Appendix E: Models and Tools

E.1. Model and Tools Introduction

There are a variety of estimating tools and models available for NASA cost and schedule analysts to use in developing an estimate. This appendix provides a reference to the primary tools available to implement the principles and strategies discussed in other sections of this handbook. NASA makes available a package of models and tools for its cost and schedule user community that includes tools that NASA has sponsored, and other commercially available tools for which NASA provides licenses. These models and tools are summarized in Table E-1, indicating which estimating methodology they may be applicable for, as well as where they are typically used in the project life-cycle.

Table E-1. Cost Models and Tools Utilization Guide

Tool Type		ONCE Portal[1]	Estimating Methodology Applicability: Parametric	Analogy	Build Up
NASA-Sponsored Models and Tools					
Project Cost Estimating Capability (PCEC)			✓		
NASA Air Force Cost Model (NAFCOM)	*(Transitioning users to PCEC)*		✓		
NASA Instrument Cost Model (NICM)		x	✓	✓	
Technology Cost and Schedule Estimation (TCASE) Tool		x		✓	
Schedule Management and Relationship Tool (SMART)		*soon*	✓	✓	
Phasing Model		x	✓		
Schedule Estimating Relationship Risk Analysis (SERRA)			✓	✓	✓
Quantitative Techniques Incorporating Phasing and Schedule (QTIPS)			✓	✓	✓
QuickCost			✓		
One NASA Cost Engineering (ONCE) Database		x	✓	✓	✓
REDSTAR Database			✓	✓	✓
Models and Tools with NASA-Provided Licenses					
Polaris[4]	*(JCL Analysis)*	x	✓	✓	✓
Argo (Monte Carlo simulation)		x	✓	✓	✓
Automated Cost Estimating Integrated Tools (ACEIT)		x	✓	✓	✓
CO$TAT (statistical analysis package)		x	✓	✓	✓
Joint Analysis of Cost and Schedule (JACS)	*(JCL Analysis)*	x	✓	✓	✓
SEER for Hardware, Electronics, & Systems (SEER-H)		*soon*	✓		
SEER for Software (SEER-SEM)		*soon*	✓		
PRICE® TruePlanning™			✓		
PRICE® Estimation Suite (PES)			✓		

Use of a tool or model that is not NASA-sponsored or has a NASA-provided license for estimates supporting Key Decision Point (KDP) reviews should be considered carefully, and the CAD should be consulted prior to proceeding with use of any such tool for those purposes.

[1] Current ONCE Model Portal availability as of February 2015, more tools and models will be made available via the ONCE Model Portal at www.oncedata.com over time.

The body of knowledge required for gaining expertise in usage of these models and tools can vary greatly, and providing instructional aid for all models and tools referenced here is beyond the scope of this appendix. There is a summary of cost models that address risk in Appendix G, Section G.4. There is also a summary of Schedule Estimating Relationship (SER) models and tools in Appendix K, Section K.4.

If additional information is sought, the NASA Cost Analysis Division, your Center cost leadership, or the tool developer or proprietor can provide assistance in application of a particular tool. Contact CAD with any questions at hq-cad@mail.nasa.gov.

E.2. Agency-Provided Tools and Models

The NASA Cost Analysis Division (CAD) leads the development, dissemination, and improvement of NASA-sponsored cost and schedule estimating tools and sponsors Agency-wide licenses for key vendor-provided tools. CAD works closely with tool vendors on new enhancements with inputs. CAD standardizes tool use and maximizes efficiency for NASA by establishing Agency-wide licenses that allow programs and projects to complete required cost estimation work without additional expenditure of funds. Additionally, CAD has, in cooperation with Center cost organizations, originated a number of in-house models and tools that are readily available to the user community. For access to these tools, please access the ONCE Portal at *http://www.oncedata.com*, or contact CAD at *hq-cad@mail.nasa.gov*.

