

Reconciling Developmental Weapons Safety Tests in MIL-STD-2105

Ken Tomasello
Navy Insensitive Munitions Office
Phone: 301-744-6078
E-mail: ken.tomasello@navy.mil

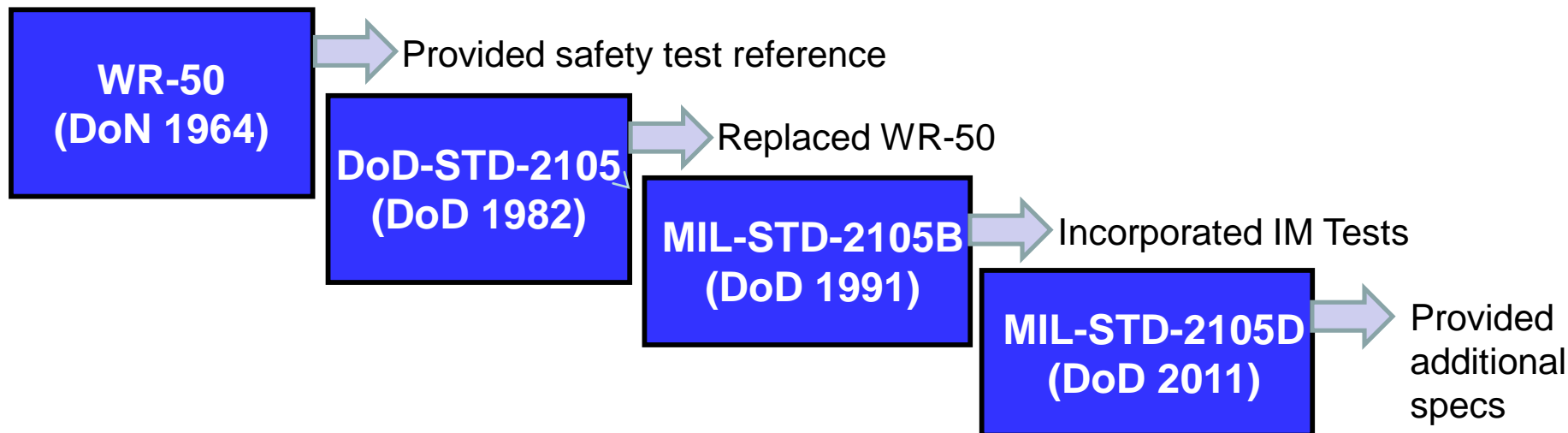
Diane Dray
Booz Allen Hamilton
Phone : 301-838-3891
E-mail: dray_diane@bah.com

Distribution A: Public Release


- What is MIL STD 2105?
- Current DOD Initiatives and NATO Weapons Safety and Suitability for Service (S3) Testing Standardization
- Safety Tests in MIL STD 2105
- Conclusions

Test Type	Purpose	References
Insensitive Munitions (IM)	Provide a basis to test munitions against meaningful, credible, potential threats and evaluate munition response against criteria that reflect the services IM vulnerability and hazard reduction goals	MIL-STD-2105, STANAG 4439 (NATO 2010), Multiple others
Basic Safety Tests	Used for Safety and Suitability for Service (S3) Assessment.	MIL-STD-2105, STANAG 4629 (NATO 2011), Multiple others
Hazard Classification	Provide procedures to assign the Class and Hazard Division for Ammunition & Explosives (AE) transportation and storage based on AE reactions	TB 700-2

History of Primary DoD Standards for Safety Tests



- What is MIL STD 2105?
- Current DOD Initiatives and NATO Weapons Safety and Suitability for Service (S3) Testing Standardization
- Safety Tests in MIL STD 2105
- Conclusions



THE JOINT STAFF
WASHINGTON, D.C. 20315-8000

JROC 102-05
20 May 2005

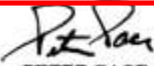
JOINT REQUIREMENTS
OVERSIGHT COUNCIL

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.

