GALORATH

Introduction To SEER-SEM

Advanced modeling tools that help engineers, managers and cost analysts plan and control critical projects

About Galorath

Over 20 Years Solving Project Management & Product Costing Problems For Government & Industry

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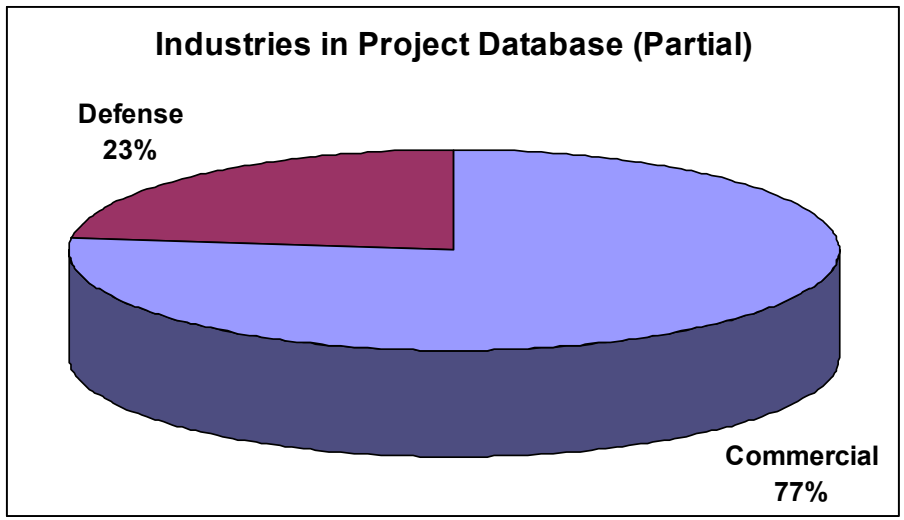
Basis For SEER-SEM

- **Calibration To Diverse, Completed Projects**
- **Side Studies**
  Staffing Dynamics, Off-the-Shelf Integration, Defects, Maintenance, Management Constraints, Object-Oriented Development, Reuse
- **Meta-Studies**



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SEER-SEM Validates More…

- **SEER-SEM Works With Small And Large Developments**

All units are Effort-Months

PROJECT	SEER-SEM ESTIMATE	ACTUAL	DELTA
ARRS	5.0	4.5	-11.1%
Blue Sheets	12.7	14.0	+9.3%
FIS	4.8	4.25	-12.9%
PDPI	19.8	18.0	-10.0%

SEER-SEM estimates are at the 50% confidence level.
'-' indicates over estimate, '+' indicates under estimate.

Results Before Any Organization Specific Calibration

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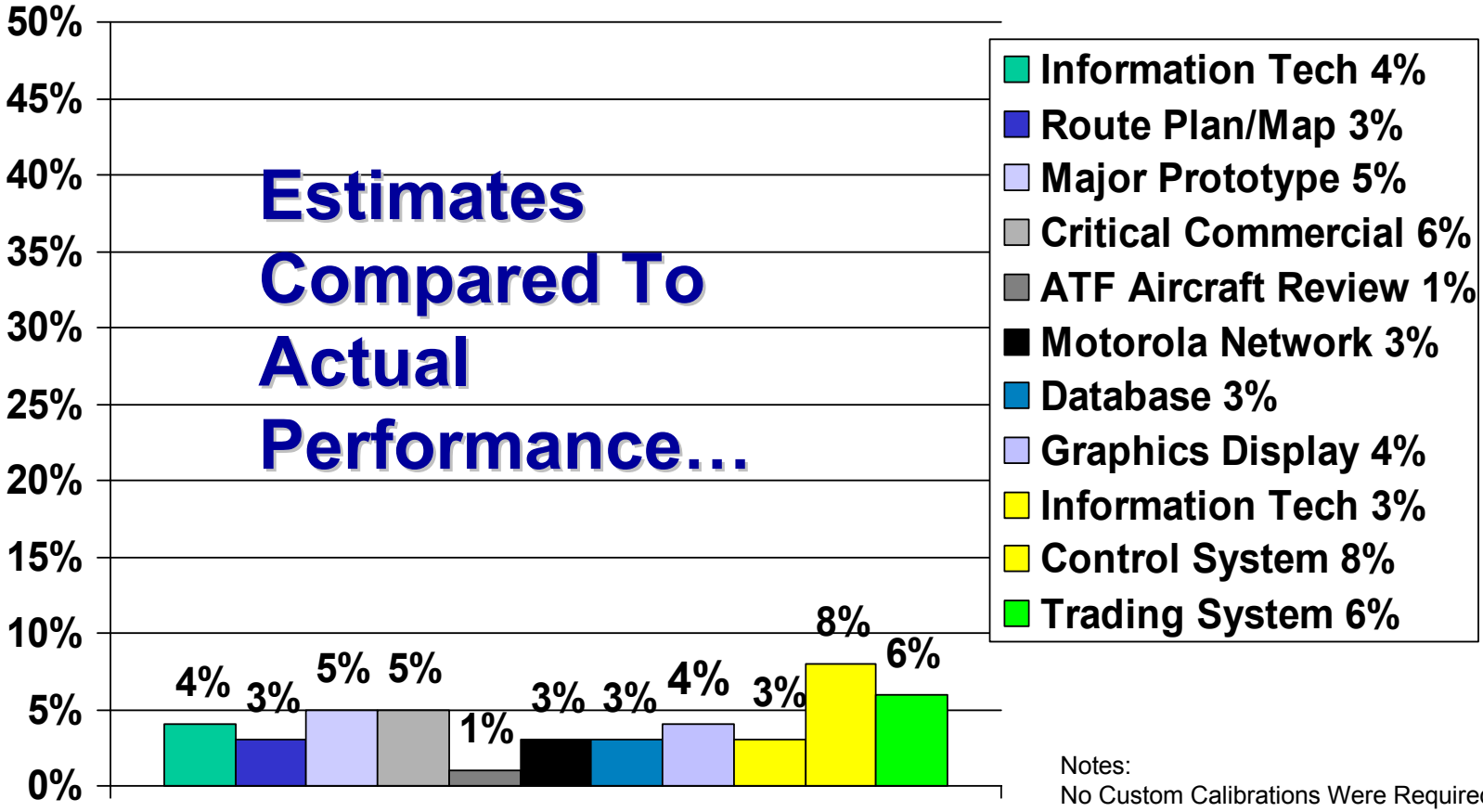
SEER-SEM Validations
"Better Than 10%"



