Program Management vs Systems Engineering

How different are they?

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Overview

- PMBoK review
- DAU Guidebook review
- INCOSE handbook review (15288)
- What are the PM’s goals, the SE’s goals?
- What should a PM do, what should an SE do?
- PM skills, SE skills
- Can one person do both?
Perspective for this presentation

- DoD
- Technical Programs (heavy SE role)
- Possible R&D bias (mine)
PMBoK (3rd Ed 2004)

- 44 “Project Management Processes”
- Each is associated with one of 5 “Project Process Groups”
  Initiating, Planning, Executing, Monitoring, Controlling
- Each is also associated with one of 9 “Knowledge Areas”
  Integration, Scope, Time, Cost, Quality, Human Resource, Communications, Risk and Procurement Management

Let’s look at those 44 processes...

...very quickly
KA 4. Project Integration Management

- 4.1 Develop Project Charter
- 4.2 Develop Preliminary Project Scope Statement
- 4.3 Develop Project Management Plan
- 4.4 Direct and Manage Project execution
- 4.5 Monitor and Control Project Work
- 4.6 Integrated Change Control
- 4.7 Close Project
KA 5. Project Scope Management

- 5.1 Scope Planning
- 5.2 Scope Definition
- 5.3 Create WBS
- 5.4 Scope Verification
- 5.5 Scope Control
KA 6. Project Time Management

- 6.1 Activity Definition
- 6.2 Activity Sequencing
- 6.3 Activity Resource Estimating
- 6.4 Activity Duration Estimating
- 6.5 Schedule Development
- 6.6 Schedule Control
KA 7. Project Cost Management

- 7.1 Cost Estimating
- 7.2 Cost Budgeting
- 7.3 Cost Control
KA 8. Project Quality Management

- 8.1 Quality Planning
- 8.2 Perform Quality Assurance
- 8.3 Perform Quality Control

- 9.1 Human Resource Planning
- 9.2 Acquire Project Team
- 9.3 Develop Project Team
- 9.4 Manage Project Team
KA 10. Project Communications Management

- 10.1 Communications Planning
- 10.2 Information Distribution
- 10.3 Performance Reporting
- 10.4 Manage Stakeholders
KA 11. Project Risk Management

- 11.1 Risk Management Planning
- 11.2 Risk Identification
- 11.3 Qualitative Risk Analysis
- 11.4 Quantitative Risk Analysis
- 11.5 Risk Response Planning
- 11.6 Risk Monitoring and Control
KA 12. Project Procurement Management

- 12.1 Plan Purchases and Acquisitions
- 12.2 Plan Contracting
- 12.3 Request Seller Responses
- 12.4 Select Sellers
- 12.5 Contract Administration
- 12.6 Contract Closure
DAU Defense Acquisition Guidebook

- Designed to compliment DoDD 5000.1 and DoDI 5000.2 “by providing the acquisition workforce with discretionary best practice…”

  a how-to guide

- Program Management (DoD style) is throughout the document

- Chapter 4 is Systems Engineering in specific  ...so we’ll look at that a bit
Technical Management Processes:
- Decision Analysis
- Technical Planning
- Technical Assessment
- Requirements Management
- Risk Management
- Configuration Management
- Technical Data Management
- Interface Management

some of these look familiar...
Technical Processes:
- Requirements Development
- Logical Analysis
- Design Solution
- Implementation
- Integration
- Verification
- Validation
- Transition
Also mentioned:
- Quality
- Master Plan / Schedule

these ring a bell also...
INCOSE SE Handbook V3

- Technical Processes (Ch 4)
- Project Processes (Ch 5)
- Enterprise and Agreement Processes (Ch 6)

Consistent with ISO/IEC 15288
Technical Processes
- Stakeholder Requirements Definition
- Requirements Analysis
- Architectural Design
- Implementation
- Integration
- Verification
- Transition
- Validation
- Operation
- Maintenance
- Disposal

very similar to DAU Guide technical processes
INCOSE SE Handbook V3

- Project Processes
  - Project Planning
  - Project Assessment
  - Project Control
  - Decision Making
  - Risk and Opportunity Management
  - Configuration Management
  - Information Management

quite similar to DAU Guide technical management processes, which were similar to PMBoK
INCOSE SE Handbook V3

- Enterprise and Agreement Processes
  - Enterprise Environment Management
  - Investment Management
  - System Life Cycle Process Management
  - Resource Management
  - Quality Management
  - Acquisition
  - Supply

