

First NASA Project-Level Structured Cost Estimate Saves 75% of Estimate Time



National Aeronautics and Space Administration, Hampton, VA

Background: The first project-level use of structured costing at NASA significantly reduced the time required to generate an independent cost estimate for the Mars Exploration Rover (MER) project. This method completed the estimate in less than 25% of the time needed for the traditional bottoms-up approach. The structured costing approach used a knowledge base that compared rover hardware and software modules to thousands of real-world projects, resulting in a highly accurate estimate in a fraction of the time.

"Structured costing saved 75% of our estimate time with the same accuracy."

Traffic Jam on Mars?

Mars is about to get busier with two large scientific rovers set for launch. "For the first time, science and technology have given us the capability to explore alien planets in ways that used to exist only in science fiction movies," said Ed Weiler, Associate Administrator for Space Science at NASA. The Mars rovers, equipped with advanced scientific instruments, will traverse different regions of Mars to uncover the planet's aqueous, climatic, and geologic history.

Original Cost Estimate

Traditionally, NASA's cost estimates involved breaking down systems into individual components and researching previous projects to find similar parts. This process was time-consuming and prone to errors. Rey Carpio, Program Analyst for NASA, sought to reduce the time needed for the independent cost estimate using SEER-H™ and SEER-SEM™ from Galorath Incorporated. These tools leverage extensive knowledge bases of actual projects to generate estimates, eliminating the need for tedious research.

"SEER tools eliminated the most time-consuming part of the bottoms-up approach."

Setting the Foundation with Knowledge Bases:

Carpio gathered detailed input from the engineering team to feed into the SEER-H and SEER-SEM programs. The tools used knowledge bases tailored for electronic and mechanical elements to predict development and manufacturing costs. The estimates were reviewed and adjusted based on engineer feedback, ensuring accuracy and capturing unique project aspects.

Estimating Software Costs

Using SEER-SEM, Carpio estimated the cost of the rover's software modules by inputting parameters like size, complexity, and development method. The tool allowed for detailed sensitivity analysis, helping to assess the impact of schedule changes and other factors on costs.

"SEER-SEM's sensitivity analysis made it easy to evaluate cost impacts of project changes."

Substantial Time Savings

The structured costing approach saved significant time and improved the quality of cost estimates. Harris engineers estimate that approximately 1,000 hours were saved using SEER™ tools. The approach also facilitated easier examination and auditing of the estimates. "The structured approach has many advantages," Carpio said. "I have recommended making this a part of our review process to convey our confidence in these estimates to budget decision-makers."

"The structured approach has many advantages and saves significant time."