Module 7: The Requirements State
Session 6 of 7
An introduction to the systems approach to project planning

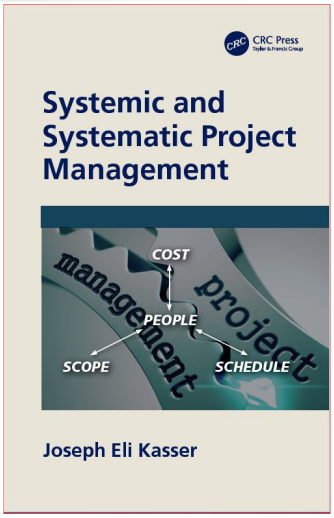
Rev 4.0.0

Knowledge

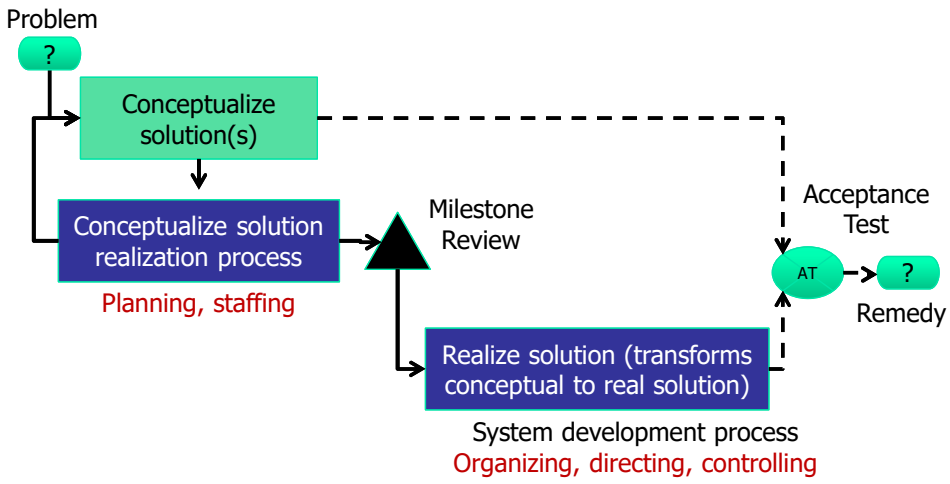
- Lecture
  - Sets the context
- Readings/videos
  - 0706 Perceptions of Systems Engineering (POSE) chapter 21. A Role-Playing Case Study: the Engaporean Air Defence System upgrade (SE Chapter 20 The Engaporian Air Defence (ADS) Upgrade project, Section 20.1 – 20.2.)
- Exercises

Topics (lecture and readings)

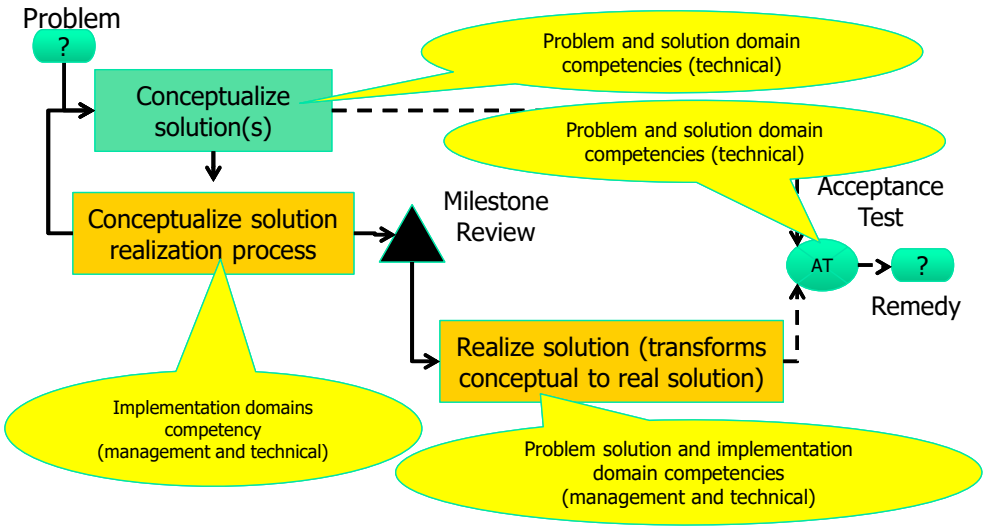
- **Project planning**
  - The mostly forgotten aspect of the System Requirements State in systems engineering
  - Ideally
    - Systems engineering defines the work to be done
    - Then does the work in the rest of the SDP
    - Project management does the staffing and cost and schedule estimating
    - The manages the resources in the rest of the SDP
- Exercises



