



# U.S. ARMY COMBAT CAPABILITIES DEVELOPMENT COMMAND

## JOINT STANDARDIZATION BOARD FUZE/INITIATION SYSTEMS - SUCCESS WITH STANDARDS

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# AGENDA



- **Fuze Engineering Standardization Working Group (FESWG)**
- **What is a Fuze?**
- **What is an Initiation System?**
- **Army Fuze Management Office**
- **Fuze & Initiation Systems Standardization Bodies**
- **NATO Standardization**
- **NATO Document Structure**
- **AC/326 CASG Standardization**
- **SG/A (IST) Program Of Work**
- **SG/A (IST) STANAGS and FESWG standards**
- **Key Takeaways**



# JOINT STANDARDIZATION BOARD FOR FUZE/INITIATION SYSTEMS



- Under the Defense Standardization Program, the Joint Standardization Boards includes requirements for munition **Fuze & Initiation Systems** fulfilled by **DoD Fuze Engineering Standardization Working Group (FESWG)**
- **FESWG is chartered with the purpose to:**
  - Maintain a DOD-wide working arrangement to prepare and review, in an effective and timely manner, the US and NATO standards, guidelines, and handbooks for fuzes and other initiation systems employed in munitions.
  - Serve as a continuing group to facilitate standardization of fuzes and other initiation systems, inclusive of associated design concepts, evolving technologies, packaging and logistics techniques, and testing and evaluation procedures, with emphasis on assuring design safety and interoperability.



# DOD FESWG OVERVIEW



## 2003

**Formally Chartered Under the of Defense (signed by DoD Standardization Executive)**

- **Determine Need For Standardization**

*In operation for*

# 50 years

## 2006

**Formally Chartered under JSB**

### **FESWG Membership well diverse.**

- Chaired by AFMO
- Includes Executive Secretary, Tri-service member leads, National Laboratories, Subject Matter Experts, Industry & Academia.

### **Serves as the US body for Fuze & Initiation Systems Engineering Standardization.**

#### **Duties include:**

- Establish and Maintain Fuze & Initiation Systems Engineering Standards
  - ❖ US Documents
  - ❖ NATO Documents
- Review and Standardize new technologies for safety
- Interact with Industry
- Advise the Safety Boards

### **Two Meetings Each Year**

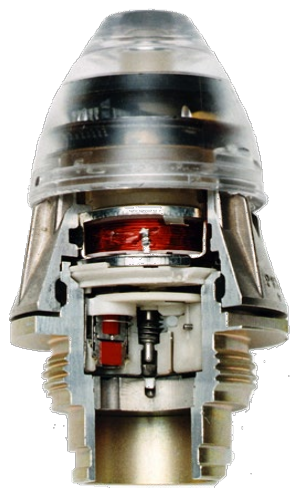
- Ad Hoc sessions as needed.



# WHAT ARE FUZES?



Fuze





# FUZE ≠ FUSE



**FuZe (FuZing System).** A physical system designed to sense a target or respond to one or more prescribed conditions, such as elapsed time, pressure, or command, and initiate a train of fire or detonation a munition's payload. Safety and arming are primary roles performed by a fuze to preclude initiation of the munition's payload before the desired position or time.



Mortar  
Fuzes



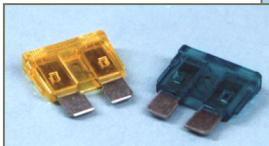
Artillery  
Fuzes



Medium  
Caliber  
Fuzes



Safe & Arm  
Devices



**FuSe** – An electrical safety device that operates to provide overcurrent protection of an electrical circuit.

**ORIGIN OF FuZe as a Military Term:** Spelling of "fuze" was mandated by a War Department to the Government Printing Office letter, dated 24 March 1927.



