Joint Service Safety Testing Standards: The Need for Non-Platform Level "Standardized" Testing and an Approach to Achieve That Goal

Dr. Elizabeth Rodriguez-Johnson
Deputy Director for Safety
ODDR&E/Systems Engineering

13th Annual NDIA Systems Engineering Conference
San Diego, CA, October 28, 2010

DISTRIBUTION STATEMENT A -- Cleared for public release by OSR on 12 October 2010 -- SR case number #11-S-0079 applies.

Drafting NATO Test Standards

System Independent

Warfighter Mode Specific:
Storage, Handling, Transportation and Employment

System Dependent

Munition Specific: STANAG 4297 – AOP 15 & STANAG 4629 - Overarching S3AP

- Ammunition (A)
  - Large Caliber (A-LC)
  - Medium Caliber (A-MC)
  - Small Caliber (A-SC)
  - Non-Lethal (A-NL)
  - Man Emplaced Demolition (A-MC)
- Missile/Rocket (MR)
  - Air Launched (MR-AL)
  - Surface Launched (MR-SL)
  - Man-Carried (MR-MC)
- Explosive Ancillary (D)
  - Pyrotechnics (P)
  - Fuze and Ignition Systems (F)
  - Underwater (UW)

Support

- Guidance (G)
  - Single Environment (G-SE)
  - Glossary (G-G)
- **Vulnerabilities**
  - IM (IM)
  - E3 (E3)
  - Software (SW)

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Proposed Construct

- The briefed construct is being pursued by the Services' test experts. This is the proposed methodology and technique to develop standard engineering and safety tests.

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Challenge

- There is a need to identify a leadership "champion" for the effort to standardize the engineering and safety tests that the communities utilize.

- Identify funding source(s) to pursue the "standardized" testing tasks.

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For Additional Information

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Systems Engineering: Critical to Program Success

Innovation, Speed, and Agility

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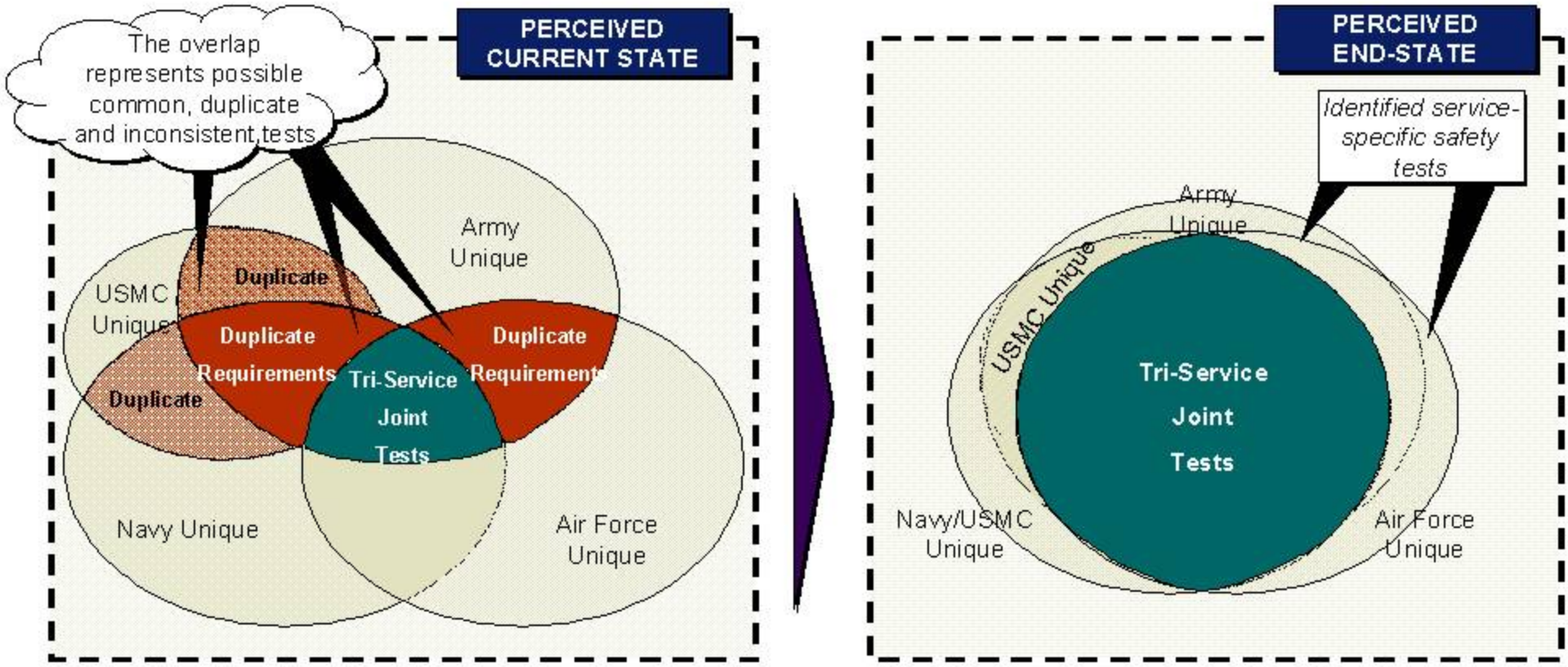
Validated Need for Joint Service Engineering and Safety Tests

