2011 AAPM ® Global Handbook

International Project Management Commission ™
Certification Board of Standards

IPMC GLOBAL
INTERNATIONAL
PROJECT MANAGEMENT
COMMISSION ™

AAPM ® American Academy of Project Management ®
International Project Management Commission ™ Professional Credentialing

2011 Global Handbook
Member Prospectus
- Masters Designations and Certifications
- International Certification and Alliance
- Regional Training and Member Support
- Graduate PM Certification Diplomas

An overview of Corporate Project Management certification programs designed for industry professional

IPMC ™ & AAPM ® American Academy of Project Management ™ Professional Project Management Certification
"The Graduate PM Credentials "

Why choose the AAPM ® and The International Project Management Commission ™?

The IPMC and AAPM**®** are the world's fastest growing project management graduate commission, with members in over 100 countries.   The IPMC and AAPM**®** offer the prestigious MPM**®** CIPM **®** & PME ™ Designations. The International Project Management Commission and the American Academy of Project Management Training Division have joined forces for global training and certification….

"Our training and designations are held by Leaders in Government, Fortune 100 Countries, Consulting, Top Military, Technology Companies and & many more…"

AAPM's qualifications are recognized and listed and disclosed on the Department of Education Training registry and recognized and offered by the American Academy of Financial Management, Royal Society of Fellows, the TJSL Law School, Informa, IBC Asia, IQPC International Quality and Productivity Centers, International Management Academy, and Computer Pro PR.

We have broad experience in training groups and teams in a public venue and onsite. Further, our accredited PM trainers and approved providers have both deep industry experience and leading-edge strategic insight, methodologies and systems which will help achieve that return on training investment.

The AAPM ® IPMC ™ programs are developed with a primary focus on management needs, and **the ability to enhance knowledge and performance of your teams and managers**.

www.aapm.info
www.certifiedprojectmanager.us
www.certifiedprojectmanager.eu

Table of Contents of the IPMC AAPM ® Treatise of Protocols PM-TOP

Next-Generation Standards

A welcome note from the Chair of the Certifying Commission

Standards in education and career development is undergoing a revolution the globally. The applications of project management are widespread in government, military, construction, technology and more. While some educational companies seek to engage (non college educated) professionals in training programs that take 21 months to 4 years (or even longer), the AAPM ® Board and IPMC Commission was established largely by leaders from PM Industry looking for methods of raising the bar in accreditation mandates in graduate management education.

Rather than create broad project management designation for anybody who has completed the fundamental terminology or with a entry level diploma, the AAPM ® IPMC has taken a graduate approach to our program design and created post-nominal designations and executive training for college educated and graduate educated sector of project management professionals.   As such, The IPMC AAPM ® requirements ensures that each IPMC and AAPM professional maintains the highest level of demonstrated education and capability for a leadership or executive position in Project Management.

In the last few years, IPMC ™ and AAPM ® have had a meteoric rise in membership. We have expanded our operations globally with new alliances, training centers and operations in the USA, Middle-East, India, USA, Caribbean, South Africa, India, Eastern Europe, and throughout Asia. Of course at home in the Americas, we are still growing strong with increased recognition from the likes of the US Department of Education, United Nations, Dept of Labor, and others. Graduate applications for the MPM ® Masters Certification and the CIPM ® international core qualification are now possible through more than 40 of the world's leading colleges and universities that offer Project Management related Graduate Degrees. Although it can take 2-4 years to complete a degree with one of our IPMC ™ recognized programs, we do offer an executive intensive Certification training to groups that have met our admission and graduate educational requirements. This Copyrighted/Patented Executive Certification Training Model is available on location, in-house, on away at pre-determined resorts as per a corporate request.

Membership growth is accelerating with members in 140+ countries. Our quickest growing regions internationally are in EU, Asia, India, the Middle-East and Africa.   I invite you to review our 2011 executive programs and online programs designed for corporations in your part of the world.   Our relationships with leading fortune 500 company executives & employees continues to be a key strategy in defining the practical direction of our programs as our corporate members or clients have identified key development needs for their staff and for time management.

Together we are truly "Building the world's future leaders in Project Management ™"

Cordially and Kindest Regards,

George Mentz, JD, MBA, MPM®
Founder, Chairman and General Counsel of the AAPM ® Board of Standards

About the AAPM ® American Academy of Project Management ®

The AAPM ® was founded in 1996, via a consolidation between the CEC/PME Project Manager E-Business Committee (PME) and the Founders Advisory Committee of the Original Chartered Condor Falcon Graduate Institute of Leadership Development ™. The AAPM ® was originally established in as a professional society for graduate students, IT Managers, Government Employees, Military Officers, and Analysts. The Condor Falcon Management Institute of Graduate Leadership was founded to examine strategic leadership and planning issues for graduates professionals and leaders and to award the leadership, project management and consulting awards and designations. The AAPM ® Graduate Board currently recognizes over 12,000 Executive Project Managers, PhDs, Masters Degree Holders, government officials, and consultants as executive members in over 141 nations. As there had not been a graduate professional project manager organization specifically for Executives, MBAs, PhDs and accredited degree holders, The AAPM ™ has met this need and become the organization of choice for highly educated individuals or industry experts because AAPM requires an accredited college degree or graduate equivalent for membership and certification. The AAPM ® receives its license, sanction and authority from the Charter and Bylaws of The IPMC International Project Management Commission.

Furthermore, AAPM ® has several Primary global certifications available for its membership which are the: MPM ® Master Project Manager, CIPM ® Certified International Project Manager, PME ™ Project Manager E-Business, CPRM ™ Certified Project Risk Manager, MQM ™ Master of Quality Management or Master Quality Manager, CPE ™ Certified Planning Engineer, and CEC ™ Certified E-Commerce Consultant. The AAPM also offers several other specialist designations in: CEA ™ E-Marketing, CHRA ™ Human Resources, CPC ™ Certified Project Consultant, and MCP Management Consulting Professional.

The AAPM ® is the regulatory body for the much sought after AAPM ™ Designations and Credentials. The AAPM ™ Executive Designation Programs provide the assurance that the holder has met the suggested criteria for graduate credentials set out in the Ibanez US Supreme Court Decision and Dicta. Further, the AAPM board certification requires meeting 6 different levels of global criteria including ethics and our global body of standards which are the 1st Standards specifically based on the methodology used by global government agencies and departments. Acceptance into the AAPM is a high distinction and requires the holder to possess a graduate level portfolio of skills and knowledge. Acceptance statistics are not high, and the designation when achieved is a high honor strictly for accredited degree and graduate education holders or individuals with superior and equivalent backgrounds who have received government sanctioned, offered, and/or germane training.

A multitude of original content, books, manuals and training materials have been maticulously amassed by the AAPM ® and IPMC over the years. As an example, the newest updated edition of global training materials for MPM and CIPM was compiled via collaboration between experts from: Asia, India, Africa, The EU, Dubai and Hong Kong. As a global organization the AAPM board finds it necessary and urgent to include the best practices from advancing and industrialized countries and experts from around the world. Our AAPM ® IPMC GRAD/TOP Treatise of Protocols is evidence that our organization is focused on Graduate Professional Practices for todays managers, leaders, and executives.

The AAPM ® has seen a meteoric rise to affluence and membership in recent years, as executives and managers strive to maintain and augment their education, unique credentials, integrity, and skill sets. AAPM affords strategic recognition of over 40 of the top business programs globally including schools that are AACSB ™ Accredited Schools and The ACBSP ™ accredited business schools. Thus, AAPM accredits and recognizes only the best project management "college level or higher" educational and training programs. Further, the AAPM has been listed and disclosed as a training and certification provider with the US Department of Education Resource Directory and to the United Nations UNESCO. Further, the AAPM is the first organization in the world to offer a certification training program from an ABA Accredited Law School Recognized degree program.

AAPM's mission is to serve its global membership and stakeholders as a world leader in educating and reinforcing the international knowledge of executives and potential leadership of institutions. AAPM ™ now has representative offices in the US Colorado and LA, India, Africa, Asia, Latin America and South America, Singapore, The Caribbean, Europe, and more. AAPM ™ mandates consent to high standards of professional conduct, and AAPM ® activities are International in nature and scope.

* Notice on Recognition: Most professionals simply view the MPM ® as a credential that is higher or more advanced than the other basic credentials. It seems that it is a natural inclination to view the AAPM ® & IPMC masters designation as one that is above the others. Overall, because we require a college education, the IPMC and AAPM have further positioned the MPM®, CIPM®, CPE and PME above the other designations; however, this policy does prevent the multitude from joining the AAPM. and IPMC.

Certification or International Diploma Certification

The American Academy of Project Management ® offers a range of certifications for the Industry, Senior Executives and Management, and Corporate professionals in the Middle-East and Asia. Programs can be taken individually as an 'Executive Charter or Certification' program or collectively to achieve a Masters Certification or International Charter

Some of these programs are offered in the public arena by partner providers such as our Alliance and Official Training Programs in: Kuwait, Dubai, Jordon, Saudi Arabia, India, Australia, Hong Kong, Singapore South Africa and more, but others are specifically designed for deployment in-house in a customized fashion.

Individual program units typically run for 4 or 5 days and require specific EDUCATIONAL prerequisites for entry, which vary depending on the award offered. The program details, by competency area, are classified as follows:

◆ CIPM Certified International Project Manager ®

◆ MPM Master Project Manager ®

◆ PME ™ Project Manager E-Business ™

◆ CPE ™ Certified Planning Engineer ™

◆ MQM ™ Master Quality Manager ™ (Quality Control)

◆ CPRM ™ Certified Project Risk Manager

◆ CLC ™ Certified Leadership Consultant ™ (Project Leaders)

◆ PMd ™ Project Management Designation ™ (Fundamentals)

◆ PME ™ Project Manager E-Business ™ (IT Web Focus)

◆ CMA ™ Certified e-Marketing Analyst (Project Marketing)

◆ CHRA ™ Certified Human Resources Analyst ™

◆ CPC ™ Certified Project Consultant

◆ MCP ™ Management Consultant Professional ™

◆ QBC ™ Qualified Business Coach ™

Awards are offered first and foremost by the AAPM ® IPMC **™** through the American Academy of Project Management ® Worldwide, however, The MPM Masters Certification can be gained by attending one of our 40+ recognized international degree programs. Other designations are also offered through our alliance with the "CEC" Institute of Certified E-Commerce Consultants and the GBM Graduate Board of Management Worldwide Board of Standards.

AAPM ® IPMC ™ International Project Management Commission Handbook for Managers & Executives ©

IPMC GLOBAL
INTERNATIONAL
PROJECT MANAGEMENT
COMMISSION ™

Global Certification From the AAPM®

THE AMERICAN ACADEMY OF
PROJECT MANAGEMENT

<div align="center">**IPMC ™ International Project Management Commission**</div>

Mission:

The AAPM ® IPMC ™ International Project Management Commission provides standards for Board Certification in the areas of Graduate Project Management Knowledge and Methodology.

Rational:

As there had not been a graduate professional project manager organization specifically for Executives, MBAs, Managers of Teams, PhDs and accredited degree holders, The AAPM ® has met this need and become the organization of choice for highly educated individuals or industry experts because AAPM requires an accredited college degree or equivalent for membership and certification. The AAPM ® receives its license, sanction and authority from the IPMC International Project Management Commission ™.

Project Management - Certification Requirements

<div align="center">www.aapm.eu
www.certifiedprojectmanager.us</div>

The AAPM ® Executive Designation Programs provide the assurance that the holder has met the suggested criteria for graduate credentials set out in the <u>Ibanez</u> US Supreme Court Decision.   Further, the IPMC ™ and AAPM ® board certification requires meeting 6 different levels of global criteria including ethics and our global body of standards which are the 1st Standards specifically based on the documented methodology used by government agencies and departments.   Acceptance into the AAPM ® is a high distinction and requires the holder to possess a graduate level portfolio of skills and knowledge.   Acceptance statistics are not high, and the designation when achieved is a high honor strictly for accredited degree holders or individuals with equivalent backgrounds.

6 Graduate Level Requirements of AAPM ® and IPMC:

1. AAPM ® IPMC ™ Commission Sanctioned Education
2. College Education or Equivalent
3. Successful Assessment or Testing
4. Abiding by the AAPM ® IPMC ™ Ethics Agreement
5. Project Management Experience
6. Sanctioned IPMC AAPM ® Continuing Education

After completing the training with an approved provider and successfully completing all membership criteria for AAPM ® certification, the training provider can then forward the nomination to the IPMC ™ Board of Standards for Processing and Registration for global board certification and designations. You then become listed on our global database which allows you to be credential checked and confirmed online from around the world while also giving you private login access to world class project management articles, publications, power points, job tools, and information.

Foundational Ethical Policy and Code of Conduct for the AAPM ® Global Members

- Members agree to abide by all of the laws of your jurisdiction and country of employment regardless of where you are living.
- To keep all customer and project relationships and information confidential unless Members can legally disclose it.
- Members are to engage all projects with effectiveness and efficiency.
- To work with zeal and diligence with all projects
- To communicate in good faith with your team members
- You are to use the IPMC Trademarks in the spirit of high ethical standards

IPMC ™ Commission - Purposes of Project Management

The purpose of Executive Project Management is to ensure the project achieves its goals & objectives, by planning, directing, tracking, and controlling, and improving the activities necessary for development and delivery of required products and services.

The IPMC ™ Project Management Methodology involves developing plans and maintaining them throughout the project life cycle. Estimates are established and maintained regarding cost, schedule, size of work products, and critical technical parameters. Commitments to project objectives and plans are established and maintained throughout the project. Project participants and stakeholders are identified and organized to meet project objectives. As the project is executed, the project and performance are monitored and tracked in accordance with the plan. Corrective actions are taken as needed to ensure the project will meet its objectives. Continuous improvement is enhanced at all levels.

Goals of Executive Project Management

1. Projects are established, maintained, and executed to provide required products and services that reflect customer and stakeholder needs.
2. Estimates of the project's planning parameters are established and maintained to support resource estimates.
3. Commitments related to the project are established and maintained.
4. Progress of the project is evaluated against its plans.
5. Corrective actions are taken when appropriate and managed to closure.

