

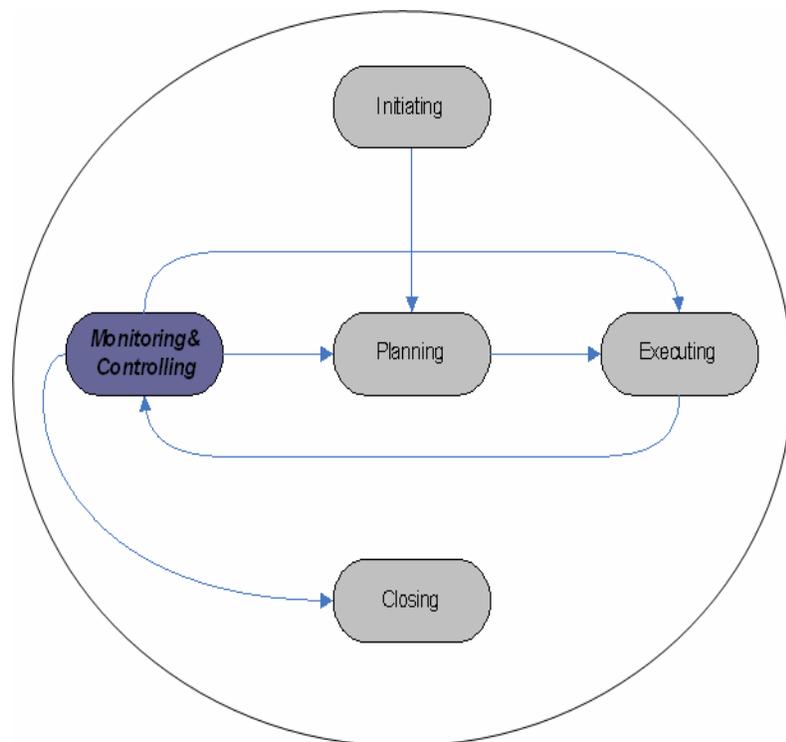
5.1 Project Control Overview

Project Control is a formal process in project management. In most respects, there is not a lot of room for creativity in the Control Phase of project management. The *PMBOK*® makes several recommendations on project control that are referenced in this section. All control processes outlined in this section are applicable to the DIS Project Management Methodology. The overview of Project Management Phases is depicted below:

The *PMBOK*® defines Project Control with the following statement:

“A project management function that involves comparing actual performance with planned performance and taking appropriate corrective action (or directing others to take this action) that will yield the desired outcome in the project when significant differences exist.”

How Project Control Works



Project Control involves the regular review of metrics and reports that will identify variances from the project baseline. The variances are determined by comparing the actual performance metrics in the Execution Phase against the baseline metrics assigned during the Planning Phase. These variances are incorporated into control processes to evaluate their meaning. If significant variances are discovered (variances that place the completion of the project in jeopardy) adjustments are made to the project plan. A significant variance does not explicitly require a change to the project plan but these variances should be reviewed to determine if preventative action is necessary. Controlling also includes taking preventative action in anticipation of possible problems.

