

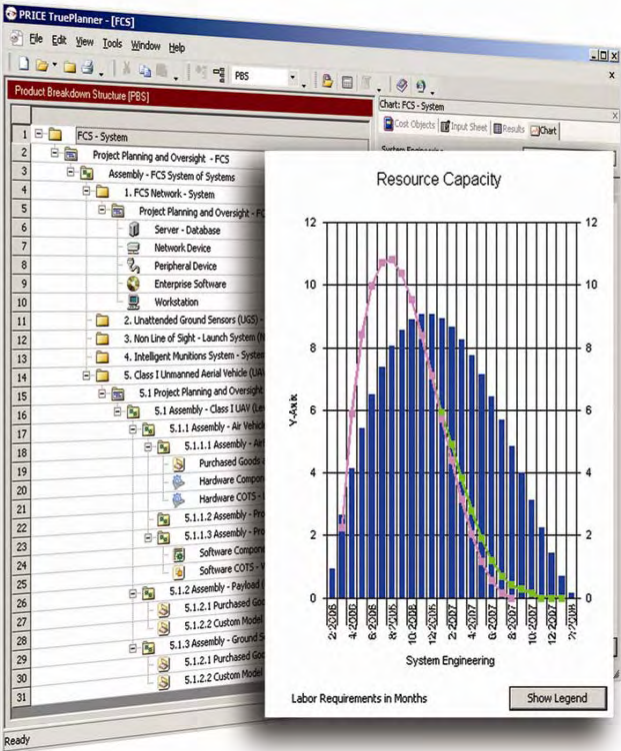
# The PRICE TruePlanning® Estimating Suite 2007

## A True System of Systems Estimating Framework and Family of Models

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### Introduction

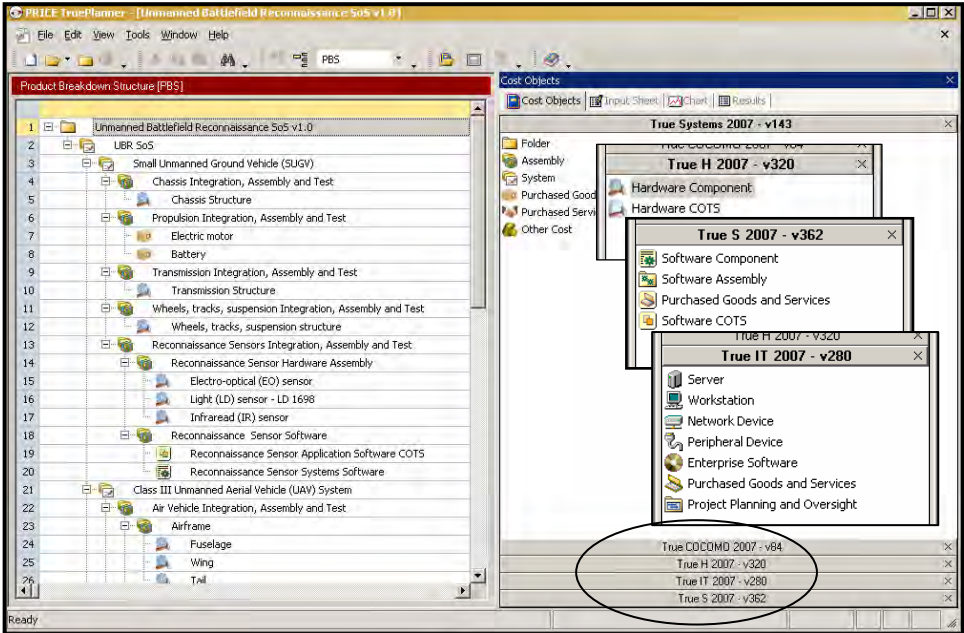
System-of-Systems (SoS) projects are large scale inter-disciplinary problems with multiple, heterogeneous, distributed systems embedded in networks at multiple levels and multiple domains. Responsive SoS cost, schedule, and risk estimating and analysis requires an agile integrated framework of models. This paper introduces the PRICE TruePlanning® Estimating Suite and several new innovations implemented by the suite. The innovations are then demonstrated by estimating and analyzing a Battlefield Reconnaissance SoS. The paper shows how heterogeneous systems containing hardware, software, and commercial-off-the-shelf network components are integrated into an easy-to-use common estimating framework. Cost/performance tradeoffs along with other “What-if?” analyses will be explored.



