DOD'S PHASED SYSTEM DEVELOPMENT PROCESS

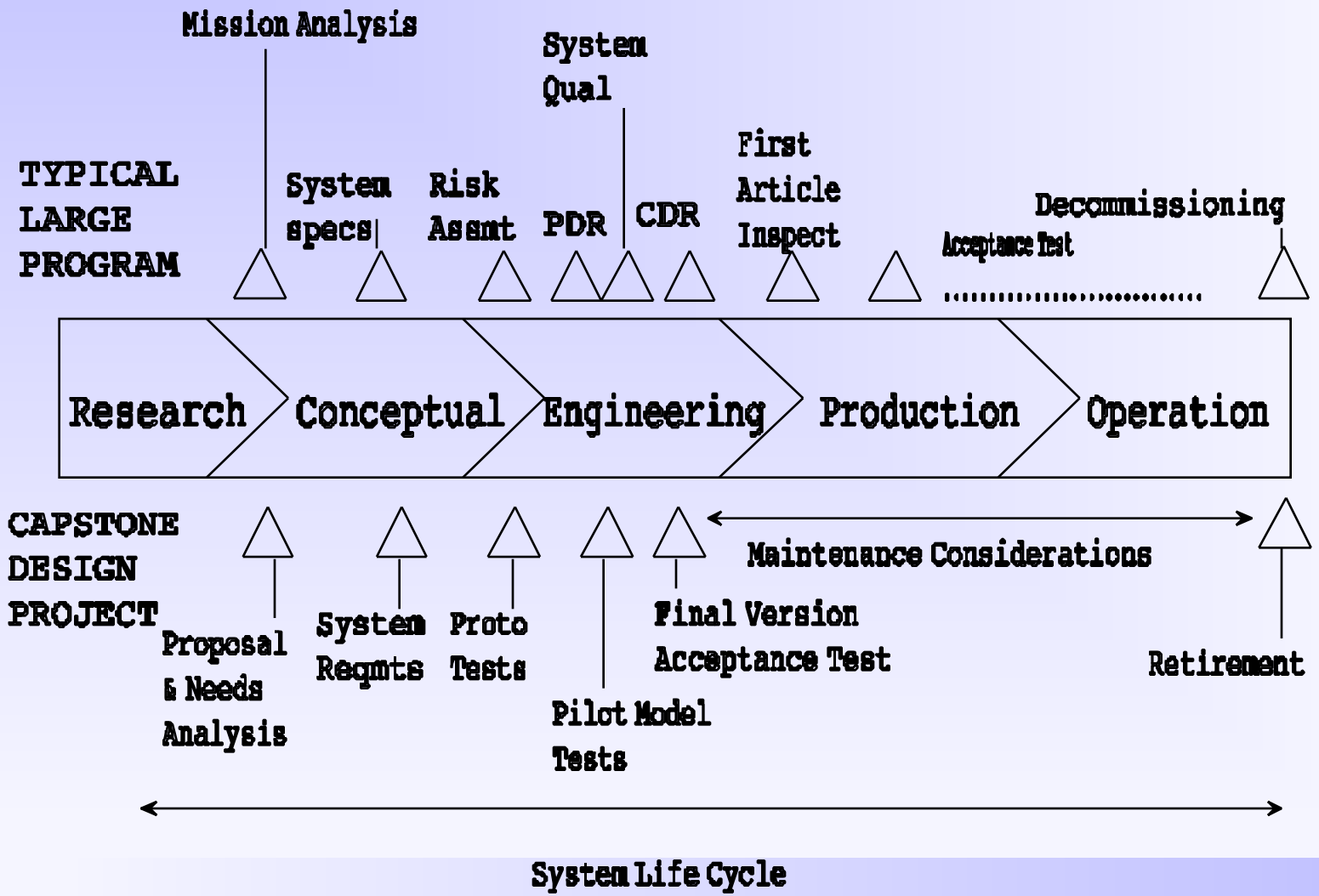
- OBJECTIVE
  - Orderly System definition growth and avoidance of premature entry into subsequent program phase.
  - Funds commitment based on reviews at specific points in program (determination of appropriate and effective base for next program phase.).