Smaller Numbers Are Better

Notes:
No Custom Calibrations Were Required
Comparisons Against SEER-SEM Estimates
At 50% Level

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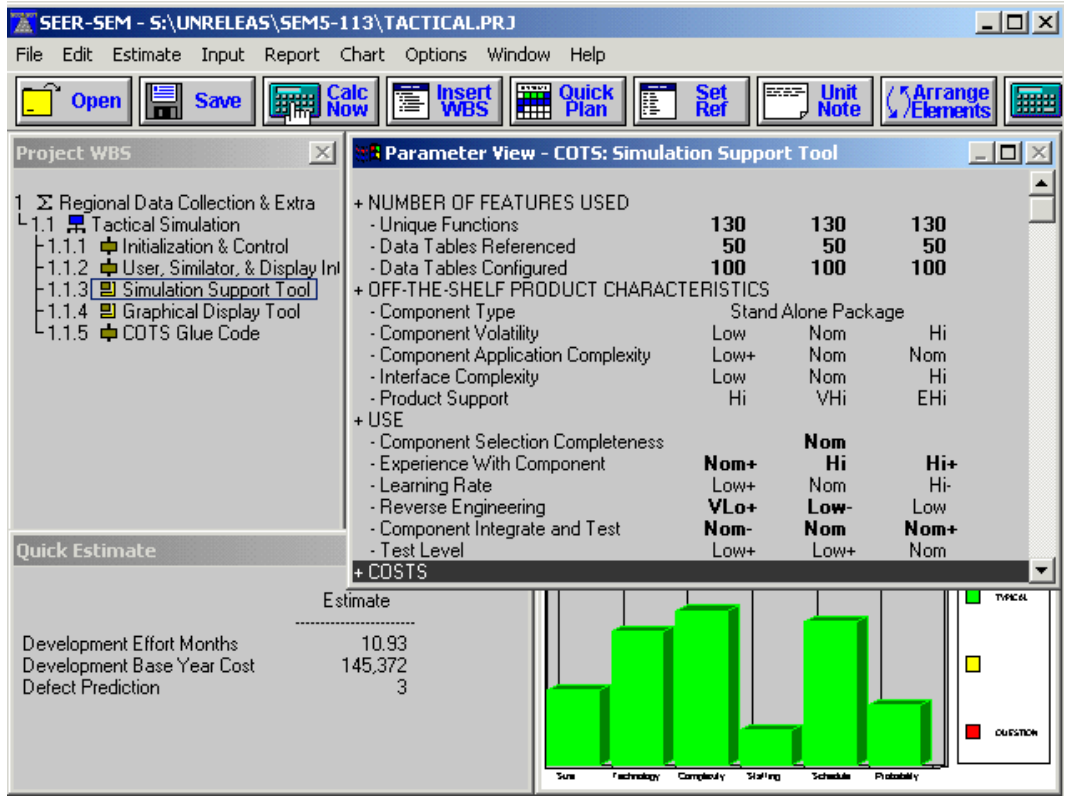
SEER-SEM Answers…
Off-the-Shelf Integration

COTS Issues Addressed:

- Integration
- Quality
- Volatility
- Refresh
- And Much More



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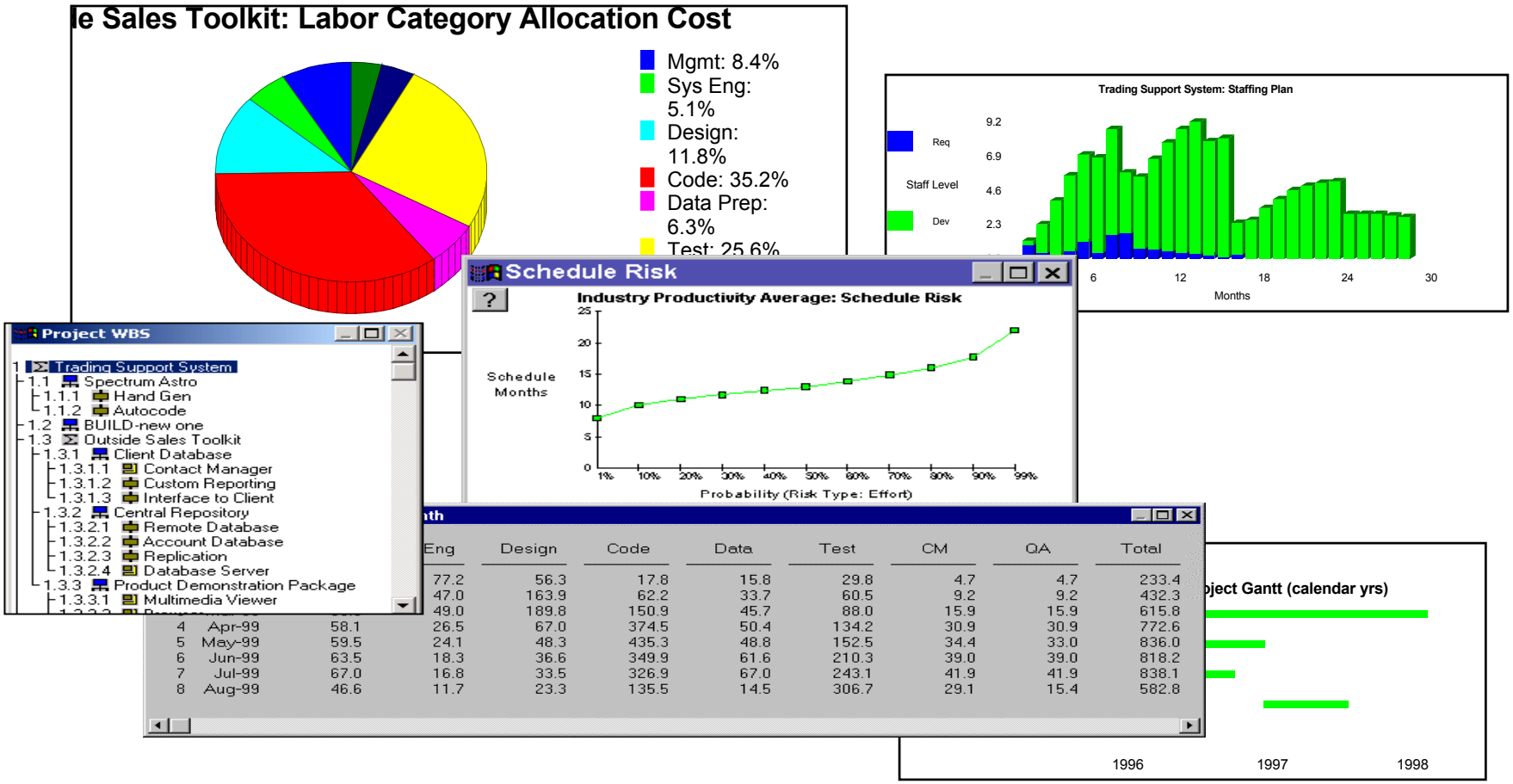
SEER Augments Demand Planning



