Integration of Systems and Software Engineering:

Implications from Standards and Models Applied to DoD Acquisition Programs

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Agenda

- Introduction
- Overview comparison of Systems Engineering (SE) process standards and models
- Some observations from review of SE Plans (SEPs)
- Some findings from Program Support Reviews (PSRs)
- NDIA Summary of SE and Software issues in DoD
- Summary implications of SE processes in DoD Acquisition Programs

Disclaimer: The views and opinions presented here are the authors' and do not necessarily represent DoD views.

Introduction

- DoD's **Defense Acquisition Guidebook** (DAG) has applied SE standards in developing its SE chapter 4, tailored to DoD acquisition policies and guidance

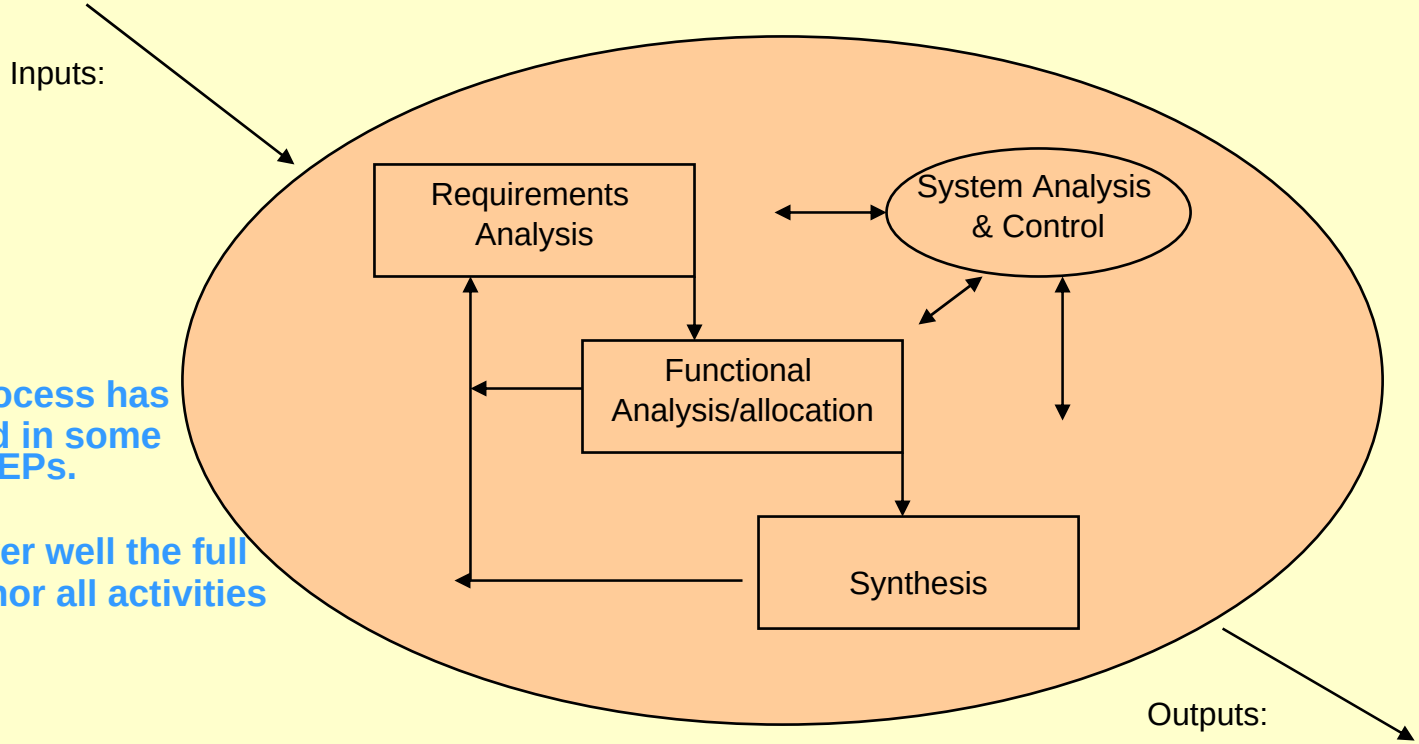
- **ISO/IEC 15288 – System life cycle processes** was recently updated and is in concert with an update to **ISO 12207 – Software life cycle processes** (*further "Harmonization" is ongoing)*

- A DAG update is imminent with changes due to new DoD acquisition policies [e.g., DoDI 5000.2) that…
  - Emphasizing enhanced (i.e., early] Systems Engineering (SE)
  - Moving Milestone B acquisition decision point to post Preliminary Design Review [PDR]
  - Changes to SE processes per ISO/IEC 15288 revision

Note: *Acronym* definitions are in backup slides

A Generic SE Process

Note: Was applied to Air Force IT/CSE SE Case Studies; http://www.afit.edu/cse/



This simple process has been observed in some program SEPs.

It does not cover well the full SE life cycle, nor all activities of import

Sources: DoD Mil Std 499A/B and the Defense Acquisition University [DAU] SE Fundamentals, 2001

System Life Cycle Processes - ISO/IEC 15288: *2008**

**Changes highlighted in red*

Agreement Processes

- Acquisition Process
- Supply Process

Project-Enabling* Processes

- Life Cycle Model Management Process
- Infrastructure Management Process
- Project Portfolio Management Process
- Human Resource Management Process
- Quality Management Process

Project Processes

- Project Planning Process
- Project Assessment and Control Process
- Decision Management Process
- Risk Management Process
- Configuration Management Process
- Information Management Process
- Measurement Process