Given the increasingly joint nature of the current military conflicts, Services are increasingly delayed by the current process that involves duplicate and inconsistent engineering and safety tests to qualify and certify systems/products.



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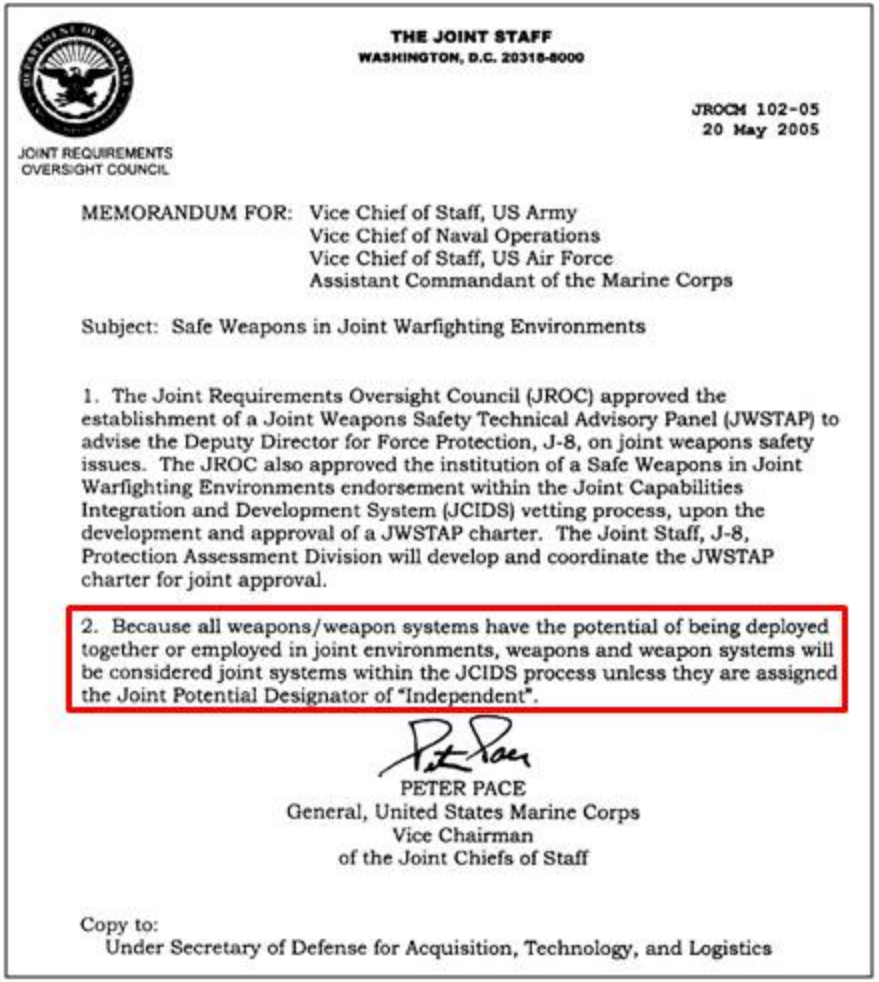
Initiatives Interwoven to Support the Joint Warfighting Environment