E.2.1. NASA-Sponsored Models and Tools

PCEC: The Project Cost Estimating Capability (PCEC) is an initiative sponsored by CAD and Marshall Space Flight Center Engineering Cost Office to provide robust and consistent analytical capability to the NASA cost and schedule communities. PCEC is based on parametrics and is intended to be the one-stop shop for cost and schedule estimating capability.

Historical NAFCOM functional capability will be replaced by PCEC framework. These include WBS templates, Cost Estimating Relationship (CER) statistics, weight-based CERs, multivariable CERs, learning curve reports, systems test hardware cost, schedule estimating, and time phasing. Other capabilities (to include the NASA Instrument Cost Model (NICM) and QuickCost) will migrate towards integration within the PCEC framework. Historical, current, and future research capabilities will also be incorporated into the PCEC framework.

PCEC Interface will facilitate the use of the PCEC Library information (e.g., inserting CERs, building Work Breakdown Structures) for creating estimates. It will also automate redundant estimating processes. The interface is an Excel add-in. PCEC access is available upon request via CAD at hq-cad@mail.nasa.gov.

NAFCOM: The NASA–Air Force Cost Model (NAFCOM) has been the primary cost estimating tool for launch vehicles, Crew Exploration Vehicle (CEV), landers, rovers, and other flight hardware elements. It is now being transitioned to the Project Cost Estimating Capability (PCEC), which incorporates its resources and capability. It has been used by over 800 Government and contractor employees. NAFCOM is a parametric cost model based on over 155 NASA and Air Force space flight hardware projects.

PCEC replacing NAFCOM

At the time of this handbook's publication, NAFCOM is still used by the NASA cost estimating community. However, NAFCOM users are in the process of transitioning to the Project Cost Estimating Capability (PCEC), which contains additional information and tools. PCEC incorporates NAFCOM models, as well as models developed by various NASA Centers and directorates. Since most users at this time are more familiar with NAFCOM, this handbook will continue to reference it. The expectation is that the functionality provided to users by NAFCOM and referred to here will continue with PCEC.

NICM: The NASA Instrument Cost Model can estimate instrument cost by analogy or by parametric CERs at the system or subsystem level depending on the amount of design information available. NICM is sponsored by NASA Headquarters and actively managed and implemented by the Jet Propulsion Laboratory (JPL). The model can produce probability density functions based on both input parameter uncertainties and CER uncertainties.

A database has been compiled as part of the NICM development. Data have been collected throughout NASA, major NASA vendors, and universities. This database allows for inputs of instrument type (optical, microwave, particles, etc.), destination, mass, power, data rate, etc. Outputs are probabilistic cost distributions at the system and subsystem level, probabilistic schedule distribution, Joint Confidence Level, and cost/schedule estimates by phase. Currently there are two versions of NICM: (1) a Government version that includes modeling capability and underlying data that can be accessed through ONCE and (b) a contractor version that includes system and subsystem estimating capability but no underlying specific data (Sensitive But Unclassified (SBU), proprietary, etc.). For access to NICM, use the ONCE model portal at *http://www.oncedata.com* or contact Joe Mrozinski at *jmrozinski@jpl.nasa.gov* with the subject line "NICM Access Request."

ONCE: The One NASA Cost Engineering (ONCE) database is a secure Web-based application containing all completed Cost Analysis Data Requirement (CADRe) submissions for easy retrieval and faster data analysis. Access is securely provided for NASA users through the Agency Identity Management & Account Exchange (IdMAX) system. ONCE provides enhanced insight and management of historical cost and technical data, which is helping to advance cost estimating practices and analysis across the Agency. The ONCE database is located in the ONCE Portal at *http://www.oncedata.com*.

Beginning in 2014, the ONCE Portal also included a Model Portal for NASA's cost estimating tools and cost models. Examples of models and tools available via the ONCE Model Portal (and as shown in Table E-1) include the NASA Phasing Model, TCASE (Technology Cost and Schedule Estimation), Polaris, ARGO, and ACEIT (which includes JACS), all of which are available for easy download for users with access. ONCE also has a new Library section that includes all original CADRes as well as the CADRe source documents, NASA New Start Inflation tables, and the NASA Cost Symposium presentations from 2006–2014.

