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INCOSEUK

Project Management and Systems Engineering

Common Goals - Different Perspectives

When delivering projects, particularly complex ones, Systems Engineering (SE) and Project Management (PM) both desire a successful outcome – completing the project with the realisation of a new or enhanced system.

PM focuses on controlling the introduction of the desired change. SE focuses on defining customer needs and required functionality early and then proceeding with design and validation, all while considering the whole problem.

Systems Engineering Perspective

CHANGE P3M

Porfolio, Programme, and Project Management Perspective

PM and SE add the most value to a project when there is clarity over PM and SE roles and responsibilities, together with mutual respect and understanding of each other's areas of focus, aided by a common language for project artefacts, roles and skills. Together they can establish and satisfy the right balance of stakeholder needs with time, quality, and cost.

This Z-Guide indicates where the key touch points between SE and PM occur, suggesting where close cooperation may achieve the greatest impact on successful project outcomes.

This is a joint guide with the Association for Project Management. For more details see: www.apm.org.uk

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Clarity, understanding, and good communication will improve decision making and outcomes. This is more rewarding for all the participants.

Having the right people fully informed at all decision points in the project lifecycle supports better decision making and forward planning, through:

Clarity of Responsibility

A RASCI table undertaken at the start of a project is a simple technique to provide clarity of roles and responsibilities, helping avoid confusion.

Mutual Understanding

They may share the same ultimate goal but SE and PM will naturally have different focuses, skills and competencies, perspectives and culture. Understanding each other will improve project outcomes.

Common Language

Agreeing and using a common language (perhaps aided by a common glossary) will further reduce misunderstanding and confusion between disciplines.

In this guide, readers should treat the term Project Management in the widest sense to include project, programme, and portfolio management.

Further Reading

Association for Project Management:
www.apm.org.uk/memberresources

INCOSE UK: www.incoseonline.org.uk

ISO/IEC15288:2015, A Framework for Systems and Software Engineering Life Cycle Processes.

NASA Project Management and System Engineering Competency Framework: www.appel.nasa.gov

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Glossary

CBS	Cost Breakdown Structure
KPI	Key Performance Indicator
OBS	Organisational Breakdown Structure
PBS	Product Breakdown Structure
PM	Project Management
PMP	Project Management Plan
RASCI	Responsible, Accountable, Support, Consulted, Informed
SE	Systems Engineering
WBS	Work Breakdown Structure

This leaflet is intended to highlight the key activities and deliverables in typical projects. Clarity of responsibility, mutual understanding, and common language are essential for SE and PM to work effectively and efficiently together. They will have significant impacts on the success of the project, programme, or portfolio.

For further information, advice and links to helpful websites go to: www.incoseonline.org.uk

Download copies of this leaflet and other Systems Engineering resources online at: www.incoseonline.org.uk

For more information about Project Management, go to the Association for Project Management website at: www.apm.org.uk

For more information about the worldwide Systems Engineering professional community, go to: www.incose.org

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Key fusion points between Project Management and Systems Engineering

Concept

Design and Delivery

Operation, Support, and Disposal

Concept

Project Management
- Business case and KPIs
- Project management plan
- Work, cost, and organisation breakdown structures
- Staff and team selection, RASCI, Competencies
- Time / quality / cost trade-offs and targets
- Team building
- PM framework / approach selection and tailoring

Systems Engineering
- Problem analysis and mission concept
- Requirements definition
- Measures of performance
- Solution options / trade studies
- Solution architecture
- System Engineering management plan
- Product breakdown structure
- Lifecycle selection and tailoring

- Joint engagement with all stakeholders will ensure needs and perspectives are fully understood.
- Business case and KPIs drive requirements analysis which drives the solution.
- Solution PBS should be mirrored in the WBS and CBS.
- Explore whole system and mission to make appropriate trades affecting time, quality, and cost targets.
- RASCI defines responsibilities across the project and is closely linked to the PBS.

Design and Delivery

Project Management
- Risk management
- Make / buy / design decisions
- Detailed project schedule
- Change, cost, and quality management
- Subcontract management
- Resource management
- Gate reviews

Systems Engineering
- Configuration management
- Architecture, KPIs and design decisions
- Impact analysis
- Integration, verification, validation and acceptance
- Acquisition framework

- Review gates and decision points must bring together solution maturity, risk, schedule, and cost considerations.
- System architecture affects "make or buy" decisions which in turn may impact on subcontract management.
- "Make or buy" decisions impact on the integration, test, and acceptance, which then impacts on gate reviews and payment.
- Design decisions impact on time, quality, and cost and are controlled by change management.

Operation, Support, and Disposal

Project Management
- Asset management
- Handover
- Transition to operations
- Lessons learnt
- Programme integration
- Benefits realisation

Systems Engineering
- Through life capability management
- Handover
- Transition to operations
- Lessons learnt
- Maintenance
- Disposal
- Achievement of quality targets
- Service delivery

- Execution of previous stages should allow the handover and transition to the operation stage to proceed smoothly.
- Programme integration and benefits realisation are more easily achieved by satisfying appropriate quality targets.

Better outcomes are achieved when Systems Engineering and Project Management work well together.

Clarity of Responsibility

Mutual Understanding

Common Language

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