ESOH In Acquisition
OSD Expectations For Implementing DoDI 5000.02

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Ms. Karen Gill (Booz Allen Hamilton) for
Ms. Patricia Huheey
Acquisition ESOH
Office of the Deputy Under Secretary of Defense
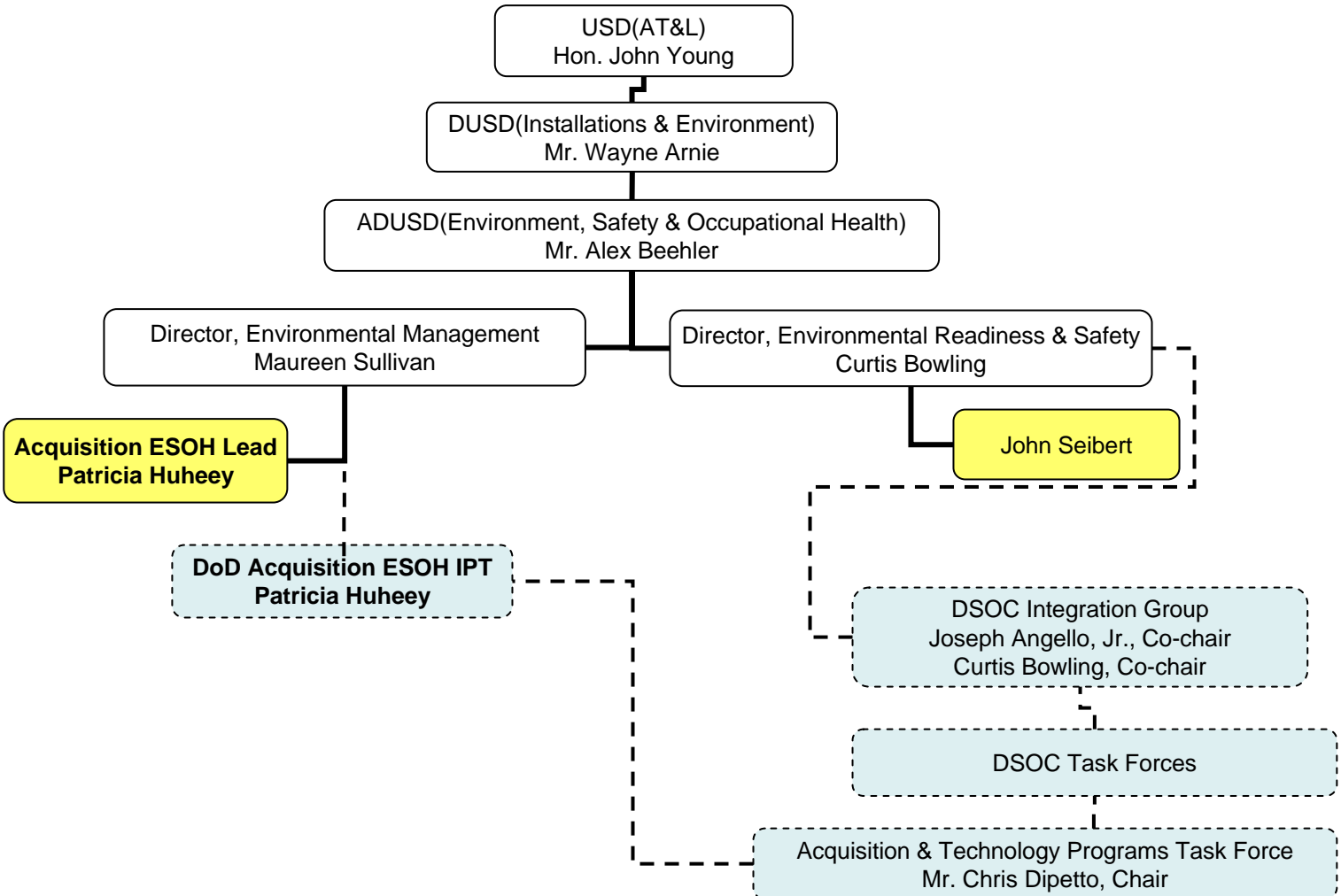(Installations & Environment)

