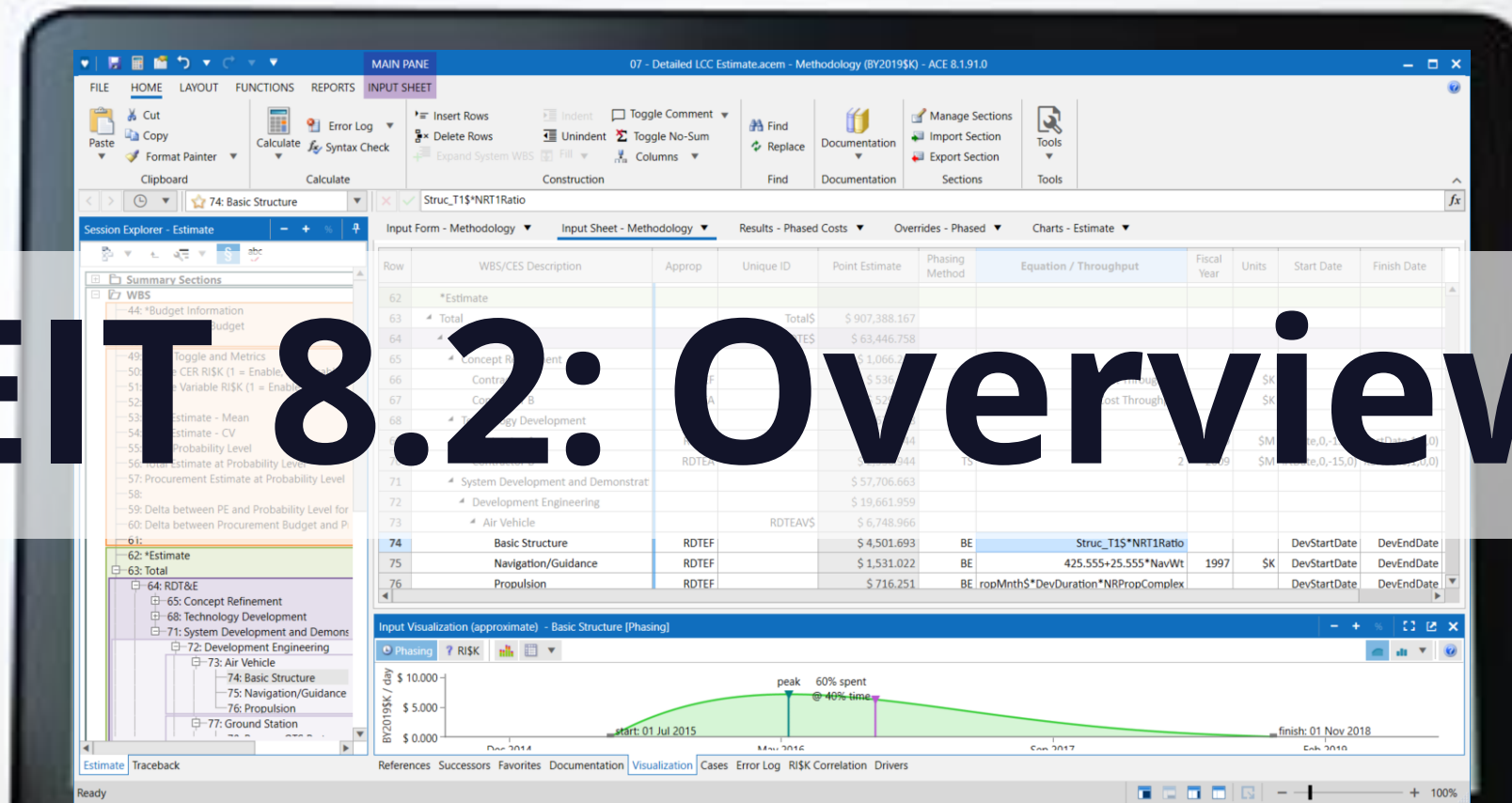# ACEIT 8.2: Overview

Do you understand ✓All the costs of your project?

- **ACEIT** is a cost-estimating suite consisting of ACE, CO$TAT, POST and JACS offing full program life cycle support. It is the premier tool for analyzing , developing, sharing, and reporting cost estimates, providing a framework to standardize the estimating process.