THE JOINT STAFF
WASHINGTON, D.C. 20318-8000

JOINT REQUIREMENTS OVERSIGHT COUNCIL

JROCM 102-05
20 May 2005

MEMORANDUM FOR: Vice Chief of Staff, US Army
Vice Chief of Naval Operations
Vice Chief of Staff, US Air Force
Assistant Commandant of the Marine Corps

Subject: Safe Weapons in Joint Warfighting Environments

1. The Joint Requirements Oversight Council (JROC) approved the establishment of a Joint Weapons Safety Technical Advisory Panel (JWSTAP) to advise the Deputy Director for Force Protection, J-8, on joint weapons safety issues. The JROC also approved the institution of a Safe Weapons in Joint Warfighting Environments endorsement within the Joint Capabilities Integration and Development System (JCIDS) vetting process, upon the development and approval of a JWSTAP charter. The Joint Staff, J-8, Protection Assessment Division will develop and coordinate the JWSTAP charter for joint approval.

2. Because all weapons/weapon systems have the potential of being deployed together or employed in joint environments, weapons and weapon systems will be considered joint systems within the JCIDS process unless they are assigned the Joint Potential Designator of "Independent".

PETER PACE
General, United States Marine Corps
Vice Chairman
of the Joint Chiefs of Staff

Copy to:
Under Secretary of Defense for Acquisition, Technology, and Logistics

Initiatives

- **Weapon Safety Reviews:** Collaborate on Joint Weapons Safety Reviews
- **Requirements:** Integrate Joint Weapons Safety Requirements in JCIDS
- **Testing:** Develop Joint Service Weapons Safety Testing Standards

Expedites safety processes and testing to field weapons to the warfighter faster.

Definition

- Within the context of this briefing, "Standardized" testing is defined as using the same test parameters, testing process, and procedures to evaluate a system or product within DoD.

- Goal: Achieve test data acceptability and interchangeability between the Services.

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Background

- Within the DoD, the engineering and safety communities utilize general functional tests to assess systems.
- Most tests apply to both communities; a small number are specific to each individual community.
- Many required tests are driven by the engineering community to evaluate ruggedness, durability, reliability, and safety of a system/product; the safety community also reviews the results of these critical tests.

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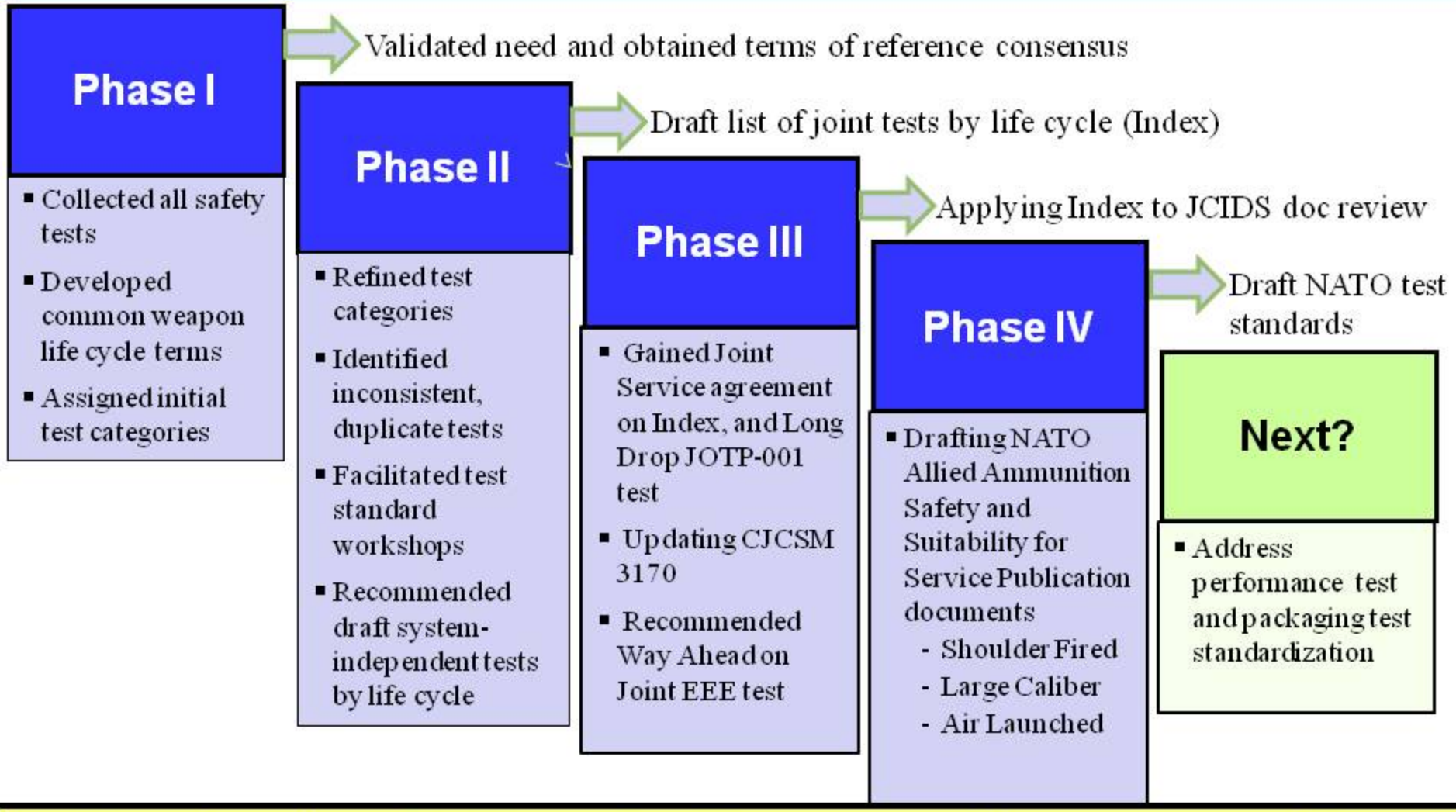
Joint Service Safety Testing Progression



