



## DoD Program Support Reviews: Data-Driven Decision Support

**Dave Castellano**

**Deputy Director, Assessments and Support**

**DEFENSE SYSTEMS**

**Office of the Under Secretary of Defense for Acquisition,  
Technology and Logistics**

**23 March 2006**

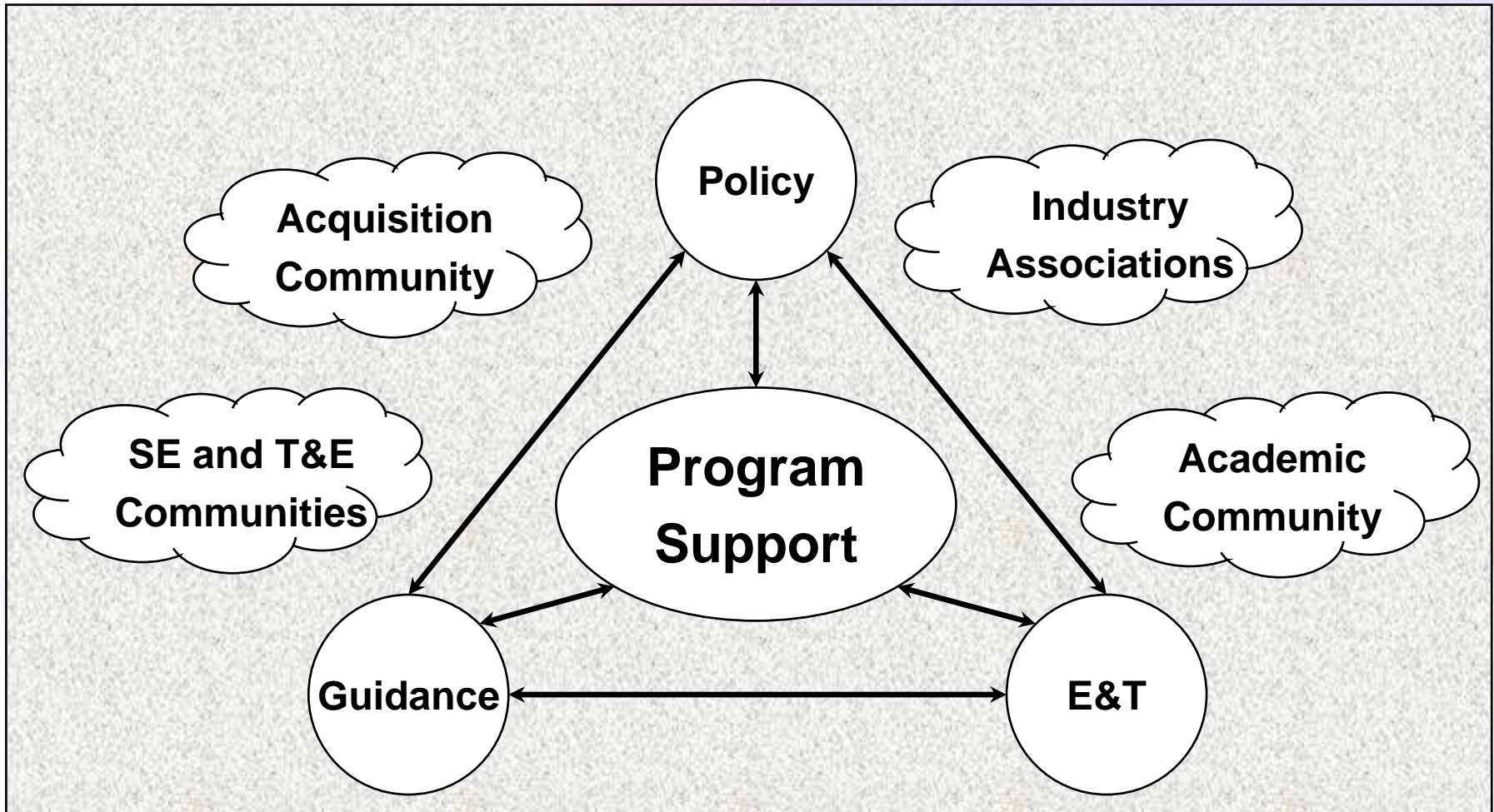


# Top Five Systems Engineering Issues\*

- Lack of awareness of the importance, value, timing, accountability, and organizational structure of SE on programs
- Adequate, qualified resources are generally not available within government and industry for allocation on major programs
- Insufficient SE tools and environments to effectively execute SE on programs
- Requirements definition, development, and management is not applied consistently and effectively
- Poor initial program formulation

