Integrating Project Management and Systems Engineering

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Day-1 Intro and Results Poster

What is SE?

- *System*: A combination of interacting elements organized to achieve one or more stated purposes

- *Systems Engineering*: An interdisciplinary approach and means to enable the realization of successful systems. It focuses on defining customer needs and required functionality early in the development cycle, documenting requirements, then proceeding with design synthesis and system validation while considering the complete problem. SE integrates all the disciplines and specialty groups into a team effort forming a structured development process that proceeds from concept to production to operation. SE considers both the business and technical needs of all customers with the goal of providing a quality product that meets user needs.

What is PM?

- **Project: A temporary endeavor undertaken to create a unique product, service or result**

- **Project Management: The application of knowledge, skills, tools, and techniques to project activities to meet the project requirements**

- **Program: A group of related projects and activities managed in a coordinated way**

- **Program Management: The application of knowledge, skills, tools, and techniques to a program to meet program requirements and to obtain benefits not available by managing projects individually**

From *A Guide to the Project Management Body of Knowledge (PMBOK® Guide) – 5th Edition*, © 2013 Project Management Institute

Additional Day 1 Notes

- **SE definitions**
  - **Too long – should include 1st and last sentence.**
  - **"early" – it's never too late to introduce SE; also gives the impression of a waterfall life cycle**
  - **PM definition includes the notion of "project of projects" (program) – include SoS in SE definitions – similar**
  - **System vs. project/program requirements**

Integrating Project Management and Systems Engineering
Day-1 Brief Out Poster

Need:

- **Integrating PM and SE results in higher likelihood of greater efficiency and effectiveness, better transparency between the efforts and common understanding, and adaptability to change.**

Customers:

- **The team (SE, PM, engineers)**
- **Executive leadership**
- **External customers**
- **Logistics, supply chain**
- **Industry, collaborative organization**

Impediments to Focus On:

1. **Lack of common vocabulary**
2. **Understanding change management vs configuration management (SE vs PM)**
3. **Lack of common life-cycle**
4. **Asymmetry of understanding (PM not understanding SE)**
5. **Compartmentalization within PM vs SE**
6. **Lack of cross- education**
7. **Conflicting priorities and not being flexible**
8. **Lack of better overlap definition con-ops**

Day-2 Workshop

Team Members

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Topic: Integrating Project Management and Systems Engineering

Need:

- **Vision: Integrating PM and SE results in higher likelihood of greater efficiency and effectiveness, better transparency between the efforts and common understanding, and adaptability to change.**

- **The PM and SE disciplines are not well aligned in objectives and incentives leading to lack of efficient, duplication of effort, cross purposes**

Stakeholders:

- **The team (SE, PM, engineers)**
- **Executive leadership**
- **External customers**
- **Logistics, supply chain**
- **Industry, collaborative organization (professional organizations)**

Impediments to Focus On:

1. **Compartmentalization within PM vs SE**
2. **Lack of cross- education**
3. **Conflicting priorities and not being flexible**
4. **Lack of better overlap definition con-ops**
5. **What does PM and SE integration look like?**

Impediments and Potential solutions

Impediments to Focus On:

1. **Compartmentalization within PM vs SE**
   1. Stop making little islands of process areas
2. **Lack of cross- education**
   1. Investigate CMMI for integration, teach people how it's supposed to be used
   2. Lack of common vocabulary
   3. Understanding change management vs configuration management (SE vs PM)
   4. Harmonize life-cycle
   5. Develop cross-training system (make them work together)
3. **Conflicting priorities and not being flexible**
   1. What is the procedure for subcontractor failure
   2. Recognize PM and SE value/priority differences and manage them
   3. Address goal alignment at enterprise level for SE and PM
   4. Fix fallback on past practice
   5. Define decision making process at lowest possible level
      1. Fix reporting chain split
   6. Constraints on PM must include Axeholders(legal, accounting and contracts)

Impediments and Potential solutions

4. Lack of better overlap definition con-ops
5. What does PM and SE integration look like?
    1. Wrap systems engineering around PM as a system itself
    2. End to end process depiction
    3. Measures and metrics for degrees of integration
    4. Templates and tools for integration support(infrastructure)
    5. Rewards system!!
    6. Research on how to do projects better
    7. Lessons learned done right(non-punitive but not overblown success)
    8. Watch for independent areas that shouldn't be integrated

Subsequent Solution and Collaborative Action

Identify requirements/needs for:

- **INCOSE and PMI training and cross certification**
- **Vocabulary consolidation**

- **Consider SEMP during integration**
  - **Represent work needing to be done on program**
  - **Evaluate for feasibility and executability**
  - **Input to planning effort**
  - **Also identify infrastructure needs**
  - **Must cover entire life cycle, but include agility**
- **Legal Documents don't reflect digital flow**
- **Beware systems integration is a gap in SE**

Subsequent Solution and Collaborative Action

- **Integration requires information exchange interface and decision authority**
- **Pay attention to "tribal knowledge"**
- **Project controls vs work control congruency**
  - **Measurable process vs new approaches**
- **Integration and disconnect:**
  - **Proposal teams + systems engineers =/= those who work the contract**
- **Provide organizational infrastructure and capabilities transcending projects**
- **Create a project out of fixing the infrastructure**
- **Lack of turnover from previous projects, failure to carry over assets(Who owns IP?)**
- **Continually migrate processes**
- **projectmanagement.com resource**