For more information on the ONCE database and CADRes, see Appendix A.

REDSTAR: The Resource Data Storage and Retrieval System (REDSTAR) Library is funded by Marshall Space Flight Center (Engineering Cost Office) and CAD. The REDSTAR Library is a repository of cost, programmatic, and technical data pertaining to space-related projects and programs. REDSTAR can be used to improve the credibility, fidelity, and consistency of cost estimating products throughout NASA. REDSTAR includes over 38,000 documents, with over 8,000 scanned for distribution in their native format.

Begun in 1971, REDSTAR's document content includes approximately 200 crewed and uncrewed spacecraft missions. Cost, technical, and programmatic data ranging from total program to the subcomponent level can be found pertaining to the spacecraft bus, attached payload, engines, launch vehicles, upper stages, scientific instruments, and aircraft. Additional data pertaining to cost models and cost estimating, schedules, ground and launch operations, mission operations, and business strategy are also found in the database library. REDSTAR Library data are available for use by all NASA employees and members of cost groups from all NASA Centers. A password-protected database of 8,000 full-text documents is available online. Questions concerning access to the REDSTAR database should be directed to Mary Ellen Harris at 256-544-2320.

E.2.2. NASA-Provided Software Licenses

The Cost Analysis Division provides the NASA cost and schedule communities with Agency-wide licenses for the key estimating tools used by the community. CAD seeks to standardize tool use and maximizes efficiency for NASA through these licenses, and works closely with the tool vendors on new enhancements. These tools are validated for use in Agency reviews, and their use is highly encouraged.

Use of other tools should be carefully considered if an estimate is being prepared for compliance with NASA Procedural Requirement (NPR) 7120.5E. ***Consult CAD prior to using any software for these purposes that is not provided by CAD through an Agency-wide license.***

Toolsets and Licenses:

NASA CAD currently has an Agency license agreement for two JCL analysis tools (ACEIT JACS and Polaris). Training on these tools has been and will continue to be provided to Agency personnel. It is recommended that all JCL analysis be performed on one of these two tool platforms. If you are a project that is considering using another toolset, please contact CAD at *hq-cad@mail.nasa.gov*. For details on how to obtain these tools or for more assistance on tool selection, please refer to *http://www.nasa.gov/offices/ooe/CAD/*.

CAD is working to have all tools eventually available through the ONCE Model Portal at https://oncedata.msfc.nasa.gov, and access can also be requested from CAD at hq-cad@mail.nasa.gov. Tools with NASA-provided licenses currently include:

Polaris

Polaris is program analysis software provided by Booz Allen Hamilton. Polaris integrates cost, schedule, and risk artifacts into a single model, enabling better project performance through real-time simulations. Polaris integrates cost estimates, schedules, and risk registers into a single analytical model that provides a cohesive view across all three project control functions. Polaris is a primary JCL tool and is validated and approved for milestone reviews.[2]

For more information, visit *http://www.boozallen.com/consulting/products/software/polaris* or contact *polaris@bah.com*.

Argo

Argo is simulation software provided by Booz Allen Hamilton. Argo utilizes an advanced approach to Monte Carlo simulation, achieving substantial run-time and file-size savings. Argo utilizes algorithmic, hardware-independent efficiencies that dramatically reduce run-times and streamline the resources required to perform sophisticated analysis.[3]

For more information, visit *http://www.boozallen.com/consulting/products/software/argo* or contact *argo@bah.com*.

Polaris and Argo via ONCE

Users covered by the NASA licenses can download Polaris and Argo through the ONCE Database at *http://www.oncedata.com*.

ACEIT

Automated Cost Estimating Integrated Tools (ACEIT) is a Government-owned tool provided by Tecolote Research, Inc. The tool consists of a family of applications, including JACS and CO$TAT, which support program managers and cost and financial analysts during all phases of a program's life cycle. ACEIT

[2] For an explanation of Polaris, visit *http://www.boozallen.com/consulting/products/software/polaris*.

