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NAVAL SEA SYSTEMS COMMAND
Ordnance Safety & Security Activity

Weapons Systems and Explosives Safety in a Joint Warfighting Environment

Prepared for: National Defense Industrial Association
40th Annual Armament Systems: Guns-Ammunition-Rockets-Missiles Conference & Exhibition

26 April 2005

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Agenda

- Safety Importance to Navy/Marine Corps
- Safety: Common Sense?
- Weapon System Explosives Safety Review Board (WSESRB)
- Other Services' Boards
  - USA Materiel Release Board
  - USAF NNMSB
- Joint Staff: Safe Weapons Capabilities Review
- Where to Next?

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Safety Importance to the Navy/Marine Corps

- Nature of Expeditionary Mission
- All Weapons Carried to the Fleet
  - Initial Allocation
  - Sustaining Requirements
- Fuel
- Other Hazardous Materials

No Where To Escape, In Case of Incident

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Safety: Common Sense?

- Common Sense isn't always common.
- Mishaps/Accidents both on and off duty have cost hundreds of USN and USMC lives and an average of $4B every 5 yrs
- Need for greater hazard awareness by all personnel at all times to preserve our greatest asset:

PEOPLE

Safety: Common Sense?

Although a weapon system can be designed to maximize safety,

People <u>really can</u> make poor decisions without applying either risk management OR common sense ……

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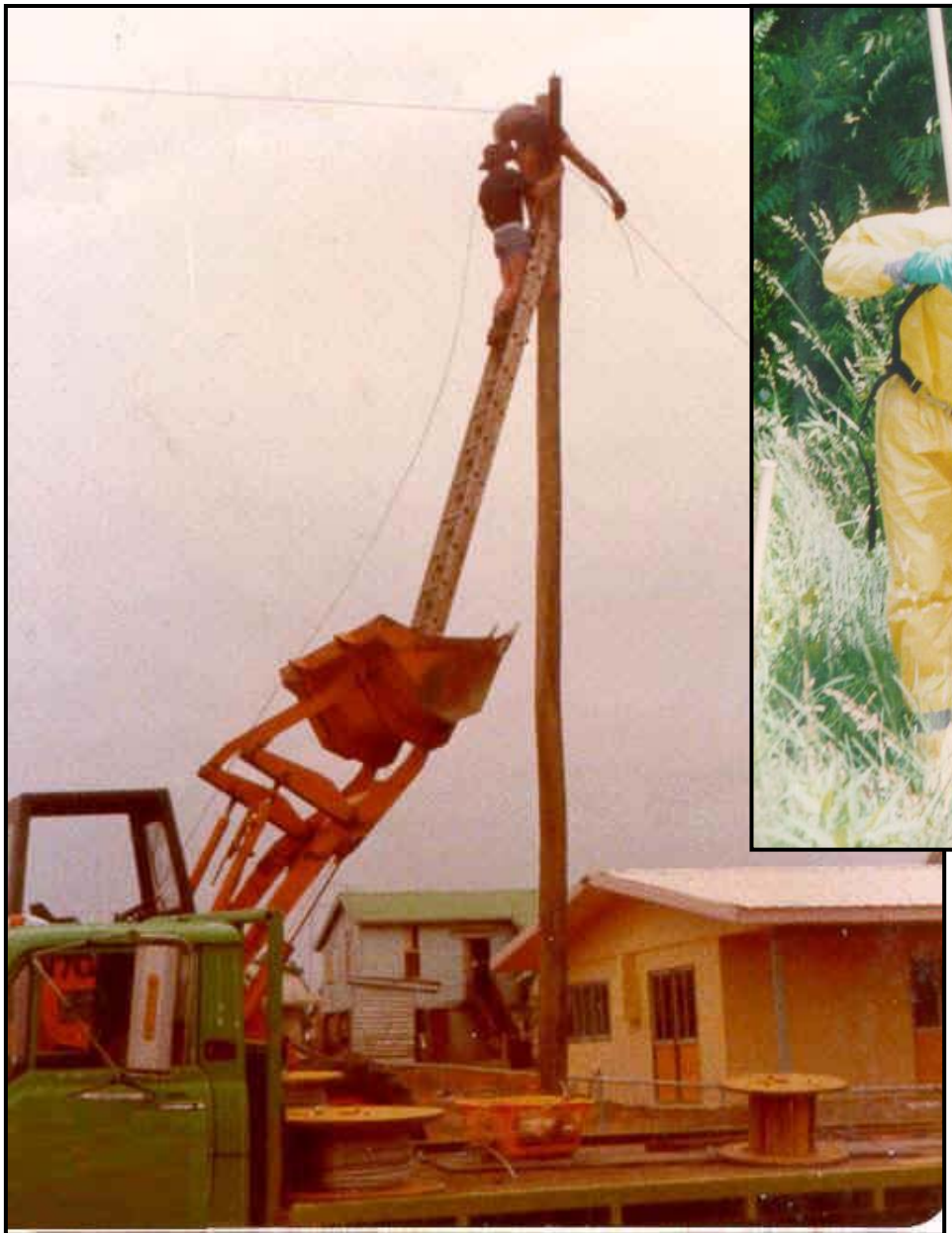
Safety: Common Sense?



