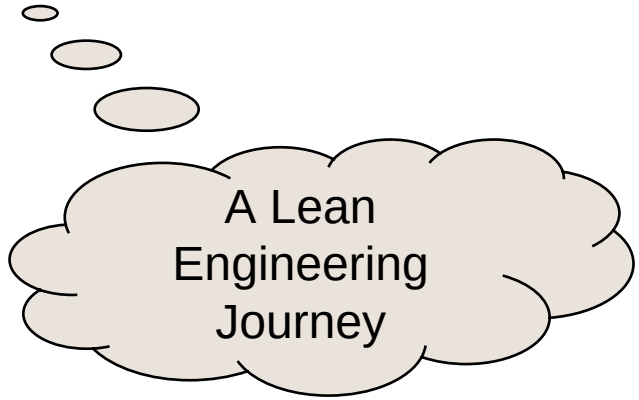
Integrating Engineering Project Management and Product Development Processes



Rockwell Collins

Objectives

- Understand context of RCI engineering process evolution
- Understand roles & responsibilities of project managers within RCI culture
- Explore the relationship of project management to product development processes
- Explore the roles of systems engineering vs. project management

Evolving Processes: Current Steps

- Design & Development (D&D) Cycle Time Reduction (CTR) Initiative
  - Simplify the engineering process model
    - Eliminate redundancy
    - Remove inconsistencies
  - Improve scalability
  - Improve user friendliness and information understanding
  - Maximize reuse of existing engineering process
    - Technical Consistent Process (TCP)

Problem Realization

- TCP Primary Focus: Engineering Development
  - Typical V-Model approach to engineering
  - Failed to address Project Management

- How does scalability of the process address Project Management scalability?
- How should Project Management fit with the engineering design & development process?

Project Manager Definitions

- Life Cycle Value Stream Manager (LCVSM)
  - Life Cycle Responsibility for products.
  - This includes business pursuit and capture, product development, transition to production, customer delivery and support, and transition out of production.
  - Must coordinate activities across the [illegible] model; Engineering, Manufacturing, [illegible] Service functions.

also known as Program Manager or Product Line Manager

also known as Technical Director

- Technical Project Manager (TPM)
  - Single point of contact for engineering on a development project.
  - Responsible for the technical leadership and project management of the design & development activities, within the guidelines set by the LCVSM/Program Manager and Customer.
  - Provides project management expertise by planning, organizing, directing, and coordinating functional department activities to achieve cost, schedule, and performance requirements
- Project Engineer (PE)
  - Lead engineer assigned to a specific project to represent the

