Value of Failure

Students Course

Module 4: Preventing Failure

Module 4: Preventing Failure

Content

1. Project Management
2. Basics of risk management

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1. Project management

- Project: The black box of project management

- Project management processes and tools help the project manager and team to organize, document, track and report on project tasks and progress

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1. Project management

- Project: What is a project?
  - Elements of a project
    - Includes an element of something new
    - Has a beginning and an end
    - Often interdisciplinary and as such involves people with differing backgrounds

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1. Project management

- Background: What is project management
  - Definition
    - The application of knowledge, skills, tools and techniques to project activities in order to meet or exceed stakeholder needs and expectations from a project
    - Project Management is the process of defining, planning ,organizing, leading and controlling the development of a project
  - Basic elements of project management
    - Project scope
    - Deliverables
    - Roadmaps
    - Roles and Responsibilities
    - Communication procedures
    - Processes

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1. Project management

- Background: Why use project management tools and techniques?
  - Use of project management
    - Focus and clarify our thinking so that we proceed in a systematic, effective, and efficient manner
    - Identify everything that needs to be considered and done to reach a goal (includes what is to be communicated and to whom)
    - Identify who will do what and time frames
    - Reduce the confusion, frustration, backtracking, and errors that can be associated with developing or introducing something new

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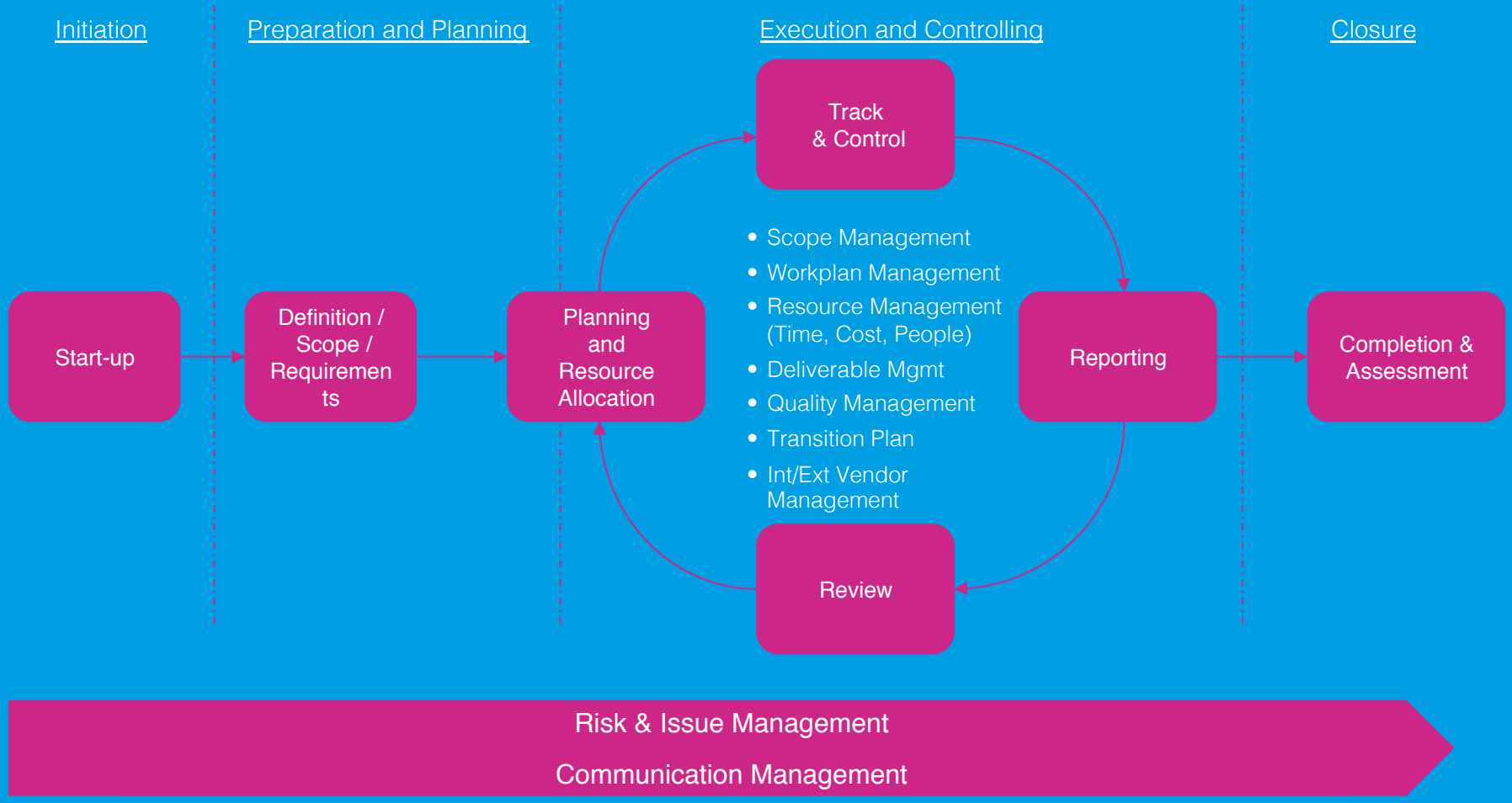
1. Project management