**TruePlanning® 2007**  
The PRICE TruePlanning® Estimating Suite 2007 is the next generation of the world-leading PRICE Estimating Suite developed to be a true System-of-Systems estimating framework and family of models.

**Innovations**  
TruePlanning 2007 combines several innovative features and new models to improve estimating productivity listed below:

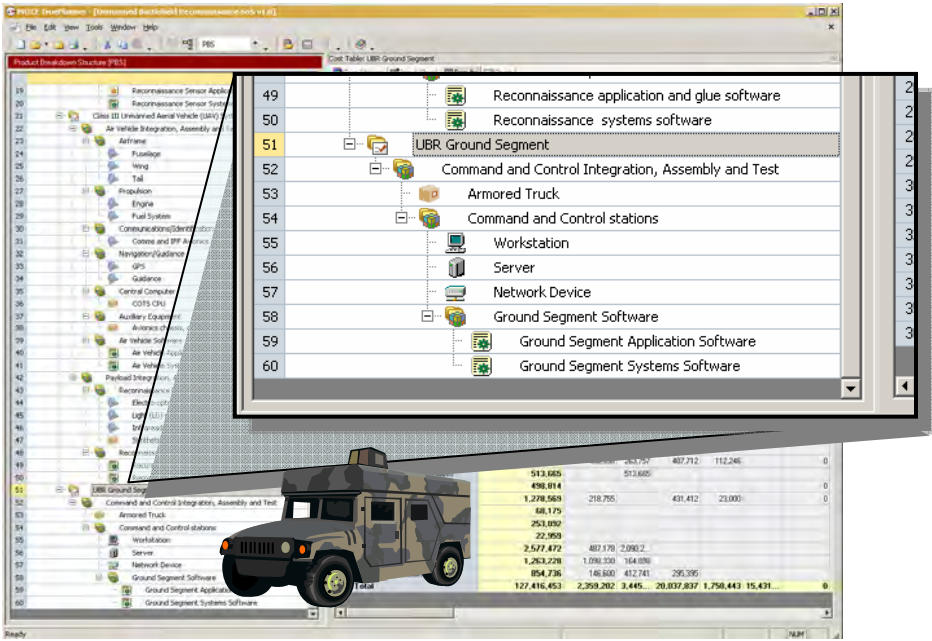
**Single application for all models.** Previously, analysts needed to be proficient in several different applications and modeling methodologies to complete a thorough system estimate. With TruePlanning, all models are integrated under a single estimating framework and user interface. Common features such as risk analysis, inflation factors, calibration, are now shared by hardware, software, network, O&S and other models. The user interface to build, process, and analyze an estimate is the same. This type of standardization speeds learning, implementation, and adoption of the estimating discipline throughout the supply-chain.



*TruePlanning is a single application for all models*

**Simplified heterogeneous systems estimating.** Systems are not homogeneous. Project managers and system engineers must simultaneously wrestle with the requirements and complexities of hardware, software, network and off-the-shelf components. TruePlanning employs common assembly, program management, systems engineering and integration cost estimating relationships for all components types. Development, production and operation & support costs for complex systems comprising hardware, software, and off-the-shelf components are easily modeled simultaneously, considering the complexity contributions of each. This all encompassing approach speeds and simplifies the estimating task, allowing more time for research and analysis.

**New IT network cost models.** Not all systems are developed from scratch. Network-centric systems utilize commercial hardware which may or may not need to be militarized. TruePlanning includes new models for the procurement, modification, operation and support of information network equipment, such as workstations, servers, peripherals, and alike. Modeling modifications of the equipment is optional, but the often overlooked costs to evaluate, select, and integrate the equipment are included.