Outline

- Background on DUSD(I&E)
- Policy Objectives & Principles
- Policy & OSD Expectations
- Initiatives and Focus Areas
  - DAU CLE 009 – "System Safety in Systems Engineering"
  - "System Safety - ESOH Management Evaluation Criteria for DoD Acquisition"
  - "ESOH in Acquisition – Integrating ESOH into Systems Engineering" Booklet

ESOH in Acquisition Leadership
Environment, Safety, and Occupational Health

USD(AT&L)
Hon. John Young

DUSD(Installations & Environment)
Mr. Wayne Arnie

ADUSD(Environment, Safety & Occupational Health)
Mr. Alex Beehler

Director, Environmental Management
Maureen Sullivan

Director, Environmental Readiness & Safety
Curtis Bowling

**Acquisition ESOH Lead
Patricia Huheey**

John Seibert

**DoD Acquisition ESOH IPT
Patricia Huheey**

DSOC Integration Group
Joseph Angello, Jr., Co-chair
Curtis Bowling, Co-chair

DSOC Task Forces

Acquisition & Technology Programs Task Force
Mr. Chris Dipetto, Chair

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Role in Acquisition

- DUSD(I&E) is the AT&L Advisor for ESOH issues
- Oversight of ACAT 1D, IAM, and AT&L Special Interest programs
- Focus on DoDI 5000.02 - ESOH in acquisition policy
- Identify OSD ESOH "expectations" in the Defense Acquisition Guidebook
- Provide guidance for policy implementation on the Acquisition Community Connection
- Provide ESOH input to CJCS 3170.01 series - JCIDS

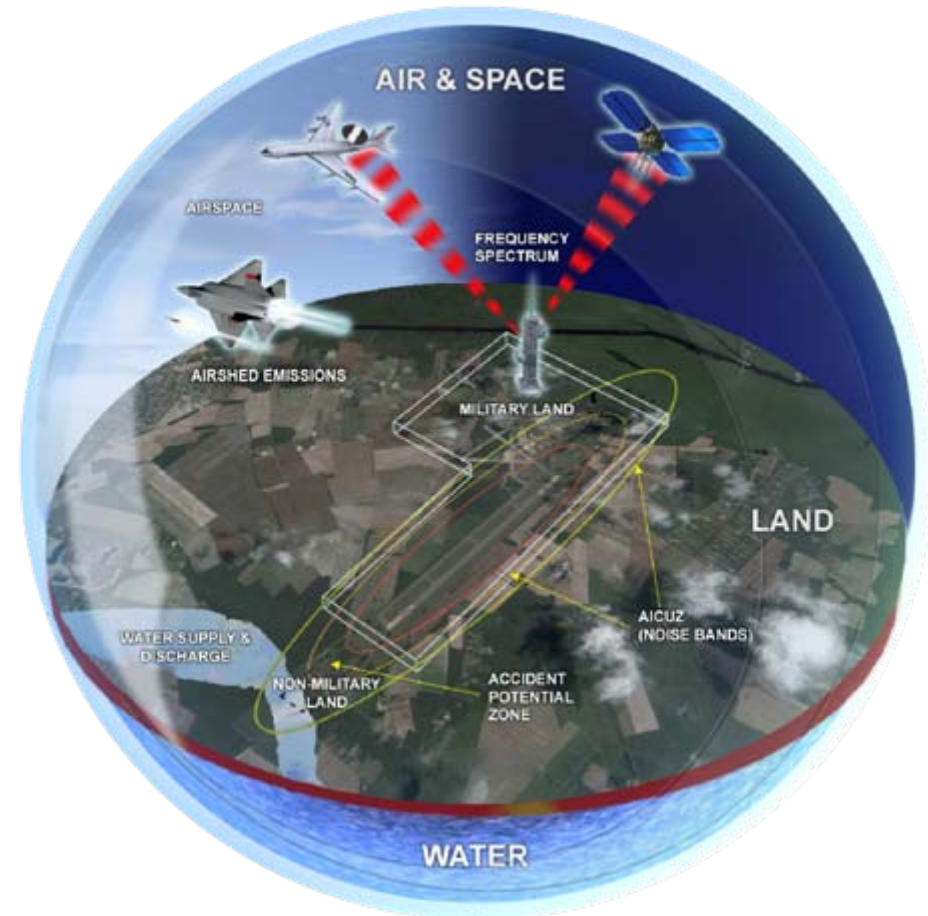# Why Be Concerned With ESOH in Acquisition?