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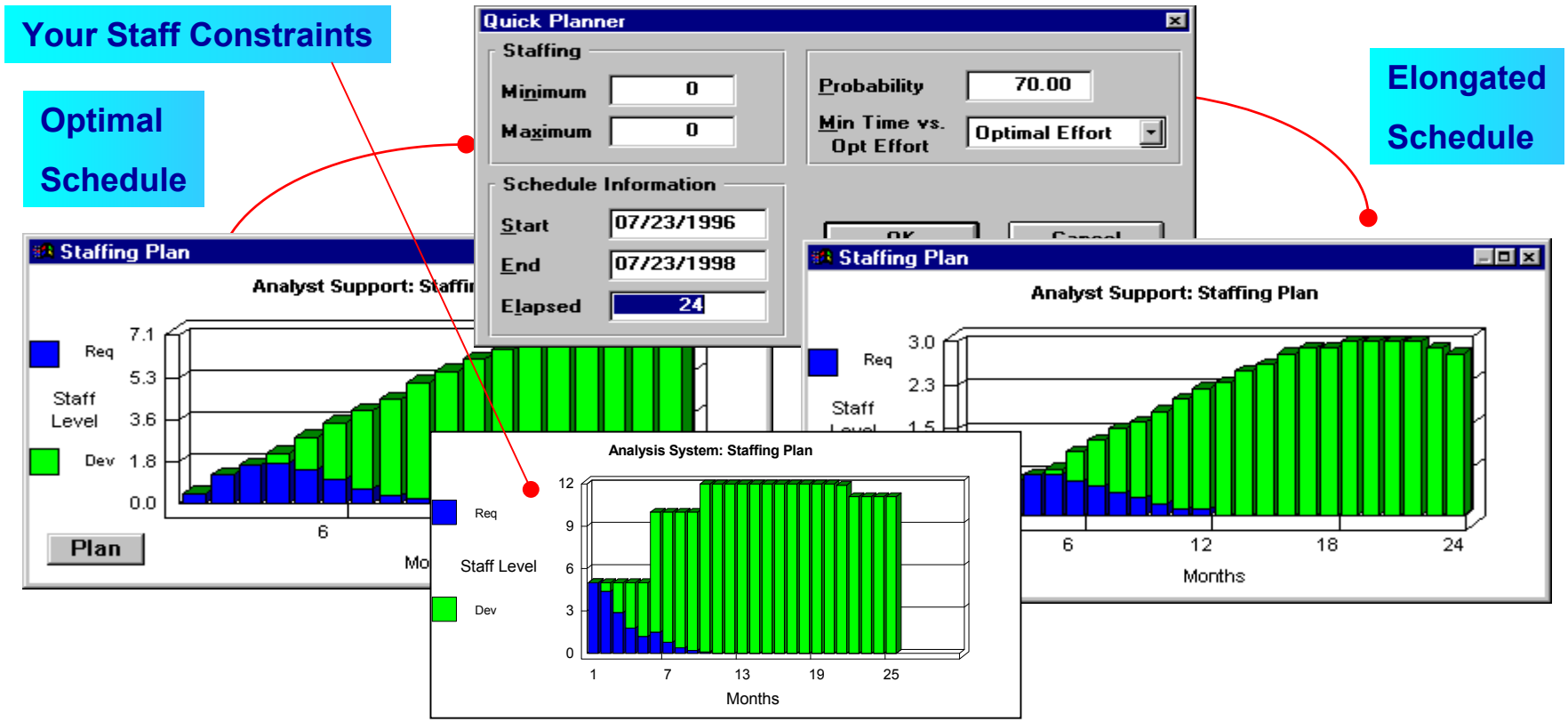
Project Rescheduling

"The customer delivery date has slipped due to a delay in hardware procurement... how should my project shift?"



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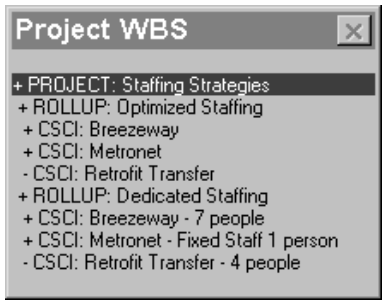
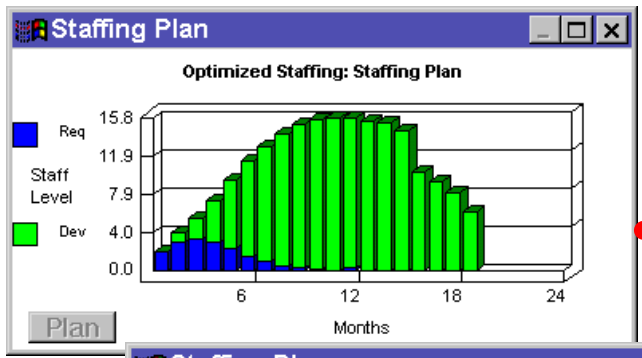
Staffing Strategy Evaluation

You may want to apply dedicated teams to projects, or you may want to shift staff from project to project, as required...





Optimal Staffing Profile:

200 effort months

18 calendar months

Fixed Staffing Profile:

213 effort months

20 calendar months

...SEER-SEM's staffing analysis capability lets you model each alternative.