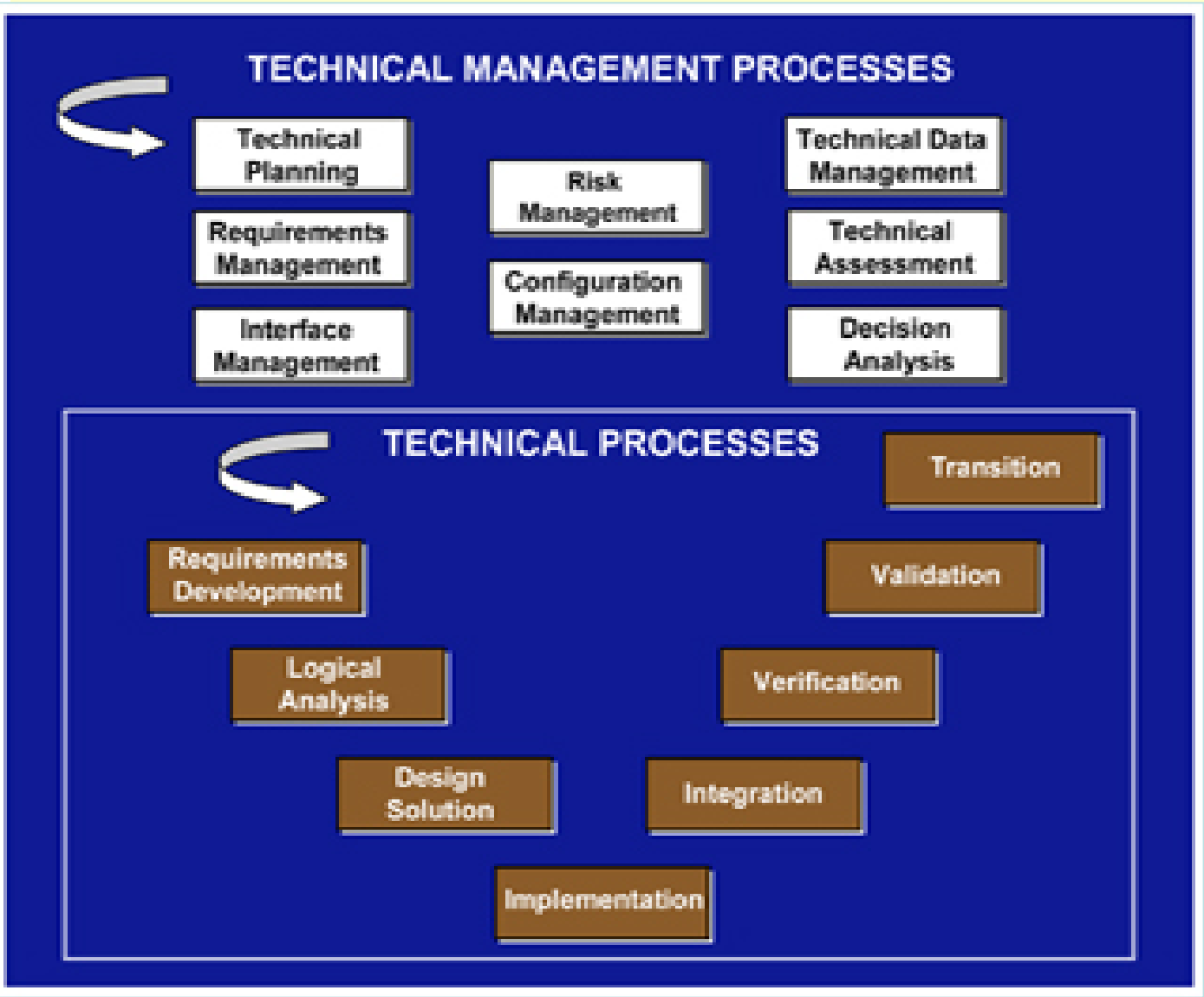
Technical Processes

- Stakeholder Requirements Definition Process
- Requirements Analysis Process
- Architectural Design Process
- Implementation Process
- Integration Process
- Verification Process
- Transition Process
- Validation Process
- Operation Process
- Maintenance Process
- Disposal Process

Source: http://www.iso.org/iso/iso_catalogue.htm (search '15288').

Note: Also adopted by IEEE, http://standards.ieee.org/announcements/pr_15288.html

Simplified Application of the SE 'V' approach



[Note: new DAG revision release imminent; tailored approach adapting ISO 15288: 2008]

[Source: DoD DAU/DAG; Chapter 4 on SE; 11/04]

SE Standards Example Mapping - Management *(*see also other DAG chapters)*

ISO/IEC 15288	EIA - 632	IEEE 1220	CMMI®-ACQ *[level 3]*	DAG/SE (#4)
Project Planning	Planning	Planning and integrating the technical/SE effort	Project Planning; Integrated Project Management (Mgt.). Acquisition Technical Mgt.	Technical Planning (*see #11 Program Management)
Project Assessment and Control	Assessment; Control	Control; Technical reviews	Project Monitoring and Control	Technical Assessment; Interface Mngt.*
Measurement	Systems Analysis	Control	Measurement and Analysis	Decision Analysis*
Decision Management	Systems Analysis	Systems analysis	Decision Analysis and Resolution	Decision Analysis*
Risk Management	Systems Analysis	Systems analysis	Risk Management	Risk Management*
Configuration Management (CM)	Control	CM; integrated repository; System breakdown structure	CM; Requirements Management	CM; Requirements Management
Information Management		Integrated data package	Project Planning; Measurement and Analysis	Technical Data Management
Acquisition and Supply	Acquisition and Supply	Development strategies	Agreement Mgt. Acquisition Technical Mgt.	*(*see other DAG chapters)*
Project -Enabling processes	Environment and Enterprise Support	Product and process improvement; Quality Mgt.	Organizational Process set; Process & Product Quality Assurance; Organization Training	*(*see other DAG chapters)*

SE Standard Example Mapping – Technical *(*see also other DAG chapters)*

ISO/IEC 15288	EIA - 632	IEEE 1220	CMMI®-ACQ/L3	DAG/SE (#4)*
Stakeholder Requirements Definition	Requirements Definition	Requirements analysis	Acquisition Requirements Development; Solicitation & Supplier Agreement Development	Stakeholder Requirements *Definition**
Requirements Analysis	Systems Analysis	Requirements & Functional analysis; Systems Analysis; Modeling	Acquisition Requirements Development	Requirements Analysis*
Architectural Design	Solution Definition	Functional analysis; Synthesis; Modeling, Specifications/drawings	Technical Solution	Architecture Design
Implementation	Implementation	Prototyping; fabrication, assembly, production	Integrated Project Management	Implementation
Integration		Integrated data package; Integration	Integrated Project Mngt.	Integration
Verification	System Verification	Functional & Design verification; Technical reviews; Test	Acquisition Verification	Verification *(*see #9 – Integrated Test & Evaluation)*
Validation	Requirements & End Products Validation	Requirements validation; Test	Acquisition Validation	Validation *(*see #9 – Integrated Test & Evaluation)*
Transition	Transition to Use			Transition
Operation; Maintenance; Disposal		Support stage		*see other DAG (e.g., #5 Life Cycle Logistics)*

Summary of SE Standards

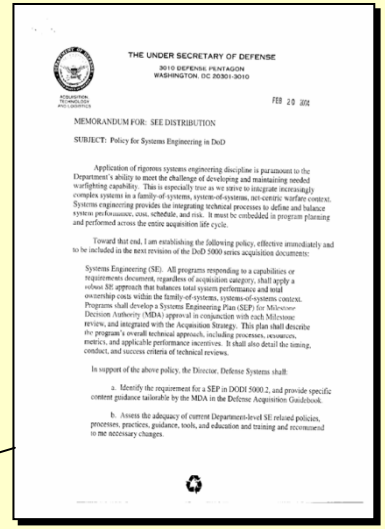
- ISO/IEC 15288 is becoming the *leading* SE 'Standard'
  - ISO/IEC 12207 [and others – e.g., 15939 re Measurement process] working for 'harmony'
  - IEEE 'adopts' it with tailoring guidance; expect revision of IEEE 1220 [also for EIA-632]
  - INCOSE adopts/tailors it with much more detail
  - DoD's DAU DAG applies it with acquisition-oriented tailoring
  - It is a *standard* and so is a very high level '**What'** is best practice

- "reality is in the details"
  - the DAG, CMMI, and INCOSE all provide more details on what & how

- *Next – overview of DUSD(A&T) SSE (and NDIA) observations and finding regarding SEP reviews, PSRs analysis, workshop findings*

USD(AT&L) Systems Engineering Plan (SEP) Policy*

- "Provide a context within which I can make decisions about individual programs."
- "Achieve credibility and effectiveness in the acquisition and logistics support processes."
- "Help drive good *systems engineering* practices back into the way we do business."



THE UNDER SECRETARY OF DEFENSE
3010 DEFENSE PENTAGON
WASHINGTON, DC 20301-3010

FEB 20 2004

MEMORANDUM FOR: SEE DISTRIBUTION

SUBJECT: Policy for Systems Engineering in DoD

Application of rigorous systems engineering discipline is paramount to the Department's ability to meet the challenge of developing and maintaining needed warfighting capability. This is especially true as we strive to integrate increasingly complex systems in a family-of-systems, system-of-systems, net-centric warfare context. Systems engineering provides the integrating technical processes to define and balance system performance, cost, schedule, and risk. It must be embedded in program planning and performed across the entire acquisition life cycle.

Toward that end, I am establishing the following policy, effective immediately and to be included in the next revision of the DoD 5000 series acquisition documents:

Systems Engineering (SE). All programs responding to a capabilities or requirements document, regardless of acquisition category, shall apply a robust SE approach that balances total system performance and total ownership costs within the family-of-systems, system-of-systems context. Programs shall develop a Systems Engineering Plan (SEP) for Milestone Decision Authority (MDA) approval in conjunction with each Milestone review, and integrated with the Acquisition Strategy. This plan shall describe the program's overall technical approach, including processes, resources, metrics, and applicable performance incentives. It shall also detail the timing, conduct, and success criteria of technical reviews.

In support of the above policy, the Director, Defense Systems shall:

a. Identify the requirement for a SEP in DODI 5000.2, and provide specific content guidance tailorable by the MDA in the Defense Acquisition Guidebook.

b. Assess the adequacy of current Department-level SE related policies, processes, practices, guidance, tools, and education and training and recommend to me necessary changes.

