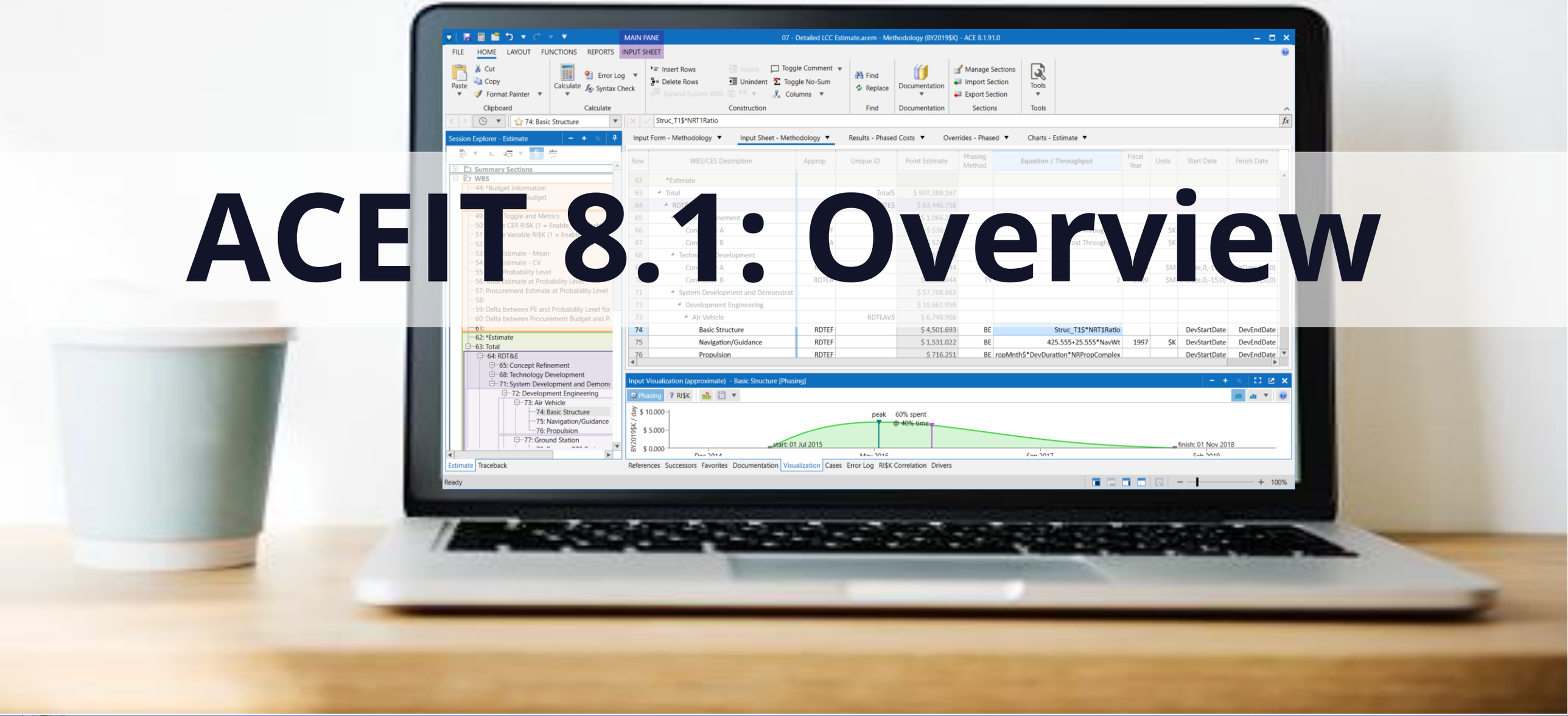
ACEIT 8.1: Overview



The ACEIT Concept

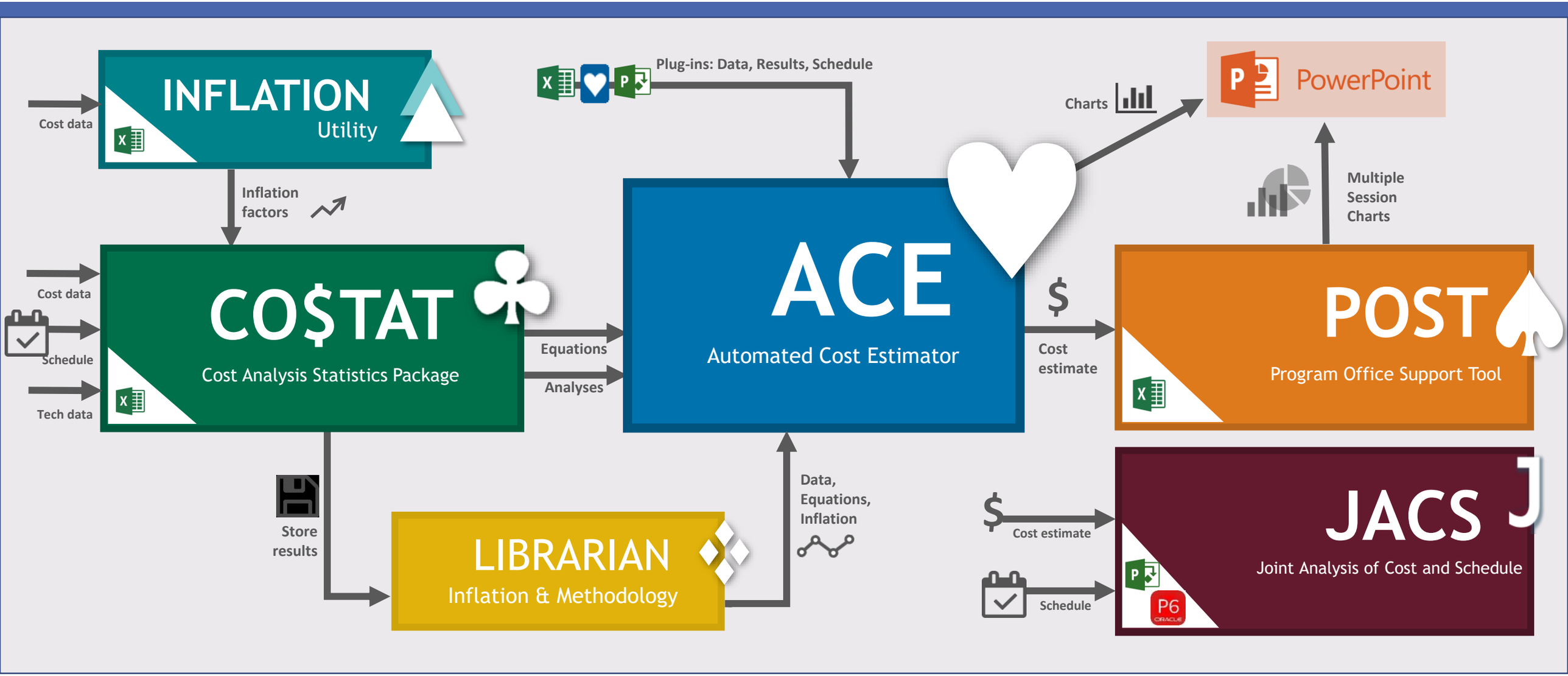
(Automated Cost Estimating Integrated Tools)

Allow analysts to focus on estimate methodology rather than spreadsheet mechanics

- Bring structure and consistency to the entire cost analysis process
- Implement a standardized process
- Increase Estimate Quality

Developed *by* cost analysts *for* cost analysts

ACEIT 8.1 Architecture



ACEIT Components

- ACE: Automated Cost Estimator – build a robust, accurate, and defendable cost model
  - Includes inflation, learning, phasing, risk, documentation, and other essential cost estimating processes
- CO$TAT – perform cost estimating statistics and regression analysis
- POST: Program Office Support Tool – automate what-if drills, charts/tables from Excel
  - Includes automated transfer of results to PowerPoint and Word
- JACS: Joint Analysis of Cost and Schedule – perform cost and schedule analyses
  - Utilizes the schedule logic and framework of MS Project or P6 with powerful ACEIT engine for processing
- Librarian – manage and share custom inflation indices and CER Libraries
- Inflation Utility – access latest ACEIT-provided government inflation indices in Excel

Benefits of Using ACEIT

- Provide Flexibility to Model Any System Type
  - **Life Cycle Cost Estimates (LCCE)**

    Independent Cost Estimates (ICE) and Program Office Estimates (POE)
  - **Other Cost Estimates**

    Budget Estimates, Rough Order or Magnitude (ROM), Independent Cost Assessments (ICA), Independent Government Cost Estimates (IGCE), and Estimate at Completion (EAC)
  - **Business Case Analysis**

    Analysis of Alternatives (AoAs), Cost Effectiveness Analysis (CEA), Economic Analysis (EA), and Cost Benefit Analysis (CBA)
- Integrates with Other Applications Through an Open Platform
- Reduces Management Challenges of training and transferring projects to other team members

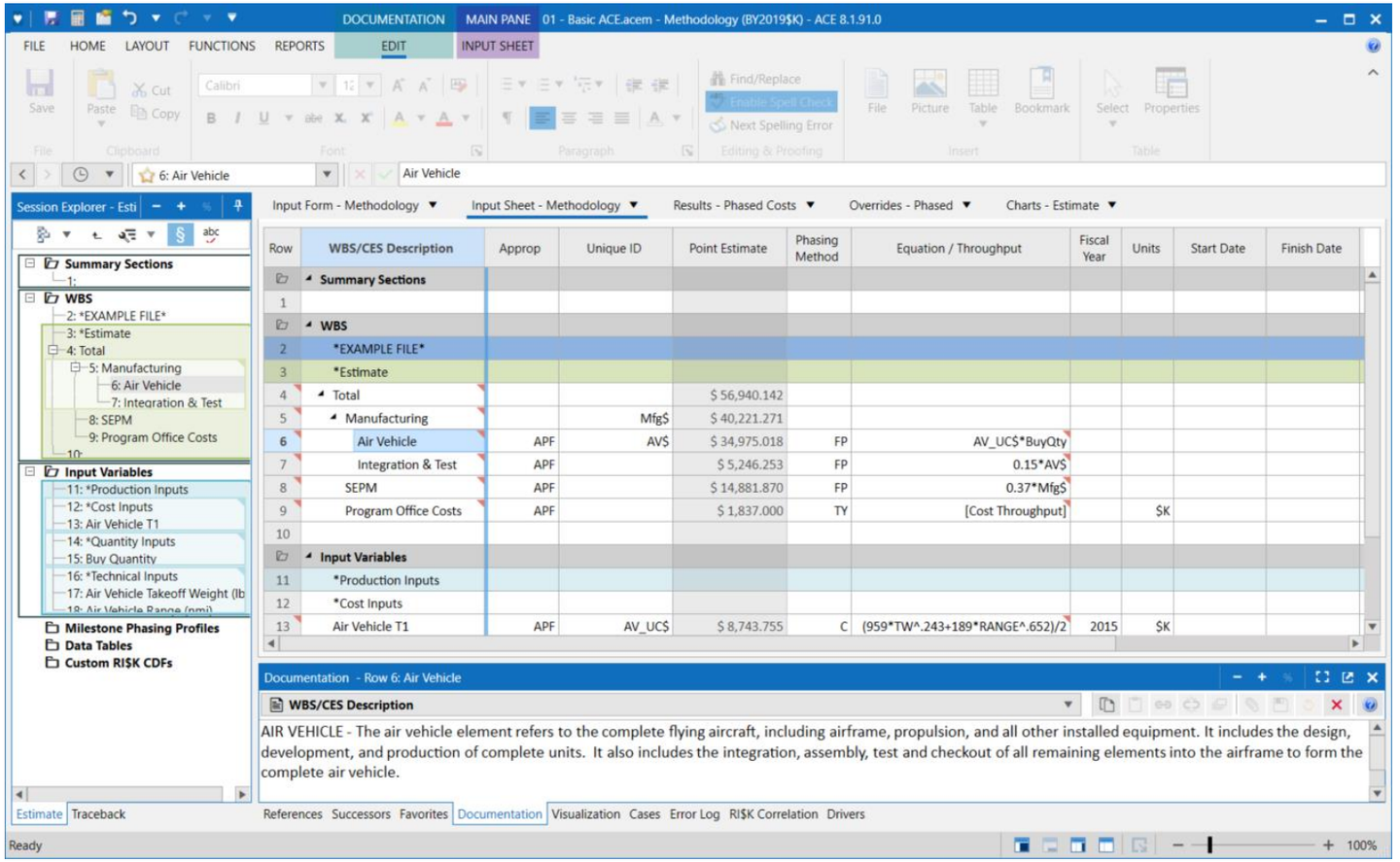
ACE

- An estimating platform
- A framework to build risk adjusted, integrated cost/schedule life cycle estimates for any project

ACE is an Estimating Platform

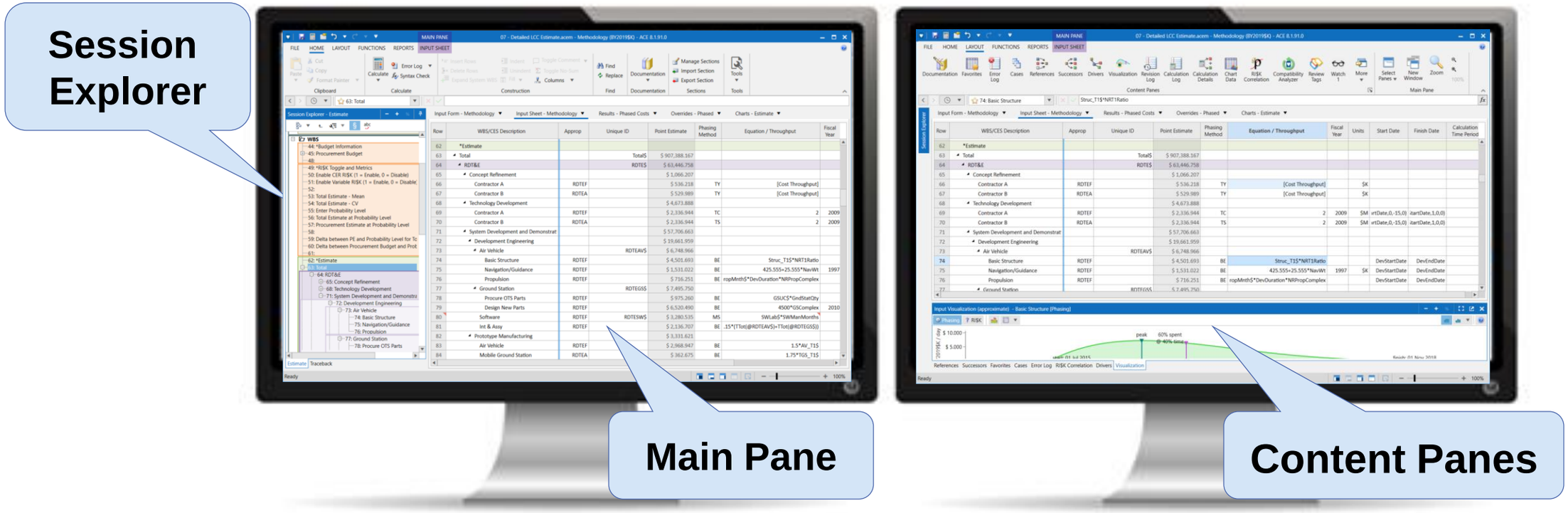
Structured framework to build consistent cost estimating models that span the entire analysis process

- Methodology
- Documentation
- Summary, WBS, and Inputs Sections
- Integrated Uncertainty Analysis
- What-If Results
- Reports
- Charts