Acquisition, Technology and Logistics

- ESOH considerations affect the operational effectiveness and sustainability of the system
  - There is a relationship between the natural and workforce infrastructures and the military mission
  - Compliance requirements and encroachment influence how DoD maintains and trains with the system
  - System design, operation, and maintenance parameters determine the installation and workforce needs to train and maintain the system

Natural Infrastructure Management (NIM)

- The essential principle of NIM is that air, land, and water resources are *assets* ***that must be managed and sustained*** for the values they provide to the military

- Natural infrastructure (NI) assets include

  - *Natural assets:* distinct ecological or physical components of natural infrastructure

  - *Statutory assets:* legally defined entitlements to access and use products and services of natural infrastructure

AIR & SPACE

AIRSPACE

FREQUENCY SPECTRUM

AIRSHED EMISSIONS

MILITARY LAND

LAND

WATER SUPPLY & DISCHARGE

AICUZ (NOISE BANDS)

NON-MILITARY LAND

ACCIDENT POTENTIAL ZONE

WATER

Leveraging NI asset values to support the mission

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Plan Ahead & Influence the System Design

- Identify system life-cycle ESOH risks early to influence design rather than address them afterwards as operational considerations

- System design is most effectively influenced through the system engineering process
  - Active participation in the IPTs is critical to success

- ESOH hazards and associated risks are best managed using a standard approach and structured process

- E, S, and OH inputs to systems engineering need to be optimized across the disciplines to meet cost and performance needs over the life cycle

Top Level Principles

- Address safety throughout the acquisition process

- Use a total systems approach to minimize or eliminate characteristics that produce environmental, safety or health hazards

- Use the system safety process in MIL-STD-882D to eliminate ESOH hazards where possible and manage ESOH risks where hazards cannot be eliminated

- Coordinate ESOH risks with the User and formally accept risks at designated management level

- Manage and document hazardous and toxic materials associated with the system and plan for safe disposal

Life Cycle ESOH Risks

- **ESOH risks may include:**
  - Hazardous and toxic materials and wastes
  - Environmental and occupational noise (e.g. litigation, lost productivity)
  - Personnel safety and occupational health (e.g. PPE, medical surveillance, lost work time, future VA benefits of injury/illness)
  - Regulatory compliance (e.g., pollution, record-keeping, non-compliance fines, litigation)
  - System component or software failures
- **Need to manage ESOH risks associated with:**
  - Routine operation and maintenance of the system
  - System failures
  - ESOH compliance requirements

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DoD Acquisition Policies and Guidance

- DoD Directive (DoDD) 5000.01, *The Defense Acquisition System* (12 May 2003)

- DoD Instruction (DoDI) 5000.02, *Operation of the Defense Acquisition System* (12 May 2003)

- MIL-STD-882D, *DoD Standard Practice for System Safety*

- Defense Acquisition Guidebook, https://akss.dau.mil/dag

- Acquisition Community Connection, ESOH Special Interest Area, https://acc.dau.mil/ESOH