[3] For an explanation of Argo, visit *http://www.boozallen.com/consulting/products/software/argo*.

contains application tools (database, statistical analysis, knowledge libraries, model building, risk analysis, and more) for storing and analyzing cost and technical data, developing cost and cost-risk models, sharing, and reporting cost estimates.[4]

For more information, visit *http://www.aceit.com* or contact *aceit_support@tecolote.com*.

CO$TAT

CO$TAT is the statistical analysis package of the ACEIT application suite that has been specifically designed for the cost/price analyst. CO$TAT is an Excel add-in that contains most of the features available in commercially sold major statistics programs. With CO$TAT, users can rapidly move through the analysis process and develop estimating relationships. The analysis results can quickly and automatically be included directly into a cost estimate. CO$TAT is a module in ACEIT and provides the framework to do cost regression analysis.

JACS

Joint Analysis of Cost and Schedule (JACS) is an add-in for Microsoft Project that is designed to quickly create probabilistic results for schedule and costs in an integrated schedule. JACS enables the cost-loading of schedule tasks and risk events, allowing the analyst to assign probability distributions and create a holistic view of the resultant risk analysis. JACS, a module in ACEIT, is a primary JCL tool and is validated and approved for milestone reviews.

PRICE

PRICE Systems, LLC, provides NASA with suite of tools that model extensive input parameters, allowing for a diverse level of estimating, from general macro-level conceptual estimating to greater fidelity in estimating as a concept matures (capable of estimating at the system and component level). PRICE cost models are based on historical project data verified and validated by extensive PRICE Research. PRICE TruePlanning is a cost estimating framework designed to reduce the time and expense required to satisfy credible, data-driven parametric estimating needs.

For more information, visit *http://www.pricesystems.com* or contact *charles.d.hunt@nasa.gov*.

SEER

System Estimation and Evaluation of Resources (SEER) is a commercial-off-the-shelf (COTS) parametric cost model widely used in Government for parametric hardware estimating. It is provided by Galorath, Inc. SEER project management tools provide project planning, project estimating, project tracking, and project cost management software for software, hardware and electronics systems; manufacturing; and information technology.

For more information, visit *http://www.galorath.com* or contact *charles.d.hunt@nasa.gov*.

E.2.3. Additional Models and Tools

There are additional models and tools available to the analyst, in addition to those identified in Table E-1. CAD continues to track estimating models and tools used across the Agency, and can provide a summary of additional tools that may be used upon request to hq-cad@mail.nasa.gov. In addition, members of NASA's estimating community who use tools not included in Table E-1 are invited to contact CAD to discuss dissemination of, or communications regarding those tools across the community.

[4] For an explanation of ACEIT and components of the ACEIT suite, visit *http://www.aceit.com*.

E.3. Models and Tools Summary

A more detailed summary of the models and tools available to all NASA estimators is available in Table E-2. Any questions or suggestions for updates or additions should be addressed to CAD at *hq-cad@mail.nasa.gov*.