Your feedback is important to ensure the success of the current and future effort.

Status

- **Accomplishments:**
  - Developed common weapon life cycle terms.
  - Defined test categories.
  - Identified inconsistent, duplicative tests.
  - Drafted NATO document construct.

- **DSOC ATP TF provided initial "seed" funding to initiate work on the stated goal, but is not currently funding the effort.**

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List of Joint Warfighting Tests Used in a System's Life Cycle

Handling	
Crane	STANAG 4375, Para 8a (Shock-Mechanical); MIL-STD-648, Test 5.8.3 (Lifting)
Man Carried	MIL-STD-331, Test F1.2 (Personnel-borne ESD) (EEE)
VERTREP	MIL-STD-331, Test F1.2 (Helicopter-borne ESD) (EEE); STANAG 4375, Para 8a (Shock-Mechanical); MIL-STD-648, Test 5.8.3 (Lifting)
Storage	
Protected/Climate--controlled Land-based Magazine	MIL-STD-2105C, Test 5.1.1 (T&H); MIL-STD-2105C, Test 5.1.2 (Vibration); MIL-STD-2105C, Test 5.1.3 (T&H); MIL-STD-648, Test 5.7 (Impact)
Unprotected/Open Land-based Magazine	MIL-STD-464, Test No. 5.8.3, HERO (EEE); MIL-STD-331, Test F1.2 (Lightning Strike) (EEE); MIL-STD-2105C, Test 5.1.1 (T&H); MIL-STD-2105C, Test 5.1.2 (Vibration); MIL-STD-2105C, Test 5.1.3 (T&H)
Transportation	
Wheeled Land Vehicle	MIL-STD-464, Test No. 5.8.3, HERO (EEE); MIL-STD-648, Test 5.11 (Storage)
Rail	MIL-STD-648, Test 5.2.7 & Appendix L (smaller items) OR Appendix M (larger items) (Impact); MIL-STD-648, Test 5.11 (Storage)
Fixed Wing Aircraft (Transport)	MIL-STD-464, Test No. 5.8.3, HERO (EEE); MIL-STD-648, Test 5.8 (Tiedown); MIL-STD-810, Method 500.4 (Pressure-Low)
Rotary Winged Aircraft	MIL-STD-464, Test No. 5.8.3, HERO (EEE); MIL-STD-331, Test F1.2 (Helicopter-borne ESD) (EEE); MIL-STD-648, Test 5.8 (Tiedown) ; MIL-STD-810, Method 500.4 (Pressure-Low)
Navy and Army Vessels	MIL-STD-464, Test No. 5.8.3 (EEE); MIL-S-901, Test 3.1.2a/b/c (Shock); STANAG 4375, Test 8a (Shock-Mechanical); MIL-STD-648, Test 5.8 (Tiedown)
Prepo/Merchant Marine/Commercial	MIL-STD-648, Test 5.8 (Tiedown); STANAG 4375, Test 8a (Shock-Mechanical)
Undersea	ITOP 4-2-601, Test 4.2 (Shock-Mechanical); MIL-STD-648, Test 5.8 (Tiedown)
Employment	
Tracked Land Vehicle	MIL-STD-464, Test 5.8.3, HERO (EEE); ITOP 4-2-601, Test 4.2 (Shock-Mechanical); ITOP 4-2-504(2), Test 4.8.9 (Function); MIL-STD-810, Method 514 (Vibration)
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Obtained Consensus on Terms of Reference for a Weapon System Life Cycle