Problem and process (Static)



Problem and process (competencies)



Project Manager Skills

- Dealing with people
- Domain knowledge
- General knowledge
- Problem identification and resolution
- Ability to establish objectives
- Big picture orientation
- Organization
- Flexibility
- Adaptability
- Time management
- Team building
- Leadership
- Ability to delegate
- Conflict resolution
- Negotiation
- Creativity
- Project management
- Ability to perform magic

Successful projects

- It depends
- Management success
  - Cost and schedule
- Systems engineering/technical performance success
  - System, operating in the situation (context), meets customer's needs by remedying the undesirable situation
- Success criteria need to be
  1. Stated at start of project
  2. Adjusted if necessary during the project
- Requirements on process and product
- Change control process

Undesired consequences of successful projects

Need to mitigate undesired consequences
Enhanced Traffic Light Charts

Some of the reasons for the failure of project management

1. Lack of a project focal point
2. Poor choice of organizational form of structure
3. Project efforts in the hands of one of the lead functional groups
4. Inadequate involvement of team members
5. Inadequate planning
6. Lack of top management support or project administration efforts
7. Too little authority in the hands of the Project Manager
8. Poor choice of Project Manager
9. Poor decision making

More reasons for the failure of project management

10. Team not prepared for team efforts
11. Poor project communication
12. Lack of team blending
13. Unclear project mission
14. Objectives are not agreed on; end result is unclear
15. Inability to estimate target dates
16. No hard milestones; little project control
17. Poor planning of project installation and termination
18. Poor technical and user documentation

What is a Project Plan (SEMP)?

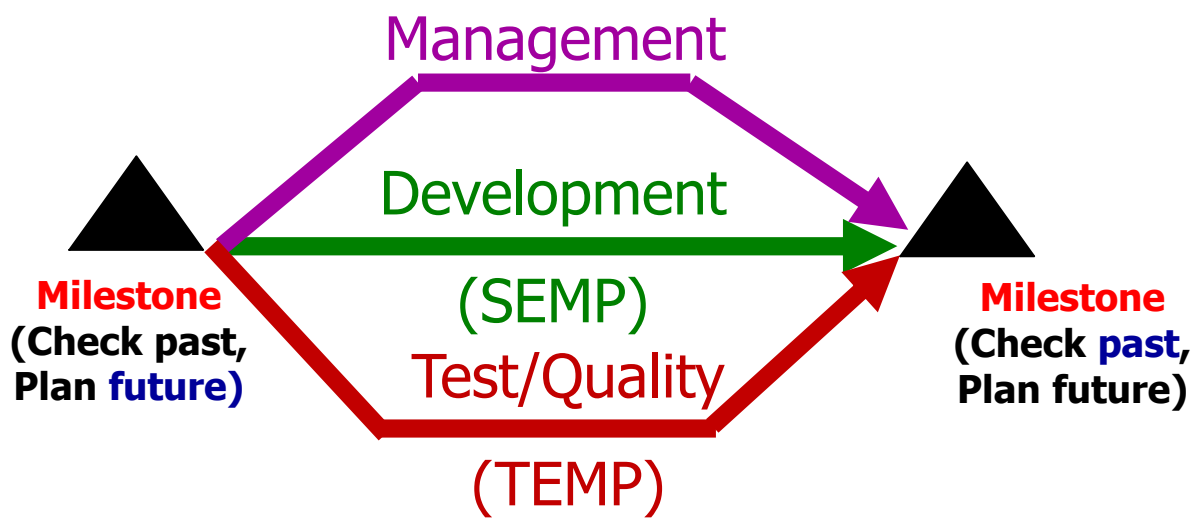
- A **guide to project execution** by providing a reference
- A communications tool
  - Present and future
- The controlling document to manage a project. The project plan describes the:
  - Interim and final deliverables the project will deliver
  - Managerial and technical processes necessary to develop the project deliverables
  - Resources required to deliver the project deliverables
  - Defines any additional plans required to support the project.

