



R&M: Managing Emerging Challenges and Risks

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**Office of the Deputy Assistant Secretary of Defense
for Systems Engineering**

**Reliability and Maintainability Symposium
Orlando, FL | January 25, 2017**



DASD, Systems Engineering Mission



Systems Engineering focuses on engineering excellence – the creative application of scientific principles:

- To design, develop, construct and operate complex systems
- To forecast their behavior under specific operating conditions
- To deliver their intended function while addressing economic efficiency, environmental stewardship and safety of life and property

DASD(SE) Mission: Develop and grow the Systems Engineering capability of the Department of Defense – through engineering policy, continuous engagement with component Systems Engineering organizations and through substantive technical engagement throughout the acquisition life cycle with major and selected acquisition programs.

A Robust Systems Engineering Capability Across the Department Requires Attention to Policy, People and Practice

- ***US Department of Defense is the World's Largest Engineering Organization***
- ***Over 108,000 Uniformed and Civilian Engineers***
- ***Over 39,000 in the Engineering (ENG) Acquisition Workforce***



DASD, Systems Engineering



Acting Deputy Assistant Secretary of Defense
and Principal Deputy, Systems Engineering
Kristen Baldwin

Homeland Defense
Capability
Development
Robin Hicks



Major Program Support
James Thompson

*Supporting USD(AT&L) Decisions with Independent
Engineering Expertise*

- Engineering Assessment / Mentoring of Major Defense Programs
- Program Support Assessments
- Overarching Integrated Product Team and Defense Acquisition Board Support
- Systems Engineering Plans
- Systemic Root Cause Analysis
- Development Planning/Early SE
- Program Protection



Engineering Enterprise
Robert Gold

*Leading Systems Engineering Practice
in DoD and Industry*

- Systems Engineering Policy and Guidance
- Technical Workforce Development
- Specialty Engineering (System Safety, Reliability and Maintainability, Quality, Manufacturing, Producibility, Human Systems Integration)
- Security, Anti-Tamper, Counterfeit Prevention
- Standardization
- Engineering Tools and Environments

Providing technical support and systems engineering leadership and oversight to USD(AT&L) in support of planned and ongoing acquisition programs

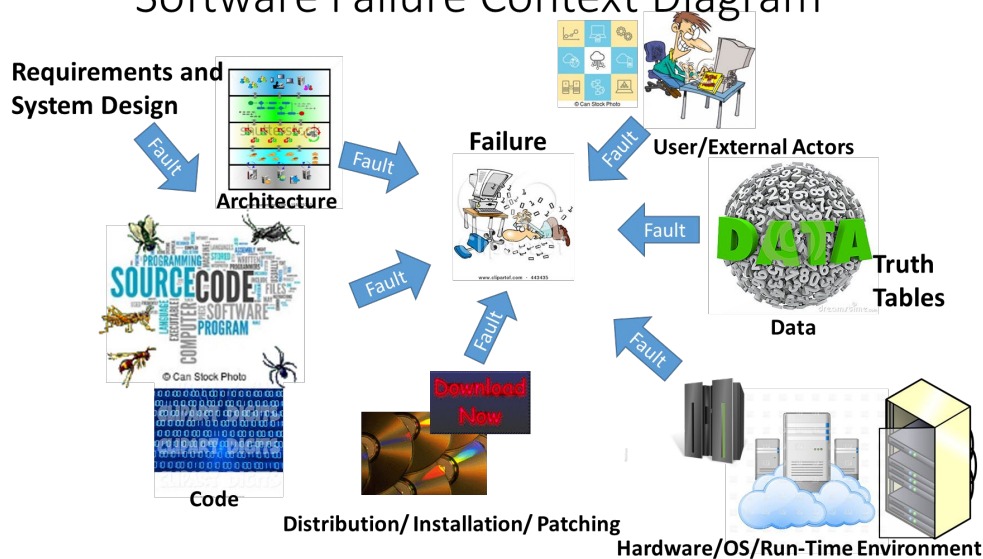


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- **Software continues to take a pivotal role in aircrafts, land vehicles, and ships as well as traditional software intensive programs**
- **Emerging risk areas include:**
 - Autonomous Weapon Systems/ AI driven decisions
 - Hardware replaced by software
 - Cloud Computing
 - Applications impact on common infrastructure
- **To design reliable software, the current practices and methods need to evolve**
- **Elements to consider in design of reliable software:**
 - Source Code
 - Architecture
 - User/External Actors
 - Data
 - Hardware/OS/Runtime
 - Distribution/Installation/Patching

Software Failure Context Diagram





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- **Consideration for the types of design related attributes when developing requirements.**
- **Types of design activities to be placed on contract for reliable performance of software.**
- **Cost-effective application (depth of analysis) for reliability block diagrams or Failure Modes, Effects Analysis (FMECA) for software.**
- **Metrics used to effectively characterize and manage software maturity.**
- **Application of appropriate test methods for assessing software performance (e.g. availability, downtime, MRT, etc.).**