Engineering Leadership: Common Purpose, Different Roles

Project Management

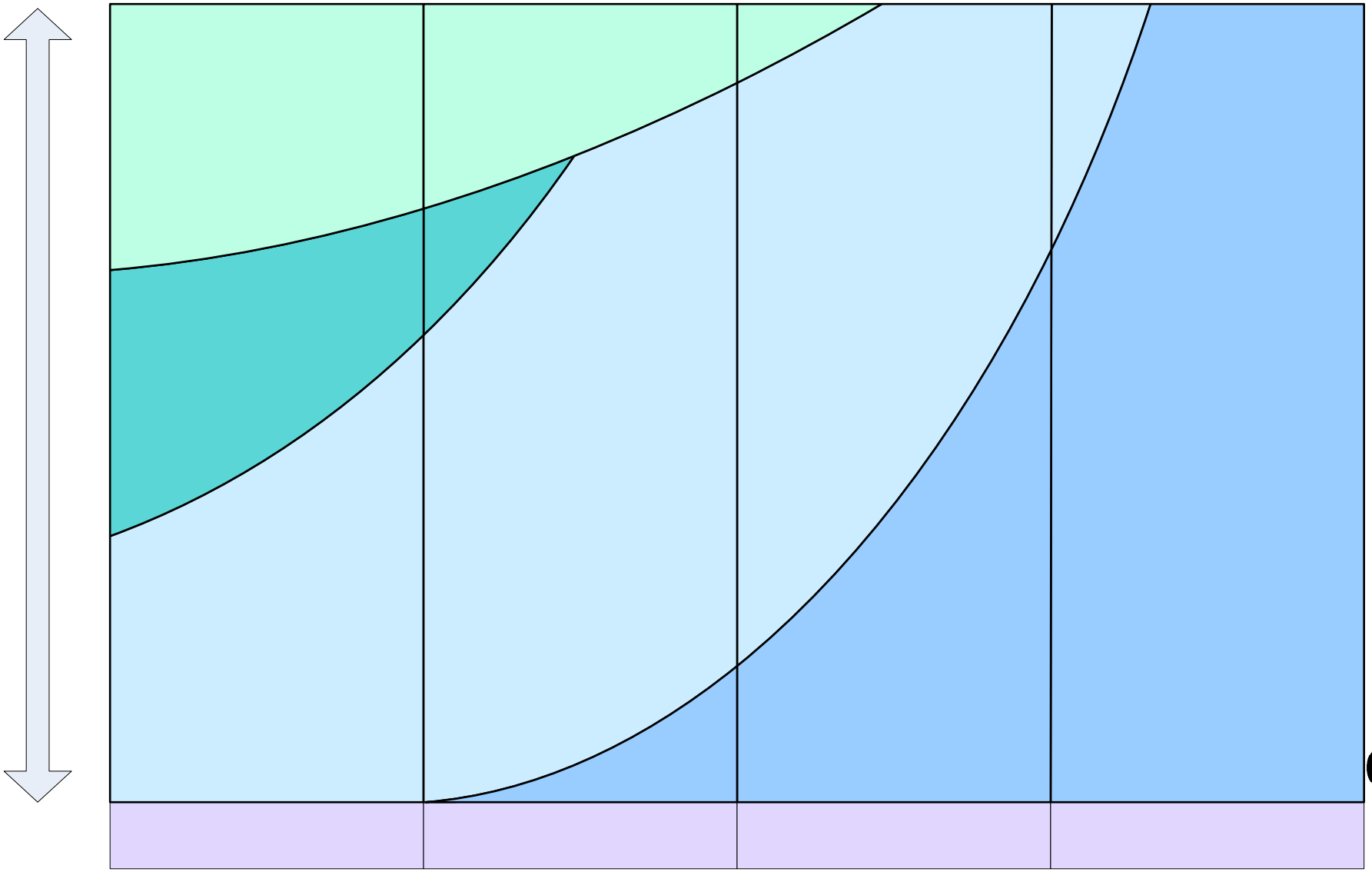
LCVSM ⟷ TPM ⟷ PE

- Multi-Disciplinary Team Leader
  - Operations, Services, Finance, Engineering
- Responsible for Profit & Loss
- Responsible for overall project commitments
- High Customer Contact
  - Business Development
  - Enterprise Coordination
- Covers project activities for DP A → DP G

- Multi-Disciplinary Engineering Team Leader
  - Systems, Software, Electrical, Mechanical, Quality
- Responsible for Technical Project Budget
- Responsible for ensuring project technical milestones are satisfied
- High Customer Contact
  - Engineering Focal Point
  - Project Execution
- Covers project activities for DP C → DP E

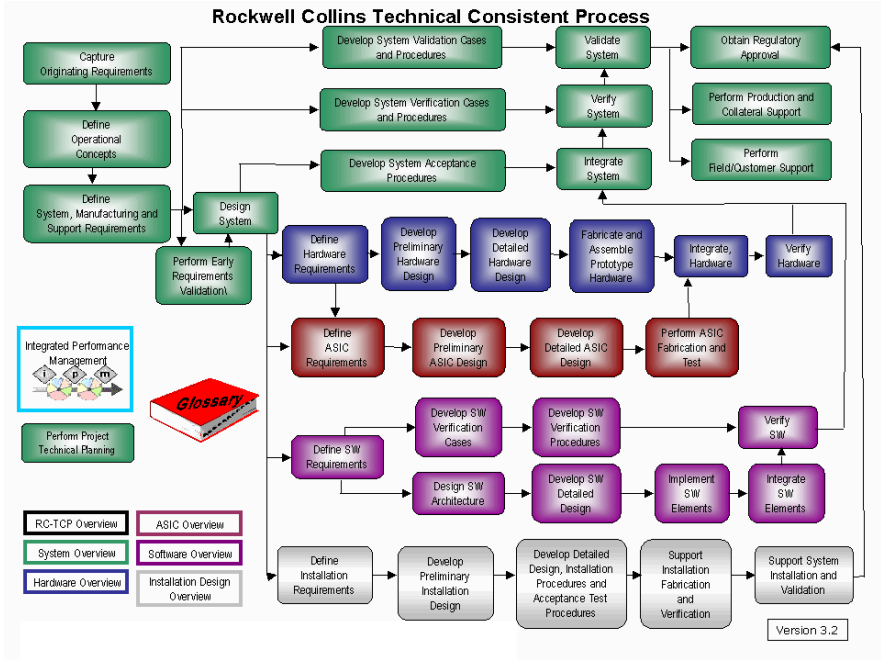
- Single-Domain Engineering Team Leader
  - Either Single or Multi-discipline
- Responsible for WBS Activity
- Responsible for completing committed activities and tasks
- Limited Customer Contact
  - Technical Content
- Covers project at various Project Milestones (as needed)