Programs shall develop a Systems Engineering Plan (SEP) for Milestone Decision Authority (MDA) approval in conjunction with each Milestone review, and integrated with the Acquisition Strategy. This plan shall describe the program's overall technical approach, including processes, resources, metrics, and applicable performance incentives. It shall also detail the timing, conduct, and success criteria of technical reviews.

Note: colors are authors

*Full policy can be found at http://www.acq.osd.mil/sse/policy.html

SEP Purpose

➢ The SEP…

- Is the artifact of a program's technical planning activities usually led by a SE Working Integrated Product Team [SE WIPT]
  - Captures government processes and planning
  - Establishes roles, responsibilities, and authorities of both government personnel and contractors within government processes
- Covers the life cycle from concept, acquisition, etc., through sustainment of the system/program
- Is the Program Manager's technical management tool

Application of a quality technical planning process, by trained and experienced staff, leads to a good SEP

Technical Planning Focus Areas in SEPs

[there are variations per Milestone / Phase]

- **Program Requirements**
  - Capabilities, CONOPS, and key performance parameters/attributes
  - Statutory, Regulatory, Certification requirements
  - Technology development, design considerations
  - Data to monitor & compare to assumptions

- **Technical Staffing and Organizational Planning**
  - Lead/Chief SE & functional Leads
  - IPT Organization/Structure, staffing & skills, coordination
  - Integration with contractors & external organizations

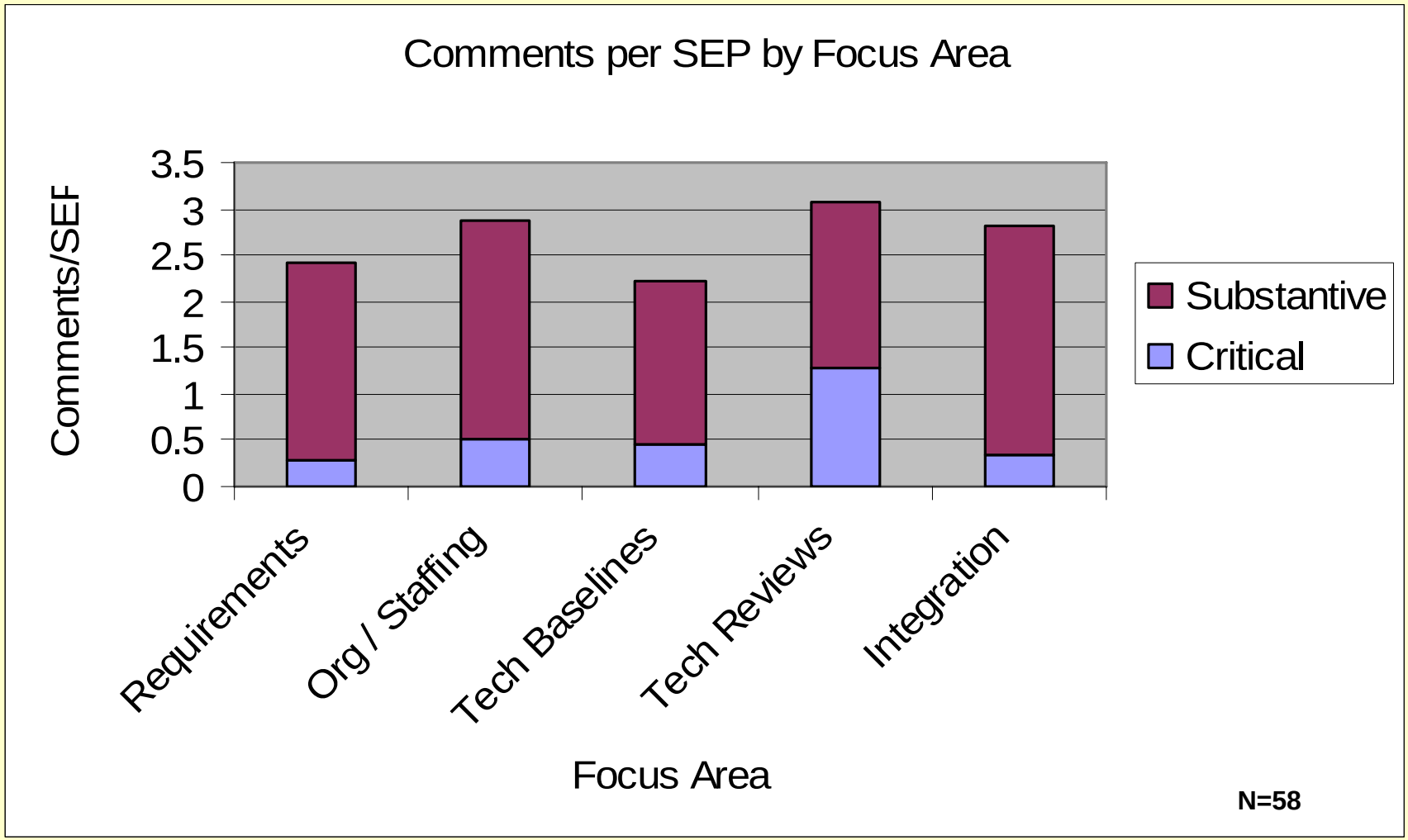
- **Technical Baseline Management**
  - Technology maturity & risk
  - Technical Baseline management responsibility & control
  - Requirements traceability, verification & validation
  - Specifications & Work breakdown Schedule (WBS)

- **Technical Review Planning** [Event driven]
  - Technical review management (who chair, determines readiness & closure)
  - Entry and exit criteria
  - Stakeholder participation
  - Peer participation [e.g., *independent* Subject Matter Experts [SMEs]]

- **Integration with Overall Program Management**
  - Linkage to other program plans (e.g., Acquisition Strategy, Integrated Master Plan & Schedule, Test & Evaluation Management Plan (TEMP), production, sustainment/logistics plans or strategies, etc.)
  - Risk Management Plan
  - Contracting Considerations (e.g., SE incentives)

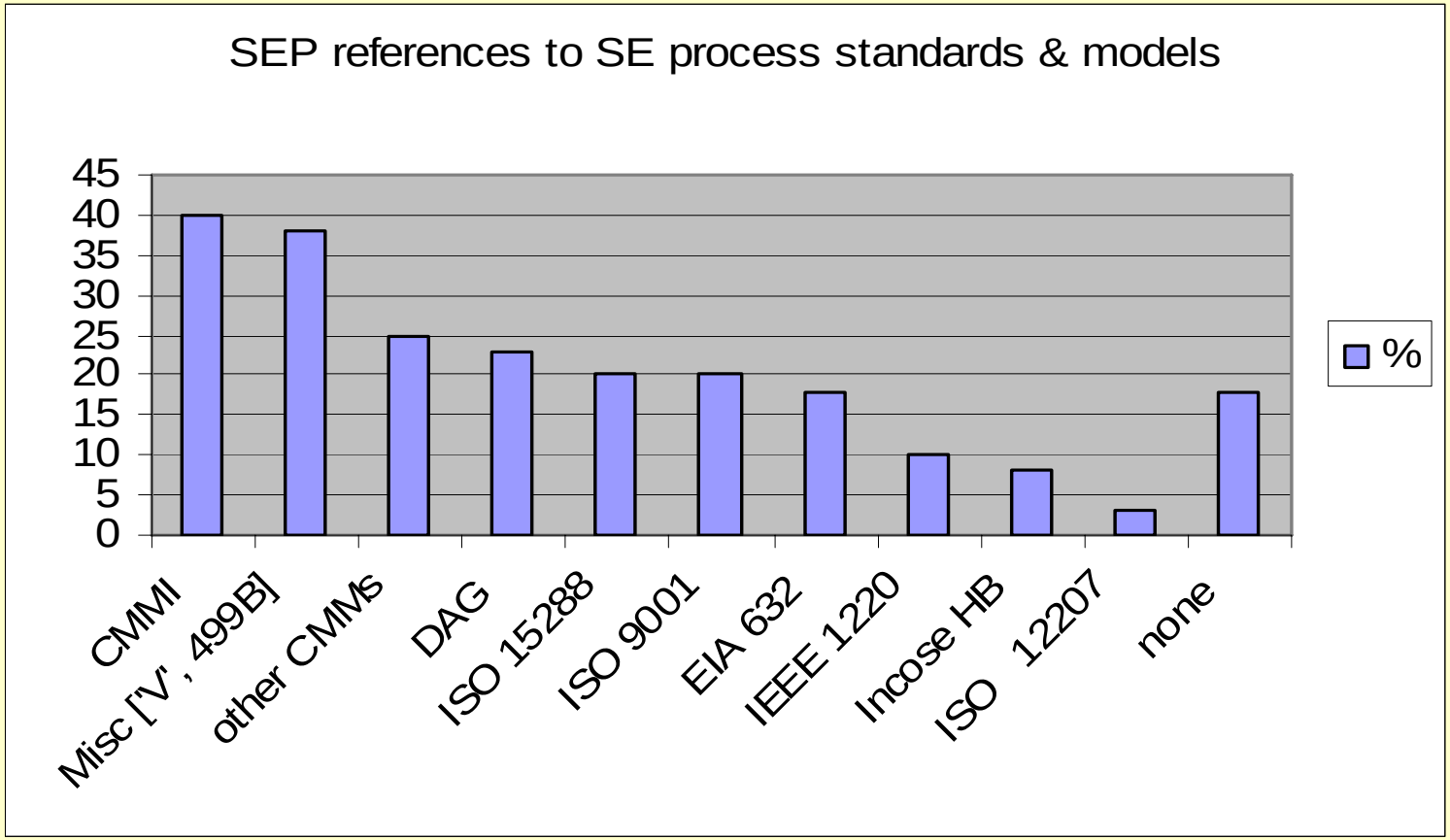
Source: ODUSD(A&T)SSE Systems Engineering Plan (SEP}) Preparation Guide; 2008