\* Based on an NDIA Study in January 2003

# Systems Engineering Revitalization Framework



***Driving Technical Excellence into Programs!***



## Recap: What We Have Done To Revitalize Systems Engineering

- Issued Systems Engineering (SE) policy
- Issued guidance on SE and Test & Evaluation (T&E)
- Integrating Developmental T&E with SE policy and assessment functions – focused on effective, early engagement of both
- Instituted system-level assessments in support of OSD major acquisition program oversight role
- Established SE Forum – senior-level focus within DoD
- Working with Defense Acquisition University to revise SE, T&E, and enabling career fields curricula
- Leveraging close working relationships with industry and academia

***Necessary but not sufficient!***



# Driving Technical Rigor Back into Programs “Portfolio Challenge”

- Defense Systems was tasked to:
  - Review program’s SE Plan (SEP) and T&E Master Plan (TEMP)
  - Conduct program support reviews (PSRs)
- Portfolio of major acquisition programs (ACAT ID and IAM) include:
  - Business Systems
  - Communication Systems
  - C2ISR Systems
  - Fixed Wing Aircraft
  - Unmanned Systems
  - Rotary Wing Aircraft
  - Land Systems
  - Ships
  - Munitions
  - Missiles

***Systems Engineering and T&E Support to Over 150 Major Programs in Ten Domains***



# Defense Systems Data-Driven Decision Support

- SE & DTE Implementation and Execution
  - Review and support program planning, execution and risk mitigation
  - Provide technical guidance and advice to PEOs and PMs to address issues and impediments to mission success
  - Perform analysis of broad systemic issues, and provide feedback in order to shape Department policy & guidance
  - Monitor SE and DT&E State-of-the-Practice
- Outreach
  - Non-Advocate Reviews
  - Independent Review Teams
  - Systems Engineering planning
  - Developmental T&E planning
  - Industry and Academia sponsored symposia & forums
- Risk-Based Oversight
  - Program Support Reviews
  - DAES assessments
  - Review/staff SEPs/TEMPs
  - Assessments of Operational Test Readiness
  - Nunn-McCurdy SE/DTE Certification



# Driving Technical Excellence into Programs

Topic	Systems Engineering	Test & Evaluation	Risk Management	Exit Criteria	Acquisition Strategy
Focus Areas	Requirements	V&V Traceability	Risk ID	Mission Systems	Mission Capability
	Organization & Staffing	Test Resources	Risk Analysis	Support	Resources & Management
	Technical Reviews	Test Articles	Risk Mitigation Planning	Manufacturing	Technical Process
	Technical Baseline	Evaluation	Risk Tracking	R & M	Technical Product
	Linkage w/ Other Program Mgmt & Controls	Linkage w/ Other Program Mgmt & Controls	Evidence of Effectiveness	Net Centric	Enterprise Environment
Product	SEP	TEMP	RM Plan	Phase Exit Criteria	ASR/APB