Engineering Leadership “Work Allocation”



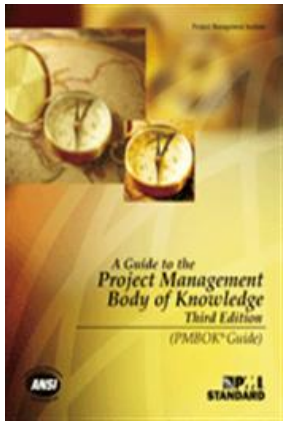
Consistent Process Model: First Steps

- Technical Consistent Process (TCP) v1.0 model released in 2000
  - Provides technical process definition
  - Provides minimal project management definition
    - Some planning activities
    - Perform config control, change control, peer reviews, technical reviews



Project Management 101

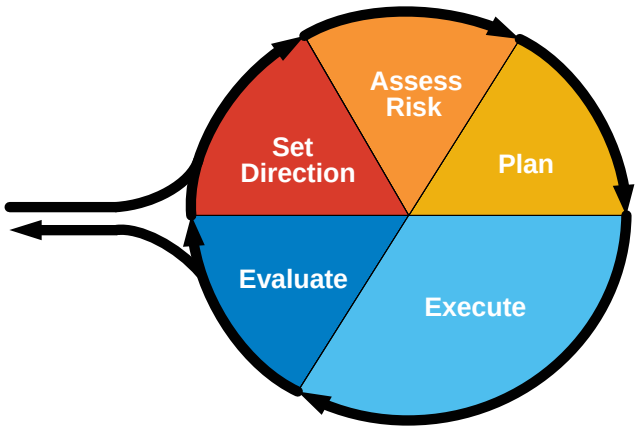
- Acquired Project Management course
  - Fundamentals of Project Management
- Convened project management focus group
- Reviewed Project Management Institute (PMI) Body of Knowledge



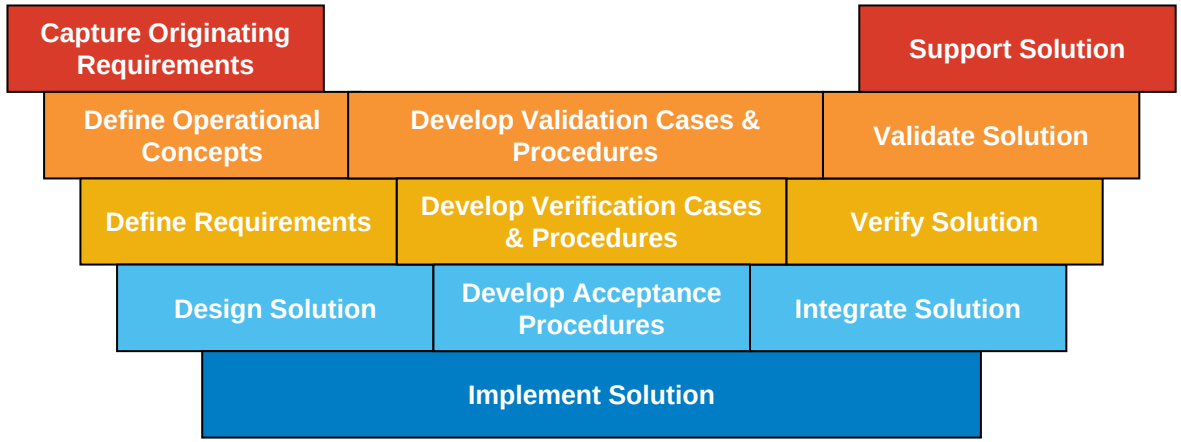
- Revisited SAP Project Management model