What is wrong with these pictures?

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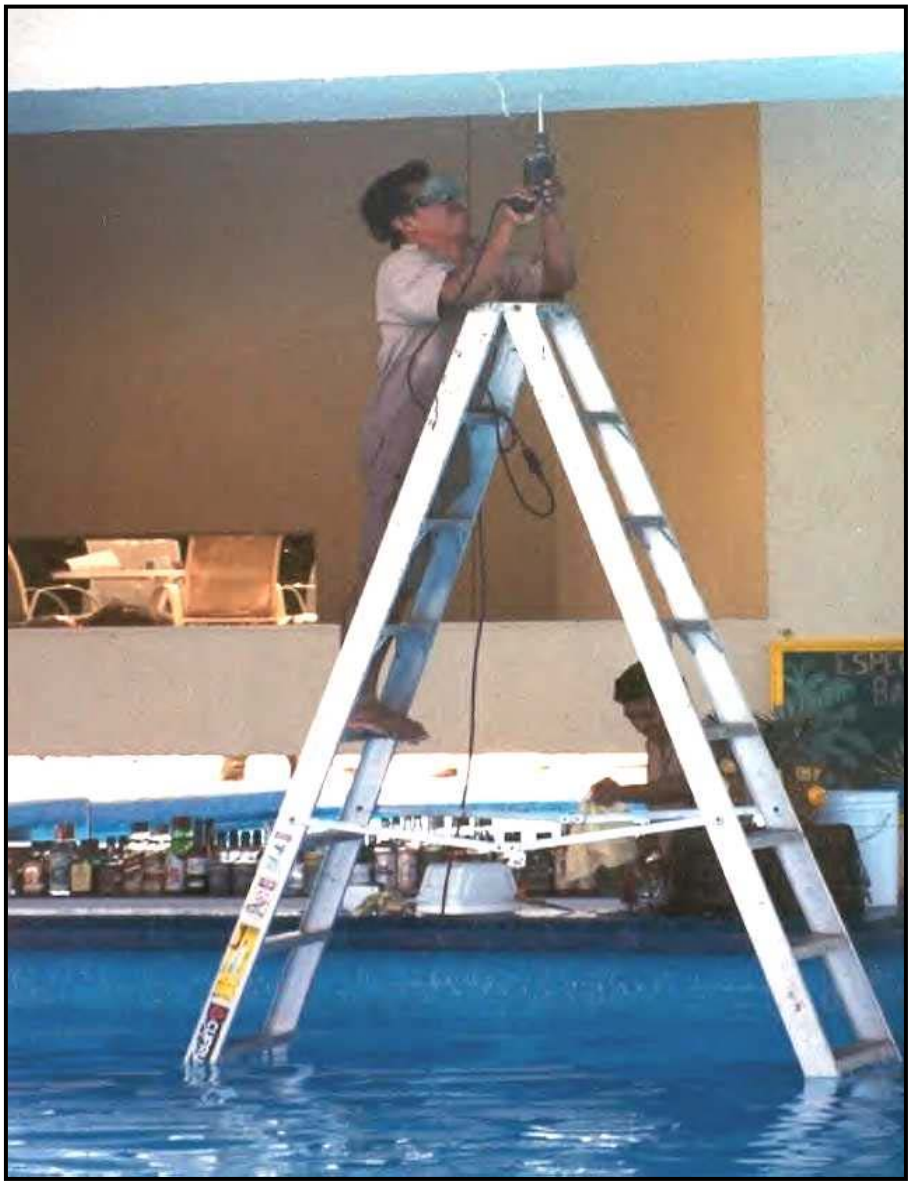
Safety: Common Sense?




PHS&T
Approved
unit loads?

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….and “Risk Management” closer to home?!!

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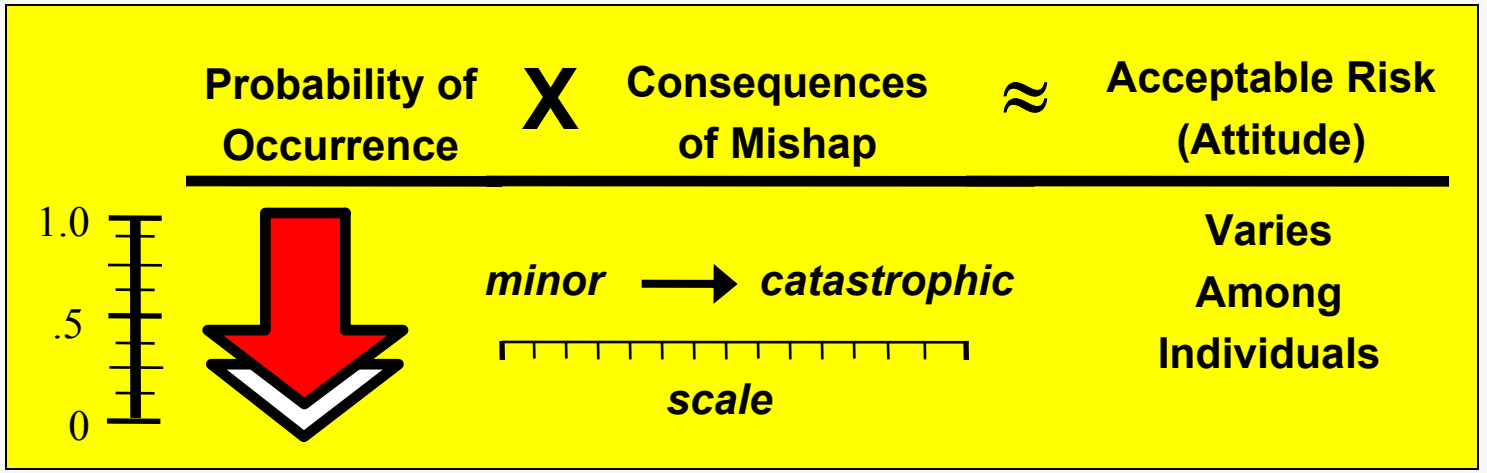
Safety: Common Sense?