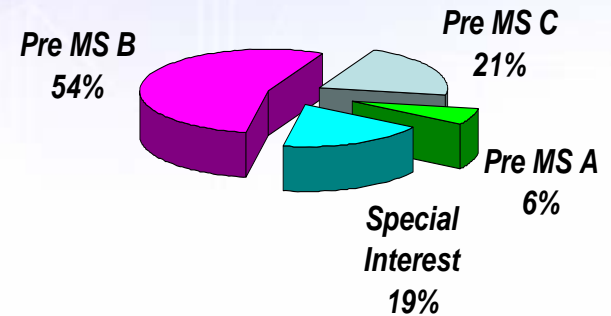


# Systems Engineering Plan Activity

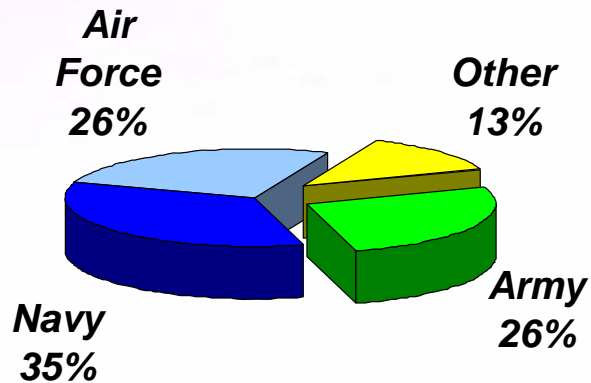
(since November 2004)

- Programs submitting SEPs: 46
- Number of SEPs reviewed: 75
  - Approved: 13
  - Pending final approval: 1
  - Pending draft review: 10