- Project Framework:



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1. Project management

- Phases of project management: Four different phases

    1. Initiation
    2. Preparation and Planning
    3. Execution and Controlling
    4. Closure

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1. Project management

- Phases of project management: Phase 1 – Initiation

  - Description
    - Process in which activities are performed to asses the size, scope, and complexity of the project and to establish procedures to support later project activities
    - Depending on the project some of the following activities might be unnecessary

  - Activities
    - Establish a project initiation team
    - Establish a relationship with the important stakeholders
    - Establish a project initiation plan
    - Establish management procedures
    - Establish project management environment and project workbook

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1. Project management

- Phases of project management: Phase 2 – Preparation and Planning
  - Description
    - The Project Planning provides an overall framework for managing Project Costs and schedules.
    - Project Planning takes place at the beginning and at the end of each Project Phase.
    - Project Planning involves defining clear, discrete “Activities” or “Tasks” and the work needed to complete each activity
  - Activities
    - Describing Project Scope, Alternatives and feasibility
    - Dividing the Project into manageable tasks
    - Estimating and creating a resources plan
    - Developing a preliminary project schedule
    - Developing a project communication plan
    - Determining project standards and procedures
    - Identifying and assessing project risks
    - Developing a statement of work
    - Setting a baseline project plan

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1. Project management

- Phases of project management: Phase 3 – Execution and Controlling

  - Description
    - The third phase in project management process in which the plans created in the prior project phases are put to action
    - If you develop a high quality project plan, it is much more likely that the project will be successfully executed

  - Activities
    - Executing baseline project plan
    - Monitoring project progress against baseline plan
    - Monitoring changes to baseline plan
    - Maintaining the project workbook
    - Communicating the project status

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1. Project management

- Phases of project management: Phase 4 – Closure

  - Description
    - The final phase of project management process which focuses on bringing a project to an end
    - Closedown is a very important activity since a project is not complete until it is closed and it is at closedown that projects are deemed a success or failure
    - Projects can conclude with a natural or unnatural termination
    - Natural termination occurs when the requirements of the project have been met and thus the project completed and is a success
    - An unnatural termination occurs when the project is stopped before natural completion

  - Activities
    - Closing Down the Project
    - Conducting Post-project Review

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1. Project management

- Alternative project management structure: five basic steps

1. Start-up
2. Define and Confirm Scope/Requirements
3. Develop Plan and Secure Resources
4. Track, Control, Report and Review
5. Completion and Assessment

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1. Project management

- Alternative project management structure: Step 1 – Start-up

  - As you engage potential team members and stakeholders, project initiation activities establish the scope, goals and preliminary plan

  - Key Activities
    - Document and/or confirm scope and assumptions
    - Confirm financing
    - Draft high level plan
    - Identify who needs to provide input into plan and resources

  - Possible Checklists
    - Project Start-up and Financing

  - Templates to consider
    - Project Scope, Gantt Chart and Resource Planning
    - Project role descriptions

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1. Project management

- Alternative project management structure: Step 2 – Confirm Scope and Define Requirements

  - Engage your financiers and business stakeholders to confirm the project scope and clarify business requirements. It is also the time to identify the technical requirements with the appropriate providers (as necessary)

  - Key Activities
    - Confirm baseline project scope with financiers
    - Define, document and confirm business and technical requirements
    - Identify impact on business processes
    - Identify what's not in scope

  - Checklists to consider
    - Financing

  - Templates to consider
    - Project Scope

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1. Project management

- Alternative project management structure: Step 3 – Develop Plan and Secure Resources

  - The initial detailed project plan will provide a project roadmap and baseline for all team members and stakeholders. As the project evolves, the plan may need to refined