Design Project Process

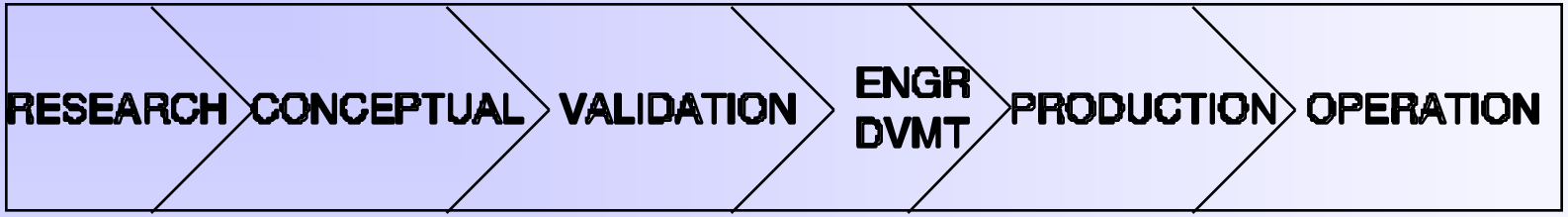
- OBJECTIVE
  - Orderly design definition growth and insurance that :
    - Design cost effectively satisfies all requirements.
    - Derived from an analysis of well defined needs.

- SUMMARY
  - Problem / Needs definition
  - Alternate solution strategies identified
  - Trade off analysis to select best solution approach based on explicitly stated criteria.
  - Baseline iteration system design evolution permits :
    - System requirements / Design changes due to reviews and test results
    - Configuration management
    - Quality assurance
    - System validations and qualifications (Thru pilot model)

Phased System Development Applied To Capstone Design Projects



DOD's System Development Process Phases

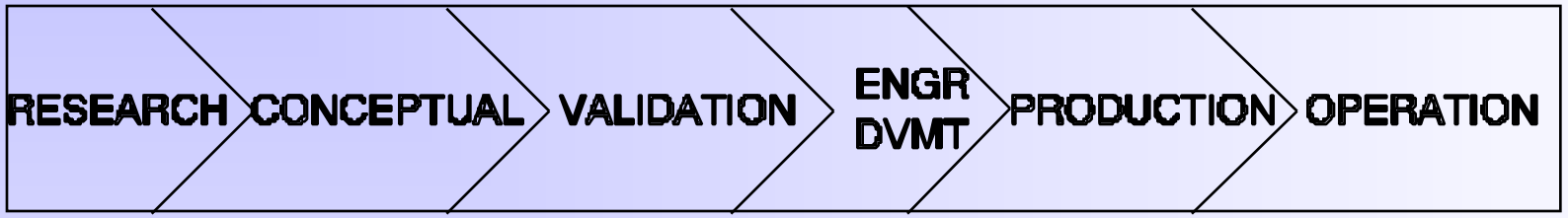


Development of scientific & technological base.	Mission & Conceptual System analysis.	Prototype testing & mission / System reqmts review/revis.	Prel. & det'd design. System integration & qualification.	Implement System & deliver to owner.	System use by owner.

MILESTONE & REVIEWS →

Mission reqmts review.	System reqmts review.	PDR	CDR	First article inspection.	IOC	Retire System.

Design Project Process Phases



RESEARCH	CONCEPTUAL	VALIDATION	ENGR DVMT	PRODUCTION	OPERATION
Literature search for project base.	Needs/problem def. Solution strategies & alternate approaches, end item identification, prel. proj. plans & sys reqmts. def.	Prototype def. implementation & test system reqmts & proj. plans, review/ revision prel legacy Rpt.	Pilot model dsn, imple. & test. Final dsn., user & tech. documentation.	Final imple. & test, Final legacy rpt.	Deliver to customer (presentation & demo.)