Critical & Substantive Comments per SEP



Have seen little significant improvement in trend

SEP References to SE Processes



*other CMM = CMMI-AM, SW-CMM

Note: N =40; sum >100% due to several listed in many SEPs

SEP Observations on SE Practices

- CMMs clearly dominate; but simplified ‘”V” or 499B are still applied
  - some use the CMMI-Acquisition Module (CMMI-AM);
  - CMMI for Acquisition (CMMI-ACQ) is too new to see any application
- Some programs list many – but not clear which, if any, actually are applied
- ~ 20% not referencing any particular SE standard/model
- Practically no information on what/how standards/models were tailored
- Some programs are referencing (adopting?) the Prime/Integration contractor’s SE set of processes
- SEPs usually only show or discuss in detail: *Requirements Management, Configuration Management, Risk Management, & Technical Review* approaches (T&E is addressed in the TEMP)

Need to see more details on tailored integrated SE approach

SEP Review Summary Observations

(~ 100 SEPs reviewed across life cycle phases)

- Lack complete **requirements (**[e.g., regulatory, statutory, certifications) sources
- Unclear understanding of **interfaces/coordination** with other programs/systems [i.e., System of Systems, Family of Systems (SoS/FoS))
- Inadequate linking of Key Performance Parameters (**KPPs**), Attributes, Technical Performance Measurements (TPMs)
- Vague on design considerations and criteria/approach to **trades**
- Unclear, incomplete and inconsistent **organizational** roles /responsibilities/authorities of program functionals and IPTs; charters, chairs, members, products – link to WBS, EVMS, TPMs.
- Lack of clarity on approach, products, responsibilities for **CM [i.e., Technical Baseline Management** – when does Government take control? CCB structure?
- Lack of complete and specific information on **Technical Reviews** – approach, chair, tailored entry/exit criteria, stakeholders/independent SMEs.
- Inadequate **Integrating SE** with other program plans/processes (e.g., Acquisition Strategy, IMS, EVM, Risk Management, production, sustainment/logistics)
- Lack of specifics as to **incentives/award fees** for good SE.
- Generic, not tailored, and vague **SE process** descriptions.

SEP *Bloopers* ☺

- **"Task analyses conducted by *human and engineers* provide qualitative data to support …."**
- **"Fifteen (15) trade studies are planned during the SDD phase. These trade studies are undefined at this time."**
- **"Integrity is not an issue on the {Program}, because the program was put on contract during acquisition reform."**
- **"The … Program Manager and Systems Engineer monitor integration activities to ensure that the KPPs and the KSAs are *not* achieved."**
- **"The …communications are intended to support both the internal communications capabilities and external interfaces between the {Program} and *the rest of the world*."**
- **"The {Program} technical reviews conducted during the PD and O&S phases are chaired by a *competent* person."**

Sources: extracts from various program SEPs

System Acquisition Issues Identified and Captured

Next a summary of recent issues identified as they relate to SE activities:

- SE and SWE issues from NDIA-SE Workshops
- Program Support Reviews systemic analysis findings from ODUSD(A&T)SSE/Assessments and Support

We **will list and compare similarities across these findings and SEP observations as they relate to the SE processes**

NDIA-SE Top 5 Systems Engineering Issues

- Key SE effective **practices inconsistently** applied across all phases of the LC
- **Insufficient SE** applied **early** in program life cycle, compromising foundation for initial requirements and architecture development
- **Requirements not always well-managed**, e.g., ineffective translation of needed capabilities into executable requirements to achieve program success
- Quantity and quality of **SE expertise insufficient** to meet demands of government and defense industry
- **Collaborative environments**, e.g., SE tools, **inadequate** to effectively execute SE at joint capability, system of systems (SoS)*, and system levels.

**Significant note: issues relative to evolving acquisition strategies and environments were also a common theme. Although task group ultimately decided to capture these aspects as comments distributed across above 5 major issues, SoS issues are significant and in aggregate could be considered a "6th issue" added to this list.*

** From NDIA-SE task group; 2006 Full report can be found at http://www.ndia.org*

NDIA-SE Top 7 Software Issues

1. The impact of **requirements** upon software is **not consistently quantified and managed** in development or sustainment.
2. Fundamental system engineering **decisions** are made **without full participation of software engineering.**
3. Software **life-cycle planning** and management by acquirers and suppliers is **ineffective**.
4. The quantity and quality of **software engineering expertise** is **insufficient** to meet the demands of government and the defense industry.
5. Traditional **software verification techniques** are **costly** and **ineffective** for dealing with the scale and complexity of modern systems.
6. There is a **failure to assure correct, predictable, safe, secure execution of complex software** in distributed environments.
7. Inadequate **attention** is given to total life cycle issues for **COTS/NDI** impacts on lifecycle cost and risk.

Source: NDIA Top Software Issues Workshop; August 2006; DOUSD(A&T)SSE/SSA

Top 10 Emerging Systemic Issues

[from ODUSD(A&T) Program Support Reviews; SSE Directorate, 8/07] *(* specific to SE activities)*

1. Management	• IPT roles, responsibilities, authority, **poor communication** • **Inexperienced staff**, lack of technical expertise
2. **Requirements**	• Creep/stability • **Tangible, measurable, testable**
3. **Systems Engineering**	• Lack of a **rigorous approach**, technical expertise • **Process compliance**
4. Staffing	• **Inadequate** Government program office staff
5. **Reliability**	• Ambitious growth curves, **unrealistic requirements** • **Inadequate "test time"** for statistical calculations
6. Acquisition Strategy	• Competing budget priorities, **schedule-driven** • Contracting issues, poor technical assumptions
7. Schedule	• **Realism, compression**
8. **Test Planning**	• Breadth, depth, resources
9. **Software**	• Architecture, design/development discipline • **Staffing/skill** levels, organizational competency (process)
10.**Maintainability/ Logistics**	• Sustainment costs not fully considered (short-sighted) • Supportability considerations traded

