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Test and Evaluation

Are we confusing the issue?

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So we are all on the Same Page RIGHT?

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- Verification
  - Confirms that a system element meets design-to or build-to specifications. Throughout the system's life cycle, design solutions at all levels of the physical architecture are verified through a cost-effective combination of analysis, examination, demonstration, and testing, all of which can be aided by modeling and simulation
    - **GLOSSARY OF DEFENSE ACQUISITION ACRONYMS & TERMS 12th edition 2005**
- Validation
  - 1. The review of documentation by an operational authority other than the user to confirm the operational capability. Validation is the precursor to approval. (CJCSI 3170.01E)
  - 2. The process by which the contractor (or as otherwise directed by the DoD Component procuring activity) tests a publication/Technical Manual (TM) for technical accuracy and adequacy.
  - 3. The process of evaluating a system or software component during, or at the end of, the development process to determine whether it satisfies specified requirements.
    - **GLOSSARY OF DEFENSE ACQUISITION ACRONYMS & TERMS 12th edition 2005**
- Acceptance
  - The act of an authorized representative of the government by which the government, for itself, or as agent of another, assumes ownership of existing identified supplies tendered, or approves specific services rendered, as partial or complete performance of the contract on the part of the contractor.
    - **GLOSSARY OF DEFENSE ACQUISITION ACRONYMS & TERMS 12th edition 2005**

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Using the right words requires knowledge of the definition

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A generational definition gap!

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- The purpose of verification of subsystem integration is to ensure that the subsystems conform to what was designed and interface with each other as expected in all respects that are important: mechanical connections, effects on center of mass and products of inertia, electromagnetic interference, connector impedance and voltage, power consumption, data flow, and so on. Validation consists of ensuring that the interfaced subsystems achieve their intended results. While validation is even more important than verification, it is usually much more difficult to accomplish.
  - **NASA Systems Engineering Handbook 1995**

- Verification of a product shows proof of compliance with requirements— that the product can meet each “shall” statement as proven though performance of a test, analysis, inspection, or demonstration. Validation of a product shows that the product accomplishes the intended purpose in the intended environment—that it meets the expectations of the customer and other stakeholders as shown through performance of a test, analysis, inspection, or demonstration
  - **NASA Systems Engineering Handbook 2007**

Definitions change. Effective communication requires constant learning

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Interesting Conversations

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- Words Count!
  - Hallway Conversations at a contactors / customer facilities
    - "The Aircraft satisfied a requirements yesterday", "Yeah that was a tough requirement to validate!"
    - "All my test points are tied to requirements, when my plan is completed all my requirements will be verified!"
    - "Yesterday we had 1304 test points and today we have 1509, how did that happen"
    - "When all my test points are sold the aircraft works"
    - "The test team validated the requirement yesterday"
    - "What is a verification requirement?, I've never heard of them"
    - "Yeah, we have a few problems with our Software V&V test yesterday"

Title 10 US Code

–Prohibits contractor involvement in OT&E conduct, criteria establishment, or evaluation

Mean what you say, don't use phrases just cause it sounds right!

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Review's? Review's? Which Review's?

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- More Confusion ???
  - System Design Review
    - MIL-STD-1521 was cancelled in 1995
    - Replaced by SFR
    - But – Not For NASA – SDR is BACK for NASA programs – Or did it ever go away????? (DTM 09-025)
  - Preliminary Design Review
  - System Requirements Review
  - Critical Design Review
  - Program Review 1
  - Technical Interchange Meeting 2

Do you understand the meaning?
Do they really help you?
What is your role?
Are you doing work outside your swim lane?

Know program expectations. Work to these common actions

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What do we really test?

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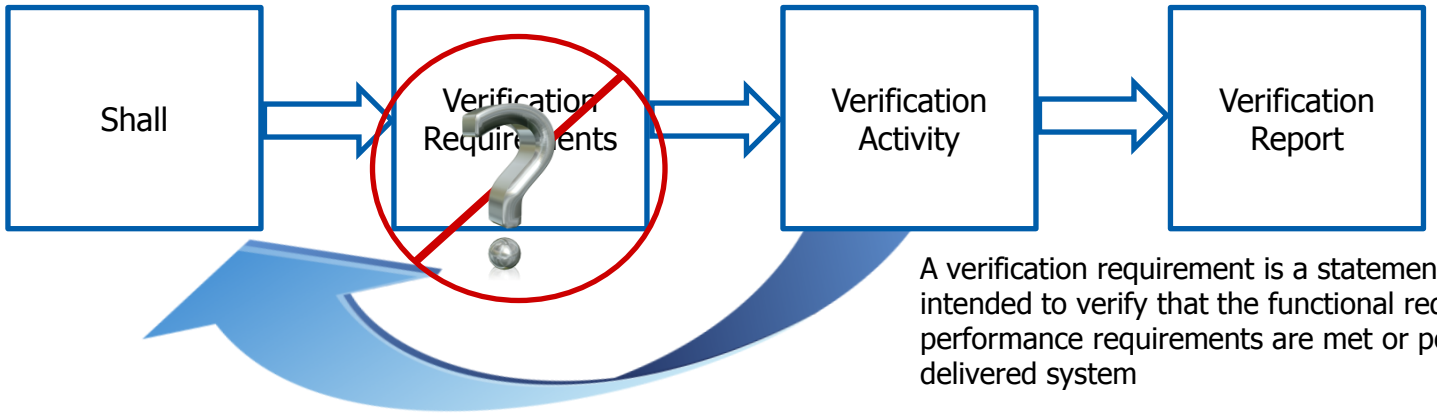
- Requirements
  - What is a Requirement?
    - Do you mean a SHALL?
    - How does this support the Verification activity?
    - What is an Verification activity ?



A verification requirement is a statement of how it is intended to verify that the functional requirements and performance requirements are met or possessed by the delivered system

- Requirements
  - Does test and evaluation verify a requirement?
  - Many programs state that the test program uses “shalls” to determine the test activity
    - Should they ?
    - Should test interpret the meaning of the “shall”?

Using the wrong words can send the wrong message.

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So What!

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- WORDS COUNT!
  - The use of words drive expectations
  - The use of the wrong words drive wrong expectations
  - The generational gap within engineering can cause confusion, dissatisfaction, arguments and lots of other bad outcomes

- Set the correct expectations
  - Know what your job really is.
  - Use your skill mix and language to shape your job expectations.
  - Lazy language can lead to undue expectations
- Know your language
  - Say what you really mean
  - Ensure phraseology for your point is accurate
  - Know the definition and the application of the words on your program and any differences they may be from your previous experience
- Know your swim lane!
  - Test provides data, test does not verify (unless they are the requirements owner)
  - It is easy to assume you are the expert on the testing of a requirement
    - Leads to misinterpretations
    - Leads to program growth
    - Leads to incomplete test programs (See Verification)

Words transmit expectations, Know what you mean, Choose the correct words

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