WSESRB: Why?

WSESRB:

- established in 1968 as a result of mishaps aboard aircraft carriers
- provides independent oversight of weapon program safety effort to ensure maximum compliance with long standing weapon safety requirements.

Proper design up front to avoid mishaps during lifecycle



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WSESRB Authority

DODI 5000.2 Para E7.7

- *PM shall identify, evaluate and manage safety and health hazards*
- *Explains the process for accepting risk*

SECNAVINST 5000.2C

- *CNO may establish system safety advisory boards*

SECNAVINST 5100.10H

- *Directs CNO/CMC to establish safety programs*

OPNAVINST 8020.14/MCO P8020.11

- *Explosives Safety Policy*
- *Tasks COMNAVSEASYSCOM to establish WSESRB*

NAVSEAINST 8020.6D

- *Defines WSESRB process and procedures*

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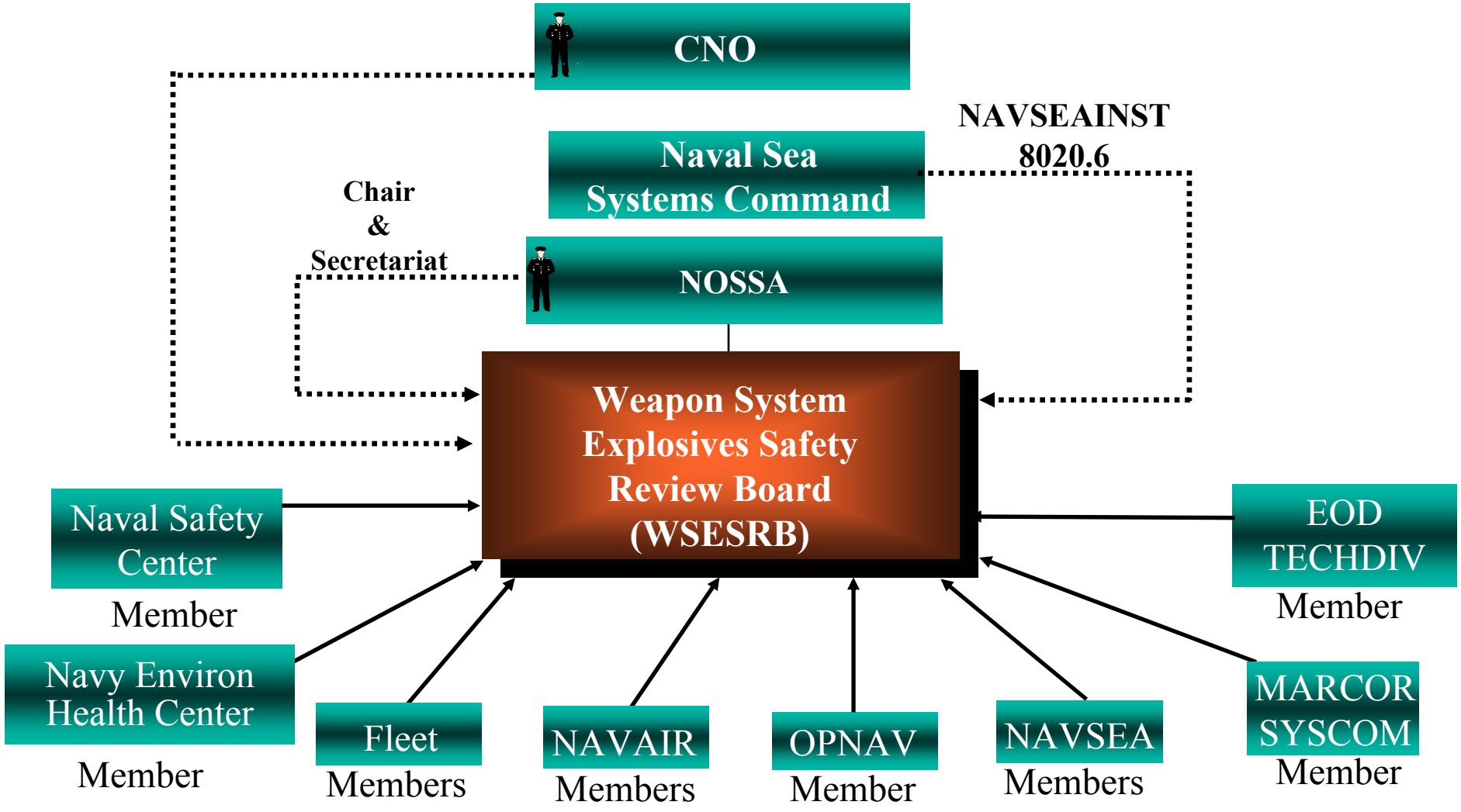
WSESRB: Who?