PROJECT MILESTONES

.. Project proposal ⟶ △

....System requirements & specificaiton review ⟶ △

.....Rapid Prototype detl'd design & test plan ⟶ △

.....Prototype test results review & Pilot version design and test report ⟶ △

Design Project Process

- TECHNICAL PERSPECTIVE
  - Research Base
  - Conceptual Base
    - Needs (mission) analysis
    - Requirement definition
    - Design Solution strategy definition
      - Alternate approaches
      - Comparative analysis (trade off studies))
    - Validation Phase
      - Needs Review
      - Design and approach feasibility
      - Rapid Prototyping
        - Design Issues
        - Prototype Design
        - Test plan and testing
        - Result analysis
        - Iterations where necessary

Engrg. Phase

Design Project Process

- TECHNICAL PERSPECTIVE (continued)
  - Engineering Development Phase
    - Implementation Feasibility
    - Pilot model
      - Construction / production issues
      - Pilot model design
      - Test plan and testing (qualification)
      - Result analysis
      - Iterations where necessary
  - Production Phase
    - Final system design
    - Acceptance test plan (verification)
    - Implementation and testing
    - Iterations where necessary
  - Operation Phase
    - Presentation and demonstration (transfer to owner)

Design Project Process

- DOCUMENTATION
  - Project Definition
    - Project plan (preliminary submitted with proposal)
    - The HOW, WHO, WHEN and WITH-WHAT of the project
    - Test plans and the procedures (details of required testing operations)
  - System Definition
    - System requirements
    - Design specifications
    - Technical manual
    - User's manual

Design Project Process

- Foundation
  - Literature and catalog search
  - Review design lab archive
- Conceptual definition
  - Need Analysis
  - System / operation description
    - Scenario - Performance requirements and maintenance considerations.
- Analysis
  - Alternate System Approaches trade-off
  - Risk Assessment

Project plan must cover all of these . . .