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  - Crane
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- Storage
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  - Man Carried

Drives System Independent Tests

System Independent and Dependent Tests

1. **Joint** Shock Test
2. **Joint** Vibration Test
3. **Joint** Temperature Test
4. **Joint** EEE Test
5. …

Drives System Dependent Tests

- Generic Subsystem
- System-Specific
- Ammunition
- Cannon
- Electric Initiators
- Explosives
- Fuze
- Power Sources
- Rocket Motors
- Software
- Submunitions
- Unmanned Targets

Safety test results will be detailed in the CPD.

Phase II focused on identifying the system independent tests for each mode. Modes will be defined in the ICD and CDD. The CDD and CPD will reference this report for specific safety tests. Phase III work will focus on harmonizing service safety tests.

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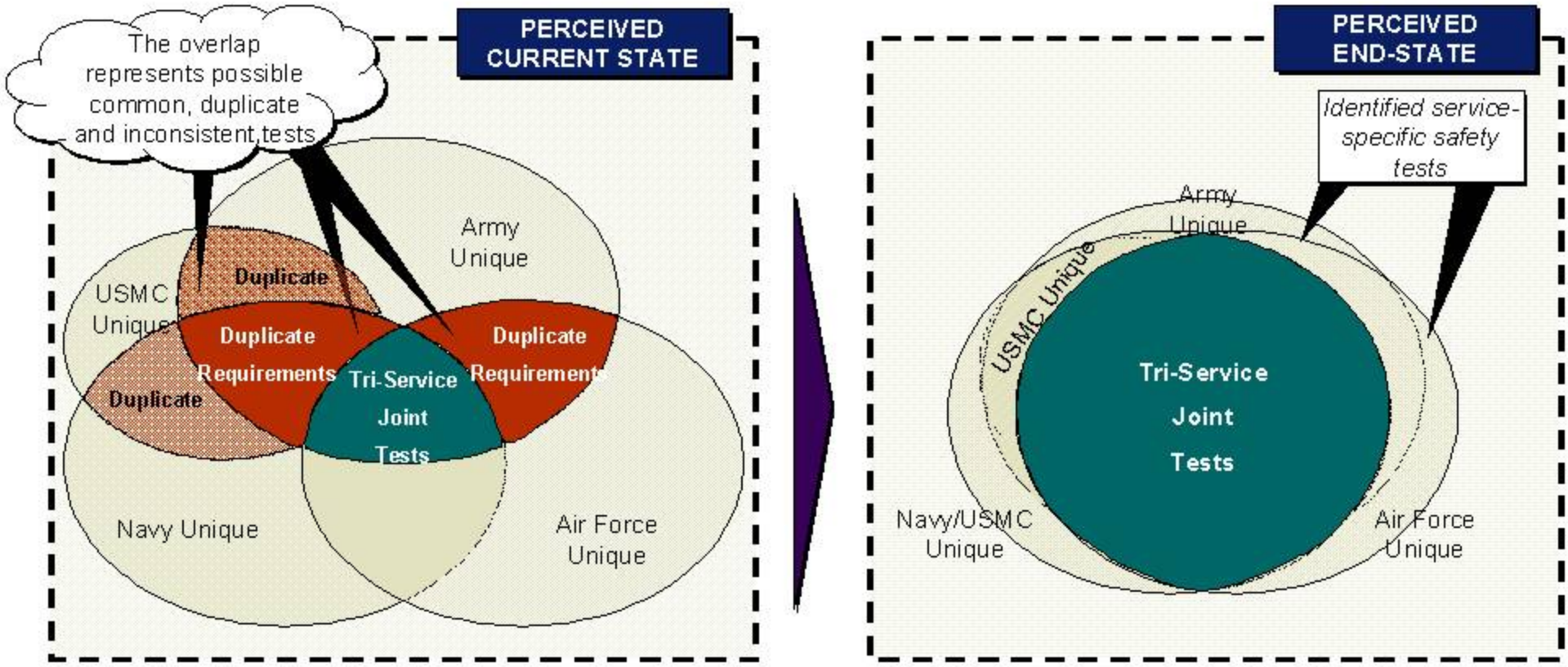

