GAO Cost Guide and 10 Years of Cost Estimate Assessments

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Outline

- Background (GAO)

- Best Practice Guides

- 10 Years of Assessments

- Case Study: Credible Characteristic

Background

Overview: About GAO

- GAO is an independent, nonpartisan agency serving the Congress to help improve the performance and ensure the accountability of the federal government.

- Core values are Accountability, Integrity, and Reliability.

- To ensure independence, the Comptroller General (CG) is appointed to a 15-year term by the President. Other than the CG, there are no political appointees at GAO.

Oversight, Insight, Foresight

Overview: About GAO (Our Work)

- GAO work is primarily done at the request of congressional committees or subcommittees or is mandated by public laws or committee reports. We also undertake research under the authority of the Comptroller General.

- Some examples of our work include:
  - Auditing agency operations to determine whether federal funds are being spent efficiently and effectively
  - Investigating allegations of illegal and improper activities
  - **Reporting on how well government programs and policies are meeting their objectives**
  - **Performing policy analyses and outlining options for congressional consideration**
  - Issuing legal decisions and opinions, such as bid protest rulings and reports on agency rules

- In 2018, Congress directed the formation of the Science, Technology Assessment, and Analytics (STAA) team, recognizing that the accelerating pace of innovation has created a need for more and deeper analysis of science and technology.

More information about GAO can be found at www.gao.gov

Best Practice Guides

Overview: Best Practice Guides

Why develop best practice guides?

- Legislators, government officials, and the public want to know whether government programs are achieving their goals and what these programs are expected to cost and when they are expected to be finished.
  - Best practice guides provide clear criteria to establish the quality of program artifacts and whether they provide managers and oversight organizations enough information to make informed decisions.

- Developing reliable program cost and schedule estimates is critical to
  - Effectively using public funds
  - Meeting OMB's capital programming process
  - Avoiding cost overruns, missed deadlines, and performance shortfalls

- The Guides help provide a framework for managing the government's complex efforts and ensuring the successful development and integration of cutting-edge technologies and their integration into large and complex systems.