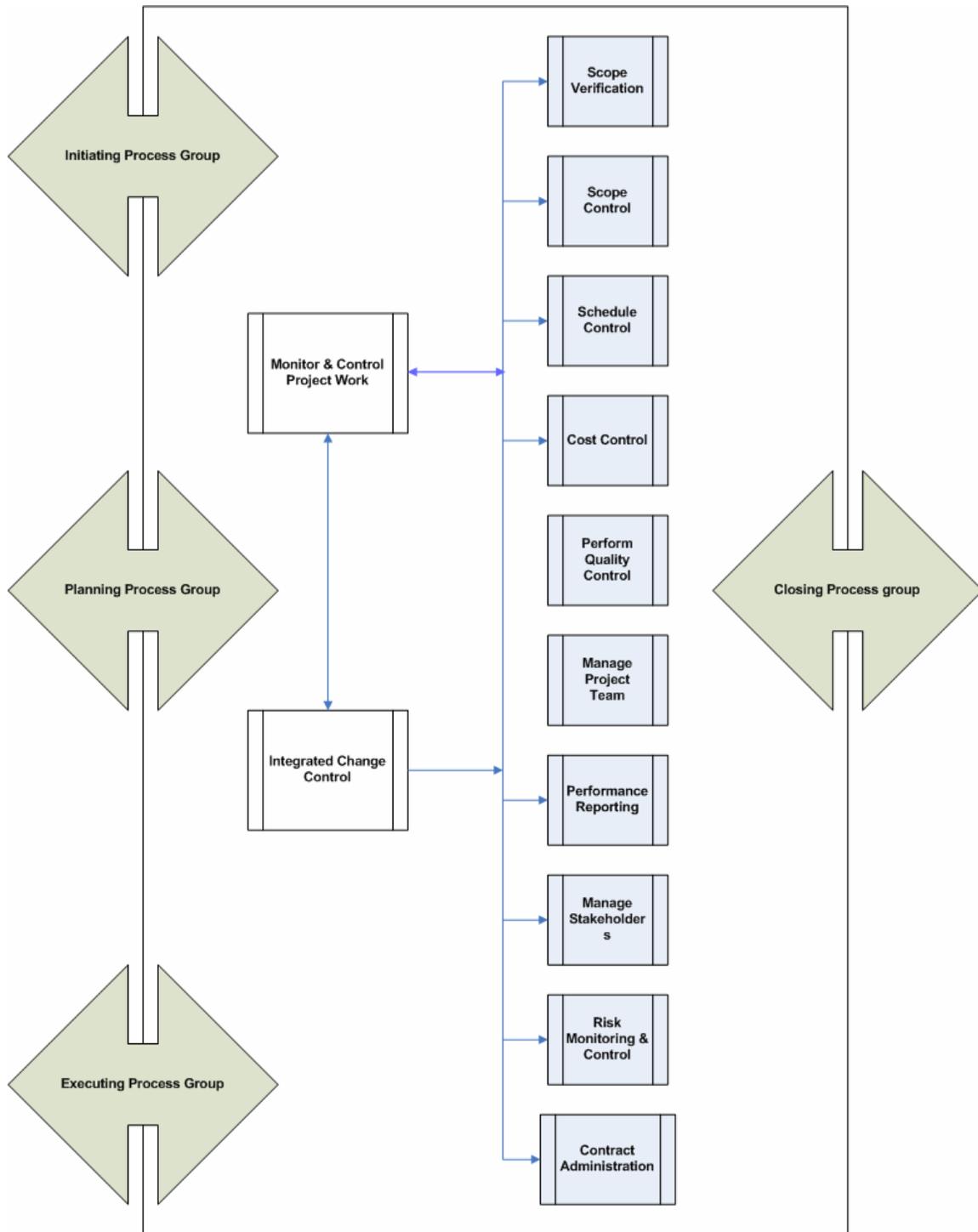
The relationship between the Project Control Phase to other project phases is concise and clear; however, it is often hard to implement as a formalized method in an organization. Project Control is important because it may determine the success of the project by the stakeholders. Project success relates to project cost, completion date, customer expectations, performance, etc.

Areas of Control

Impact of Project Control

Project Control has a direct correlation to project progress and stake-holder's expectations. Projects rarely fail because of one issue. Rather, failure is usually a collection of minor items that individually have negative impact in a specific project area; however, when looked at over the life span of a project, these minor items can cause significant impacts to cost, schedule, risk, and can manifest themselves as deviations from the original Project Plan. In the other subsections of the Control Phase, the basic concepts of control related to scope, change, schedule, cost, risk, and contract administration will be reviewed. The relationships among the control processes are shown in the diagram below.

Figure 5.1.2
Relationships Among the Control Process



5.2 Configuration Management

The configuration management system is a subsystem of the overall project management information system. The system includes the process for submitting proposed changes, tracking system for reviewing and approving proposed changes, defining approval levels for authorizing changes, and providing a method to validate approved changes. In most application areas, the configuration management system includes the change control system. The configuration management system is also a collection of formal documented procedures used to apply technical and administrative direction and surveillance to:

- Identify and document the functional and physical characteristics of a product or component.
- Control any changes to such characteristics.
- Record and report each change and its implementation status.
- Support the audit of the products or components to verify conformance to requirements.

When to use Configuration Management

Like change control, implementation of Configuration Management processes should be carried out on all projects, especially those projects that are large or complex. In short Configuration Management is a necessity. Configuration Management processes should be implemented at the organization level to ensure a consistent approach. Special consideration should be given to the needs of each project. The complexity and size of Configuration Management is less important than its functionality and intent.

Configuration Management should not be construed to be the prevention of changes. It is concerned with the identification and management of possible changes to the project. Management of these changes includes the administrative management, tracking, review and decision of change approval. It also includes the administrative process to ensure that the project team is informed of approved changes when they occur.

