Early Systems Engineering Planning: Milestone A Systems Engineering Plans (SEPs)

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Outline

- **What is a SEP?**

- **What is a Milestone (MS) A SEP?**

- **Why do one for MS A?**

- **How should it be written?**

- **Who should write it?**

- **When should it be written?**

    and then . . .

- **What do you do with it?**

What is a SEP?

A SEP

- **Articulates and communicates technical planning and management approach to program team, stakeholders, and contractor teams (including bidders if provided with Request for Proposal (RFP))**

- **Captures integration of both government and contractor systems engineering (SE) activities, roles, and responsibilities over the acquisition and sustainment life cycle**

- **Provides expected management interactions and impacts of their respective processes not only by addressing program-tailored processes, but also the "who, when, and to what result(s)"**

What is a MS A SEP?

	MS A SEP for TD Phase Planning	MS B SEP for EMD Phase Planning	MS C SEP for P&D and O&S Phases
Focus	•Technology maturation •Trade studies •Competitive prototyping •Requirements definition •SRR, SFR (SDR) & PDR	•Engineering •Manufacturing maturity •DT&E results integrated w/ SE •Requirements refinement •CDR, TRR, PRR & FCA	•Production planning & sustainment engineering •Technology refresh mechanisms and plans •OTRR & ISRs
All SEPs	Risk management and reduction Requirements management PMO & IPT staffing Tech baseline management Tech review management Integration of SE with program management IUID implementation planning		

PMO-Program Management Office
SFR-System Functional Review
TRR-Test Readiness Review

IPT-Integrated Product Team
SDR-System Design Review
PRR-Production Readiness Review

IUID-Item Unique Identification
PDR-Preliminary Design
FCA-Functional Configuration Audit
DT&E-Developmental Test & Evaluation

SRR-System Requirements Review
CDR-Critical Design Review
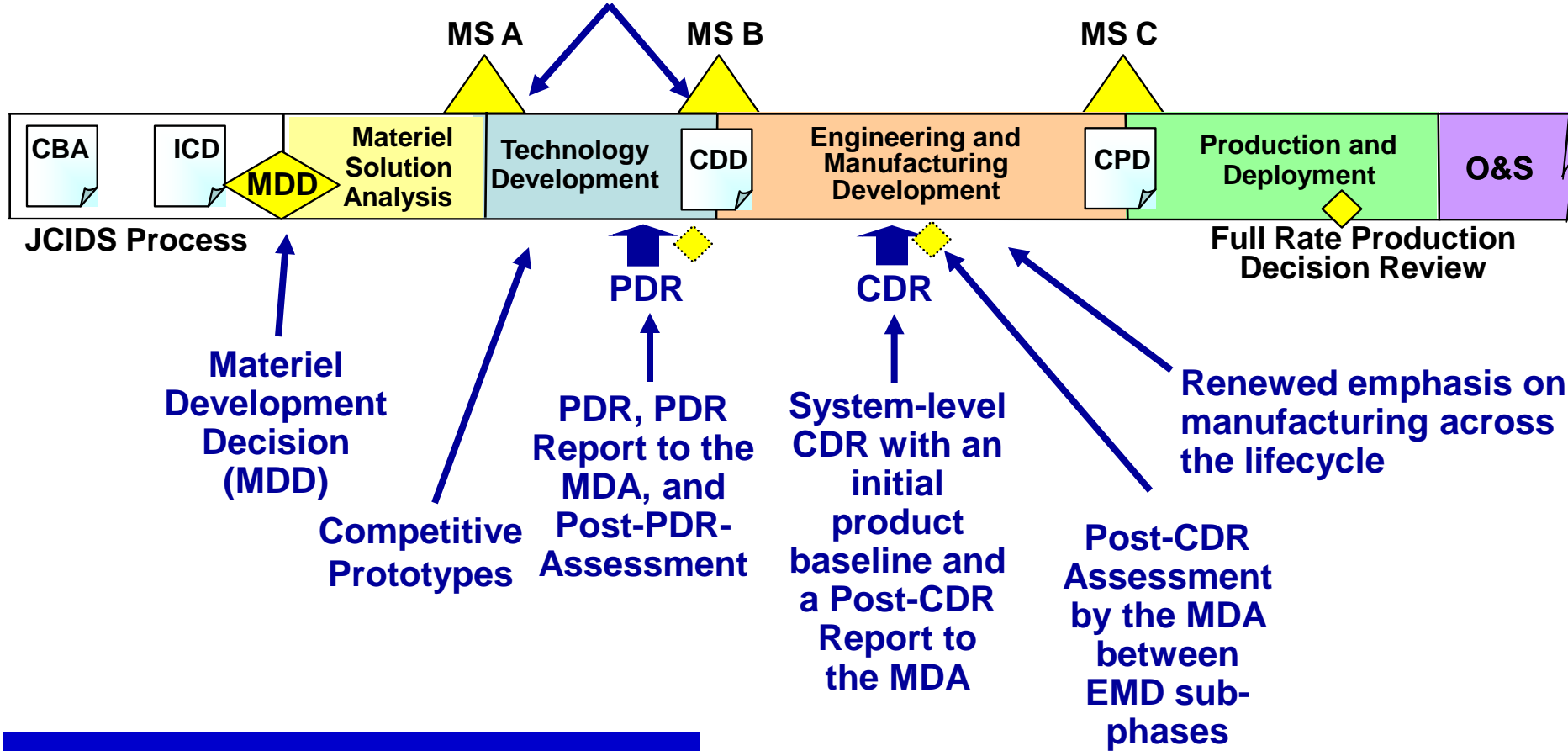ISR-In-Service Review