Overview: Best Practice Guides

- **Cost Estimating and Assessment Guide**
  - Issued: March 2020, GAO-20-195G

- **Schedule Assessment Guide**
  - Issued: December 2015, GAO-16-89G

- **Technology Readiness Assessment Guide**
  - Issued: January 2020, GAO-20-48G

- **Agile Assessment Guide**
  - Issued: November 2023, GAO-24-105506

Cost Estimating and Assessment Guide

Cost Assessment

Assess program life cycle cost estimates

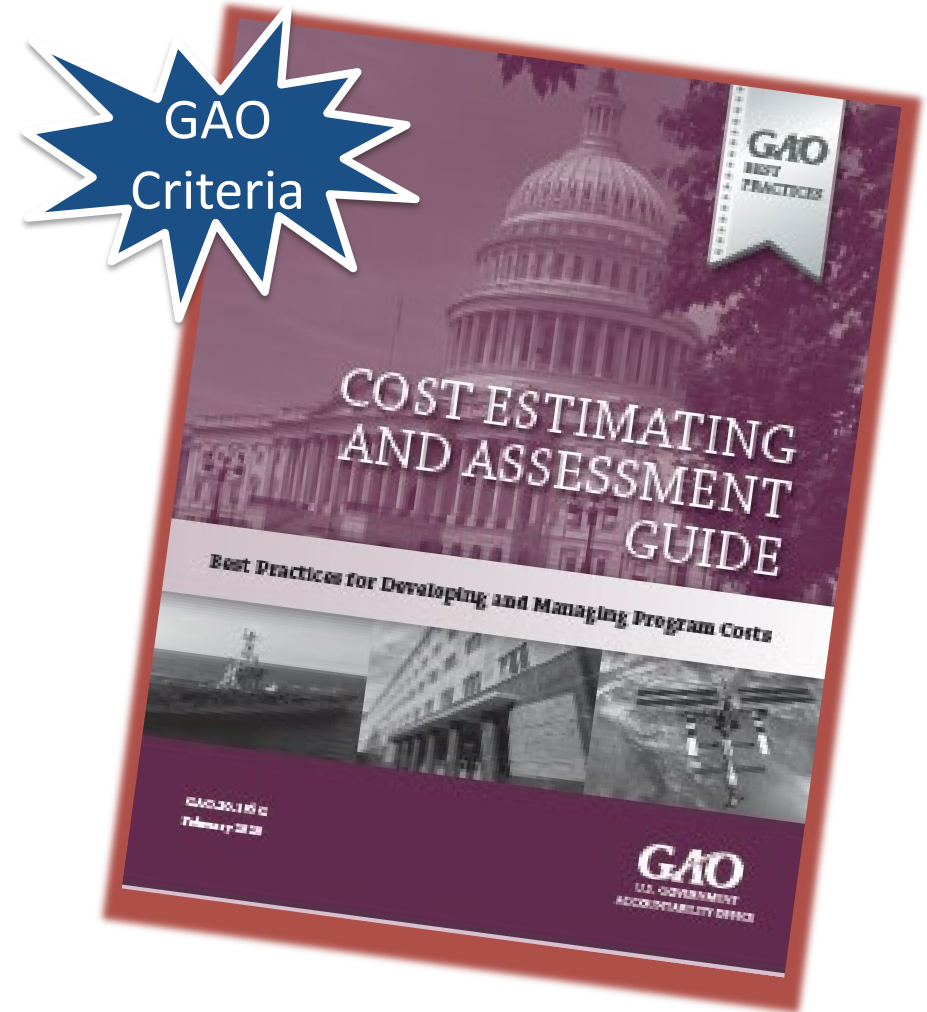By determining the extent to which the estimates are:
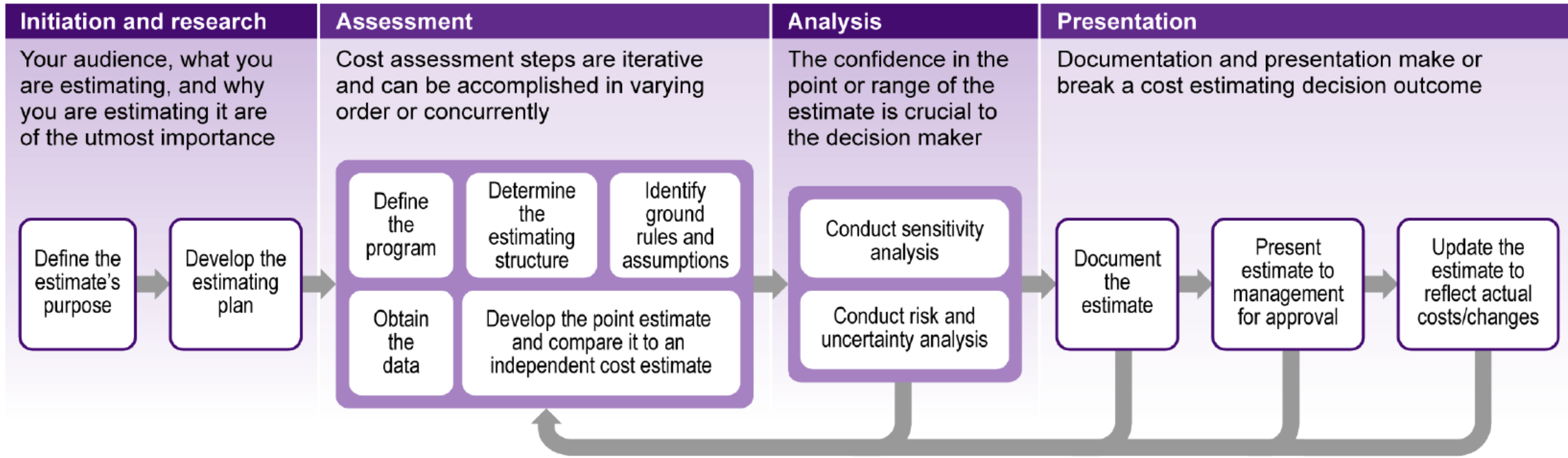
Comprehensive	Well-documented	Accurate	Credible

Through the evaluation of 18 best practices

GAO Criteria

GAO Cost Guide:
https://www.gao.gov/products/GAO-20-195G

Cost Estimating 12 Step Process

Initiation and research

Your audience, what you are estimating, and why you are estimating it are of the utmost importance

- Define the estimate's purpose
- Develop the estimating plan

Assessment

Cost assessment steps are iterative and can be accomplished in varying order or concurrently

- Define the program
- Determine the estimating structure
- Identify ground rules and assumptions
- Obtain the data
- Develop the point estimate and compare it to an independent cost estimate

Analysis

The confidence in the point or range of the estimate is crucial to the decision maker