Technical Consistent Process v4.0

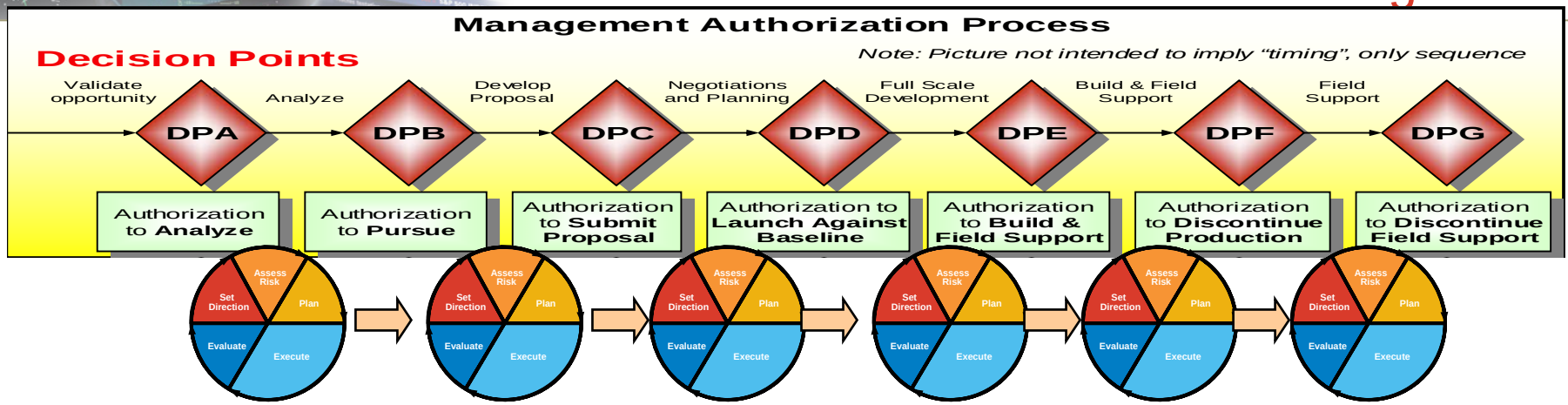
Technical Management Activities (TMA)



Technical Development Activities (TDA)



Process Integration



Capture Originating Requirements

Define Operational Concepts

Define Requirements

Design Solution

Implement Solution

Integrate Solution

Verify Solution

Validate Solution

Support Solution

Time Progression (not to scale)

Project Management vs. Systems Engineering

- System Engineer ∉ Technical Project Manager

Can be same person, but roles are distinct

  - Technical Project Manager:
    - Interdisciplinary role - management
    - Provides project management services for design and development activities for a given project
    - Cost, schedule, and project performance accountability to LCVSM
    - Work governed by TMA process; oversees overall TCP execution
  - System Engineer
    - Interdisciplinary role – technical
    - Provides technical definition for a specific domain area for a project (technical domain expert)
    - Technical performance accountability to PE & TPM
    - Work governed by TDA process; technical coordination between disciplines