Policy Flow and Membership



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WSESRB: What?

- **Reviews weapon and combat system acquisition programs, including Product Improvement Programs, for compliance with longstanding safety design requirements.**
  - PM identifies, evaluates and manages safety and health hazards
  - Focus on safety from an overall Combat System perspective
  - Emphasis on Human Systems Integration (HSI)
- **Provides concurrence or nonconcurrence with the design; makes recommendations.**
- **PM responds to the Board with the actions taken or planned.**
- **For those hazards that cannot be eliminated, risk is assessed, Board provides concurrence.**
- **PM must get any residual risk accepted at appropriate level.**
  - High risk = ASN (RDA)
  - Serious risk = PEO
  - Moderate/low risk = PM

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WSESRB: Why?

- WSESRB works in partnership with Program Managers and the Fleet in identifying hazards
- Identify hazards
- Develop actions to mitigate the hazards
- Communicate any residual risks to Fleet operators

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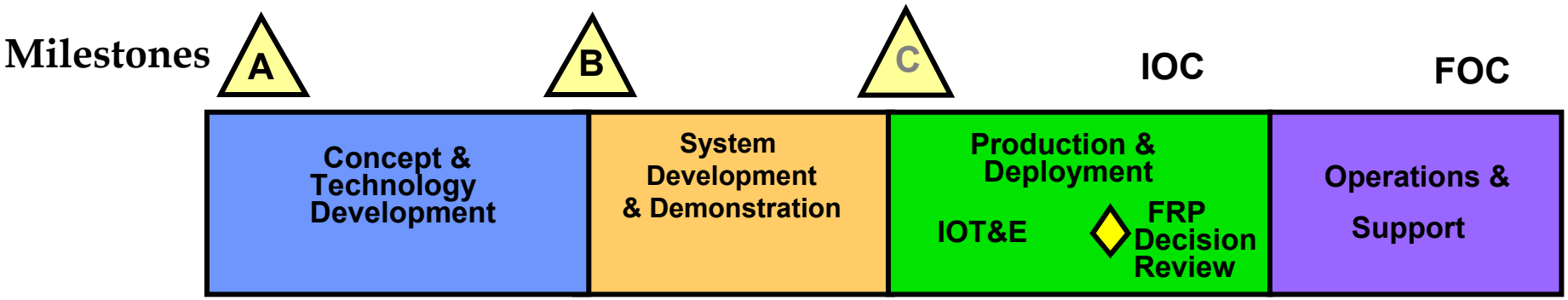
WSESRB: When?

Acquisition Events That Trigger WSESRB Reviews



- Acquisition Strategy
- Component Advance Development

- Pre-PDR
- Pre-CDR
- Developmental Tests
- Operational Tests
- Product Improvements

- LRIP
- Production
- Deployment

- Mishap
- QE Data

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Weapons Systems Safety

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USA: Safety Reviews

- Army Fuze Safety Review Board
  - Board of Technical and Safety Experts
  - Certify fuze design for Army munitions based on STANAGs 4157, 4187 and 4497 and associated AOPs
  - Fuze Board approval included in milestone decision review package
- Army Ignition System Review Board
- Materiel Release Board
  - Looks at a system's Safety, Supportability and Suitability
  - Final QA check
    - Unresolved safety hazards?
    - Meets approved capabilities document?