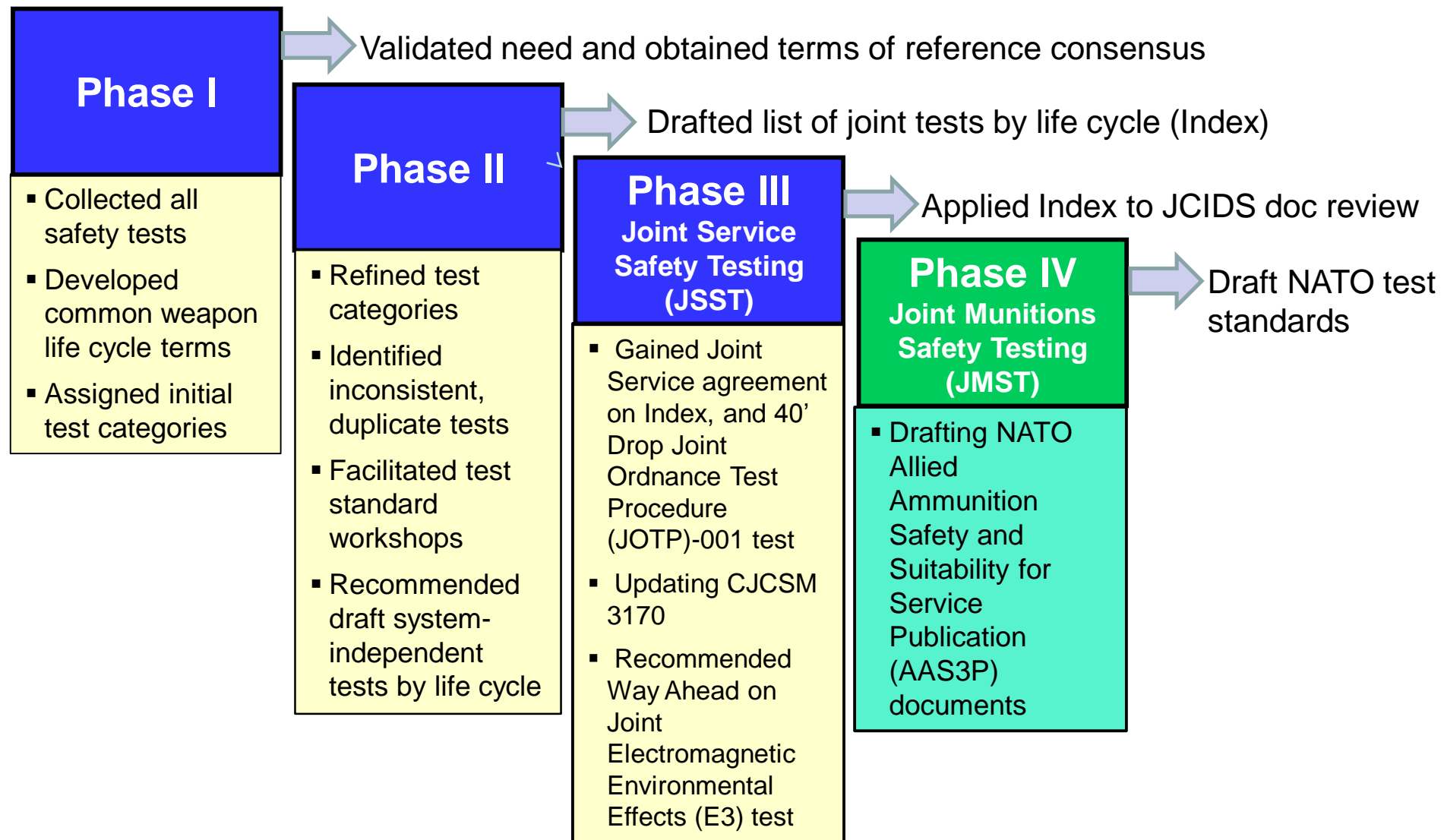
2. Because all weapons/weapon systems have the potential of being deployed together or employed in joint environments, weapons and weapon systems will be considered joint systems within the JCIDS process unless they are assigned the Joint Potential Designator of "Independent".