- **ACEIT** is not a black-box estimator. It offers robust model-building tools for developing high quality cost estimates with uncertainty.
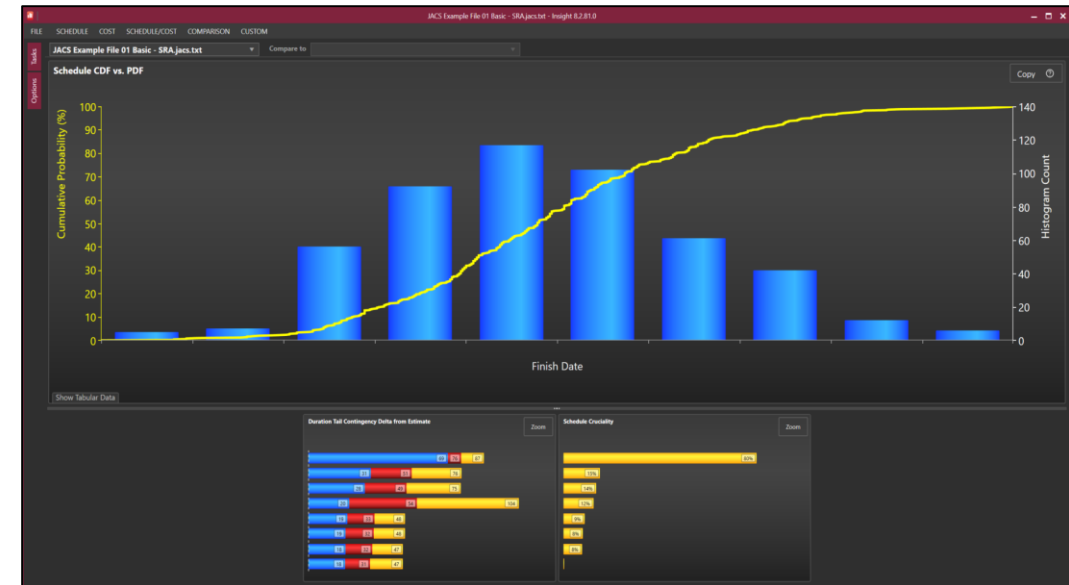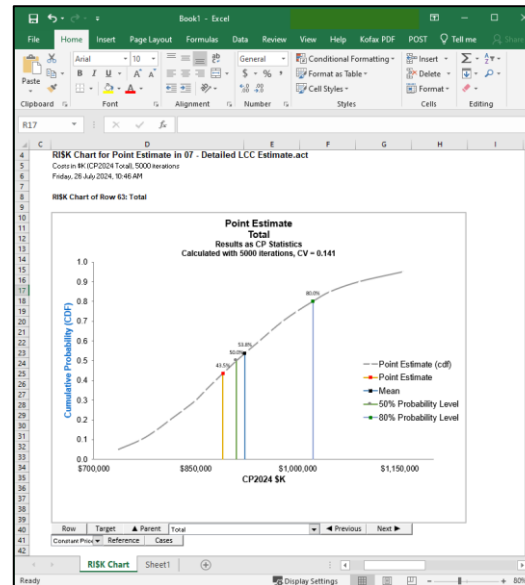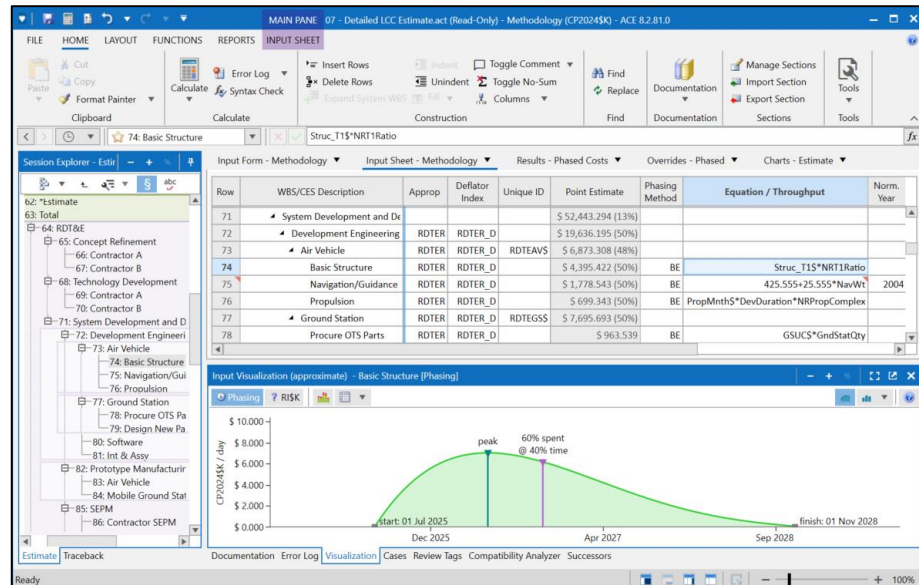
ACEIT: Designed to Support Best Practices