Table E-2. Estimating Models and Tools

Tool/Model Name	POC	Abstract
Category: NASA-Sponsored Models and Tools		
Project Cost Estimating Capability (PCEC)	MSFC Andy Prince *andy.prince@nasa.gov* NASA Headquarters Charles Hunt *charles.d.hunt@nasa.gov*	The Project Cost Estimating Capability (PCEC) is an initiative sponsored by CAD and Marshall Space Flight Center (Engineering Cost Office) to provide robust and consistent analytical capability to the NASA cost and schedule communities. PCEC is based on parametrics and is intended to be NASA's one-stop shop for cost and schedule estimating capability. Historical NAFCOM functional capability will be replaced by PCEC framework. These include WBS templates, Cost Estimating Relationship (CER) statistics, weight-based CERs, multivariable CERs, learning curve reports, systems test hardware cost, schedule estimating, and time phasing. Other capabilities (to include the NASA Instrument Cost Model (NICM) and QuickCost) will migrate towards integration within the PCEC framework. Historical, current, and future research capabilities will also be incorporated into the PCEC framework. PCEC Interface will facilitate the use of the PCEC Library information (e.g., inserting CERs, building Work Breakdown Structures) for creating estimates. It will also automate redundant estimating processes. The interface is an Excel add-in. PCEC access is available upon request via CAD at hq-cad@mail.nasa.gov.
NASA Air Force Cost Model 12 (NAFCOM)	MSFC Andy Prince *andy.prince@nasa.gov*	NAFCOM is an automated parametric cost estimating tool that uses historical space data to predict the development and production costs of new space programs. It uses parametric relationships to estimate subsystem- and component-level costs for aerospace hardware, including Earth-orbiting spacecraft, piloted spacecraft, launch vehicles, upper stages, liquid rocket engines, scientific instruments, and planetary spacecraft. The model is used primarily in the early phases of a space project and estimates development and production costs at the subsystem and/or component level. *NAFCOM will transition into the Project Cost Estimating Capability in 2014–2015. The same functionality will be retained.*
NASA Instrument Cost Model VI (NICM)	Jet Propulsion Laboratory Hamid Habib-Agahi and Joe Mrozinski *jmrozins@jpl.nasa.gov* NASA Headquarters James Johnson *james.k.johnson@nasa.gov*	NICM is a new observational instrument cost model that can estimate instrument cost by analogy or by parametric CERs at the system or subsystem levels, depending on the amount of design information available. The inputs are objective; instrument type, mass, power, data rate, and design life are some of the independent variables. The model can produce probability density functions based on both input parameter uncertainties and CER uncertainties. The tool has undergone validation. Both the expected value and the uncertainty in the stochastic PDFs have been verified.

Tool/Model Name	POC	Abstract
Technology Cost and Schedule Estimation (TCASE) Tool	SpaceWorks Enterprises, Inc. (SEI) Jon Wallace jon.wallace@sei.aero NASA Headquarters Marc Greenberg marc.w.greenberg@nasa.gov	The Technology Cost and Schedule Estimation (TCASE) tool generates estimated ranges of cost and schedule duration for a new technology development project. It does so by drawing analogies to historical and current project, or by means of a decision tree model trained on these data. Past performance information for nearly 3,000 technology development projects is stored in an accompanying database. The tool is specifically designed to examine technologies in the range of TRL 1 through TRL 6.
Schedule Management and Relationship Tool (SMART)	SpaceWorks Enterprises, Inc. (SEI) Jon Wallace jon.wallace@sei.aero NASA Headquarters Arnold Hill arnold.a.hill@nasa.gov	The Schedule Management and Relationship Tool (SMART) combines analogy-based and parametric methods in a schedule estimating tool for unmanned spacecraft projects. The tool utilizes high-level technical and programmatic characteristics to determine a spacecraft's likely development schedule duration. It incorporates several previously developed , third-party schedule estimating relationships (SERs) for comparison.
Phasing Model	NASA Headquarters Charles Hunt charles.d.hunt@nasa.gov	The Phasing Model generates Phasing Estimating Relationships (PERs) that can be used to help the analyst estimate annual funding for a mission, given a cost and schedule estimate. The relationships developed by the Phasing Model are based on historical data and do not necessarily represent "optimal" phasing. The time period for the PERs is System Requirements Review (SRR) to Launch, and the content can include two options: Option 1: Total project excluding launch Option 2: Spacecraft and instruments only The Phasing Model can be used to support, assess, and/or defend budgets, and is also a good starting point for analyzing cost & schedule ramifications.
Schedule Estimating Relationship Risk Analysis (SERRA)	NASA Headquarters Charles Hunt charles.d.hunt@nasa.gov	The SERRA model is designed to estimate high-level schedules early in a project's life cycle. Top-level design (Phases A–C) and manufacturing (Phase D) durations are calculated with parametric equations based on technical inputs. SERRA allows the analyst to: • Obtain a point estimate for design and manufacturing duration. • Calculate schedule S-curve by specifying distributions for technical inputs. • Assess a range of missions, including planetary, launch vehicle/unpiloted, and Earth-orbiting.
Quantitative Techniques Incorporating Phasing and Schedule (QTIPS)	NASA Headquarters Charles Hunt charles.d.hunt@nasa.gov	The QTIPS model is designed to analyze cost and schedule implications for changes to a baseline schedule. It allows the user to assess the following scenarios: • The cost impact when a program schedule grows. • The cost impact when a program schedule shrinks. • The cost and schedule impact when a program incurs an annual budget cost cap.

