

Appendix M: Software Cost Estimating

Software represents a substantial portion of the cost for space systems. Estimating the cost, schedule, and effort associated with a proposed software development project is a challenging task.

Although software estimation is unique, the cost estimating process described in this handbook still applies. The primary difference between costing software and hardware or systems is that the dominant cost component is labor, therefore correctly estimating the development effort is key. The estimation methods will depend on the resources available and the level of understanding of the needs and objectives (Task 1) and the ground rules and assumptions (Task 4). A comprehensive process for software estimation is documented in Jet Propulsion Laboratory's (JPL's) Software Cost Estimation Handbook (JPL-D-26303).

Currently, NASA has agency-wide licenses for both PRICE¹ and SEER² estimating suites, which both include software estimation tools (see Appendix E). These two specific tools trend toward the higher side of the cost-complexity spectrum, but there are several other models available to estimate software costs. One commonly used model is the Constructive Cost Model³ (COCOMO), which was developed by the Center for Software Engineering (CSE) at the University of Southern California, headed by Dr. Barry Boehm⁴.

This appendix will be developed in more detail, but the references should provide the analyst with the basics to help with software cost estimating. Contact CAD at hq-cad@mail.nasa.gov.

¹ <http://www.pricesystems.com/en-us/offerings/pricecostmodels.aspx>

² <http://galorath.com/products/software/SEER-Software-Cost-Estimationpr>

³ http://csse.usc.edu/csse/research/COCOMOII/cocomo_main.html

⁴ Boehm, et al, *Software Cost Estimation with COCOMO II*, Prentice Hall, 2000.