Creating a project monitoring system involves determining:

- What data to collect
- How, when, and who will collect the data
- How to analyze the data
- How to report current progress to management
Project Monitoring Information System

• Information System Structure
  – What data are collected?
    • Current status of project (schedule and cost)
    • Remaining cost to compete project
    • Date that project will be complete
    • Potential problems to be addressed now
    • Out-of-control activities requiring intervention
    • Cost and/or schedule overruns and the reasons for them
    • Forecast of overruns at time of project completion
Project Monitoring System… (cont’d)

• Information System Structure (cont’d)
  – Collecting data and analysis
    • Who will collect project data?
    • How will data be collected?
    • When will the data be collected?
    • Who will compile and analyze the data?
  – Reports and reporting
    • Who will receive the reports?
    • How will the reports be transmitted?
    • When will the reports be distributed?
The Project Control Process

• Control
  – The process of comparing actual performance against plan to identify deviations, evaluate courses of action, and take appropriate corrective action.

• Project Control Steps
  1. Setting a baseline plan.
  3. Comparing plan against actual.
  4. Taking action.

• Tools
  – Tracking and baseline Gantt charts
  – Control charts
Developing an Integrated Cost/Schedule System

1. Define the work using a WBS.
   a. Scope
   b. Work packages
   c. Deliverables
   d. Organization units
   e. Resources
   f. Budgets

2. Develop work and resource schedules.
   a. Schedule resources to activities
   b. Time-phase work packages into a network

3. Develop a time-phased budget using work packages included in an activity. Accumulate budgets (PV).

4. At the work package level, collect the actual costs for the work performed (AC). Multiply percent complete times original budget (EV).

5. Compute the schedule variance (EV-PV) and the cost variance (EV-AC).
Development of Project Baselines

• Purposes of a Baseline (PV)
  – An anchor point for measuring performance
    • A planned cost and expected schedule against which actual cost and schedule are measured.
    • A basis for cash flows and awarding progress payments.
    • A summation of time-phased budgets (cost accounts as summed work packages) along a project timeline.

• What Costs Are Included in Baselines?
  – Labor, equipment, materials, project direct overhead costs (DOC)
Development of Project Baselines (cont’d)

• Rules for Placing Costs in Baselines
  – Costs are placed exactly as they are expected to be “earned” in order to track them to their point of origin.
  – Percent Complete Rule
    • Costs are periodically assigned to a baseline as units of work are completed over the duration of a work package.
Methods of Variance Analysis

• Comparing Earned Value
  – With the expected schedule value.
  – With the actual costs.

• Assessing Status of a Project
  – Required data elements
    • Data Budgeted cost of the work scheduled (PV)
    • Budgeted cost of the work completed (EV)
    • Actual cost of the work completed (AC)
  – Calculate schedule and cost variances
    • A positive variance indicates a desirable condition, while a negative variance suggests problems or changes that have taken place.
Developing A Status Report: A Hypothetical Example

• Assumptions
  – Each cost account has only one work package, and each cost account will be represented as an activity on the network.
  – The project network early start times will serve as the basis for assigning the baseline values.
  – From the moment work an activity begins, some actual costs will be incurred each period until the activity is completed.
Indexes to Monitor Progress

- **Performance Indexes**
  - **Cost Performance Index (CPI)**
    - Measures the cost efficiency of work accomplished to date.
    - CPI = EV/AC
  - **Scheduling Performance Index (SPI)**
    - Measures scheduling efficiency
    - SPI = EV/PV
  - **Percent Complete Indexes**
    - Indicates how much of the work accomplished represents of the total budgeted (BAC) and actual (AC) dollars to date.
    - PCIB = EV/BAC
    - PCIC = AC/EAC
Additional Earned Value Rules

• Rules applied to short-duration activities and/or small-cost activities
  – 0/100 percent rule
    • Assumes 100% of budget credit is earned at once and only when the work is completed.
  – 50/50 rule
    • Allows for 50% of the value of the work package budget to be earned when it is started and 50% to be earned when the package is completed.
  – Percent complete with weighted monitoring gates
    • Uses subjective estimated percent complete in combination with hard, tangible monitoring points.
Forecasting Final Project Cost

- Methods used to revise estimates of future project costs:
  - $EAC_{re}$
    - Allows experts in the field to change original baseline durations and costs because new information tells them the original estimates are not accurate.
  - $EAC_f$
    - Uses actual costs-to-date plus an efficiency index to project final costs in large projects where the original budget is unreliable.
Baseline budget
Control chart
Cost performance index (CPI)
Cost variance (CV)
Earned value (EV)
Estimated Cost at Completion—Forecasted (EAC$_f$)
Estimated Cost at Completion—Revised Estimates (EAC$_{re}$)
Percent complete index—budget costs (PCIB)
Percent complete index—actual costs (PCIC)
Schedule performance index (SPI)
Schedule variance (SV)
Scope creep
To complete performance index (TCPI)
Tracking Gantt chart
Variance at completion (VAC)