

Rocket System Characterization: A Statistical Engineering Case Study

Discussion and QA Session

Stargel R. Doane, Ph.D.
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Introduction

- A brief discussion on...
 - Engineers and Statisticians
 - Academia/Industry/Government
- Common themes:
 - “Complex” problems
 - Historical component(s)
 - New “breed” of SMEs
 - Large teams
 - Limited resources



Case Study Highlights

- Demonstrated aspects of SE
 - Strategic planning and “nested experimental designs”
 - Objective presentation of results to SME
 - Non-traditional application of RSM
 - Leverage/combined multiple disciplines/tools
- Consequences of a non-SE approach
 - OFAT
 - Scope creep and churn
- Challenges
 - Precise objective

Case Study Extension – A Sales Pitch

- How can the solution to the “current” problem be structured to support future efforts?
- What was the total reduction in resources for OFAT/SME approach vs. SE approach?
- What obstacles were overcome to reach the solution?
 - Technical
 - Organizational

SE in DoD acquisition

Defense Acquisition Life Cycle Compliance Baseline (Pre-Tailoring)

This chart illustrates DoDI 5000.02, Hybrid Program Model A (Hardware Dominant), tailoring to individual program circumstances is encouraged. Acquisition of Services is covered by DoDI 5000.74

Ver. 1.2, January 31, 2018

Small suggestions for improvement

Milestone & Phase Information Requirements
 Statutory information requirements are shown in dark red bold italics. Regulatory and best practice information requirements are shown in blue bold. For a complete list of statutory and regulatory information requirements see Table 2 of DoDI 5000.02

Program Oversight & Review

Key Phase Activities

Joint Capabilities Integration and Development System (JCIDS)