  - Key Activities
    - Identify who needs to provide input into plan
    - Develop preliminary detailed plan based on scope, requirements, etc.
    - Identify skills sets needed to accomplish tasks
    - Develop communication plan
    - Identify and secure resources
    - Conduct pre-kick-off meeting with financiers
    - Conduct kick-off meeting
    - Conduct risk assessment with team members
    - Identify the criteria for stopping the project
    - Update detailed plan and get buy-in from team and financiers

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1. Project management

- Alternative project management structure: Step 3 – Develop Plan and Secure Resources (continued)

  - Checklists to consider
    - Project Planning
    - Deliverable and Quality Assurance
    - Transition

  - Templates to consider
    - Activity list
    - Detailed project plan
    - Project Resource Plan
    - Communication matrix
    - Project Risk Assessment

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1. Project management

- Alternative project management structure: Step 4 – Track, Control, Reporting and Review

  - Once you kick off the project, the track, control, reporting and review activities will be iterative and comprise the bulk of the project management tasks

  - Key Activities
    - Implement communication plan
    - Hold regular team meetings to:
      - share progress/status
      - identify/resolve issues
    - Hold formal sponsor updates
    - Keep your manager informed
    - Keep stakeholders informed
    - Monitor progress and report status
    - Monitor risks and take action as necessary
    - Identify and manage issues
    - Manage scope and track changes
    - Update plan as needed

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1. Project management

- Alternative project management structure: Step 4 – Track, Control, Reporting and Review (continued)

  - Checklists to Consider
    - Project planning
    - Financing
    - Transition

  - Templates to Consider
    - Project scope change
    - Communication matrix
    - Project status snapshot
    - Detailed Project Plan
    - Risk Assessment
    - Issue Log

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1. Project management

- Alternative project management structure: Step 5 – Completion and Assessment

  - The following activities will help to ensure a smooth transition and leverage lessons learned for future projects

  - Key Activities
    - Develop a cutover plan or checklist, if applicable
    - Complete documentation, training, and knowledge transfer
    - Conduct final project review
    - Conduct sponsor sign-off
    - Transition to support/service organization or next project team
    - Close-out final tasks and issues
    - Conduct lessons learned
    - Celebrate success

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1. Project management

- Alternative project management structure: Step 5 – Completion and Assessment (continued)
  - Checklists to consider
    - Transition
    - Project Closeout
  - Templates to consider
    - Issue log
    - Detailed project plan
    - Communications Matrix

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1. Project management

- Important tools to use: Things that help successful project management

  - Work Breakdown Structure (WBS)
  - Gantt Charts
  - Network Diagrams (PERT/CPM)

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1. Project management

- Important tools to use: Work Breakdown Structure (WBS)

  - Description
    - Project must be divided into manageable tasks and then logically order them to ensure a smooth evolution between tasks.
    - The definition of tasks and their sequences is referred as the Work Breakedown Structure (WBS)
    - WBS is essential in Planning and executing the Project because it is the foundation for developing the Project Schedules (PERT / and GANTT chart) for identifying Milestones in the Scheduling and for managing Costs

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1. Project management

- Important tools to use: Work Breakdown Structure (WBS)
  - Example (IT-Project)

Phase	Duration in days	Number of Resources
1.0 Project Planning Phase		
1.1 Define the problem		
1.1.1 Meet with users	2	2
1.1.2 Determine scope	2	2
1.1.3 Write statement of business benefits	1	-
1.1.4 Define statement of system capabilities	1	-
1.1.5 Develop context diagram	1	-
1.2 Produce the project schedule		
1.2.1 Develop work breakdown schedule	3	2
1.2.2 Estimate resources, durations, and predecessors	2	2
1.2.3 Develop PERT chart and Gantt chart	2	2

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1. Project management

- Important tools to use: GANTT Chart
  - Description
    - A graphical representation of a project that shows each task as a horizontal bar whose length is proportional to its time for completion
    - A GANTT chart is a horizontal bar chart that illustrates a project schedule
    - In the GANTT chart time is displayed on the horizontal axis and the tasks/ activities are arranged vertically from top to bottom, in order of their start dates
    - A detailed GANTT chart for a large project might be quite complex and hard to understand. To simplify the chart project manager can combine related activities into one task

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1. Project management

- Important tools to use: GANTT Chart
  - Example

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1. Project management

- Important tools to use: Network Diagram
  - Description
    - Is a graphical depiction of Project tasks and their inter-relationships.
    - The distinguishing feature of a Network Diagram is that the ordering of Tasks is shown by connecting with its predecessor and successor tasks
    - Network Diagramming is a Critical Path Scheduling Technique used for controlling resources.
    - CRITICAL PATH SCHEDULING
    - A scheduling technique whose order and duration of a sequence of task activities directly affect the Completion Date of a Project