*a few more familiar terms...*
PMBOK vs DAU vs INCOSE Hdbk

So who does what?
<table>
<thead>
<tr>
<th>PMBoK</th>
<th>DAU</th>
<th>INCOSE</th>
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<tbody>
<tr>
<td>4.1 Develop Project Charter</td>
<td>Technical Planning</td>
<td>Project Planning, SLC Process Mgmt, Investment Mgmt</td>
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<td>Technical Planning</td>
<td>Project Planning, SLC Process Mgmt</td>
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<td>4.3 Develop Project Management Plan</td>
<td>Technical Planning</td>
<td>Project Planning, Resource Mgmt, Investment Mgmt</td>
</tr>
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<td>4.4 Direct and Manage Project execution</td>
<td>Decision Analysis</td>
<td>Project Assessment, Project Control</td>
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<td>4.5 Monitor and Control Project Work</td>
<td>Technical Assessment</td>
<td>Project Assessment, Project Control, Decision making</td>
</tr>
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<td>Configuration Mgmt, Tech Data Mgmt</td>
<td>Project Assessment, Project Control, Configuration Mgmt</td>
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<td>4.6 Integrated Change Control</td>
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<td>4.7 Close Project</td>
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<td>5.1 Scope Planning</td>
<td>Technical Planning</td>
<td>Project Planning, Enterprise Environment Mgmt, SLC Process Mgmt</td>
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<tr>
<td>5.2 Scope Definition</td>
<td>Technical Planning</td>
<td>Project Planning</td>
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<td>5.3 Create WBS</td>
<td>Technical Planning</td>
<td>Project Planning</td>
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<td>5.4 Scope Verification</td>
<td>Technical Assessment</td>
<td>Project Assessment, Enterprise Environment Mgmt</td>
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<td>Decision Analysis,</td>
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<td>5.5 Scope Control</td>
<td>Technical Assessment</td>
<td>Project Control</td>
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<td>DAU</td>
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<td>Technical Planning</td>
<td>Project Planning</td>
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<td>6.2 Activity Sequencing</td>
<td>Technical Planning</td>
<td>Project Planning, Decision Making</td>
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<td>6.3 Activity Resource Estimating</td>
<td>Technical Planning</td>
<td>Project Planning, Resource Mgmt</td>
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<td>6.4 Activity Duration Estimating</td>
<td>Technical Planning</td>
<td>Project Planning</td>
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<td>6.5 Schedule Development</td>
<td>Technical Planning</td>
<td>Project Planning</td>
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<td>6.6 Schedule Control</td>
<td>Technical Assessment</td>
<td>Project Control, Decision making</td>
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<td>7.1 Cost Estimating</td>
<td>Technical Planning</td>
<td>Project Planning</td>
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<td>7.2 Cost Budgeting</td>
<td>Technical Planning</td>
<td>Project Planning, Resource Mgmt</td>
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<td>7.3 Cost Control</td>
<td>Technical Planning</td>
<td>Project Control, Decision making, Resource Mgmt</td>
</tr>
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<td>8.1 Quality Planning</td>
<td>Technical Planning</td>
<td>Project Planning, Quality Mgmt</td>
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<td>8.2 Perform Quality Assurance</td>
<td>Quality</td>
<td>Configuration Mgmt, Quality Mgmt</td>
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<td>8.3 Perform Quality Control</td>
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<td>9.1 Human Resource Planning</td>
<td>Technical Planning</td>
<td>Project Planning, Enterprise Environment Mgmt, Resource Mgmt</td>
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<td>9.2 Acquire Project Team</td>
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<td>Enterprise Environment Mgmt, Resource Mgmt</td>
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<td>9.3 Develop Project Team</td>
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<td>Resource Mgmt</td>
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<td>9.4 Manage Project Team</td>
<td></td>
<td>Project Control, Resource Mgmt</td>
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<td>10.1 Communications Planning</td>
<td>Tech Data Mgmt</td>
<td>Project Planning, Information mgmt</td>
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<tr>
<td>10.2 Information Distribution</td>
<td>Tech Data Mgmt</td>
<td>Information mgmt</td>
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<tr>
<td>10.3 Performance Reporting</td>
<td>Tech Data Mgmt</td>
<td>Information mgmt</td>
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<td>10.4 Manage Stakeholders</td>
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<td>Enterprise Environment Mgmt</td>
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<tr>
<td>11.1 Risk Management Planning</td>
<td>Technical Planning, Risk Mgmt</td>
<td>Project Planning, Risk and Opportunity Mgmt</td>
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<td>11.2 Risk Identification</td>
<td>Risk Mgmt</td>
<td>Risk and Opportunity Mgmt</td>
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<td>Risk Mgmt</td>
<td>Project Assessment, Risk and Opportunity Mgmt, Decision making</td>
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<td>Risk Mgmt</td>
<td>Project Assessment, Risk and Opportunity Mgmt, Decision making</td>
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<td>Technical Planning, Risk Mgmt</td>
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<td>Risk Mgmt</td>
<td>Project Assessment, Risk and Opportunity Mgmt</td>
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<td>12.1 Plan Purchases and Acquisitions</td>
<td>Technical Planning</td>
<td>Project Planning, Acquisition &amp; Supply Processes</td>
</tr>
<tr>
<td>12.2 Plan Contracting</td>
<td>Technical Planning</td>
<td>Project Planning, Acquisition &amp; Supply Processes</td>
</tr>
<tr>
<td>12.3 Request Seller Responses</td>
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<td>Acquisition &amp; Supply Processes</td>
</tr>
<tr>
<td>12.4 Select Sellers</td>
<td></td>
<td>Project Control, Decision making, Acquisition &amp; Supply Processes</td>
</tr>
<tr>
<td>12.5 Contract Administration</td>
<td></td>
<td>Project Control, Acquisition &amp; Supply Processes, Resource Mgmt</td>
</tr>
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<td>12.6 Contract Closure</td>
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<td>Acquisition &amp; Supply Processes</td>
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<td>DAU</td>
<td>INCOSE</td>
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<td>Requirements Development</td>
<td>Stakeholder Requirements Definition</td>
<td>Requirements Analysis</td>
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<td>Logical Analysis</td>
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<td>Requirements Analysis</td>
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<td>Design Solution</td>
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<td>Architectural Design</td>
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<td>Implementation</td>
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<td>Transition</td>
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<td>Maintenance</td>
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PMBoK vs DAU vs INCOSE Hdbk