- Conduct sensitivity analysis
- Conduct risk and uncertainty analysis

Presentation

Documentation and presentation make or break a cost estimating decision outcome

- Document the estimate
- Present estimate to management for approval
- Update the estimate to reflect actual costs/changes
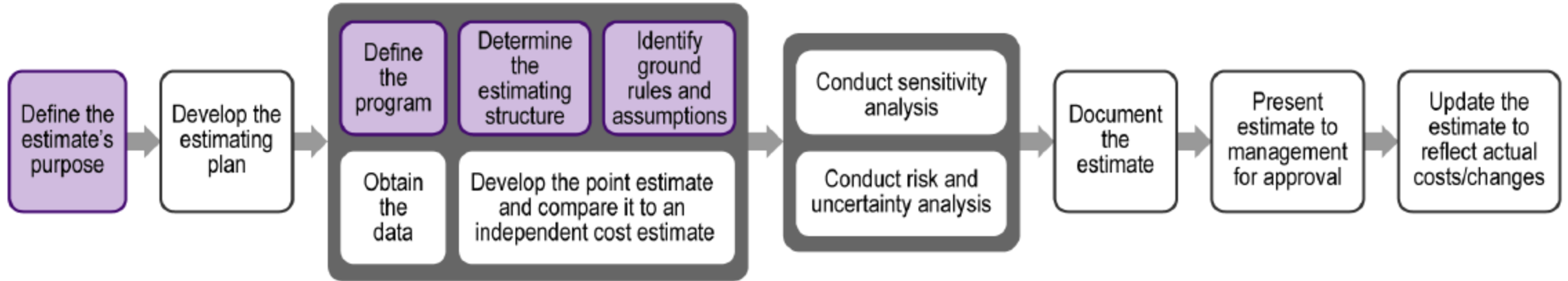
Analysis, presentation, and updating the estimate steps can lead to repeating previous assessment steps.
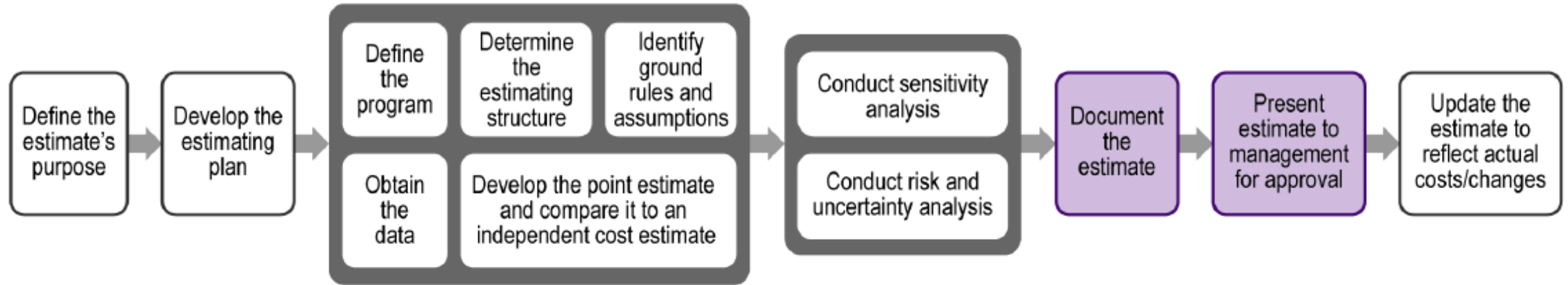
Source: GAO. | GAO-20-195G

Comprehensive Characteristic

Comprehensive
- includes all life cycle costs
- a technical baseline description defines the program
- based on a WBS that is product-oriented
- documents all cost-influencing ground rules and assumptions

