Acquisition Program Technical Measurement

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Outline

• **Background**
  – Weapon Systems Acquisition Reform Act of 2009 (WSARA)
  – Acquisition Program Technical Measurement

• **Program Assessment & Monitoring**
  – Individual Program Support Review (PSR) Stop light
  – Signs of Good Programs
  – Integration of Existing Metrics to Uncover Trends and Relationships
  – Program Insight

• **Preferred End State**
  – Notional Scorecard
  – Integration of DoD Data Repositories
  – Leveraging Industry Best Practices

• **Summary**
Weapon Systems Acquisition Reform Act of 2009

- Establishes Director, Systems Engineering (D, SE) and Director, Developmental Test and Evaluation (D, DT&E) as principal advisors to the SECDEF and the USD(AT&L)
- Mandates documented assessment of technological maturity and integration risk of critical technologies for MDAPs during the Technology Development (TD) phase
- Establishes D, DT&E and D, SE joint tracking and Congressional reporting on MDAP achievement of measurable performance criteria
- Mandates competitive prototyping and MDA completion of a formal Post-Preliminary Design Review Assessment for all MDAPs before MS B; additional MDA certification to both at MS B
- Strengthens technical analysis of cost and schedule breaches during the Technology Development (pre-MS B) and the Engineering and Manufacturing Development (post-MS B)
Acquisition Program Technical Measurement

- Program performance reporting inadequate to support effective Acquisition decision making
  - Program-level metrics change as throughout the life cycle to address changing information needs (prevents Acquisition organization from obtaining complete data covering the program’s full life cycle)
  - Programs develop unique metrics which help them effectively manage their program (prevents Acquisition benchmarking due to dissimilar program data)

- **Our objective is to establish an objective trustworthy Acquisition Program Measurement capability**
  - Fulfilling Statutory requirements of the Weapons Systems Acquisition Reform Act of 2009
  - Maximizing use of existing program reporting requirements and processes
  - Linking Services’ and OSD databases to enable DoD Program benchmarking

*Enable Objective Information Based Decision Making*
Conceptual Information Flow: (Creating Meaningful Metrics)

- **Information Needs**: Questions to be answered (common issue areas)
- **Key life cycle decision activities**
- **Stakeholders**
- **Decisions**
- **Measurement & Analysis**: Solution (e.g., models, metrics, ...)
- **Information Product**: Integration of Information to support decisions
- **Metrics**

(Adapted from: SSCI 2007)
Program Assessment and Monitoring

• **Fall 2002: OSD establishes SE organization to:**
  • Drive SE back into programs
  • Instill credibility in the acquisition process

• **Program Assessments: Element of DoD SE revitalization effort**
  − Help Program Managers identify & mitigate risks
  − Shape technical planning and management
  − Provide insight to OSD stakeholders
  − Identify systemic issues requiring resolution above program

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3.9.6. **Program Support Review (PSR).** PSRs are a means to inform the MDA, OIPT, and Program Office of the status of technical planning and management processes by identifying cost, schedule, and performance risk and recommendations to mitigate those risks. PSRs shall be conducted by cross-functional and cross-organizational teams appropriate to the program and situation. PSRs for ACAT ID and IAMs shall be planned by the Director, Systems and Software Engineering to support pending OIPT program reviews, at other times as directed by the USD(AT&L), and in response to requests from PMs.

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**Program Assessments**
- Support acquisition decisions & requests
- Address technical issues
- DAPS Methodology provides framework

**Program Monitoring**
- SE technical reviews, WIPTs, test events
- Program Signature
- Metrics to assess program performance
- Systemic Root Cause Analysis

**Continuous Program Engagement Enhances Program Execution**
Use Signs and Artifacts of Good Programs to Identify Meaningful Metrics

**Technical Excellence Milestone A**
- SEP - Risk management planning
- TES
- TDS
- ADM, Phase exit criteria
- Draft RFP

**Technical Excellence Milestone B**
- SEP - Risk management planning
- TEMP
- Acquisition Strategy - Contract Scope
- ADM, Phase exit criteria
- PDR report

**Mission Capabilities/Requirements**
- Establish reasonable, measurable and testable CDD/CPD requirements
- Conducts SRR in TD phase with competing contractors
- Uses competitive prototyping
- Establishes PM/User/Contractor advisory group to assess cost/performance trades
- Maintains stable requirements

**Technical Product**
- Mature technologies and modular open architecture
- Reliability and maintainability designed-in
- Early focus on production planning
- Realistic software size, productivity, and reuse estimates
- Assessments of manufacturing planning and maturity

**Technical Process**
- Established SE processes in use
- SEP approved prior to RFP release
- Adequate requirements flow-down/traceability/decomposition
- Emphasis on test and verification approach
- Comprehensive contractual verification (section 4 of spec) of meeting requirements (section 3 of spec)

**Resources and Management**
- Funding properly phased and adequate to support planned SE activities
- Adequately staffed with qualified personnel
- Adequate management reserve consistent with program risks
- Good communication between user, acquirer, supplier; IPTs
- Manages external interfaces with complementary programs
- Maintains event driven schedules
- Robust risk management process and mitigation activities; Integration with IMS and EVM
Integration of Indicators to Uncover Relationships and Trends