Acquisition Intelligence

Contracting

Major Products

Systems Engineering

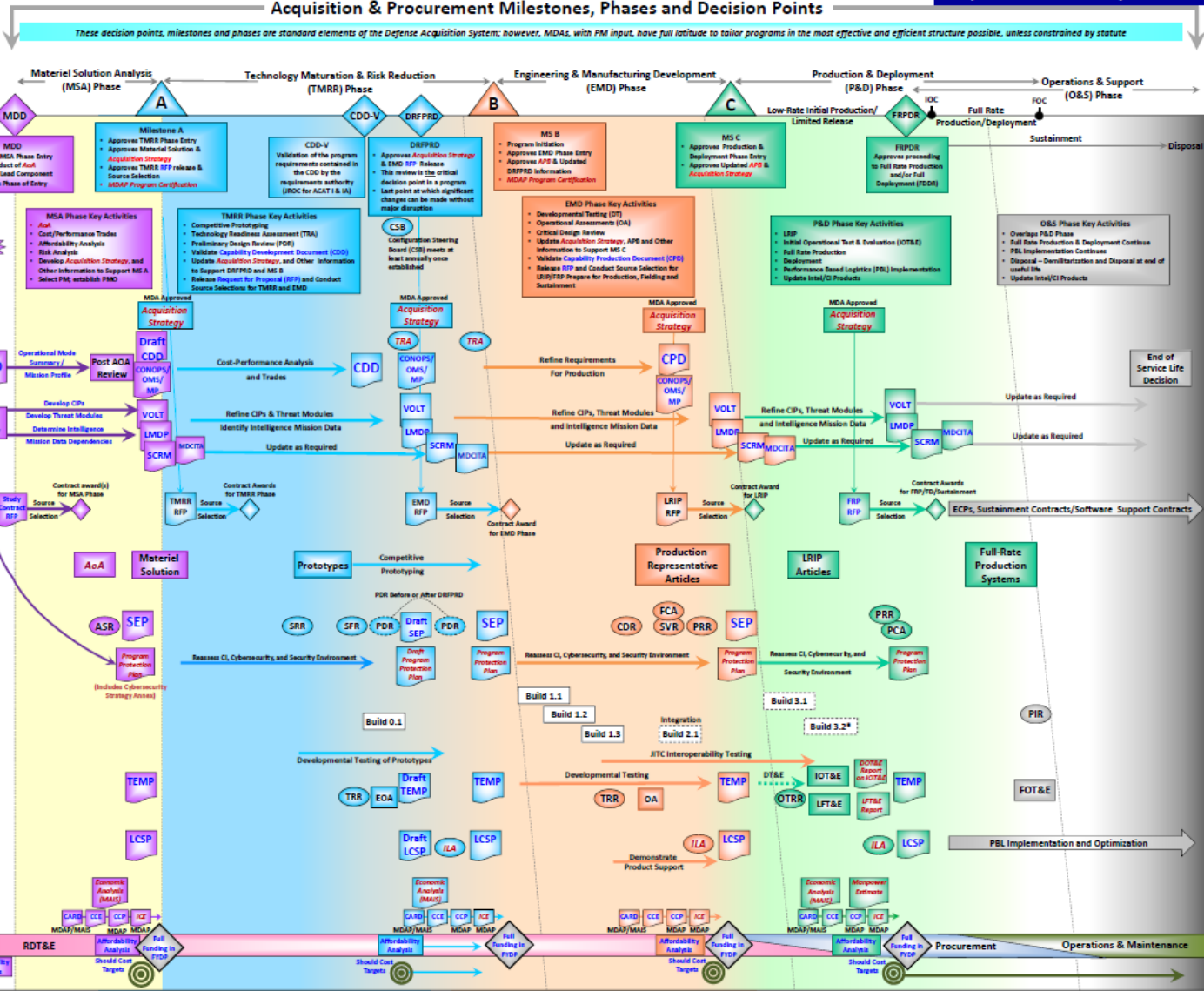
Software

Test and Evaluation

Logistics/Sustainment

Financial Management

For a more detailed PIR reference see the DoD Financial Management Platform Card



Acronyms & Abbreviations

- ACAT – Acquisition Category
- AA – Analysis of Alternatives
- APB – Acquisition Program Baseline
- ASR – Alternate Systems Review
- CARD – Cost Analysis Requirements Description
- CCE – Component Cost Estimate
- CCP – Component Cost Position
- CCD – Capability Development Document
- CCD-V – Capability Development Document Validation
- CDR – Critical Design Review
- CPI – Critical Intelligence Parameters
- CONOPS/OM/MP – Concept of Operations/Operational Mode Summary/Mission Profile
- CPD – Capability Production Document
- CSB – Configuration Steering Board
- DCAPE – Director, Cost Assessment & Program Evaluation
- DRPPD – Development Request for Proposal Release Decision
- DT&E – Developmental Test & Evaluation
- DT&E – Department of Defense Instruction
- DOT&E – Director of Operational Test & Evaluation
- ECI – Engineering Change Proposal
- EOD – Engineering & Manufacturing Development
- EOP – Early Operational Capability
- FCA – Functional Configuration Audit
- FD – Full Deployment
- FDC – Full Operational Capability
- FOT&E – Follow-on Operational Test & Evaluation
- FPP – Full-rate Production
- FPP/VD – Full-rate Production / Full Deployment Decision Review
- FTRP – Future Year Defense Program
- ICD – Initial Capabilities Document
- ICE – Independent Cost Estimate
- ILA – Independent Logistics Assessment
- IOC – Initial Operational Capability
- IT&E – Initial Operational Test & Evaluation
- IS – In-Service Review
- JCC – Joint Interoperability Test Command
- JIOC – Joint Requirements Oversight Council
- LCCE – Life Cycle Cost Estimate
- LCF – Life Cycle Subcontract Plan
- LT&E – Live Fire Test & Evaluation
- LMDP – Life Cycle Mission Data Plan
- LRIIP – Low-Rate Initial Production
- MAS – Major Automated Information System
- MDAP – Materiel Decision Authority
- MDAP – Major Defense Acquisition Program
- MOCTA – Multi-Discipline Counterintelligence Threat Assessment
- MO – Materiel Development Decision
- MS – Milestone
- MSA – Materiel Solution Analysis
- OA – Operational Assessment
- OT&E – Operational Test Readiness Review
- PIR – Performance-Based Life-Cycle Product Support: Performance-Based Logistic
- PCA – Physical Configuration Audit
- PDR – Preliminary Design Review
- PIB – Post Implementation Review
- PM – Program Manager
- PMO – Program Management Office
- PPRE – Planning, Programming, Budgeting & Execution
- PRR – Production Readiness Review
- PT&E – Research, Development, Test & Evaluation
- SCM – Supply Chain Risk Management
- SEP – Systems Engineering Plan
- SRR – System Requirements Review
- SFR – System Functional Review
- SUR – System Verification Review
- TEMP – Test & Evaluation Master Plan
- TRM – Technology Maturity & Risk Reduction
- TRA – Technology Readiness Assessment
- TRR – Test Readiness Review
- VOLT – Validated Online Lifecycle Threat