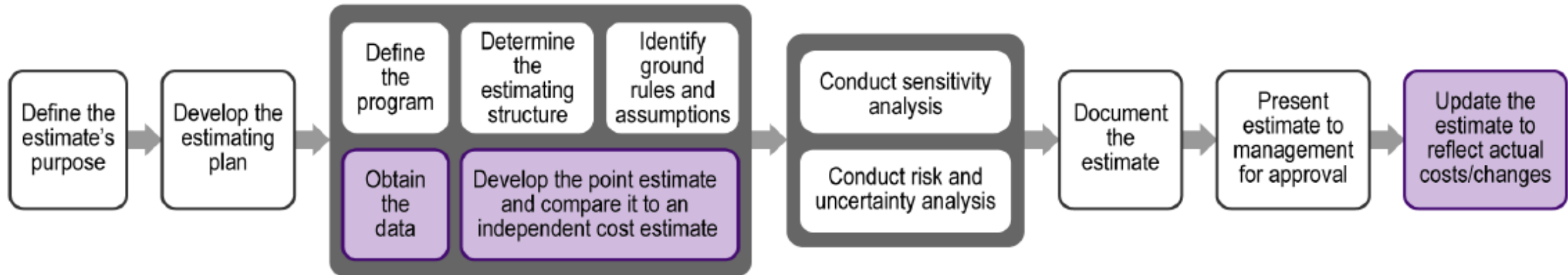Source: GAO. | GAO-20-195G

Well Documented Characteristic

Well documented
- shows the source data used
- describes step by step how the estimate was developed
- discusses the technical baseline description
- provides evidence that the cost estimate was reviewed
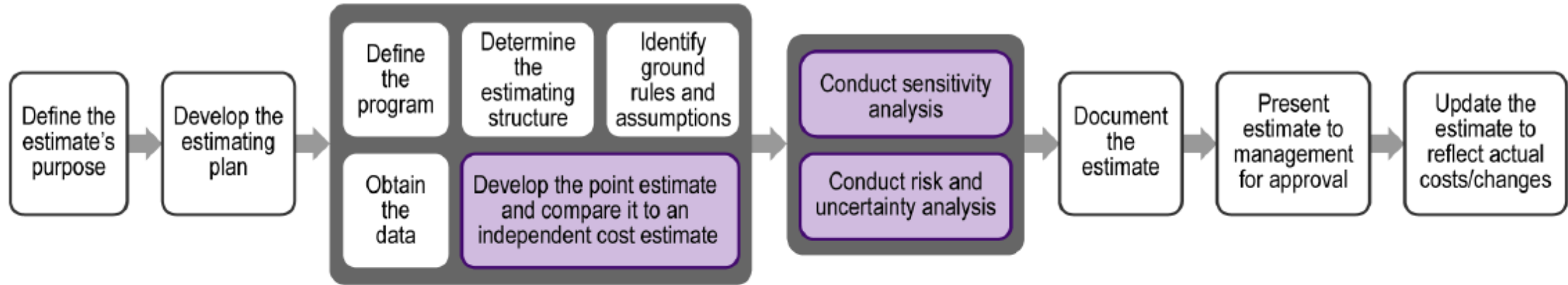
Source: GAO. | GAO-20-195G

Accurate Characteristic

Source: GAO. | GAO-20-195G

Accurate

- uses the best methodology from the data collected
- adjusted properly for inflation
- contains few, if any, minor mistakes
- regularly updated
- documents and explains variances
- based on a historical record

Credible Characteristic


Source: GAO. | GAO-20-195G

10 Years of Assessments

10 Years of Assessments

- We performed cost estimate assessments for 117 programs across the federal government contributing to the publication of 75 GAO reports.

- Program selection is primarily done at the request of Congress.

- Often programs are selected due to risk level or existing performance issues.

- Majority of reports lead to recommendations for areas of improvement.

- When recommendations are addressed by the agency a follow up assessment is performed and a determination is made whether to close the recommendation.

Number of Reports Issued by Fiscal Year
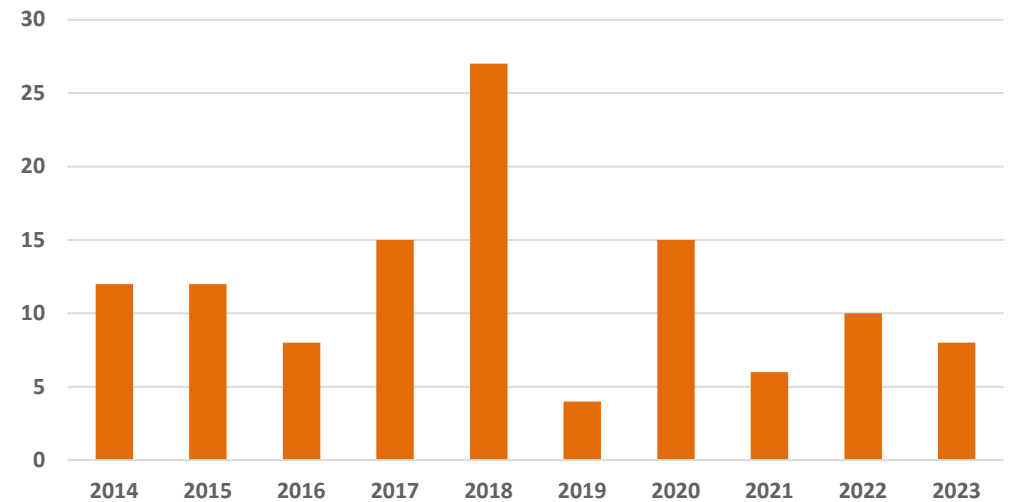
Who Have We Assessed

U.S. Department of Homeland Security

5 Customs and Border Protection
4 Transportation Security Administration
4 U.S. Coast Guard
7 Other DHS Entities

Other Government Agencies

5 Housing and Urban Development
5 Veterans Affairs
3 Commerce
3 Agriculture
3 State
3 Administrative Office of the U.S. Courts
2 NASA
2 Labor
2 Treasury
2 General Services Administration
2 Architect of the Capitol
2 Library of Congress
8 Other Government Entities