In the previous methodology phases, the concepts of project scope, schedule, and requirements were discussed. Change control is relevant to all of these phases. At key points in the project timeline, all Project Plan items are baselined. Once they are baselined, changes to the baseline are managed through a formal change request.

Change Control Components

At DIS, Configuration Management Changes for Application Software are categorized as a Class 1 change and are processed through the Configuration Change Control Review Procedure. Class 1 change processing includes review of all CCB Requests by the Configuration Control Board (CCB). The process is necessary to ensure that any implemented changes are not duplicative or counter-productive to the needs of other system users, as well as to ensure that DIS continues to meet agency and statewide functional and business practices.

The criteria for a Class 1 Application Software change contain the following components:

- A change to the established baseline artifacts, components, or the Project Plan.
- A change to the approved baselined artifacts including any referenced documentation.

Configuration Control Board

The governing body, CCB, is assigned to evaluate, rank, and approve changes to an Application Software development effort. This group is made up of individuals representing functional groups within a project development team. The purpose of the board is to assure that Application Software changes are properly identified, evaluated, and approved.

The Configuration Control Board members will be appointed by the Lead (normally the Project Manager) and the Quality Engineer. The CCB will be representative of the functions for each project. Each CCB has the flexibility and responsibility to include appropriate temporary

members when the request warrants additional representation to properly evaluate the request. Each member or alternate have voting privileges on all issues brought before the CCB. If both a member and their alternate participate in a meeting in which a vote takes place, only the member is allowed to vote.

Defining the Baseline

The baseline process, while a key to project control, is often misunderstood. A baseline is defined as the original plan for a project, a work package, or an activity, plus or minus approved changes. A modifier (Project Budget Estimate schedule baseline, performance measurement baseline) is usually included.

A Baseline Is a Ruler

A baseline provides the "ruler" that a project can be evaluated with. If the schedule baseline plan indicates that you should be 30 percent finished with a specific activity at a specific point, and you are 15 percent finished or 90 percent finished, you have a variance; however, further investigation is needed before an opinion can be formed about the significance of the variance.

Baseline Changes

Baseline changes are significant events and should not be made without consideration of their impact. Baseline changes are only made to reflect a change in project scope, not just to reflect when the project is behind schedule. A baseline change adjusts the ruler for the project. A variance does not justify a baseline change. It only indicates that the initial plan was not accurate. Baseline change should be facilitated through a normal change control process.

5.3 Scope Control

Scope Control is a straightforward concept. The intent of implementing a Scope Control process is to identify and manage all elements that may increase or decrease the project's scope beyond the required or defined need of the original approved Project Scope Statement. Attributes of Scope Control include the following:

- Determine when a scope change has occurred.
- Manage the actual changes when and if they occur.

Scope changes will come from the need of a change in a project deliverable that may affect its functionality and in most cases the amount of work and resources needed to complete the project. A Scope Control change is a very crucial occurrence. In essence, a scope change may change every phase of the project life cycle.

Scope Control System

A scope change normally will require additional project funds, resources and time; therefore, a committee that consists of stakeholders from all areas of the project should be willing to convene and discuss the potential change and its anticipated impact to the project. This group of stakeholders should be a predefined cross section of people that will have the ability to commit their interests at a strategic management level. Once a decision has been made to increase or reduce scope, the change must be authorized by all members of the committee. Any changes that are agreed upon must be documented and signed as a matter of formal scope control.

In addition, the impact of the scope change will be realized throughout the Planning Phase processes and documents. Documents such as the Work Breakdown Structure and Project Schedule will need to be reevaluated and updated to include the scope change impacts. Scope changes need to be communicated clearly and effectively to the project team by the project manager. Team members will want and need to understand how the scope changes affect their respective roles in the project.

Schedule Control

Attributes of Schedule Control include:

- Determining that the schedule has changed.
- Managing the actual changes when and as they occur.

Schedule Control is one of the most difficult but important activities within project control. The project schedule can be affected by any number of issues from resources to funding, vendors, weather, and anything in between. The ability of a Project Manager to manage the schedule of a project and deliver it on time is a high-visibility concern for project success from a customer point of view.

Schedule issues, as stated previously, come from a variety of sources; however, there should be a single, focused method for dealing with schedule changes. If a potential schedule problem is discovered, the problem must be investigated and the cause uncovered as soon as possible. Once the problem is discovered, a plan should be created for correcting the problem in the shortest allowable time with the least impact. It is also advisable to bring forward alternatives of varying costs.