The Essence of the AAPM ® IPMC   Methodology

Project management methods are used to establish and evolve project plans, to assess actual achievement and progress against the plans, and to control execution of the project to successful conclusion. The resources applied to project management should be scaled according to the size and complexity of the project. Stakeholders should be involved in project planning to ensure every participant understands what resources are required and commits to providing them when needed. Examples of small projects are typically found in research or infrastructure efforts. The determination and continuous adjustment of the appropriate effort and scope for management of a project is an appropriate activity of Project Management. Coordination and commitment among affected groups and individuals (stakeholders) is critical to successful development and execution of plans. The detail and formality with which Project Management steps are applied should be adjusted according to the size, criticality, complexity, and risk of projects. Some level of disciplined project management is appropriate for the smallest of projects. Project Management methods and steps are applicable to all manner of projects, including planning, new product or service design and development, production, operations, maintenance, product or services evaluation, and support. Project Management applies to managing a business unit or a service organization. The project manager is ultimately responsible to the customer.

Project Management Gains Control Over the following

> **TIME -** The amount of time required to complete the project. Typically broken down for analytical purposes into the time required to complete the components of the project.
> **COST -** Calculated from the time variable. Cost to develop an internal project is time multiplied by the cost of the team members involved.
> **QUALITY -** The amount of time put into individual tasks determines the overall quality of the project.
> **SCOPE -** Requirements specified for the end result. The overall definition of what the project is supposed to accomplish, and a specific description of what the end result should be or accomplish.
> RISK - Potential points of failure. Most risks or potential failures can be overcome or resolved, given enough time and resources.

AAPM ® Project Management is composed of several different types of activities such as:

◆ **Planning the work**
◆ **Assessing risk**
◆ **Estimating resources**
◆ **Organizing the work**
◆ **Acquiring human and material resources**
◆ **Assigning tasks**
◆ **Directing activities**
◆ **Controlling project execution**
◆ **Reporting progress**
◆ **Analyzing the results based on the facts achieved**

AAPM ® IPMC ™ 12 Steps to Project Management © and Project Management Best Practices

1. **Define project objectives, scope, and outputs:** Define project objectives, scope, and the work products and services that are to be provided by the project.
2. **Define the activities and life-cycle approach:** Define the activities needed to achieve project outputs and the life-cycle approach that will be used.
3. **Estimate planning parameters:** Estimate and document the work product and task planning parameters that provide a basis for resource estimates.
4. **Estimate project resource requirements:** Estimate the project effort, cost, and other resource requirements.
5. **Establish schedules:** Develop management and technical schedules for the project.
6. **Establish and maintain plans:** Establish and maintain a complete set of plans for providing the products and services throughout the project life cycle.
7. **Establish commitment:** Establish and maintain commitment of affected groups and individuals to project objectives and plans, and commitment of resources as identified in the plan.
8. **Organize to meet project objectives:** Identify individuals or teams that will be assigned the resources and responsibilities for meeting project objectives.
9. **Direct the project:** Communicate project plans, direction, corrective actions, and status, and coordinate project activities.
10. **Monitor Project Performance:** Monitor and track project activities and results against plans.
11. **Review and Analyze Project Performance:** Conduct formal and informal reviews of project performance and analyze variances from plans.
12. **Take Corrective Action:** Take corrective actions to address problems.

AAPM ® Expanded list of 12 Steps to the Best Practices of Executive Project Management

1. Define project objectives, scope, and outputs

Define project objectives, scope, and the work products and services that are to be provided by the project.

Description
Determine project objectives and measures that will be used to evaluate performance. Identify project constraints, and the scope of the project endeavor. Confirm the customers for the products and services that the project will deliver. Identify and define the products and services that will constitute the deliverable outputs of the project. Work product and service definition includes the characteristics and requirements of work products and the criteria by which they will be evaluated. Work product requirements flow from or trace to the product and service requirements established as inputs to the project (i.e., outputs of Requirements. A project may have been initiated based on a statement of need, and more precise project requirements may be a project deliverable. Identify interim (non-deliverable) work products and their requirements.

Typical Work Products

- project objectives, scope, and constraints
- project performance measures
- deliverables
- work products, and services
- characteristics, requirements, and evaluation criteria for products and services - non-deliverable work products and their requirements (deliverables are inputs)
- lists of project information items and categories of information to be managed
- list of customers
- key technical parameters

Notes
Examples and guides for work product definition (e.g., requirement and design document templates) can be found in industry standards on engineering and project management.

- Review customer contracts and statements of work to identify work products and activities.
- Correlate work products and deliverables with identified activities.
- Review orders, policies, and <u>regulations</u>.
- Identify the project objectives and constraints in terms of quality, cost, time and stakeholder satisfaction. Identify each objective with a level of detail that permits selection, tailoring, and implementation of the appropriate processes and activities.
- Define the project <u>scope</u> based on the stages in the whole system life cycle. Confirm that the project includes all the relevant activities required to satisfy the decision criteria and complete the project successfully.

2. Define the activities and life-cycle approach

Define the activities needed to achieve project outputs, and the life-cycle approach that will be used.

Description
This practice identifies the activities that will be carried out. Project activities include management, technical, and support activities that form the basis for providing the required products or services. Management activities include activities for continual assessment of plan execution and application of appropriate corrective actions and re-planning. Support activities may pertain to configuration management, information management, quality assurance, training, measurement, or establishment of facilities. Because of the potentially large number of activities that need to be planned, an organized and disciplined approach should be followed for activity identification.

This practice also structures those activities into life-cycle phases that will be used by the project to provide the required products or services. Considerations in selecting the project life cycle are whether the product or service is/was (already performed), the degree of risk (technical, cost, and schedule), and the project size and duration. Determination of the life-cycle approach considers management issues such as in-house development or outsourcing, and the use of non-developmental items. Typical life cycle models include waterfall, evolutionary spiral, and incremental.

The documented management, technical, and support activities provide the basis for plans for the project and for a schedule of project activities.

Typical Work Products

- work breakdown structure
- lists of identified activities
- activity descriptions
- product and service evaluation tasks for development of needed support plans, such as configuration management, quality assurance, and verification plans
- tasks for integration and life-cycle management of non-developmental items
- selected project life cycle model
- selected technical process
- project phases
- project commitment decision points
- criteria for continuing into subsequent phases
- cycles and phases of operation
- maintenance cycles

Notes

Sources for identification of project activities include work product hierarchies and activity lists from other projects. Historical data from similar projects, where available, can be used as a reference in developing the list of activities in order to gain confidence that the list is complete. Methods such as the Delphi method, whereby peer-level experts are used to add activities and refine the list may also be helpful.

The project's life-cycle phases should include planned periods for evaluation and decision making. These periods provide for logical decision points that allow relatively efficient project course corrections and appropriate decision and analysis regarding significant commitment of future resources. The technical plan developed in Establish and Maintain Plans will include process activities, inputs, outputs, sequences, and quality measures that are tied to the increments in the identified lifecycle model.

Additional Practice Guidance

- Review historical records for similar projects to aid in identifying all the required activities.
- Consult with experts to identify activities.
- Conduct peer reviews and brainstorming sessions to identify activities.
- Compare the list of project activities with the requirements to aid in maintaining consistency between plans and requirements.
- Evaluate alternative life-cycle models against established selection criteria.
- Establish decision criteria for continuing into subsequent phases.
- Develop alternative courses of action for subsequent phases.

3. Estimate planning parameters

Estimate and document the work product and task planning parameters that provide a basis for resource estimates.

Description
Determination of justifiable planning parameters (e.g., size, scope, and complexity) is a prerequisite for estimating the project effort hours, cost, and schedule. The project's scope and size is dependent on the technical approach and can be estimated by decomposing the conceptual product or service into component elements that are similar to those of other projects. Size estimates can then be adjusted for factors such as differences in complexity or other parameters throughout the life cycle of the project.

Historical sources and models calibrated to historical experiences often provide information for initial size estimates. Initial estimates can be refined as more information on the current project becomes available. Planning parameters should be documented and their validity tracked so they can be refined to support re-planning or planning for other projects.

Typical Work Products

- required skill level of staff
- maximum number of vessels per hour per route
- average/maximum number of service requests per week (if not specified by customer)
- average time to respond to a service request
- average/maximum number of change requests per week (if not specified by customer)
- average and maximum number of hospital patients per week
- number of functions, inputs and outputs, data volume
- number and frequency of user interactions
- number and complexity of interfaces
- number of technical risk items
- number of source lines of code or function points
- computer resources
- number of cards of electronics
- number of cubic yards of material to be moved
- relative complexity of work products and tasks
- planning parameter rationale

Notes

A considerable amount of project data, including scope, requirements, and material items must be identified and evaluated prior to estimating cost, schedule, and material needs. Checklists and historical data from other projects can be used to identify cost items that may otherwise be overlooked. Variance reports and lessons-learned documents are typically good sources of this type of information. Planning parameters are dependent on the technical approach, i.e., the top-level strategy for development of the products. Determination of the technical approach may require a high-level iteration of the architecture and design process for the product or service. In the case of products it may include decisions on architectural features, such as distributed or client server; state-of-the-art or established technologies to be applied, such as robotics, composite materials, or artificial intelligence; and breadth of the functionality expected in the final products, such as safety, security, and ergonomics. In the case of services, the technical approach may include such factors as which service element(s) will interact with customers, how customer service issues will be processed and resolved, and how premium services will be priced and marketed.

Estimates are incorporated into the plans and are maintained throughout the full life cycle.

Additional Practice Guidance

- Base planning parameters on the identified tasks, products, and services and on the technical approach.
- Use established historical data or models to determine the planning parameters.
- Document the basis and rationale for planning parameters for use in maintaining plans.

Organize and AcquireStaff
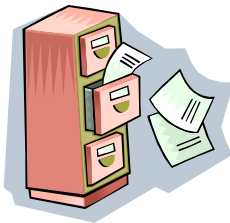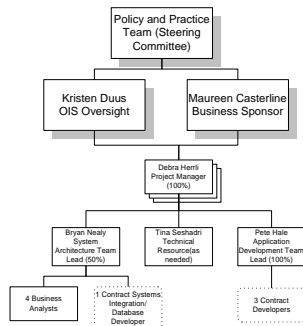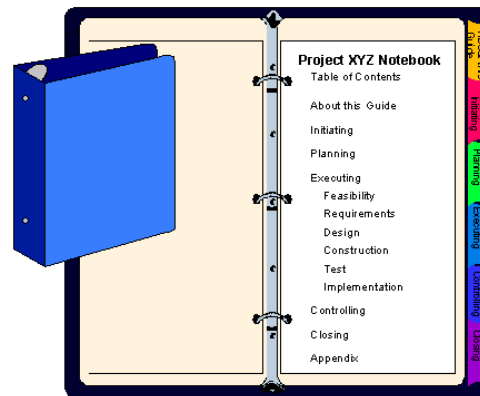
4. Estimate project resource requirements

Estimate the project effort, cost, and other resource requirements.

Description
Estimates of effort hours and cost are determined by applying labor and cost estimation methods to the planning parameters and the identified tasks, work products, and services with consideration to schedule and other constraints. Historical parameters or cost models calibrated to historical data are employed to estimate labor costs based on job complexity, tools, available skills and experience, schedules, and direct and overhead rates for similar projects. Estimation parameters and models should be based on measurement data and available from an organizational repository. Other resource requirements, including special skills and knowledge, are determined by reviewing the project requirements and the technical approach.

A detailed estimate of project costs, including life-cycle support costs is essential to good project management. Estimates of project costs are made by determining the labor costs, material costs, and subcontractor costs expected for the project's planned activities and the identified scope of the system to be built. Both direct costs and indirect costs (such as the cost of infrastructure, work environment, tools, training, special test and support items) are included. Appropriate reserves are established, based on identified risks.

Estimates are independently reviewed.

Typical Work Products

- total labor hours by skill level and schedule
- total labor cost by skill level and schedule
- cost of material by item, vendor, and schedule
- cost of subcontracts by vendor and schedule
- identification of skills and knowledge not commonly available
- cost of acquisition
- cost of tools
- cost of training
- life cycle support costs
- supporting rationale

Notes

A considerable amount of project data such as scope, schedule, planning parameters, and material items must be collected prior to estimating costs. Checklists and historical data from other projects can be used to identify cost items that may otherwise be overlooked. Variance reports and lessons-learned documents are typically good sources of this type of information. Estimates may be derived from historical sources, calibrated models, Delphi methods, or other ways. Estimates are incorporated with the plans and maintained throughout the full life cycle.

Additional Practice Guidance

- Use checklists and lessons learned from other programs to assure that all costs are determined.
- Include supporting infrastructure needs when estimating schedule and cost.
- Maintain a repository of costing models and historical data to support re-planning and planning for future projects.
- Confirm that effort and cost estimates are based on credible prediction factors (rationale) that take into account work product size and complexity, requirements, risk, technical feasibility, security issues, precedence, historical performance, and availability of personnel skill.
- Examine the project schedule and identify the types of resources required at each point in time.
- List resources that are not easily obtainable. Cross check and augment this list by identifying skills that are required to synthesize the system and work products.

Estimate Resource Costs

Develop cost estimates for:

- internal & external labor (hrs,rates)
- materials
- supplies
- contracts and legal costs
- special costs
- fluctuating costs i.e. steel

Estimate

refined during the
course of the project ,
definitive just prior
to construction

Build Budget and Spending Plan

Budgeting involves assigning the cost estimates to all the tasks creating a cost baseline.

Budget/Spending Plan					
	Jan	Feb	Mar	Jun	So on
Internal Labor	5,000	5,000	5,000	6,000	6,000
External Labor	0	0	15,000	15,000	15,000
HW/SW	0	0	7,000	7000	0
Contracts	0	0	5,000	5000	10,000
Training	0	3,000			3,000
Total	5,000	8,000	32,000	32,000	34,000
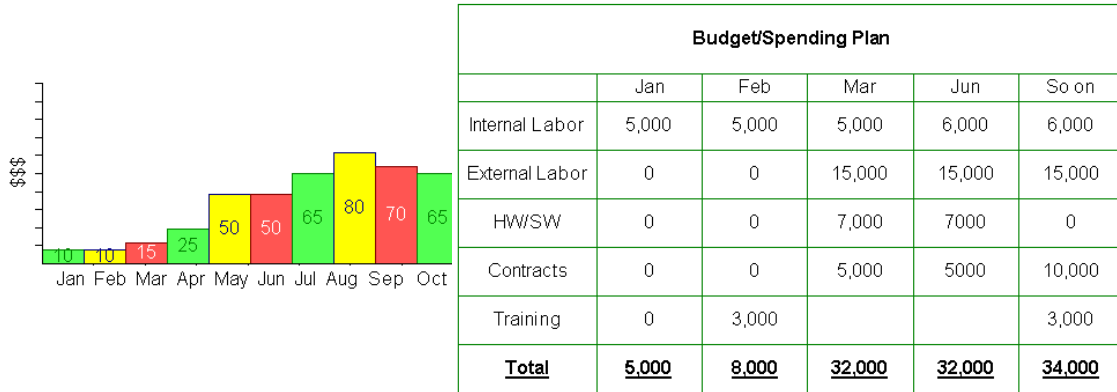
5. Establish schedules

Develop management and technical schedules for the project.