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

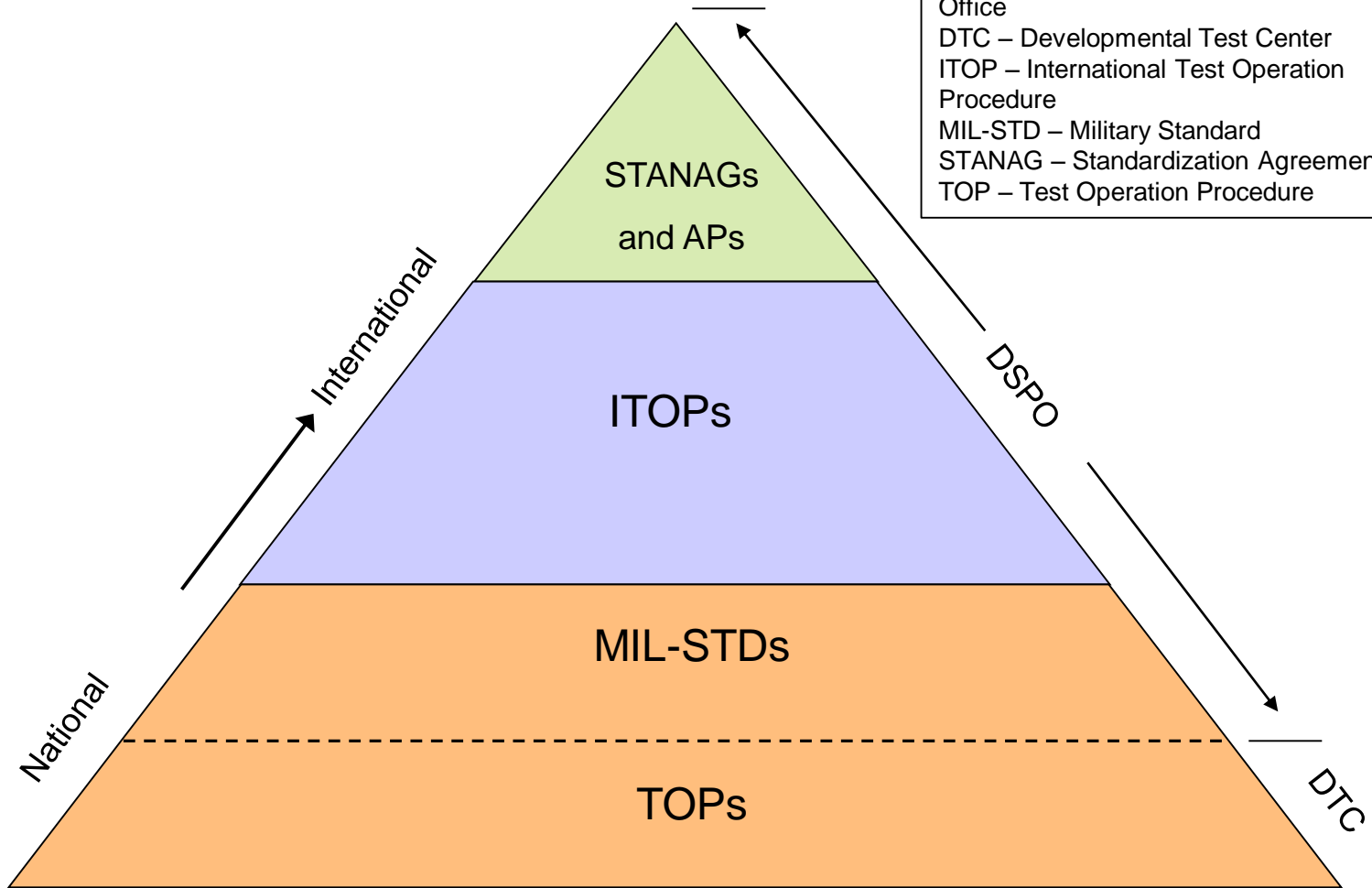
- **Materiel Reviews:** Collaborate on Joint Weapons Safety Reviews
- **Requirements:** Integrate Joint Weapons Safety Requirements in Joint Capabilities Integration and Development System (JCIDS)
- **Testing:** Develop Joint Service Weapons Safety Testing Standards

