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Abstract Title	Working Toward Mitigating Cognitive Biases in Analogous-Based Cost Estimating Models
Topic Area	System and Decision Analysis for National Security
Level of Classification	<input checked="" type="checkbox"/> Unclassified <input type="checkbox"/> Classified (depends on number of proposed/accepted presentations and the ability to accommodate)
Presenter	Dr. Jon Wright
Title	Systems Analyst
Organization	Sandia National Laboratories
Email	jonwrig@sandia.gov
Phone	(505) 845-0544
Abstract Synopsis	
<p>Since 2014, an analogous estimating process and model known as the Scope, Complexity, Options, Risks, Excursions (SCORE) process has been developed and refined to support robust and defensible nuclear warhead cost estimates for the National Nuclear Security Administration (NNSA) 25-year strategic plan. The SCORE process engages Subject Matter Experts (SMEs) and analysts from across the Nuclear Security Enterprise (NSE) and involves the following steps: systematically determine the warhead development scope assumptions for each piece of the warhead of interest, elicit relative complexity estimates for the scope of work in question versus a well-understood reference scope of work, calculate complexity factors based on known reference costs, and estimate the warhead costs. The analogous approach hinges on expert knowledge and valid reference systems, both technically and with a true cost basis. The ability to measure and assess the influence that cognitive biases have regarding SME inputs for complexity estimates is challenging.</p> <p>We will explore two questions regarding the six years' worth of SME elicitation data from the SCORE process: (1) What quantitative trends of complexity drivers, if any, exist within the qualitative work scope descriptions provided by the SMEs? and (2) How do the current SME complexity estimates compare quantitatively to the guidance in the AACE International Recommended Practice No. 18R-97 for estimate classes given the maturity of the program being assessed? We will first discuss a modified Estimate Input Checklist and Maturity Matrix for nuclear warheads. Then, we will apply this checklist to the quantitative assessment of the SME complexity estimates and see if they fall within the expected range given a program's level of maturity. The results of this analysis could be used during future SCORE elicitation sessions as guidance to ensure the proper questions are being asked of the SMEs and as a validation for the provided complexity estimate ranges, which will continue to enhance the fidelity of the NNSA cost estimates.</p>	
Presenter Biography	
<p>Dr. Wright is a Systems Analyst within the Nuclear Security Enterprise and Cost Analysis Department at Sandia National Laboratories (SNL). Since 2015, he has been assisting key stakeholders with their decisions in the areas of: strategic nuclear weapon stockpile planning, cost analysis and estimating, technology maturation, nuclear security enterprise wide planning, and risk management. Additionally, during his time at SNL, Jon has worked for the B61-12 Life Extension Program (LEP) documenting, tracking, and assessing risk factors at systems, sub-systems, and component levels across the LEP program both qualitatively and quantitatively. Prior to working at SNL, Jon was a technical engineering & safety point-of-contact for factory tritium production at Savannah River Tritium Enterprise at the Savannah River Site. He has a Ph.D. in Materials Science & Engineering (MSE) from the University of Florida.</p>	