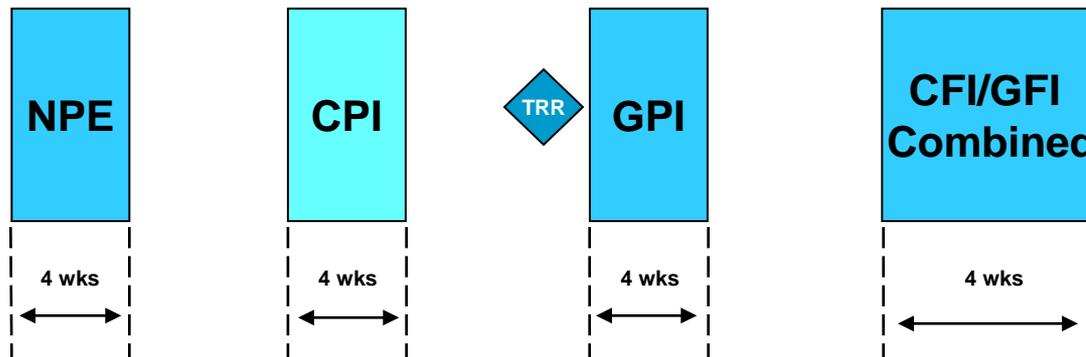


## Each test name has implication to the Milestone Decision Authority (MDA) and APEOs

- The MDA reviews numerous strategies and schedules on a daily basis
- If the naming convention is incorrect or unfamiliar, he/she has a hard time assessing program risks based on the information presented
- For example, the MDA knows that IT-B5 is the fifth integrated test phase conducted after MS B during the Engineering Manufacturing Development (EMD) phase
  - Based on the number 5, if there are a high number of DRs, he/she will be concerned



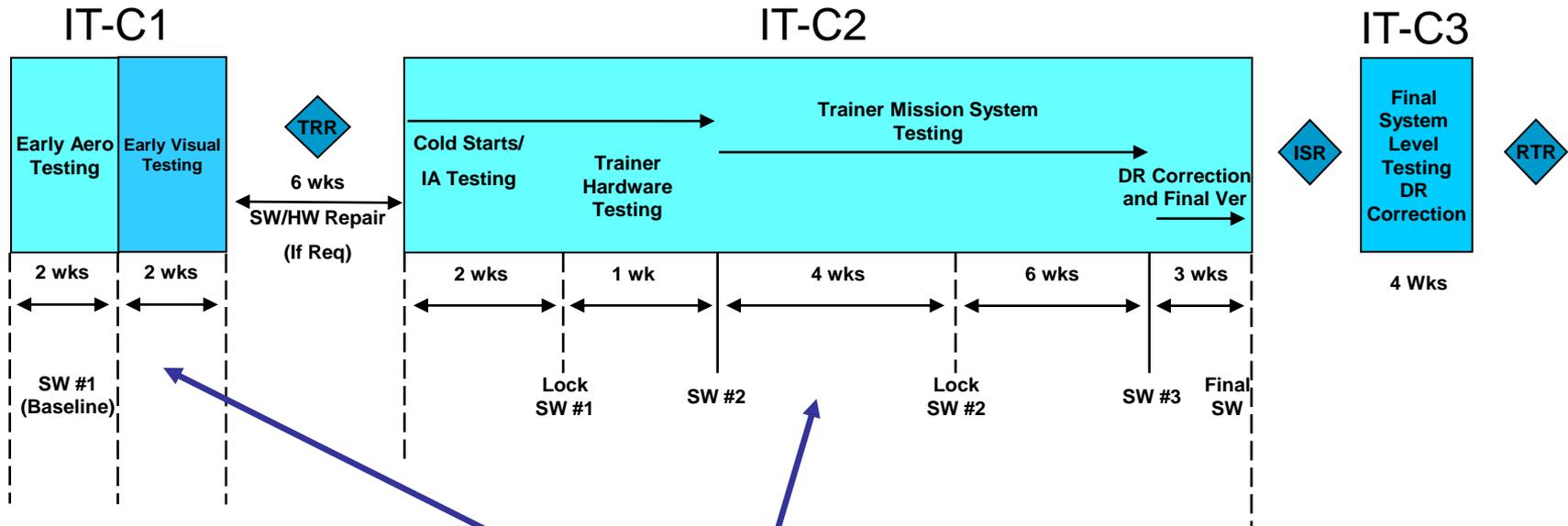
# Example Legacy Trainer Test Schedule



**Test Phases Were Based on Specification Compliance**



# Training System Test Schedule (Notional)



- Test strategy is specification compliance and training capabilities based
- High risk testing occurs first to allow for design changes

**T&E Strategy Supports Acquisition Strategy**



# Test Execution



- Testing consists of:
  - Specification Compliance (RTVM, etc.)
    - Determines if the systems is built according to the system specification
  - Mission based or Capability based T&E
    - System Level Testing to determine if the training system is capable of meeting the training tasks and attribute measures as outlined in the 3960 test plan– *In Progress*
      - Requires AIR-4.6.3 (ISD) and AIR-4.6.8 (SE) help to document the necessary cues and measures to decrease the chance of subjective evaluations
      - The NAWCTSD START\* process will be used to help generate test cards related to training tasks