So (again) who does what?
PM vs SE: what are their goals?

- PM is accountable for the success of the entire program and all aspects of it.

- SE is responsible for the technical success of the program.
Some “clear” distinctions

These are “owned” by the PM:

Enterprise Environment Management
Investment Management
System Life Cycle Process Management
Some “clear” distinctions

These are “owned” by the SE:

Stakeholder Requirements Definition
Requirements Analysis
Architectural Design
Implementation
Integration
Verification
Validation
Transition
Operation
Maintenance
Disposal
Some “not so clear” distinctions

These are probably “owned” by the PM, but require inputs and assistance from the SE:

- Project Planning
- Project Assessment
- Project Control
- Decision Making
- Risk and Opportunity Management
- Configuration Management
- Information Management
- Resource Management
- Quality Management
- Acquisition
- Supply
Getting the Right People

- What makes a good PM?
- What makes a good SE?
A “good” PM – the Program Leader

- Is ideally a business or management major, or has a strong background & skills in these areas

- Beware the Technical major as PM!
  - Might get stuck “in the weeds,” lack program level vision.
  - Tend to micromanage technical aspects.
  - Might get focused on technical problem and not make the best **programmatic** decision.
  - May not have the discipline to manage rigorously *(think CMMI: do “coders” like CMMI?)*
A “good” SE – the Technical Leader

- Is (hopefully!) a technical major

- Beware the Non-technical major who has some sort of SE role (or if there is no SE)
  - May lack ability to form and propagate an overarching technical vision
  - Might be more of a manager than a leader
  - Might not have the proper knowledge to resolve technical conflict or make/approve technical decisions.
PM vs SE perspectives

*It is not necessarily bad for there to be a bit of friction between the two*

...because sometimes the optimal technical solution is not the optimal programmatic solution
So, can one person do both?

- On a “small” program
- Very early in a program (even a big program)
- On a non-complex program
  - No hardware/software mix, single technology, few or no external interfaces...
Things to watch out for in these cases

- Need to get an individual with strong and broad technical knowledge and management skills
- Make sure they have a mental concept of their two “hats” and when they need to wear each one.
Perspective – a parting thought

- Both people need to appreciate the role of the other person, determine mutually agreeable dividing lines for their responsibilities.
Questions, comments?