

**SBIR Topic Number:**  
OSD05-CM1

**SBIR Title:**  
Cost Modeling  
Interoperability  
and Integration

**Contract Number:**  
FA8650-08-C-5702

**SBIR Company Name:**  
PRICE Systems, L.L.C.,  
Mount Laurel, NJ

**Sponsoring Office:**  
Office of the Secretary of  
Defense, Washington, DC

**Technical Project Office:**  
AFRL Materials &  
Manufacturing  
Directorate, Wright-  
Patterson AFB, OH

This Air Force SBIR/STTR Innovation Story is an example of Air Force supported SBIR/STTR technology that met topic requirements and has outstanding potential for Air Force and DoD.

**Relevance To Customer / End User**  
Today engineering organizations require a more integrated and collaborative approach to product life cycle development

**Drivers Include:**

- Cost of Human Capital
- Need for Cost Risk Mitigation
- Pressure To Reduce Cycle-Time
- Increasing Competition / Reduced Market Share

**LCIF Concept**

**Technical Description:**

- Service Oriented Architecture (SOA) for cost model integration
- LCIF Activity Based Costing and Activity Based Modeling XML Standards
- Develop & Implement Standards for Four Applications to Include:
  - Sponsor: OSD
  - Phase II SBIR FA8650-08-C-5702
  - Program Manager: Al Herner, AFRL

**Benefits**

- Ties Planning, Budgeting and Performance Together For Trade-off Analysis
- Improves Acquisition Process Through Linkage of Technology, Design, & Production
- Enables the establishment of an authoritative database which reduces cycle time

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**PRICE Systems' LCIF graphic prepared for the National SBIR Beyond Phase II Conference and Technology Showcase held at Orlando, Florida, in September 2009.**

## Life Cycle Interoperability

- The Department of Defense needs tools which support the integration and interoperability of cost models with applications and systems across all phases of the project life cycle
- PRICE Systems is developing a new cost modeling framework based on Service Oriented Architecture (SOA) which allows easier integration of cost models to other modeling environments
- Known as the Life Cycle Interoperability Framework (LCIF), this information technology allows an analyst to establish a cost basis for a program or project and carry that basis throughout the life of the project seamlessly based on SOA concepts
- The LCIF should be of interest to system designers, system engineers, and cost estimators who are interested in cost and effort as an output or a constraint

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## Air Force Requirement

Acquisition programs continue to face significant cost management challenges. Common denominators in cost escalation include the inability to estimate costs accurately up front, account for uncertainty and risk, and accurately predict the cost impacts of changes during system development. The disciplines of cost analysis, engineering design, and logistics support have often been separated into stove-piped functions.

The Department of Defense needs tools which support the integration and interoperability of cost models with applications and systems across all phases of the project and product life cycle.

## SBIR Technology

In this SBIR project, PRICE Systems is developing a new cost modeling framework. This framework is based on Service Oriented Architecture (SOA) which allows easier integration of cost models to other modeling environments. The objective of this effort is to develop and implement data exchange standards that integrate these functions in support of effective project and product life cycle management.

Known as the Life Cycle Interoperability Framework (LCIF), this information technology allows an analyst to establish a cost basis for a program or project and carry that basis throughout the life of the project seamlessly based on SOA concepts. Through the LCIF, software, hardware, support, obsolescence, and any other aspect of the program can be modeled and interfaced with other engineering design tools. The LCIF provides organizations a more integrated and collaborative approach to product life cycle management.

## Potential Application

This R&D effort should be of interest to system designers, system engineers, and cost estimators who are interested in cost and effort as an output or a constraint. Specifically, this effort will develop an XML standard for the communication and translation of system cost data, and demonstrate the integration of four applications that reside in one of four phases of the product life cycle:

- Engineering Design – Parametric Technology's Pro/ENGINEER®
- Product Lifecycle Management – IBM Rational ClearQuest®
- Simulation and Integration – Phoenix Integration ModelCenter® 8.0

- Life Cycle Maintenance – Tools for Decision (TFD®) Monterey Activity-based Analytical Programme (MAAP®)

Moreover, interoperability is required to provide real time, predictive cost assessments in response to changes in the product development process which leads to optimized or "best value" solutions. The LCIF establishes the rules and language that makes this interoperability achievable, with the following benefits:

- Ties in strategic planning, budgeting, and performance to rapidly understand trade-offs providing full traceability.
- Improves the acquisition process through the linkage between technology, design, and production
- Facilitates early capture of requisite knowledge to efficiently and effectively manage program risks
- Improves management of design changes or engineering change requests during the development of complex products in a multi-disciplinary environment.
- Promotes process and data standardization.

Further, this effort delivers a fully-configurable environment that demonstrates the LCIF deployed across a multi-disciplinary scenario. This scenario links a cost, schedule and risk engine to an engineering design suite (Parametric Technology's Pro/ENGINEER), to the IBM Rational ClearQuest software configuration management database, to system engineering process and design optimization engine with a Life Cycle Maintenance application (TFD MAAP®). This illustrates how design engineers, software and systems engineers, and logistics engineers can collaborate on a single heterogeneous system (or family of systems) throughout the product life cycle (from cradle to grave).

## Defense Acquisition Program Impact

Acquisition programs costs and schedules are difficult to manage because access to credible program estimates is extremely limited throughout the program lifecycle. Frequent, easy access to accurate cost models from engineering simulation and design tools will empower engineers to keep programs on budget and on schedule. The LCIF will result in fewer and less dramatic acquisition program cost and schedule overruns.

## Company Impact

This SBIR project provided PRICE Systems the opportunity to further build upon its expertise in developing estimating solutions, such as TruePlanning®, and conduct R&D in new and challenging areas with promising government and commercial applications.



# SBIR/STTR

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