**Provide Training System Certification to meet training tasks**



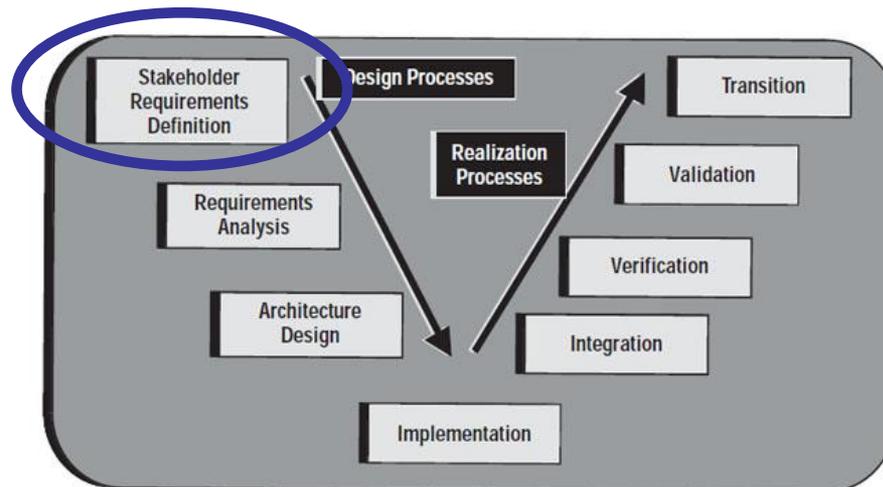
# Test Reporting



- Contractor and Gov't testers will write SARs, STRs, etc. during specification compliance verification testing (i.e., Developer Deficiency Tracking Method such as Snags, Problem Reports, etc.)
- AIR 5.1 testers will write Mission relation NAVAIR Deficiencies Part I, II, III– *Future Goal, Internal Document*
- AIR 5.1 testers will write Interim Summary Reports (ISRs) as training systems are incrementally tested to support ready for training– *Future Goal, Internal Document*
- Final results will be published in a Report of Test Results (RTR) for all upgrades– *Future Goal, Internal Document*

- Stakeholder Analysis

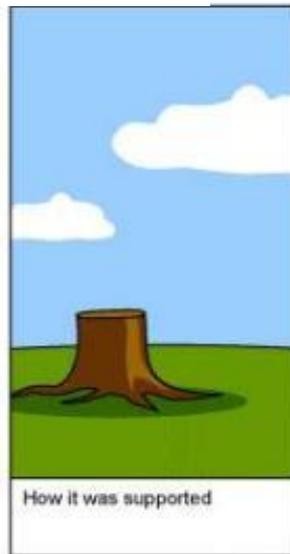
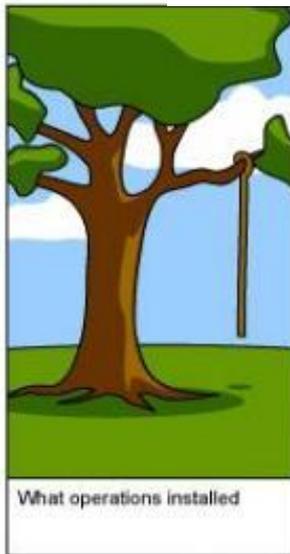
- Document the customer's requirement by defining the situation and the desired training outcome
  - Capability Outcome Needed → Someone who can employ the F/A-18 in an air-to-air mission
  - AIR 4.6.3 (ISD) works with the User to decompose training requirements
  - AIR 4.6.8 (SE) with AIR 5.1 (T&E) develops SPECs with testable requirements
  - AIR 5.1.1 leads the T&E WIPT to develop a test strategy to collect the data to show that the system meets the User's requirements