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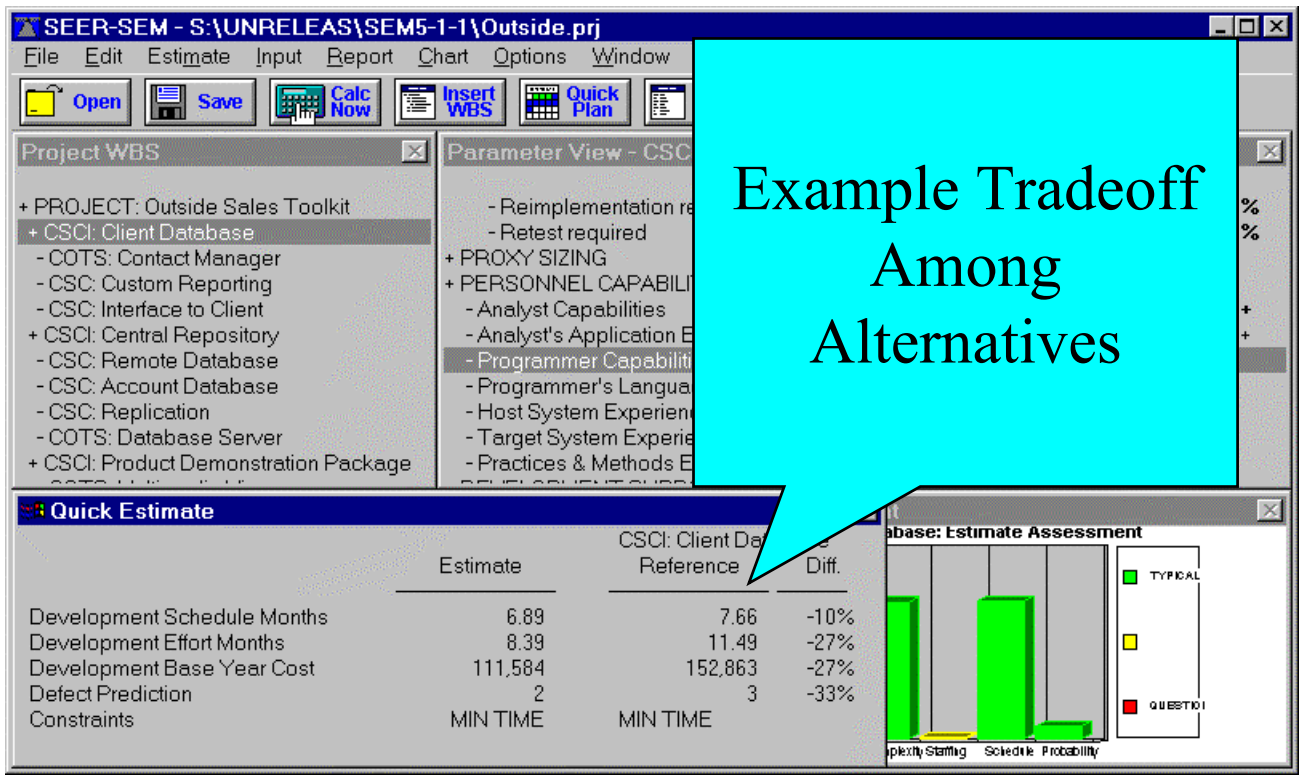
Contracting and Outsourcing Evaluation

Evaluates Cost, Schedule, Risk and Effort For Outsourcing Alternatives, Contractors, Etc.



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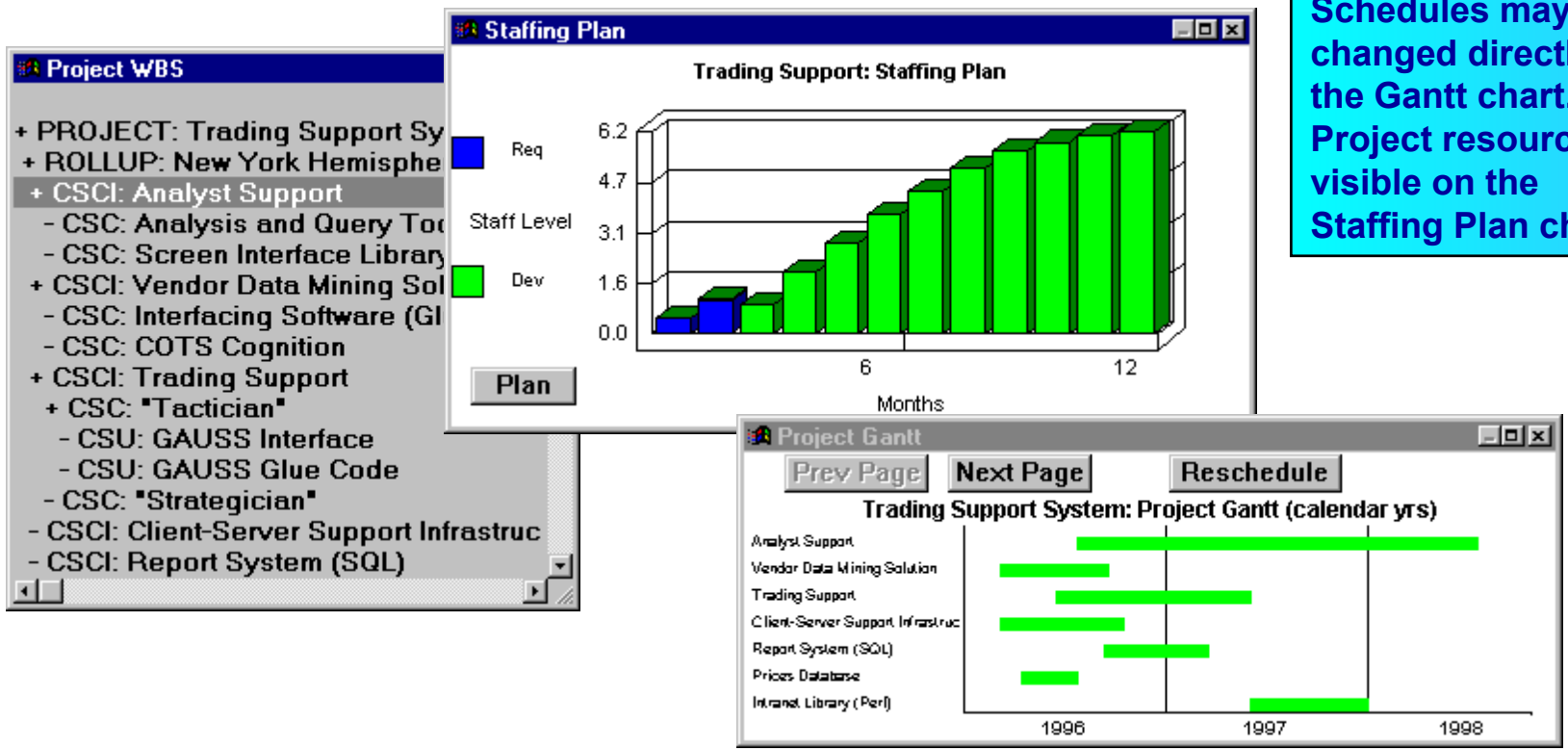
Early Resource Projections

SEER-SEM dynamically identifies resource requirements.