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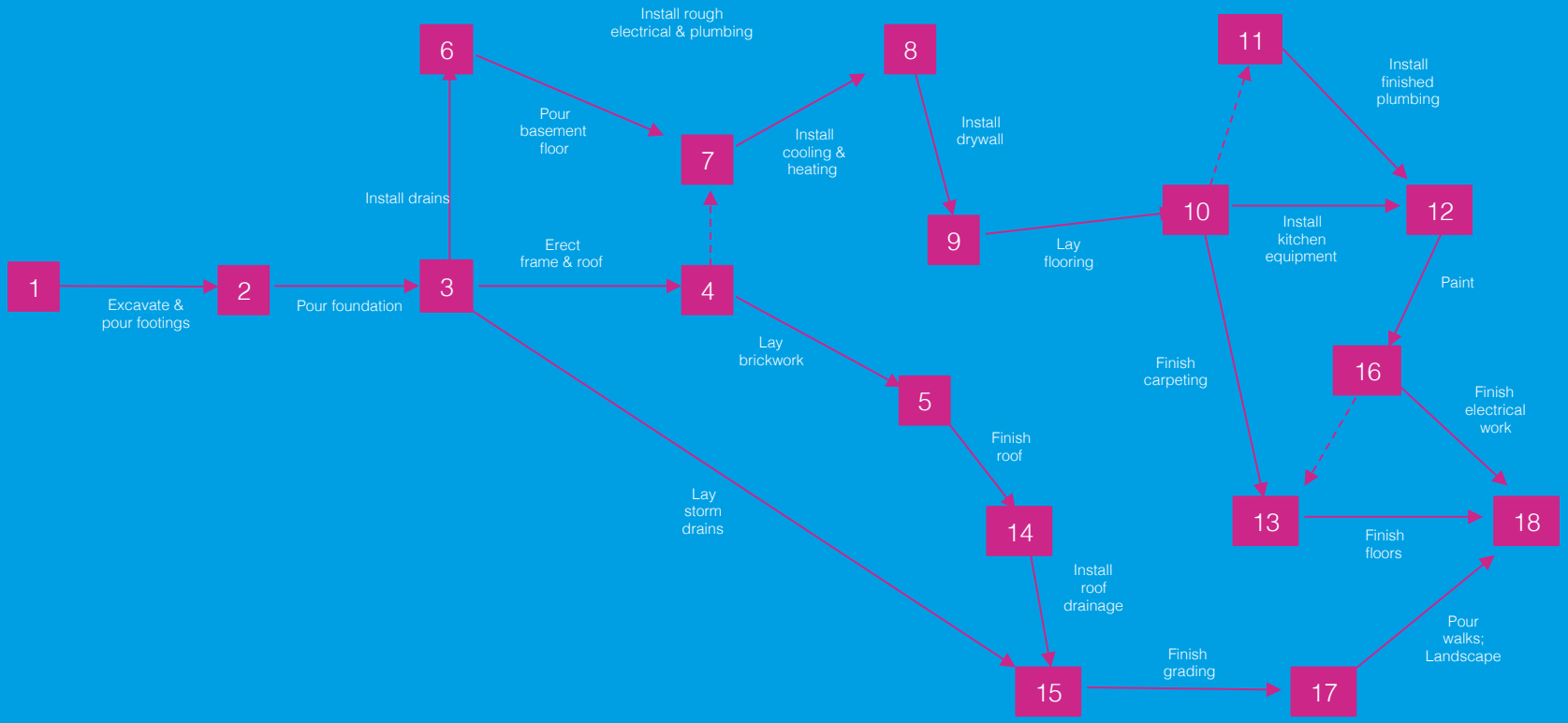
1. Project management

- Important tools to use: Network Diagram
  - Example: House construction



Module 4: Preventing Failure

Content

1. Project Management
2. Basics of risk management

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2. Basics of risk management

- Definitions: Important terms around risk management

  - Risks:
    - Risks are potential events that have negative impacts on a certain tasks or project (e.g. safety, technical performance, cost or schedule)
      - Complex function of probability, consequences and vulnerability
      - Risks can be reduced but never eliminated
  - Risk Assessment:
    - Risk assessment and risk analysis can be defined as a set of systematic methods to:
      - Identify hazards
      - Quantify risks
      - Determine components, safety measures and/or human interventions important for the task
    - Risk analysis is teamwork
      - Ideally risk analysis should be done by bringing together experts with different backgrounds