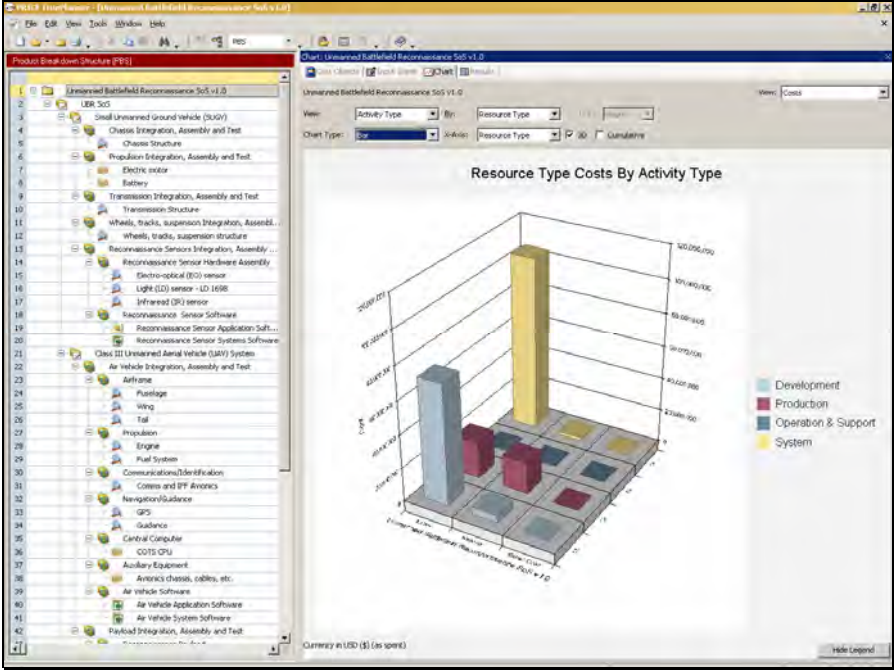


*TruePlanning includes new IT network cost models*

**New Flexible and robust PMO/SE/IT cost models.** Today’s programs have several levels of integration and interface complexity. PRICE has researched, identified, and developed estimating relationships for all activities and resources necessary to integrate heterogeneous system components. And we implemented the research through new TruePlanning models. It is no longer necessary to estimate other “ility” costs outside of the single frameworks. No longer will you underestimate the complexity of integrating software with hardware as requirements change. Management and auditors can be assured that all activities are included and that the full cost is being estimated. New and flexibly inserted systems engineering cost estimating relationships capture the multiple levels and complexity of heterogeneous component integration.

**Monthly Granularity.** No projects remain constant over time. TruePlanning empowers analysts to specify demand, quantities, resource availability and other parameters throughout the life cycle in monthly increments. Calculations are performed using the parameters specified for any given month. Capacity analysis, production lots, and other effects over time can now be modeled easily.

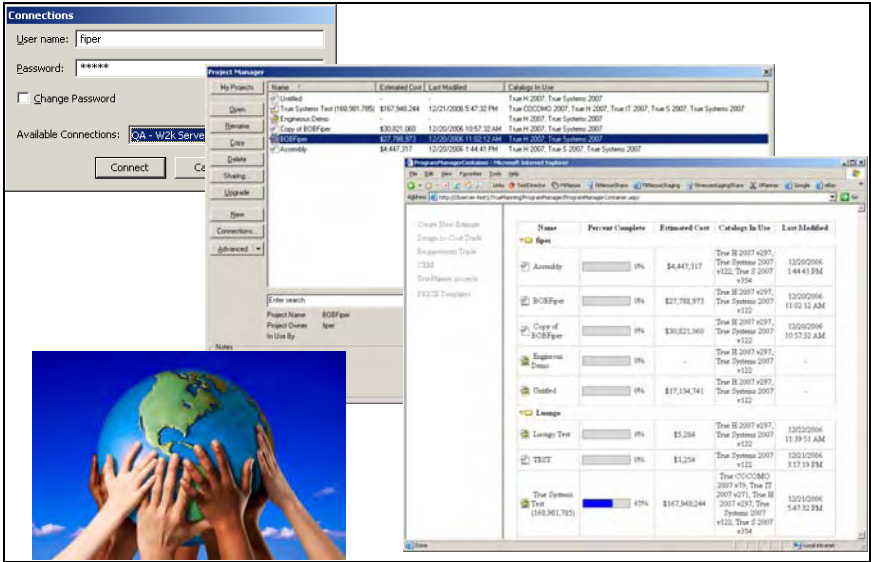
**Project hypercube analyses.** A good estimator must analyze their estimate from several views to ensure consistency and credibility. Like a hyper-dimensional Rubik’s Cube, TruePlanning presents you with the project estimate hypercube, allowing you to view and analyze costs, by activity, by activity type, by resource, by resource type, by component, by assembly, by systems, by phase, by month, by quarter, by year, etc. Each analysis can be viewed tabular or as a chart – a picture is worth a thousand worksheets. Now the answers to those numerous questions are just a click away.



