

Estimating Total Ownership Costs





Product-Oriented Design and Construction (PODAC) Cost Model Development Project

Sponsors:

- Mid-Term Sealift Ship Technology Development Program
- Affordability Through Commonality Program
- NAVSEA 03R2 Innovation & Technology Transition Division

Team Members:

Avondale	SPAR Associates, Inc.	Cost Engineering and
BIW	Designers and Planners, Inc.	Industrial Analysis Division
Ingalls	UMTRI	(SEA 017)
NASSCO	Surface Ship Design and Systems	Naval Surface Warfare
NNS	Engineering Group (SEA 03D)	Center, Carderock Division
		(Code 20)

What is the PODAC Cost Model?



A Product-Oriented Design and Construction (PODAC) Cost Model is a cost estimating tool that will more accurately reflect the cost of ships being built in modern ship production facilities with modern ship building processes, new architectures, technologies and concepts.

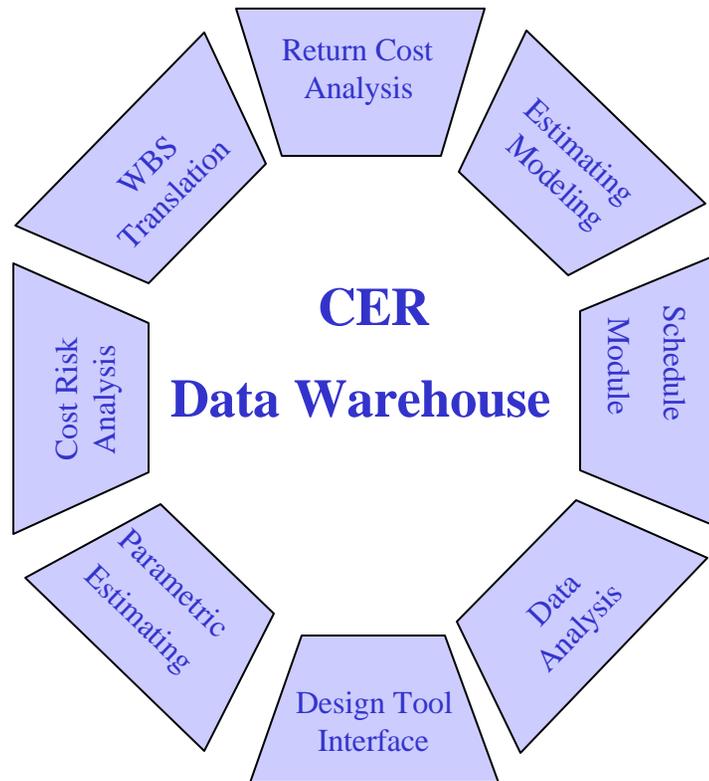
Product-Oriented Emphasis

- The cost estimating approach inherent in the PODAC Cost Model and the cost model itself will provide insight into the cost of ships.
- This insight allows:
 - Ship designers to understand the cost impact of design issues;
 - Shipbuilders to understand and evaluate the costs of the production process;
 - Program Managers to evaluate the cost impacts of design, technical and production decisions.

How does it give us insight into cost?

- The model employs both a Product-Oriented Work Breakdown Structure (PWBS) & System Work Breakdown Structure (SWBS)
- The CERs can be derived from historical return cost
- Cost Estimating Relationships (CERs) are product based and process driven

Cost Model Capabilities



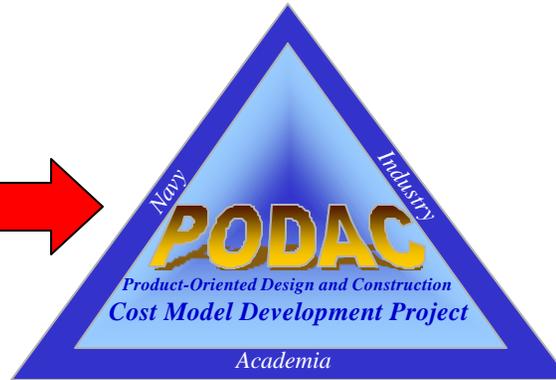
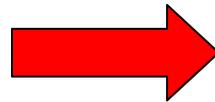
Data Analysis Module

- Ability to review raw data for accuracy and completeness
- Ability to parse and restructure data for statistical analysis
- Ability to modify CERs generated by the model
- Need identified by shipyard during model evaluation process

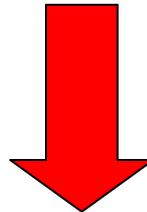
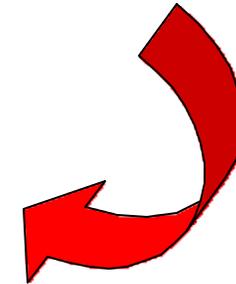
*Systems
Integration*