Major contributors to poor program performance

SE Issues Example Mapping – Management

(SE processes with top issues – authors own)*

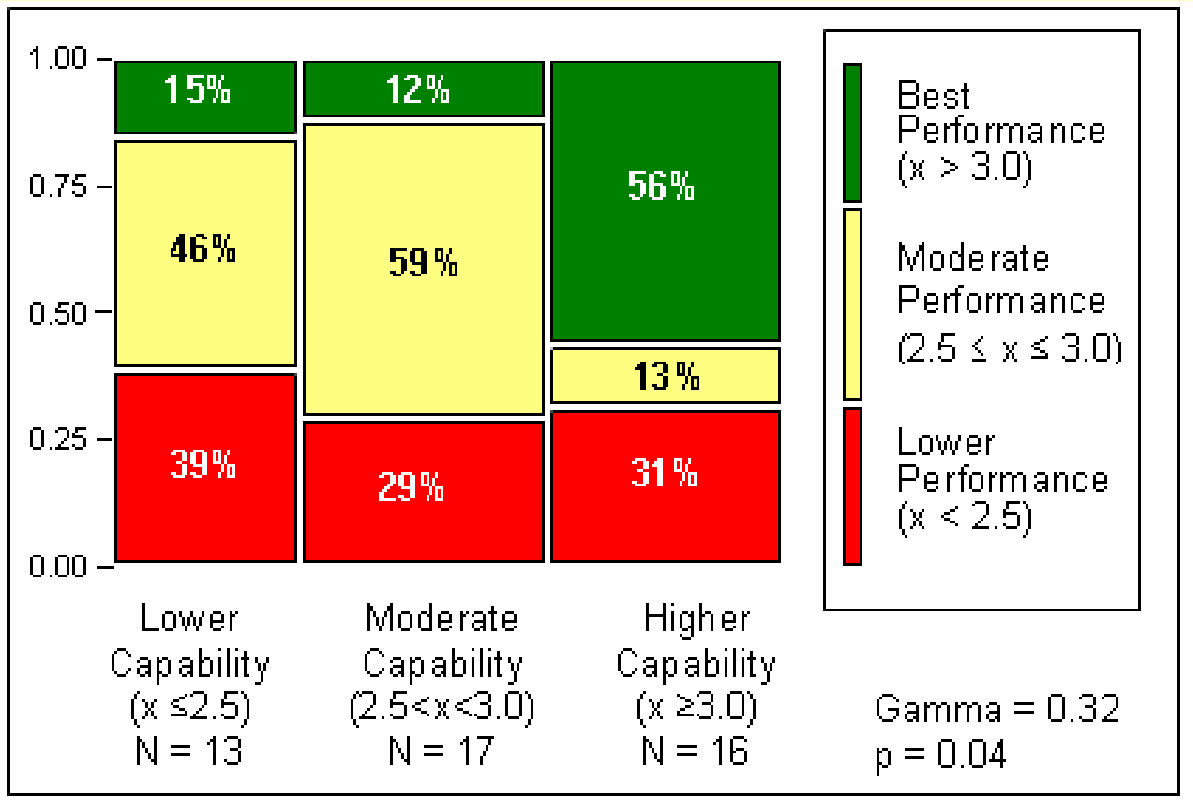
ISO/IEC 15288	SE issues	SW issues	PSR findings	SEP observations
Project Planning*	Inconsistent SE practices; insufficient early SE	Ineffective life cycle planning, estimation	IPT roles/ responsibilities; non rigorous SE approach; compressed schedule driven; coupling IMP/IMS/WBS	Incomplete; inconsistent; unclear responsibilities
Project Asses - ment & Control*	Inadequate tools	Ineffective management	Poor communication	*see others*
Measurement		Requirements		Usually little specifics (e.g., TPM allocations to IPTs)
Decision Management		Key decisions made w/o SW participation		Little details on who & how (other than IPTs communicate)
Risk Management*		Inadequate re COTS/NDI	SE – SW integration	Lack of details, responsibility, risk mitigation
Configuration Management				All key baselines not clearly defined; nor when transition to Government
Info. Mgt.				
Acquisition & Supply		Ineffective management		Lack of SE specific incentives/award fees (sometimes too much responsibility deferred to Prime)
Project-Enabling processes*	Insufficient SE skills; inadequate collaborative environment	Insufficient SW engr. expertise; process compliance	Inexperienced, inadequate staff	

SE Issues Example Mapping – Technical

(SE processes with top issues –author's own)*

ISO 15288	SE issues	SW issues	PSR findings	SEP observations
Stakeholder Requirements Definition	Not well managed or translated		Poor definitions	
Requirements Analysis*	Not well managed or translated	Not consistently quantified & managed	Unrealistic reliability goals; test time	
Architectural Design			Poor technical assumptions; architecture design & development	
Implementation				
Integration				Lacks specifics on who & what re integrating elements, interfaces
Verification		Costly & ineffective techniques for scale/ complexity	Test planning breadth / depth / resources inadequate	*(details would be from in TEMP reviews)*
Validation		failure to assure proper execution		Technical Reviews lack criteria, clear roles, participants
Transition				Lacks details for Production & Deployment
Operations; Maintenance; Disposal			Sustainment / supportability lightly considered	Lacks details on O&S

Total SE Capability vs. Project Performance



Source: "*A Survey of Systems Engineering Effectiveness*" *by: NDIA SEE Committee* @INCOSE – Orlando Chap, .Geoff Draper, February 28, 2008

Projects with better Systems Engineering Capabilities deliver better Project Performance (cost, schedule, functionality)

Wrap Up

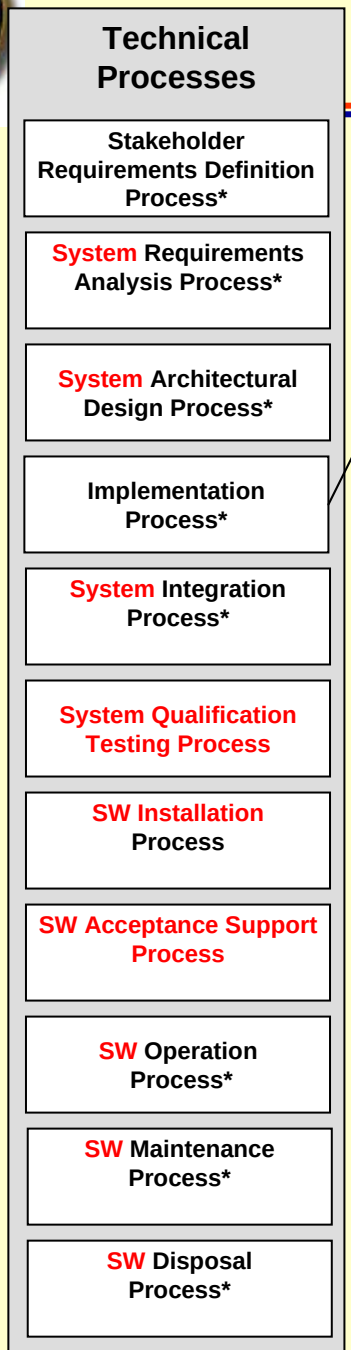
DoD and NDIA are already addressing some key issues, e.g.,

- SE technical planning guidance to program SE WIPTs
- Defense Acquisition Program Support (DAPS) Methodology update (for PSRs)
- SoS guide
- Engineering for System Assurance guide
- DT&E guide
- Updated DAG based on new DOD Acquisition Management Policy (DoDI 5000.2) and ISO 15288,
- Some SW Engineering focus areas (WBS, estimation,…)
- University affiliated SE research program
- DAU SE courses and Certification

Backups

- SE “V” for MS B: SD&D phase
- ISO/IEC -12207 Software life cycle process
- IEEE - 1220: SE Process
- EIA - 632: Processes for Engineering a System
- INCOSE SE Handbook – Planning Process example
- DoD’s Acquisition Life Cycle: Old vs *New*
- Early SE Initiation
- Acronyms
- References
- Links

ISO/IEC 12207:2008 : Software life cycle processes (*changes in red)



Source: IEEE Std 12207-2008

SW Reuse Processes:

- **Domain Engineering**
- **Reuse Asset Mgt..**
- **Reuse Program Mgt..**

Note: Agreement , Organizational Enabling, and Project processes are essentially the same as ISO/IEC 15288