U.S. Department *of* Defense

10 Air Force
6 Army
6 Navy
6 Marine Corps
6 Other DoD Entities
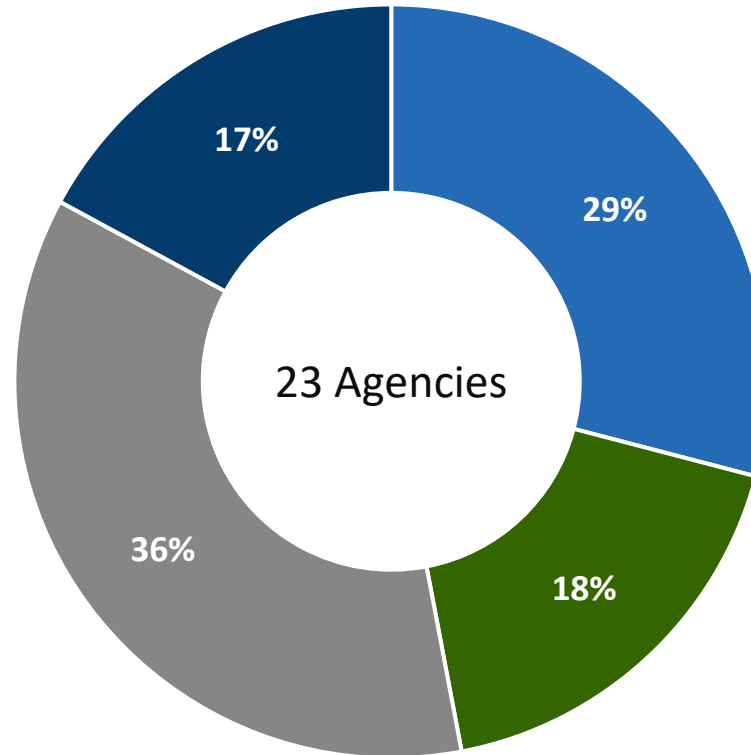
U.S. DEPARTMENT OF ENERGY

10 National Nuclear Security Administration
5 Office of Environmental Management
6 Other DOE Entities

Donut chart (23 Agencies): 17%, 29%, 18%, 36%

Cost Estimate Assessments 2014-2023

How Are Assessments Scored

- Each best practice has associated criteria.

- We assess evidence against these criteria to determine how well they were met.

  - Criteria can be found at the end of each Step chapter in the Cost Guide.

- We rate each best practice based on the fulfillment of its criteria.

- We average the rating of each best practice to determine the score of the overall characteristic.

- A cost estimate is considered reliable if the overall assessment ratings for each of the four characteristics are substantially or fully met.

- If any of the characteristics are not met, minimally met, or partially met, then the cost estimate does not fully reflect the characteristics of a high-quality estimate and cannot be considered reliable.

Best Practice Scoring

Not Met = 1

The organization provided no evidence that satisfies any of the criterion.

Minimally Met = 2

- The organization provided evidence that satisfies a small portion of the criterion.

Partially Met = 3

- The organization provided evidence that satisfies about half of the criterion.

Substantially Met = 4

- The organization provided evidence that satisfies a large portion of the entire criterion.

Fully Met = 5

- The organization provided complete evidence that satisfies the entire criterion.

Best Practice	Individual Assessment	Score
The cost estimate includes all life cycle costs	Substantially Met	4
The cost estimate is based on a technical baseline description that completely defines the program, reflects the current schedule, and is technically reasonable.	Partially Met	3
The cost estimate is based on a WBS that is product-oriented, traceable to the statement of work, and at an appropriate level of detail to ensure that cost elements are neither omitted nor double-counted.	Met	5
The cost estimate documents all cost-influencing ground rules and assumptions.	Minimally Met	2
Average Score (4 + 3 + 5 + 2) / 4 = 14 / 4		3.5
Comprehensive Overall Assessment	**Substantially Met**	

Agency Cost Estimate Ratings Varied Over Past 10 Years

- Scores are reflections of the program estimates assessed, not the agency itself.

- Scores are presented as of the assessment published in the GAO report.

- Recommendation follow-ups occur after the published report that may lead to a higher score and closure of the recommendation.

- Program cost estimates most consistently scored lowest in the best practices associated with the Credible characteristic.