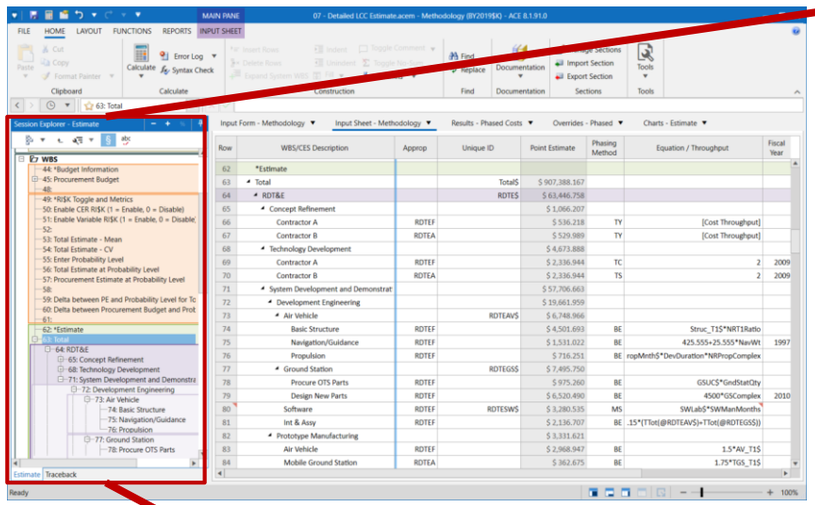


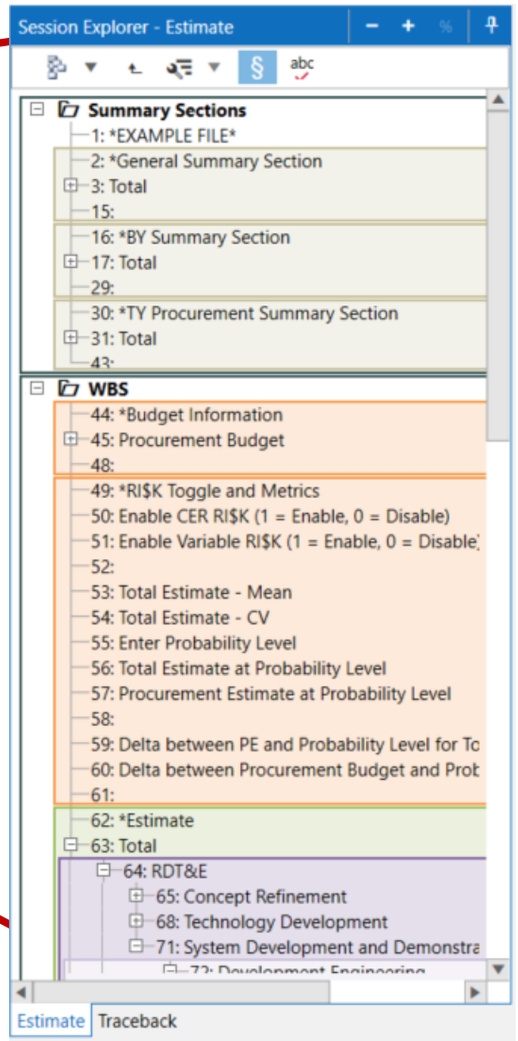
Configurable Workspace

Tailor Workspace to your needs: Arrange panes on multiple monitors



Workspace: Session Explorer





Session Explorer

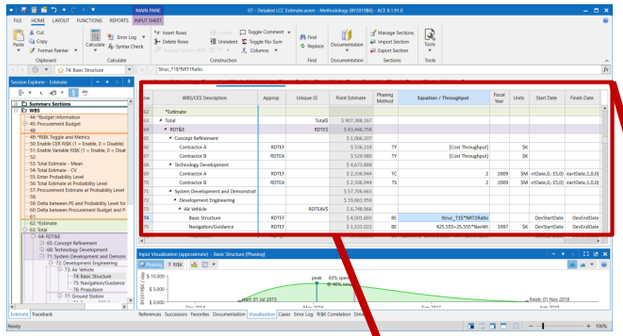
Displays Session row hierarchy

- Summary Sections
- WBS
- Input Variables

Offer two modes

- Estimate - View session WBS tree, input variables and data tables
- Traceback - Assist with tracing the logical row connections in the model

Workspace: Main Pane



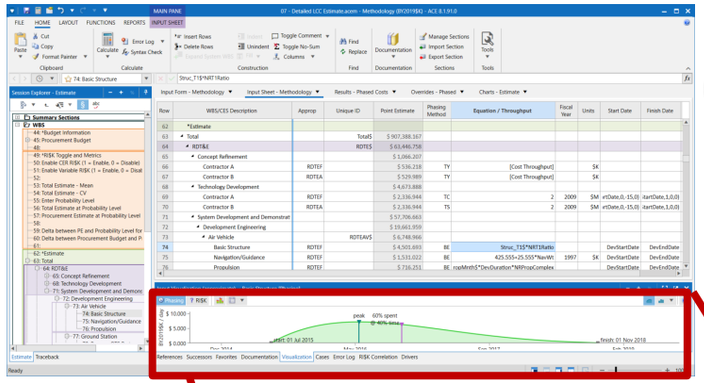
Main pane provides data entry and results views

- Five views – Input Forms, Input Sheets, Results, Overrides, Charts

Input Form - Methodology | **Input Sheet - Methodology** | Results - Phased Costs | Overrides - Phased | Charts - Estimate

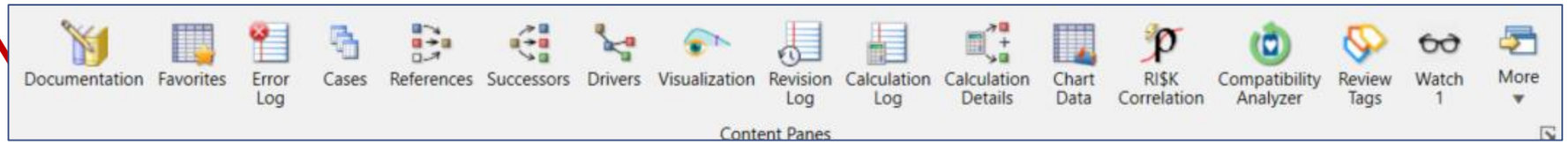
Row	WBS/CES Description	Approp	Unique ID	Point Estimate	Phasing Method	Equation / Throughput	Fiscal Year	Units	Start Date	Finish Date
62	*Estimate									
63	Total		Total$	$ 907,388.167						
64	RDT&E		RDTE$	$ 63,446.758						
65	Concept Refinement			$ 1,066.207						
66	Contractor A	RDTEF		$ 536.218	TY	[Cost Throughput]		$K		
67	Contractor B	RDTEA		$ 529.989	TY	[Cost Throughput]		$K		
68	Technology Development			$ 4,673.888						
69	Contractor A	RDTEF		$ 2,336.944	TC	2	2009	$M	ırtDate,0,-15,0)	ıtartDate,1,0,0)
70	Contractor B	RDTEA		$ 2,336.944	TS	2	2009	$M	ırtDate,0,-15,0)	ıtartDate,1,0,0)
71	System Development and Demonstrat			$ 57,706.663						
72	Development Engineering			$ 19,661.959						
73	Air Vehicle		RDTEAV$	$ 6,748.966						
74	Basic Structure	RDTEF		$ 4,501.693	BE	Struc_T1$*NRT1Ratio			DevStartDate	DevEndDate
75	Navigation/Guidance	RDTEF		$ 1,531.022	BE	425.555+25.555*NavWt	1997	$K	DevStartDate	DevEndDate
76	Propulsion	RDTEF		$ 716.251	BE	ropMnth$*DevDuration*NRPropComplex			DevStartDate	DevEndDate
77	Ground Station		RDTEGS$	$ 7,495.750						
78	Procure OTS Parts	RDTEF		$ 975.260	BE	GSUC$*GndStatQty			rtDate,0,0,120)	StartDate,0,30)
79	Design New Parts	RDTEF		$ 6,520.490	BE	4500*GSComplex	2010	$K	rtDate,0,0,120)	StartDate,0,30)

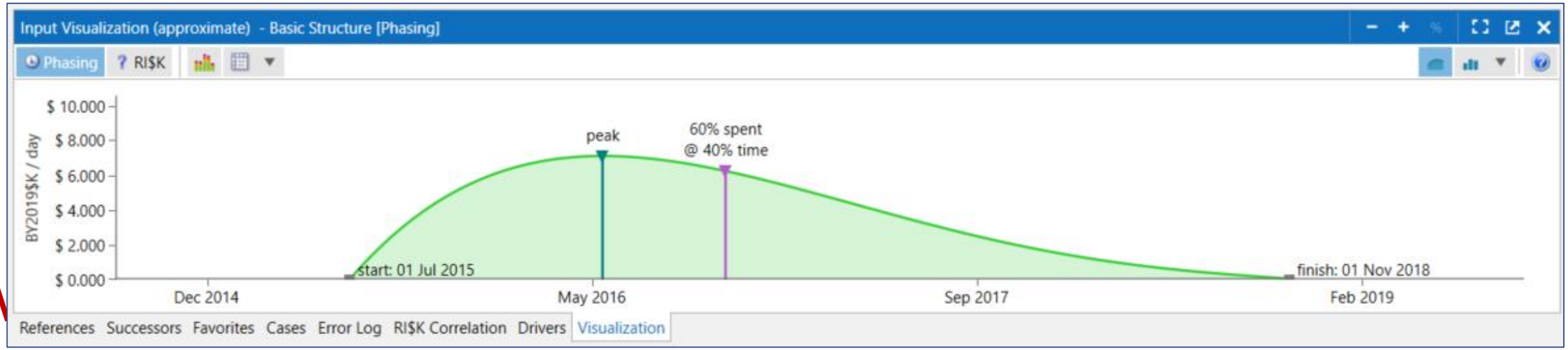
Workspace: Content Panes



Content panes add **insight** to the workspace

- Many views covering documentation, visualization, cases, error log, reference rows, driver rows, revision log, calculation details, and more

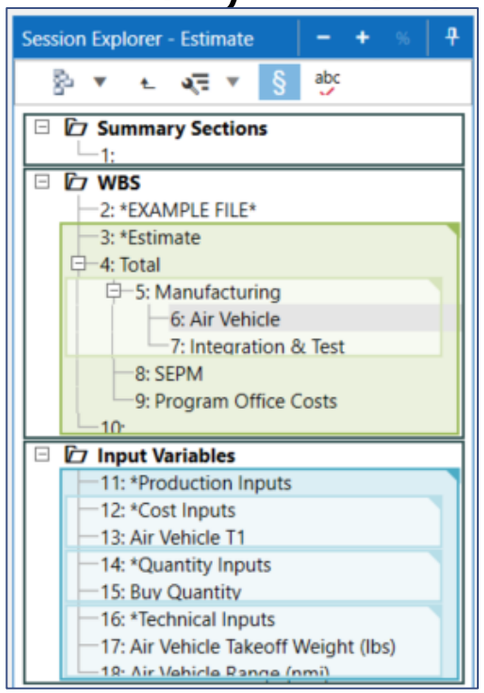




Built-In WBS Hierarchy

ACE uses an indenture structure to sum lower level elements ensuring **proper calculation** of parent rows at all times

- Tree-view allows for expansion and collapse of model rows
- Easily insert new WBS rows without updating parent levels

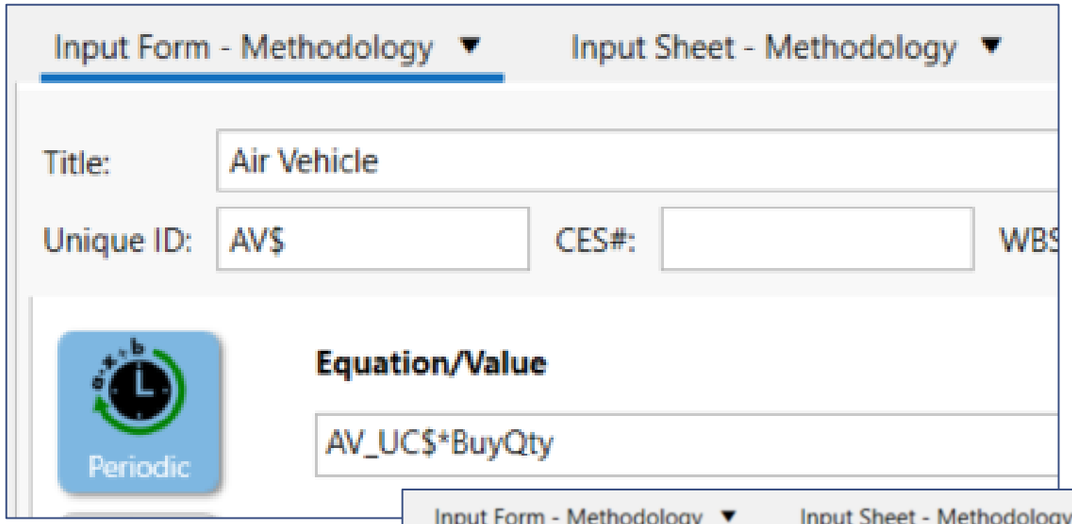


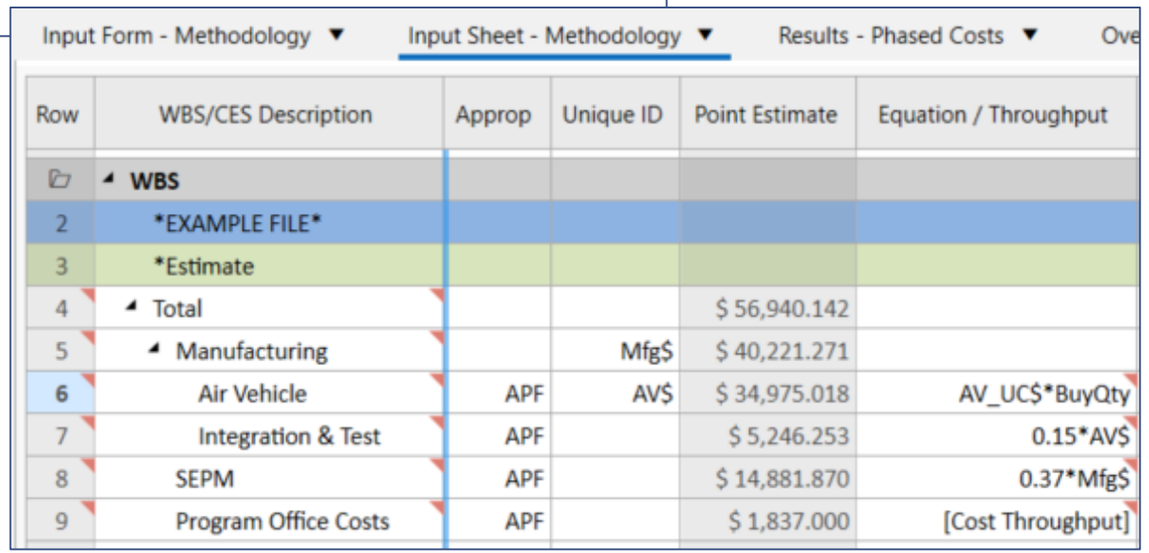
Row	WBS/CES Description	Point Estimate	Equation / Throughput
	WBS		
2	*EXAMPLE FILE*		
3	*Estimate		
4	Total	$ 56,940.142	
5	Manufacturing	$ 40,221.271	
6	Air Vehicle	$ 34,975.018	AV_UC$*BuyQty
7	Integration & Test	$ 5,246.253	0.15*AV$
8	SEPM	$ 14,881.870	0.37*Mfg$
9	Program Office Costs	$ 1,837.000	[Cost Throughput]

Easily Enter Estimate Methodologies

Two ways to input data

- Input forms provide **guidance** to less experienced cost estimators
- Input sheets offer extensive data entry capability across rows; **build large models quickly**