Design Project Process

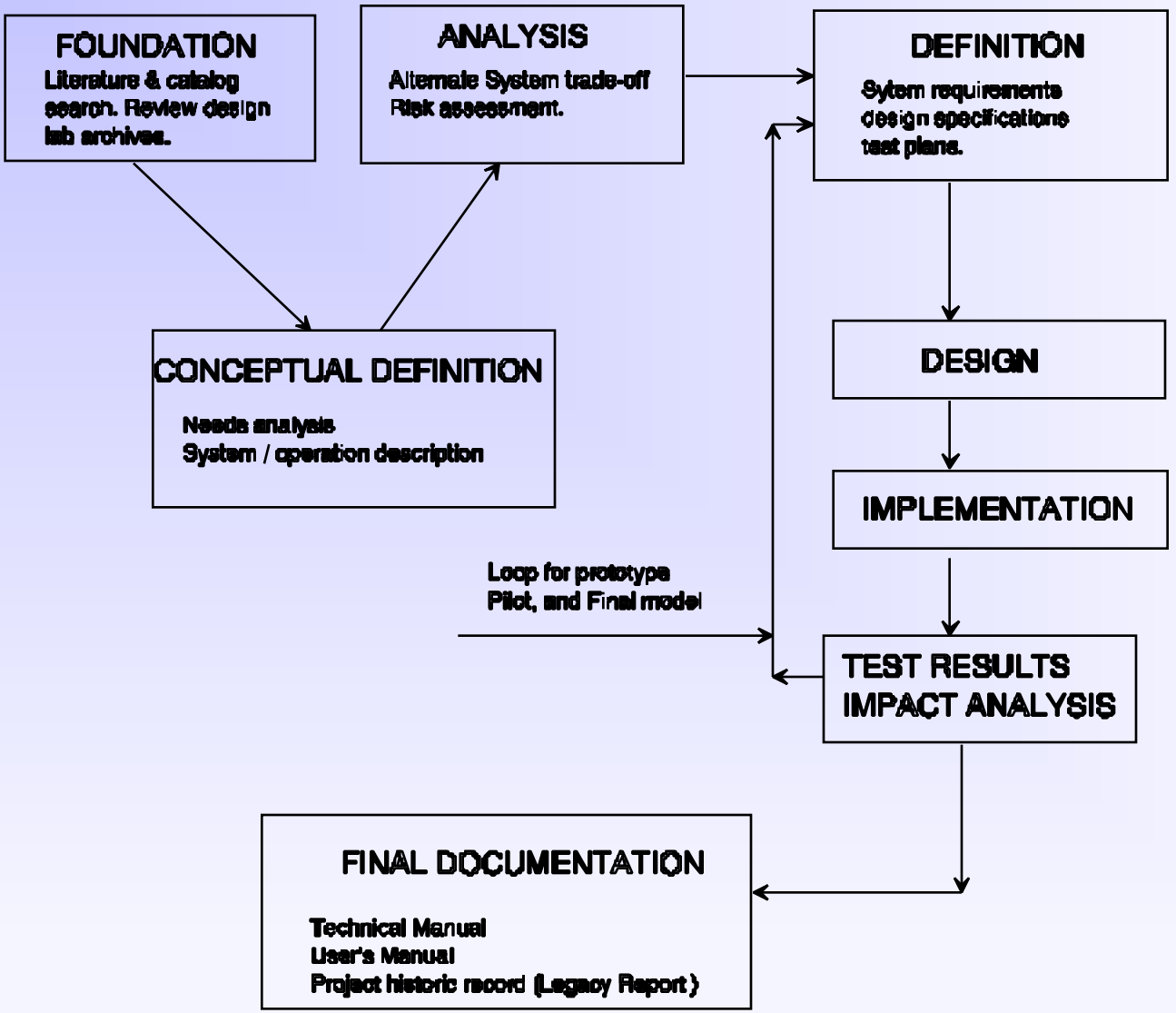
Loop for prototype, pilot, and final models

- Definition
  - System requirements
  - Design Specs
  - Test plans
- Design
- Implementation
- Test results impact analysis

Project plan must cover all of these

- Final documentation
  - Technical manual
  - User's manual
  - Historic record (legacy report)

THE DESIGN PROJECT PROCESS



Steps to project planning

- As a team, brainstorm possible needs to be satisfied.
- Select one of those identified
- In some detail, describe the needs to be satisfied, and the possible system approaches.
- Identify the system approach selection criteria (risk included), and select one via a trade-off analysis.
- Identify project milestones necessary to realize the given major milestone.

Steps to project planning

- Assign functional responsibilities to team members who then define the associated tasks: to whom assigned, when started, when completed, required inputs (and when), provided outputs (and when).
- Connect the tasks into a project task network, and define the required resources (and required dates)
- Define the project's management procedures (configuration management tracking and control, resource acquisition, quality assurance, etc.)