Tool/Model Name	POC	Abstract
QuickCost	Joe Hamaker jhamaker@galorath.com NASA Headquarters Charles Hunt charles.d.hunt@nasa.gov	• QuickCost estimates the cost and schedule of scientific missions (including the spacecraft bus, instruments, launch services, ground station, and MO&DA). The model requires only a few top-level independent variables (the dry mass, power, data rate, apogee, pointing accuracy, design life, ATP date, number of instruments, and percentage of new designs). It provides a prediction interval around the estimate and any specified confidence level.
One NASA Cost Engineering (ONCE) Database	NASA Headquaerters Eric Plumer eric.plumer-1@nasa.gov James Johnson james.k.johnson@nasa.gov	The One NASA Cost Engineering (ONCE) database is a secure Web-based application containing all completed Cost Analysis Data Requirement (CADRe) submissions for easy retrieval and faster data analysis. Access is securely provided for NASA users through the Agency Identity Management & Account Exchange (IdMAX) system. ONCE provides enhanced insight and management of historical cost and technical data, which is helping to advance cost estimating practices and analysis across the Agency. The ONCE database is located in the ONCE Portal at http://www.oncedata.com. Beginning in 2014, the ONCE Portal also included a Model Portal for NASA's cost estimating tools and cost models. Examples of models and tools available via the ONCE Model Portal (and as shown in Table E-1) include the NASA Phasing Model, TCASE (Technology Cost and Schedule Estimation), Polaris, ARGO, and ACEIT (which includes JACS), all of which are available for easy download for users with access. ONCE also has a new Library section that includes all original CADRes as well as the CADRe source documents, NASA New Start Inflation tables, and the NASA Cost Symposium presentations from 2006–2014.
Resource Data Storage and Retrieval (REDSTAR) Library	MSFC Mary Ellen Harris (256) 544-2320	The REDSTAR Library is a NASA-owned (MSFC Engineering Cost Office) and controlled repository containing over 35,000 documents related to spacecraft cost, technical, and programmatic information. The physical library is located at SAIC's Research Park Odyssey Drive facility in Huntsville, AL.