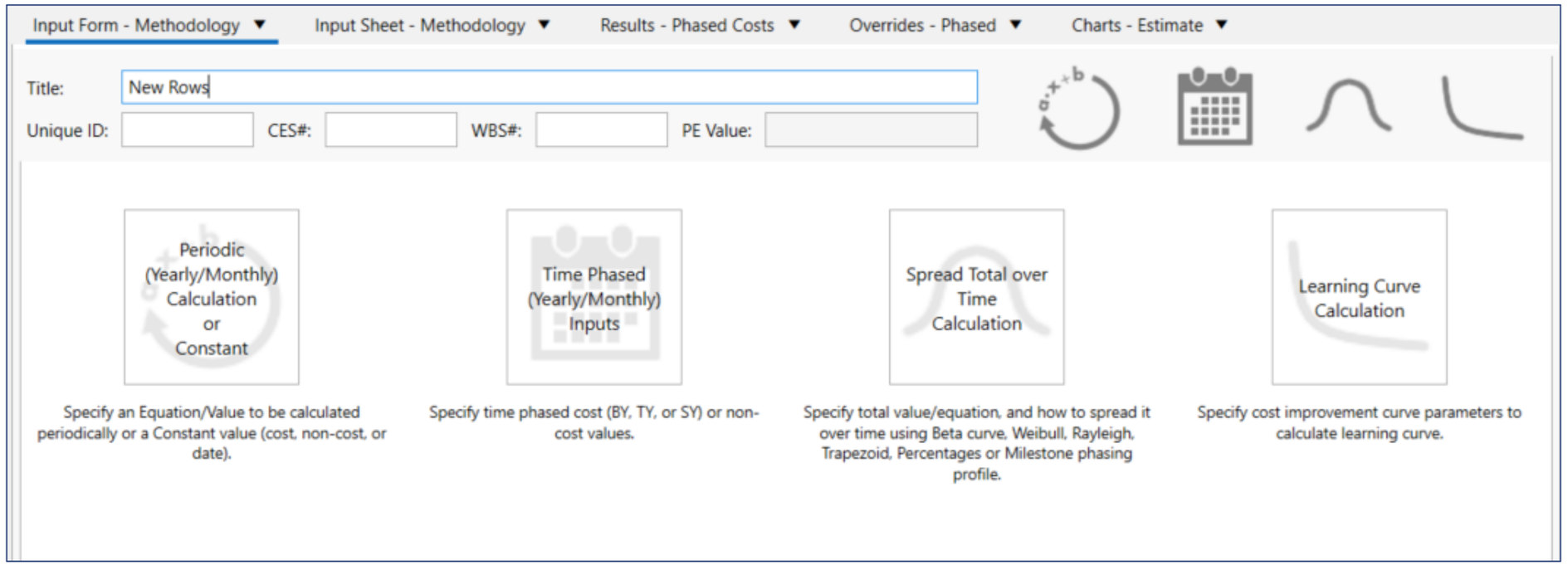




Create Estimates with Guidance from Input Forms

Use guidance on input forms to select from four methodology types

- Periodic
- Time Phased Inputs
- Spread Total
- Learning Curves



Enter Data Directly into Input Sheets

Use specific columns in spreadsheet view to enter equations and annual throughputs

Row	WBS/CES Description	Point Estimate	Phasing Method	Equation / Throughput	Fiscal Year	Units
63	Total	$ 904,459.331 (86%)				
64	RDT&E	$ 62,952.687 (13%)				
65	Concept Refinement	$ 1,058.427				
66	Contractor A	$ 532.172	TY	[Cost Throughput]		$K
67	Contractor B	$ 526.255	TY	[Cost Throughput]		$K
68	Technology Development	$ 4,637.328				
69	Contractor A	$ 2,318.664	TC	2	2009	$M
70	Contractor B	$ 2,318.664	TS	2	2009	$M
71	System Development and Demonstration	$ 57,256.932 (13%)				
72	Development Engineering	$ 19,508.162 (50%)				
73	Air Vehicle	$ 6,696.175 (48%)				
74	Basic Structure	$ 4,466.480 (50%)	BE	Struc_T1$*NRT1Ratio		
75	Navigation/Guidance	$ 1,519.046 (50%)	BE	425.555+25.555*NavWt	1997	$K

WBS Rows

Row Results

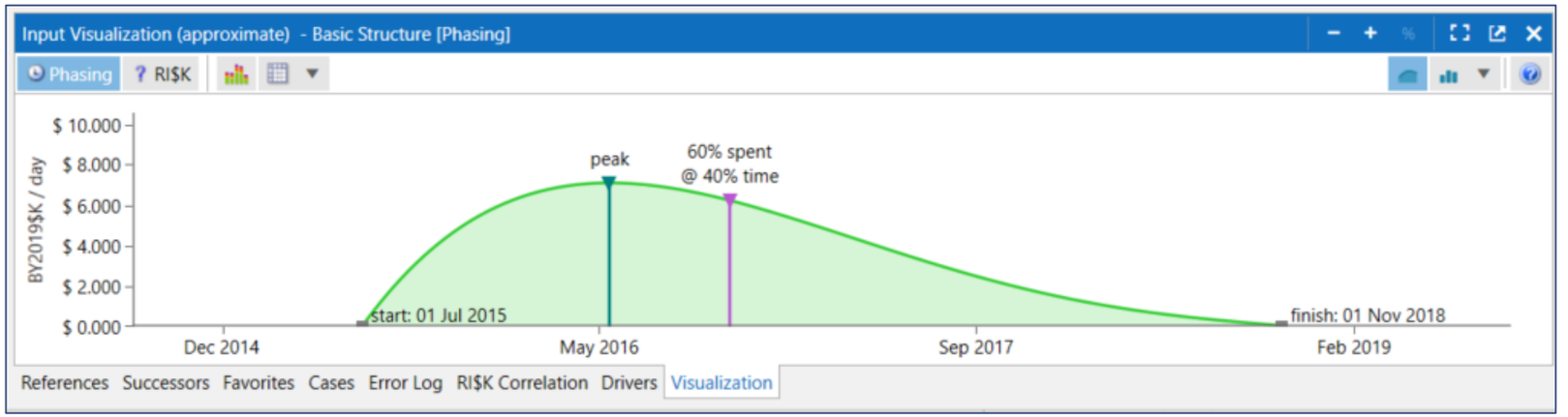
Throughputs

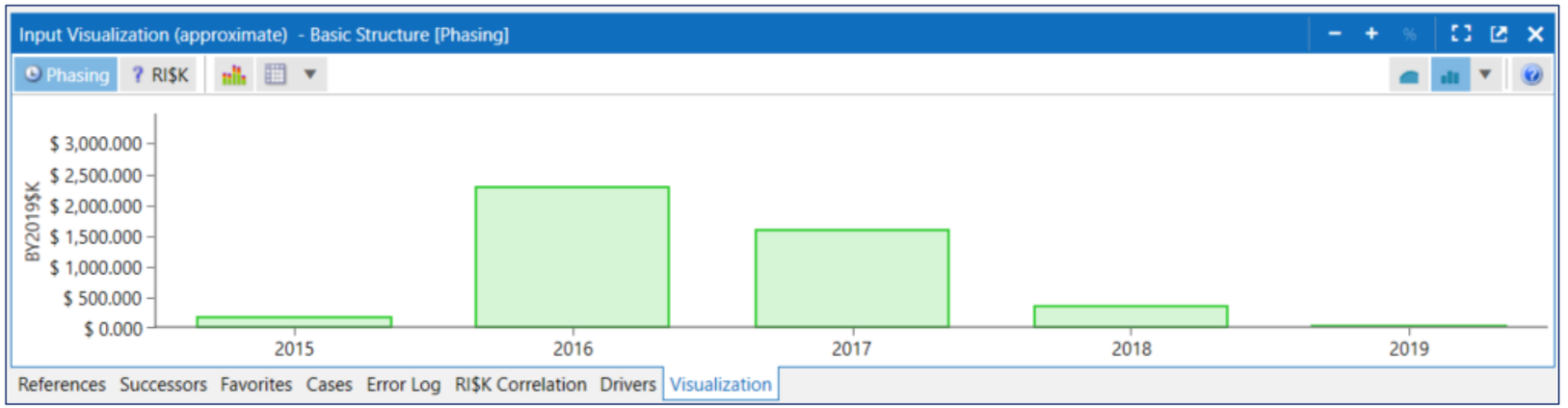
Equations

Visualize Phasing

Improve your input **understanding** with data visualizations

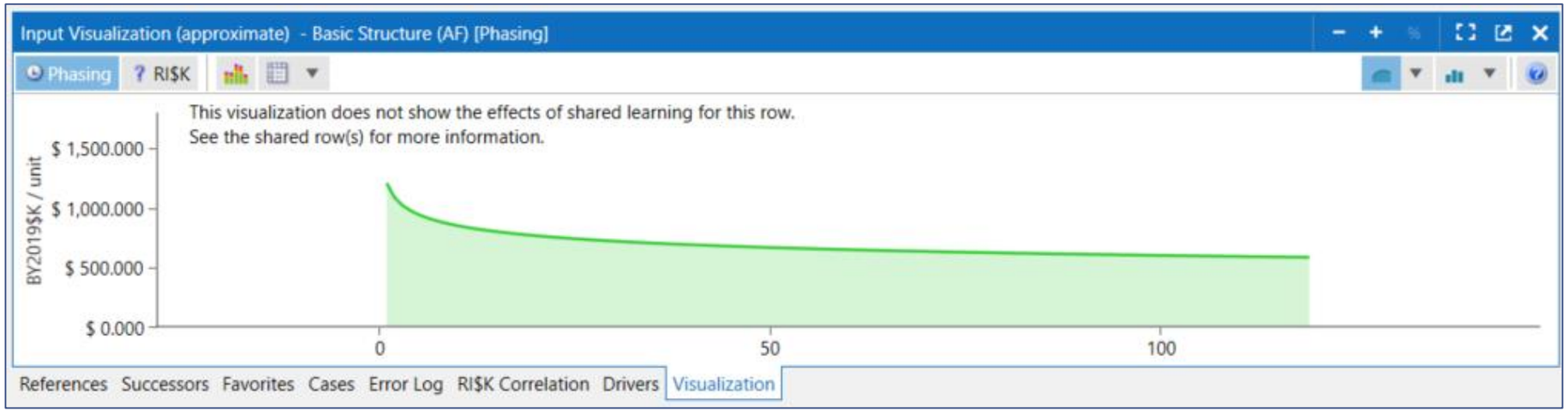
- View the shape of the phasing
- Explore phasing adjustments by selecting and dragging parameters

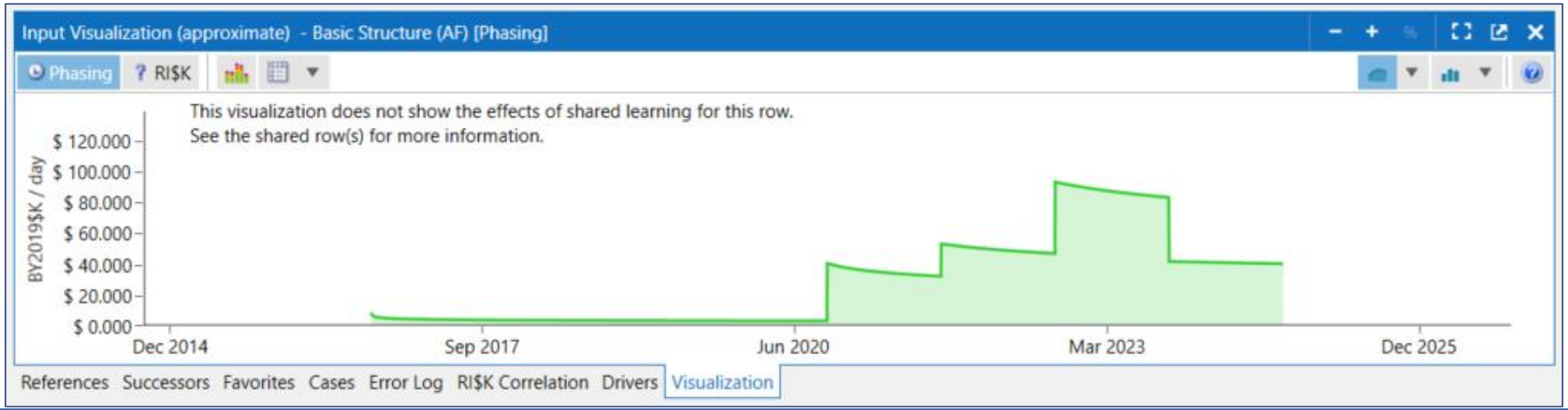




Visualize Learning

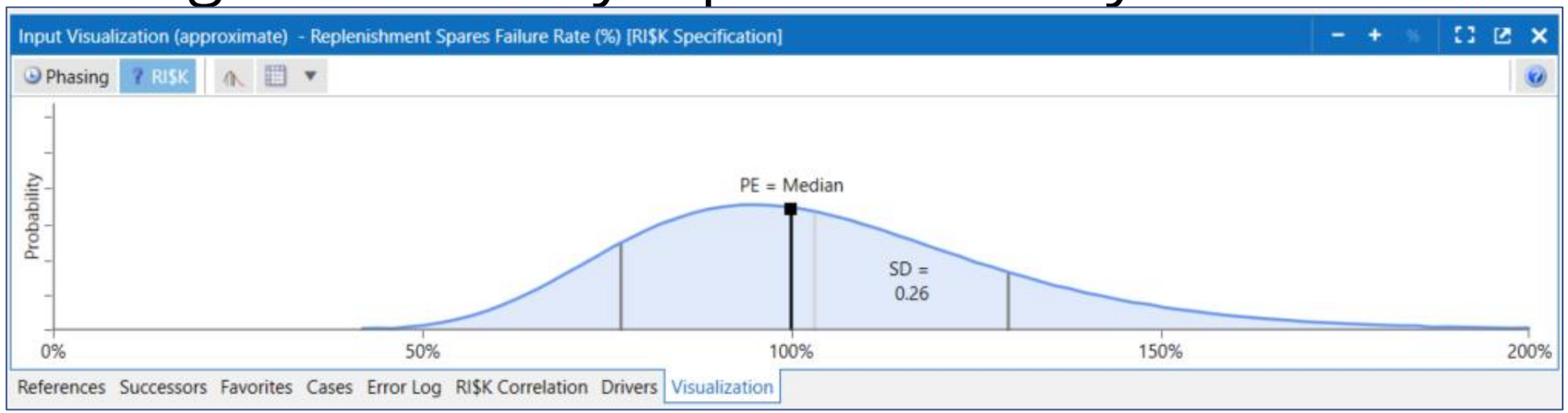
Understand Learning Inputs with Theoretical and Applied illustrations

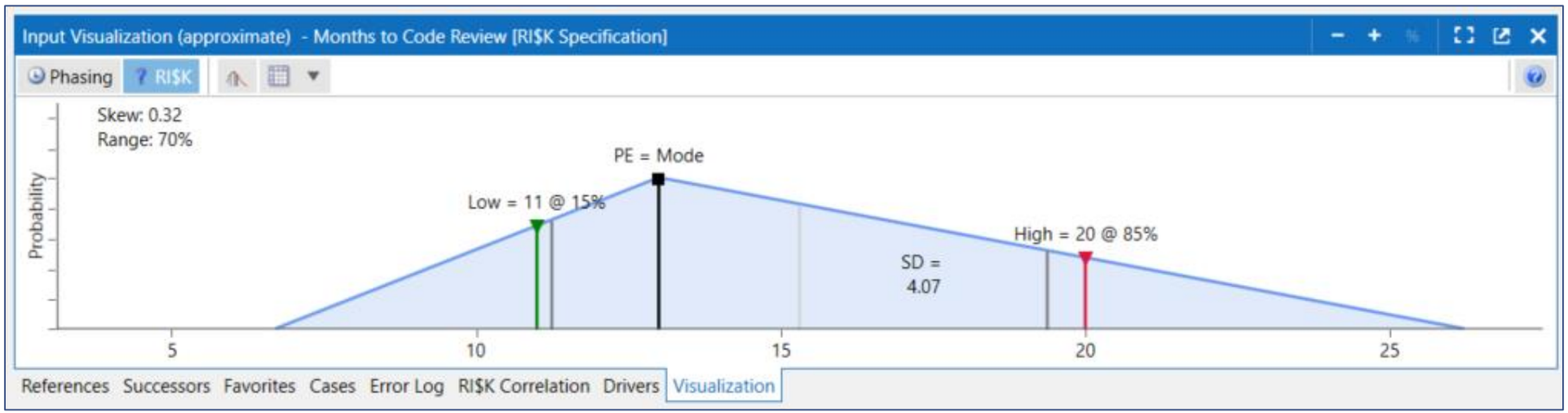




Visualize RI$K

View and change uncertainty inputs on the fly





Quickly Access a Variety of Result Views

View phased, total, uncertainty, or allocated results in BY, TY, or SY $

Input Form - Methodology ▼ Input Sheet - RI$K Basic ▼ Results - Phased Costs ▼

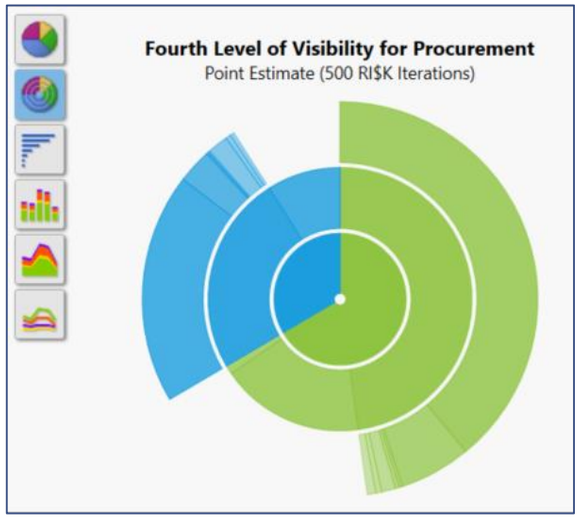
Row	WBS/CES Description	Total: Point Estimate	FY 2014	FY 2015	FY 2016
62	*Estimate				
63	Total	$ 907,388.167	$ 1,888.489	$ 3,269.489	18,676.482
64	RDT&E	$ 63,446.758	$ 1,888.489	$ 3,269.489	18,676.482
65	Concept Refinement	$ 1,066.207	$ 1,066.207		
66	Contractor A	$ 536.218	$ 536.218		
67	Contractor B	$ 529.989			
68	Technology Development	$ 4,673.888			
69	Contractor A	$ 2,336.944			
70	Contractor B	$ 2,336.944			
71	System Development and De	$ 57,706.663			
72	Development Engineering	$ 19,661.959			