# WHAT IS AN INITIATION SYSTEM?



**Physical system designed to initiate or fire a munition's propulsion system. Safety and arming are primary roles performed by an initiation system to preclude initiation before intentional launch.**



# ARMY FUZE MANAGEMENT OFFICE (AFMO)

*Provides centralized oversight management  
of all non-nuclear Army fuzing throughout the life cycle*

## Fuze/Munitions Industrial Base

Propose, recommend and support actions directed towards ensuring the **fuze industrial base** is properly maintained

- Key participant of the DoD Fuze Integrated Product Team
- Key participant of the Joint Fuze Technology Program (JFTP)

## Joint Standardization Board Fuze & Initiation Systems

DoD's focal point for multi-service and international **Fuze and Initiation systems standardization**

- Chair of the DoD FESWG for over 50 years
- Chair of the NATO AC326 Subgroup A on Fuzing and Initiation Systems for over 30 years

## Fuze Safety Boards

Chairs and manages the **Army Fuze Safety Review Board** providing an Independent technical design safety review authority

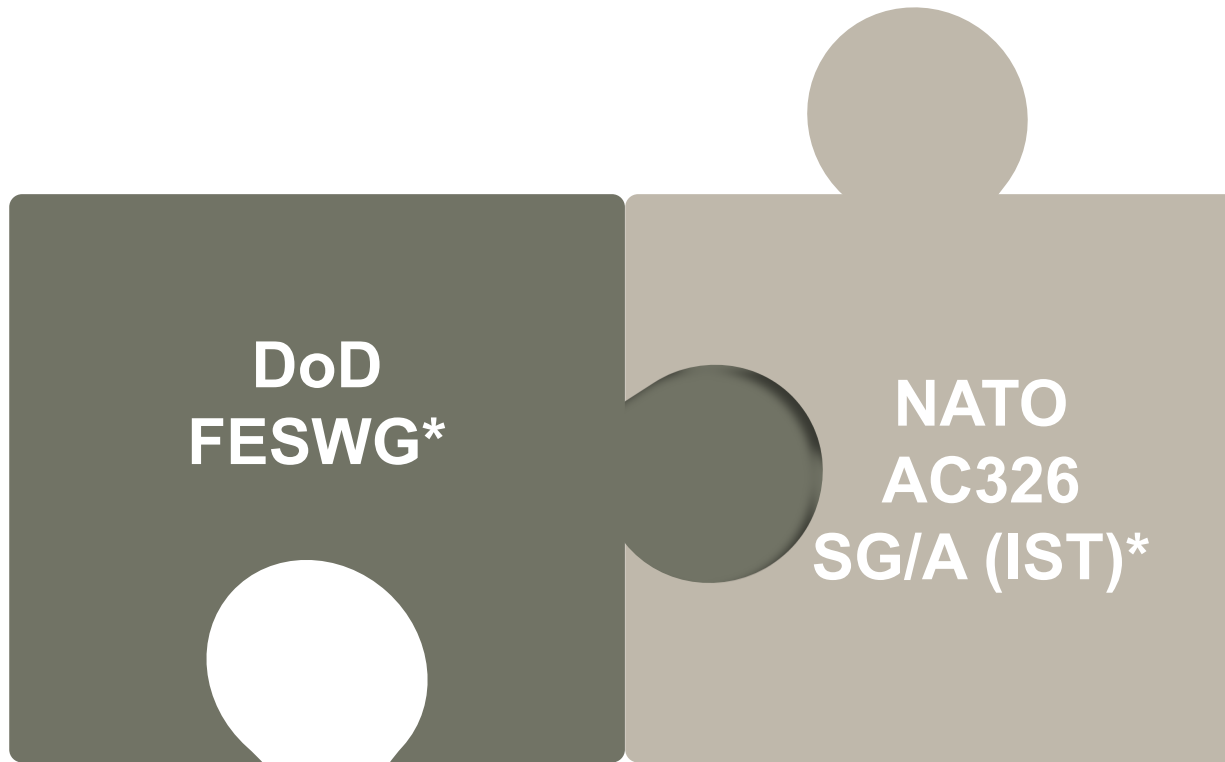
- Facilitator of the Joint Service Fuze & Ignition Systems Safety Review Board

