

GAO Cost Estimating and Assessment Guide
Twelve Steps of a High-Quality Cost Estimating Process

Step	Description	Associated task
1	Define estimate's purpose	<ul style="list-style-type: none"> • Determine estimate's purpose, required level of detail, and overall scope; • Determine who will receive the estimate
2	Develop estimating plan	<ul style="list-style-type: none"> • Determine the cost estimating team and develop its master schedule; • Determine who will do the independent cost estimate; • Outline the cost estimating approach; • Develop the estimate timeline
3	Define program characteristics	<ul style="list-style-type: none"> • In a technical baseline description document, identify the program's purpose and its system and performance characteristics and all system configurations; • Any technology implications; • Its program acquisition schedule and acquisition strategy; • Its relationship to other existing systems, including predecessor or similar legacy systems; • Support (manpower, training, etc.) and security needs and risk items; • System quantities for development, test, and production; • Deployment and maintenance plans
4	Determine estimating structure	<ul style="list-style-type: none"> • Define a work breakdown structure (WBS) and describe each element in a WBS dictionary (a major automated information system may have only a cost element structure); • Choose the best estimating method for each WBS element; • Identify potential cross-checks for likely cost and schedule drivers; • Develop a cost estimating checklist
5	Identify ground rules and assumptions	<ul style="list-style-type: none"> • Clearly define what the estimate includes and excludes; • Identify global and program-specific assumptions, such as the estimate's base year, including time-phasing and life cycle; • Identify program schedule information by phase and program acquisition strategy; • Identify any schedule or budget constraints, inflation assumptions, and travel costs; • Specify equipment the government is to furnish as well as the use of existing facilities or new modification or development; • Identify prime contractor and major subcontractors; • Determine technology refresh cycles, technology assumptions, and new technology to be developed; • Define commonality with legacy systems and assumed heritage savings; • Describe effects of new ways of doing business

6	Obtain data	<ul style="list-style-type: none"> • Create a data collection plan with emphasis on collecting current and relevant technical, programmatic, cost, and risk data; • Investigate possible data sources; • Collect data and normalize them for cost accounting, inflation, learning, and quantity adjustments; • Analyze the data for cost drivers, trends, and outliers and compare results against rules of thumb and standard factors derived from historical data; • Interview data sources and document all pertinent information, including an assessment of data reliability and accuracy; • Store data for future estimates
7	Develop point estimate and compare it to an independent cost estimate	<ul style="list-style-type: none"> • Develop the cost model, estimating each WBS element, using the best methodology from the data collected, and including all estimating assumptions; • Express costs in constant year dollars; • Time-phase the results by spreading costs in the years they are expected to occur, based on the program schedule; • Sum the WBS elements to develop the overall point estimate; • Validate the estimate by looking for errors like double counting and omitted costs; • Compare estimate against the independent cost estimate and examine where and why there are differences; • Perform cross-checks on cost drivers to see if results are similar; • Update the model as more data become available or as changes occur and compare results against previous estimates
8	Conduct sensitivity analysis	<ul style="list-style-type: none"> • Test the sensitivity of cost elements to changes in estimating input values and key assumptions; • Identify effects on the overall estimate of changing the program schedule or quantities; • Determine which assumptions are key cost drivers and which cost elements are affected most by changes
9	Conduct risk and uncertainty analysis	<ul style="list-style-type: none"> • Determine and discuss with technical experts the level of cost, schedule, and technical risk associated with each WBS element; • Analyze each risk for its severity and probability; • Develop minimum, most likely, and maximum ranges for each risk element; • Determine type of risk distributions and reason for their use; • Ensure that risks are correlated; • Use an acceptable statistical analysis method (e.g., Monte Carlo simulation) to develop a confidence interval around the point estimate; • Identify the confidence level of the point estimate; • Identify the amount of contingency funding and add this to the point estimate to determine the risk-adjusted cost estimate; • Recommend that the project or program office develop a risk management plan to track and mitigate risks

10	Document the estimate	<ul style="list-style-type: none"> • Document all steps used to develop the estimate so that a cost analyst unfamiliar with the program can recreate it quickly and produce the same result; • Document the purpose of the estimate, the team that prepared it, and who approved the estimate and on what date; • Describe the program, its schedule, and the technical baseline used to create the estimate; • Present the program's time-phased life-cycle cost; • Discuss all ground rules and assumptions; • Include auditable and traceable data sources for each cost element and document for all data sources how the data were normalized; • Describe in detail the estimating methodology and rationale used to derive each WBS element's cost (prefer more detail over less); • Describe the results of the risk, uncertainty, and sensitivity analyses and whether any contingency funds were identified; • Document how the estimate compares to the funding profile; • Track how this estimate compares to any previous estimates
11	Present estimate to management for approval	<ul style="list-style-type: none"> • Develop a briefing that presents the documented life-cycle cost estimate; Include an explanation of the technical and programmatic baseline and any uncertainties; • Compare the estimate to an independent cost estimate (ICE) and explain any differences; • Compare the estimate (life-cycle cost estimate (LCCE)) or independent cost estimate to the budget with enough detail to easily defend it by showing how it is accurate, complete, and high in quality; • Focus in a logical manner on the largest cost elements and cost drivers; • Make the content clear and complete so that those who are unfamiliar with it can easily comprehend the competence that underlies the estimate results; • Make backup slides available for more probing questions; • Act on and document feedback from management; • Request acceptance of the estimate
12	Update the estimate to reflect actual costs and changes	<ul style="list-style-type: none"> • Update the estimate to reflect changes in technical or program assumptions or keep it current as the program passes through new phases or milestones; • Replace estimates with EVM EAC and independent estimate at completion (EAC) from the integrated EVM system; • Report progress on meeting cost and schedule estimates; • Perform a post mortem and document lessons learned for elements whose actual costs or schedules differ from the estimate; • Document all changes to the program and how they affect the cost estimate