Description
Coordinated schedules, at an appropriate level of detail, are needed for all project activities including work product and service development, formal and informal management and technical evaluations, support functions, and acquisition of materials, skills, knowledge, tools, and facilities. Schedules are based on verifiable effort models or data for identified tasks, and must allow for task interdependencies and the availability of procured items. Schedules should include slack time appropriate for identified risks. All affected parties must review and commit to schedules.

Typical Work Products

- activity charts
- PERT diagrams (See PERT in Table of Contents)
- project schedules
- milestone charts
- technical schedules
- critical paths
- schedule dependencies

Notes

The determination of schedules interacts strongly with the other project management practices. Scheduled activities are organized within the lifecycle phases and must account for all identified activities and work products of the project master plan and supporting plans. Management of schedule item dependencies and reserves (e.g., slack time) are coordinated with identified risks and risk mitigation activities.

Milestones for contractor product and service delivery often merit special attention due to the increased risk (factors outside direct control of the project). Schedule events should be included for monitoring the status of externally acquired products and services. For example, if the project is critically dependent on training services (e.g., training on a specific type of equipment to support its maintenance service) it may be advisable to add milestones to check the status of the training availability and/or its procurement status.

On complex projects it may be advantageous to define near-term activities more precisely than activities that start later in the project ("rolling wave approach"). Schedules should be evaluated against labor profiles in order to level peaks and valleys in labor needs.

Additional Practice Guidance

- Identify events and accomplishments that affect achievement of schedule milestones.
- Schedule reviews with a frequency that supports effective and efficient corrective action.
- Schedule slack time to allow for corrective action prior to the start of subsequent tasks.
- Identify and evaluate risks associated with meeting schedule milestones.

Gantt Chart

Task Name		October	November	December	Janua
	9/10 9/17 9/24	10/1 10/8 10/15 10/22 10/29	11/5 11/12 11/19 11/26	12/3 12/10 12/17 12/24	12/31
Initiate					
Product Description & Benefits					
Charter					
Project Proposal Approved	9/18				
Plan					
Scope Statement					
Work Plan					
Contract/Procurement Plan					
QA Plan					
Risk Plan					
Project Plans Approved	9/27				
Execute					
Requirements					
Analysis					
Design					
Coding					
Testing					
Maintenance					
Controls					
Status Reporting					
Change Management					
Communication Mgmt					
Closing					
Evaluation					
Maintenance Turn-over					

> **Terminology -**
> This is a schedule or Gantt chart,
> not a WBS, not the project plan

6. Establish and maintain plans

Establish and maintain a complete set of plans for providing the products and services throughout the project life cycle.

Description
Establishing and maintaining a complete set of plans that define the project, management of the project, and interaction with internal and external organizations is critical to project success. The project plans are policy-driven, documented descriptions of all theresources, management, and technical activities, supporting and infrastructure activities, responsibilities and schedules needed to meet the project's product, service, and organizational objectives. They include commitment and coordination among project staff and with other affected individuals and groups. Initial plans and updates are provided with the timeliness needed to meet project and customer objectives.

Provisions for verification of work products, services, process compliance, and corrective actions are included. Plans are updated and maintained in concert with the need for corrective actions as determined via the monitor and control practices.

Supporting plans are needed for a broad range of support functions that are necessary for successful delivery of products and services to the customer. These include definition of the structure of authority and responsibility; acquisition of materials, goods, and enabling services (e.g., plans for solicitation, supplier selection, acceptance, contract administration and contract closure); identification and management of project information (including its security, archival, and availability to project staff), provision for development facilities and tools; and definition of project quality activities. Project support plans should be integrated by defining their interfaces and work product dependencies. Planning for infrastructure and support includes planning the activities to develop these supporting plans.

Typical Work Products

- project management plan
- updates to plans
- criteria for plan revisions
- project memoranda (for minor plan changes)
- plan content requirements
- project resources
- risks
- project organization and assignments
- project schedule
- selected systems engineering process for the project
- subordinate supporting plans
    - configuration management and information management
    - quality management
    - training plans (project-unique)
    - risk management
    - security and safety
    - acquisition of products and services, reuse and COTS
    - budgeting/funding increments
    - acquisition of skill and knowledge
    - facilities and support environment (tools, communication equipment, computers)
    - product and service evaluations
    - monitoring, tracking, and review
    - on-going process improvement

Notes
Planning of the technical activities for the full life cycle is identified in the project plans. Engineering activities should be integrated into technical planning for the entire project. These activities include the planning of engineering support facilities and tools.

Technical management plans typically include:

- plans for developing the products and services
- plans for interacting with other organizations (e.g., subcontractors) performing the technical effort

Plans should include key technical parameters that can be traced over the life of the project and that will serve as in-progress indicators for meeting the technical objectives. Key technical parameters can be identified through interaction with the customer, customer requirements, market research, prototypes, identified risks, or historical experience on similar projects. Each technical parameter to be tracked should have a threshold or tolerance beyond which some corrective action would be expected. Key technical parameters should have pre-planned assessments scheduled at useful points in the project schedule.

Decisions will need to be made as to whether to include infrastructure and support planning in the project plan or in subordinate plans, based on the size and complexity of the project. Acknowledged experts, other project plans, organization policies and procedures, and lessons learned are sources for infrastructure and support planning.

The responsibility for project-unique skill and knowledge is shared by project management and organizational training functions. Project management is responsible for identifying project skill and knowledge needs, individual training plans for project staff, coordination of training with the organizational training function, and coordination of the acquisition of external expertise with Contracts Management.

Additional Practice Guidance

- Involve appropriate stakeholders in developing project plans.
- Establish methods for rapid amendments to plans (e.g., between plan updates).
- Establish methods for providing operation detail for plans, such as project directives.
- Include performance thresholds for corrective actions.
- Provide a mechanism to trigger plan updates when requirements change.
- Base the need for infrastructure and support plans on project size and complexity.
- Identify the infrastructure and support plan stakeholders.
- Coordinate and integrate the various infrastructure and support plans.

* Gain Agreement on the Project Plan
The project plan formally captures and documents agreements among customers, stakeholders and project participants. Secure an informed agreement up front, and maintain this agreement throughout the project life. This will ensure that the project meets expected results. This will also help align the project with the organization's business plans and supporting plans. Over time, manage the project scope carefully, since there will be a tendency for different areas of the project to acquire their own divergent momentum.

7. Establish Commitment

Establish and maintain commitment of affected groups and individuals to project objectives and plans, and commitment of resources as identified in the plan.

Description
This practice provides for negotiation and obtaining commitment of project staff and of the affected groups and individuals that interface with the project. Commitment of individuals and groups is based a common understanding of the project objectives (shared vision) and the activities and resources needed to achieve the objectives. Establishing commitment includes negotiating project resources, scope, and requirements with management and customers in order to secure the commitment of resources identified in the plan. Commitment is maintained throughout the project duration.

Assign requirements and responsibilities to individuals and teams. Obtain commitment from project individuals and teams and from external entities to their assigned requirements, responsibilities and resources. Commitment of individuals and groups is based a common understanding of the project objectives (shared vision) and the activities and resources needed to achieve the objectives. Establishing commitment includes negotiating project resources, scope and requirements with management and customers in order to secure the commitment of resources identified in the plan. Commitment is maintained throughout the project duration.

The objective of project plan reviews is to ensure a bottom-up, common understanding of the process, resources, schedule, and information requirements by affected groups and individuals (stakeholders) throughout the project. Inputs on the project plan are solicited from all affected organizational elements and project staff. Whenever possible, these inputs are incorporated to build team ownership of the plans. If an input is rejected or modified, feedback is provided to the originator. Interim and completed project plans are distributed for review. A commitment to the project plans is obtained from all groups comprising the project team.

Project interfaces include any interface with organizations and individuals that are necessary to successful project execution, whether they are inside or outside the project group. Types of interaction include information exchange, tasking, and deliveries. Methods and processes (including controls) for interaction are established as appropriate for the parties that are interacting.

Typical Work Products

- documented commitment from individuals, teams, organizational elements, suppliers and customers
- committed resources
- allocated funds
- defined processes for project interfaces
- interface issues between disciplines/groups
- memoranda of understanding
- risks
- project plan inputs
- project plan comments
- project plan issues and resolutions

Notes

Affected groups and individuals typically include:

- software engineering
- hardware engineering
- manufacturing
- management
- customers
- users
- partners
- subcontractors

Establishing the commitment of individuals to their assigned responsibilities requires that the individual have a full understanding of the required tasks and a justifiable confidence that the task(s) can be performed with the assigned resources. Commitments lacking such understanding and confidence pose a risk to the project. In general achieving individual commitment requires a negotiation between project management and the individual. Negotiation may result in identifying new approaches to performing tasks, new tools, additional training, requirement changes, or changes in budget or schedule.

An example of achieving the commitment of groups to plans involves structured reviews. Identify questions that each group should answer as part of their review for commitment. The questions may be different for different groups. Communicate to the groups how the review will be conducted. Provide the technical management plans to the groups and meet with them at a pre-arranged time to discuss their comments. Produce a list of issues from the reviewers' comments and work on each issue until it is resolved.

1. Identify the project plan stakeholders and affected groups and organizations.
2. Solicit plan inputs and review comments.
3. Negotiate commitment and responsibility with project staff.
4. Reconcile available resources with the scope of work.

* The Lead Manager or MPM ™ Master Project Manager will have mastered these qualities.

1. ***Drive***.
2. ***Ability to Build Consensus***.
3. ***Ability to Take Risks***.
4. ***Ability to Communicate***.
5. ***Experience***..
6. ***Technical Knowledge***.
7. ***Sense of the Big Picture***.

8. Organize to meet project objectives.

Identify individuals or teams that will be assigned the resources and responsibilities for meeting project objectives.

Description
Establish a project organizational structure appropriate to the project activities and work products. Establish and use integrated teams for groups of activities or work products that are interdependent or that would benefit from the characteristics of integrated teams. Establish an appropriate number and size of teams based on consideration of project characteristics, work product dependencies and an efficient balance between inter- and intra-team coordination. Define the scope of work for individuals and teams and confirm that the number of teams and work scope is viable through a preliminary assignment of requirements and responsibilities and analysis of workloads and overall work coverage. Identify stakeholders appropriate for participation in project activities, and maintain and communicate stakeholder lists. Consider the project activities that would benefit from stakeholder participation and identify stakeholders according to their relevance to the activities.

Typical Work Products

- project organizational structure
- integrated team identifications
- integrated team membership
- inter-team coordination procedures
- team charters
- team and individual objectives, assignments, and resources
- lists of stakeholders by activity
- stakeholder contact information
- stakeholder availability and constraints
- stakeholder information access mechanisms and procedures
- review and meeting distribution lists
- stakeholder inputs

Notes
Project organization around integrated teams has been found to work well in project situations with the following characteristics:

- Project results are organized and managed around work products, as opposed to activities (team focus on work products).
- The project has technology risks or issues whose resolution would benefit from focused diversity of inputs and team synergy.
- Work products assigned to teams have a complex and highly interdependent structure that would benefit from the tight coordination provided by teams.
- Labor and schedule resources are available to support the slightly higher overhead involved in intra-team coordination and decision making.

In some cases (typically the inverse of the above) individual assignments may be more effective. (For example, a work product that can be sub-divided into relatively independent parts and handled by highly skilled individuals, where effort and schedule are highly constrained.) The integrated team structure can encompass the whole project with a network of sub-teams, coordination teams, and individuals. The Integrated Teaming process area provides detailed practices on establishing and supporting integrated teams.

Candidates for stakeholders include, in addition to project staff, higher levels of management, customers, users, customer experts, law enforcement, and policy-makers. In the FAA context, stakeholder candidates include passengers, pilots, crew, controllers, management, division or departmental staff, site municipal officials, lawmakers, news media, and the general public. Refer to the practices of the Needs process area regarding identification of stakeholders.

Additional Practice Guidance

- *Coordinate Teams*
- *Involve Appropriate Stakeholders* in determining corrective actions.
- *Define Success Up Front* - Define project success in terms of specific business objectives. From the customer's point of view, how should different business objectives be prioritized?
- *Use Metrics to Focus On Outcomes* - Focus on outcomes rather than outputs. Prioritize the metrics for which project participants will be held responsible. Gain agreement on critical metrics and use them to drive planning and delivery.
- *Integrate Planning Activities Across the Project* - Formalize planning processes. Assign roles and responsibilities specifically for planning-related activities. The CEO or other executives can help anchor project plans in the organization's business and planning.
- *Realign Plans Over Time* - How will plans need to be modified along the way? Make sure project plans continue to support intended business priorities. If the project encounters significant changes, then the original plans will have to be realigned to ensure desired results.

9. Direct the project

Communicate project plans, direction, corrective actions, and status, and coordinate project activities.

Description
Provide day-to-day direction for the project including distribution of project plans and addenda, authorization to commence work on project activities, direction to suspend or terminate activities, resolution of questions and issues, communication of project status and meetings, coordination among tasks and individuals, and ad-hoc tasking as required. Maintain informal participation and contact with project staff and stakeholders to keep informed on progress, issues, and staff morale.

Schedule project activities, such as reviews, with consideration of stakeholder commitments and constraints. Provide stakeholders with appropriate access to project information. Obtain inputs from stakeholders on requirements, issues, and work product and schedule dependencies.

Provide for communication and coordination among individuals and teams.

- written and verbal tasking
- project memoranda
- work authorizations
- stop work orders
- project status
- project meetings
- question and issue resolution

Notes

There are many resources available on project management including training courses, publications, best practices, tools, and techniques. Successful project managers use a variety of tools and techniques for effective communication and coordination with project staff. One highly touted method is called "management by wandering around" or MBA.