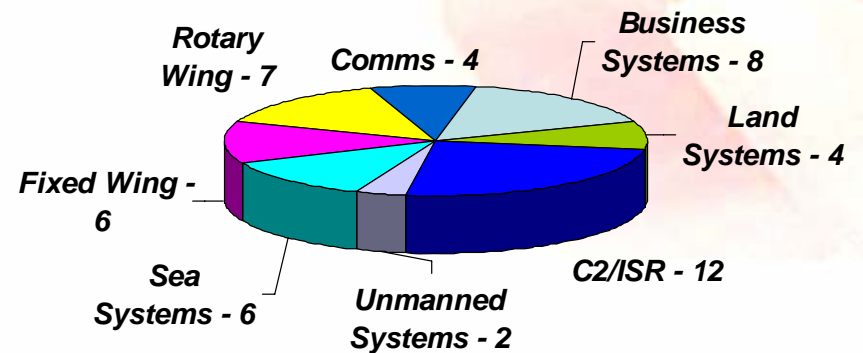
## SEP Program Milestones



## Component-Managed Acquisitions



## Programs by Product Line



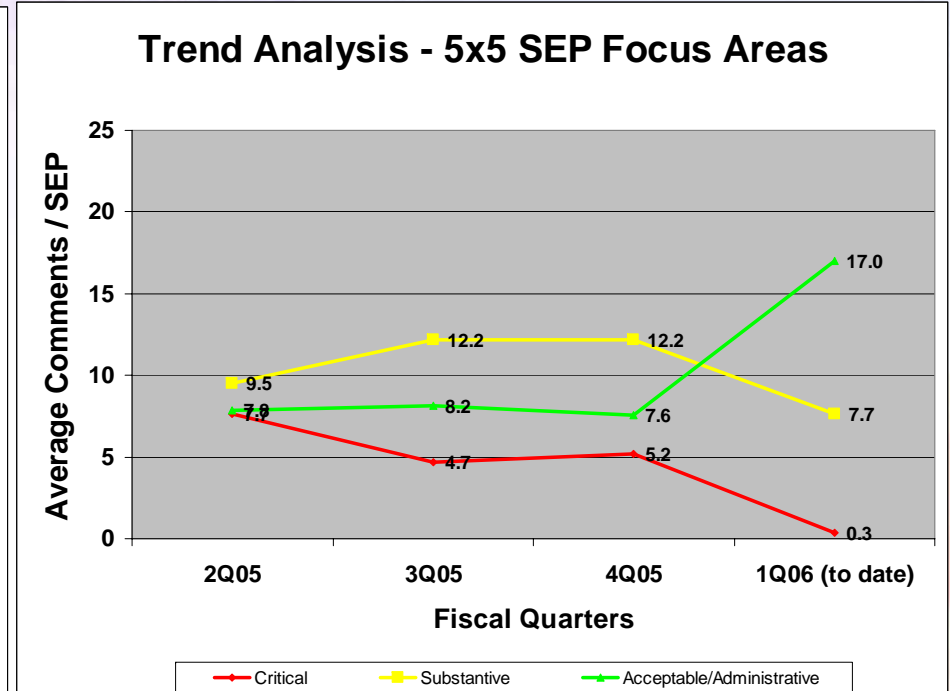
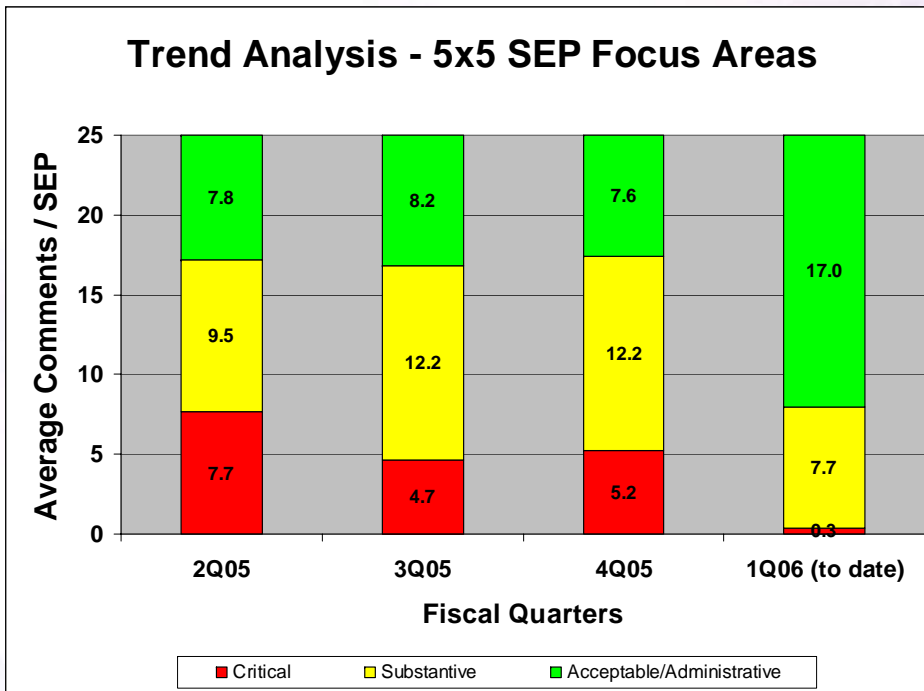




# Emerging SEP Issues - Trends\*\*

(not systemic across all programs)

\*\*BASED ON ANALYSIS OF 31 OUT OF 36 PROGRAMS



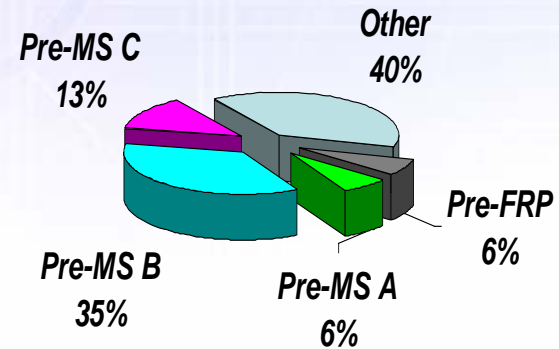


# Program Support Review Activity

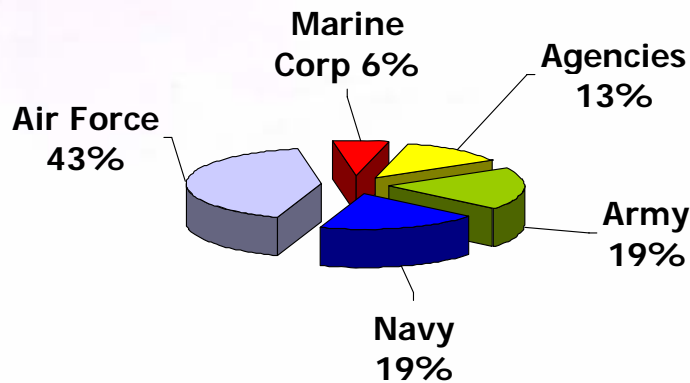
(since March 2004)

- Number of PSRs completed: 31
- Number of AOTRs completed: 5
- Number of Nunn-McCurdy completed: 1
- Number of IRT's: 4
  