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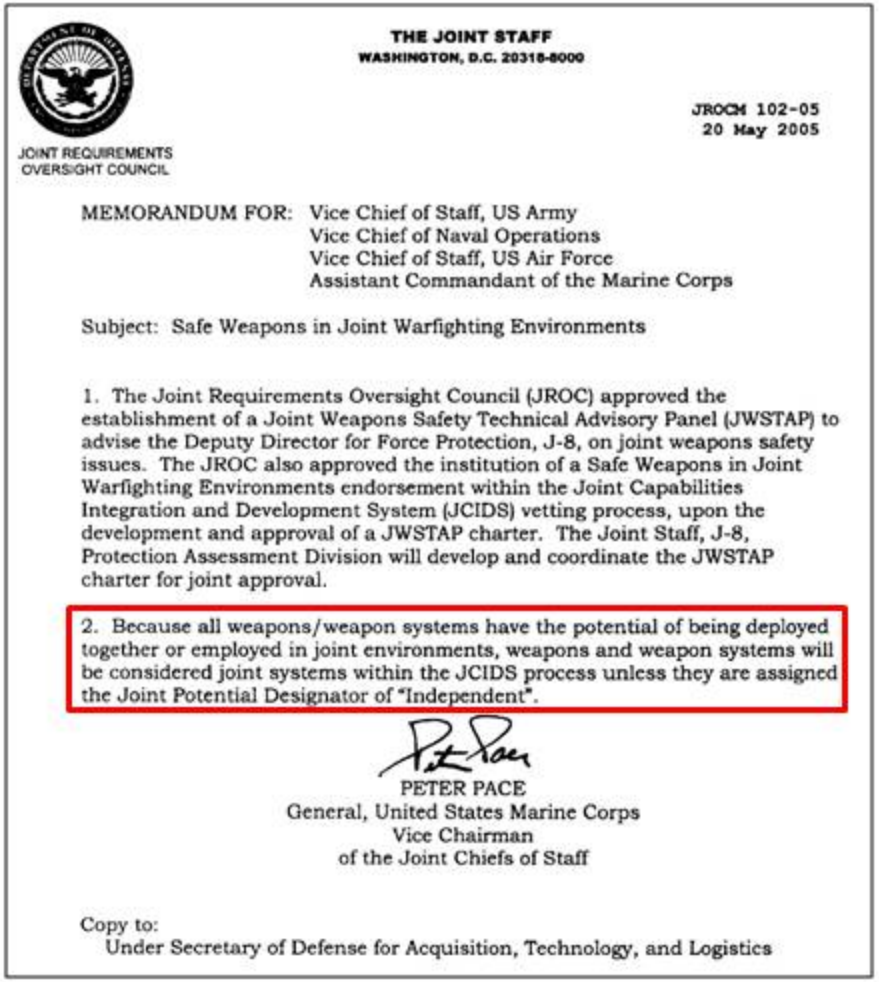