Additional Practice Guidance

- Maintain an open door policy that encourages project staff to bring questions, issues and improvement opportunities to project management.

10. Monitor project performance

Monitor and track project activities and results against plans.

Description

Monitor and track management and technical progress through all phases of the project. Include tracking of planning parameters, technical performance, budget, schedule, and resources against established project plans. Progress is determined by measuring the performance and the variance between planned performance and actual performance at predetermined levels of detail. Monitor and track performance measures established for the project. Monitoring provides visibility of progress, and insight into the risks of the project. Visibility encourages timely corrective action when performance deviates from plans. When issues or concerns arise performance parameters are tracked at finer resolution. Project monitoring includes establishing and using methods to collect and manage issues.

Typical Work Products

- cost and schedule performance
- cost and schedule variance
- defect densities and trends
- technical performance measures
- technical parameter trend data
- resource usage data
- change requests for the project management plan

Monitoring management performance includes measuring the variance to plan of cost and schedule for designated management activities (e.g., reviews, plan updates). Monitoring technical performance involves measuring the cost and schedule variances of technical effort, as well as selected technical parameters (e.g., number of transactions supported, sensor accuracy, and product or service availability) and defects (e.g., errors per thousand lines of code, number of evaluation non-conformities, volume of rework, etc.).

When variances are identified that approach or exceed the pre-determined levels, a finer granularity of monitoring may be needed to track specific performance factors.

Earned value is a typical method used to determine cost and schedule variance. Earned value is used with other indicators to provide more accurate insight into issues and problem areas.

Additional Practice Guidance

- Establish guidelines and thresholds for reporting variances.
- Evaluate and adjust the frequency of measurements in order to detect variances before they become significant risks to project success.
- Correlate and document actual performance and planning parameters for use in re-planning and for future projects (historical data).
- Document lessons learned for use in ongoing project management and planning and managing future projects.

11. Review and analyze project performance

Conduct formal and informal reviews of project management and technical performance and analyze variance from plans.

Description
Performance measurement data obtained from monitoring and tracking activities is reviewed and analyzed to identify risks, analyze variances to determine if corrective action is needed, and to determine if measurement (tracking) frequency and variance reporting thresholds need to be revised. The need for corrective action is based on comparing variances to pre-determined action thresholds. Performance data, variances, exceeded action thresholds, and other issues are elevated to appropriate levels of management for determination of corrective actions. Progress in meeting technical objectives is monitored at appropriate levels ranging from peer reviews to formal design reviews. Risk management results, including risk assessments and decisions on mitigation alternatives, are reviewed to influence or validate risk management strategy. Project performance is reviewed with customers to assure agreements are being satisfied.

Typical Work Products

- program management reviews and agendas
- minutes/slides
- lists of performance issues needing corrective action
- risks discovered in perform review and analysis
- "top ten issues"
- formal reviews (system requirements, design, and subsequent reviews, preliminary and critical design reviews, and test readiness reviews)
- management reviews
- quality assurance reviews and audits (functional configuration audit, preliminary configuration audit, process audits, product audits)
- technical reviews
- status reports
- action item list

Notes

Corrective action thresholds are established and documented in project plans. Thresholds may need to be revised as the project progresses, due to risks or other factors. Variances that are close to action thresholds or those that can be extrapolated to cross action thresholds (e.g., through trend analysis) in the future are candidates for finer resolution tracking.

Reviews are scheduled with agendas provided. Artifacts of the meeting are kept and action items recorded and tracked to closure. Reviews include all affected groups and individuals including, e.g., senior management, project management, task management, system engineering (hardware and software), test, maintenance, operations, quality assurance, end user, customer, subcontractors, external system representatives, and the business office.

Examples of reviewing performance include:

- Meetings of the stakeholders of the project to present analyses of performance and suggested corrective actions
- Status reports which document a particular issue or occurrence (technical meeting)
- Analysis of project management indicators
- Review of contractor prepared management reports

- Maintain records of variances, defects, and issues and evaluate for trends.
- Extrapolate variances as a method of identifying risks and potential impacts to budget and schedules.
- Establish an environment that encourages early reporting of problems (before they become larger problems).
- Use the results of early validation to support tracking and oversight of project performance.

12. Take corrective action

Take corrective actions to address problems.

Description
When problems or potential problems are identified, corrective actions are taken commensurate with the nature and magnitude of the problem. These corrective actions may take the form, for example, of reallocating resources, changing methods and procedures, or increasing adherence to the existing plans. When the complexity of the problem warrants, formal decision analysis may be needed to identify a number of alternative corrective actions and selection of the appropriate alternative based on coordinated and approved criteria. Project plans are revised to reflect the corrective actions. Corrective actions are tracked to closure.

Typical Work Products

- resource reallocations
- changes to methods and procedures
- change orders
- action items
- requirement changes
- schedule changes
- changes in project scope
- project plan revisions
- decision to terminate the project

Notes
This base practice covers whatever actions are needed to prevent anticipated problems or to correct the problems discovered. Corrective actions may involve reassignment of personnel, project re-organization, acquisition of new tools or skills, and budget and schedule adjustments. The possible actions taken under this base practice are varied and numerous. Lessons learned should be reviewed to identify types of corrective actions that are usually successful and those that are not. For example, adding personnel to a late project is usually not an effective corrective action.

- Involve appropriate stakeholders in determining corrective actions.
- Evaluate risks associated with alternative corrective actions.
- Define new metrics, data gathering, and analysis where information provided fails to effectively detect non-compliance, faults, and adverse trends.

Organizational Management

Organizational Management is responsible for the identification of the need and opportunity for a project, assessment of project risk, and the approval of the project's feasibility and resources. They are also responsible for establishing the strategic plans and for validating that projects are consistent with customer and organizational requirements. Management provides close oversight for high risk or high cost projects.

MANAGEMENT ROLES AND RESPONSIBILITIES					
General	**Initiating**	**Planning**	**Executing**	**Monitoring/Controlling**	**Closing**
Provide leadership and resources to establish and improve project management Ensure that sufficient resources are available to conduct projects Review and approve commitments to external entities (e.g., customers, vendors) Ensure staff is properly trained in project management techniques and principles	Select Project Manager and assist in Project Team staffing Review, validate and approve project charter Authorize and provide funding	Verify that project goals and objectives are defined Review and approve Project Management Plan, cost, risk and establish management reserves Provide management oversight as predicated by review of the project risk analysis, risk response planning and Project Management Plan Enable project staff availability	Regularly conduct executive management reviews and provide oversight	Review project status and corrective action plans (if required) Review and approve changes affecting scope, timing, cost, and/or quality, as required	Validate project completion (goals & objectives) Verify customer and sponsor acceptance Review and close project accounting/financial files Review project lessons learned and post project reports for continuous improvement action

Project Sponsor / Business Sponsor

The Project Sponsor is usually a member of the management team (of the customer) who will be the recipient of the project's end result (the product). The Project Sponsor is typically the head of a program area. This individual makes the business argument for the project to exist, controls the overall funding of the project and defines the acceptance criteria of the product.

SPONSOR ROLES AND RESPONSIBILITIES					
General	**Initiating**	**Planning**	**Executing**	**Monitoring/Controlling**	**Closing**
Articulate project and/or customer requirements Validate that project requirements are met Provide the necessary funding and resources as appropriate Champion the project to provide exposure and buy-in Communicate the sponsor's views on project progress and success factors to the Project Team and other stakeholders Define project goals, objectives and success criteria	Provide the strategic goals and objectives of the recipient organization and guidance to the Project Team to identify the relevance and value of the project Obtain or provide funding for the project	Review and approve the Project Management Plan and management approach Participate in planning sessions	Attend executive requirement reviews Resolve escalated project requirements issues, remove barriers and obstacles to the project Provide written agreement to project requirements and qualifying criteria	Attend and participate as needed at Project Status Reviews and steering meetings Attend change control meetings and review and approve changes in scope, timing, quality and/or cost as impacted	Provide representation or input to lessons learned reviews Sign off on project completion

Project Manager – Oversight List

The Project Manager has overall project responsibility. In order to achieve success, the Project Manager should work closely with the Sponsor with respect to staffing requirements and funding availability. The Project Manager is responsible for completing the project on time, within budget, and meeting the quality criteria and requirements. The Project Manager should be assigned as early as possible in the life cycle of the project in order to establish project ownership and management responsibility as well as to begin the development of the project requirements from the "ground up."
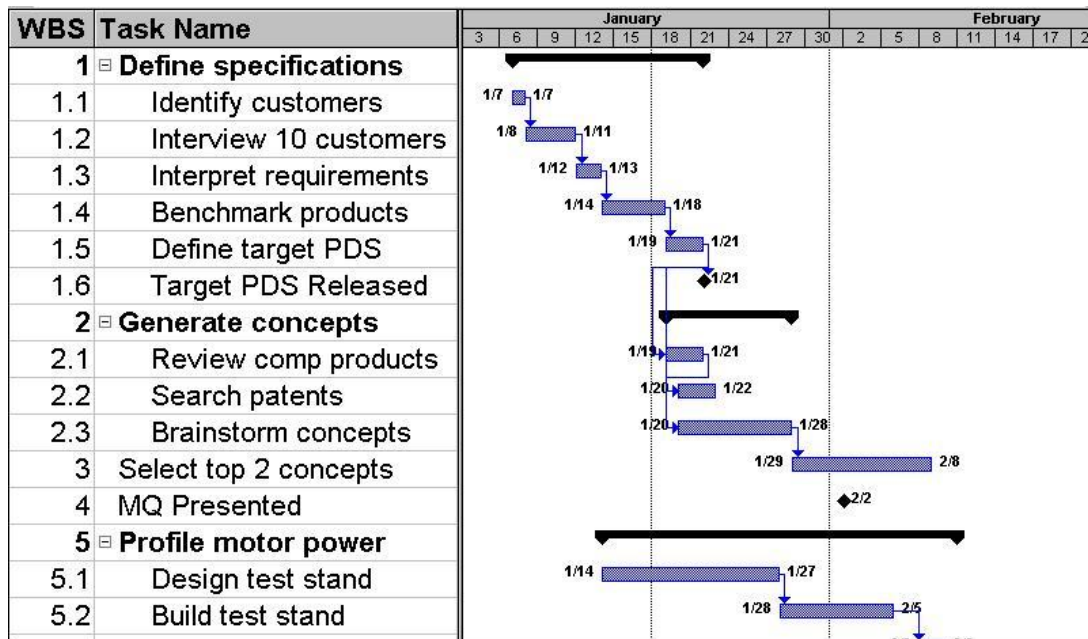
PROJECT MANAGER ROLES AND RESPONSIBILITIES					
General	**Initiating**	**Planning**	**Executing**	**Monitoring/Controlling**	**Closing**
Comprehend and implement organizational project policies and procedures

Maintain project staff technical proficiency and productivity, and provide training where required

Establish and maintain project quality

Identify, purchase and acquire project infrastructure needs

Identify and secure Project Team resources

Serve as focal point for project communications

Ensure that IT security C&A requirements are met | Develop project concept document

Define sponsor and organizations needs

Develop Project Charter and obtain approval

Identify and document project constraints

Identify and document project assumptions

Document requirements

Review customer requirements for feasibility and available resources | Develop Project Plan, including Project Charter, Scope Statement, constraints, assumptions, WBS defining project deliverables, cost estimates and project budget, major milestones, schedule, resource requirements, acquisition/procurement plans, risk analysis and response plans, Project Team structure and communications plan. Also included will be the deliverables acceptance criteria (quality metrics) and the acceptance process.

Develop the supporting plans such as scope, cost, risk, schedule, quality, resource, security deliverables, procurement and change management plans

Obtain stakeholder approval and acceptance of the Project Management Plan

Obtain organizational commitment and support for completion of projects assignments, timing and quality

Establish baselines | Manage and monitor day-to-day activity and provide direction to team members and supporting organizations

Manage to and monitor quality targets and goals (both project and product)

Manage and monitor risk response strategies

Disseminate project information and maintain communication

Develop and update system security plan and other security deliverables

Manage, or support, purchases and acquisitions process and contract administration requirements | Develop and distribute project performance reports. Regularly review project status, evaluating performance criteria (scope, cost, schedule & quality)

Develop and manage corrective action plans

Evaluate project performance and initiate change requests as required (scope, cost, schedule or quality)

Participate in change control board to review and approve product/project changes

Review project risks and establish risk response plans

Adjust Project Management Planning, as required, to include approved changes in scope, timing, cost or quality after obtaining customer approval | Obtain customer and management approval and acceptance of completed product

Complete contract closure process

Close out open action items

Develop post-implementation report

Conduct lessons learned session and develop recommendations for continuous improvement

Close out any financial accounts or charge codes

Archive all project data

Recognize Project Team and celebrate success |

Gantt Charts and Graphs

◆ **Gantt was credited with designing the first PM bar style charts. i.e. more or less a spread sheet on a time line. Duties Assigned…**

WBS	Task Name
1	□ Define specifications
1.1	Identify customers
1.2	Interview 10 customers
1.3	Interpret requirements
1.4	Benchmark products
1.5	Define target PDS
1.6	Target PDS Released
2	□ Generate concepts
2.1	Review comp products
2.2	Search patents
2.3	Brainstorm concepts
3	Select top 2 concepts
4	MQ Presented
5	□ Profile motor power
5.1	Design test stand
5.2	Build test stand

PERT – Program Evaluation Review Technique or CPM

PERT stands for *Program Evaluation Review Technique which goes by many names such as:* the *Critical Path Method* (CPM)
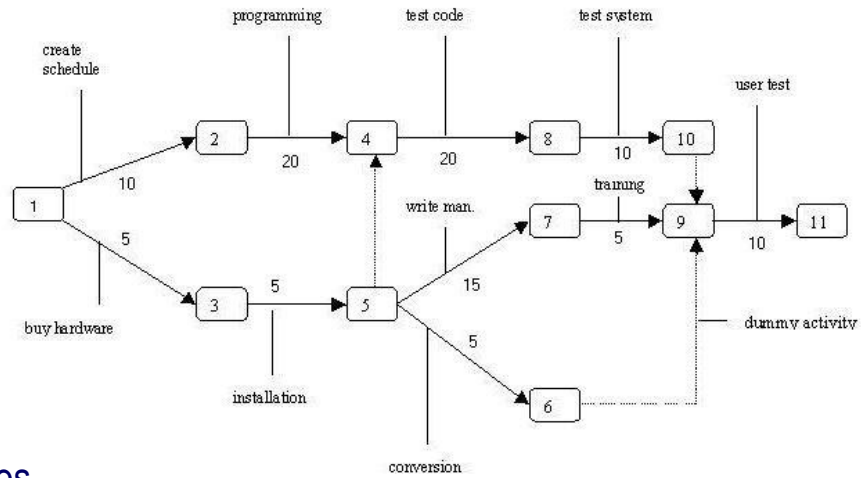
Pert illustrates task dependencies

* Numbered rectangles are nodes and represent events or milestones.
* Directional arrows represent dependent tasks that must be completed sequentially.
* Diverging arrow directions (e.g. 1-2 & 1-3) indicate possibly concurrent tasks
* Dotted lines indicate dependent tasks that do not require resources.