** Implies SW similar to SE*

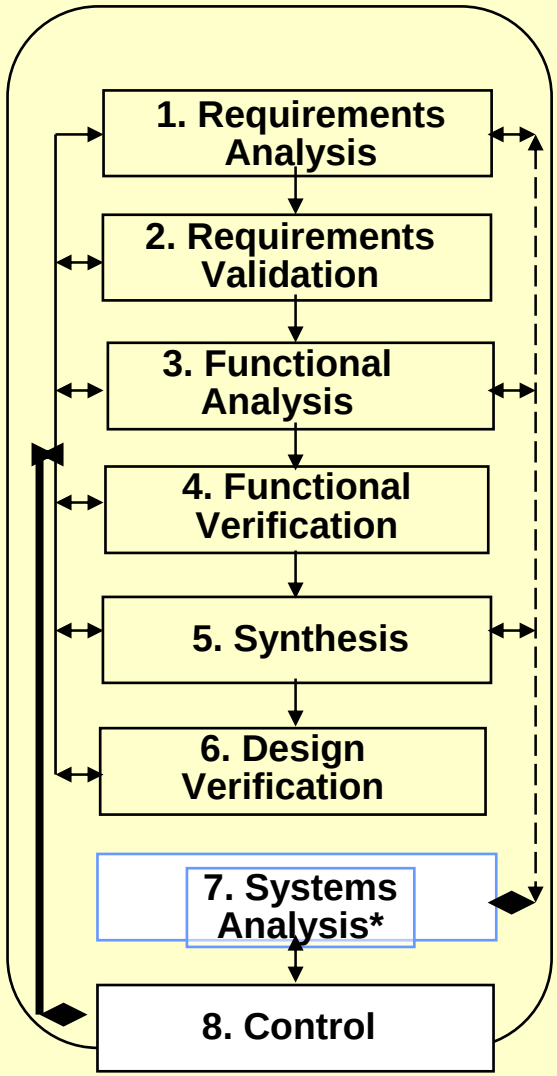
IEEE 1220: SE Process – 2005

Clause 4 - General Requirements

1. SE process
2. Polices & procedures for SE
3. Planning the technical effort:
4. Development strategies
5. Modeling & prototyping
6. Integrated repository: data, tools.
7. Integrated data package: HW, SW
8. Specification tree
9. Drawing tree
10. System breakdown structure
11. Integration of the SE effort: concurrent engr., Int. teams
12. Technical reviews
13. Quality management
14. Product and process improvement: re-engineering, self-assessment, Lessons

Note: Standard includes detailed flows for each activity; and an example SEMP table of contents

Clause 6 – The SE Process

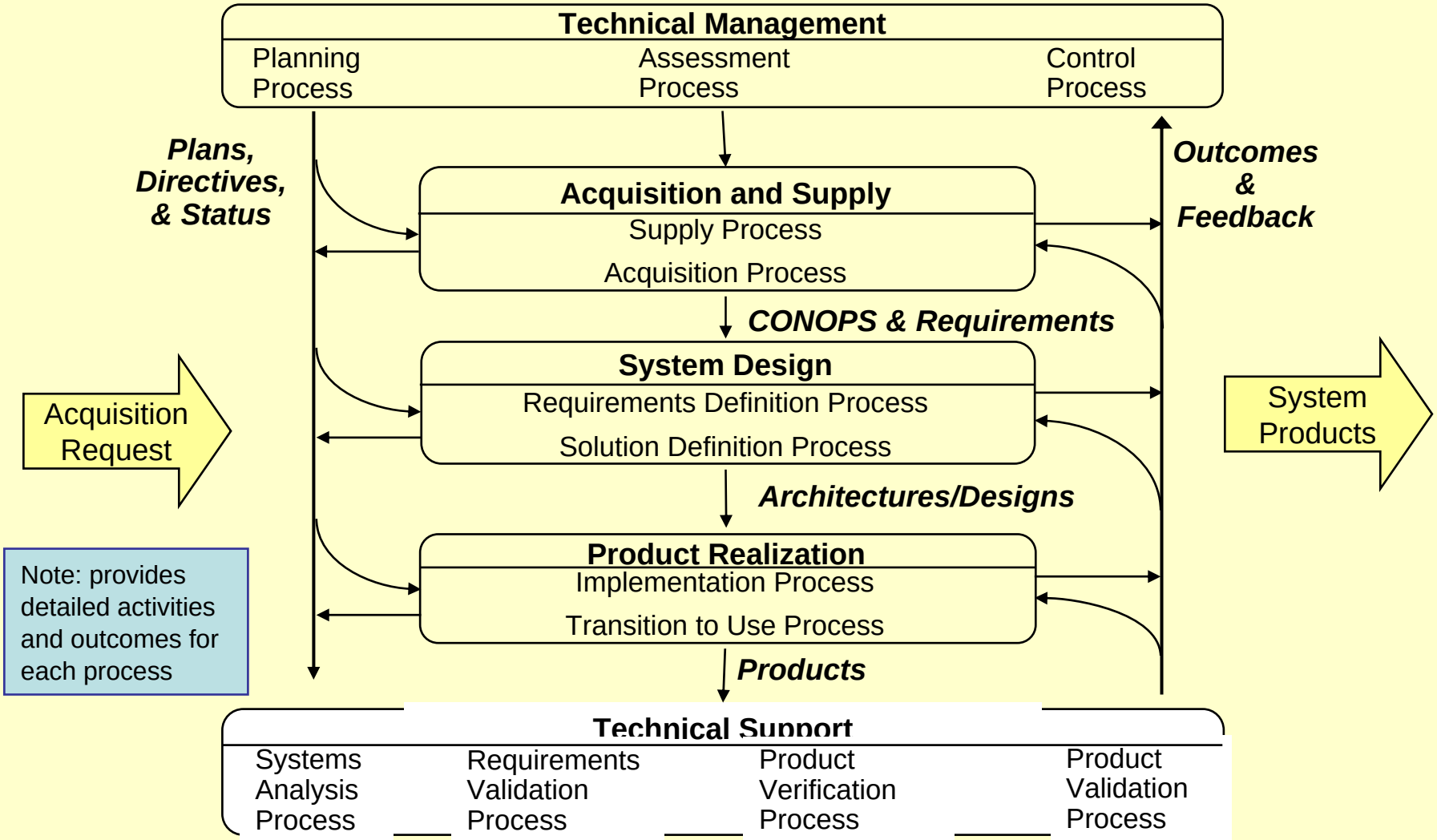


* Require-ments/ Functional /Design trade studies & assess-ments

Source: IEEE 1220 – 2005

EIA - 632: Processes for Engineering a System *(1999; reaffirmed 2003)*

(Source: INCOSE SE Handbook v2)