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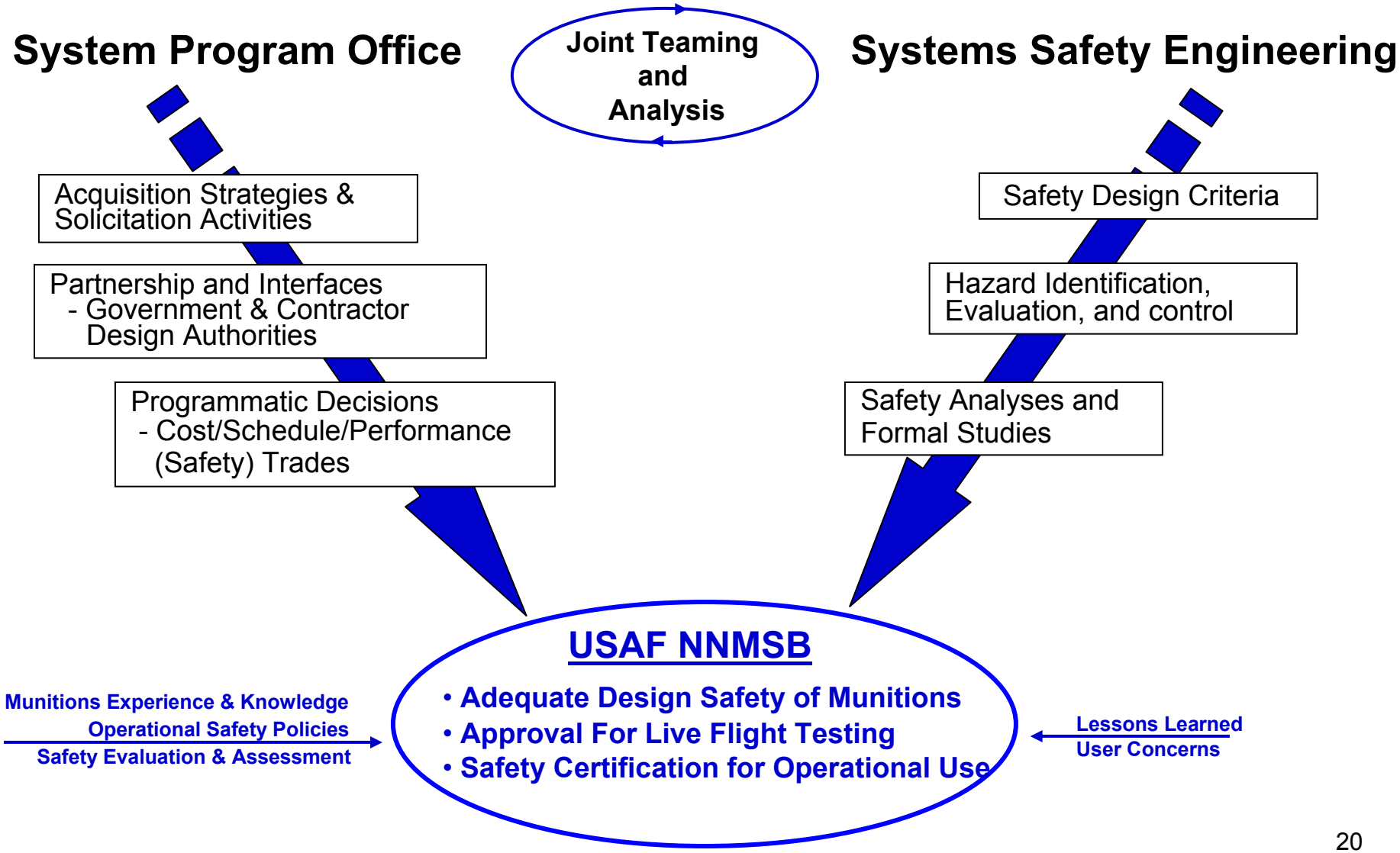
USAF: Nonnuclear Munitions Safety Board (NNMSB)



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Current Drivers in DOD

Joint Operations Are Now the Norm

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Challenges to Safe Joint Environment

- Limited Joint Review of Safety Capabilities
- Increased Weapon System Complexity
- Weapon/Environment Incompatibilities
- Service Unique Design Requirements
- Implementation of Evolving and Varied Acquisition Strategies
- Technology Gaps
- Budget Pressures

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CJCS, J8 (DDFP) Action

- **Supported Chartering Service Representatives to Explore Process to Ensure**
  - Safe Weapons in a Joint Warfighting Environment
- **Review Capability Documents**
- **Recommend Process**
  - CJCSI&M 3170 Changes
  - Charter
  - Process Development