*You can analyze many dimensions of your estimate with TruePlanning*

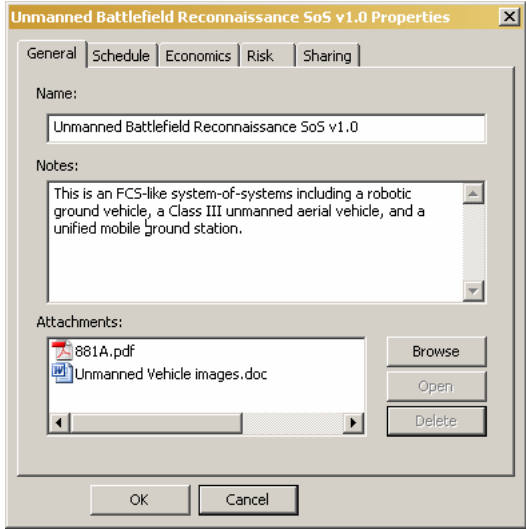
**Collaborate, retain and share estimates in a secure environment.** Estimators use various desktop software applications and store projects and estimates on their personal computers. Such a disparate computing environment makes it impossible to find important estimates, to allow subject matter experts collaboration, and to share assumptions and results. TruePlanning can be deployed as a client/server application storing all workgroup projects and data in a single relational database. Now team leaders and contributors can share estimates, collaborate on parameters, and search all workgroup estimates for analogs and related materials. Access with userids and passwords ensure that only the right people see the right data.

**Manage your estimating team.** It is challenging to manage a team of geographically dispersed estimators working on several simultaneous projects and research. TruePlanning's workgroup features enable leaders to view their team's estimates whether complete or in process, no matter where the estimator is located.



*You can collaborate, share, and publish status of your estimate*

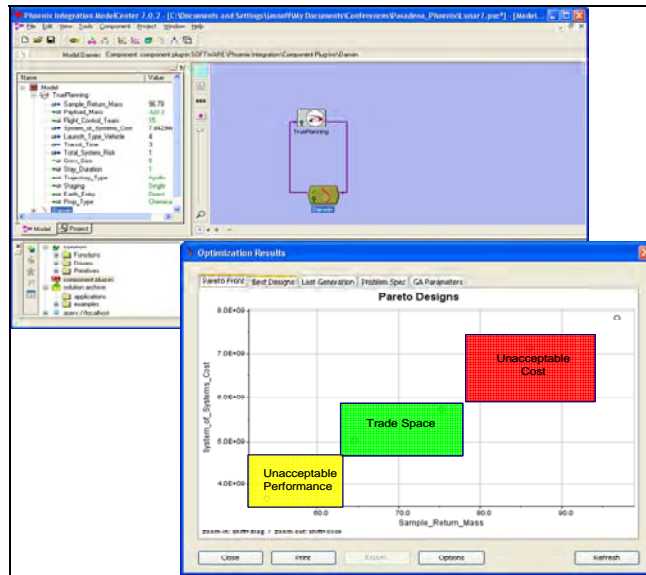
**Make notes and attach documents to annotate your estimates.** Good estimators thoroughly research the subject of their estimate and leave an audit trail to the sources of their findings and assumptions. Unfortunately, packaging pictures, charts, drawings, specifications, websites, notes and other documents in a single cohesive document was impossible, until now. TruePlanning allows estimators to annotate each and every input parameter, worksheet, and assumption. Documents can be attached at each point as well. Now estimates can be stored, retrieved, shared, and exported with a complete audit trail.