Since the 1980's, ACEIT has been designed to...

Provide a **standardized framework** to support estimating processes for US Government and other organizations
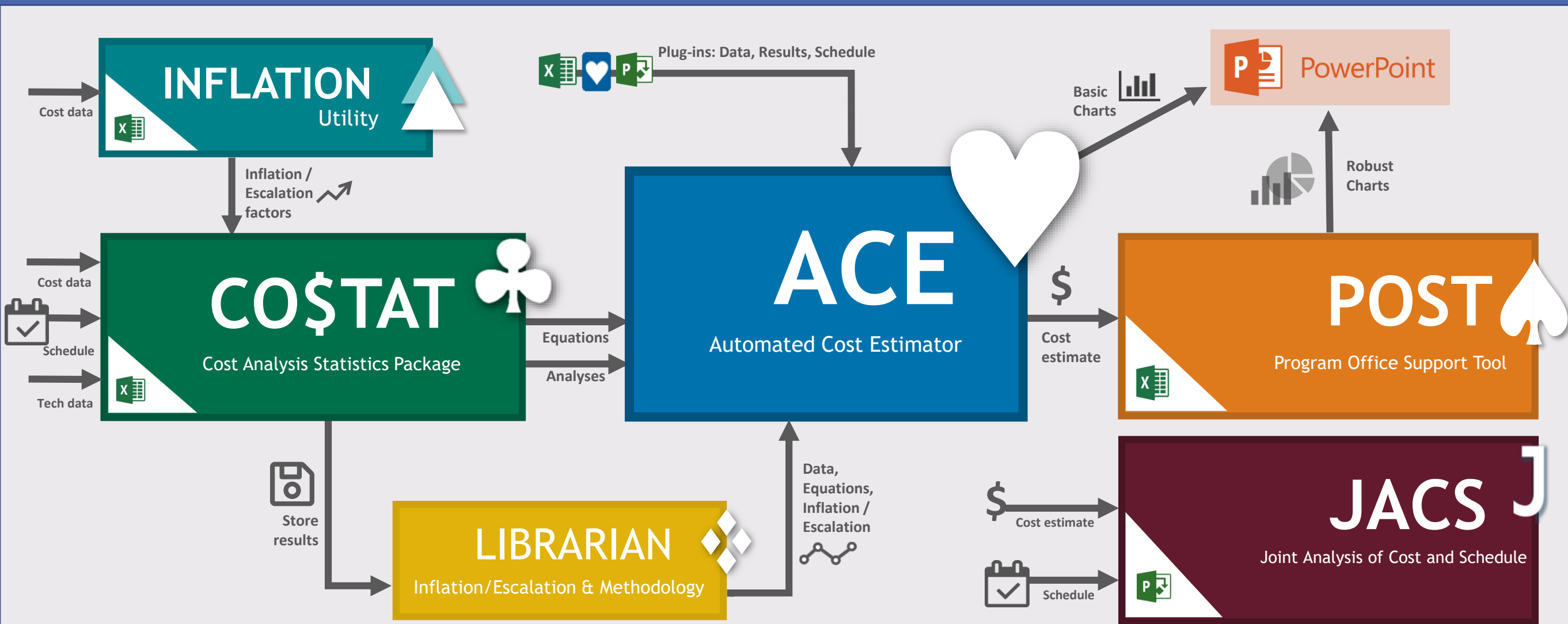
Support cost analysts to follow **established best practices** with analysis, model development, uncertainty, and reporting
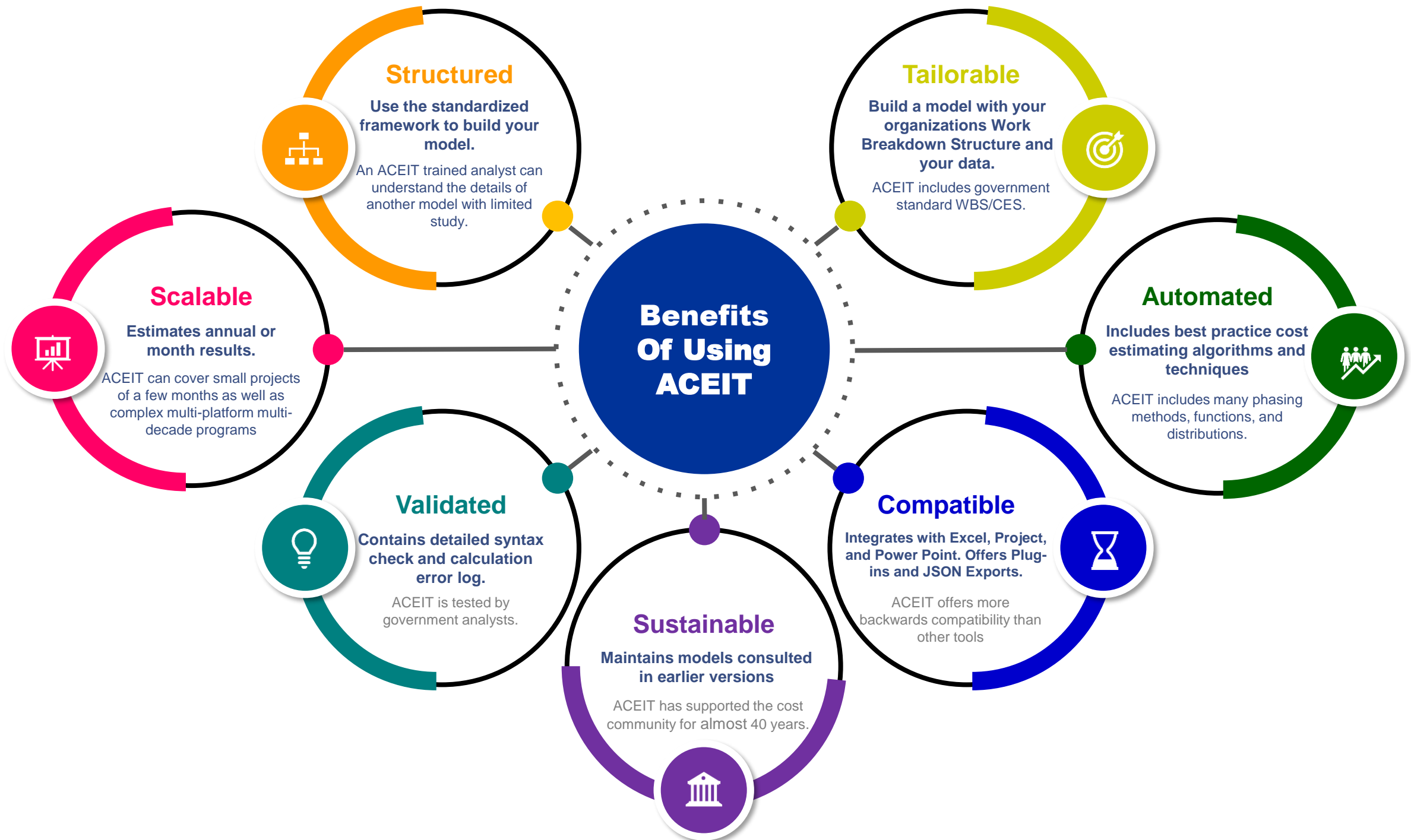
Developed by cost analysts for cost analysts

Automated Cost Estimator and Integrated Tools

ACE

Automated Cost Estimator

- build a robust, accurate, and defendable cost model
- includes inflation/escalation, learning, phasing, uncertainty, documentation, and other essential cost estimating processes

CO$TAT

Cost Statistics

- 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

INFLATION

Inflation Utility

- access latest ACEIT-provided government inf/esc indices in Excel

JACS

Joint Analysis of Cost and Schedule

- perform cost and schedule analyses
- Utilizes the schedule logic and framework of MS Project or P6 with ACEIT engine for processing

LIBRARIAN

Inflation and Methodology

- manage and share custom inf/esc indices and CER Libraries

Full suite provides a complete solution

ACEIT 8.2 Architecture

Benefits Of Using ACEIT

Structured
Use the standardized framework to build your model.
An ACEIT trained analyst can understand the details of another model with limited study.