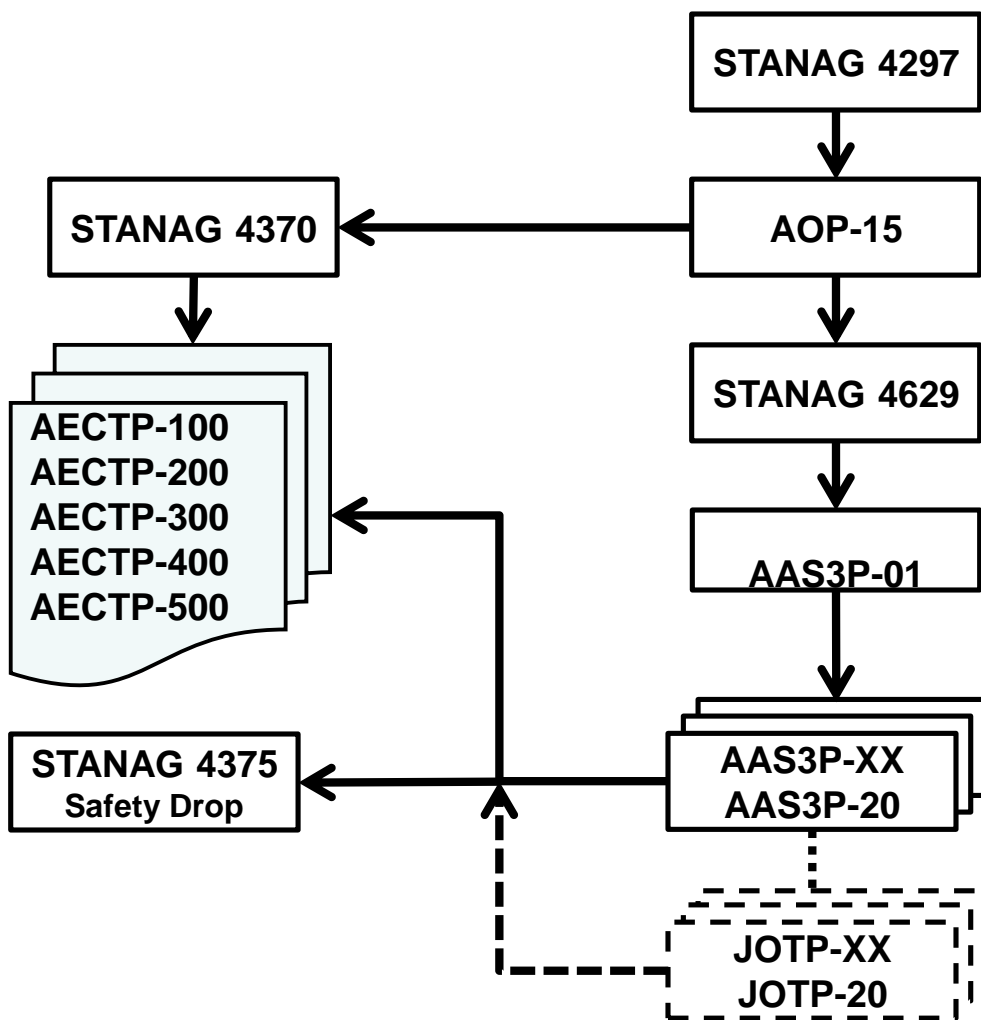


Standardization Approach