SEP Blooper
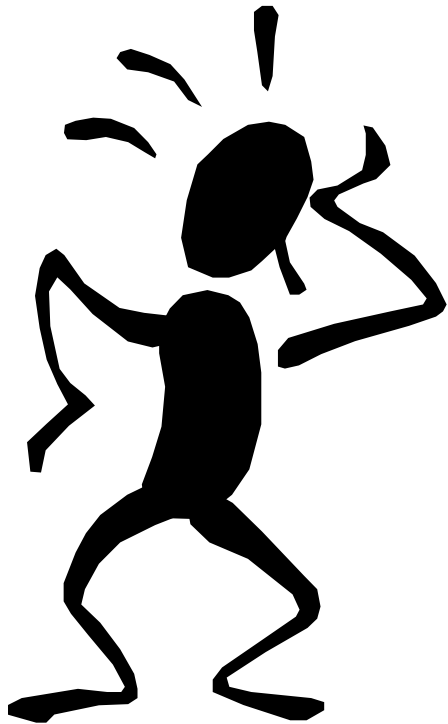
"Fifteen (15) trade studies are planned during the EMD phase. These trade studies are undefined at this time."

DoDI 5000.02 and PL 111-23 – the Changed Acquisition Landscape

New 2366a & 2366b Certifications*

| MS A | | MS B | | | MS C | |

| CBA | ICD | MDD | Materiel Solution Analysis | Technology Development | CDD | Engineering and Manufacturing Development | CPD | Production and Deployment | O&S |

JCIDS Process

PDR

CDR

Full Rate Production Decision Review

Materiel Development Decision (MDD)

Competitive Prototypes

PDR, PDR Report to the MDA, and Post-PDR-Assessment

System-level CDR with an initial product baseline and a Post-CDR Report to the MDA

Post-CDR Assessment by the MDA between EMD sub-phases

Renewed emphasis on manufacturing across the lifecycle

* Director, SE supports MDA certifications including PDR Report assessment at MS B

Systemic Program Planning Issues

	Planning
Requirements	•Lack of reasonable/measurable/testable requirements
Resources	•Schedule driven programs •Marginal Program Office staffing •Optimistic plans to leverage M&S
Management	•Lack of incremental acquisition strategy •Poor communications prior to contract award •Lack of IMP/IMS •Unclear roles, responsibilities, lines of authority •Lack of mature risk management program
Tech Process	•Lack of rigorous SE planning; no SE tech reviews •Lack of growth margins/trade-space •Underestimation of integration efforts & COTS mods •Insufficient efforts to design-in reliability •Inadequate testing and verification approach

Early SE Planning should prevent these findings!