Schedule Control is something that typically is managed at the project level by the Project Manager; however, it is very important to make the customer aware that a schedule change has occurred. Furthermore, the customer needs to be made aware of what is being done to fix the issue and the impact it will have on the project's time line, performance and deliverable.

5.4 Risk Control

Risk control involves executing the Risk Management Plan in order to respond to risk events over the course of the project. When changes occur that include risks, the cycle listed below may be followed:

- Identify the actual risk event - some of the identified risk events will occur; others will not occur.
- Qualify/quantify -as risks are qualified and quantified, the project management team must separate actual risk events from sources of risk.
- Respond - the response for the risk should be appropriate for the risk as defined in the Risk Management Plan.

Risk Control Tools

It is important to understand that even the most thorough and comprehensive analysis cannot identify all risks and probabilities correctly; identification of risks are necessary for the success of the project. Some effective tools and techniques for risk control are Workarounds. Workarounds are unexplained responses to negative risk events and are considered to be short-term solutions. Workarounds are unplanned in the sense that the response was not defined in advance of the risk event occurring.

If the risk event was not anticipated or the effect was greater than expected, the planned response may not be adequate. When this happens, it will be necessary to repeat the response process and the risk quantification process. Additional risk response development may also be required.

5.5 Quality Control

Quality control involves monitoring specific project results to determine if they comply with relevant quality standards and identifying ways to eliminate causes of unsatisfactory results. Quality control should be performed throughout the project. Project results include both product results such as deliverables and management results such as cost and schedule performance. Quality control is performed by the Quality Engineering (QE) unit at DIS.

Each project should have a QE representative assigned to it. The QE representative will work with the Project Manager to develop a Quality Management Plan specific for that project using agency quality guidelines with input from the customer and other stakeholders.

The project management team should have a working knowledge of statistical quality control, especially sampling and probability, to help evaluate quality control outputs. The team should also be aware of the following:

- Prevention (keeping errors out of the process) and inspection (keeping errors out of the hands of the customers).
- Attribute sampling (the result conforms or it does not) and variables sampling (the result is rated on a continuous scale that measures degrees of conformity).
- Special cases (unusual events) and common causes (normal process variation). Common causes are also called random causes.
- Tolerances (the result is acceptable if it falls within the range specified by the tolerance) and control limits (the process is in control if the result falls within the control limits).

5.6 Cost Control

Projects may fail to control cost, or go over budget, for many reasons. Often it is not a single problem but a series of small problems that combined permit cost control to be sacrificed and prevent the project from being completed successfully. Cost control contains the following attributes:

- Determine if the Project Budget Estimate has changed.
- Manage the actual change and take corrective action.
- Inform appropriate stakeholders of authorized changes.

Cost control is not simply a reporting process. It includes the searching out of the "why" for both positive and negative variances between the scheduled and actual costs. It must be thoroughly integrated with the other control processes. For example, inappropriate responses to cost variances can cause quality or schedule problems or produce an unacceptable level of risk later in the project. To be effective, all tools require the reporting of actual performance on a consistent and regular basis for evaluation against project budget estimates. To prevent significant labor overhead for the maintenance of cost information during a project, the source and methods of reporting costs must be addressed in the initial phases of project planning and may be addressed in the Project Budget Estimate.

Revised cost estimates are modifications to the cost information used to manage the project. They may be done in response to changes, additional information received from other activities, or other reasons. Stakeholders should be kept apprised of significant changes, either through normal reporting systems or exception reporting as outlined in the Project Budget Estimate. These modifications may or may not affect other aspects of the Project Plan. Corrective action is anything done to bring expected future performance in line with the Project Plan.

Budget updates are a special category of revised cost estimates. They are changes to an approved Project Budget Estimate and are normally done in response to a change in project scope. They are synonymous with schedule revisions as outlined in the previous section. Budget updates may also be required if cost variances become so severe that the current plan no longer provides a realistic perspective on project performance.

In regards to cost control, lessons learned are valuable tools that can be used for gathering and recording informational experience from other projects and then applying them to current and future projects so as to be more effective.

5.7 Contract Administration Control

Quite simply, contract administration control is the process of ensuring that the vendor's or section within the organization's performance meets contractual requirements. This is accomplished through the use and monitoring of a Project Plan from the vendor, estimates from performing sections, periodic progress reports, and the completion of deliverables as delineated in a project statement of work. Contract closure should be coordinated with the Contract Manager of the agency.