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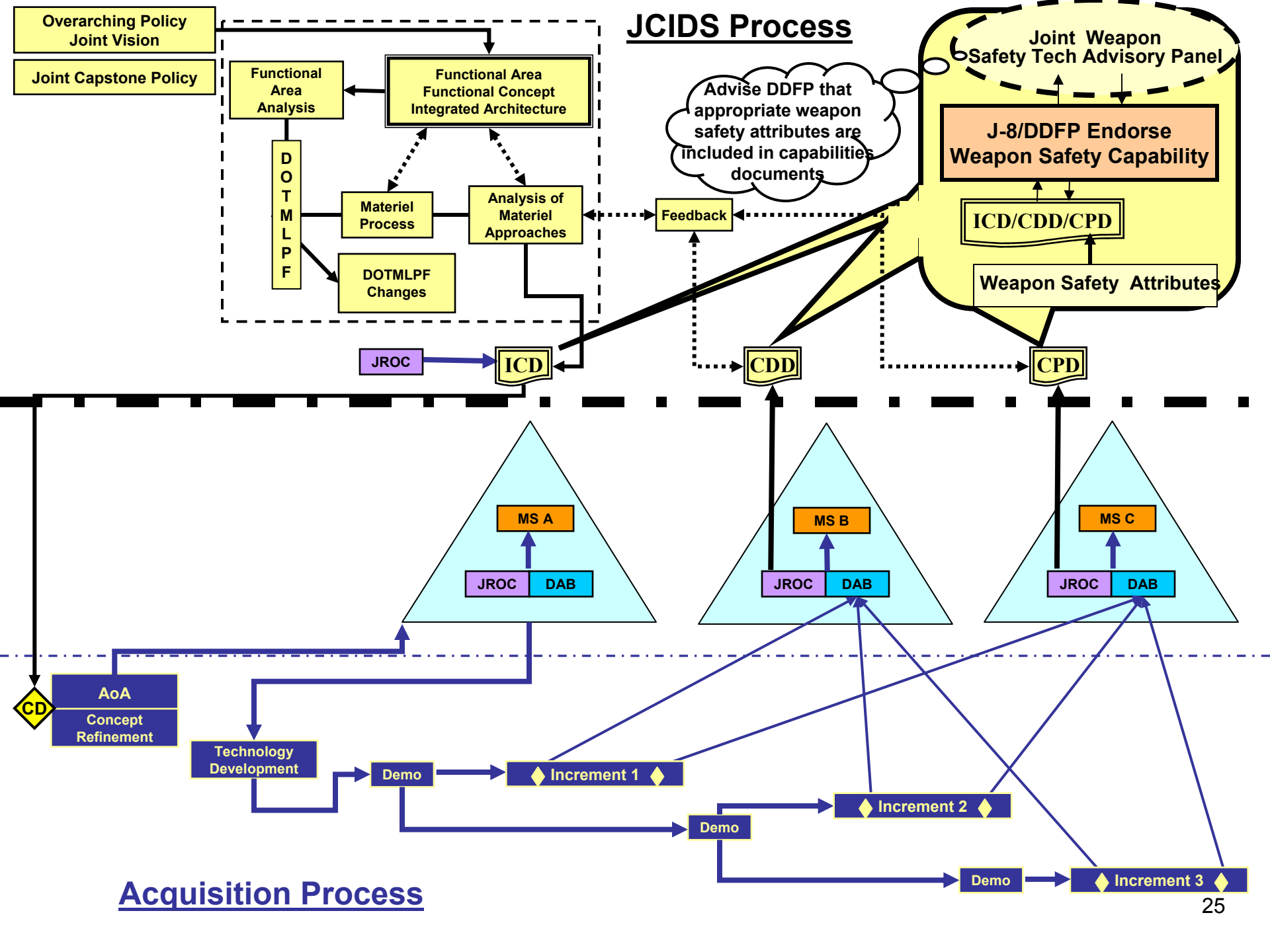
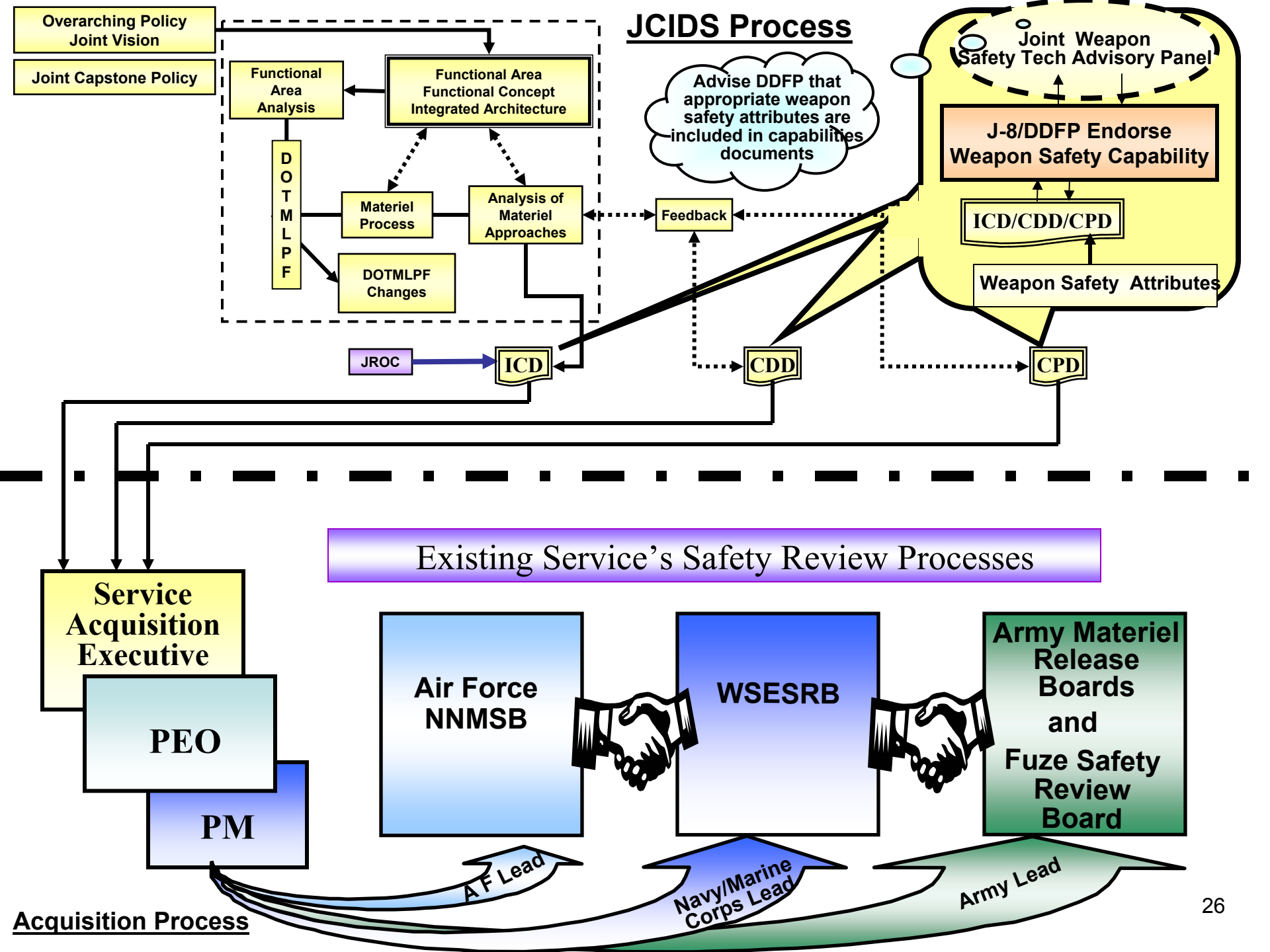
JCIDS Recommended Process