Average Characteristic Score By Agency	# of Program Reviews	Average Score
Department of Homeland Security	20	3.6
Department of Defense	34	3.1
Department of Energy	21	3.1
Other Agencies	42	2.3
Grand Total	117	3.0

Met	5
Substantially Met	4
Partially Met	3
Minimally Met	2
Not Met	1

Average Comprehensive Score By Agency	# of Program Reviews	Average Score
Department of Homeland Security	20	4.0
Department of Defense	33	3.6
Department of Energy	21	3.4
Other Agencies	42	3.2
Grand Total	116	3.5

Average Well Documented Score By Agency	# of Program Reviews	Average Score
Department of Homeland Security	8	3.6
Department of Defense	29	3.2
Department of Energy	18	3.1
Other Agencies	35	2.8
Grand Total	90	3.1

Average Accurate Score By Agency	# of Program Reviews	Average Score
Department of Homeland Security	19	3.3
Department of Defense	30	3.2
Department of Energy	18	3.1
Other Agencies	35	2.7
Grand Total	102	3.0

Average Credible Score By Agency	# of Program Reviews	Average Score
Department of Homeland Security	8	3.0
Department of Defense	32	2.3
Department of Energy	18	2.6
Other Agencies	34	1.9
Grand Total	92	2.3

Reliability Assessment - Data in Detail

400 Individual Characteristic Assessments
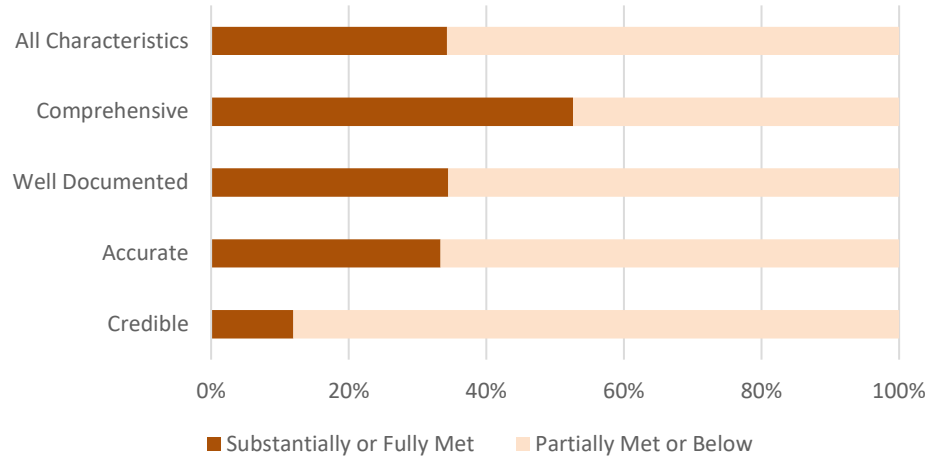
88 Full Reliability Assessments


A cost estimate is considered reliable if the overall assessment ratings for each of the four characteristics are substantially or fully met.

- 88 Full Reliability Assessments
  - 6 Reliable (7%)
  - 82 Not Reliable (93%)

- 20% of "Not Reliable" assessments are Near Misses – Only one of the four characteristics was scored lower than Substantially Met
  - 15 Credible Near Misses (17%)
  - 2 Well Documented Near Misses (2%)
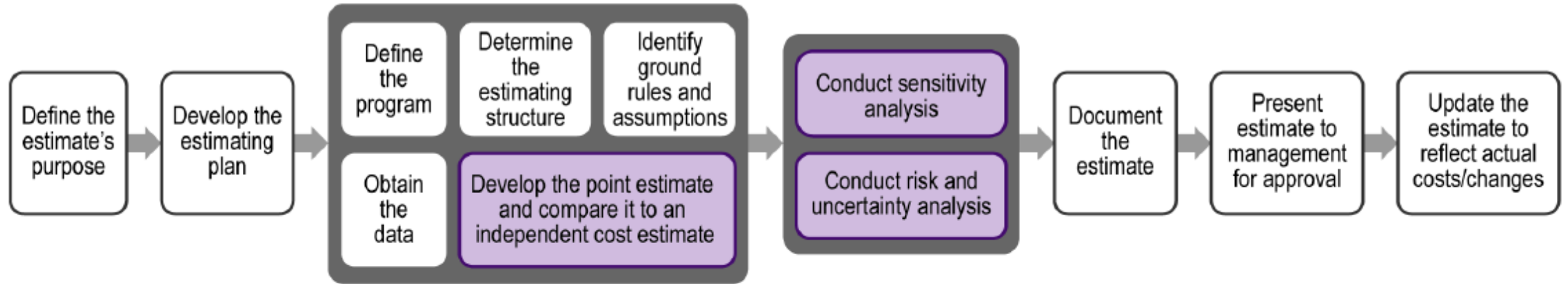 - 1 Comprehensive Near Miss (1%)
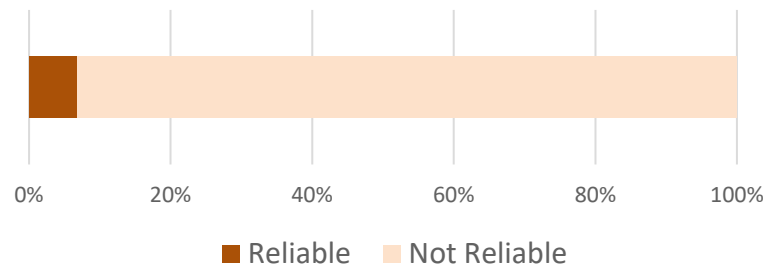
Case Study:
Credible Characteristic