- Reviews planned for rest of FY06
  - PSRs: at least 30
  - AOTRs: 2
  - Nunn-McCurdy: 4

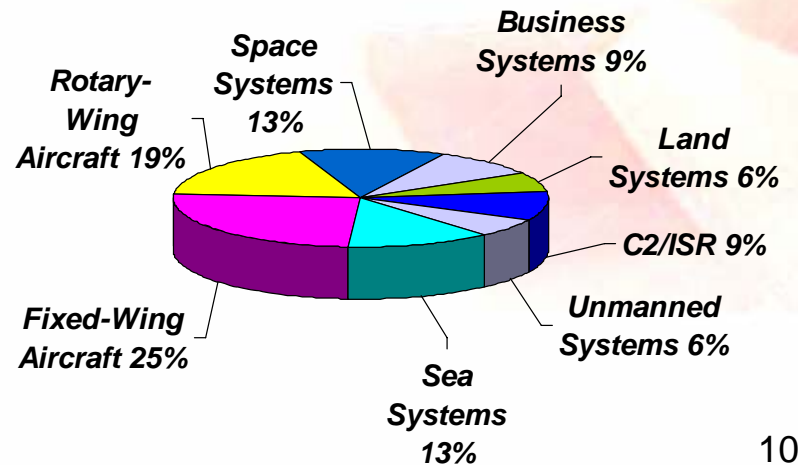
## Reviews Conducted Prior to Each Milestone