SE in DoD acquisition

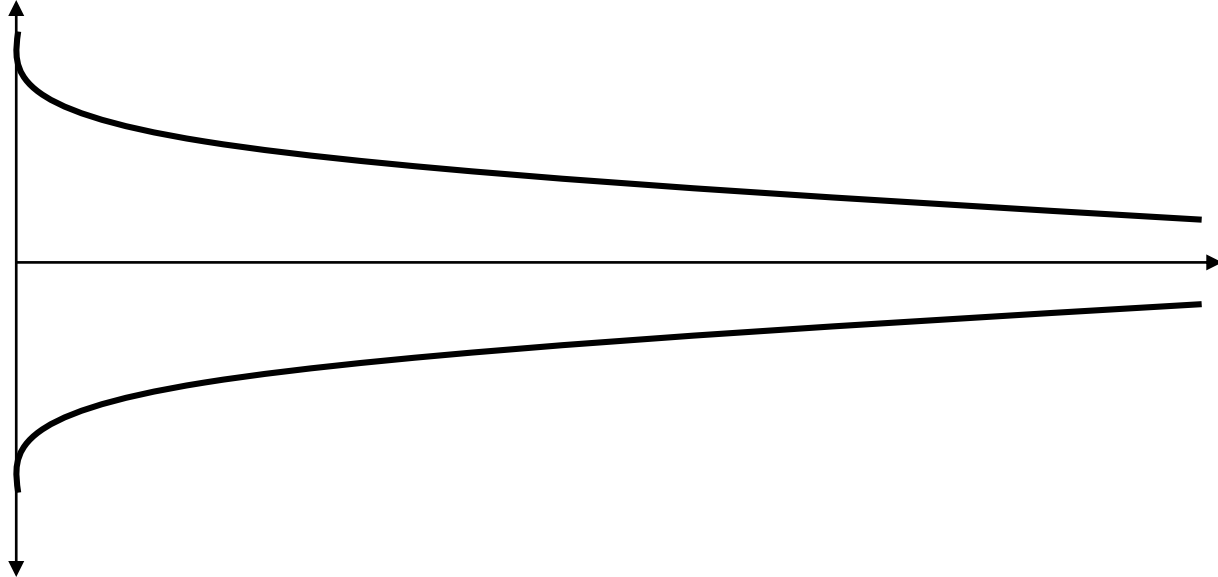
- Minimal Resources
- Many Stakeholders
- Rapid Acquisition/Immediate Need
- Legacy Procedures and Processes
- Push to leverage M&S in lieu of physical testing
- Data Management Challenges

Thoughts on SE: “The big picture”

- My Opinions/Topics for Discussion
 - SE is about **problem solving not statistical tools**
 - “Confounding” is the most important topic for the SE community to address and socialize.
 - and now a word on “Big Data”
 - SE practitioners cannot feel as though they “saved the day” if the primary contribution was highlighting what cannot be done or claimed
 - Opportunity has been missed
 - True measure of success for the SE initiative is...
 - having leadership select SE practitioners to lead projects

Thoughts on SE: “The big picture”

- So what exactly does a statistical engineer do?
 - Develops and implements statistically based management strategies that continuously refine uncertainty estimates and promote a multi-dimensional understanding of the system(s) in question.



Discussion