Revisiting the Credible Characteristic

Source: GAO. | GAO-20-195G

Credible Characteristic Case Study: GAO-23-106067

United States Government Accountability Office
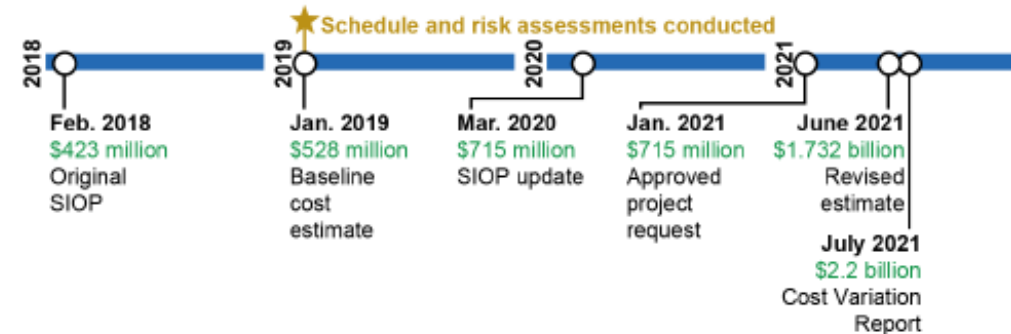
Report to Congressional Committees

GAO

June 2023

NAVY READINESS

Actions Needed to Address Cost and Schedule Estimates for Shipyard Improvement
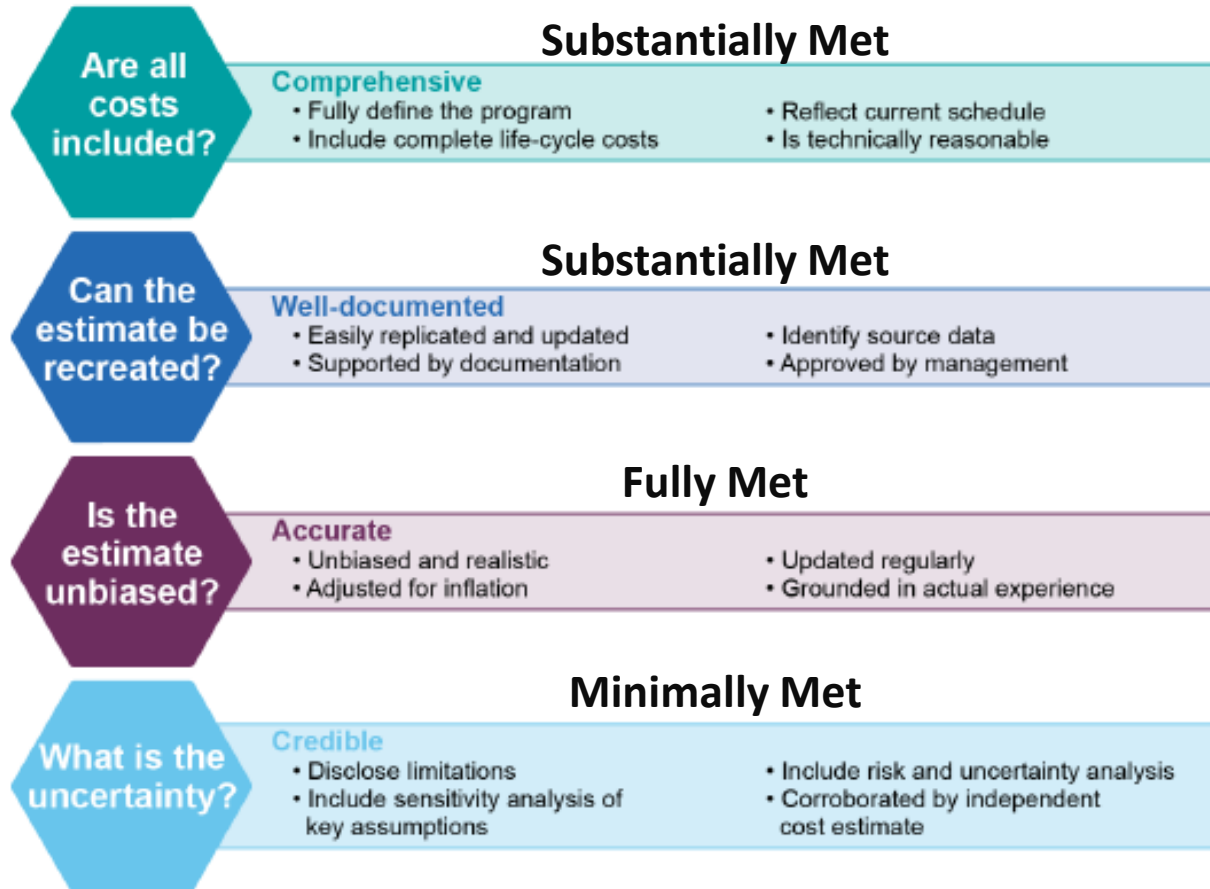
GAO-23-106067