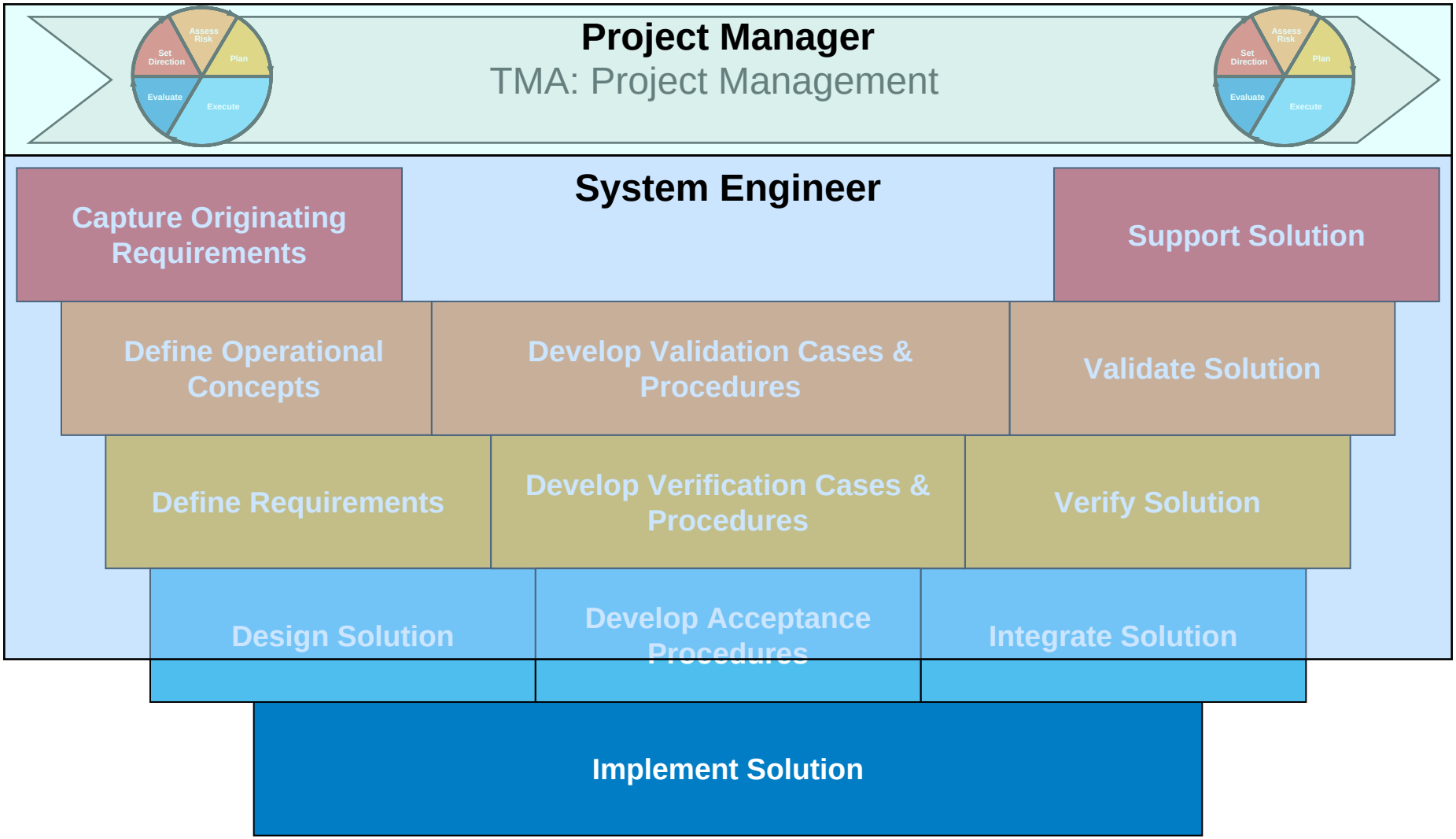
Project Management vs. Systems Engineering

- System Engineer ∉ Project Engineer

Can be same person, but roles are distinct

  - Project Engineer:
    - Can be from any discipline (system, software, hardware, etc)
    - Provides project management services for a specific domain and/or discipline area for a given project
    - Cost, schedule, and project performance accountability to TPM
    - Work governed by TMA process; oversees TCP execution
  - System Engineer
    - Typically specifically trained as a system engineer
    - Provides technical definition for a specific domain area for a project (technical domain expert)
    - Technical performance accountability to PE & TPM
    - Work governed by TDA process; technical coordination between disciplines

Project Management vs. Systems Engineering



Conclusion

- Understand context of RCI engineering process evolution
  - Needed to address shortcomings in project management specific processes
- Understand roles & responsibilities of project managers within RCI culture
  - LCVSM, TPM, and PE: Varying levels of project management responsibility
- Explore the relationship of project management to product development processes
  - Complimentary TMA and TDA process models: project management and product development
- Explore the roles of systems engineering vs. project management
  - Complimentary roles – shared by some, distinct in others