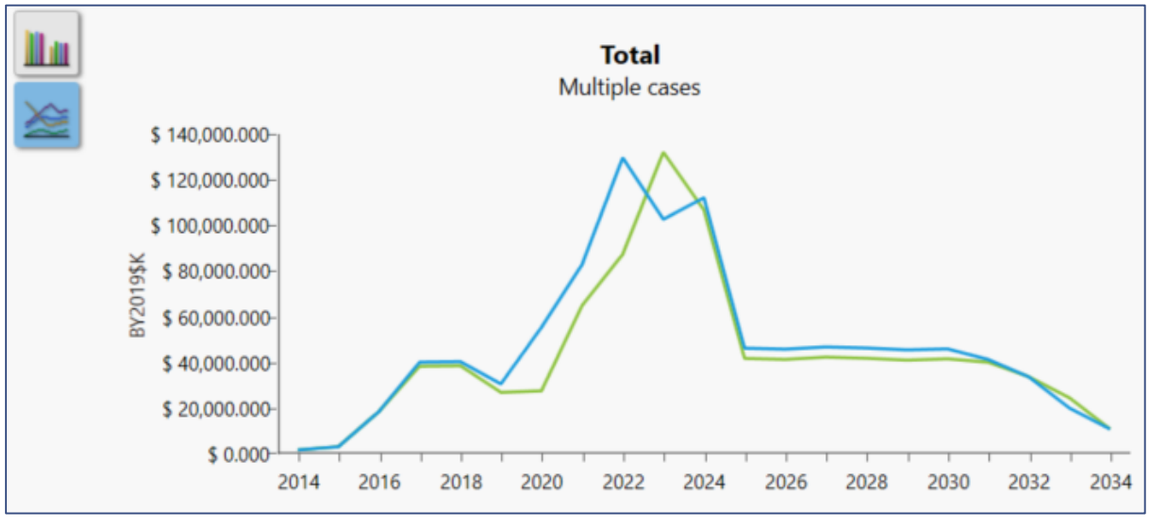
Input Form - Methodology ▼ Input Sheet - RI$K Basic ▼ Results - RI$K Statistics ▼ Overrides - Phased ▼ Charts - Estimate ▼

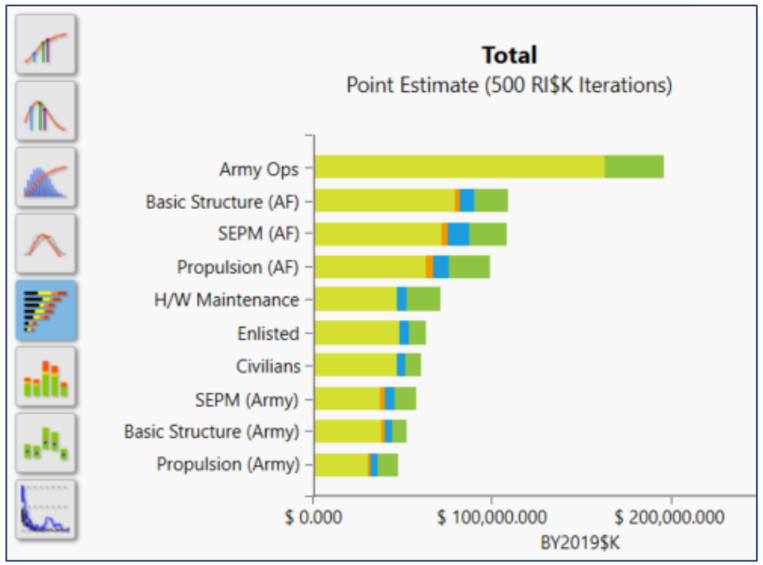
Row	WBS/CES Description	Point Estimate	Mean	Std Dev	CV	5%	10%	15%
62	*Estimate							
63	Total	$ 907,388.167 (43%)	$ 939,232.230 (55%)	$ 129,667.684	0.138057	$ 749,740.516	$ 786,060.629	$ 809,153.979
64	RDT&E	$ 63,446.758 (13%)	$ 70,747.085 (51%)	$ 6,510.383	0.092023	$ 60,106.168	$ 62,596.472	$ 63,839.946
65	Concept Refinement	$ 1,066.207	$ 1,066.207			$ 1,066.207	$ 1,066.207	$ 1,066.207
66	Contractor A	$ 536.218	$ 536.218			$ 536.218	$ 536.218	$ 536.218
67	Contractor B	$ 529.989	$ 529.989			$ 529.989	$ 529.989	$ 529.989
68	Technology Development	$ 4,673.888	$ 4,673.888			$ 4,673.888	$ 4,673.888	$ 4,673.888
69	Contractor A	$ 2,336.944	$ 2,336.944			$ 2,336.944	$ 2,336.944	$ 2,336.944
70	Contractor B	$ 2,336.944	$ 2,336.944			$ 2,336.944	$ 2,336.944	$ 2,336.944
71	System Development and Demonstration	$ 57,706.663 (13%)	$ 65,006.991 (51%)	$ 6,510.383	0.100149	$ 54,366.074	$ 56,856.378	$ 58,099.851
72	Development Engineering	$ 19,661.959 (50%)	$ 19,874.722 (55%)	$ 2,079.643	0.104638	$ 16,714.380	$ 17,402.391	$ 17,788.151

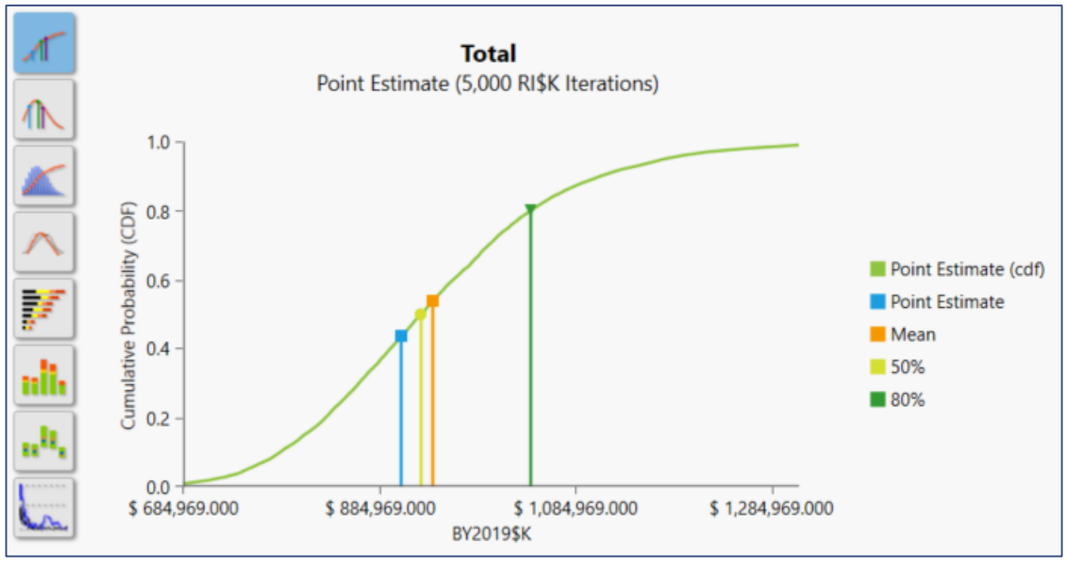
Generate Robust Charts

- Estimates
  - One case - multiple views
- Case Comparative
  - Two or more cases
- Uncertainty
  - CDF
  - PDFs
  - Contributors
- Analysis



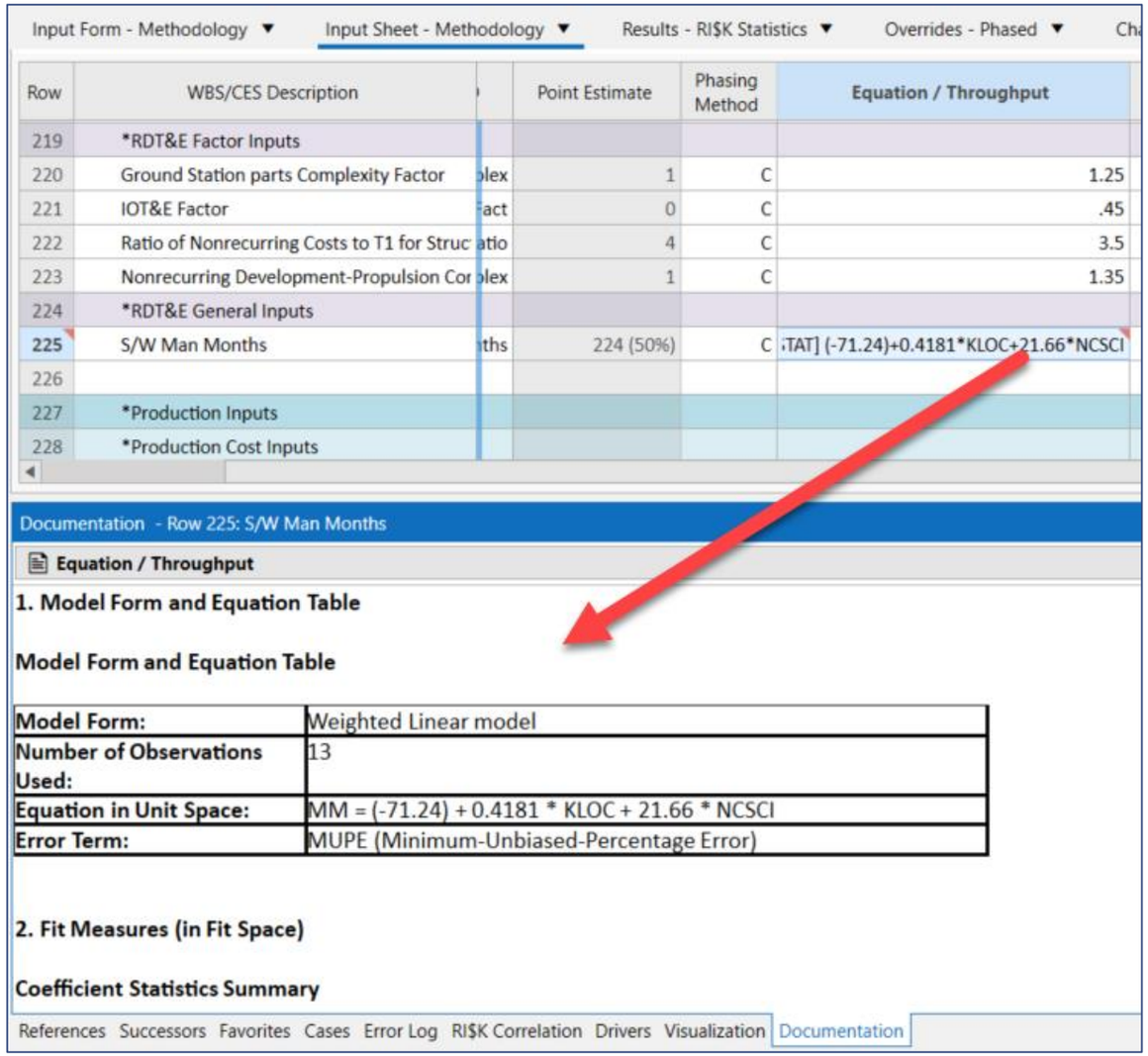






Store Documentation within your Estimate Files

- Enter documentation for any cell
- Create narrative reports from the embedded documentation
- Manage model-wide documentation for updates and review



Create Unlimited What – if Cases

- Create unlimited number of cases saved in the ***same*** file
- Override inputs to view and compare results of alternate scenarios

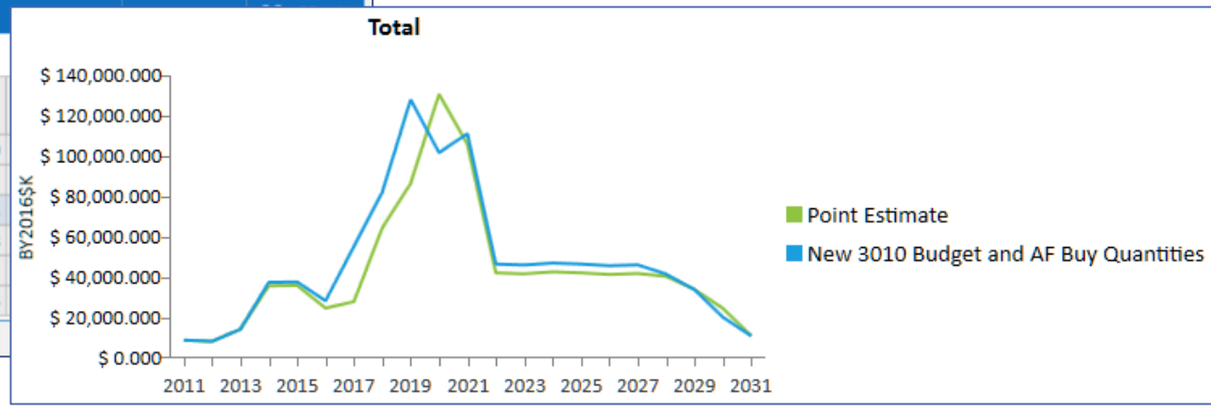
Input Form - Methodology | Input Sheet - Methodology | Results - RI$K Statistics | Overrides - Phased | Charts - RI$K

Row	WBS/CES Description	FY 2014	FY 2015	FY 2016	FY 2017	FY 2018	FY 2019	FY 2020	FY 2021	FY 2022	FY 2023	FY 2024
236	*Production Quantity Inputs											
237	Total Air Vehicle Buy Quantity				1	1	4	19	35	65	40	4
238	Air Force Buy Quantities				1	1	2	16	25	50	25	2
239	Low Rate Initial Production		0	0	1	1	2	1				
240	Full Rate Production						0	15	25	50	25	2
241	Army Buy Quantities						1	1	10	15	15	1
242	Low Rate Initial Production						1	1				
243	Full Rate Production								10	15	15	1