*Leave an estimate audit trail*

**Integrate custom Excel models.** Sometimes it is appealing to implement cost estimating relationships in a worksheet, but duplicating inflation, risk, and reporting features for each Excel model can be tedious. Excel models quickly breakdown with increasing complexity and are often impossible to audit. TruePlanning allows custom Excel models to be embedded and integrated in estimates along with other models. Embedded Excel model results can then take advantage of the many additional robust modeling features of the TruePlanning Estimating Suite. Excel documents becomes part of the overall estimate, and are stored in one cohesive project along with other model data.

**Integrate with CAE and CAD tools.** Simulations are vital early in the systems engineering process. Yet, cost and affordability simulations are seldom performed. TruePlanning includes integrations with several computer-aided engineering tools empowering system engineers to perform such simulations.



*Add cost simulation to your engineering analyses to determine affordability*

**Find and Replace.** What if the schedule changes at the last minute? What if production quantities change? Must you find and replace schedule dates and production quantities in several different applications and integrate the results? Could you have possibly missed some schedule interactions or integration complications? TruePlanning has powerful find and replace features that allow you to view parameters throughout your entire estimate, hardware components, software components, whatever, and make global or specific changes in one screen.

### **Systems Engineering and Cost Estimating Revitalization**

With the John Warner National Defense Authorization Act for Fiscal Year 2007, Pub. L. No. 109-364 §§ 820, 853 (2006), Congress is requiring DOD to make it a goal that within 5 years certain critical acquisition functions, including cost estimating, be performed by properly qualified DOD employees, and that in developing a comprehensive strategy for supporting the program manager role, DOD address improved resources and support such as cost-estimating expertise. This Act dictates a systems engineering and cost estimating

revitalization in DOD programs. PRICE Systems' role is to support the revitalization with the tools and expertise necessary to help estimators succeed. The TruePlanning innovations described above support the revitalization. Specific to the challenge, TruePlanning deploys:

- A systems-of-systems estimating framework
- PM/SE/IT cost estimating relationships, capturing multiple levels of integration and complexity
- Integration with CAE tools
- A collaborative workgroup environment for sharing and SME contribution

**Example**

The utility of TruePlanning's innovations are demonstrated through the estimate of an unmanned battlefield reconnaissance system of systems (UBR).

**2005 FUTURE COMBAT SYSTEMS**

**Class III Unmanned Air Vehicles (UAV)**

**Mission:** Provides a multifunction aerial system capable of providing RSTA at battalion/brigade level. ISR / SA / day-night / network node

**Endurance:** 6 hr time on station at 40 km area

**Ceiling:** 12,000 ft MSL

**Sensors:** EO/IR/LD with mine detection and ATR, SAR/GMTI, Acoustic

**Small Unmanned Ground Vehicle (SUGV)**

**Mission:** Provides extended reconnaissance of MOUT and subterranean battlespace / network node

**Armament:** Non-Lethal specific to MOUT

**Gross Weight:** 30lbs

**Endurance:** 6hrs w/ly recharge

**Range:** 100km ground, 200km tunnel

**Sensors:** Color/Monochrome EO, Un-cooled IR, Seismic, Acoustic, Target designation, NBC

**TruePlanning Software Screenshot:**

Product Breakdown Structure (PBS) for Unmanned Battlefield Reconnaissance S05 v1.0

Item	Total	Programme	Software	Test	Configuration	Material	Other Desc	Proc
Unmanned Battlefield Reconnaissance S05 v1.0	108,902,483	3,302	5,117	6,448,928	3,532,553	17,459		14
Class III Unmanned Aerial Vehicle (UAV) System	1,281,637	219,861	618,902	442,874				
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*TruePlanning can model complex heterogeneous system of systems*