Top Five SE Issues*

As identified in the NDIA Systems Engineering Division's Task Group Report on the *Top Five Systems Engineering Issues within Department of Defense and Defense Industry*, July 2006, not necessarily in priority order:

- **Key SE practices known to be effective are not consistently applied across all phases of the program life cycle.**

- **Insufficient SE is applied early in program life cycle, compromising foundation for initial requirements and architecture development.**

- **Requirements are not always well-managed, including effective translation from capabilities statements into executable requirements to achieve successful acquisition programs.**

- **Quantity and quality of SE expertise is insufficient to meet demands of government and defense industry.**

- **Collaborative environments, including SE tools, are inadequate to effectively execute SE at joint capability, system of systems (SoS), and system levels.**

*Past Projects at http://www.ndia.org/Divisions/Divisions/SystemsEngineering/

SEP Blooper

"The … Program Manager and Systems Engineer monitor integration activities to ensure that the KPPs and the KSAs are *not* achieved."

SEP Preparation Guide v2.01
(April 2008)

Describes expected SEP content

- **Requirements: KPPs, Statutory/Regulatory, and Certification**

- **Technical Staffing: Program Office and IPT**

- **Technical Baselines: Traceability and related processes**

- **Technical Reviews: Tailored details**

- **Integration: SE activities with program management**

Prep Guide v3.0 **to accommodate the PL 111-23 (Spring 2010)**

Addendum to SEP Prep Guide v2.01
(July 2009)

Identifies impacts of DoDI 5000.02 to all SEPs by phase; Specifically for MS A:

- **Describe the design impact of and assessment at technical reviews of**
  - Reliability, Availability, and Maintainability
  - Manufacturing
  - Human Systems Integration
  - Critical Program Information
- **Mandatory PDR details**
- **Use of Configuration Steering Boards**
- **Inclusion of IUID Implementation Plan Summary**

More planning earlier!

"Task analyses conducted by *human and engineers* provide qualitative data to support …."

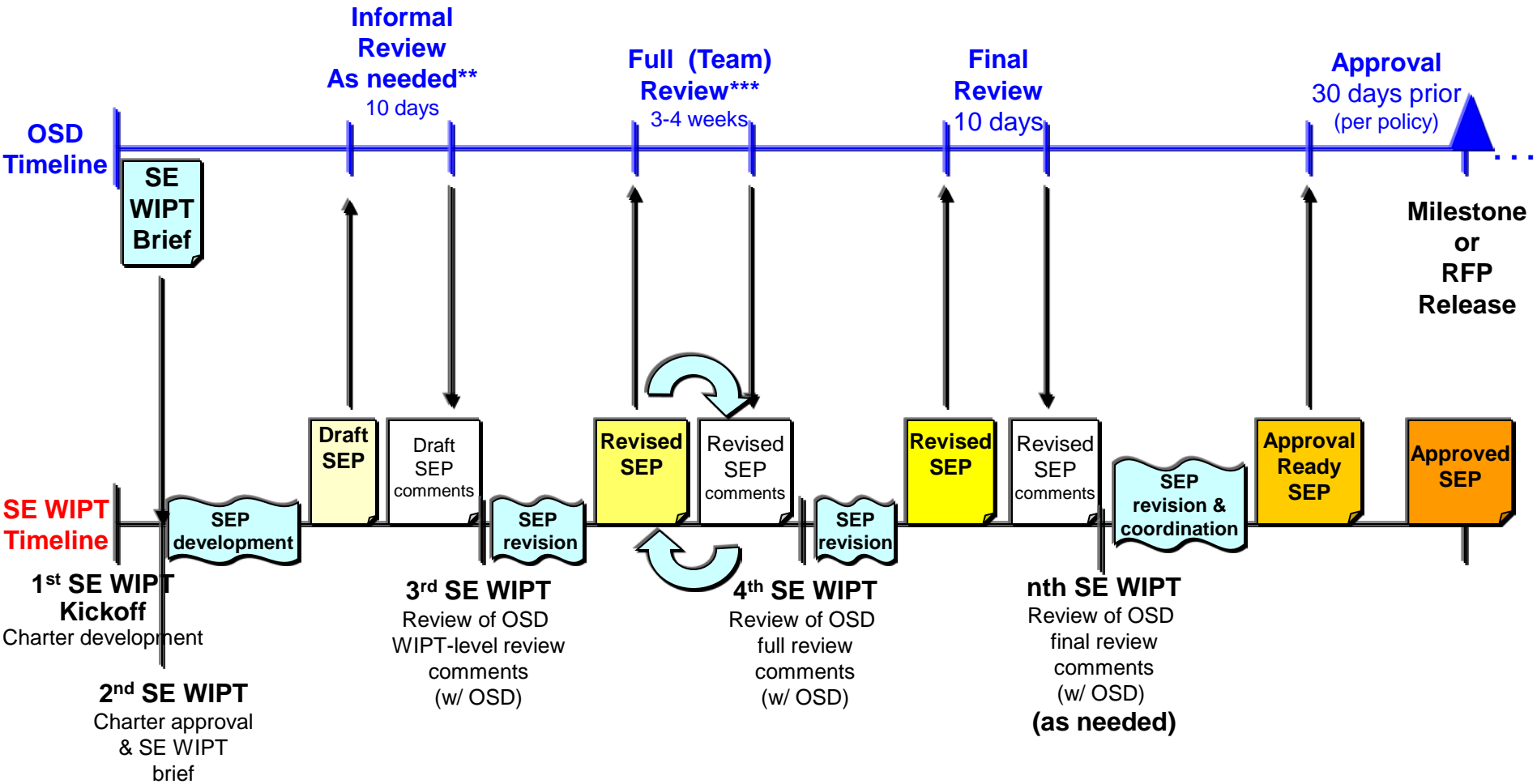# Systems Engineering Working Integrated Product Team (SE WIPT)