Cases

Case Name	Compare	Time Last Calculated	Description	Overridden Rows
Point Estimate	☑	11/4/2022 5:01:53 PM		0
Lower Cost Propulsion	☐	11/4/2022 4:55:17 PM	Lower Propulsion T1 Cost	1
New APF Budget and AF Buy Quantities	☑	11/4/2022 5:08:26 PM	Override APF Budget row to slip money to later years a	3
Propulsion and O&S Mods	☐	11/4/2022 4:55:12 PM	Overrides to NREC complexity factor and Propulsion un	8
Propulsion, Ground Station, and O&S Mods	☐	11/4/2022 4:55:17 PM	Overrides to NREC complexity factor and Propulsion un	11
Higher Uncertainty	☐	11/4/2022 4:55:17 PM	Increased uncertainty on Production inputs	4

References | Successors | Favorites | Cases | Error Log | RI$K Correlation | Drivers | Visualization | Documentation

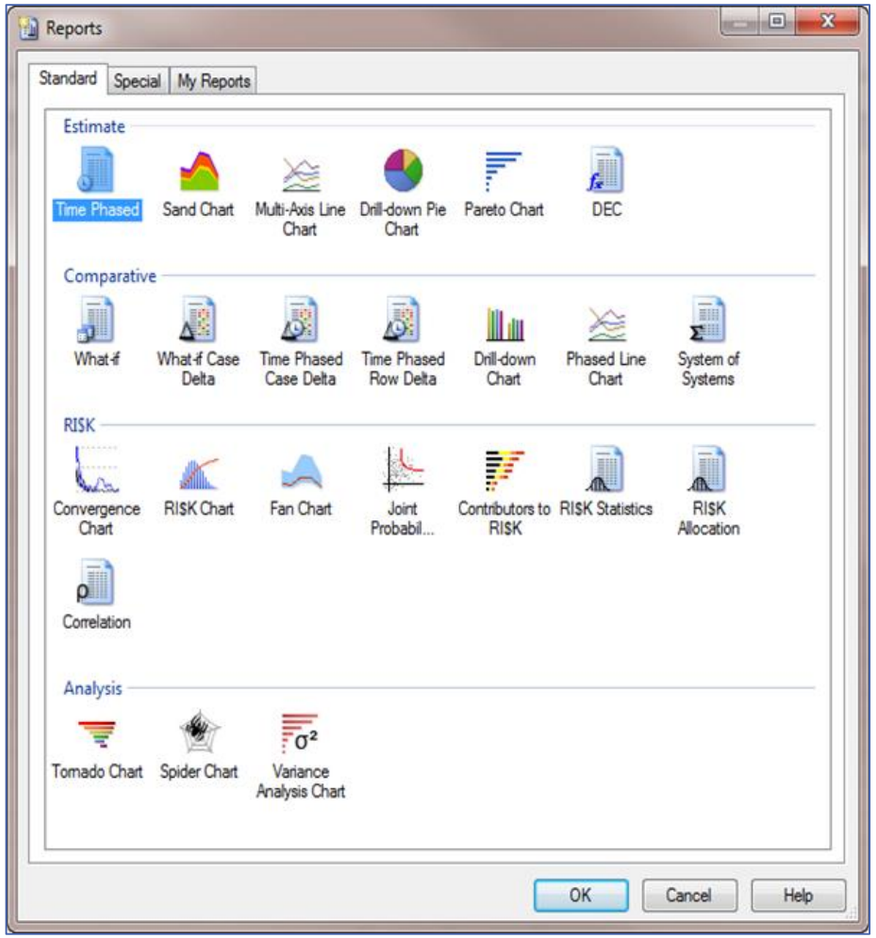


POST

- Excel add-in providing tabular and graphical reports linked to your ACE session
- Create alternative scenario (what-if) estimates
- Graphically identify cost and uncertainty drivers
- Populate and automatically update PowerPoint presentations

Use POST to Tell the Story of Your Project

Select from a large list of reports and charts



Tabular Reports

- **Estimate:**
  - Time Phased
  - DEC
- **Comparative:**
  - What If
  - What If Case Delta
  - Time Phased Case Delta
  - Time Phased Row Delta
  - System of Systems
- **RI$K:**
  - Statistics
  - Allocation
  - Correlation

Graphical Charts

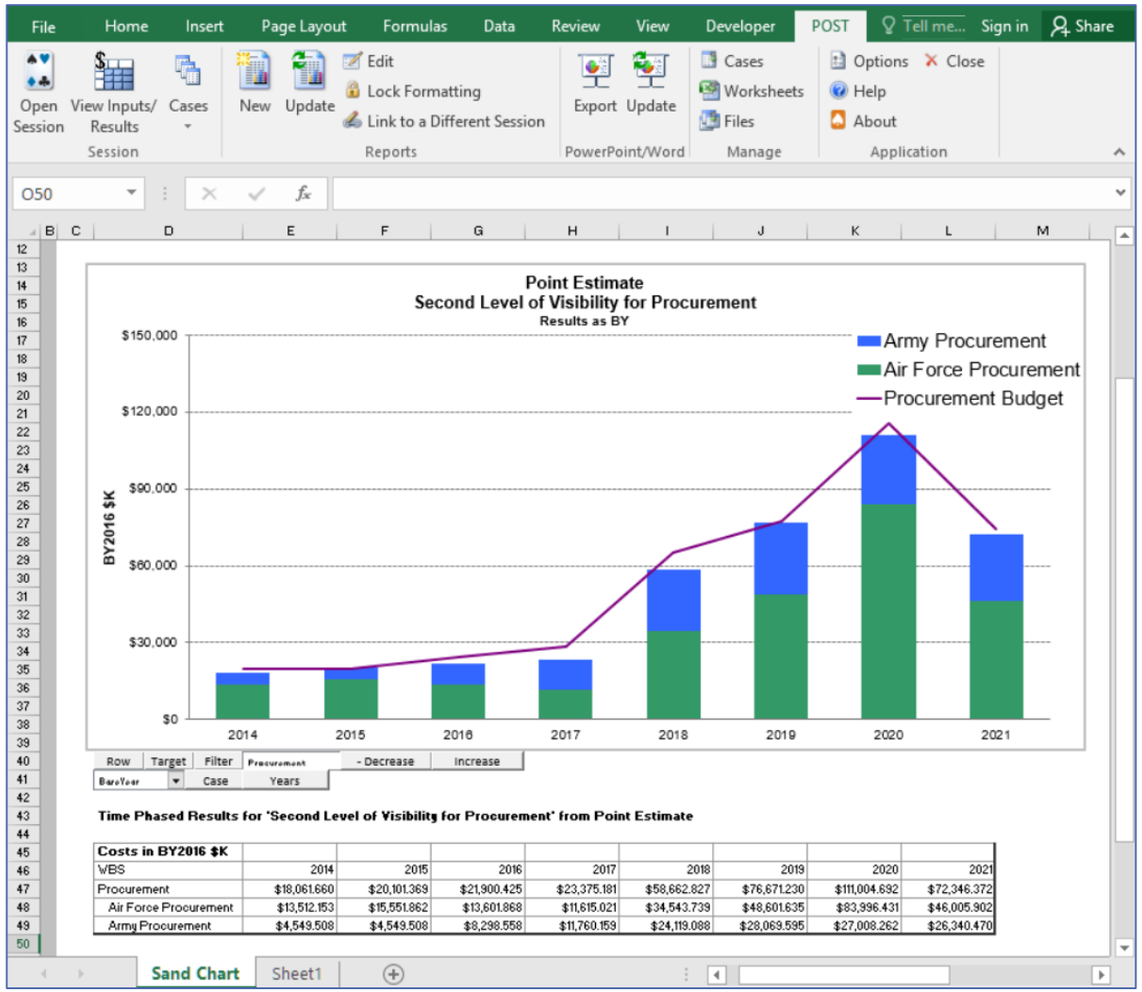
- **Estimate:**
  - Sand
  - Multi-Axis Line
  - Drill-Down Pie
  - Pareto
- **Comparative:**
  - Drill-Down
  - Phased Line
- **RI$K:**
  - Histogram/CDF
  - Fan
  - Joint Probability
  - Convergence
  - Contributors
- **Analysis:**
  - Tornado
  - Spider
  - Variance Analysis

Manage Charts/Reports in Excel Workbooks

Create charts and reports for any ACE or POST case

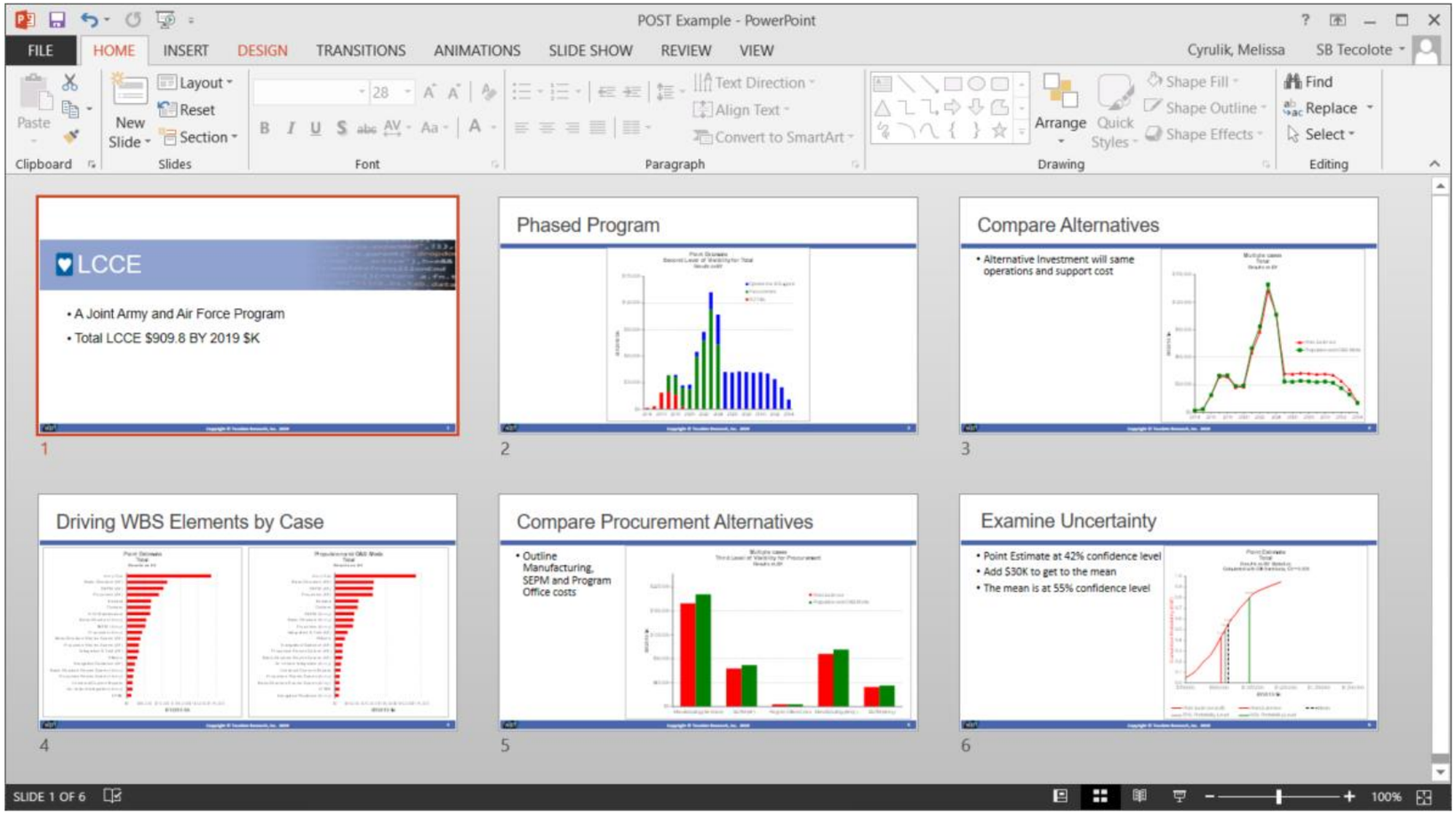
- Save charts and reports in individual worksheets
- Share workbook with other stake holders

  Note: Charts/reports can be viewed by all. ACEIT is required on the machine to manipulate them.



Create and Automatically-Update Presentations

- Manage and update estimate briefings
- Export all charts and reports to MS PowerPoint
- **Automate** presentation updates in easy, three-step process
  1. Modify ACE session
  2. Update POST charts
  3. Update PowerPoint

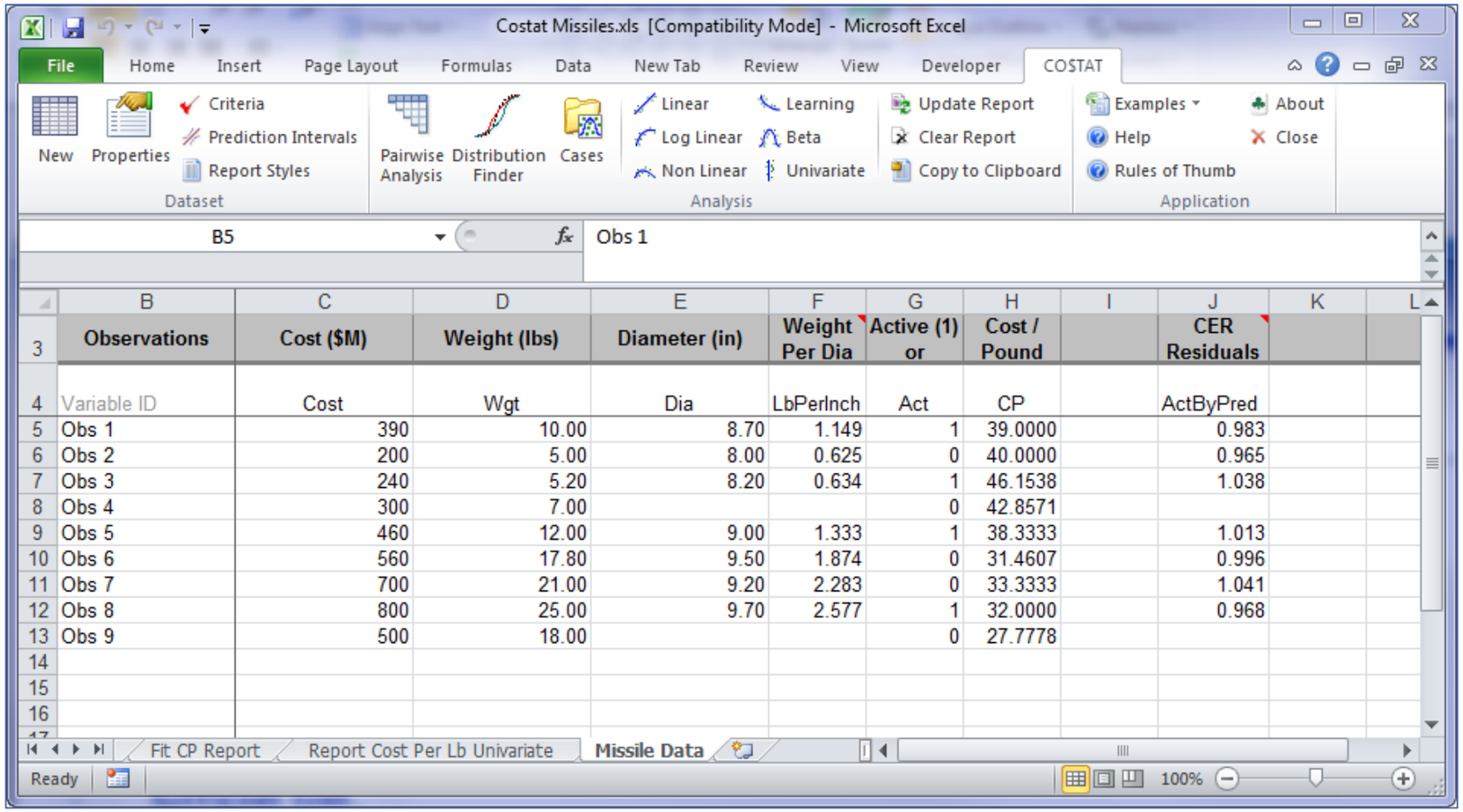


CO$TAT

- Excel add-in statistical analysis tool designed specifically for cost analysis
- Conduct analysis
  - CER development: linear and nonlinear regression, univariate analysis
  - Learn Curves
  - Beta curve fitting
  - Uncertainty distribution fitting
- Easily export analyses results to ACE or Librarian