Update Policy and Guidance

- In 2007 coordinated with the Services and provided ESOH input update of DoDI 5000.02
  - "Facts of life" changes only (plus AT&L inputs)
  - Incorporated the 3 USD(AT&L) ESOH-System Safety Memos since 2003 and new EO 13423
  - Moved main ESOH section to the new Enclosure 12 - Systems Engineering and updated ESOH paragraphs
- Provided updated ESOH section to the Defense Acquisition Guidebook to reflect the upcoming changes to DoDI 5000.02 (will come out with updated 5000.02)

Paragraph 3.8.2.2

Life-Cycle Sustainment Considerations

- Life-cycle sustainment considerations include supply; maintenance; transportation; sustaining engineering; data management; configuration management; manpower, personnel, training, habitability, survivability, **environment, safety (including explosives safety), and occupational health**; protection of critical program information and anti-tamper provisions; supportability; and interoperability.

Paragraph 3.8.3
Disposal

- At the end of its useful life, a system shall be demilitarized and disposed of in accordance with **all legal and regulatory requirements and policy relating to safety (including explosives safety)**, security, and the **environment**.

- During the design process, PMs shall **document hazardous materials contained in the system in the Programmatic Environment, Safety, and Occupational Health Evaluation (PESHE)** (see paragraph E12.6.), and shall **estimate and plan** for the system's demilitarization and **safe disposal**.

E12.6 Environment, Safety, and Occupational Health

- The PM shall **integrate ESOH risk management into the overall _systems engineering process_ for _all_ developmental and sustaining engineering activities**. As part of risk reduction, the PM shall eliminate ESOH hazards where possible, and manage ESOH risks where hazards cannot be eliminated. **The PM shall use the methodology in MIL-STD-882D**, _DoD Standard Practice for System Safety_.

- PMs shall **report on the status of ESOH risks and acceptance decisions at technical reviews**.

E12.6 Environment, Safety, and Occupational Health, con't.

- Acquisition **program reviews and fielding decisions shall address the status of all high and serious risks, and applicable ESOH technology requirements**.

- ***Prior to exposing*** people, equipment, or the environment to known **system-related ESOH hazards**, the PM shall document that **the associated risks** _**have been accepted**_ by the following acceptance authorities: the CAE for high risks, PEO-level for serious risks, and the PM for medium and low risks. The **user representative shall be part of this process throughout the life cycle** and shall provide **formal concurrence prior to all serious and high risk acceptance** decisions.

E12.6.1 Programmatic ESOH Evaluation (PESHE)

- The PM for all programs, regardless of ACAT level, shall prepare a PESHE which incorporates the MIL-STD-882D process and includes the following:
  - identification of ESOH responsibilities
  - the strategy for integrating ESOH considerations into the systems engineering process
  - ★ **identification of ESOH risks and their status**
  - ★ **a description of the method for tracking hazards throughout the life cycle of the system**
  - ★ **identification of hazardous materials, wastes, and pollutants (discharges/emissions/ noise) associated with the system and plans for their minimization and/or safe disposal**
  - a compliance schedule covering ***all system related activities*** for the National Environmental Policy Act (NEPA) and Executive Order 12114
- The **Acquisition Strategy** shall incorporate a **summary of the PESHE**, including the NEPA/EO 12114 compliance schedule

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E12.6.2 National Environmental Policy Act/Executive Order 12114

- The PM shall conduct and document NEPA/E.O. 12114 analyses for which the PM is the action proponent

- The PM shall ***provide system-specific analyses and data to support other organizations' NEPA and EO 12114 analyses***

- The **CAE** (or for joint programs, the CAE of the Lead Executive Component) **or designee, is the approval authority for system-related NEPA** and E.O. 12114 documentation

Enclosure 12 Systems Engineering
E12.6.3 Mishap Investigation Support

- PMs will support system-related Class A and B mishap investigations by **providing analyses of hazards that contributed to the mishap** and **recommendations for materiel risk mitigation measures**, especially those that minimize human errors.