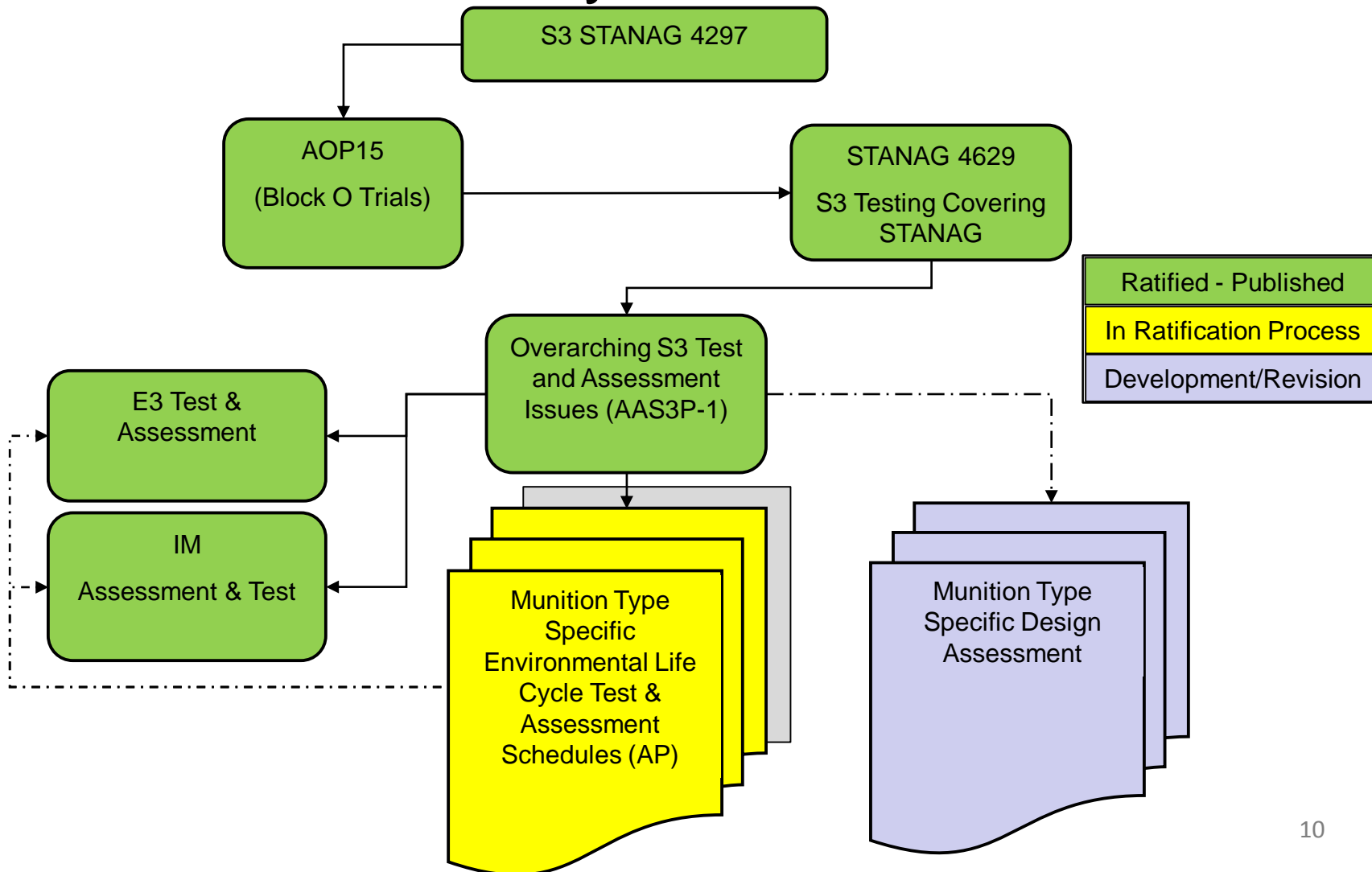
Providing Ordnance Safety For Our Warfighters