Internal perspective: Contents of the SEMP*

- Technical Program Planning and Control
- "Systems Engineering Process"
- Engineering Specialty Integration

*Kasser J.E., Schermerhorn R., "Gaining the Competitive Edge through Effective Systems Engineering", *Proceedings of the NCOSE 4th International Symposium*, San Jose , CA., 1994.

Three Streams of activities/work



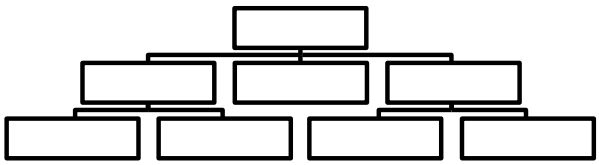
Contents of project plans

- **Who** is going to do it
  - Resources
- **Where** it is going to be done
  - Resources
- **When** it is going to be done
  - Schedule
- **What** is going to be done
  - Work packages for tasks and activities
- **Why** it is going to be done
  - Reason and context
- **How** it is going to be done and how much will it cost
  - Narrative description – resources, schedules

Answers Kipling questions used in Active Brainstorming

Essential elements of a project plan

- Schedules
- Products
- Activities
- Resources
  - Costs and people
- Risks



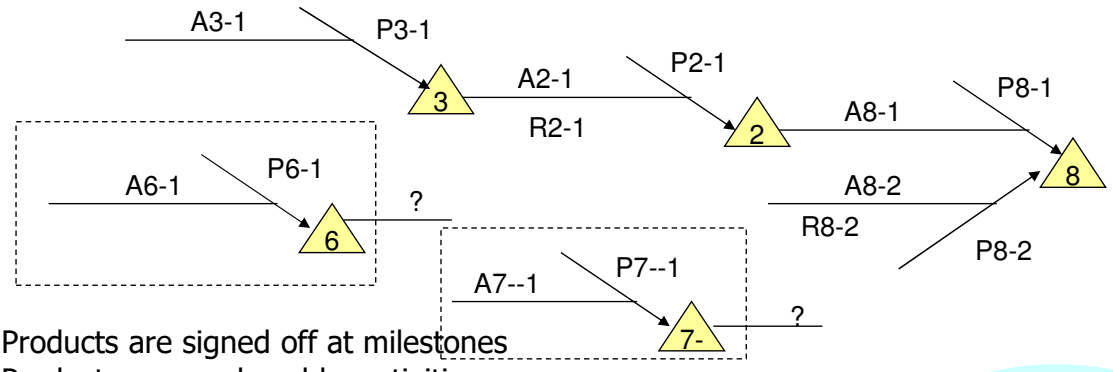
Systems approach to project management

- A process is a system
- Start with functions or activities
  - Functions produce a product
- Architect the process out of functions
  - Work back from delivery
- Construct work packages for the processes
  - Further into the future, less detail needed
- Monitor progress
- Keep track of context
- Incorporate effect of change

Developing the plan

- Think back from last milestone to each prior milestone
  - Activities
  - Products
  - Resources
- Use PAM charts
- Use work package templates
- Build network of interdependent activities
  - Each activity has an input and produces a product
  - Integrate risk management
- WBS is a hierarchical view of the activities
  - WBS is not an input tool (in the systems approach)

Partial PAM chart for identifying project network



- Products are signed off at milestones
- Products are produced by activities
- Activities shall start and end at milestones
- Activities use resources
- PAM Triptych numbers must match
- PAM Triptych and WPs are self similar

PAM provides big picture, WPs contain details

Work package (partial)

Identification number	Reason activity is being done [CONOPS]
Name of activity	Prerequisites (products or milestones)
Priority	Resources (people, equipment, material)
Narrative of activity [CONOPS]	Internal key milestones (if any)
Schedule (+ accuracy)	Decision points (if any)
Products (outputs)	Risks (probability, seriousness, mitigation WP ID)
Acceptance criteria for products	Requirement's Traceability (source of work)
Estimated cost	Lower level work package ID's (if any)
Accuracy of cost estimate	Assumptions not stated elsewhere