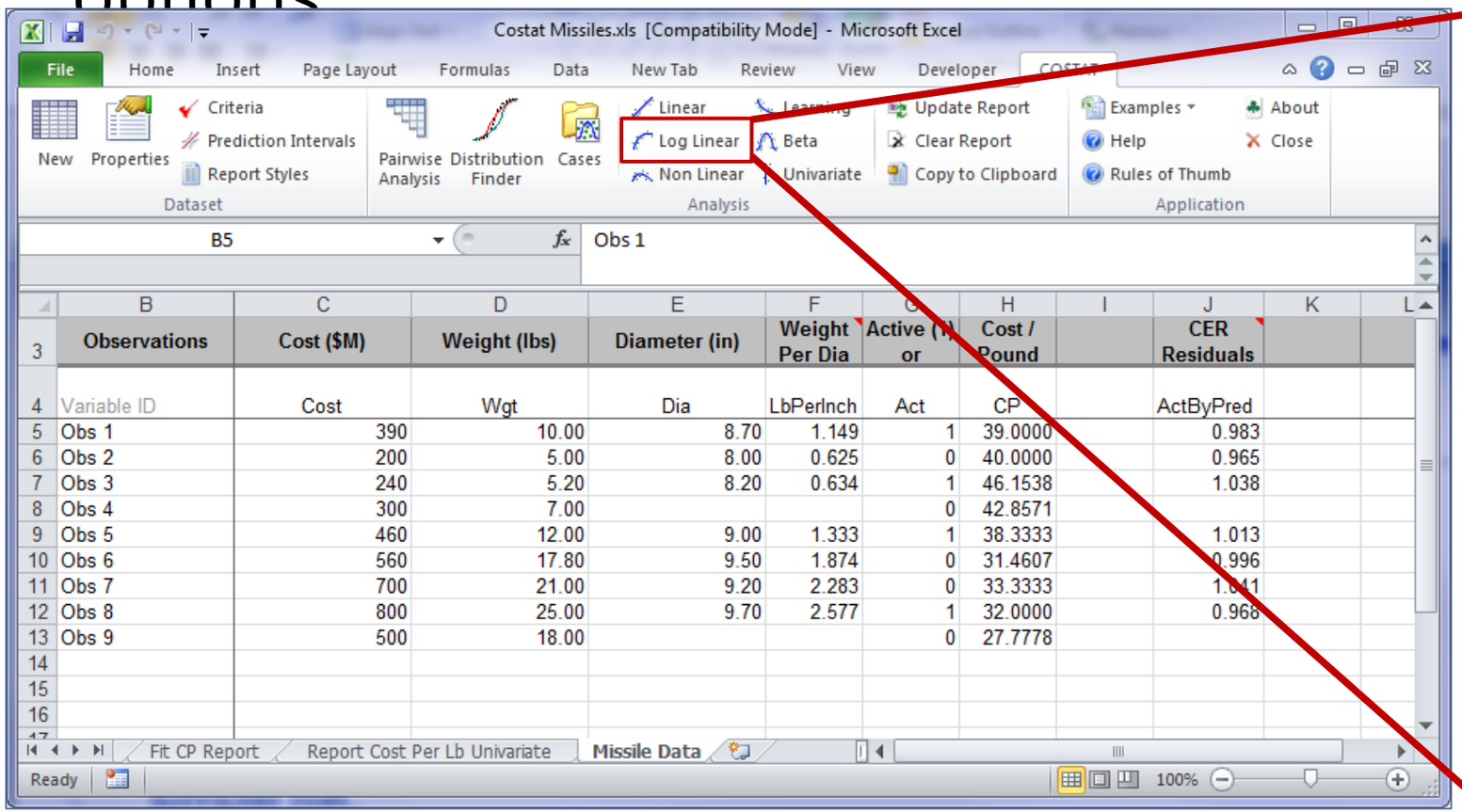
Manage Datasets

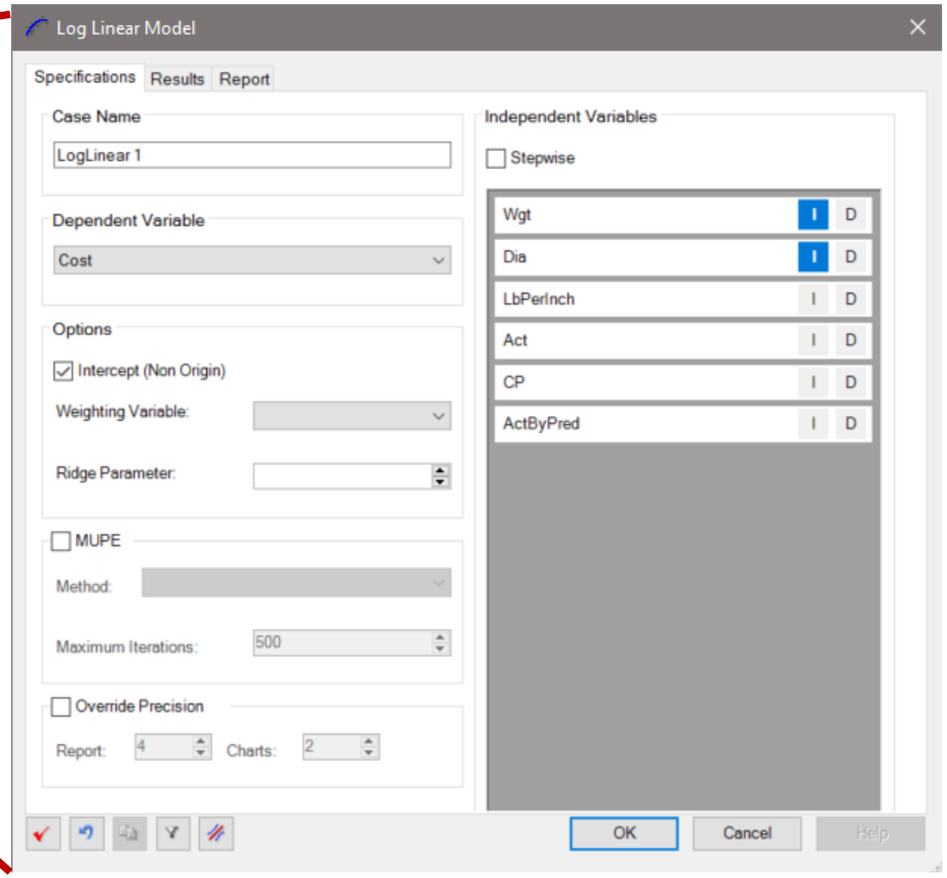
Easily create, update, and manage datasets in Excel workbooks



Run Analysis

Select dependent and independent variables as well as analysis options





View Comprehensive Statistics

Quickly view statistical results and charts in a detailed report stored in the Excel workbook

LogLinear 1

Wednesday, 09 April 2014, 1:59 PM

I. Model Form and Equation Table

Model Form:	Unweighted Log-Linear model
Number of Observations Used:	7
Equation in Unit Space:	LbPerInch = 0.9975 * Wgt^1 * Dia^(-0.9987) * 0.9996^Act

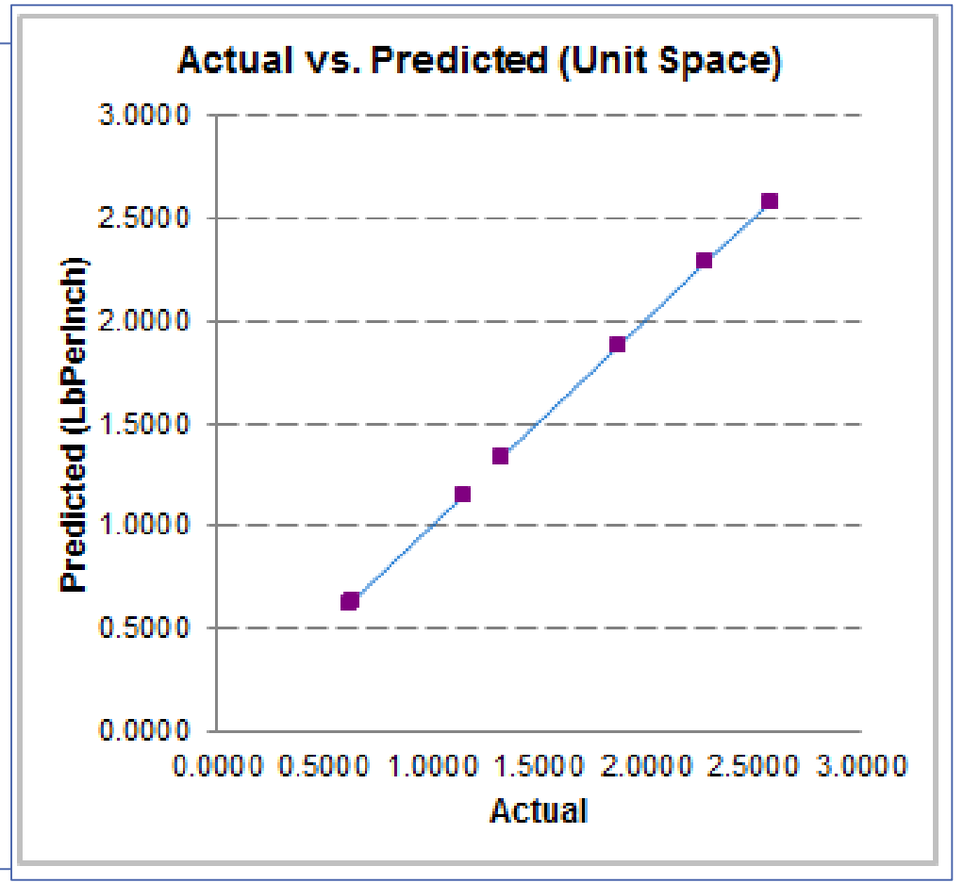
II. Fit Measures (in Fit Space)

Coefficient Statistics Summary

Variable	Coefficient	Std Dev of Coef	Beta Value	T-Statistic (Coef/SD)	P-Value	Prob Not Zero
Intercept	-0.0025	0.0043		-0.5879	0.5979	0.4021
Wgt	1.0000	0.0003	1.1219	3935.9014	0.0000	1.0000
Dia	-0.9987	0.0023	-0.1257	-442.2979	0.0000	1.0000
EXP_Act	-0.0004	0.0000	-0.0003	-5.1540	0.0142	0.9858

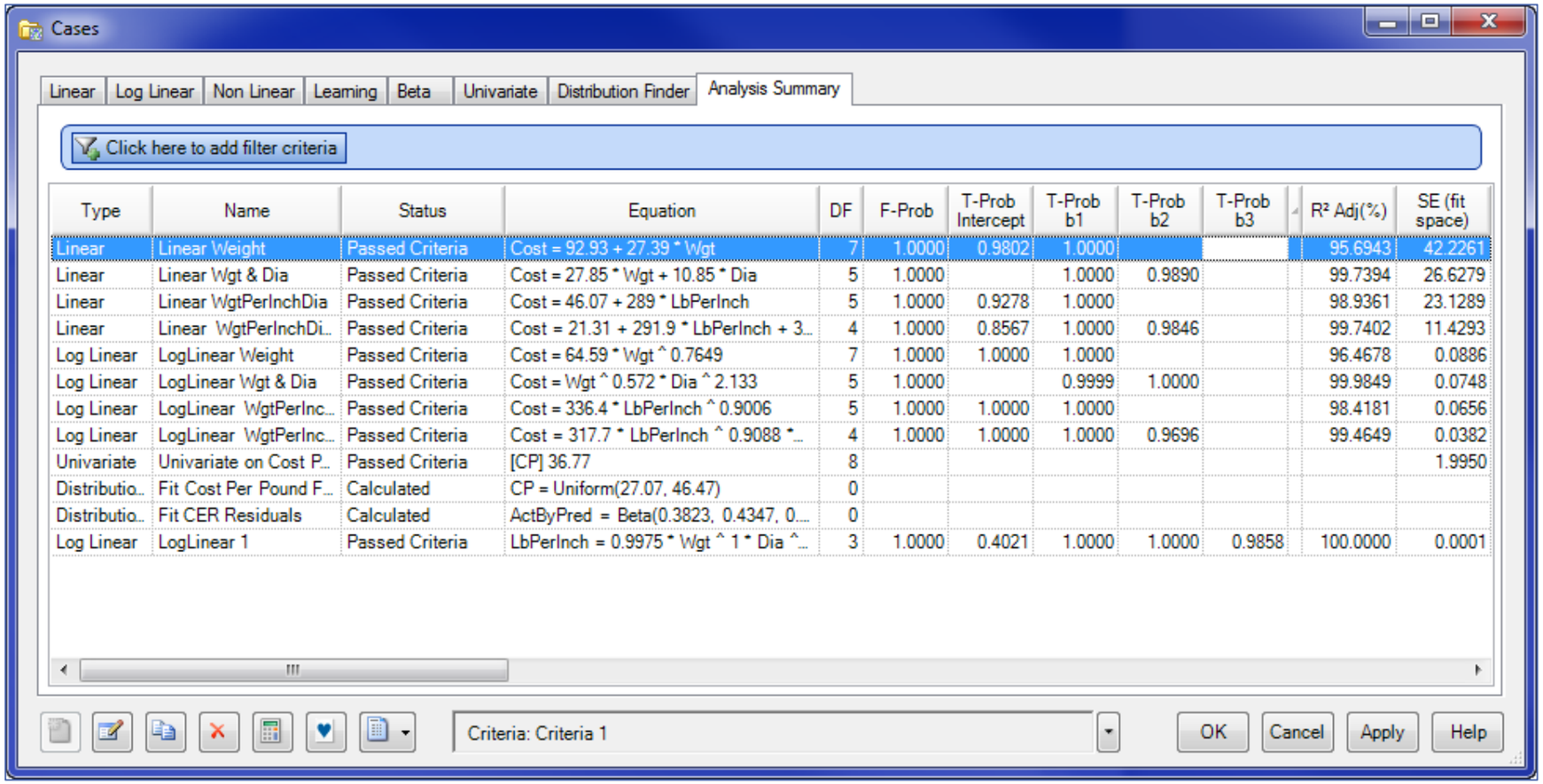
Goodness-of-Fit Statistics

Std Error (SE)	R-Squared	R-Squared (Adj)	Pearson's Corr Coef
0.0000	100.00%	100.00%	1.0000