**Continuous Improvement of Standards among DoD, Industry Partners,  
Academia & International Partners**





# FUZE & INITIATION SYSTEMS JOINT STANDARDIZATION BODIES



DoD  
FESWG\*

NATO  
AC326  
SG/A (IST)\*

**DoD FESWG is the**  
*Fuze & Initiation Systems*  
**standardization**  
**authority for USA**

**AC326 SG/A (IST) is the**  
*Fuze & Initiation Systems*  
**standardization**  
**authority for NATO**

\*Both bodies are chaired by AFMO



# STATUS OF DOD FESWG STANDARDS



STANDARDS	ACCOMPLISHMENTS
MIL-STD-1316 (Fuze safety design requirements)	<i>Revision F published on 18 Aug 2017</i>
MIL-STD-331 (Fuze safety test procedures)	<i>Revision D published on 31 May 2017</i>
MIL-DTL-23659 (Qualification tests for EEDs)	<i>Revision G in process</i>
MIL-STD-1901 (Launch ignition system safety design)	<i>Revision B in process</i>
MIL-STD-1911 (Hand-emplaced ordnance design safety)	<i>Revision B started</i>
JOTP-050 (Active Hazard Mitigation Device)	<i>Revision A published on 24 June 2019</i>
JOTP-051 (Logic devices)	<i>Revision A in staffing</i>
JOTP-052 (Fuze safety qualification test program)	<i>Published on 17 March 2012</i>
JOTP-053 (Electrical stress test)	<i>Published on 03 Nov 2015</i>
JOTP-054 (Low Voltage Command Arm)	<i>Published on 17 Oct 2019</i>
MIL-HDBK-145 (US Fuze catalog)	<i>Revision D published on 9 June 2015 (This is continuously being updated)</i>

## NEW STANDARDS IN DEVELOPMENT

- JOTP-05x (Safety Design Criteria for Remotely Controlled Fuzing Systems used in Munitions)
- JOTP-05x (Guidance for Cluster Munition Fuzing Systems)

## NATO STANDARDS

Review as required to ensure US DoD needs are met **(SEE NEXT CHARTS)**

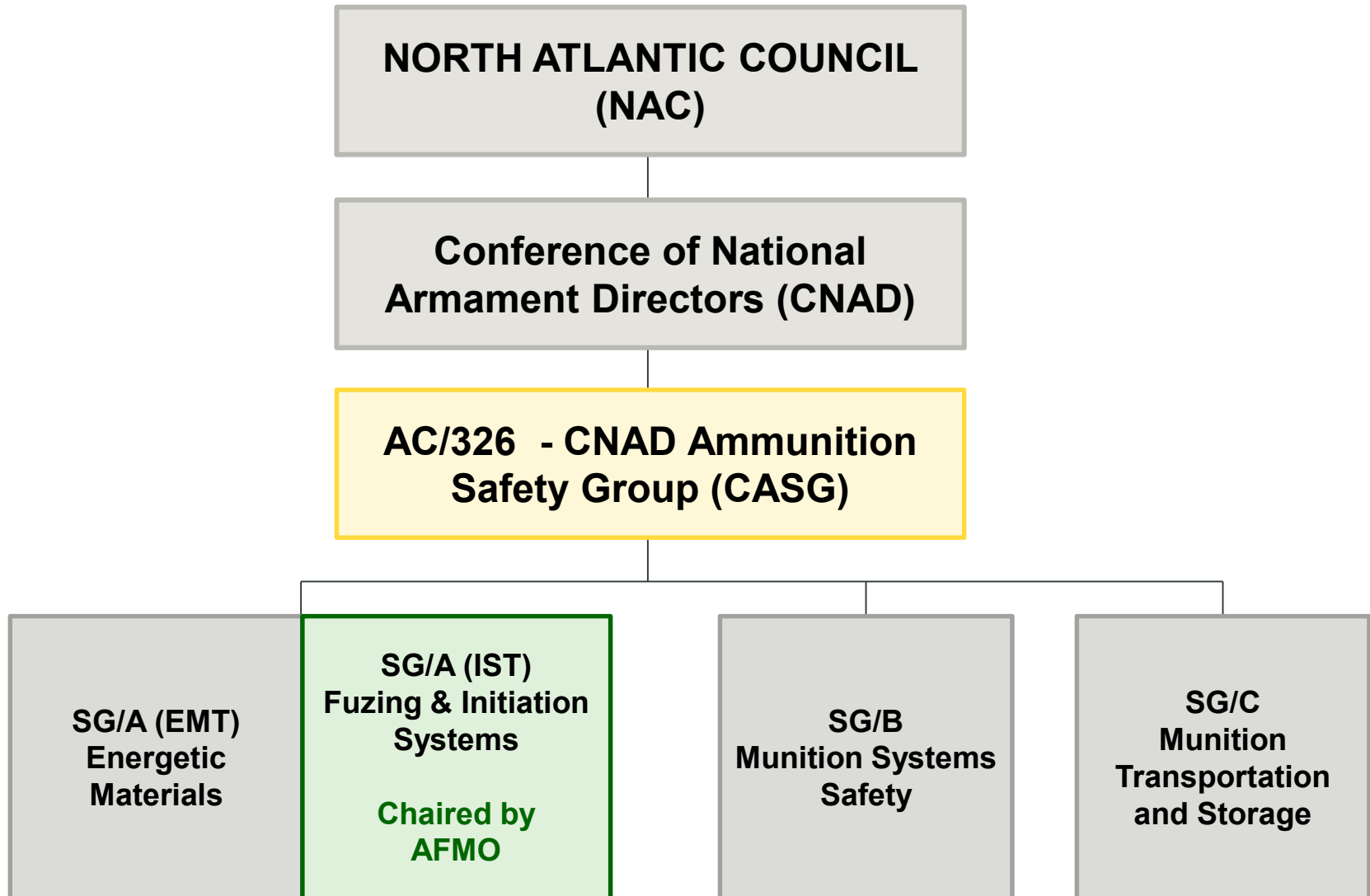
**Fuze & Initiation Systems Standards are well positioned to support DoD Modernization and Interoperability Priorities**