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2. Basics of risk management

- Definitions: Important terms around risk management (continued)
  - Risk Management:
    - Risk Management comprises purposeful thought to the sources, magnitude, and mitigation of risk, and actions directed toward its balanced reduction
      - The same tools and perspectives that are used to discover, manage and reduce risks can be used to discover, manage and increase project opportunities

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2. Basics of risk management

- Risk management: What it is about

  - Risk Management:
    - Risk management is a continuous and iterative decision making technique designed to improve the probability of success. It is a proactive approach that:

      - Seeks or identifies risks
      - Assesses the likelihood of these risks
      - Assesses the impact of these risks
      - Identifies the most significant risks
      - Develops and chooses mitigation options to implement
      - Tracks progress to confirm that cumulative project risk is indeed declining
      - Communicates and documents the project risk status
      - Repeats this process throughout the project life

Source: NASA SE Handbook 1995 section 4.6

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2. Basics of risk management

- Risk management: Types of risks addressed by risk management (Example of NASA Space-Shuttle Projects)

Risk Type	Examples
Technical Performance Risk	Failure to meet a technical requirements or specifications
Cost Risk	Failure to stay within a cost cap for the project
Programmatic Risk	Failure to secure long-term political support
Schedule Risk	Failure to meet a critical timeframe
Liability Risk	Failure to work properly over time
Regulatory Risk	Failure to secure proper approvals
Operational Risk	Failure of product during operation time
Safety Risk	Hazardous material failures
Supportability Risk	Failure to resupply important broken parts

Source: Lisa Guerra of NASA's Exploration Systems Mission Directorate

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2. Basics of risk management

- Risk management: Other factors to consider in assessing risk (but not limited to)
  - Factors to consider:
    - Complexity of management and technical interfaces
    - Design and test margins
    - Availability and allocation of resources such as mass, power, volume, data volume, data rates, and computing resources
    - Scheduling and manpower limitations
    - Ability to adjust to cost and funding profile constraints
    - Data handling, i.e., acquisition, archiving, distribution and analysis
    - Available facilities

Source: Lisa Guerra of NASA's Exploration Systems Mission Directorate

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2. Basics of risk management

- Risk Identification: How to identify risks
  - Possible sources to identify risks:
    - Risks are identified by the project team, peer reviews, lessons from past projects and expert review
  - Lessons learned from past should be captured systematically:
    - Lessons from past projects are captured via 'trigger questions', or questions that challenge a development strategy or design solution
  - Risk identification is an on-going task:
    - The project risk status and top ten risk list are reviewed periodically and at the project milestone reviews

Source: Lisa Guerra of NASA's Exploration Systems Mission Directorate

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2. Basics of risk management

- Risk Identification: Learning from the past
  - Examples of Trigger Questions
    - Have requirements been implemented such that a small change in requirements has the potential to cause large cost, performance or schedule system ramifications?
    - Do designs or requirements push the current state-of-the-art?
    - Has the concept for operating, maintaining, decommissioning or disposal of the system been adequately defined to ensure the identification of all requirements?
    - Has an independent cost estimate been performed?
    - Is the schedule adequate to handle the level of requirements or objectives changes that are occurring or are likely to occur?
    - Have the necessary facilities for environmental test been identified and availability problems been resolved?

Source: Lisa Guerra of NASA's Exploration Systems Mission Directorate

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2. Basics of risk management

- Risk Identification: While each project has unique risks, underlying sources of risks can harm every project
  - Examples of underlying risks:
    - Technical complexity - many design constraints or many dependent operational sequences having to occur in the right sequence and at the right time
    - Organizational complexity - many independent organizations having to perform with limited coordination
    - Inadequate margins or reserves
    - Inadequate implementation plans
    - Unrealistic schedules
    - Total and year-by-year budgets mismatched to the actual implementation risks
    - Over-optimistic designs pressured by expectations
    - Limited engineering analysis and understanding due to inadequate engineering tools and models
    - Inadequately trained or inexperienced project personnel
    - Inadequate processes or inadequate adherence to proven processes

Source: Lisa Guerra of NASA's Exploration Systems Mission Directorate

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Learned

- What we discussed today
  - different techniques of project management
  - techniques of risk assessment
  - helpful tools like GANTT Charts, WBS, network diagramms

- Thank you for your attention

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