Tool/Model Name	POC	Abstract
Category: Models and Tools with NASA-Provided Licenses		
Polaris	Booz Allen Hamilton Eric Druker polaris@bah.com http://www.boozallen.com/consulting/products/software/polaris	Polaris is program analysis software provided by Booz Allen Hamilton. Polaris integrates cost, schedule, and risk artifacts into a single model, enabling better project performance through real-time simulations. Polaris integrates cost estimates, schedules, and risk registers into a single analytical model that provides a cohesive view across all three project control functions. Polaris is a primary JCL tool and is validated and approved for milestone reviews.
Argo	Booz Allen Hamilton Eric Druker argo@bah.com http://www.boozallen.com/consulting/products/software/argo	Argo is simulation software provided by Booz Allen Hamilton. Argo utilizes an advanced approach to Monte Carlo simulation, achieving substantial run-time and file-size savings. Argo utilizes algorithmic, hardware-independent efficiencies that dramatically reduce run-times and streamline the resources required to perform sophisticated analysis.
Automated Cost Estimating Integrated Tools (ACEIT)	Tecolote Research, Inc. Stephen Sekeres aceit_sales@tecolote.com www.aceit.com	ACEIT is an integrated suite of analysis tools for the desktop. Similar to how Microsoft Office provides a suite of applications to automate office functions, ACEIT provides a suite of applications to automate cost estimating and analysis. ACEIT has several applications focusing on the functions within the cost estimating environment.
CO$TAT	Tecolote Research, Inc. Stephen Sekeres aceit_sales@tecolote.com	CO$TAT is the statistical analysis package of the ACEIT application suite that has been specifically designed for the cost/price analyst. CO$TAT is an Excel add-in that contains most of the features available in commercially sold major statistics programs. With CO$TAT, users can rapidly move through the analysis process and develop estimating relationships. The analysis results can quickly and automatically be included directly into a cost estimate. CO$TAT is a module in ACEIT and provides the framework to do cost regression analysis.
Joint Analysis of Cost and Schedule (JACS)	Tecolote Research, Inc. Stephen Sekeres aceit_sales@tecolote.com	Joint Analysis of Cost and Schedule (JACS) is an add-in for Microsoft Project that is designed to quickly create probabilistic results for schedule and costs in an integrated schedule. JACS enables the cost-loading of schedule tasks and risk events, allowing the analyst to assign probability distributions and create a holistic view of the resultant risk analysis. JACS, a module in ACEIT, is a primary JCL tool and is validated and approved for milestone reviews.

Tool/Model Name	POC	Abstract
SEER for Hardware, Electronics, & Systems (SEER-H)	Galorath Incorporated Brian Glauser bglauser@galorath.com www.galorath.com/DirectContent/SEERforHardware2.pdf	SEER for Hardware, Electronics, & Systems (SEER-H) is a robust decision-support tool providing LCC for any size hardware project, from individual components to a variety of complete product assemblies. Using parametric algorithms, extensive knowledge bases, or user-supplied data, SEER-H can reliably and accurately estimate the total cost of ownership for new product development projects. It provides cost and pricing vision from project inception to production, including systems level, product development, production, operations and support, and disposal costs. It also provides detailed insight into the risks, uncertainty, and cost drivers associated with hardware development, acquisition, and integration.
SEER for Software (SEER-SEM)	Galorath, Incorporated Brian Glauser bglauser@galorath.com http://www.galorath.com/DirectContent/SEERforSoftware2.pdf	SEER-SEM is a powerful decision-support tool that estimates software development and maintenance cost, labor, staffing, schedule, reliability, and risk as a function of size, technology, complexity, and any project staffing constraints. SEER-SEM is effective for all types of software projects, i.e., new development, modification, and off-the-shelf integration projects. SEER-SEM estimates the resources and scheduling that software development requires, and it has an unparalleled capability for tradeoff and risk analysis.
PRICE® TruePlanning™	PRICE Systems, LLC Melissa Winter melissa.winter@pricesystems.com www.pricesystems.com/pdf/PRICE_Cost-Model_H-HL.pdf	PRICE® TruePlanning™ is a cost estimating framework designed to reduce the time and expense required to satisfy credible, data-driven parametric estimating needs at all levels of an organization—executive, financial, and project/program estimating and management. It is the only cost estimating framework that can integrate multiple cost models—including hardware, software, IT, assembly, and program management costs—all within the same estimate. PRICE® TruePlanning™ also helps to refine the value of project cost histories within the parametric estimating process and supports the ability to integrate dynamic Work Breakdown Structure (WBS) and Cost Element Structure (CES) mapping.
PRICE® Estimation Suite (PES)	PRICE Systems, LLC Arlene Minkiewicz arlene.minkiewicz@pricesystems.com	Based on extensive historical cost experience gained from thousands of projects, these independent models continue to provide PRICE customers with reliable cost estimating for discrete disciplines. They do not, however, integrate with the PRICE® TruePlanning™ Framework and its Companion Applications, and cannot incorporate multiple cost models within the same estimate.