# DSP 2020 Presentation on NATO AC326 SG/A Initiation Systems Team (IST)



# NATO STANDARDIZATION



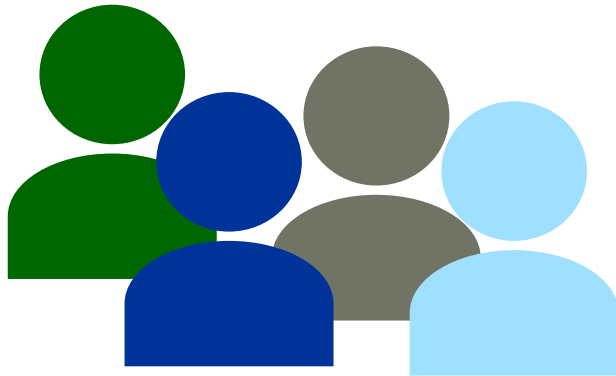


# NATO STANDARDIZATION



## SG/A Co-Chair Arrangement:

- Chair for Energetic Materials Group
- Chair for Initiation Systems Group  
*(Chaired by AFMO)*

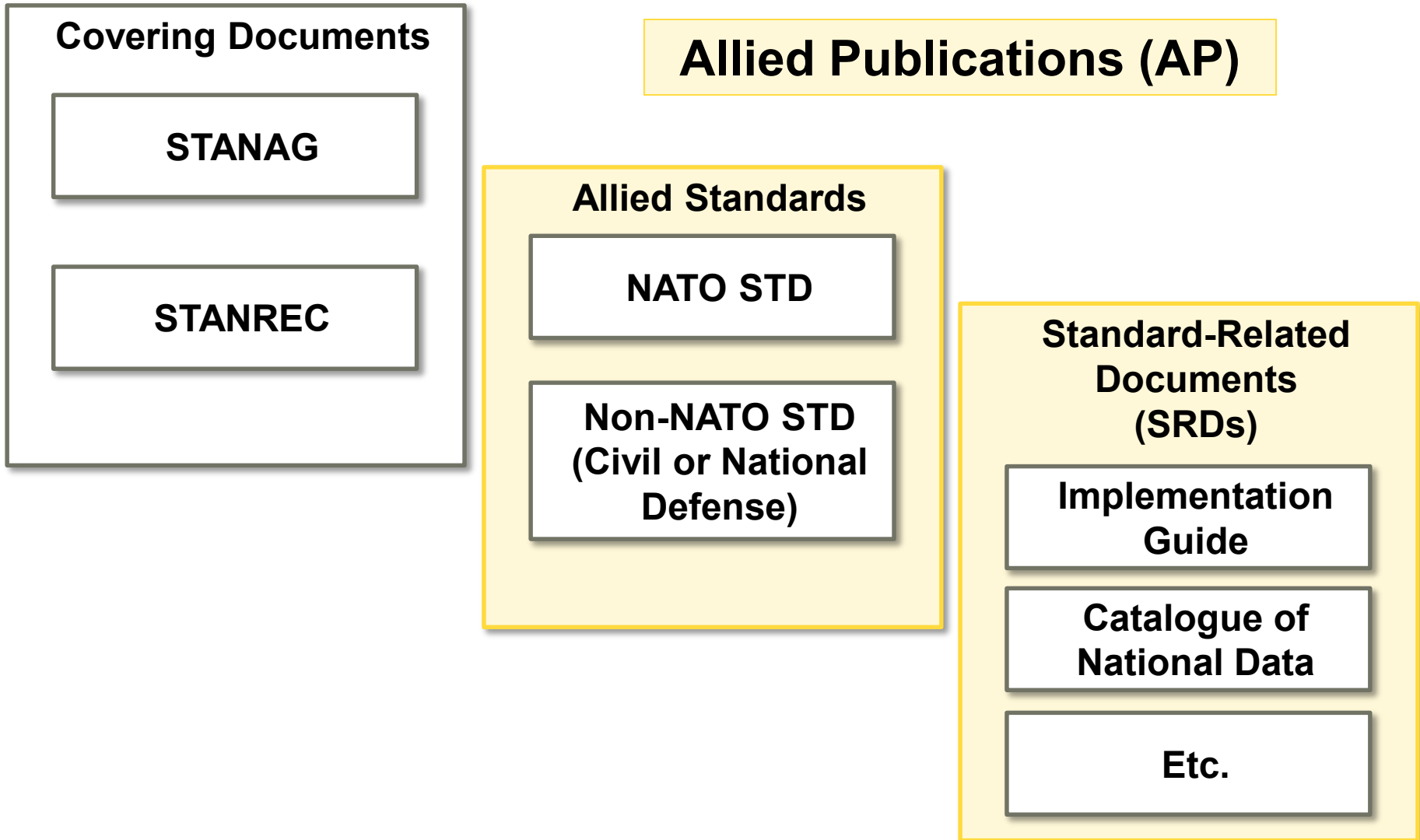


## Two Meetings Each Year

- Each group meets separately



# NATO DOCUMENT STRUCTURE





# AC/326 CASG STANDARDIZATION



## OBJECTIVES

*In support of NATO deployed MISSIONS and OPERATIONS*

*For the complete Munitions Life Cycle*

1

Improve Interoperability  
with commonly agreed

- Safety Requirements
- Assessment Tools (Tests & Methodologies)

2

Introduce safe  
Munitions  
into Service

3

Give Guidance and  
Specifications to  
Munitions Designers

4

Give Rules and  
Recommendations  
to Logisticians



# SG/A (IST) PROGRAM OF WORK



## RECENT ACCOMPLISHMENTS AND CURRENT WORK

- STANAG 4497 – PROMULGATED 23 SEPTEMBER 2020 (REFORMATED)
- STANAG 4593 – PROMULGATED 28 AUGUST 2020 (NEW)
- STANAG 4363 – PROMULGATED 16 MARCH 2020 (REFORMATED)
- STANAG 4547 – PROMULGATED 8 OCTOBER 2019 (REFORMATED)
- STANAG 4187 – CURRENTLY IN UPDATE (France)
- STANAG 2818 – CURRENTLY IN UPDATE (Turkey)
- STANAG 4809 – NEW: CURRENTLY BEING DEVELOPED (United States)
- STANAG 4368 – PLANNED UPDATE (United States)
- STANAG 4560 – PLANNED UPDATE (United Kingdom)
- Terminology is being reviewed and updated for the NATO Term database