As of June 2023, cost estimates for several Shipyard Improvement Optimization Program (SIOP) efforts had increased significantly from their original baseline estimate. One such project, the Portsmouth Naval Shipyard drydock grew 4x in 2.5 years. GAO assessed the extent to which the Portsmouth Naval Shipyard dry dock cost estimate met GAO's best practices.

Figure 9: Timeline of Changes to Portsmouth Naval Shipyard Dry Dock Cost Estimate

⭐ Schedule and risk assessments conducted

2018	2019	2020	2021	
Feb. 2018 $423 million Original SIOP	**Jan. 2019** $528 million Baseline cost estimate	**Mar. 2020** $715 million SIOP update	**Jan. 2021** $715 million Approved project request	**June 2021** $1.732 billion Revised estimate **July 2021** $2.2 billion Cost Variation Report

SIOP   Shipyard Infrastructure Optimization Program

Source: GAO analysis of Navy documents. | GAO-23-106067

Credible Characteristic Case Study: GAO-23-106067

Substantially Met

Are all costs included?

Comprehensive
- Fully define the program
- Include complete life-cycle costs
- Reflect current schedule
- Is technically reasonable

Substantially Met

Can the estimate be recreated?

Well-documented
- Easily replicated and updated
- Supported by documentation
- Identify source data
- Approved by management

Fully Met

Is the estimate unbiased?

Accurate
- Unbiased and realistic
- Adjusted for inflation
- Updated regularly
- Grounded in actual experience

Minimally Met

What is the uncertainty?

Credible
- Disclose limitations
- Include sensitivity analysis of key assumptions
- Include risk and uncertainty analysis
- Corroborated by independent cost estimate

Source: GAO. | GAO-23-106067

GAO Found:

✓ Cost risk and uncertainty analysis and sensitivity analysis was performed on the January 2019 project estimate, representing a maturity level of 15 percent, but was not updated to reflect the final design estimate that informed the project budget request.

✓ The project estimate did not contain any documented cross-checks

✓ The Navy did not conduct an Independent Cost Estimate (ICE)

GAO recommended the Navy update their cost risk and uncertainty and sensitivity analyses of key SIOP projects throughout the design process as well as ensure that high-value cost elements are cross-checked using different estimating methodologies

Thank you

Guides Available Online and Downloadable in PDF:

GAO Cost Estimating and Assessment Guide:
https://www.gao.gov/products/gao-20-195g

GAO Schedule Assessment Guide:
https://www.gao.gov/products/gao-16-89g

GAO Technical Readiness Assessment Guide:
https://www.gao.gov/products/gao-20-48g

GAO Agile Assessment Guide:
https://www.gao.gov/products/gao-24-105506

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Back Up

Cost Estimating Best Practices

Comprehensive
- Includes all life cycle costs
- Based on a technical baseline description
- Documents cost-influencing ground rules and assumptions
- Based on a product oriented WBS

Well-Documented
- Shows the source data used
- Describes step by step how the estimate was developed
- Discusses the technical baseline description
- Provides evidence that the cost estimate was reviewed and accepted

Accurate
- Adjusted properly for inflation
- Based on a historical record
- Uses the best methodology from the data collected
- Contains few, if any, minor mistakes
- Documents and explains variances
- Regularly updated

Credible
- Conduct sensitivity analysis
- Conduct risk and uncertainty analysis
- Perform cross checks
- Compare to an independent estimate