Importance / Lessons
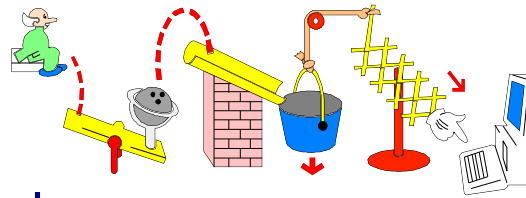
◆ Straying from original goals,

◆ Inadequate resources

◆ Repetitive meetings - on what needs done (prep)

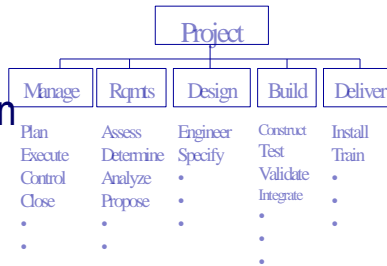◆ Frustration - poorly defined, communicated, and coordinated work activities

◆ Issues not understood or related

◆ Decisions repetitively re-opened or re-addressed
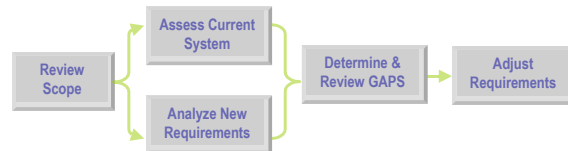
Define and Sequence Activities – Work Breakdown Chart

◆ **Develop a Work Breakdown**

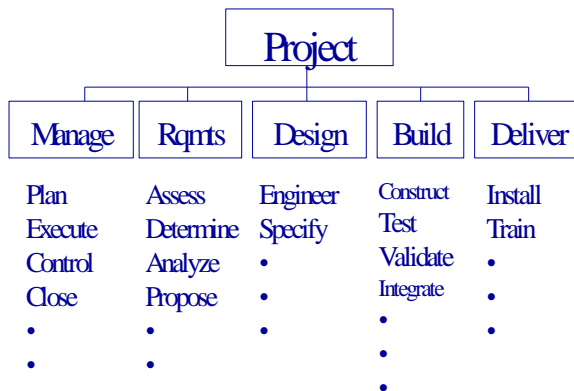define <u>work activities</u> to manage, create and deliver the solution

```
                        Project
        ┌────────┬────────┬───────┬────────┐
     Manage    Rqmts    Design   Build   Deliver

     Plan      Assess    Engineer Construct Install
     Execute   Determine Specify  Test      Train
     Control   Analyze   •        Validate  •
     Close     Propose            Integrate
     •         •                  •         •
     •         •                  •
                                  •
```

◆ **Determine Dependencies (Sequencing)**

determine the order of work

```
                   Assess Current
                      System
  Review                              Determine &      Adjust
  Scope                               Review GAPS    Requirements
                   Analyze New
                  Requirements
```

Hierarchy Diagram Format

```
                        Project
        ┌────────┬────────┬───────┬────────┐
     Manage    Rqmts    Design   Build   Deliver

     Plan      Assess    Engineer Construct Install
     Execute   Determine Specify  Test      Train
     Control   Analyze   •        Validate  •
     Close     Propose   •        Integrate
     •         •         •        •         •
     •         •                  •         •
                                  •
```

Examples of Sequencing
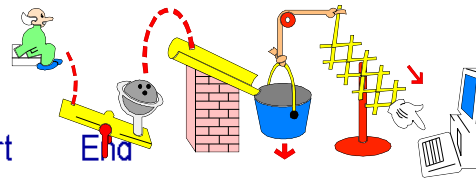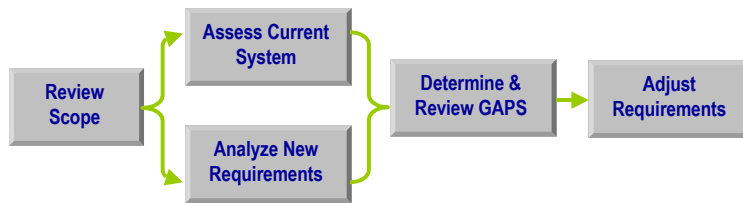
	Start		End
1 Review Scope	1/10	-	2/ 2
2 Assess Current System	2/03	-	2/18
3 Analyze New Rqmts	2/03	-	2/18
4 Determine & Review gaps	2/19	-	3/11
5 Adjust Requirements	3/11	-	3/31

Determine How Quality will be Managed

How will quality assurance and control be conducted?

What? → •Identify Quality Standards

How? → •Quality Assurance

Check → •Quality Control

Sometimes performed by a 3rd Party

Quality Plan

**Determine How to Meet
Communications, Data and
Collaboration Needs**

The plan should determine:

- who needs what information
- when will they need it
- how will it be given to them
- by whom

See IPMC
Standards

And determine how to:

- store, update, and disseminate information
- close, file and archive information

Summary of PM – Case Studies

Meeting The Mission
It's why you're here

Align the Project Mission with the Agency's Mission

What is your department or agency's mission? What is the relationship of your project to your agency's mission? Project activities need to support this mission.

Know the Project Stakeholders

A strong project mission can not be created in a vacuum. Who are the people with an interest in the outcome of the project? What are their common expectations? Stakeholders' expectations are rarely spelled out in legislation, executive orders, or formal memoranda.

Amplify the Voices of Your Customers

Who will be paying for this project? Who will actually be using the systems and processes being designed? Clarify the business priorities of these customers and their criteria for success. Actively and emphatically communicate this information. Do this for customers inside the organization as well as those outside the organization.

One reviewed project was situated within an agency which had recently undergone major budget reductions and large-scale structural changes. Because senior management was unclear about customer expectations, the firm or agency had been unable to articulate a clear strategic view of the project and its role in the new environment. Customers had insufficient information to guide them in improving work processes. The commission recommended that the agency work with customers to accelerate development of a new strategic plan, and that it publish a concept of operations to communicate how the system would operate in future years.

One reviewed project reversed its declining fortunes by making substantial revisions to project requirements several months into the project. Project leaders had conducted an evaluation of requirements, leading to large but necessary reductions in both scope and requirements. Though initially disorienting, this reduction did much to stabilize the project, leading to a significantly improved outlook for project success.

The Commission encountered a project which, after 7 years of planning, had yet to define an

Maintain High-Level Communication About the Project Mission

Communicate steadily with stakeholders and customers throughout the project. This will help to manage their expectations and requirements over time. Design project development so that requirements and expectations can be reconfirmed at regular junctures. Periodically check to see that stakeholders and customers understand and support changes, delays, and new developments.

Strategies
What do you want to accomplish?

Set Realistic Business Objectives

What are the common business needs of the organizations that will depend on the final product or system? What accomplishments will be critical for the project to be considered successful? Define project boundaries at the outset, and use this definition to manage requirements throughout the project. A clear definition of business success will also help ensure that project efforts support the agency's strategic plan.

Define a Sound Master Plan

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Implement Systems Incrementally

Work toward an outcome or system implementation that will deliver, in twelve months or less, incremental, useable levels of functionality

architecture. The project had come to rely heavily upon the functional program knowledge of the technical contractor, and there were insufficient technical resources involved in crucial technology decision-making. The Commission recommended that the organization establish technical requirements for deliverables, define modular delivery of specified interim products, monitor product delivery, and generally strengthen the role of contract management.

The plan, design or architecture should provide a focal point for project definition and clarity. Indeed, ambiguity surrounding this fundamental concept may be a clue that your architecture requires attention. One Commission-reviewed project exhibited a number of inconsistencies in its use of the term "architecture." This led to conflicting expectations when information about the architecture was disseminated among project participants. Upon closer inspection, the Commission found that the architecture required broad realignment with the organization's strategic plan and budget.

One Commission-reviewed project had negligible high-level involvement on the part of its organizational leadership. It

which support specific business objectives. The detailed concept of operations should explain how the plan and outcome will satisfy these objectives and how it will prioritize them. It should also communicate responsibilities for implementing and managing the end result or system.

Coordinate Technical Standards

Which standards are essential to ensure that the technical needs ultimately support the business objectives? Define these, paying particularly close attention to interfaces. Develop a plan to ensure compliance with standards. The technical interface must be documented to ensure its consistency with the overall agency-level design.

Gain Agreement on the Project Plan

The project plan formally captures and documents agreements among customers, stakeholders and project participants. Secure an informed agreement up front, and maintain this agreement throughout the project life. This will ensure that the project meets expected results. This will also help align the project with the organization's business plans and supporting IT plans. Over time, manage the project scope carefully, since there will be a tendency for different areas of the project to acquire their own divergent momentum.

People
Understand the project participants

Organizational Leadership

Listen to the Customer and Create a Vision

The project sponsor manages high-level customer

relationships, translating key customer expectations into a practical vision for the project. To be effective, this vision must be broadly communicated.

Commit to the Project

The most frequent cause of project failure is the lack of involvement of the organizational leaders. Ongoing involvement is crucial. It is critical to structure the project in such a way that go/no-go decisions may be made at highly visible milestones. Leadership commitment stabilizes the project so that it can accommodate changes over time.

Leverage the Existing Organizational Structure

The roles and responsibilities of the project and its partners are most effective when they correspond with the way in which the overall agency is managed. For example, in an organization in which field offices have a great deal of autonomy, a centralized approach to IT management could bring about unnecessary conflict.

Example: Empower the Chief Officer or CIO

The Chief Information Officer (CIO) position requires extraordinary qualifications in both IT management skills and general management skills. The CIO needs authority and visibility to guide the organization in key decisions. The CIO focuses on three things:

Synergy. Bring realistic synergy to

2. Capital Planning
· IT Performance Assessment
· Capital Planning and Investment Assessment
3. Change Management
4. Managerial/Technical
· Professional Development and Training
· IT Topics
· IT Trends

Project leadership does not simply appear; it must be nurtured. Among all of the projects reviewed by the Commission, those with the greatest chance for success were those which sought to grow and develop leadership competencies over the long run. Though many aspects of project management may be reduced to defined processes, the development of project management leadership competencies remains a difficult but worthwhile challenge.

One Commission-reviewed project exhibited no partnership among functional program leaders, IT managers and contract managers. Significant confusion resulted among both contractor and agency employees as to who made key decisions. In the absence of cooperative leadership, critical analysis of functional requirements was seriously

IT strategy by focusing disparate IT activities on their contribution to the organization's mission. Ensure that business objectives take precedence over technological advances. Direct architectural compliance across the enterprise. Create a formal strategic IT plan that reflects business priorities.

Sharing. Leverage the centralized technical authority to reduce redundancy across different organizational units. Enable them to share systems and data, as well as IT training, approaches, and other commonly needed resources. Coordinate a coherent strategy for commercial off-the-shelf software. Seek to make the enterprise technologically seamless.

Support. Establish complementary managerial and technical structures to provide support for critical enterprise functions. Do this in a way that provides different organizational units with the flexibility they require.

Project Leadership

Select a Strong Project Manager

Empower a central point of responsibility for project decisions, and clearly distinguish this role from functional program management roles. Clarify the risks which the project manager is expected to manage strategically. "Leadership ability" is difficult to articulate, and even more difficult to find. At a minimum, it includes the following characteristics:

Drive. Does the project manager have a

lacking. The Commission recommended that the project not only clarify the respective roles of project team members, but that it re-organize its executive steering committee to make it truly accountable for all final project decisions.

In the majority of reviews it has conducted, the Commission has recommended that organizations immediately establish a process for independent validation and verification and that executives explicitly consider IV&V recommendations when making decisions.

One Commission-reviewed project found a significant shortage of staff on the agency management team. The Commission recommended that the management team take all possible actions to expand its staff, concentrating on the addition of technical expertise in computer software and systems. The Commission also recommended that contract personnel be more effectively used to provide project management support

strong desire to succeed?

Ability to Build Consensus. Can the project manager get key individuals to work together towards common ends?

Ability to Take Risks. Can the project manager recognize opportunities and find ways to seize them?

Ability to Communicate. Is the project manager able to communicate clearly and convincingly to all parties?

Experience. Does the project manager have a track record of success? Look for characteristics and experiences that relate directly to the project at hand.

Technical Knowledge. Does the project manager possess demonstrated knowledge in the appropriate technical fields?

Sense of the Big Picture. Does the project manager understand the project from a broad business perspective?

Enable a Cooperative Environment

Nurture cooperation among members of the leadership, including the project sponsor, functional program manager, project manager, contracting officer and contractor. Create a learning environment which attracts individual skills to the table. Actively encourage team members to innovate by rewarding judicious risk-taking.

Ensure Accountability

The project manager is responsible for results. Successful project managers actively encourage team members to make minor challenges known before they become major problems. The project

One Commission-reviewed project revealed a clear need to integrate IT planning across various organizational units involved in the project. A new business concept of operations required that IT processes be realigned to meet evolving demands. The Commission recommended that the organization use experts in BPR and information modeling to facilitate the necessary process analysis and redesign

One agency requested the Commission review its enterprise-wide architecture. The agency appeared to lack a structured process for testing products within the architecture before placing them into use. The Commission recommended a centralized test bed which would enable the agency to simulate new functionalities and assess them before placing them into service.

One Commission-reviewed project faced serious risk of failure due to recent major shifts in the agency's mission. If carried out according to the original plan, the project would simply have automated certain processes which no longer made

needs a "truth culture" – let the messenger live. Stress the importance of accountability by systematically introducing constructive criticism into current practices. One recommended technique is to outsource for independent validation and verification (IV&V) support. It is critical for the executive leadership to listen to IV&V advice. Another technique is to create an anonymous channel for reporting problems.

sense in the new environment. The Commission recommended that the organization cease development of certain sub-systems, and retain consultants to facilitate high-level process redesign.