**Program of Work is reviewed and approved by the CASG**

**All Subgroups report their work progress to CASG twice per year.**





# LINKING OF NATO SG/A (IST) STANAGS AND DOD FESWG STANDARDS



NATO	DoD FESWG
STANAG 4187 & AOP-16	MIL-STD-1316 (Fuze safety design requirements)
STANAGS 4157, AOP-4157 & AOP-20	MIL-STD-331 (Fuze safety test procedures)
STANAG 4560 & AOP-43 Characterization tests	MIL-DTL-23659 (Qualification tests for EEDs)
STANAG 4368	MIL-STD-1901 (Launch ignition system safety design)
STANAG 4497	MIL-STD-1911 (Hand-emplaced ordnance design safety)
STANAG 4797 and AOP-4797	JOTP-050 (Active Hazard Mitigation Device)
Being incorporated into STANAG 4187	JOTP-051 (Logic devices)
Incorporated into STANAG 4157	JOTP-052 (Fuze safety qualification test program)
Incorporated into AOP-20	JOTP-053 (Electrical stress test)
STANAG 4369 & AOP-22 Inductive setting for large caliber	No US document
STANAG 4547 Inductive setting for medium caliber	No US document
STANAG 4593 & AOP-60 Inductive setting for guided large caliber projectile	No US document
STANAG 2916	No Active US document
STANAG 4326 & AOP-8 NATO Fuze catalog	MIL-HDBK-145 (US Fuze catalog)
STANAG 2818 & AOP-31 Demolition Materiel Design	No US document
STANAGS 4363 & AOP-21 Testing for Assessing Detonating Explosive Components	No US document
STANAG 4809 & AOP-67 Remotely Controlled Fuzing Systems	JOTP-05x (Safety Design Criteria for Remotely Controlled Fuzing Systems used in Munitions)

**NATO & DoD Fuze & Initiation Systems Standards are  
closely linked through the work of the FESWG**



# KEY TAKEAWAYS



**Chaired and managed by AFMO, standardization activities are seamlessly coordinated among Domestic and NATO communities, industry partners and academia**

**DoD FESWG, under charter by the JSB, is the fuze and initiation systems standardization custodian for the USA**



**Promote interchangeability, safer munitions & interoperability**

**Standards Are Well Positioned To Support DoD Modernization Priorities**

**Promotes both DoD & NATO interoperability for munition fuzing & ignition systems**

**Fuze & Ignition systems Standardization products account for changes in technology, DoD Policy, DoD munition modernization efforts, and international interoperability**



# BACK-UP



## NATO STANDARDIZATION (AAP-03 (K))



### 1.6.1 NATO STANDARD AGREEMENT

1. A NATO Standardization Agreement (STANAG) is a NATO standardization document that specifies the agreement of member Nations to implement a standard, in whole or in part, with or without reservation, in order to meet an interoperability requirement.
2. An Allied standard covered by a STANAG is implemented, as applicable, and complied with to the maximum extent possible by ratifying Allies, adopting partner nations and NATO bodies. Sections on “interoperability requirements” and “implementation of the agreement” are included in each STANAG. They specify the interoperability requirements substantiating the STANAG and provide guidance to assist Nations and NATO bodies with the implementation of the covered Allied standards.



## NATO STANDARDIZATION (AAP-03 (K))



### 1.6.1.2 NATO STANDARDIZATION RECOMMENDATION (STANREC)

1. A STANREC is a NATO standardization document used exclusively in the materiel field of standardization that lists one or several NATO or non-NATO standards relevant to a specific Alliance activity unrelated to interoperability.
2. A STANREC is a non-binding covering document used to recommend useful practices in multinational cooperation. It is employed on a voluntary basis and does not require commitment of Allies to implement the Allied standards it covers.



## NATO STANDARDIZATION (AAP-03 (K))



### 1.6.2 ALLIED STANDARDS

Allied standards are standards developed or selected in the framework of the NATO standardization process.

NATO recognizes the following concept of a standard by ISO/IEC: a standard is a document, established by consensus and approved by a recognized Body that provides, for common and repeated use, rules, guidelines or characteristics for activities or their results, aimed at the achievement of the optimum degree of order in a given context.



## NATO STANDARDIZATION (AAP-03 (K))



### 1.6.2.2 NATO STANDARD

A NATO STD is a standard developed by NATO and promulgated in the framework of the NATO standardization process.

### 1.6.2.3 NON-NATO STANDARD

A non-NATO STD is a standard developed outside NATO. Non-NATO standards include civil standards, national and multinational defence standards. Non-NATO standards might be referred to or adopted by NATO. Their content might also be reproduced in NATO standards.

### 1.6.3 STANDARD-RELATED DOCUMENT (SRD)

A SRD is a NATO standardization document that facilitates understanding and implementation of one or more Allied standards. It may provide additional data and information to support the management and implementation of Allied standards. Examples are national data catalogues, standards implementation guides, etc.



# AC/326 CASG STANDARDIZATION



## AC/326 CASG TASKS

- To develop Standards and Guidance for safe munitions
- Promote interoperability
- To provide Advice and Expertise

**In order to guarantee that the Risks presented by Munitions to be used jointly by NATO Forces during co-operations are:**