INCOSE SE Handbook - Planning Process Example

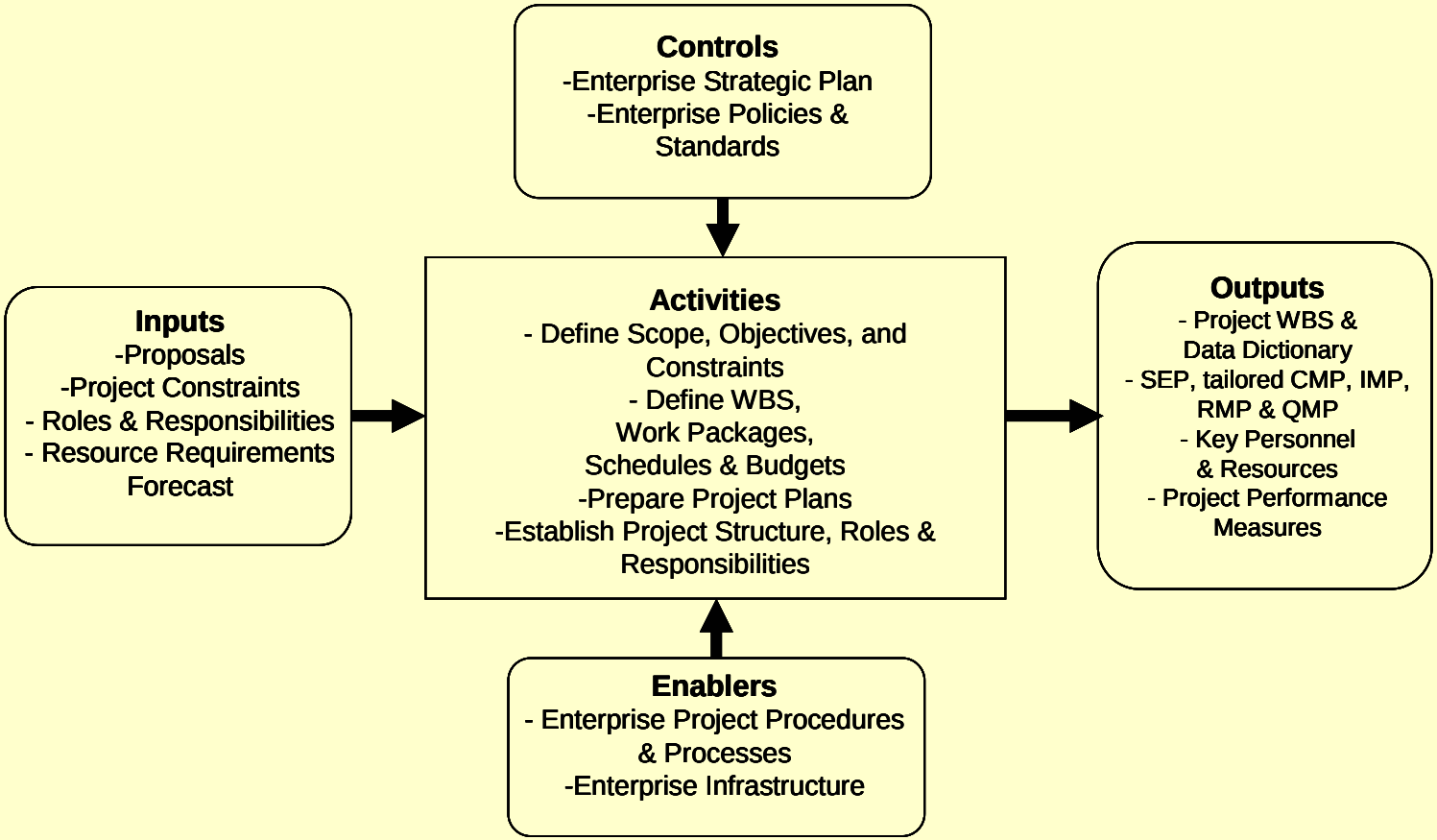


Figure 5-2 Context Diagram for the Project Planning Process

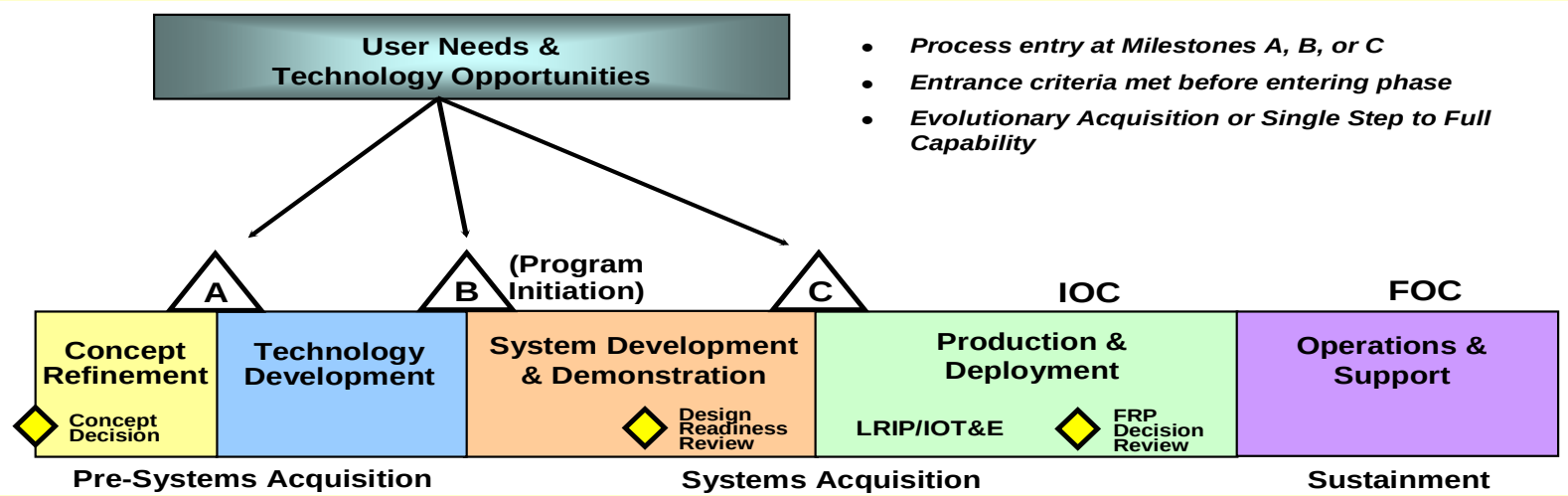
Note: Handbook is based generally on ISO 15288: 2002; will be updated to be in sync with 2008 version

Source: INCOSE SE Handbook v3.1

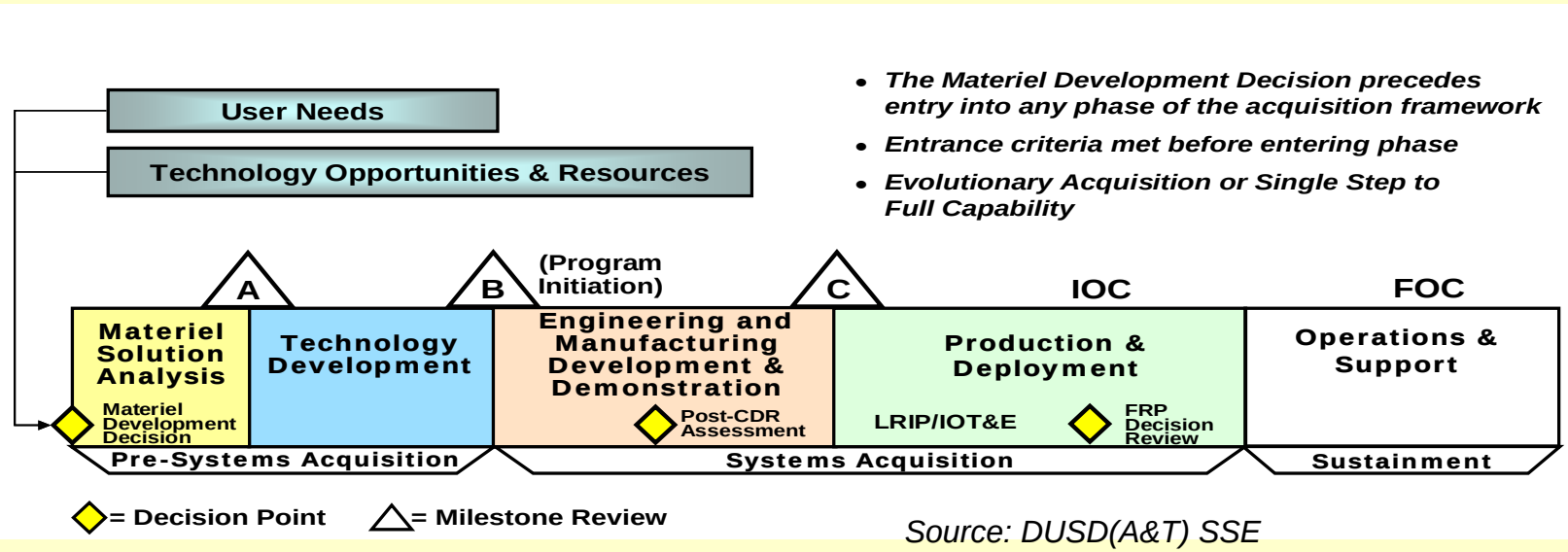
DOD's Acquisition Life Cycle: Old vs *New*