Project Team Members

Get What's Needed to Succeed

What are the competencies of the team? How does the staffing plan distribute these competencies against project tasks? Assess the team's particular strengths, then get the additional expertise needed. There may be a need to outsource for additional skills to round out the team. Balance the mix of management and technical expertise, and the mix of contractor and government personnel. Distinguish between critical strategic activities and tactical activities. Make use of consultants to leverage the team's capabilities.

Keep the Core Team Together

The Commission reviewed one project which had recently negotiated movement from a cost reimbursement contract to a fixed price contract. While the Commission concluded that this was an appropriate step, it noted that the agency would need to consider more thoroughly the different risks entailed by the new contract incentives, and that it would need to balance the risk between the agency and the contractor. For example, the Commission recommended that the agency tie progress payments to accomplishment of specific milestones.

Maintain a commitment to the integrity of the core team. The project should include the project manager, the functional program manager, the contracting officer and other key players from project conceptualization through implementation. Empower a central point of responsibility for technical decisions, including standards and architecture.

Monitor Team Productivity

How does the level of effort contribute to project deliverables and results? How is the team progressing against the project plan? Perform periodic cost-benefit analyses and life cycle cost estimates. This information will be needed for go/no-go decisions at major project and contract milestones.

One recently redesigned project lacked test and acceptance procedures for a large set of new technical requirements. The Commission recommended that the agency establish test and acceptance procedures at frequent milestones consistent with the project's work breakdown structure. It further recommended that the requirements be re-baselined, and frozen, in order to ensure an acceptable level of functionality.

Develop Competencies Over Time

Invest in building competencies in key people. Institute and follow a formal plan for skills training and career development. Align the competencies of team members with the long-term needs of the project.

The Commission reviewed a project whose software development process was in a perpetual state of change. The Commission recommended the establishment of configuration management baselines as well as cost and schedule baselines.

Processes Making it happen

Planning

Define Success Up Front

Define project success in terms of specific business objectives. From the customer's point of view, how should different business objectives be prioritized?

Use Metrics to Focus On Outcomes

Focus on outcomes rather than outputs. Prioritize the metrics for which project participants will be held responsible. Gain agreement on critical metrics and use them to drive planning and delivery.

Integrate Planning Activities Across the Project

Formalize planning processes. Assign roles and responsibilities specifically for planning-related activities. The CIO can help anchor project plans in the organization's business and IT plans.

Realign Plans Over Time

How will plans need to be modified along the way? Make sure project plans continue to support intended business priorities. If the project encounters significant changes, then the original plans will have to be realigned to ensure desired results.

Managing Technology

Choose an Appropriate Development Model

Base selection of a development model on careful consideration of four factors:

Costs. Consider various development alternatives and estimate how they might contribute to project costs.

Risks. Consider how much risk the project faces due to:

- High visibility due to public or political attention or requirements
- Highly compressed development time
- High uncertainty associated with the system's requirements, the technology that the system will employ, or the way that the system will affect business processes

Complexity. Consider the project to be complex if it:

- Affects many organizations or functional areas.
- Results from business process reengineering, dramatically altering the use of information technology.
- Requires new or rapidly advancing technology.
- Requires a long time for development.

Type. Consider the general type of the project:

- A new development
- A modification of an existing system
- A system integration

Select an Appropriate Life Cycle

The life cycle provides an organizing structure

with which to align project objectives with appropriate technologies and resources. Different projects require different degrees of rigidity in the sequencing of their phases. Long, complex projects intended to modify familiar systems typically yield to more rigid sequencing. On the other hand, less rigid sequencing may be required to achieve a series of innovations under conditions of high uncertainty.

Deal with Shifting Priorities

Business needs may change. All requirements must be formally managed. Address downstream changes in the life cycle through systematic risk assessment.

Make Progress Visible to All

Project participants need a clear idea of how well the project plan is working. Establish a set of key progress indicators and make them visible to all project participants.

Know The Limits of Automation

Don't simply automate existing processes. Rethink existing processes instead of simply "paving the cowpaths." If your agency lacks the skills, use consultants to facilitate business process reengineering (BPR) and information modeling prior to defining requirements.

Leverage Expertise in Established Management Areas

    Managing Inputs. Encourage project participants to address

evolving technical priorities with appropriate resources. For example, employ contract incentives to deliver the desired results in accordance with the projected cost and schedule. Offer high incentives (18 - 20%) to in-house staff.

Managing Activities. Use scope management techniques such as a Work Breakdown Structure (WBS) to organize project activities and tasks. Graphically display the work to be accomplished. Update the display periodically to reflect reality.

Managing Outcomes. Encourage all staff to identify potentially problematic outcomes. Use formal risk management techniques to anticipate and mitigate project risks.

Controlling Tasks

Put Meaning in the Metrics

Define requirements so that they may be thoroughly tested and validated at the unit and systems level of granularity. Identify frequent milestones with a defined set of measurable pass/fail performance criteria. Structure related contracts so that they reflect the same units, granularity, and milestones. This enables you to measure earned value throughout the contract life. These criteria should comply with a pre-established test plan.

Leverage Expertise in Control Areas

Controlling Inputs. Conduct life-cycle cost analysis to evaluate the impact of design implementation alternatives throughout the project. Use agreed upon plans to control the resources applied to the project. For example, periodically review actual project expenditures and compare them to the projected budget.

Controlling Activities. Standardize processes which deal with the most routine activities. For example, routine progress reports can be structured to capture and highlight exceptions from anticipated progress.

Controlling Outcomes. Use configuration management processes to ensure the project is building what the customer wants. The implications of changes along the way can be understood and incorporated while driving toward the desired result.

Ethics & Code of Conduct for AAPM ® IPMC ™ ©

1. You agree to abide by all of the laws of your jurisdiction and country of employment regardless of where you are living.
2. To keep all customer and project relationships and information confidential unless you can legally disclose it.
3. To work with zeal and diligence with all projects
4. To communicate in good faith with your team members and supervisors.
5. Promote Productivity, Efficiency and Effectiveness.
6. You are to use the IPMC Trademarks in the spirit of high ethical standards
7. Assist other project managers in their professional development
8. Engage fair and just treatment of other project managers.
9. Ethically provide information about project cost, time and quality.
10. Use utmost care in the receipt of gifts or any other perks.
11. Maintain personal accountability and responsibility for projects.
12. Maintain high professional conduct in my affairs.
13. Encourage others to act fairly and ethically.
14. Strive to protect the safety and health of the public at-large in our work and projects.
15. Avoid legal conflicts of interest.

Breach of Conduct:

At any time, a member can be put on probation or have their use of credentials stripped for any of the following reasons:

- Lapse of good standing with the organization. Good standing includes lack of payment for membership, certification, course, or designation use.
- A breach of any of the above ethics guidelines.
- Mis-use of any of the AAPM IPMC trademarks, content, literature, training materials or brand.

If a member has breached the Board of Standards rules, the Board may review and vote to either put the member on probation or revoke the certification and membership. A revocation would include banning the member name from any AAPM or IPMC materials and the legal injunction upon the member to not use any of the AAPM or IPMC brand or marks ever again.

AAPM ® Glossary of Project Management Terms

- A -

Activity – An element of work performed during the course of a project. An activity normally has an expected duration, cost, and resource requirements and results in a deliverable or handoff to another activity. In this way, the activity is tied back to the *Work Breakdown Structure*. Activities are often subdivided into tasks.

Activity Based Budget – A budgeting concept based on the goods and services produced by an organization for it's customers rather than the traditional cost based budget based on requests from cost centers. Activities are processes that consume resources, such as time and money, to produce a given output.

Actual Cost (AC) – Total costs incurred that must relate to whatever cost was budgeted within the planned value and earned value (which can sometimes be direct labor hours alone, direct costs alone, or all costs including indirect costs) in accomplishing work during a given time period. See also *earned value*.

Actual Cost of Work Performed (ACWP) – This term has been replaced with the term actual cost.

Administrative Closure – Generating, gathering, and disseminating information to formalize phase or project completion.

Assumptions – Assumptions are factors that, for planning purposes, are considered to be true, real, or certain. Assumptions affect all aspects of project planning, and are part of the progressive elaboration of the project. Project teams frequently identify, document, and validate assumptions as part of their planning process. Assumptions generally involve a degree of risk.

- B -

Baseline – The original approved plan (for a project, a work package, or an activity), plus or minus approved scope changes. Usually used with a modifier (e.g., cost baseline, schedule baseline, performance measurement baseline). Also called *Baseline Plan*.

Budget At Completion (BAC) – The sum of the total budgets for a project.

Budgeted Cost of Work Performed (BCWP) – This term has been replaced with the term *earned value*.

Budgeted Cost of Work Scheduled (BCWS) – This term has been replaced with the term *planned value*.

Business Case – Structured proposal for business improvement that functions as a decision package for organizational decision-makers. It may contain the goals of the project and how those goals support the goals of the enterprise. Other sections may include a cost/benefit analysis, a requirement analysis, and a make or buy analysis. A business case usually includes a comprehensive fiscal analysis and estimate.

Business Requirements – 1) Requirements state the customer needs the project output will satisfy. Requirements typically start with phrase "The system shall ….." Business requirements refer to how the project will satisfy the business mission of the customer. 2) Business requirements refer to business functions of the project, such as project management, financial management, or change management.

Business Reference Model (BRM) – A function-driven framework that describes the Lines of Business and Internal Functions performed by the Federal government independent of the agencies that perform them. Major IT investments are mapped to the BRM to identify collaboration opportunities.

Buy-In – usually refers to securing a personal or organizational agreement with project goals or management methods. Buy-in from senior management or functional organizations may be necessary to accomplish many aspects of an enterprise project.

- C -

CIPM – CIPM ® Certified International Project Manager ® (Certification from IPMC ™ Federally Trademarked and Copyrighted Program)

CPE – Certified Planning Engineer – An AAPM ® planning certification offered globally

CPRM Certified Project Risk Manager – An AAPM ® Risk Management certification offered globally

CHRA Certified Human Resources Analyst - An AAPM ® Human Resources Management certification offered globally

Capital Assets – land, structures, equipment, intellectual property (e.g., software), and information technology (including IT service contracts) that are used by the Federal government and have an estimated useful life of two years or more. See Appendix One of the Capital Programming Guide for a more complete definition of capital assets. Capital assets do not include items acquired for resale in the ordinary course of operations or items that are acquired for physical consumption, such as operating materials and supplies.

Capital Planning And Investment Control (CPIC) – The same as capital programming and is a decision-making process for ensuring that information technology (IT) investments integrate strategic planning, budgeting, procurement, and the management of IT in support of agency missions and business needs. The term comes from the Clinger-Cohen Act of 1996 and generally is used in relationship to IT management issues.

Capital Programming – An integrated process within an agency for planning, budgeting, procurement and management of the agency's portfolio of capital assets to achieve agency strategic goals and objectives with the lowest life-cycle cost and least risk.

Capital Project (Investment) – The acquisition of a capital asset and the management of that asset through its life-cycle after the initial acquisition. Capital projects (investments) may consist of several useful segments.

CEC Certified e-Commerce Consultant– e-Commerce Designation from the CEC AAPM and IPMC Global for e-Commerce specialists and managers.

CPE – **Certified Planning Engineer** – Planning and program certification from AAPM.

Change Control – The processes, procedures and responsibilities for identifying, evaluating and managing change. Integration is achieved by assessing a potential change's impact to all relevant aspects of a project, primarily scope, cost, schedule, risk and quality. Change control involves implementing a process change requests and the systematic tracking of change assessment and implementation.

Change Management – 1) The process of implementing change control. 2) The active involvement of project management in monitoring and controlling the change control process.

Closeout – The last phase of a project. Closeout involves closing contracts, archiving records, completing project administrative tasks, and conducting final project reviews.

Communications Management Plan – The Communications Management Plan describes how the various types of project information are distributed, reviewed, updated and filed.

Concept Definition – A phase of a project where the initial business case (based on a business need) is tested and the viability of the proposed solution and approach is explored. During the Concept Definition phase the project is "initiated" or "chartered" and the Project Sponsor, Business Sponsor, and/or Project Manager is given authority to proceed with the project.

Configuration Management (CM) – Any documented procedure used to apply technical and administrative direction and surveillance to: identify and document the functional and physical characteristics of an item or system, control any changes to those characteristics, record and report the change and its implementation status and audit the items and system to verify their conformance to requirements.

Constraint – Applicable restriction that will affect the performance of the project. Any factor that affects when an activity can be scheduled.

Contingencies – See reserve and contingency planning.

Contingency Planning – The development of a management plan that identifies alternative strategies to be used to ensure project success if specified risk events occur.

Contingency Reserve – The amount of money or time needed above the estimate to reduce the risk of overruns of project objectives to a level acceptable to the organization.

Contract – A mutually binding agreement that obligates the seller to provide the specified product and obligates the buyer to pay for it.

Contract Administration – Managing the relationship with the seller.

Contract Closeout – Completion and settlement of the contract, including resolution of any open items.

Control – The process of comparing actual performance with planned performance, analyzing variances, evaluating possible alternatives, and taking appropriate corrective action as needed.

Control Charts – A graphic display of the results, over time and against established control limits, of a process. They are used to determine if the process is "in control" or in need of adjustment.

Corrective Action – Changes made to bring expected future performance of the project into line with the plan.

Cost Baseline – The process of freezing cost estimates and budget. When a baseline is established, the change control process is implemented and performance is measured against the baselined cost data.

Cost Budgeting – Allocating the overall cost estimates to individual project activities.

Cost Control – Controlling changes to the project budget.

Cost Estimating – Developing an approximation (estimate) of the cost of the resources needed to complete project activities.

Cost Management – The process of monitoring project cost data to determine performance and variance from the planned cost targets/estimates.

Cost Management Plan – The cost management plan describes the process for implementing change control over cost estimates and the project time-phased cost baseline. The plan includes the steps taken when the performance measurement system identifies major or minor cost variances.

Cost of Quality – The costs incurred to ensure quality. The cost of quality includes quality planning, quality control, quality assurance, and rework.