## Service-Managed Acquisitions



## Programs by Product Line

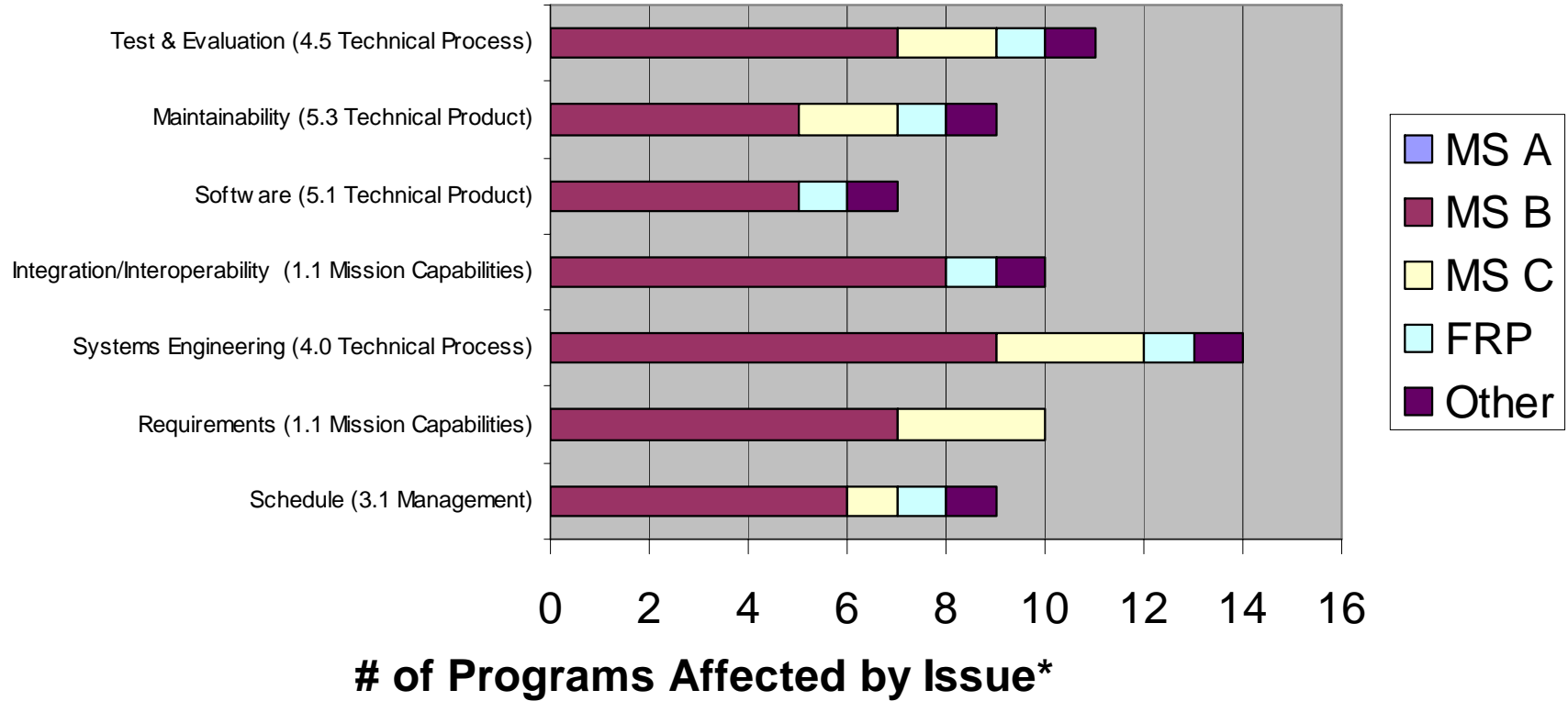




# Initial Thoughts on Systemic Issues

## Critical PSR Issue Commonality

Identified Issue Areas



\* Based on 14 programs

# Assessments and Support

## Example Systemic Findings and Recommendations



- **Schedule Realism** – identified and recommended changes to unrealistic, un-executable, or high-risk program schedules for VXX, V-22, ARH, DD(X), FCS, JSF, LCS, MMA, EA-18G, MP-RTIP, and Stryker
- **Requirements** – poor management discipline across most programs reviewed; made recommendations to address issues in each program, with specific focus on issues relating to ARH, FCS, SDB, MMA, SM-6, DD(X), MP-RTIP, and Stryker
- **Integration/Interoperability** – noted a general lack of common authority across some programs that function in a System of Systems context (e.g., MP-RTIP, LCS, MMA, UH-60M, and DD(X)); in some cases recommended the establishment of a Joint PEO structure with cross-cutting Product Line Authority (e.g., JC2, JTRS, NCOE, and SIAP)
- **Software** – noted a general deficiency in software engineering practice and program management oversight, despite claims of high level process capability/maturity; specific recommendations made to programs include GTN-21, DD(X), EA-18G, Stryker, FCS, JSF, and MP-RTIP
- **Maintainability** – recommendations made to address failures to design for, and failure to evaluate maintainability early enough in the development process (e.g., F/A-22, MP-RTIP, Stryker, VXX, and MMA)
- **Systems Engineering and Test & Evaluation** – numerous issues and recommendations systemic across all programs reviewed

# Backup Slides





# Representative Issues

(1 of 3)

- **Representative Issues for Schedule**
  - Schedules too aggressive
  - Detailed schedules missing key components
  - Schedule concurrency (e.g. T&E activities)
- **Representative Issues for Requirements**
  - Requirements don't support planned modifications, increasing capacity
  - Requirements changed without consideration or coordination with PM/PO and dependent programs
  - “Shortsighted” requirements, i.e. safety critical, bandwidth to support future capabilities
- **Representative Issues for Integration/Interoperability**
  - Integration plans lacking key components
  - Multi-platform, scalable design benefits not realized due to low hw/sw commonality
  - Interoperability with Joint Forces not adequately addressed



# Representative Issues

(2 of 3)

- **Representative Issues for Software**
  - Software processes not institutionalized
  - Software development planning doesn't adequately capture lessons learned to incorporate into successive builds
  - Systems and spiral software requirements undefined
  - Software architecture immature
  - Software reuse strategies are inconsistent across programs
  - Software support plan missing
- **Representative Issues for Maintainability**
  - Maintainability requirements incomplete or missing
  - Diagnostic effectiveness measures are either too ambiguous or missing
  - Tailoring out of criticality calculations translates to inability to monitor the maintainability status of reliability critical items