Phases

- Materiel Solution Analysis
- Technology Development
- Engineering and Manufacturing Development
- Production & Deployment
- IOC
- FOC Operations & Support

Work Efforts

- Materiel Development
- Decision
- Post PDR Assessment
- Post CDR Assessment
- FRP Decision Review

Activities

- Pre-Systems Acquisition
- TRA
- Systems Acquisition
- Acquisition

Reviews

- Materiel Development Decision
- Post PDR
- Post CDR

Metrics

- Assessment (PSR Summary/recommendation tracking, QUAD charts, Bubble charts, etc.)
- Cost (EVMS - CPI, SPI, variances, burn rate,)
- Schedule (Tier 1, Critical path, schedule risk assessment, late starts/finishes, FoS/SoS schedules, etc.)
- Performance (KPP/KSA progress, TPMs, reliability growth, TRLs, etc.)
- Management (Staffing, Risk cube and burn-down curve, exit criteria, etc.)
- Software (SLOC, productivity, reuse, defects, etc.)
- Manufacturing (MRLs, Equip/Facilities, Supply Chain, etc.)
- T&E (Schedules, CTPs, MOE/S, retest, verification status)
- Other: Drawing release,

Special Interest Areas (Tailored by Phase)
Leverage Existing Data & Metrics

- Portfolio of MDAP Programs
- PSRs provide primary Major Program Support (MPS) touch points to collect data and assess Program Performance

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<thead>
<tr>
<th>Phases</th>
<th>Materiel Solution Analysis</th>
<th>Technology Development</th>
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# of Programs on 2009 DT Oversight

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Notional Dashboard

Inform Milestone decisions by providing assessment against key program factors as well as comparison against past program trends.
Dashboard Contents based on Existing Indicators

Measure
Combine
Analyze
Report

Leading Indicators
Indicators
Indicators
Metrics
Data
Data
Data

OSD/Joint Level

NAVY/USMC Level

1. ICD Approval
   - Forum: Lead Orgs: Chair/Co-chairs: N8
2. Alternative Selection
   - R3B OPNAV CNO/ASN(RDA)
3. CDD and CONOPS Approval
   - R3B OPNAV/CFFC CNO
4. SDS Approval
   - R3B ASN(RDA)
5. RFP Approval
   - R3B ASN(RDA)
6. Contract Award
   - Briefing ASN(RDA)

PASS 1

PASS 2
Notional Example for Director of Major Program Support

Program

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<tr>
<th>Program</th>
<th>DDR&amp;E Generated</th>
<th>DoD Data Repositories</th>
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OVERALL

SEP  | PSR  | TEMP |
-----|------|------|

DAES | APB  | SAR  | CCDR/SRDR | EVM CR
-----|------|------|------------|--------

DAMIR | DACIMS | EVM CR
Position DDR&E to Leverage Related Industry Best Practices

SYSTEMS ENGINEERING LEADING INDICATORS GUIDE

Integrated Analysis Example
Readiness for Delivery
Supporting Future Alignment of Existing DoD Data Sources

Develop Leading Indicators

Consolidated Data Set (MMT)

Independent Variables
(Interdependence)

Dependent Variables
(cost, schedule)

Data

Analyses

Apply to Acquisition
• Assess program risk
• Inform resource req’ts
• Etc…

DAES Charts

SAR (DAMIR)

Budget Exhibits

SAR (DAMIR)

SAR (DAMIR)

ISP (JCPAT)

Interactions, Interdependencies and Synchronization with Complementary Systems for DoD S/CI/NI/S

Number / Diversity of Stakeholders
• Funding Diversity
• Number of Program Elements

Cost Growth
• Schedule Delay
• Performance Shortfalls

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Conceptual Information Flow: (Creating Meaningful Metrics)

- Stakeholders
- Decisions
  - Key life cycle decision activities
  - Questions to be answered (common issue areas)
  - Organization & Project Characteristics
- Information Needs
- Measurement & Analysis
  - Solution (e.g., models, metrics, ...)
- Information Product
  - Integration of Information to support decisions
  - Creation of Relevant Information

(Adapted from: SSCI 2007)
Summary

- **Objective is to better insight to Acquisition decision makers**
  - Statutory reporting requirements of the Weapons Systems Acquisition Reform Act of 2009
  - Effective decision making supported by existing program performance reporting as well as increasing the integration of DoD Data repositories

- **Development of useful Acquisition metrics and leading indicators requires integration of existing engineering and management performance data**
  - Minimizing effort associated with data collection and analysis, yet increasing the degree of objective program performance data

- **Focus on creating a set of useful Information products for Acquisition stakeholders, which requires:**
  - Knowledge of data quality (reproducible, unbiased, …)
  - Baselining key decisions and information needs
  - Creating meaningful ways to aggregate and integrate data throughout the Acquisition hierarchy
Questions/Discussion

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