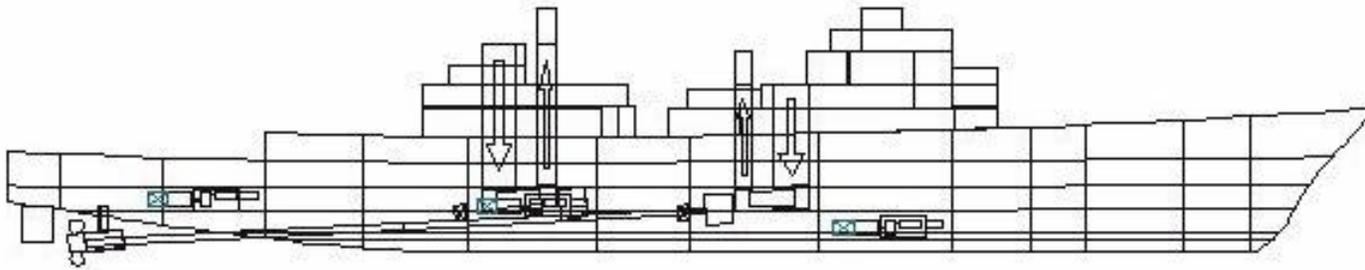
ASSET
Advanced Surface Ship Evaluation Tool



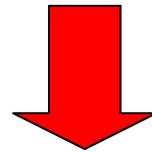
PRICE HL
Life Cycle Cost Model



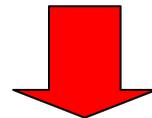
TOC: R&D + Acquisition + In-Service + Disposal