Shown in two columns to fit slide

Using an N^2 chart in planning

Activity								
Create Test Plan	301						o	
Create Test Procedure		401	o					
Run Test			501		o			
Create Item to be tested			o	411				
Review Test					517-	o		o
Manage failed items						523		
Create test pass fail criteria		o					412	

Known as a Gantt chart in project management

Example

- Milestone:
  - System Requirements Review SRR (200)
- Products
  - 210. System requirements document (SRD)
  - 202. SEMP
  - 203. SRR meeting logistics
  - 204 .... Project plans, Test Plans, and anything else as specified by the contract or later stipulated by contractor and customer

SRR includes

- 203-1. SRR invitations
  - Activities to produce and record attendance
- 203-2 SRR presentation
  - Activities to produce and distribute
- 203-3 SRR handouts
  - Activities to produce, circulate ahead of time and distribute
- SRR deliverables
  - Activities can be in each stream
  - 210. Activities to produce SRD
  - 202. Activities to produce SEMP
    - Risk management, etc.
    - Activities to coordinate timeliness
      - For each requirement, what will it take to make it happen
        - Link between requirements and plans
    - Activities to prevent defects/mistakes

Systems approach

The TEMP*

- Documents the overall structure and objectives of the Test and Evaluation program.
- Provides a framework within which to generate detailed T&E plans and documents schedule and resource implications associated with the T&E program.
- Identifies the necessary Developmental Test and Evaluation, Operational Test and Evaluation, and Live Fire Test and Evaluation activities.
- Relates program schedule, test management strategy and structure, and required resources to:
  - Critical Operational Issues, Critical Technical Parameters, objectives and thresholds documented in the Capability Development Document , evaluation criteria, and milestone decision points.

* https://acc.dau.mil/CommunityBrowser.aspx?id=29065 Accessed 11 May 2010.

The SHMEMP (bumph)

- Integrated Logistics Support
  - Sustainment
- Configuration Management
- Project Management
- Human interface
- Etc.

Exercise 7-61

1. List at least 10 documents in the SHMEMP
2. Prepare a <5 minute presentation containing
    1. This slide and version number of session
    2. Each document, its purpose and where and when it will be used in the SLC
    3. A compliance matrix for the exercise
    4. Lessons learned from exercise
    5. The problem posed by the exercise formulated per COPS problem formulation template
3. Save as a PowerPoint file in format Exercise7-61-abcd.pptx
4. Post presentation in the Asynchronous group

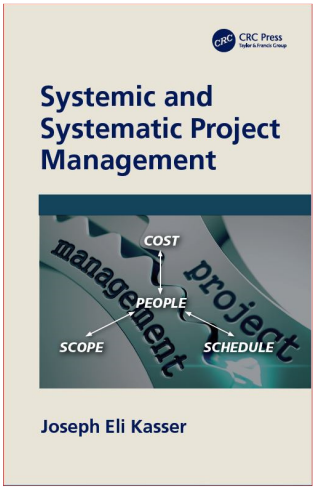
Exercise 7-62

1. The HEADS project (reading 0706) is about to enter the System Requirements State.
2. Create a high level SEMP for the HEADS covering the states in the system development process
3. Consult project management texts, and cite them in the presentation, as appropriate
4. Prepare a <5 minute presentation containing
    1. This slide and version number of session
    2. The parts of the SEMP
    3. The GANTT and PERT charts
    4. One of the PAM charts you used to create the plan
    5. A compliance matrix for the exercise
    6. Lessons learned from the exercise
    7. The problem posed by the exercise formulated per COPS problem formulation template
5. Save as a PowerPoint file in format Exercise7-62-abcd.pptx
6. Post/email presentation as instructed

Summary (lecture and readings)

- Project planning
- Exercises

- Current plan is to replace this session with appropriate modules/sessions from Creating Outstanding Project Managers (COPM) in 2024



Any questions ?

1. Best
2. Worst
3. Missing

Email: beyondsystemsthinking@yahoo.com
Subject: <class title> BWM Session #