MIL-STD-882D Eight Mandatory Steps

1. <u>Document the system safety approach</u> – Document the Government and Contractors' approach to ESOH risk management

2. <u>Identify hazards</u> – Conduct hazard analyses of ever-increasing fidelity as the system design matures

3. <u>Assess the risk</u> – For each hazard, determine the associated level of risk

4. <u>Identify risk mitigation measures</u> – For each identified hazard, propose alternatives/controls to eliminate the hazard or reduce the risk of the hazard to an acceptable level

5. <u>Reduce risk to an acceptable level</u> – For each hazard, select the risk mitigation measure(s) to be used to eliminate the hazard or reduce the risk

6. <u>Verify risk reduction</u> – For each hazard, verify that the hazard has been eliminated or the risk mitigation measure(s) has reduced the risk of the hazard

7. <u>Review hazards and accept risk by appropriate authority</u>

8. <u>Track hazards, their closures, and residual risk</u> – Maintain a tracking system to document hazards, mitigation measures, and hazard status throughout the life cycle

MIL-STD-882D Order of Precedence

Most to Least Preferred Risk Mitigation Measures	
1. Eliminate hazards through design selection	If unable to eliminate an identified hazard, reduce the associated risk though design selection.
2. Incorporate safety devices	If unable to eliminate the hazard though design selection, reduce the risk using protective safety features or device.
3. Provide warning devices	If safety devices do not adequately lower the risk of the hazard, include a detection and warning system to alert personnel to the particular hazard.
4. Develop procedures and training	Where it's impractical to eliminate hazards through design selection or to reduce associated risk to an acceptable level with safety and warning devices, incorporate special procedures and training. Procedures may include the use of personal protective equipment. Note: For catastrophic or critical severity categories, avoid using warning, caution, or other written advisory as the only risk reduction method.

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"System Safety in Systems Engineering" DAU CLE009

Acquisition, Technology and Logistics

- Roadmap for using the MIL-STD-882D System Safety methodology to integrate ESOH considerations into the SE process during each life cycle phase

- Maps System Safety analyses into the SE "V" model

- Never been done before by either the System Safety or SE communities—fundamental breakthrough in defining how the communities are supposed to work together

- Results to Date:
  - Available online April 2005
  - 3054 graduates as of OCT08

> **ODUSD(I&E) - ESOH SME and logistical support**
>
> **ODUSD(A&T)/SSE - SE SME and DAU SE courses**

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System Safety - ESOH Management Evaluation Criteria for DoD Acquisition

- Tool to assess SE technical discipline in the integration of ESOH using System Safety methodology
  - Technical and Program Reviews (self assessment)
  - Milestone Review Process (oversight assessment)
- Four key areas for evaluation
  - Planning
  - Requirements Analysis
  - Hazard analysis
  - Resources

System Safety - ESOH Management Evaluation Criteria for DoD Acquisition

- Assessment criteria for each area for each life cycle phase
  - Weighted summation of four ratings to overall rating for each life cycle phase

- Incorporated into the next Defense Acquisition Program Support (DAPS) SE Assessment Methodology

- Available at Acquisition Community Connection https://acc.dau.mil/ESOH

Integrating ESOH Into SE Booklet

Environment, Safety, and Occupational Health (ESOH) in Acquisition

Integrating ESOH into Systems Engineering

- Builds on CLE009 and depicts when ESOH activities should be performed to influence system design throughout the systems engineering process

- System Safety-ESOH Mgt. Evaluation Criteria are included

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Trish Huheey
ODUSD(I&E)
ESOH in Acquisition Lead
(703) 604-1846
patricia.huheey@osd.mil

BACKUP

NI Asset Valuation

- Tenet: To make good decisions about managing assets, it helps to know something about their value!

- Corollary: Value depends on actual or potential use. Therefore, the process of identifying NI asset values can uncover innovative opportunities to use NI assets to support the mission.

  - *NI asset valuation is fundamentally about leveraging NI asset values to support the mission.*

- NI asset valuation is a set of approaches and techniques used to assess values of NI.