Schedules may be changed directly on the Gantt chart. Project resources visible on the Staffing Plan chart.

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Budgeting

Development Cost by Month

	Month	Mgmt	Sys Eng	Design	Code	Data
1	Jun-96	675.9	2,841.5	788.5	87.3	337.9
2	Jul-96	874.9	2,422.6	1,836.1	625.6	509.8
3	Aug-96	1,203.5	1,094.1	4,485.7	1,312.9	875.3
4	Sep-96	2,528.6	2,298.7	9,424.9	2,758.5	1,839.0
5	Oct-96	3,778.0	3,434.6	14,081.8	4,121.5	2,747.7
6	Nov-96	3,182.9	1,436.1	3,158.0	23,995.4	2,708.8

SEER-SEM reports cost, effort, staff levels, and hours monthly and annually.

Cost by Fiscal Year

Base Year: 1994
Cost Escalation Factor: 3.00%
Fiscal Year Start Month: 10

Fiscal Year	Base Year Cost	Base Year Cumulative	Then Year Cost	Then Year Cumulative
-------- Development --------				
1996	15,105	15,105	16,024	16,024
1997	268,770	283,875	293,693	309,717
1998	338,378	622,253	380,847	690,565
-------- Maintenance --------				
1995	207,062	207,062	213,274	213,274
1996	455,600	662,662	483,346	696,620
1997	455,600	1,118,262	497,846	1,194,466

Long term or short term, SEER-SEM will assist in budget planning.

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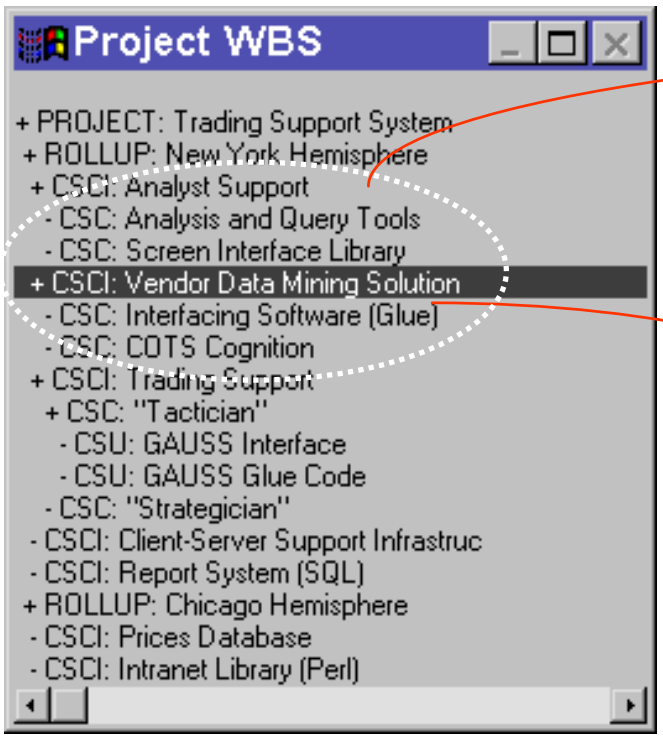
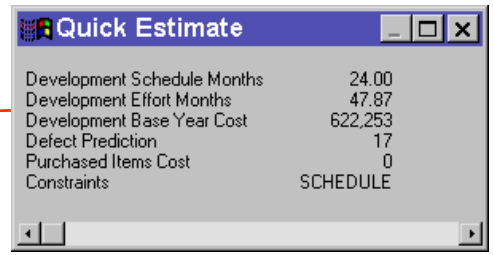
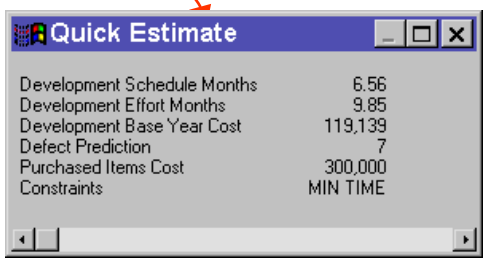
Architecture Tradeoffs

Unearth the hidden costs of off-the-shelf software (COTS).





COTS software can be a great value and productivity boost...



...it can also demand additional hardware and software purchases and upgrades.

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Vendor Evaluation

Scrutinize vendor proposals with SEER-SEM

In-House Project

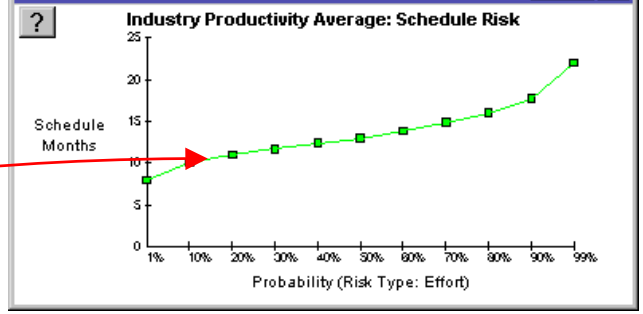
Vendor Proposal

Quick Estimate

Development Schedule Months	14.04	11.41	23%
Development Effort Months	64.93	34.86	86%
Development Base Year Cost	493,458	397,387	24%
Defect Prediction	54	35	54%
Constraints	MIN TIME	MIN TIME	

Verify productivity claims and measure them against industry averages.

Schedule Risk



Using industry average productivity levels, the vendor has a 20% probability of achieving their proposed 11 month schedule.

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Project Re-Scoping – New and Changing Requirements

"Prototype demos have initiated a flurry of changes. The customer wants more features..."

FBS Inputs with Notes

	Low	Average	High	
+ NEW FUNCTIONS				
+ EXTERNAL INPUTS (EI)	15	32	36	
- Input Screens	8	9	11	The Fixed Income Group wants more parameter selection functionality.
- Interactive Inputs	5	20	25	
- Hardware Inputs	0	0	0	
- Batch Input Streams	2	3	0	
+ EXTERNAL OUTPUTS (EO)	9	6	4	
- Screen Reports	7	3	4	
- Printed Reports	0	0	0	
- Media Outputs	2	3	0	
- Software Outputs	0	0	0	

...detailed function based sizing supports a quick re-assessment of evolving project requirements.