- ICD/CDD/CPD Required to Address Weapon Safety
  - ICD to Contain Weapon Safety Capabilities Statement
  - CDD and CPD to Address Specific Weapon Safety Attributes Needed for Joint Warfighting Environments
- DDFP Validates that the ICD/CDD/CPD Adequately Address Weapon Safety Attributes within the JCIDS Process
- J-8/DDFP Provides Weapon Safety Capabilities Endorsement, with Any Limitations Identified
- Joint Weapons Safety Technical Advisory Panel Council (JWSTAP) Created to Advise the DDFP and Sponsors in the Weapon Safety Capabilities Endorsement Process


JCIDS Process
Overarching Policy
Joint Vision
Joint Capstone Policy
Functional Area Analysis
Functional Area
Functional Concept
Integrated Architecture
DOTMLPF
Materiel Process
Analysis of Materiel Approaches
DOTMLPF Changes
Feedback
Advise DDFP that appropriate weapon safety attributes are included in capabilities documents
Joint Weapon Safety Tech Advisory Panel
J-8/DDFP Endorse Weapon Safety Capability
ICD/CDD/CPD
Weapon Safety Attributes
JROC
ICD
CDD
CPD
MS A
MS B
MS C
JROC
DAB
CD
AoA
Concept Refinement
Technology Development
Demo
Increment 1
Increment 2
Increment 3
Acquisition Process


Overarching Policy
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Advise DDFP that appropriate weapon safety attributes are included in capabilities documents
Feedback
Joint Weapon Safety Tech Advisory Panel
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ICD/CDD/CPD
Weapon Safety Attributes
JROC
ICD
CDD
CPD
Existing Service's Safety Review Processes
Service Acquisition Executive
PEO
PM
Air Force NNMSB
WSESRB
Army Materiel Release Boards and Fuze Safety Review Board
A F Lead
Navy/Marine Corps Lead
Army Lead
Acquisition Process

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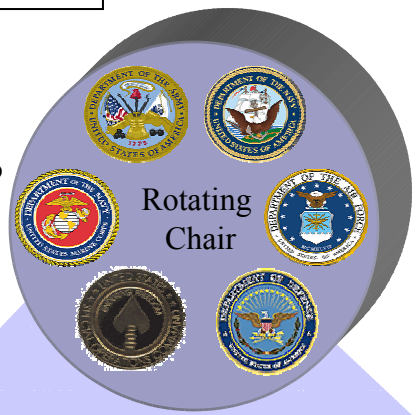
Joint Weapon Safety Technical Advisory Panel

Working Within the Joint Capabilities & Integration Development Process

JWSTAP



JWSTAP Provides

Weapon Safety Capability Endorsement Recommendation to the J-8/DDFP Regarding ICD, CDD, CPD

Joint Warfighting Safety Requirements; Tailored From Existing Standards

Leverage Existing SME, With Warfighter Representation

Air Force
Nonnuclear Munitions Safety Board

Army
Materiel Release Boards
Fuze Safety Review Board

Navy **Marine Corps** **Coast Guard** **USSOCOM**
Weapon System Explosives Safety Review Board

Existing DoD 5000 Acquisition Process

Hardware/Software Safety Design Review and Approval

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Where Will This Take Us?

- Toward Service Collaborative Reviews
- Toward More Universal Cross-Service Criteria
- Toward Single Safety Reviews

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How Can You Help?

- **If the WSESRB is Remiss in Coordinating Reviews…**
  - **ask for coordinated review?**
- **Communicate Early in the Acquisition Process?**

Questions?