# Representative Issues

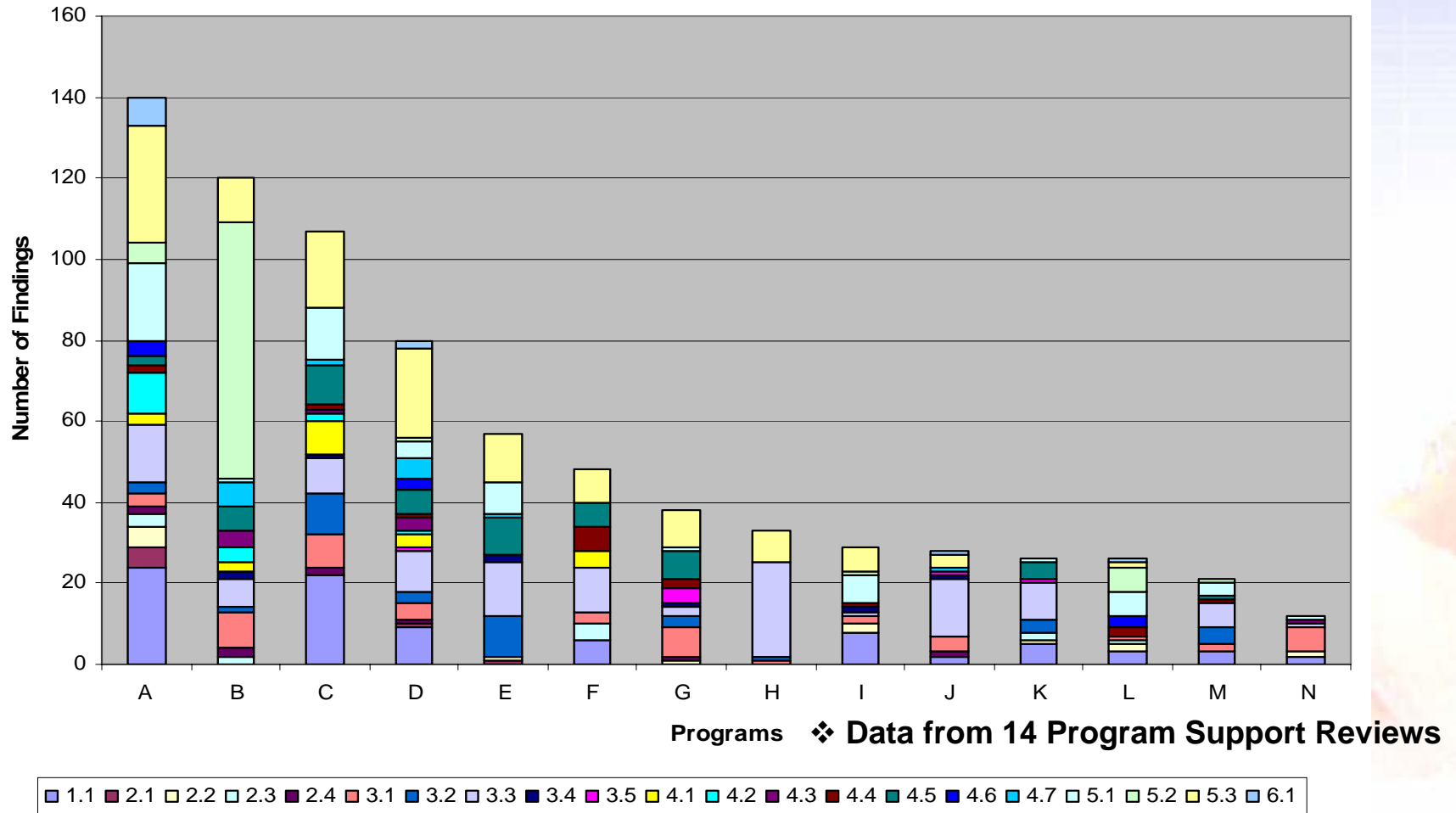
(3 of 3)

- **Representative Issues for Test and Evaluation**
  - No reliability details (hours, profile, exit criteria, confidence level, OC curve)
  - Lack metrics
  - Basis for some threat-based requirements not fully explained or rationalized
- **Representative Issues for Systems Engineering**
  - Lack of disciplined SE process, metrics, etc
  - PO not conducting PRR prior to LRIP
  - Missing Joint CONOPs
  - Missing System Functional Review (SFR) and PDR during SDD