Compare Metrics for Different Equation Attempts

View, compare, analyze and export all results from a simple interface

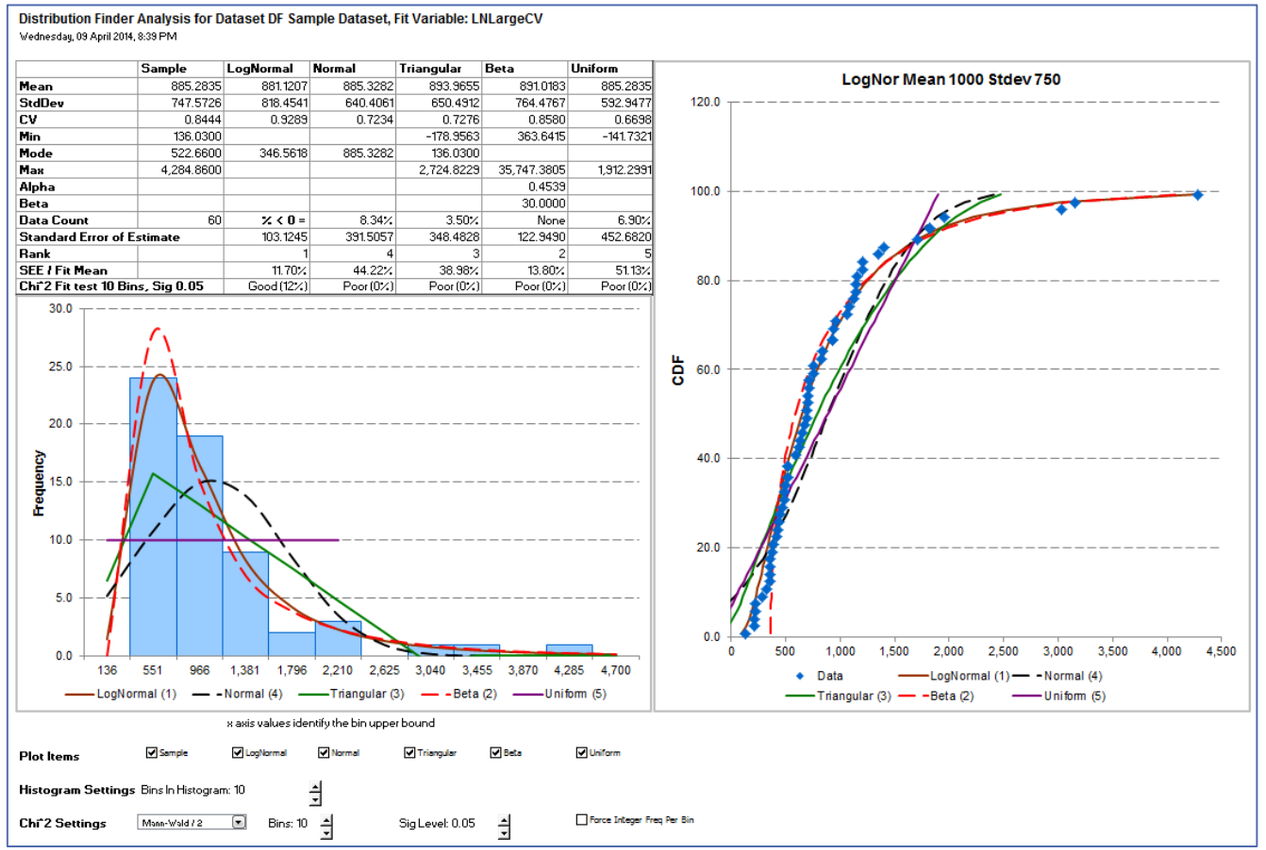


Type	Name	Status	Equation	DF	F-Prob	T-Prob Intercept	T-Prob b1	T-Prob b2	T-Prob b3	R² Adj(%)	SE (fit space)
Linear	Linear Weight	Passed Criteria	Cost = 92.93 + 27.39 * Wgt	7	1.0000	0.9802	1.0000			95.6943	42.2261
Linear	Linear Wgt & Dia	Passed Criteria	Cost = 27.85 * Wgt + 10.85 * Dia	5	1.0000		1.0000	0.9890		99.7394	26.6279
Linear	Linear WgtPerInchDia	Passed Criteria	Cost = 46.07 + 289 * LbPerInch	5	1.0000	0.9278	1.0000			98.9361	23.1289
Linear	Linear WgtPerInchDi...	Passed Criteria	Cost = 21.31 + 291.9 * LbPerInch + 3...	4	1.0000	0.8567	1.0000	0.9846		99.7402	11.4293
Log Linear	LogLinear Weight	Passed Criteria	Cost = 64.59 * Wgt ^ 0.7649	7	1.0000	1.0000	1.0000			96.4678	0.0886
Log Linear	LogLinear Wgt & Dia	Passed Criteria	Cost = Wgt ^ 0.572 * Dia ^ 2.133	5	1.0000		0.9999	1.0000		99.9849	0.0748
Log Linear	LogLinear WgtPerInc...	Passed Criteria	Cost = 336.4 * LbPerInch ^ 0.9006	5	1.0000	1.0000	1.0000			98.4181	0.0656
Log Linear	LogLinear WgtPerInc...	Passed Criteria	Cost = 317.7 * LbPerInch ^ 0.9088 *...	4	1.0000	1.0000	1.0000	0.9696		99.4649	0.0382
Univariate	Univariate on Cost P...	Passed Criteria	[CP] 36.77	8							1.9950
Distributio...	Fit Cost Per Pound F...	Calculated	CP = Uniform(27.07, 46.47)	0							
Distributio...	Fit CER Residuals	Calculated	ActByPred = Beta(0.3823, 0.4347, 0....	0							
Log Linear	LogLinear 1	Passed Criteria	LbPerInch = 0.9975 * Wgt ^ 1 * Dia ^...	3	1.0000	0.4021	1.0000	1.0000	0.9858	100.0000	0.0001

Understand Distributions: Distribution Finder

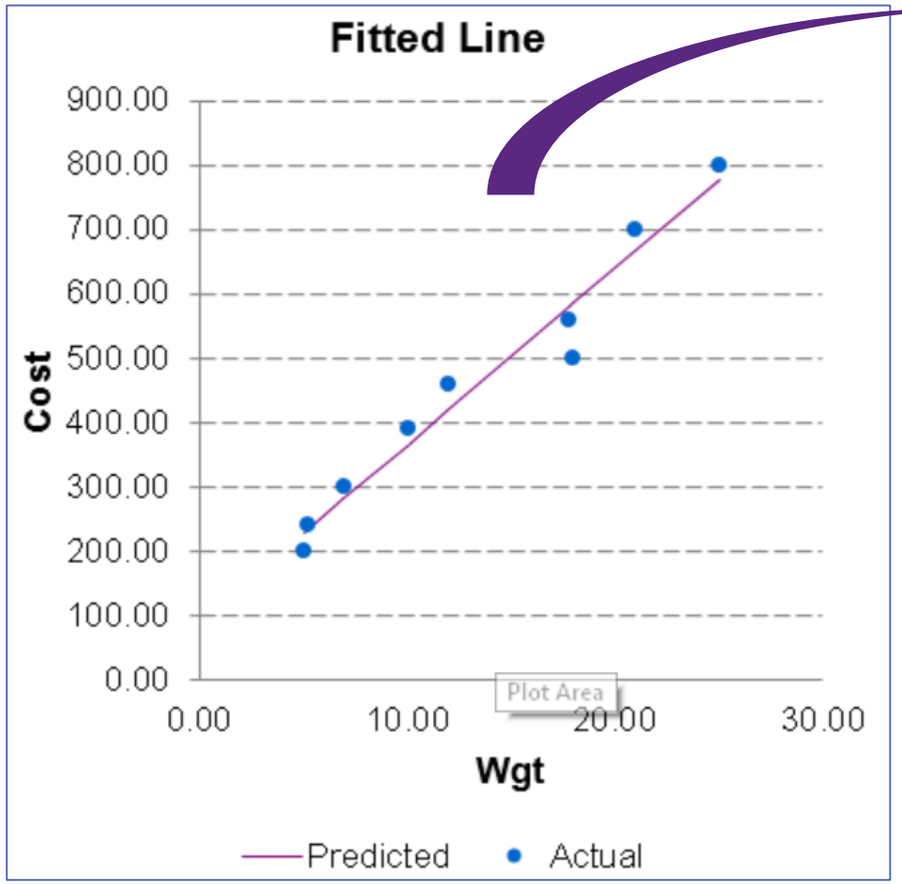
Analyze the distribution shape of a data set to inform uncertainty analysis

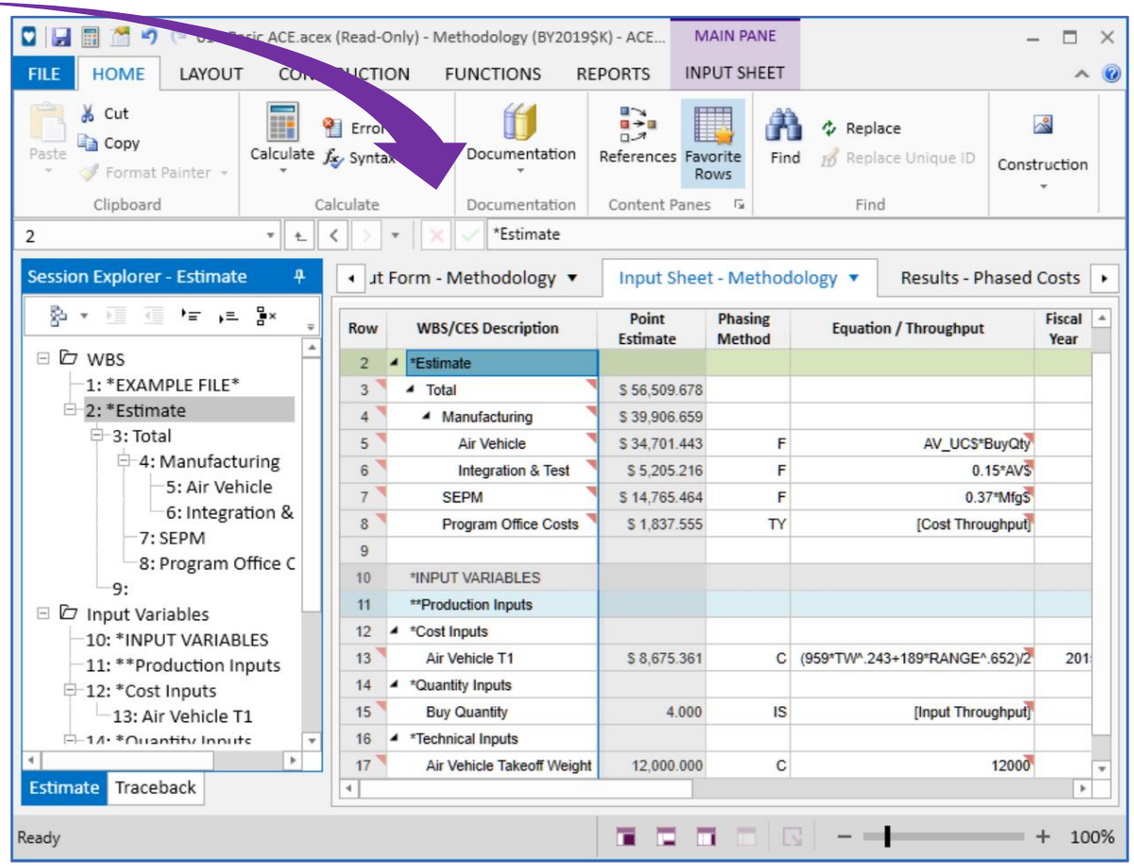
	B	C
3	Observations	LogNor Mean 1000 Stdev 750
4	Variable ID	LNLargeCV
5	Project 1	353.82
6	Project 2	438.44
7	Project 3	424.04
8	Project 4	934.55
9	Project 5	754.40
10	Project 6	415.07
11	Project 7	473.28
12	Project 8	225.47
13	Project 9	1,129.11
14	Project 10	3,154.59
15	Project 11	1,821.75
16	Project 12	1,959.22
17	Project 13	1,148.85
18	Project 14	
19	Project 15	4,284.86
20	Project 16	492.64
21	Project 17	758.22
22	Project 18	708.66
23	Project 19	714.72
24	Project 20	1,081.27
25	Project 21	210.94
26	Project 22	1,059.59
27	Project 23	1,160.09
28	Project 24	1,714.10
29	Project 25	289.40
30	Project 26	499.08
31	Project 27	936.16
32	Project 28	387.57
33	Project 29	489.42



Export Directly into ACE

Export CER and uncertainty bounds directly into ACE





JACS

- A robust risk analysis add-in tool for MS Project (standalone for Primavera P6 also available)
- A vital program management tool to help keep a program on track and under budget

Answer Management Questions

Empower analysts to answer key project management questions

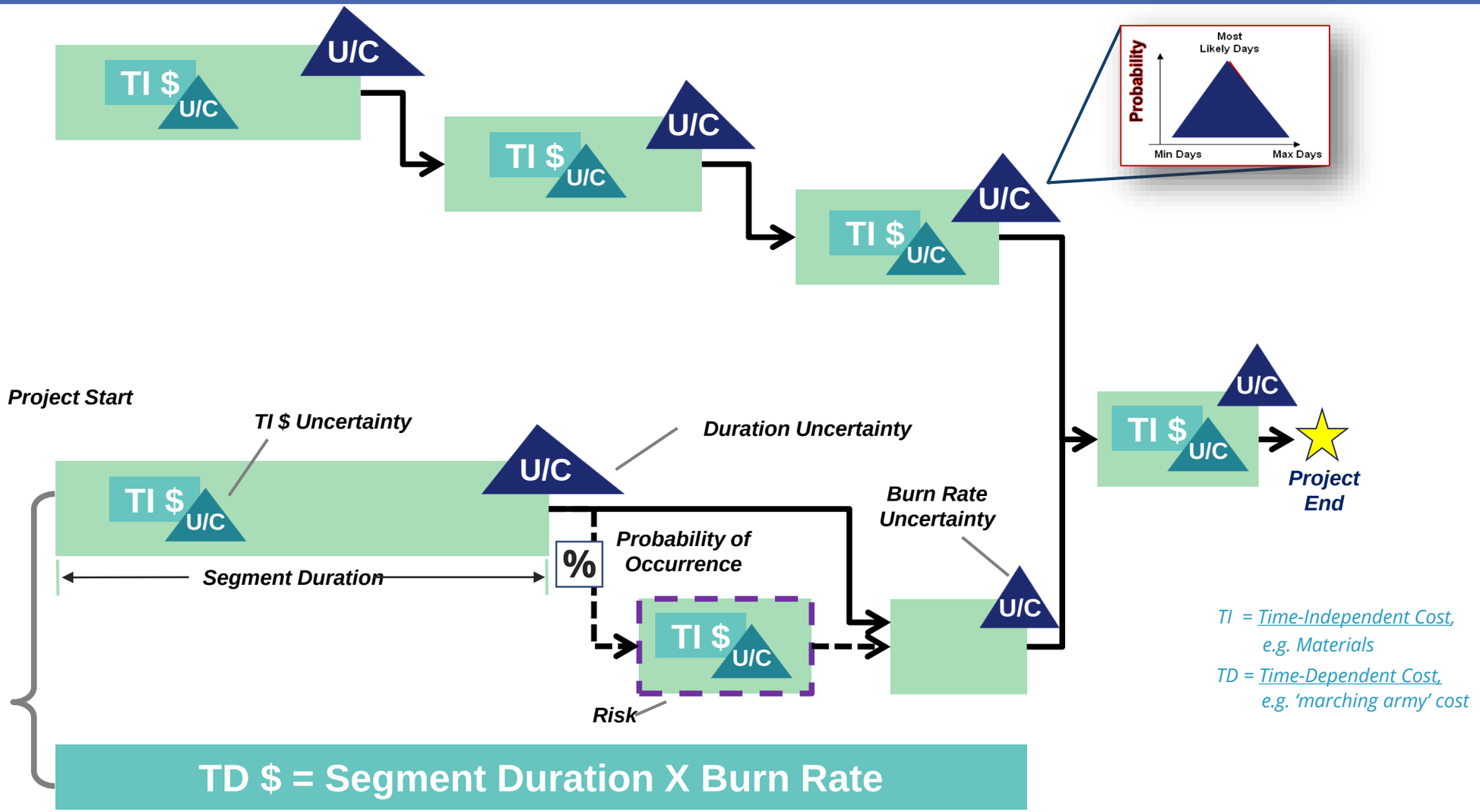
- Are there enough funds to complete the effort by target date?
- What is the likelihood of completing the effort by target date?
- What can be done to increase the likelihood of being on-time?
- If the program slips beyond target end date, what is the potential cost overrun and schedule slip?