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Back-ups

- **USAF NNMSB**
  - **Chart #5**

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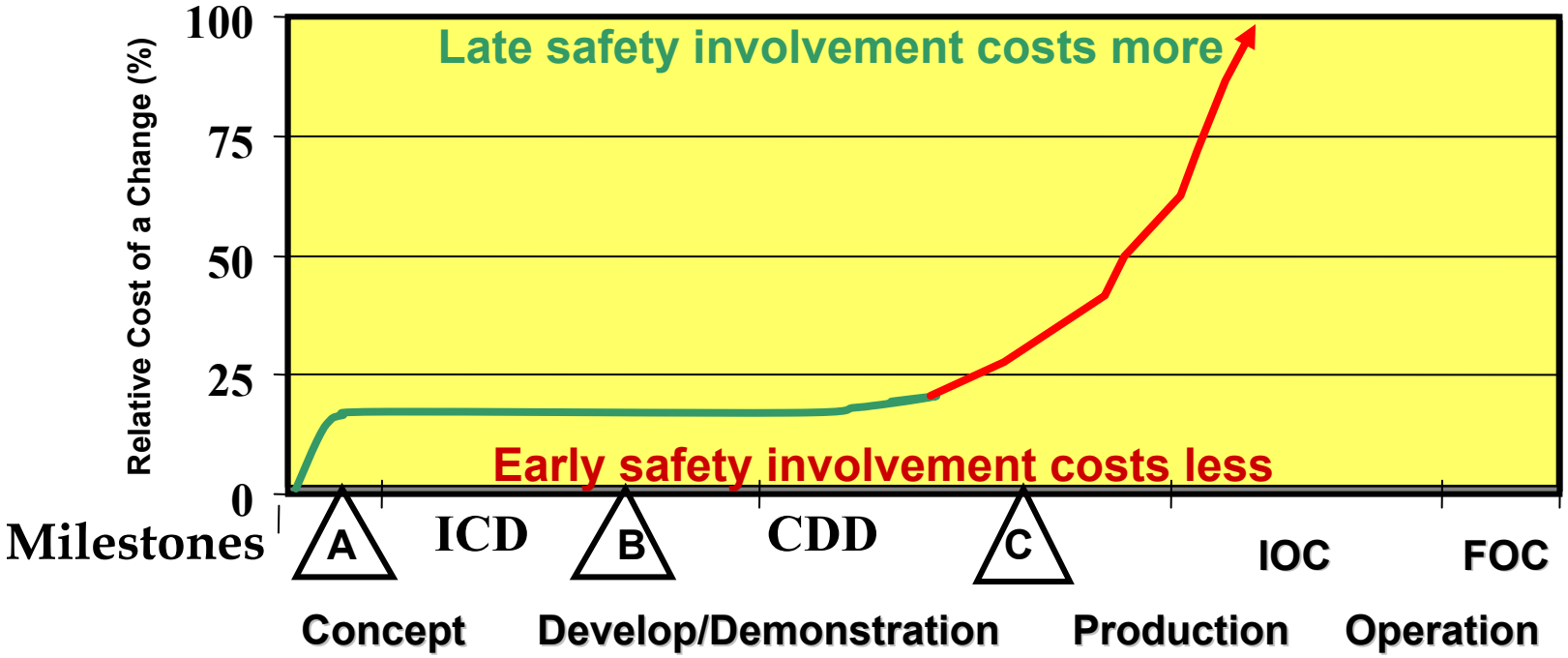
Why a Weapon Safety "Certification" Process?

Over a program's lifecycle it costs less to integrate safety early

Curve adapted from NASA's Practice No. PD-AP-1314.



System Engineering/Acquisition Phases

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Joint Operations Example

- USS DWIGHT D. EISENHOWER September 1994
  - Embarked Army Contingent; 14 AH-1F Cobra, 13 MH-58 Kiowa and 26 MH-60 Blackhawk Helicopters
  - Examples of Issues
    - Shipboard Bow Whip Antennas Secured Until All Cobra Helicopters Departed
    - Hot tube loading of 2.75” Rockets Not Authorized
    - Thermite Grenades (NALC G900) Not Permitted, Exceeded Jettison Locker Capacity
    - Army Munitions on Wooden Pallets, Wooden Boxes; Shipboard Fire Issue

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Joint Operations Example

- USS KITTYHAWK, Fall 2001
  - Embarked Army SOF in Support of Enduring Freedom
  - Examples of Issues
    - HERO Unsafe, Untested, or Susceptible; Required Restrictive EMCON to be Set When Handling SOF Ordnance
      - Reduces Communications, Detections, and Tracking Capabilities of the Ship
    - Waiver Granted for Non-thermally Protected Ordnance Aboard Ship
    - Waiver Granted for SOF to Conduct Hot Tube Loading of 2.75 Inch Rockets
    - Identification, Compatibility, Segregation of SOF Ordnance

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Joint Operations Example

EMV Compatibility Issues

- Aircraft Susceptibility Issues Discovered During EMV Testing to the Army/Navy Joint Operation Electromagnetic Environment (Reports Available Dated July 1986, April 2001, February 2002)
  - Engine Instrumentation
  - Avionics Systems
  - Multifunction Display
  - Weather Radar
  - GPS System
  - HF and UHF Communication Set
  - Digital Electronic Control System

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Interim Workarounds

- Joint Shipboard Helicopter Integration Program (JSHIP)
  - 5 Year DoD JT&E Sponsored Program (1998-2003)
  - Ordnance was One Part of the JSHIP Effort
  - Attempt to Develop Procedures to Mitigate Risk
  - Cost: $22M
- Joint Shipboard Weapons/Ordnance Program (JSWORD)
  - 1 Year Quick Reaction Test Sponsored by DoD JT&E (12 May 03 – 31 March 05)
  - Sponsored by USSOCOM
  - Focused on Developing Shipboard Procedures for Hot Tube Loading of 2.75” Rockets On Army Helicopters
  - Cost: $1M

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Working Group Recommendations

- Establish a Weapon Safety Capability Certification Process for Joint Warfighting Environments
  - Not Modeled on Current CJCSI Certification Processes
  - Risk Identification and Acceptance Decision Process
  - Safety Is Risk Management, Not Compliance, Issue
- Identify Weapon Safety Capabilities in ICD/CDD/CPD Process
- Establish a Technical Advisory Committee to Review Capabilities Specified in the ICDs/CDDs/CPDs and Advise DDFP on Risks and Limitations, If Any