- AP – Allied Publication
- DSPO – Defense Standardization Program Office
- DTC – Developmental Test Center
- ITOP – International Test Operation Procedure
- MIL-STD – Military Standard
- STANAG – Standardization Agreement
- TOP – Test Operation Procedure





S3 Family Structure



Philosophy of Test

STANAG 4297 – AOP15 STANAG 4629 – Overarching S3 AP

Munition Specific

Missile/Rocket (MR)
10-Series

Ammunition (A)
20-Series

Explosive Ancillary (D)
30-Series

Air Launched
(MR-AL)

Large Calibre
(A-LC)

Pyrotechnics (P)

Surface and Underwater
Launched (MR-SUL)

Medium Calibre
(A-MC)

Fuze and Ignition
Systems (F)

Man-Carried
(MR-MC)

Small Calibre
(A-SC)

Naval (N)

Non-Lethal (A-NL)

Man Emplaced
Demolition (A-MC)

Mortars
(A-M)

Support

Guidance (G)

Single Environment
(G-SE)

Glossary (G-G)

Vulnerabilities

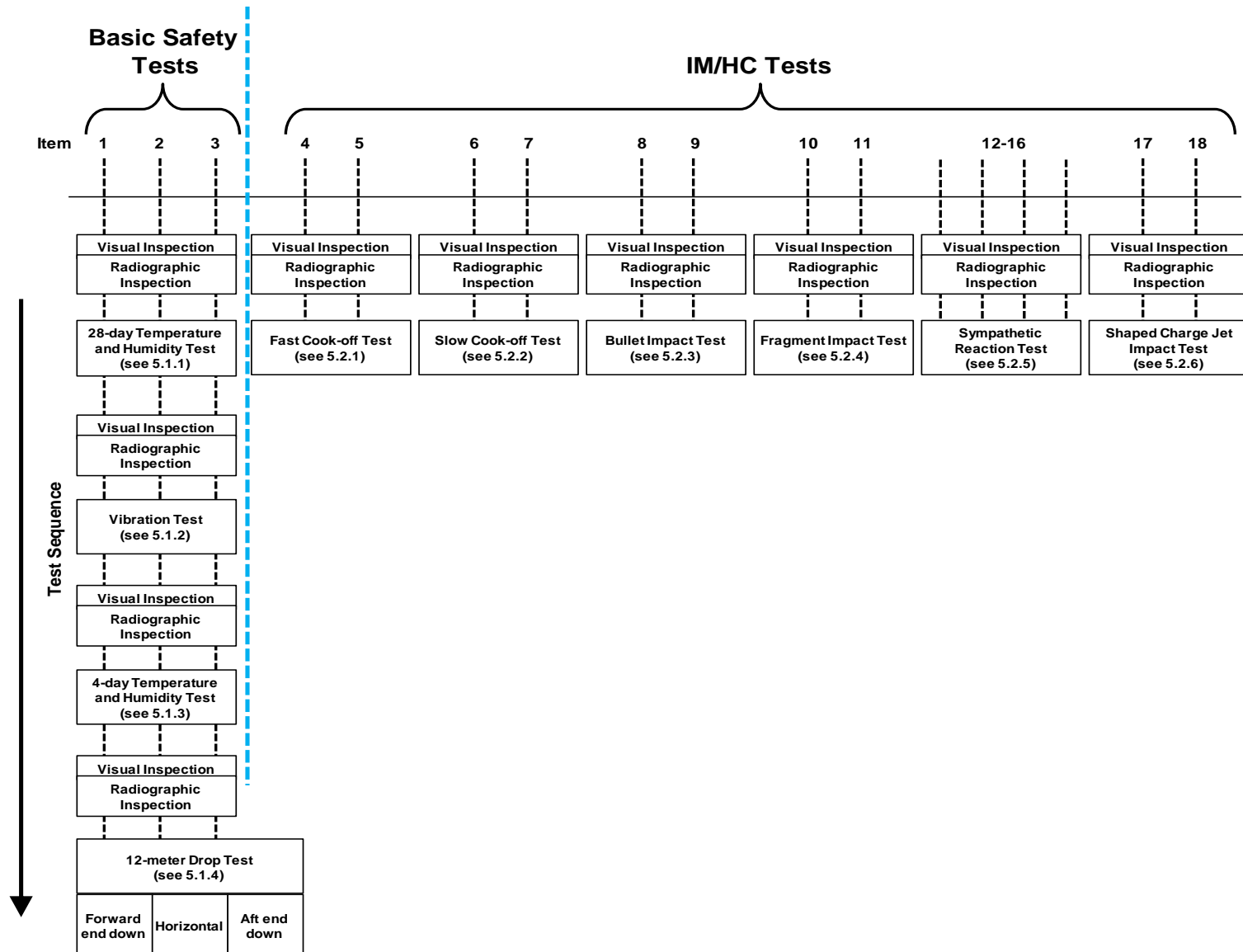
IM

E³ (E3)

Software (SW)

Document Divisions

- What is MIL STD 2105?
- Current DOD Initiatives and NATO Weapons Safety and Suitability for Service (S3) Testing Standardization
- **Safety Tests in MIL STD 2105**
- Conclusions



- WR-50 and MIL-STD-2105 did not provide any rationale for T&H tests or the 40-foot drop test.
- WR-50 and MIL-STD-2105 did not provide any rationale for the specific sequence of the safety tests.
- The NATO documents capture an expanded series of Sequential Environmental Tests, based on a generic munition's probable lifecycle, and which can be tailored to the specific lifecycle of the munition under test.
- The NATO documents provide some rationale for the climatic environment tests (analysis using Arrhenius relationship).
- Less objective criteria are used for other tests, such as the high temperature cycling and low temperature shock tests.

- What is MIL STD 2105?
- Current DOD Initiatives and NATO Weapons Safety and Suitability for Service (S3) Testing Standardization