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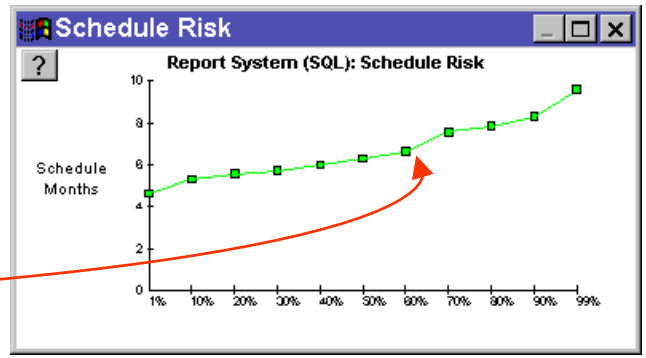
Risk Analysis

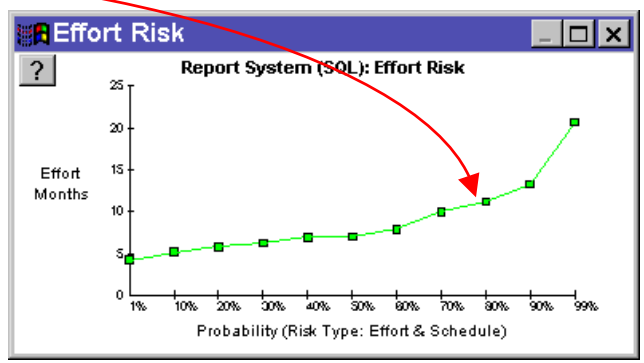
What are the chances of meeting a tight schedule?

A low effort objective?

Risk Analysis

Probability	Sched Months	Development: Effort Months	Development: Effort Hours	Cost
1%	4.63	4.26	647.33	51,531
10%	5.31	5.20	789.96	62,884
20%	5.58	5.83	886.55	70,570
30%	5.73	6.25	949.65	75,596
40%	6.00	7.00	1,064.27	84,720
50%	6.32	7.06	1,073.47	85,458
60%	6.63	7.93	1,205.44	95,963
70%	7.57	10.03	1,524.86	121,391
80%	7.86	11.24	1,708.09	135,971
90%	8.32	13.35	2,029.54	161,564
99%	9.60	20.72	3,149.01	250,677





40% probability of meeting a 6 month schedule.

60% probability of completion within 1200 hours.

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Estimate To Complete

"Is it done yet... how close are we?"

Estimate to Complete

Activity	Schedule Months	Person Months	Person Hours	Cost
System Concept	0.00	0.00	0	0
Cumulative	0.00	0.00	0	0
System Requirements Design	0.44	0.05	8	650
Cumulative	0.44	0.05	8	650
S/W Requirements Analysis	0.52	0.16	24	1,907
Cumulative	0.95	0.21	32	2,557
Preliminary Design	0.47	0.06	10	779
Cumulative	1.42	0.28	42	3,336
Detailed Design	1.58	1.13	172	13,708
Cumulative	3.00	1.41	214	17,044
Code & CSU Test	2.05	3.18	484	38,499
Cumulative	5.06	4.59	698	55,543
CSC Integrate & Test	1.58	3.18	484	38,523
Cumulative	6.64	7.77	1,182	94,066
CSCI Test	0.18	0.37	56	4,436
Cumulative	6.81	8.14	1,237	98,502
System Integrate Thru OT&E	0.07	0.24	36	2,879
Cumulative	6.89	8.38	1,274	101,381
Maintenance	0.00	0.00	0	0
Cumulative	6.89	8.38	1,274	101,381

Effort

Schedule

Cost

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Total Cost of Ownership

Example Shows That 5 More Maintenance Years Cost Nearly What Development Does

Quick Estimate

	Estimate
Development Schedule Months	30.31
Development Effort Months	782.25
Development Effort Hours	118,901
Development Base Year Cost	10,403,869
Maintenance Schedule Months	60.00
Maintenance Base Year Cost	8,174,063
Defect Prediction	241
Constraints	MIN TIME

Maintenance Effort by Year

Base Year: 1998
Fiscal Year Start Month: 1

ffort Months				Base Year	Base Year
ct	Enhance	Total	Cumulative	Cost	Cumulative
6.9	5.1	135.3	135.3	1,799,440	1,799,440
2.0	14.9	163.2	298.5	2,170,892	3,970,332
0.4	25.3	108.3	406.8	1,440,514	5,410,846
4.3	25.7	90.3	497.1	1,200,791	6,611,637
4.3	25.7	90.3	587.4	1,200,791	7,812,428
7.3	7.7	27.2	614.6	361,635	8,174,063

Quick Estimate

	Estimate	Program: Tactical Simulation Reference	Diff.
Development Schedule Months	30.31	30.31	0%
Development Effort Months	782.25	782.25	0%
Development Effort Hours	118,901	118,901	0%
Development Base Year Cost	10,403,869	10,403,869	0%
Maintenance Schedule Months	120.00	60.00	100%
Maintenance Base Year Cost	14,178,018	8,174,063	73%
Defect Prediction	241	241	0%
Constraints	MIN TIME	MIN TIME	