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JROCM 102-05
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MEMORANDUM FOR: Vice Chief of Staff, US Army
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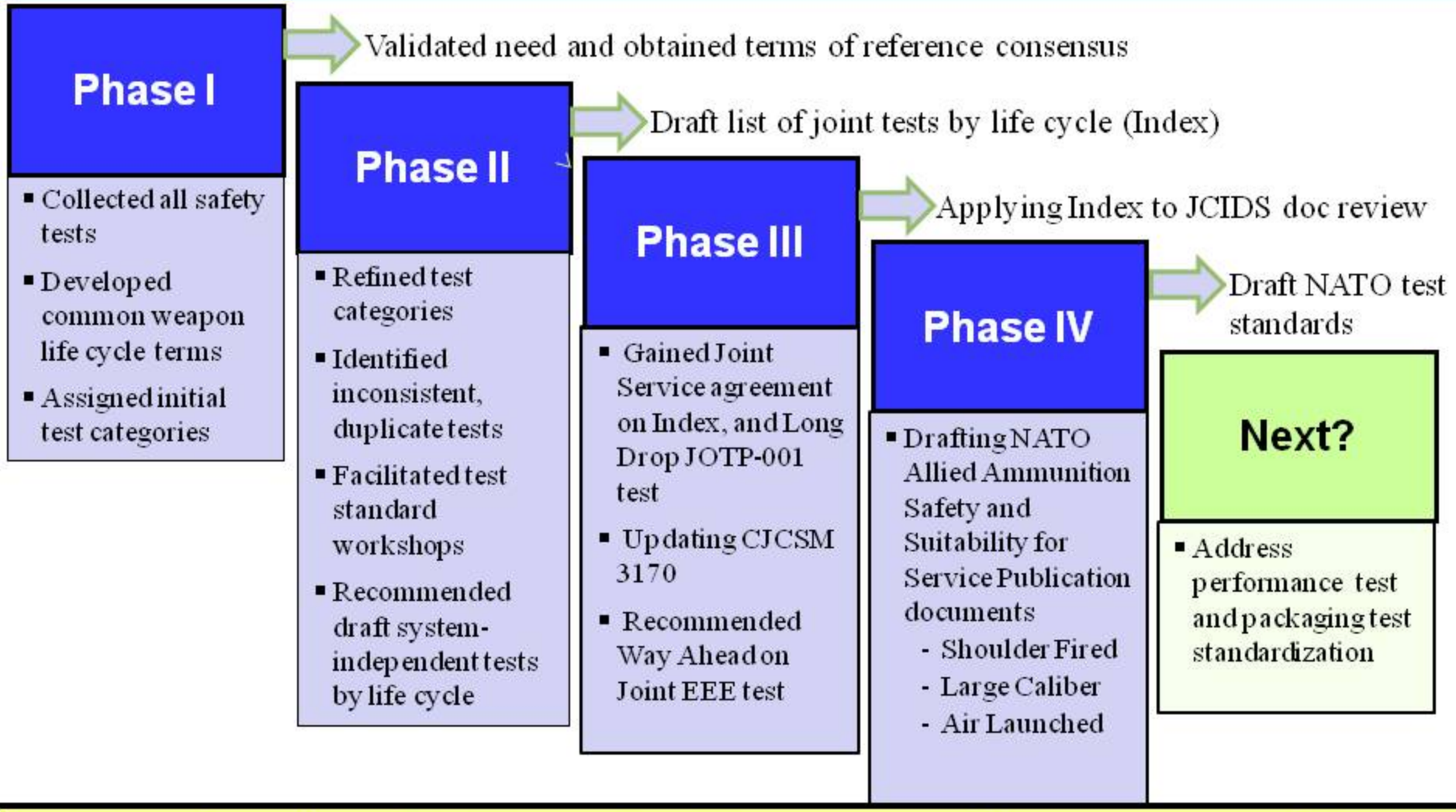

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  - Man Carried

Drives System Independent Tests

System Independent and Dependent Tests

1. **Joint** Shock Test
2. **Joint** Vibration Test
3. **Joint** Temperature Test
4. **Joint** EEE Test
5. …

Drives System Dependent Tests

- Generic Subsystem
- System-Specific
- Ammunition
- Cannon
- Electric Initiators
- Explosives
- Fuze
- Power Sources
- Rocket Motors
- Software
- Submunitions
- Unmanned Targets

Safety test results will be detailed in the CPD.

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