- **To be effective, an SE WIPT (like all WIPTs) requires:**
  - **Full support of Program Manager, Chief Engineer, and Lead Systems Engineer (LSE)**
  - **Charter defining goals, products, membership, and reporting requirements**

- **Recommended participants, as applicable:**
  - **Program Manager**
  - **LSE (Program and Contractor)**
  - **IPT Leads (Program and Contractor)**
  - **LSEs from PEO and applicable System of Systems**
  - **Service Systems Engineering organization representatives (e.g., AF: SAF/AQRE, NAVSEA: SEA05, NAVAIR: AIR 4.0, etc.)**
  - **OSD SE representative (s)**

Even with a limited program office staff, involve the right people!

SEP Development Timeline*

Note: Planning should be thought-through and take place long before it is documented in a SEP

OSD Timeline

Informal Review As needed** 10 days

Full (Team) Review*** 3-4 weeks

Final Review 10 days

Approval 30 days prior (per policy)

SE WIPT Brief

Milestone or RFP Release

SE WIPT Timeline

SEP development

Draft SEP

Draft SEP comments

SEP revision

Revised SEP

Revised SEP comments

SEP revision

Revised SEP

Revised SEP comments

SEP revision & coordination

Approval Ready SEP

Approved SEP

1st SE WIPT Kickoff
Charter development

2nd SE WIPT
Charter approval & SE WIPT brief

3rd SE WIPT
Review of OSD WIPT-level review comments (w/ OSD)

4th SE WIPT
Review of OSD full review comments (w/ OSD)

nth SE WIPT
Review of OSD final review comments (w/ OSD) **(as needed)**

*Not to scale　　　****Informal Review: Showstopper only review**　　　*****Full (Team) Review: Detailed review**

How to use your SEP

- **Starting a new program? Use SEP Prep Guide to help ensure much is considered before SE plans are finalized**

- **New to the program? Read the SEP to understand the program's system-level technical planning**

- **Going to a technical review? Check the SEP's documented entry and exit criteria prior to conduct and participation**

- **Working in a program office? Refer to the SEP for SE process descriptions, roles, responsibilities, and expected products**

- **Going to an IPT meeting? Check the SEP for which positions and functions who should be invited/present**

- **Have an approved SEP? Execute to it!**

Execute to the Plan!

MS A SEP Summary

Your MS A SEP should

- Reflect well-thought-through, actual technology development and risk reduction planning for the Government program office

- Abide by law and comply with policy

- Be written by the right people on the right timeline

- Follow guidance and use charts, figures, tables, graphics, and hotlinks as much as possible

- Guide conduct of IPTs/WIPT meetings, technical reviews, and process usage

Session Summary

Revised policy, the new statute, and SEP guidance enable you to

- Improve early planning
- Improve product design and integration
- Improve program execution
- *Succeed!*

Improved Capability for the Warfighter!

For More Information

- ## Contact me:
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- ## Refer to:
  ## http://www.acq.osd.mil/sse/pg/guidance.html