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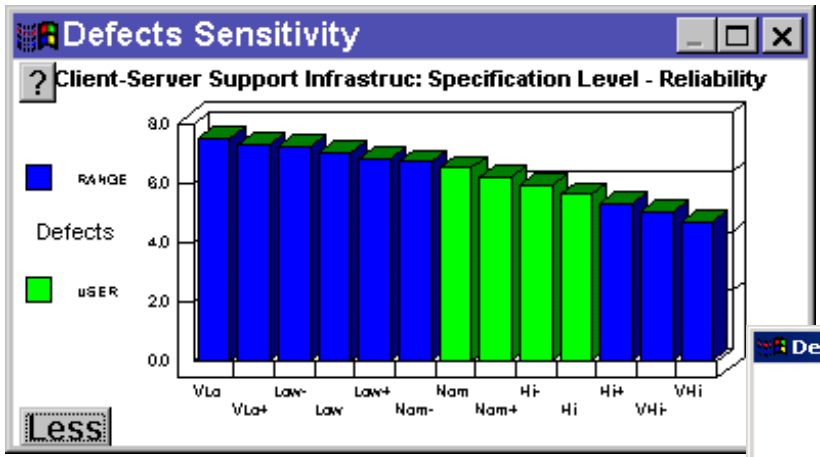
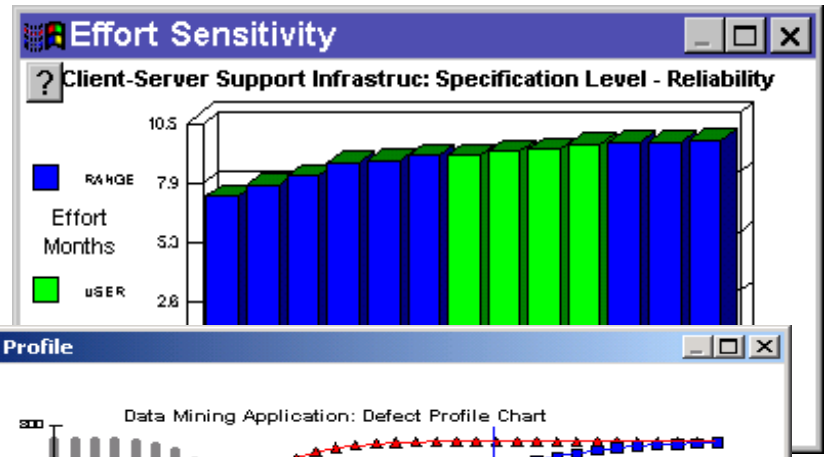
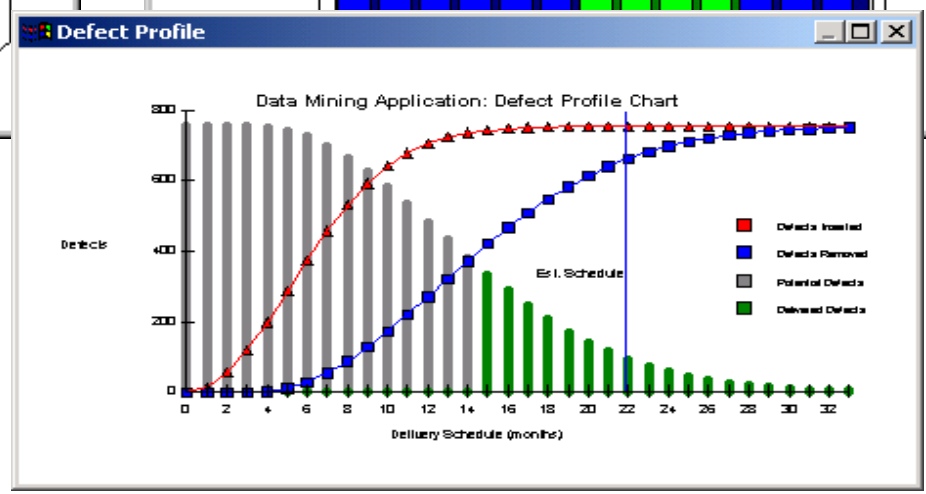
Defect Analysis

SEER-SEM's sensitivity charts offer visibility into cost and quality tradeoffs.







What is the cost / risk of shipping early?

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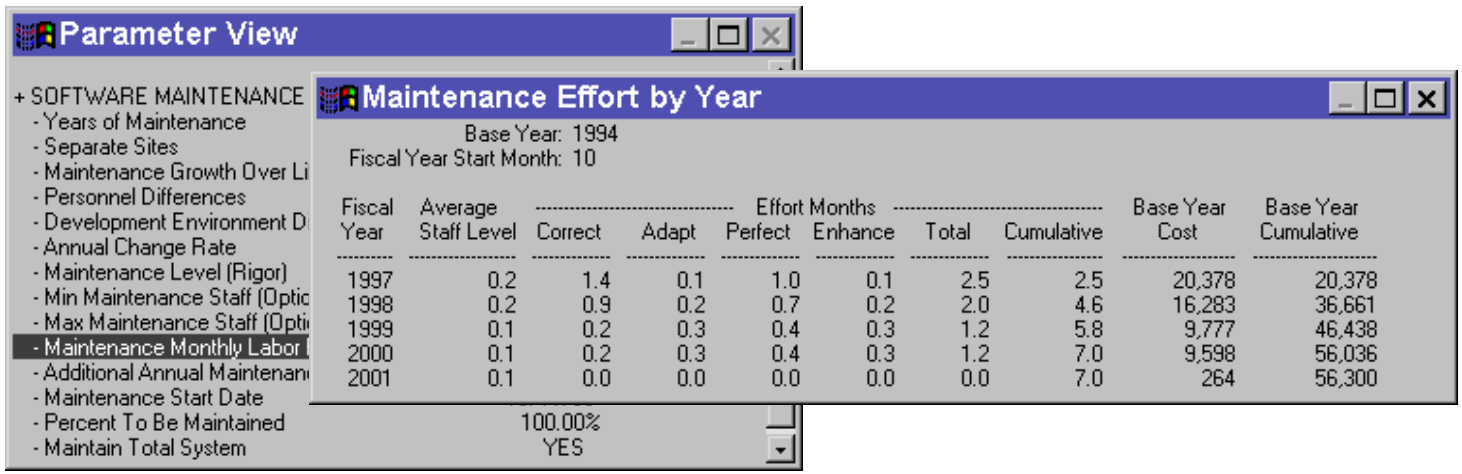
Support Projections

Now that your system is up and running, what will it take to keep it going?



Fiscal Year	Average Staff Level	Effort Months Correct	Adapt	Perfect	Enhance	Total	Cumulative	Base Year Cost	Base Year Cumulative
1997	0.2	1.4	0.1	1.0	0.1	2.5	2.5	20,378	20,378
1998	0.2	0.9	0.2	0.7	0.2	2.0	4.6	16,283	36,661
1999	0.1	0.2	0.3	0.4	0.3	1.2	5.8	9,777	46,438
2000	0.1	0.2	0.3	0.4	0.3	1.2	7.0	9,598	56,036
2001	0.1	0.0	0.0	0.0	0.0	0.0	7.0	264	56,300

SEER-SEM projects the resources required for various maintenance strategies.

