

New tool aids cost estimates for complex projects

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Consider the following scenario: A project manager at a major aerospace company is about to bid on the development of a new air fighter for the U.S. Air Force.

The bid must bring the project in on time, on budget and meet all the government's requirements. If the bid is too low, the project will miss these markers; too high and the company will be seen as wasteful or inefficient and may disqualify itself from the competition.

Now a new, first-of-its-kind systems engineering cost-estimation model developed by an MIT researcher can ensure that the bid is right on target, which means project risk (and costs) can be reduced. The model allows companies and organizations to develop more accurate bid proposals, thereby eliminating excess "cost overrun" padding that is often built into these proposals.

The Constructive Systems Engineering Cost Model (COSYSMO), now available commercially, helps eliminate the guessing game played by many large corporations in planning and executing large systems in many different industries. It also helps government agencies evaluate proposals from contractors with a more objective approach.

"In the past, a program manager would look at an earlier aircraft program and estimate by analogy, but now we can go beyond that and use parametrics to go beneath the surface to the underlying reasons why a certain aircraft costs what it does to develop," said Ricardo Valerdi, a

researcher at MIT's Lean Aerospace Initiative (LAI) who developed the new model.

Validated with assistance and historical data from seven major aerospace companies, COSYSMO can be adapted to systems engineering programs in many different industries.

"The inputs to the COSYSMO model are generic, they are not domain specific, so it could be used in estimating effort associated with waste management systems or building new highway tunnels in Boston," said Valerdi.

Systems engineering is an interdisciplinary approach to creating successful systems by focusing on variables including customer needs, system requirements, design synthesis and system validation all while considering the complete problem.

Others have developed cost-estimation models for computer hardware and software development, but until now no models have been created to estimate the costs associated with systems engineering.

Computer hardware and software cost-estimation tools help companies estimate costs specifically associated with developing and designing computer hardware and software components and platforms. The costs associated with systems engineering are more difficult to estimate because the discipline deals with multiple factors in the big picture such as system design and customer needs.

COSYSMO helps companies estimate "person-months" specifically associated with a systems engineering effort and costs -- such as how many people it will take to develop a command and control system in an aircraft and meet all the customer requirements.

According to Valerdi, the failure to adequately plan and fund systems engineering efforts appears to have contributed to a number of cost overruns and schedule slips, especially in the development of complex aerospace systems.

In addition to its availability via commercial channels, the academic version of COSYSMO and its new user's manual are both available to members of the LAI Consortium. Many of the consortium members, including BAE Systems, Northrop Grumman, Lockheed Martin, Raytheon and L-3 Communications, participated in the validation of COSYSMO.

Three corporations now offer COSYSMO commercially: Price Systems, Galorath and Softstar Systems.

Source: MIT

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