Tailorable
Build a model with your organizations Work Breakdown Structure and your data.
ACEIT includes government standard WBS/CES.

Scalable
Estimates annual or month results.
ACEIT can cover small projects of a few months as well as complex multi-platform multi-decade programs

Automated
Includes best practice cost estimating algorithms and techniques
ACEIT includes many phasing methods, functions, and distributions.

Validated
Contains detailed syntax check and calculation error log.
ACEIT is tested by government analysts.

Compatible
Integrates with Excel, Project, and Power Point. Offers Plug-ins and JSON Exports.
ACEIT offers more backwards compatibility than other tools

Sustainable
Maintains models consulted in earlier versions
ACEIT has supported the cost community for almost 40 years.

ACE: Automated Cost Estimator

Workspace
- ✓ Session Explorer
- ✓ Main Pane
- ✓ Content Panes
- ✓ Reports

Session Explorer
- ✓ Estimate Tree
- ✓ Model Sections
- ✓ Data Tables
- ✓ Milestone Phasing
- ✓ Custom RI$K CDF
- ✓ Model Traceback

Main Pane
- ✓ Input Form - Methodology, RI$K, Custom Columns
- ✓ Input Sheets - Methodology, WBS/CES, Learning, RI$K
- ✓ Results - Phased, Total, RI$K, Custom Columns
- ✓ Overrides - Phased, Total, RI$K, Custom Columns
- ✓ Charts – Estimate, Comparative, RI$K, Analysis

Content Panes
- ✓ Documentation
- ✓ Favorites
- ✓ Error Log
- ✓ Cases
- ✓ References
- ✓ Successors
- ✓ Drivers
- ✓ Visualization
- ✓ Revision Log
- ✓ Calculation Log
- ✓ Calculation Details
- ✓ Chart Data
- ✓ RI$K Correlation
- ✓ Compatibility Analyzer
- ✓ Review Tags
- ✓ Watch Windows

Reports
- ✓ Phased
- ✓ Narrative
- ✓ Learning
- ✓ RI$K Statistics
- ✓ Inflation/Escalation
- ✓ Documentation
- ✓ What-if
- ✓ Delta
- ✓ Input Sheet
- ✓ Cost Category
- ✓ Budgetary
- ✓ Data Table
- ✓ Cost Comparison
- ✓ Executive Summary
- ✓ More

Other
- ✓ Phasing Methods
- ✓ Cost Types
- ✓ Sunk Costs
- ✓ Functions
  - ✓ ACE Specific
  - ✓ Date
  - ✓ Economic Analysis
  - ✓ Inf/Esc
  - ✓ Logic
  - ✓ Math
  - ✓ Matrix
  - ✓ Operational RI$K
  - ✓ Time Phased
- ✓ Uncertainty RI$K
- ✓ Plug-ins
- ✓ Session Analyzer