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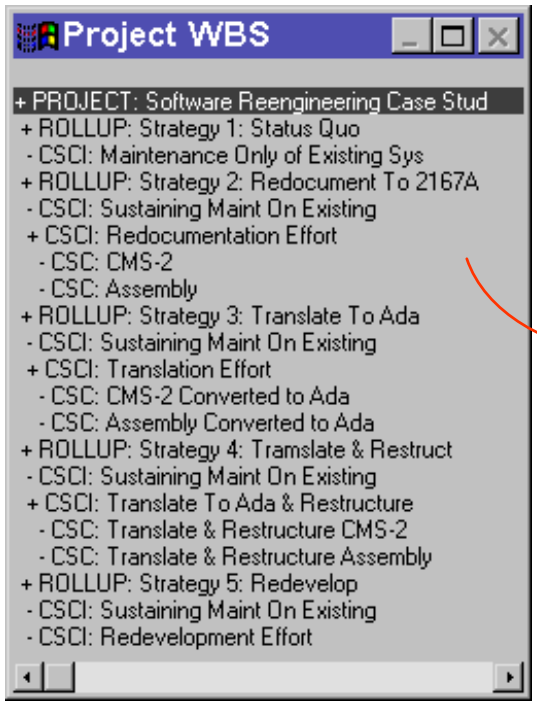
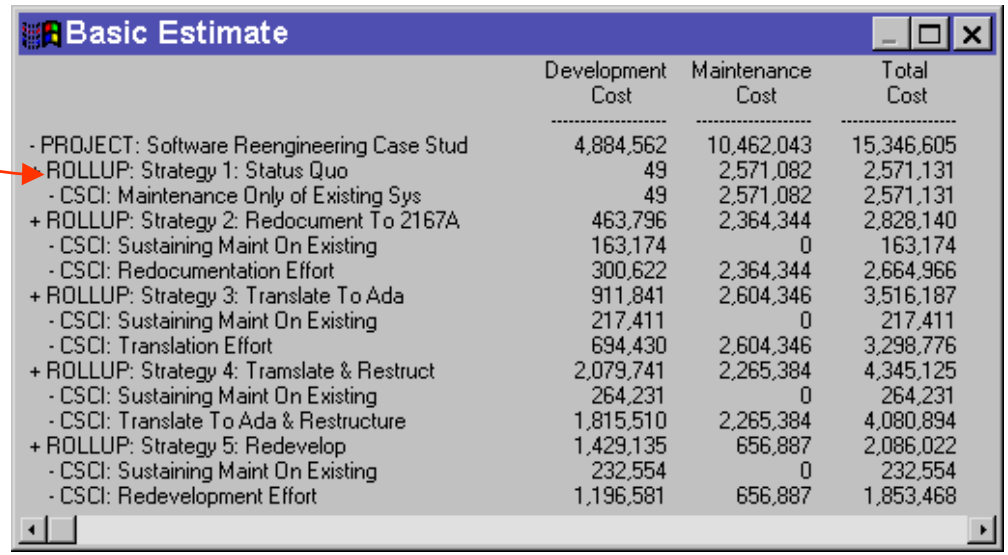
Replacement and Reengineering Decisions

Evaluate both long term and short term cost of re-engineering alternatives.





Basic Estimate

	Development Cost	Maintenance Cost	Total Cost
- PROJECT: Software Reengineering Case Stud	4,884,562	10,462,043	15,346,605
+ ROLLUP: Strategy 1: Status Quo	49	2,571,082	2,571,131
- CSCI: Maintenance Only of Existing Sys	49	2,571,082	2,571,131
+ ROLLUP: Strategy 2: Redocument To 2167A	463,796	2,364,344	2,828,140
- CSCI: Sustaining Maint On Existing	163,174	0	163,174
- CSCI: Redocumentation Effort	300,622	2,364,344	2,664,966
+ ROLLUP: Strategy 3: Translate To Ada	911,841	2,604,346	3,516,187
- CSCI: Sustaining Maint On Existing	217,411	0	217,411
- CSCI: Translation Effort	694,430	2,604,346	3,298,776
+ ROLLUP: Strategy 4: Tramslate & Restruct	2,079,741	2,265,384	4,345,125
- CSCI: Sustaining Maint On Existing	264,231	0	264,231
- CSCI: Translate To Ada & Restructure	1,815,510	2,265,384	4,080,894
+ ROLLUP: Strategy 5: Redevelop	1,429,135	656,887	2,086,022
- CSCI: Sustaining Maint On Existing	232,554	0	232,554
- CSCI: Redevelopment Effort	1,196,581	656,887	1,853,468

SEER-SEM gives you a forum to examine options in an up-front, collaborative manner.

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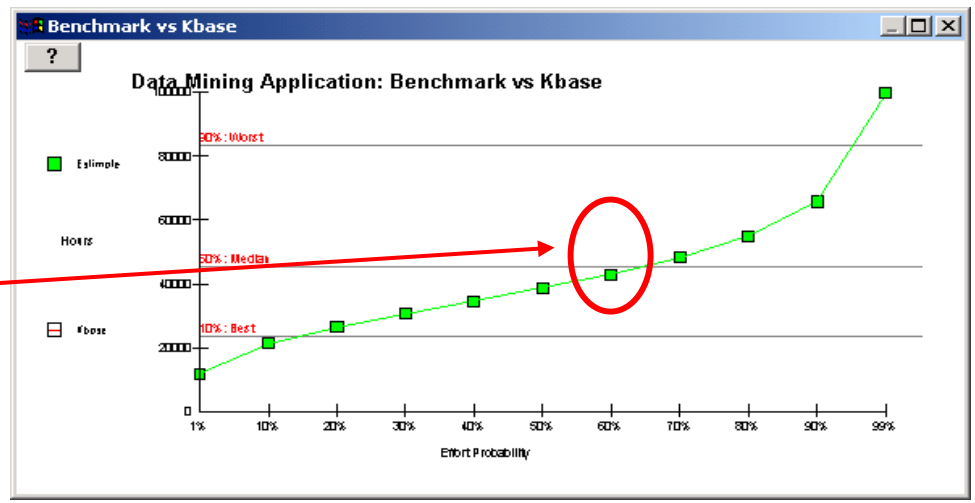
Benchmark Your Performance & Generate Quick Estimates

- Knowledge Bases Provide Industry Ranges For Estimation & Benchmarking
- Provide Starting Point For Your Estimates
  - Enter Your Specifics Where Known
- Augment Knowledge Bases With Your Organization's Lessons Learned

You Are Performing Better Than Industry Mean, But Some Perform Better



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