Ship Characteristics: Physical, Functional &
Mission Requirements



PODAC
Parametric
Cost Estimating
CERs & Packages

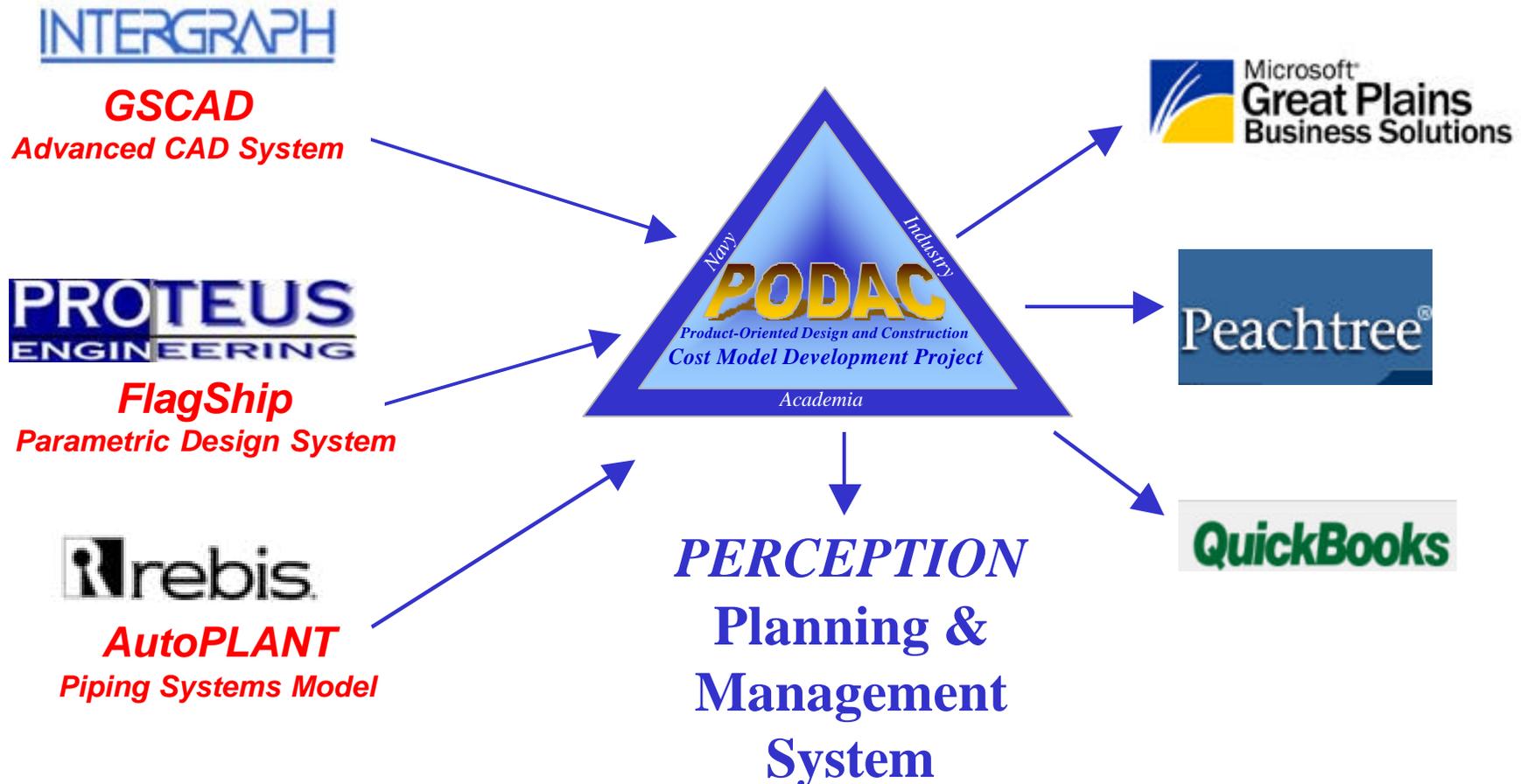


TOC: R&D + Acquisition + In-Service + Disposal

Additional Systems Integration

CAD Systems

Accounting Systems



Cost Libraries & Database

- ✓ **U.S. Shipyard Production Costs – Naval & USCG**
- ✓ **U.S. & Foreign Shipyard Production Costs – Commercial**
- ✓ **U.S. & Foreign Ship Maintenance & Repair Costs**
- ✓ **Navy O&S Costs (OSCAM & COMET)**
- ✓ **Bid Estimate Costs**
- ✓ **Other Sources**

Cost Libraries & Database

- ❖ **CER Libraries by Work Type Categories**
- ❖ **CER Libraries by Ship Type Categories**
- ❖ **CER Libraries by Ship Systems**
- ❖ **Ship Design Packages**
- ❖ **Ship Construction Interim Product Packages**
- ❖ **Ship Manning & Operations Packages**
- ❖ **Ship Repair & Maintenance Packages**

Data Mining & CER Development

- **Statistical Analysis of Shipyard Return Costs**
- **Statistical Analysis of Repair & Maintenance Costs**
- **Historical & Projected CERs**
- **Empirical & Parametric CERs**
- **Concept-to-Detail Estimating Capabilities**
- **Generic Industry Cost Standards**

PERCEPTION - Total Shipyard Management

File Edit View Environment Library Data System Window Help

C P G A Z U

Workspace Navigator

WBS Company Parameters Perception Parts Catalog

Contract Tanker Demo

- Projects
 - Project T44
 - SWBS
 - PWBS
 - PWBS Zone B
 - PWBS Zone C
 - PWBS Zone D
 - PWBS Zone M
 - PWBS Zone S
 - COA
 - Characteristics
 - Characteristic Dspl 55000 MTON
 - Characteristic LOA 182.2 M
 - Characteristic D 17.3 M
 - Characteristic T 10.5 M
 - Characteristic B 32.2 M
 - Characteristic Crew Off Sr 2 PERS
 - Characteristic Vk 15 KTS
 - Characteristic Crew Deck 8 PERS
 - Characteristic Crew Eng 7 PERS
 - Characteristic Crew 23 PERS

Many Views of the Ship Design:

- SWBS (systems)
- PWBS (products)
- COA, Shipyard Chart of Accounts (stages)
- Ship Design Characteristics

Ready

Full Summary of Costs At Any WBS Level

PERCEPTION - Total Shipyard Management

File Edit View Environment Library Data System Window Help

C P G A Z U

Workspace Navigator

WBS

Details For Selected Level

Contract Tanker Demo Description 44k bbl tanker for FlagShip/Project 21 Demonstration

Customer Chesapeake Bay Ship Design

Bill Method T&M Notes

Manager T. Anteon

	Labor	Material	Sub Con	Travel
Hours	689,724.71		0.00	
Cost	14,001,348.95	14,909,458.04	0.00	0.00
Profit	2,369,229.88	1,821,169.12	0.00	0.00
G&A	2,501,189.27	2,247,652.39	0.00	0.00
Overhead	6,937,659.64	341,039.03	0.00	0.00
Local Tax	0.00	713,540.43	0.00	0.00
Federal Tax	0.00	0.00	0.00	0.00
Sub Totals	25,809,427.74	20,032,859.01	0.00	0.00
Start Date	00/00/0000	Min. Risk	45,842,286.75	

Contract TSHIP CONTRACT

Contract x

Ready