ACE is a Structured Estimating Platform

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

- Generate a WBS/CES
- Enter estimating inputs and Methodologies
- Document within the structure
- Store data in data tables
- Integrate uncertainty analysis
- Generate results in various cost types
- Conduct what-ifs
- Make reports
- Generate charts
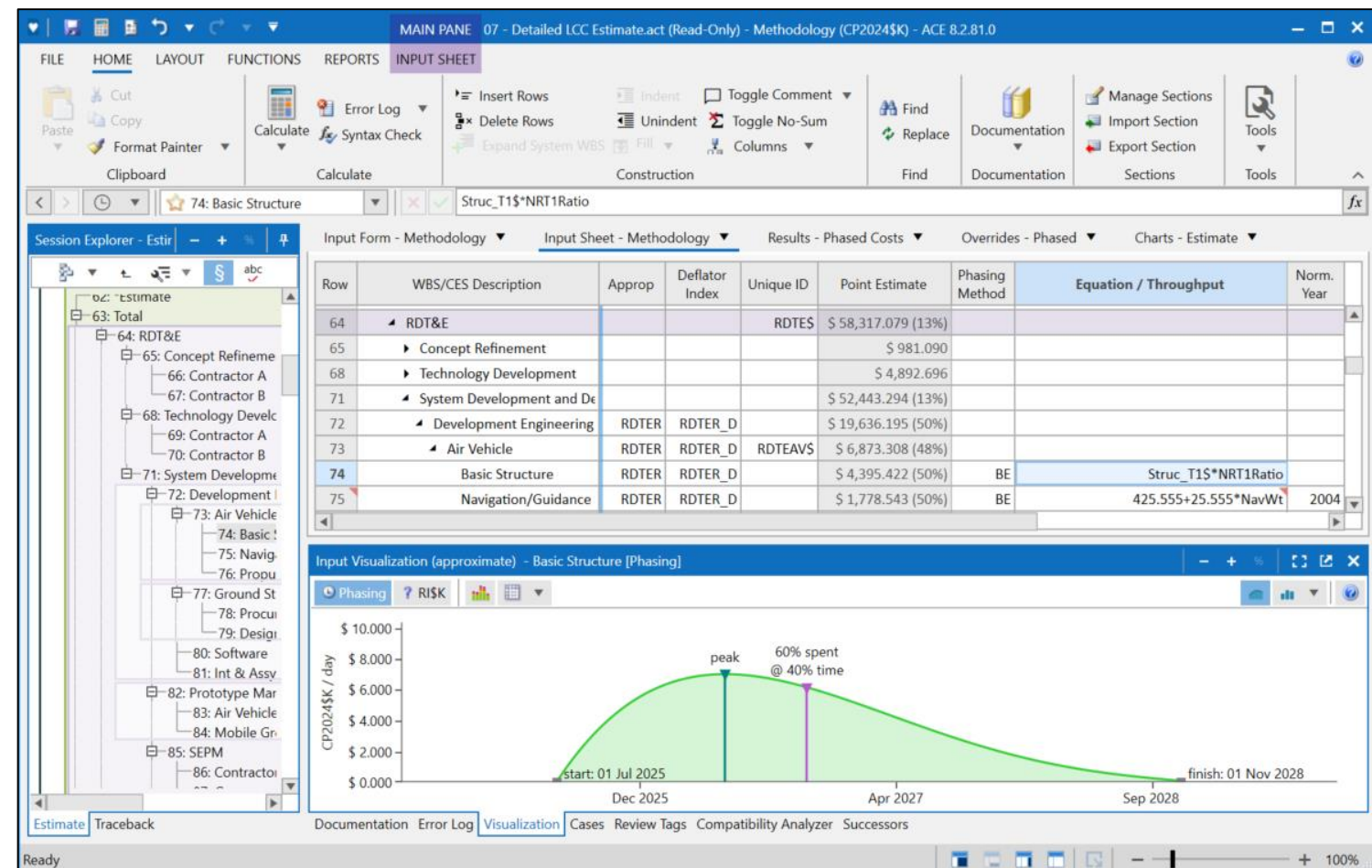
Configure the Workspace

Tailorable workspace: Arrange panes on multiple monitors

Session Explorer

Input Sheet

Content Panes

Results

Explore the Session

Use the Session Explorer to understand the detail of an estimate

Session is organized into five major sections

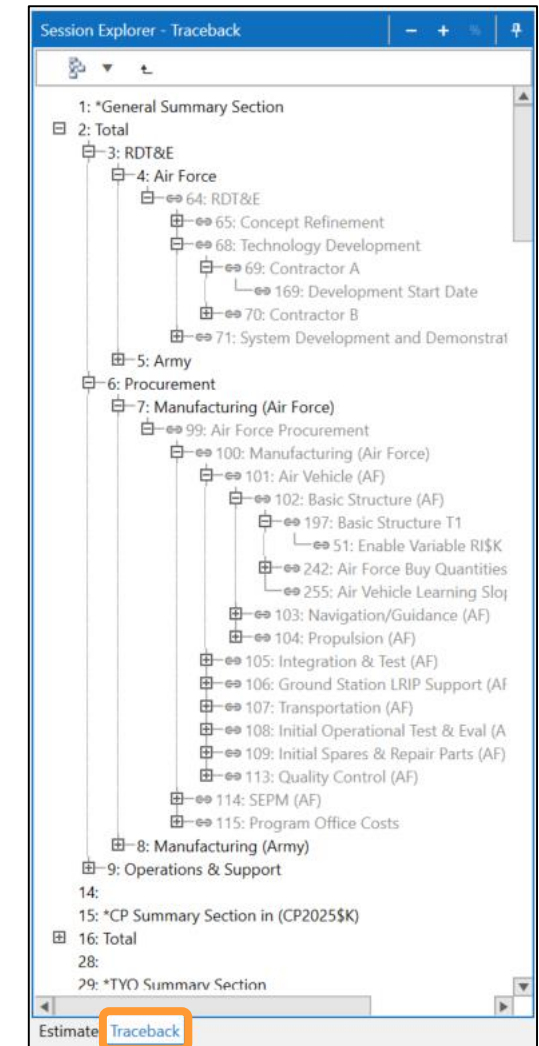**Provides two modes to explore the session:**