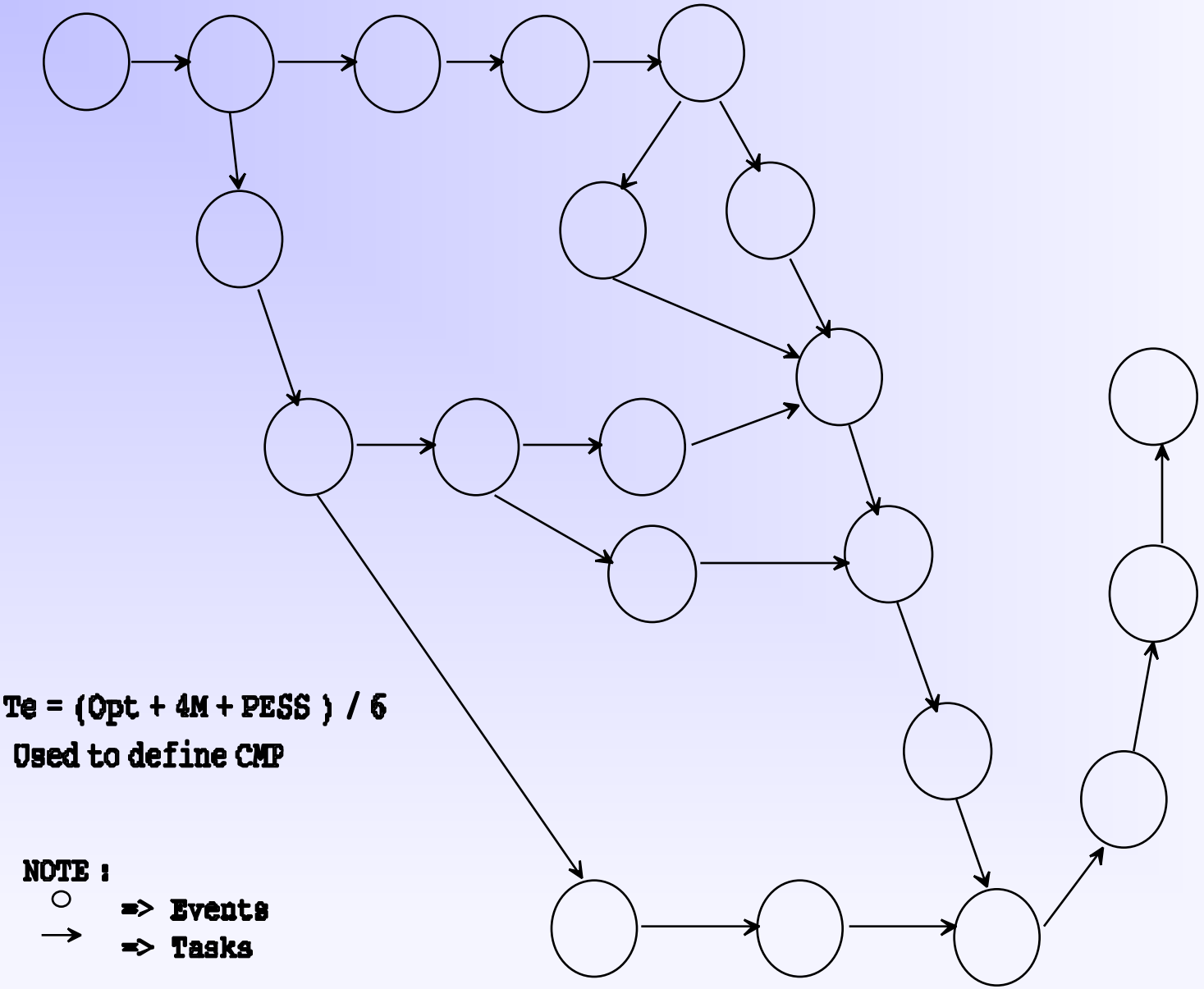
Project Planning

- Work Decomposition and Organization
  - Work Breakdown Structure (WBS)
- Scheduling
- Financial Management
  - Cost estimating, budgeting, reporting and control.
- Technical Performance
  - System performance decomposition to component level
  - Tracking / reporting to identify development problems for appropriate action.
  - Provides visibility as to meeting the system requirements during development process

Project Planning

- Work Breakdown Structure (WBS)
  - Top down work hierarchy definition
  - To low levels of responsibility assignment, cost estimates / accounting, scheduling, and performance assessment.
- Scheduling
  - Gantt charts - horizontal bar charts
  - Milestone charts
  - Performance Evaluation and Reporting Technique (PERT)
    - originally developed and used on the Polaris program by Lockheed.

SUMMARY NETWORK



Te = (Opt + 4M + PESS) / 6

Used to define CMP

NOTE :

○ => Events

→ => Tasks