# Understanding the Requirement



**What We Put on Contract and Built**



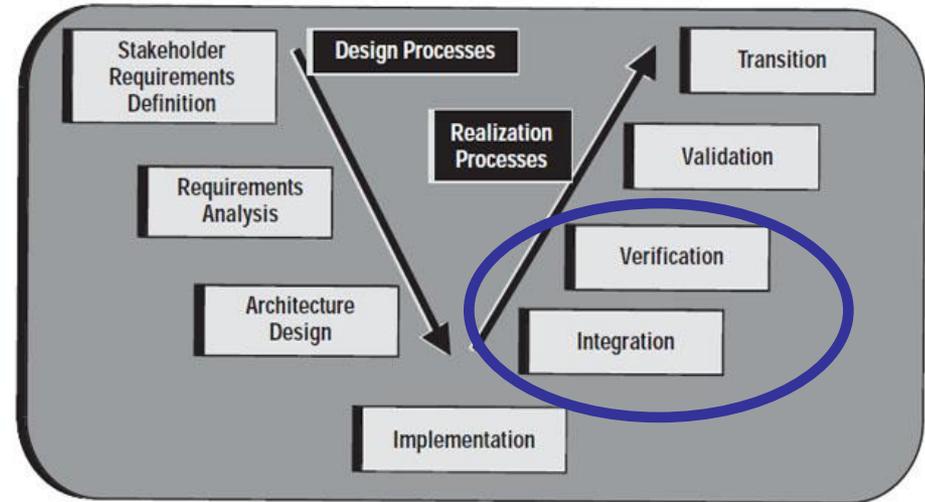


# Verification



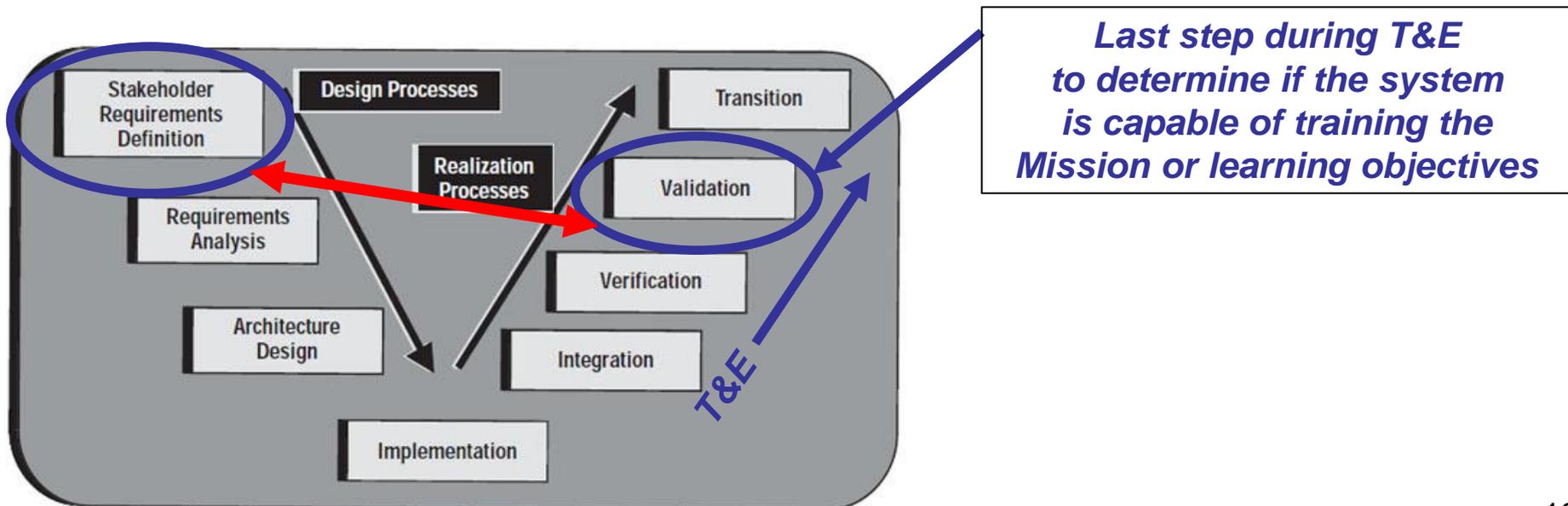
SPEC RTVM determines if the training device “it was built correctly” ...

BUT, does not determine if “It was the correct training system to meet the training objectives” .....



ID	Description	Source Comments	CPD Traceability	IMRD Traceability	Allocation	CSCI/CSC	Design Doc Traceability	Verification Method	Verification Class	Test Procedure	Traceability To	Traceability From
SOW XYZ	shall organize, coordinate, and control the program activities to ensure compliance with the contract requirements and the timely delivery of the required product(s) and services.	Para 3.1.1	N/A	N/A	N/A			Project Mgmt Assessment	Programmatic			
SOW XYZ2	shall provide the necessary program management, systems engineering, design engineering, materials, services, equipment, facilities, testing, technical, logistics, manufacturing, and clerical support for the efforts described in NAWCTSD SOW and NAWCTSD Specification PRF: .....	Para 3.1.1	N/A	N/A	N/A			Project Mgmt Assessment	Programmatic			

- Training System validation is part of the SE Process
- Validation takes place during the T&E Phase
  - The Test Plan documents the process to conduct verification and validation
    - Did we acquire the right training system to meet the training objectives?
  - The Test Report documents the results - Capabilities and Limitations





# Summary



- Test and Evaluation is a NAVAIR Technical Competence to support program IPTs
  - A Process by which a system or components are compared against requirements
  - An Engineering Tool for PMs and SEs
    - Used to reduce risk throughout the acquisition cycle
    - Used to assess progress of design, performance, and supportability
- Verification/Acceptance testing
  - *Did we build it right?*
- Validation/Capabilities Based Test and Evaluation
  - *Did we build the right thing?*
- Certification

**Test and Evaluation principles and practices apply to all acquisition programs regardless of size or cost**



??QUESTIONS??