Systems and Software Engineering

Old Life Cycle

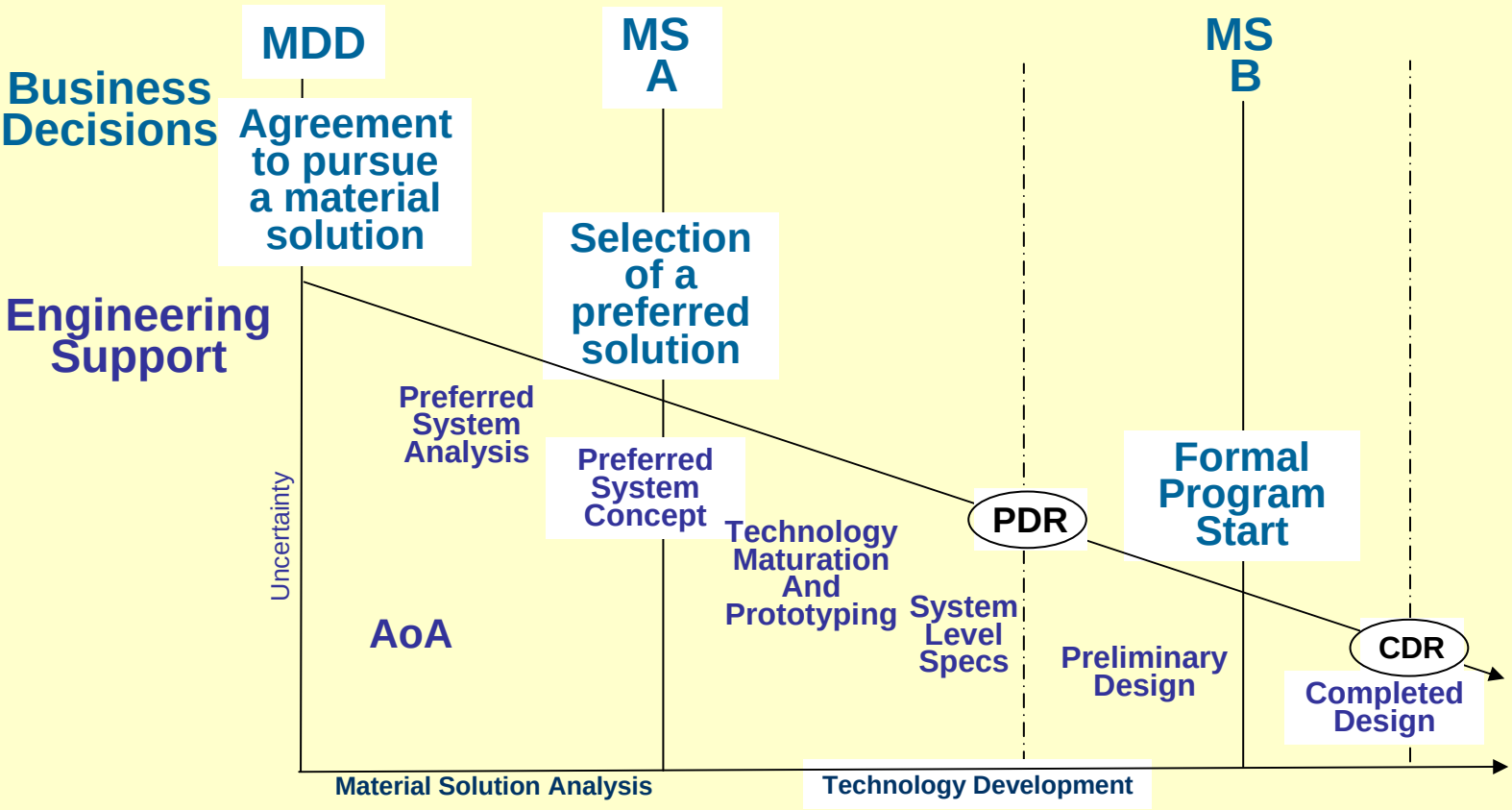


New Life Cycle



Source: DUSD(A&T) SSE

SE Provides a Technical Foundation for Acquisition *(based on new DoD Acquisition Policy)*



Source:
National Research Council

"Pre-Milestone A and Early-Phase Systems Engineering" Jan 2008

Systems Engineering is most effective when it is initiated early to start a program right!

Acronyms/Definitions

- A&T – Acquisition and Technology [@ODUSD]
- ANSI – American National Standards Institute
- CMP – Configuration Management Plan
- DAG – Defense Acquisition Guidebook
- DAU – Defense Acquisition University
- DoD – U.S. Department of Defense
- DoDI – DoD Instruction
- EIA – Electronic Industries Alliance
- FRP – Full Rate Production
- GEIA – Government Electronics and Information Technology Association
- IEC – International Electrotechnical Commission
- IEEE – Institute for Electrical and Electronics Engineers
- INCOSE – International Council on Systems Engineering
- IOT&E – Integrated Operational Test & Evaluation
- IMP/IMS – Integrated Master Plan/Integrated Master Schedule
- ISO – International Standards Organization
- IOC – Initial Operating Capability
- IT – Information Technology
- LRIP – Low Rate Initial Production
- NDIA – National Defense Industries Association [SE division]
- PMI – Project Management Institute
- PSR – Program Support Review
- QA – Quality Assurance
- QMP – Quality Management Plan
- RMP – Risk Management Plan
- SE – Systems Engineering
- SEE – SE Effectiveness
- SEI – Software Engineering Institute [@Carnegie Mellon U.]
- SEMP – SE Management Plan
- SEP – Systems Engineering Plan
- SoS – System of Systems
- SSCI – Systems and Software Consortium
- SSA – Software Engineering and Systems Assurance
- SSE – Systems & Software Engineering Directorate [@ODUSD (A&T]
- SW - Software
- SWE – Software [SW] Engineering

Some SE Related Process References

- **CMMI® – ACQ**: SEI/CMU, *11/07*
- **Defense Acquisition Guidebook**, Chapter 4 - Systems Engineering; Defense Acquisition University, 2004 *(soon to be updated)*
- **EIA/IS - 632**: **1998** - Processes for Engineering a System
- **IEEE 1220**: **2005** Application and Management of the Systems Engineering Process
- **IEEE/EIA 12207: 2007** (adopted ISO/IEC 12207:2007)
- **INCOSE** Systems Engineering Handbook, v3.1; 8/2007
- **ISO/IEC 15288**: **2007** System Engineering – System Life Cycle Processes
- NDIA **SE Effectiveness** (SEE) Study; 2008
- **Understanding and Leveraging a Supplier's CMMI Efforts**; ODUSD(A&T)SSE, 2007

Other References and Links

Some References:

- "Special Feature: Standards in Systems Engineering", **INCOSE Insight** , April 2007 (see particularly K. Crowder, D. Kitterman, T. Doran, R. Harwell, and S. Arnold articles)
- CMMI – Next Steps; Kristen Baldwin, ODUSD(A&T)SSE/SSA, CMMI technology Conference; November, 2007
- "Harmonization of Systems and Software Engineering Processes", James W. Moore; Mitre; June, 2007, brief for ASQ-DC meeting
- Issue on Systems Engineering, **CROSSTALK**, STSC, October 2007

Links:

- ANSI/EIA-632: http://www.geia.org/index.asp?bid=552
- CMMI: http://www.sei.cmu.edu/cmmi/
- DAU-DAG: http://akss.dau.mil/dag/
- IEEE - http://www.ieee.org/web/standards/home/find.html
- INCOSE – Standards site: http://www.incose.org/practice/techactivities/standards.aspx
- INCOSE Guide to SE BoK: http://g2sebok.incose.org/
- ISO: http://www.iso.org/iso/iso_catalogue.htm [look for ISO/IEC 15288, 12207]
- NDIA-SE: http://www.ndia.org/Template.cfm?Section=Divisions [then select SE]
- ODUSD (A&T) SSE: http://www.acq.osd.mil/sse/