	Duration		TI and TD Costs						Risk Events			
Name	Duration	JACS Duration Uncertainty	Cost	JACS Baseline Cost	JACS TI Task Cost	JACS TI Cost Uncertainty	JACS TI Spending Contour	JACS TD Task Cost	JACS TD Cost Uncertainty	JACS Threat ID	JACS Is Threat	JACS Threat % Likelihood	JACS Is Threat Active
Air Vehicle Project	**490 days**		**$30,920,000.00**	**$0.00**	**$0.00**			**$0.00**			**No**	**0**	**No**
Manufacturing	**490 days**		**$22,000,000.00**	**$0.00**	**$0.00**			**$0.00**			**No**	**0**	**No**
Air Vehicle (T1)	180 days	I(Manu=0.75)	$9,900,000.00	$9,900,000.00	$4,400,000.00		Early Peak	$5,500,000.00			No	0	No
Integration (T1)	90 days	I(Manu=0.75)	$1,480,000.00	$1,480,000.00	$900,000.00		Turtle	$580,000.00			No	0	No
Air Vehicle (T2)	180 days	I(Manu=0.75)	$9,200,000.00	$9,200,000.00	$5,500,000.00		Early Peak	$3,700,000.00			No	0	No
Integration (T2)	90 days	I(Manu=0.75)	$1,420,000.00	$1,420,000.00	$860,000.00		Turtle	$560,000.00			No	0	No
SEPM (Hammock)	**490 days**		**$8,400,000.00**	**$8,400,000.00**	**$0.00**			**$8,400,000.00**	**LN*(100,20)**		**No**	**0**	**No**
SEPM Start	0 days		$8,400,000.00	$0.00	$0.00			$0.00			No	0	No
SEPM Finish	0 days		$0.00	$0.00	$0.00			$0.00			No	0	No
Other	160 days	LN*(95,15)	$520,000.00	$520,000.00	$0.00			$520,000.00			No	0	No

Provide Three Levels of Integration and Analysis

1. Conduct a schedule risk analysis
2. Integrate cost into the schedule risk analysis
3. Perform joint confidence level analysis (uncertain cost/schedule and risk events)

Integrate Risk and Uncertainty

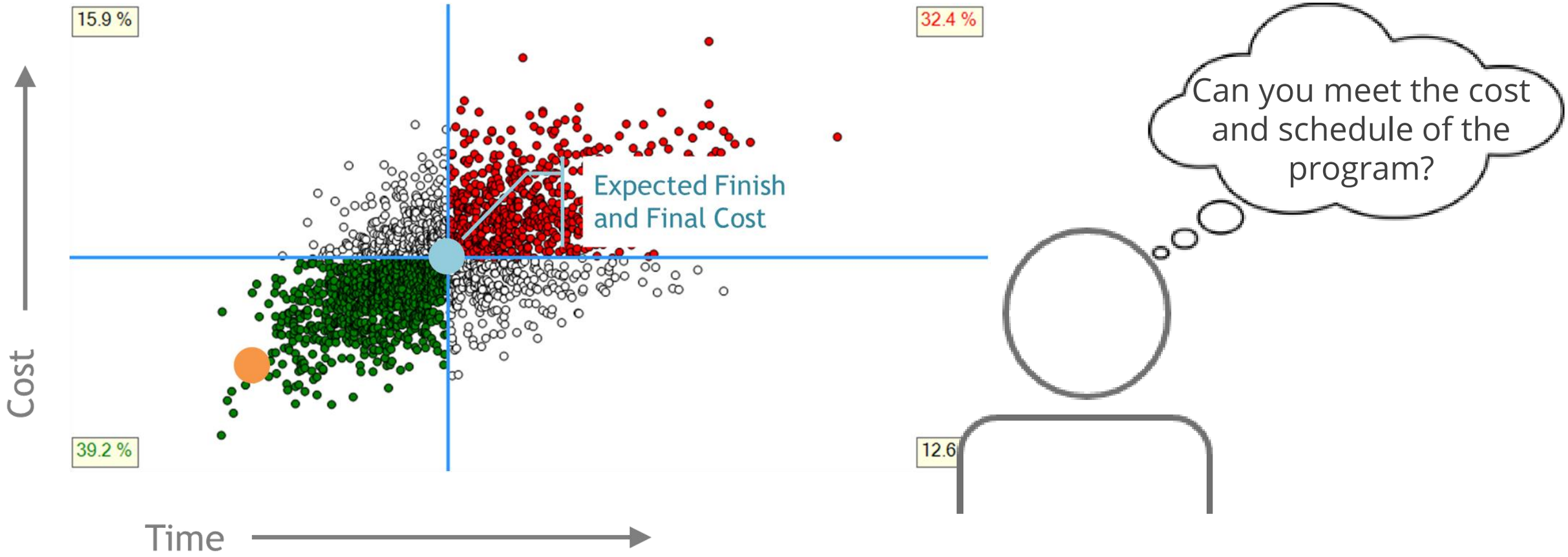


TI = Time-Independent Cost, e.g. Materials

TD = Time-Dependent Cost, e.g. 'marching army' cost

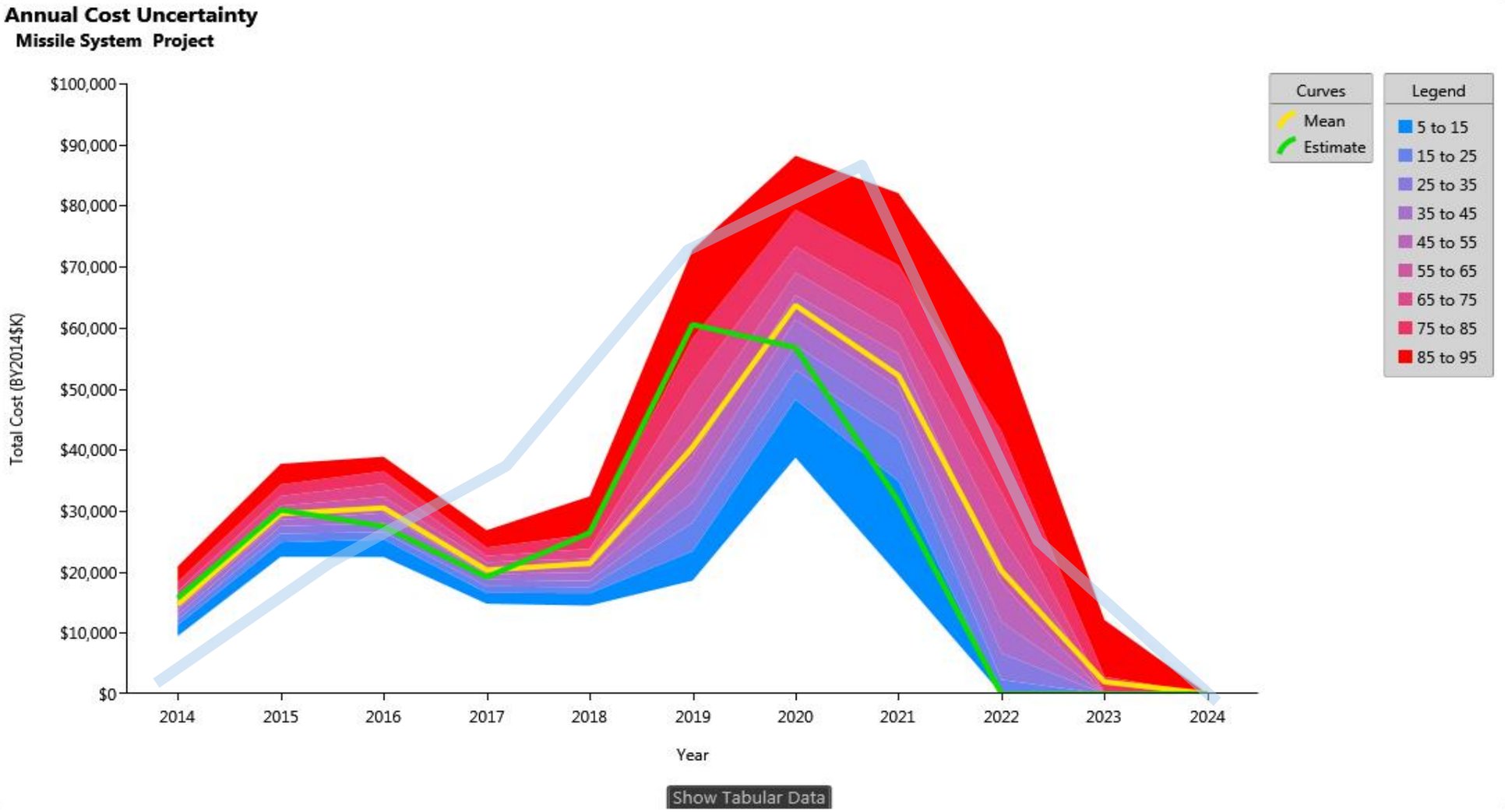
Identify Cost and Schedule Range

Understand the confidence level of combine cost and schedule

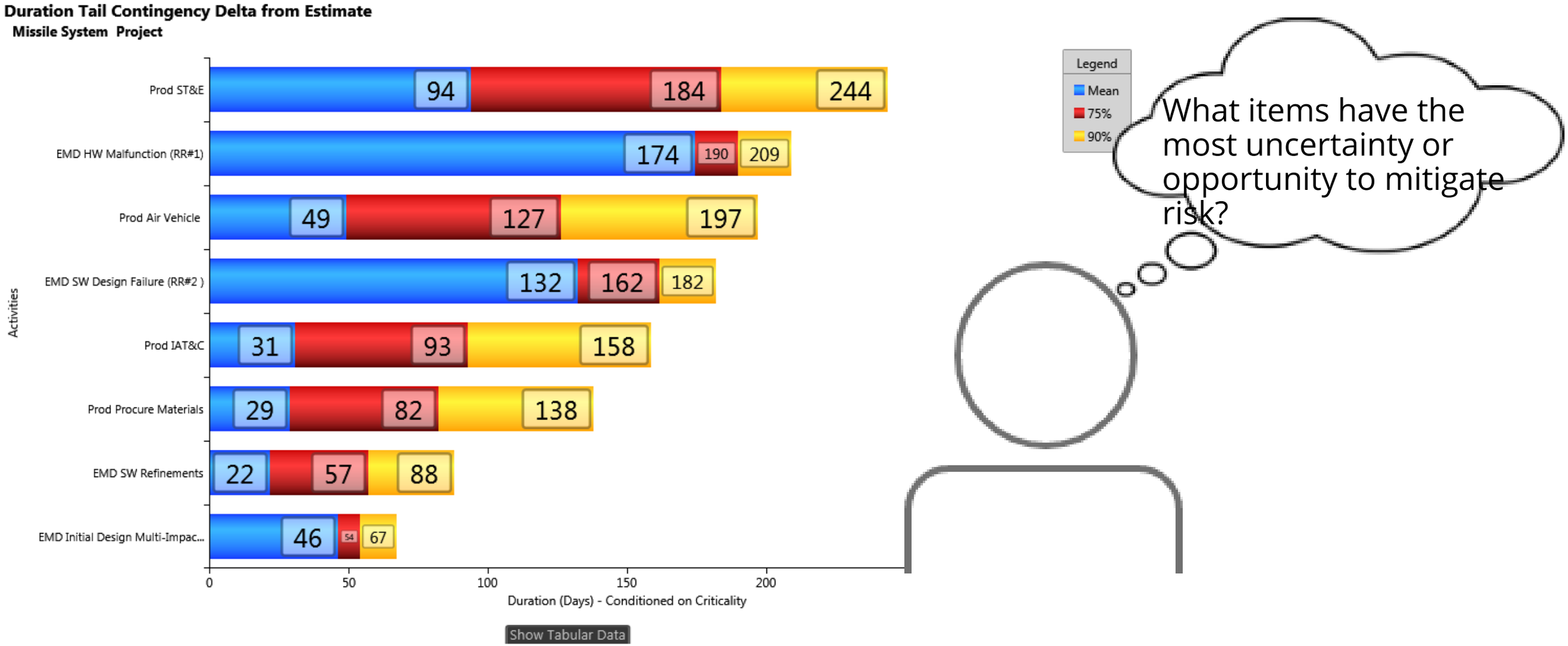


Assess Required Funds Over Time

Graphs assist analysts and managers with understanding funding

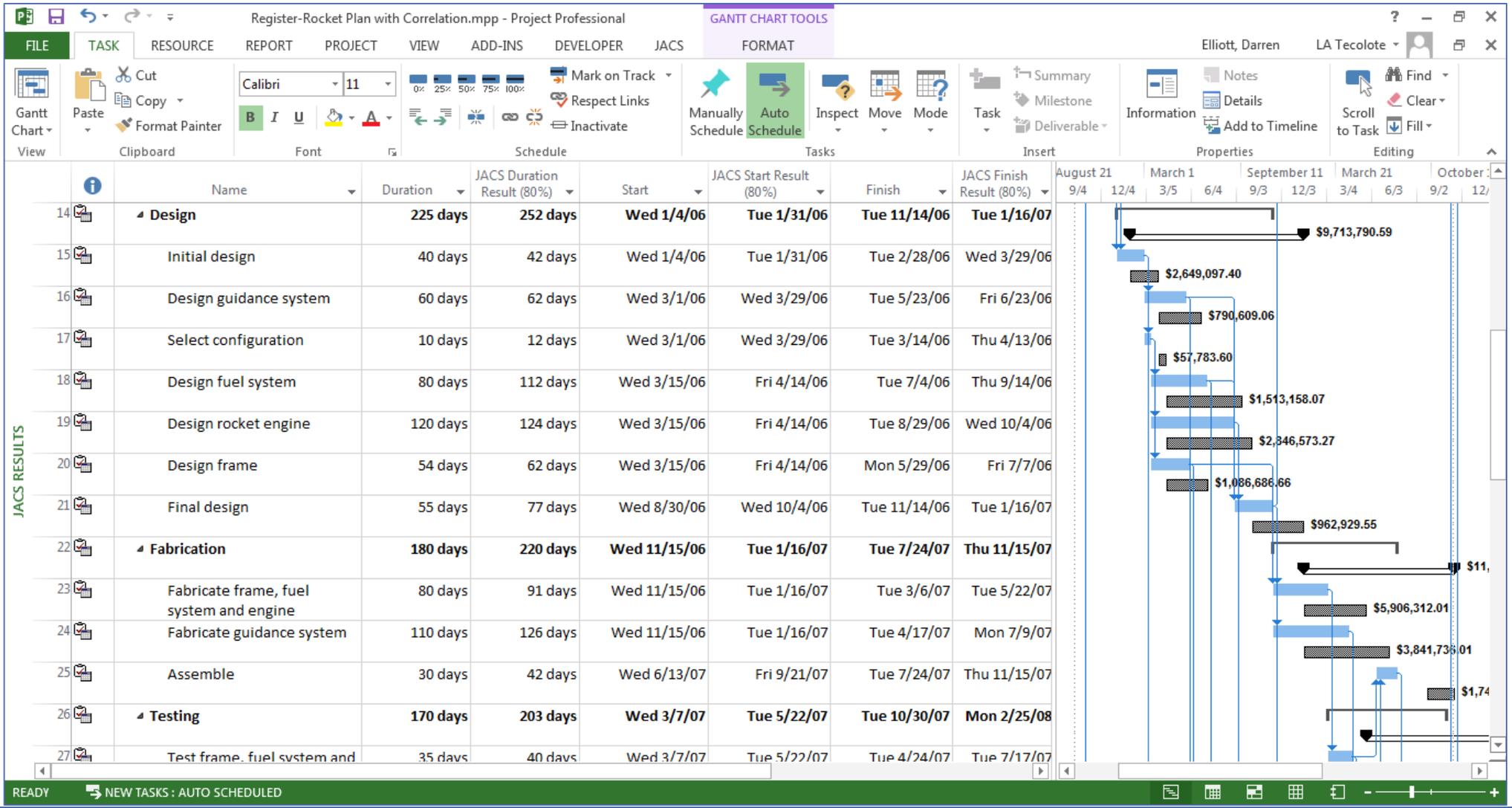


Identify Areas with Highest Potential Impact



View Risk Adjusted Schedules

Generate updated schedules with higher confidence of completion



Gain **Insight**: Dashboard Charting Tool

- Quickly view JACS top-level results in dashboard format
- Customize the dashboard to your areas of interest

ACEIT 8.0 Training

Instructors, possessing real-world experience with ACEIT, provide hands-on training

ACEIT Training Approach

Tell me and I forget.

Teach me and I remember.

Involve me and I learn.

-Benjamin Franklin

ACEIT 8.0 Training

Open Courses	
ACEIT for Model Builders	4 days
ACEIT for Reviewers	2 days
ACEIT for Advanced Model Builders	4 days
ACEIT for CER Developers: CO$TAT	2 days
ACEIT for Schedules: JACS	2 days

Onsite courses available upon request

More Information

- Visit www.ACEIT.com
- Please contact ACEIT Sales

  Email: aceit_sales@tecolote.com

  Phone: (805) 964-6963