- Safety Tests in MIL STD 2105
- Conclusions

- This paper is the result of a review of historical documents and interviews with members of the IM and safety community.
- In general, the safety tests were developed over the years in response to incidents or accidents with ordnance. However, the specific rationale for test parameters and pass/fail criteria may go back to World War II or before, may not be documented, and may have been lost to history.
- The basic safety tests have recently begun the promulgation process in a series of interconnected NATO documents with the weight of STANAGs.
- The expected result of JMST is a detailed set of S3 standards for weapons, and a method to address unique national requirements.

- Document rationale and requirements behind tests in AAS3Ps and NATO test STANAGs
 - Technical purpose for conducting a test
 - Technical rationale for pass/fail criteria
 - Standard instrumentation requirements
 - Standard measurements/units
 - Standard reporting requirements
- Result: data packages that can withstand scrutiny by multiple service boards and provide transparent results that are retrievable years later.
- Remove basic safety tests with next revision of MIL STD 2105D
 - MIL STD 2105 would retain only IM tests
 - Less confusing, more focused MIL STD
 - S3 assessment testing will be addressed separately in a well-defined set of NATO STANAGs and Allied Publications

Ken Tomasello, Navy Insensitive Munitions Office

telephone – (301) 744-6078

e-mail – ken.tomasello@navy.mil

Jim Gerber, Naval Ordnance Safety and Security Activity/Code N31 - Weapon System Safety / WSESRB

telephone - (301) 744-6018

email: james.gerber1@navy.mil

Ken Thompson, Aberdeen Test Center

telephone - (443) 861-9338

email: kenneth.p.thompson14.civ@mail.mil

Diane Dray, Booz Allen Hamilton

telephone – (301) 838-3891

email – dray_diane@bah.com

QUESTIONS