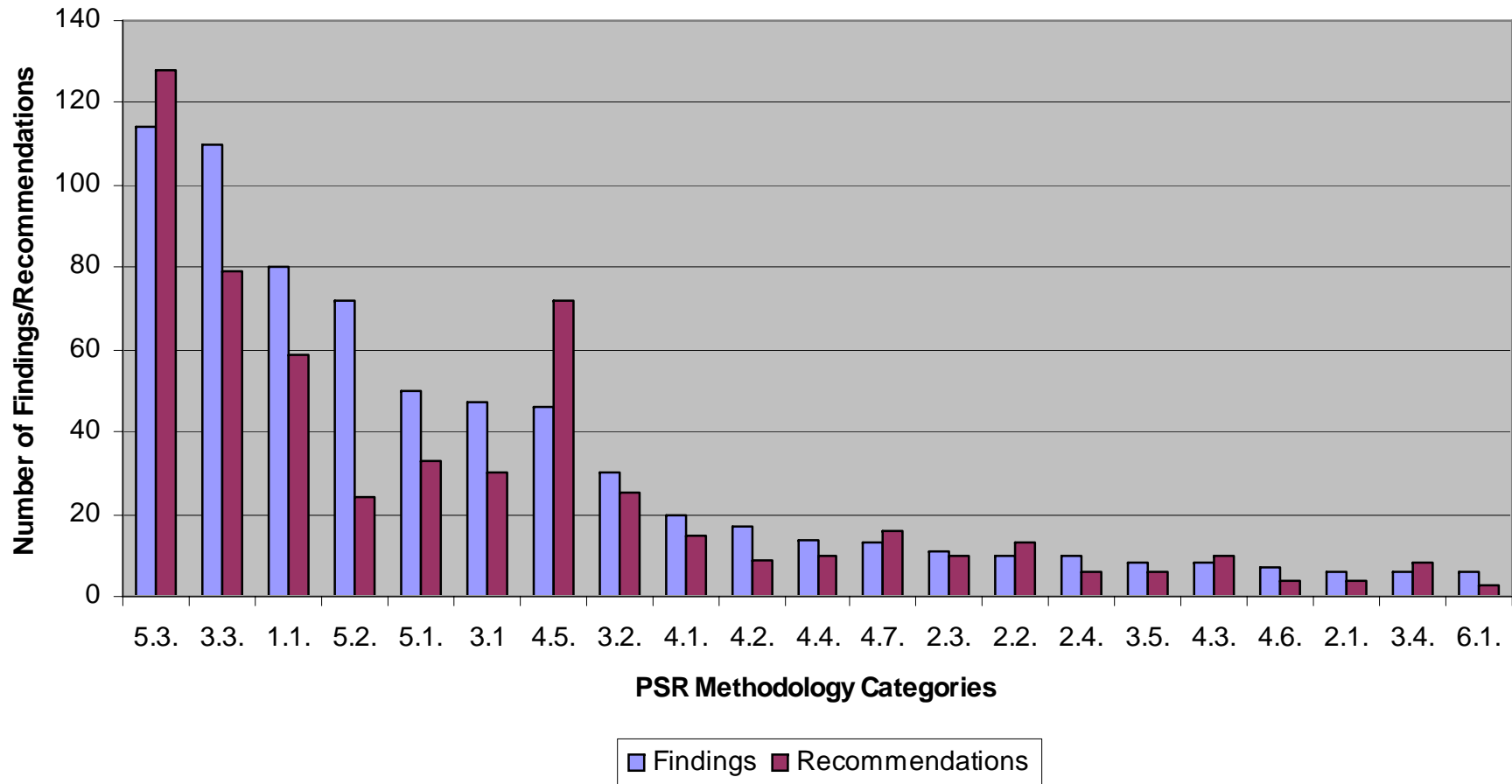
# Number and Type of Findings by Program



Numbers represent sections of the PSR Methodology



# Level 2 Findings and Recommendations



❖ Data from 14 Program Support Reviews