Cost Performance Index (CPI) – The cost efficiency ratio of earned value to actual costs (CPI = EV/AC). CPI is often used to predict the magnitude of a possible cost overrun using the following formula: BAC/CPI = projected cost at completion.

Cost Variance (CV) – (1) Any difference between the budgeted cost of an activity and the actual cost of that activity. (2) In earned value, (CV = EV – AC).

Crashing – Taking action to decrease the total project duration after analyzing a number of alternatives to determine how to get the maximum duration compression for the least cost.

Critical Activity – Any activity on a critical path. Most commonly determined by using the *critical path method.* Although some activities are "critical," in the dictionary sense, without being on the *critical path*, this meaning is seldom used in the project context.

Critical Path – The series of activities that determines the duration of the project. In a deterministic model, the critical path is usually defined as those activities with *float* less than or equal to a specified value, often zero. It is the longest path through the project. See *critical path method*.

Critical Path Method (CPM) – A network analysis technique used to predict project duration by analyzing which sequence of activities (which path*)* has the least amount of scheduling flexibility (the least amount of *float).* Early dates are calculated by means of a *forward pass* using a specified start date. Late dates are calculated by means of a *backward pass* starting from a specified completion date (usually the forward pass' calculated project *early finish date*).

Critical Success Factors – Defines how progress and outcomes will be measured on a project—sometimes called objectives. Some typical critical success factors include functionality, quality, time, and cost.

Current Finish Date – The current estimate of the point in time when an activity will be completed.

Current Start Date – The current estimate of the point in time when an activity will begin.

Customer – Generally the organization that receives and becomes the final owner of the output of the project. The customer can be both internal or external to the organization developing the project output.

Customer Approval – The formal process of receiving written acceptance of the project output.

Customer Requirements – Requirements enumerate and state the customer needs the project output will satisfy. Requirements typically start with phrase "The system shall ….."

- D -

Data Date (DD) – The date at which, or up to which, the project's reporting system has provided actual status and accomplishments. Also called *as-of date*.

Deliverable – Any measurable, tangible, verifiable outcome, result, or item that must be produced to complete a project or part of a project. Often used more narrowly in reference to an external deliverable, which is a deliverable that is subject to approval by the project sponsor or customer.

Dependency – Logical relationship between and among tasks of a project's WBS, which can be graphically depicted on a network. May also refer to dependencies among projects.

Deployment Process – see also *System Deployment*

Duration (DU) – The number of work periods (not including holidays or other non-working periods) required to complete an activity or other project element. Usually expressed as workdays or workweeks. Sometimes incorrectly equated with elapsed time. See also *effort*.

Duration Compression – Shortening the project schedule without reducing the project scope. Duration compression is not always possible and often requires an increase in project cost.

- E -

E-Board – Pursuant to the requirements of the Clinger-Cohen Act, the Department of Agriculture has established the E-Board, made up of senior-level policy executives, to ensure that USDA IT investments are managed as strategic business resources. The deputy secretary oversees this process as part of his responsibility for day-to-day operations of the Department.

The E-Board will:

- Approve new IT investments and evaluate existing projects and operational systems to create a USDA IT investment portfolio which best supports the Department's missions and program delivery processes.
- Assemble and evaluate the portfolio using a standard set of criteria, developed by the OCIO and approved by the E-Board. Criteria will include a consideration of Departmental or Government-wide impact, visibility, cost, risk, eGovernment support, security and standards.
- Support and protect the USDA Enterprise Architecture.
- Assure that the Department's IRM Program remains in compliance with the requirements of the Clinger-Cohen Act, and other legislation that addresses IT issues.

In the scope of E-Board activities, an IT investment encompasses all investments involving IT and information resources as defined in the Clinger-Cohen Act. This includes equipment, IRM services, information or application system design, development, and maintenance, regardless of whether such work is performed by government employees or contractors.

E-business (Electronic Business) – Doing business online. E-business is often used as an umbrella term for having an interactive presence on the Web. A government e-business initiative or investment includes web-services type technologies, component based architectures, and open systems architectures designed around the needs of the customer (citizens, business, governments, and internal Federal operations).

E-government (E-Gov) – The use by the government of web-based Internet applications and other information technologies, combined with processes that implement these technologies.

Early Finish Date (EF) – In the *critical path method,* the earliest possible point in time on which the uncompleted portions of an *activity* (or the project) can finish based on the *network logic* and any schedule *constraints*. Early finish dates can change as the project progresses and changes are made to the project pan.

Earned Value (EV) – The physical work accomplished plus the authorized budget for this work. The sum of the approved cost estimates (may include overhead allocation) for activities (or portions of activities) completed during a given period of (usually project-to-date). Previously called the budgeted cost of work performed (BCWP) for an activity or group of activities.

Earned Value Management (EVM) – A method for integrating scope, schedule, and resources, and for measuring project performance. Its compares the amount of work that was planned with what was actually earned with what was actually spent to determine if cost and schedule performance are as planned.

Effort – The number of labor units required to complete an activity or other project element. Usually expressed as staff hours, staff days or staff weeks. Should not be confused with duration.

Element – One of the parts, substances, or principles that make up a compound or complex whole.

Estimate – An assessment of the likely quantitative result. Usually applied to project costs and durations and should always include some indication of accuracy (e.g., +/- x percent). Usually used with a modifier (e.g., preliminary, conceptual, feasibility). Some application areas have specific modifiers that imply particular accuracy ranges (e.g., order-of-magnitude estimate, budget estimate, and definitive estimate in engineering and construction projects).

Estimate At Completion (EAC) – The expected total cost of an activity, a group of activities, or of the project when the defined scope of work has been completed. Most techniques for forecasting EAC include some adjustment of the original cost estimate, based on project performance to date.

- F -

Federal Enterprise Architecture (FEA) – A framework that describes the relationship between business functions and the technologies and information that support them. Major IT investments will be aligned against each reference model within the FEA framework.

Federal Information Security Management Act (FISMA) – Requires agencies to integrate IT security into their capital planning and enterprise architecture processes, to conduct annual IT security reviews of all programs and systems, and to report the results of those reviews to OMB.

Final Performance Report – Developed during the closeout phase of the project to capture the final variance from baselined scope, cost and schedule.

Finish Date – A point in time associated with an activity's completion. Usually qualified by one of the following: actual, planned, estimated, scheduled, early, late, baseline, target, or current.

Float – The amount of time that an activity may be delayed from its *early start* without delaying the project finish date. *Float* is a mathematical calculation, and can change as the project progresses and changes are made to the Project Plan. Also called *slack*, *total float*, and *path float*.

Full Acquisition – the procurement and implementation of a capital project (investment) or useful segment/module of a capital project (investment). Full acquisition occurs after all planning activities are complete and the EIB and SMC selects and approves the proposed technical approach and project (investment) plan, and establishes the baseline cost, schedule and performance goals for this phase of the investment.

Full Funding – appropriations—regular annual appropriations or advance appropriations—are enacted that are sufficient in total to complete a useful segment of a capital project (investment) before any obligations may be incurred for that segment. When capital projects (investments) or useful segments are incrementally funded, without certainty if or when future funding will be available, it can result in poor planning, acquisition of assets not fully justified, higher acquisition costs, project (investment) delays, cancellation of major projects (investments), the loss of sunk costs, or inadequate funding to maintain and operate the assets. Budget requests for full acquisition of capital assets must propose full funding.

Functional Manager – A manager responsible for activities in a specialized department or function (e.g., engineering, manufacturing, marketing).

- G -

- H -

Human Resource Management – The processes employed to organize the efforts personnel assigned to the project. Human Resource Management include organizational planning, staff acquisition, and team development.

- I -

Impact Assessment – The process of evaluating project risks and performance variances to determine the effect on project disciplines such as scope, cost and schedule.

Impact Probability Chart – Rates risks on the cost effect a risk occurrence will generate on the project budget. Can be stated as a percentage or also as a statement like: very high (above 81%), high (60% to 80%), probable (40% to 79%), low (20% to 39%), and very low (below 19%).

Information Collection and Distribution – Making needed information available to project shareholders.

Information Technology – As defined by the Clinger-Cohen Act of 1996, sections 5002, 5141, and 5142, means any equipment or interconnected system or subsystem of equipment that is used in the automatic acquisition, storage, manipulation, management, movement, control, display, switching, interchange, transmission, or reception of data or information. For purposes of this definition, equipment is "used" by an agency whether the agency uses the equipment directly or it is used by a contractor under a contract with the agency that (1) requires the use of such equipment or (2) requires the use, to a significant extent, of such equipment in the performance of a service or the furnishing of a product. Information technology includes computers, ancillary equipment, software, firmware and similar procedures, services (including support services), and related resources. It does not include any equipment that is acquired by a Federal contractor incidental to a Federal contract.

Initiation – Approving the Project Sponsor, Business Sponsor, and/or Project Manager to begin the next phase in the project life cycle.

Integrated Change Control – Coordinating changes across the entire project.

Integrated Change Control Management Plan –Establishes the processes, procedures and responsibilities for identifying, evaluating and managing change. Integration is achieved by assessing a potential change's impact to all relevant aspects of a project, primarily scope, cost, schedule, risk and quality.

Integrated Project Team (IPT) – A multi-disciplinary team lead by a project manager responsible and accountable for planning, budgeting, procurement and life-cycle management of the investment to achieve its cost, schedule and performance goals. Team skills include: budgetary, financial, capital planning, procurement, user, program, value management, earned value management, and other staff as appropriate.

- K -

- L -

Lessons Learned – The documented learning gained from the process of performing the project. Lessons learned may be identified at any point. Also considered a project record.

Life Cycle- The entire useful life of a product or service, usually divided into sequential phases which include initiation, development, execution, operation, maintenance, and disposal or termination.

Life-Cycle Costs – The overall estimated cost, including both government and contractor labor costs, for a particular program alternative over the time period corresponding to the life of the program, including direct and indirect initial investment (non-recurring) costs plus any periodic or continuing (recurring) costs of operation and maintenance.

Life Cycle Costing – The concept of including acquisition, operating, and disposal costs when evaluating various alternatives.

Life-Cycle Costs – The overall estimated cost, both government and contractor, for a particular program alternative over the time period corresponding to the life of the program, including direct and indirect initial costs plus any periodic or continuing costs of operation and maintenance.

- M -

Major Acquisition – A capital project (investment) that requires special management attention because of its: (1) importance to an agency's mission; (2) high development, operating, or maintenance costs; (3) high risk; (4) high return; or (5) significant role in the administration of an agency's programs, finances, property, or other resources.

MCP Management Consultant Professional – A Graduate Management Certification issued by the American Academy of Project Mnaagement

MQM Master Quality Manager – A Quality Certification issued by the American Academy of Project Mnaagement

Major IT Investment – An information system that requires special management attention because of its importance to an agency mission (mission critical); its high development, operating, or maintenance costs; or its significant role in the administration of agency programs, finances, property, or other resources. All mission critical systems are, therefore, major systems. Major IT systems meet a least one of the following criteria:

▲ Total lifecycle costs greater than $50 million

▲ Significant multiple-agency impact

▲ Mandated by legislation or executive order, or identified by the Secretary as critical

▲ Require a common infrastructure investment

▲ Department strategic or mandatory-use system

▲ Significantly differs from or impacts on the Department infrastructure, architecture, or standards guidelines

▲ Financial systems with lifecycle costs greater than $500,000

▲ Directly tied to the top two layers of the Federal Enterprise Architecture

MPM – MPM ® Master Project Manager ® (Board Certification from AAPM and IPMC) Federal Trademark and copyrighted Program USA and International.

Management Plan – see also *Project Management Plan*

Master Schedule – A summary-level schedule that identifies the major activities and key milestones.

MQM Master Quality Manager or Master of Quality Control from the AAPM and IPMC.

Milestone – A significant event in the project, usually completion of a major *deliverable*.

Milestone Reviews – Decision points in VA's Program/Investment Management Life Cycle where the project/system is presented to the EIB and approved (or disapproved) to move forward to the next step in the process.

Mitigation – See *risk mitigation*.

Monitoring – The capture, analysis, and reporting of project performance, usually as compared to plan.

- N -

Network Analysis – The process of identifying early and late start and finish dates for the uncompleted portions of project activities. See also critical path method, program evaluation and review technique, and graphical evaluation and review technique.

- O -

Office of the Chief Information Officer – Provides technical direction and guidance to ensure that information technology (IT) is acquired and IT resources are managed for the Department in a manner that implements the policies and procedures of the Clinger-Cohen Act and the priorities established by the Secretary and Chief Information Officer.

OMB Exhibit 300 (Capital Asset Plan and Business Case) – OMB Circular A-11 Part 7 describes the OMB Exhibit 300 as a format to demonstrate to agency management and OMB that it has employed the disciplines of good project management, represented a strong business case for the investment, and met other Administration priorities to define the proposed cost, schedule, and performance goals for the investment if funding approval is to be obtained.

Operational (steady state) – An asset or part of an asset that has been delivered and is performing the mission.

Organizational Breakdown Structure (OBS) – A depiction of the project organization arranged so as to relate *work packages* to organizational units.

Organizational Planning – Identifying, documenting, and assigning project roles, responsibilities, and reporting relationships.

- P -

Performance Criteria – Various standards used to evaluate variances from the scope, schedule, and cost baselines. Examples could include schedule activities that are one week late, cost increases that exceed ten percent of budget, or the addition of a work breakdown structure work package

Performance Reporting – Collecting and disseminating performance information. This includes status reporting, progress measurement, and forecasting.

PERT Chart – The term is commonly used to refer to a project network diagram. See *program evaluation and review technique* for the traditional definition of PERT.

Planned Value (PV) – the cumulative budgeted value of the project for work *scheduled* to date. PV is calculated by applying the scheduled percentage of completion against the cost budget.

Planning – preparing, developing or acquiring the information you will use to: design the investment; assess the benefits, risks, and risk-adjusted life-cycle costs of alternative solutions; and establish realistic cost, schedule, and performance goals, for the selected alternative, before either proceeding to full acquisition of the capital project (investment) or useful segment or terminating the investment. Planning must progress to the point where you are ready to commit to achieving specific goals for the completion of the acquisition before preceding to the acquisition phase. Information gathering activities may include market research of available solutions, architectural drawings, geological studies, engineering and design studies, and prototypes. Planning is a useful segment of a capital project (investment). Depending on the nature of the investment, one or more planning segments may be necessary.

PMCOM – The Project Management Commissions Guide to the Project Management Compendium of Methods. This document represents project management best practices.

PMCOM Map/Mapping – Coordinating organizational project management functions to the functional processes and knowledge area activities described in the PMCOM.

Policy and Governance – Formal written standards that control the operational functions of a major enterprise organization.

Post-Implementation Report – Documents project status and performance as a result of the Post-Implementation Review.

Post-Implementation Review – The last of the IT milestone reviews. Conducted at a time when an assessment of the operation of the project output is practical. Determines open project activities and insures major project requirements are satisfied.

Privacy Impact Assessment – A process for examining the risks and ramifications of collecting, maintaining and disseminating information in identifiable form in an electronic information system, and for identifying and evaluating protections and alternative processes to mitigate the impact to privacy of collecting information in identifiable form. Consistent with forthcoming OMB guidance implementing the privacy provisions of the E-government Act, agencies must conduct privacy impact assessments for all new or significantly altered information technology investments administering information in identifiable form collected from or about members of the public. Agencies may choose whether to conduct privacy impact assessments for information technology investments administering information in identifiable form collected from or about agency employees.

Procurement Management – see *Project Procurement Management*

Procurement Management Plan – Describes the project procurement processes such as: solicitation planning, solicitation, source selection, and contract administration. Includes the tools and techniques and outputs from each procurement process.

Program – A group of related projects managed in a coordinated way. Programs usually include an element of ongoing work.

Program Evaluation and Review Technique (PERT) – An event-oriented network analysis technique used to estimate project duration when there is uncertainty in the individual activity duration estimates. PERT applies the critical path method using durations that are computed by a weighted average of optimistic, pessimistic, and most likely duration estimates. PERT computes the standard deviation of the completion date from those of the path's activity durations.

Project – A temporary endeavor undertaken to create a unique product, service or result.

Project Assumptions – see *Assumptions*

Project Authority – Generally a senior organizational executive that approves project mission and cost planning. In some cases the project authority and project sponsor may be the same executive.

Project Budget – The estimated costs, over time, for each project Work Breakdown Structure element.

Project Charter – A document issued by senior management that formally authorizes the existence of a project. It provides the *Project Manager* with the authority to apply organizational resources to project activities.

Project Closeout – see *Closeout*

Project Constraints – see *Constraints*

Project Control – The act of monitoring and measuring variances from the project plan. Implementation of the integrated change control process establishes control over project activities.

Project Communications – The process that insures the generation, collection, dissemination and storage of project information. Project communications includes communications planning, information distribution, performance reporting and administrative closure.

Project Initiation – see *Initiation*

Project Life Cycle – A collection of generally sequential project phases whose name and number are determined by the control needs of the organization or organizations involved in the project.

Project Management – The application of knowledge, skills, tools, and techniques to project activities in order to meet the project requirements.

Project Management Information System (PMIS) – A system that facilitates project information flow within an organization.

Project Management Office (PMO) – The organization, either at the enterprise, Administration, and/or project level that aids Project Managers with standards, tools and techniques. The PMO maintains project metrics and in most cases monitors and consolidates project cost reporting

Project Management Plan – A management summary document that gives the essentials of a project in terms of its objectives, justification, and how the objectives are to be achieved. It describes how major activities of the project management function are to be accomplished (project execution), and describes the methods of overall project control. The project management plan includes the subsidiary plans covering the project management knowledge areas.

Project Management Process – Overlapping activities occurring at varying intensities, throughout each phase of the project.

Project Management Software – A class of computer applications specifically designed to aid with planning and controlling project costs and schedules.

Project Management Team – The members of the project team who are directly involved in project management activities. On some smaller projects, the project management team may include virtually all of the project team members.

Project Manager E-Business (PME) – The individual responsible for managing a project who has been certified by IPMC and AAPM with e-Business Skills

Project Master Schedule – A detailed schedule, based on project milestones and deliverables, that integrates all aspects of the project. The Project Master Schedule is using the Work Breakdown Structure (WBS).

Project Performance Reports – see *Performance Reporting*

Project Phase – A collection of logically related project activities, usually culminating in the completion of a major *deliverable*.

Project Management Plan – A formal, approved document used to guide both project execution and project control. The primary uses of the project plan are to document planning assumptions and decisions, facilitate communication among stakeholders, and document approved scope, cost, and schedule *baselines*.

Project Management Plan Development – Integrating and coordinating all project plans to create a consistent, coherent document.

Project Management Plan Execution – Carrying out the project plan by performing the activities included therein.

Project Planning – The development and maintenance of the project plan.

Project Procurement Management – A subset of project management that includes the processes required to acquire goods and services to attain project scope from outside the performing organization. It consists of procurement planning, solicitation planning, solicitation, source selection, contract administration, and contract closeout.

Project Procurement Management Plan – See Procurement Management Plan

Project Quality Management – A subset of project management that includes the processes required to ensure that the project will satisfy the needs for which it was undertaken. It consists of quality planning, quality assurance, and quality control.

Project Schedule – The planned dates for performing activities and the planned dates for meeting *milestones*.

Project Scope – The work that must be done to deliver a product with the specified features and functions.

Project Scope Management – A subset of project management that includes the processes required to ensure that the project includes all of the work required, and only the work required, to complete the project successfully. It consists of initiation, scope planning, scope definition, scope verification, and scope change control.

Project Sponsor – Executive level person or organization that champions the project goals. In some cases, but not all, the project sponsor may control the financial resources for the project.

Project Status Report – Details the current and upcoming activities on the project. Also can report on performance related to project scope, schedule and cost.

Project Team Members – The people who report either directly or indirectly to the *Project Manager*.

Project Team Resources – Generally refers to personnel assigned to the project team. May include skill descriptions and availability.

Project Time Management – A subset of project management that includes the processes required to ensure timely completion of the project. It consists of activity definition, activity sequencing, activity duration estimating, schedule development, and schedule control.

- Q -

Qualitative Risk Analysis – Performing qualitative analysis of risks and conditions to prioritize their effects on the project objectives. It involves assessing the probability and impact or project risks and using methods such as the *probability and impact matrix* to classify risks into categories of high, moderate, and low for prioritized risk response planning.

Quality Assurance (QA) – (1) The process of evaluating overall project performance on a regular basis to provide confidence that the project will satisfy the relevant quality standards. (2) The organizational unit that is assigned responsibility for quality assurance.

Quality Control (QC) – (1) The process of monitoring specific project results to determine if they comply with relevant quality standards and identifying ways to eliminate causes of unsatisfactory performance. (2) The organizational unit that is assigned responsibility for quality control.

Quality Management – A collection of quality policies, plans, procedures, specifications, and requirements is attained through quality assurance (Managerial) and quality control (Technical).

Quality Management Plan – address what will be measured, how it will be measured, the responsibility for those activities and how quality improvement will be implemented during the course of the project.

Quality Planning – Identifying which quality standards are relevant to the project, and determining how to satisfy them.

Quantitative Risk Analysis – Measuring the probability and consequences of risks and estimating their implications for project objectives. Risks are characterized by probability distributions of possible outcomes. This process uses quantitative techniques such as simulation and decision tree analysis.

- R -

Reserve – A provision in the project plan to mitigate cost and/or schedule risk. Often used with a modifier (e.g., management reserve, contingency reserve) to provide further detail on what types of risk are meant to be mitigated. The specific meaning of the modified term varies by application area.

Resource – People, equipment and/or materials used to accomplish activities.

Rework – Action taken to bring a defective or nonconforming item into compliance with requirements or specifications.

Risk – An uncertain event or condition that, if it occurs, has a positive or negative effect on a project's objectives.

Risk Category – A source of potential risk reflecting technical, project management, organizational, or external sources.

Risk Containment Plan – A document detailing all identified risks, including description, cause, probability of occurring, impact(s) on objectives, proposed responses owners and current status. Also referred to as *risk response plan*.

Risk Event – A discrete occurrence that may affect the project for better or worse.

Risk Identification – Determining which risk events might affect the project and documenting their characteristics.

Risk Management – The art and science of identifying, analyzing, and responding to risk factors throughout the life of a project and in the best interests of its objectives.

Risk Management Plan – Documents how risk processes will be carried out during the project. This is an output of Risk Management planning.

Risk Mitigation – Risk mitigation seeks to reduce the probability and/or impact of a risk to below an acceptable threshold.

Risk Monitoring and Control – Monitoring residual risks, identifying new risks, executing risk reduction plans, and evaluating their effectiveness throughout the project life cycle.

Risk Response Plan – See *risk containment plan*.

- S -

Schedule Baseline – See Baseline

Schedule Control – Controlling changes to the schedule.

Schedule Critical Path – Activities or tasks in a project schedule that, if the duration changes, will either shorten or lengthen the total duration of the project.

Schedule Dependency – The linking of tasks in a project schedule in order of execution or implementation. Example: task must be completed before task B.

Schedule Development – Analyzing activity sequences, activity durations, and resource requirements to create the project schedule.

Schedule Management – Updating the project master schedule and comparing progress with the baseline schedule. Changes to the project schedule are managed through the Integrated Change Control Plan.

Schedule Performance – Comparing the project master schedule with the baseline schedule to determine slippage or changes in scope.

Schedule Performance Index (SPI) – The schedule efficiency ratio of earned value accomplished against the planned value. The SPI describes what portion of the planned schedule was actually accomplished. SPI is calculated as (SPI = EV/PV).

Schedule Variance (SV) – (1) Any difference between the scheduled completion of an activity and the actual completion of that activity. (2) In *earned value,* (SV = EV – PV).

Scope – The sum of the products and services to be provided as a project. See *project scope* and *product scope*.

Scope Change – Any change to the *project scope*. A scope change almost always requires an adjustment to the project cost or schedule.

Scope Change Control – Controlling changes to *project scope*.

Scope Creep – Any change to the *project scope* (products and services described by the project) that happens incrementally and is subtle in recognition.

Scope Definition – Subdividing the major *deliverables* into smaller, more manageable components to provide better control.

Scope Management – See Integrated Change Control

Scope Planning – The process of progressively elaborating the work of the project, which includes developing a written scope statement that includes the project justification, the major deliverables, and the project objectives.

Scope Statement – The scope statement provides a documented basis for making future project decisions and for confirming or developing common understanding of project scope among the stakeholders. As the project progresses, the scope statement may need to be revised or refined to reflect approved changes to the scope of the project.

Scope Verification – Formalizing acceptance of the *project scope*.

Section 508 – Refers to Section 508 of the Rehabilitation Act of 1973 (29 U.S.C. 794d), which requires Federal agencies to develop, procure, maintain, or use electronic and information technology (EIT) that is accessible to Federal employees and members of the public with disabilities.

Simulation – A simulation uses a project model that translates the uncertainties specified at a detailed level into their potential impact on objectives that are expressed at the level of the total project. Project simulations use computer models (e.g., Monte Carlo technique) and estimates of risk at a detailed level.

Solicitation – Obtaining quotations, bids, offers, or proposals as appropriate.

Source Selection – Choosing from among potential sellers.

Sponsor – see *Project Sponsor*

Staff Acquisition – Getting needed human resources assigned to and working on the project.

Stakeholder – Individuals and organizations that are actively involved in the project, or whose interests may be positively or negatively affected as a result of project execution or project completion. They may also exert influence over the project and its results.

Start Date – A point in time associated with an activity's start, usually qualified by one of the following: actual, planned, estimated, scheduled, early, late, target, baseline, or current.

Statement of Work (SOW) – A narrative description of products or services to be supplied under contract.

System Deployment – Addresses the Project Closing Phase, Step 4 of the VA system Development Life Cycle. Project Closing is performed once all defined project objectives have been met and the customer has accepted the project's product. Refers to transferring the project output to the customer.

System Development – A project life cycle phase encompassing the design, integration and demonstration of the project output. Generally follows the planning phase and is usually accomplished in conjunction with the execution and control process groups.

System Development Life Cycle – varies by project output. For example in the construction the System Develop Life Cycle could be described as feasibility, planning, design, construction and turnover. For software development a spiral (the life cycle repeats until complete) process is employed: requirements identification, system design, build and rebuild, and evaluation.

System Development Methodology – The type of methodology to be used in a system development project, e.g. Rational Unified Process, Spiral Development, Iterative Development, System Development Methodology, Information Engineering Methodology, or Rapid Application Development Methodology.

System Operation – The phase in the system life cycle where the system is in use and on-going activities such as regular maintenance and improvement are underway.

System Prototype – A development model that is used for testing in an operational environment. Typically built to be modified into the production model.

- T -

Task – A generic term for work that is not included in the work breakdown structure, but potentially could be a further decomposition of work by the individuals responsible for that work. Also, lowest level of effort on a project.

Triggers – Triggers, sometimes called risk symptoms or warning signs, are indications that a risk has occurred or is about to occur. Triggers may be discovered in the risk identification process and watched in the risk monitoring and control process.

- U -

User – Usually a member of the customer's organization. Person or organization that will operate the project's output.

- V -

Variance – Divergence from plan. For example if the schedule falls behind it is said to have negative variance. A variance is typically expressed in explicit terms such as a $200,000 overrun. Variance can also be expressed as an index, in which case a schedule performance index of .89 would mean the schedule is 11 percent behind the baseline plan (schedule).

- W -

Work Activities – Sometimes called tasks. Generally project events or efforts that make up a schedule. Activities have a duration (time), consume resources and in most cases are dependent or result from other activities.

Work Activity Durations – The amount of time it takes to accomplish the work. Can be expressed in hours, day, weeks, or months.

Work Breakdown Structure (WBS) – A deliverable-oriented grouping of project elements that organizes and defines the total scope of the project. Each descending level represents an increasingly detailed definition of a project work.

Work Breakdown Structure (WBS) Baseline – The process of freezing the WBS to measure the affect of change. When the WBS is baselined, change control is applied and change is assessed against other aspects of the project, such as cost and schedule.

Work Package – A deliverable at the lowest level of the work breakdown structure, when that deliverable may be assigned to another Project Manager to plan and execute. This may be accomplished through the use of a subproject where the work package may be further decomposed into *activities*.

- Z -

Zachman Cell – The Zachman Framework is guide for developing and managing an enterprise architecture. It consists of a grid with columns titled: data, function, network, people, time and motivation and rows titled: scope, business model, system model, technology model and detailed representation. A specific cell might represent the scope of the data aspect of the enterprise data infrastructure.

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