- **Estimate** - View session WBS tree

- **Traceback** - Assist with tracing the logical row connections in the model
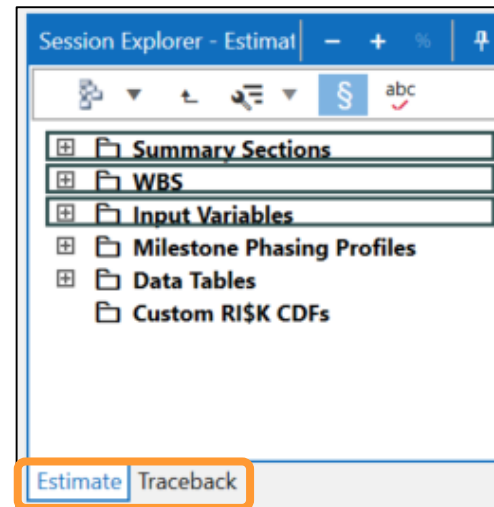
Estimate
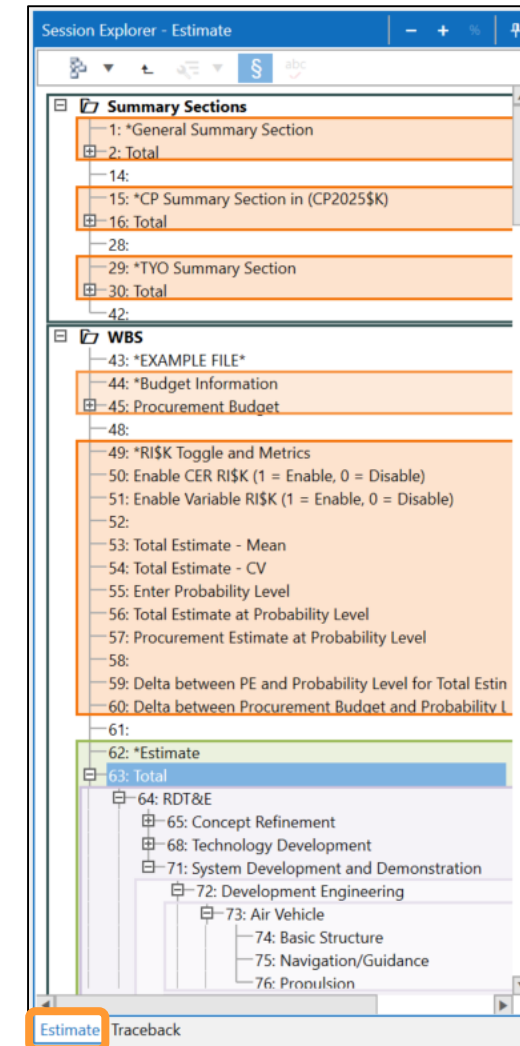
Traceback

Construct the Estimate

Enter data, equations, methods and inputs from the Input Form or Input Sheet

- Input forms **guides** less experienced cost estimators through Methodology and RI$K entry

- Input sheets offer extensive data entry capability across rows; **build large models quickly**

Input Form

Input Sheet

View Results

View estimate results with uncertainty in the Results, Overrides, and Charts Panes

- View Results for Phased, Total, RI$K and Custom Columns

- Add Cases and then conduct What-if drills on total, time phased, and custom columns from Overrides

- Use the Charts to view case results with and without uncertainty and compare what-if cases
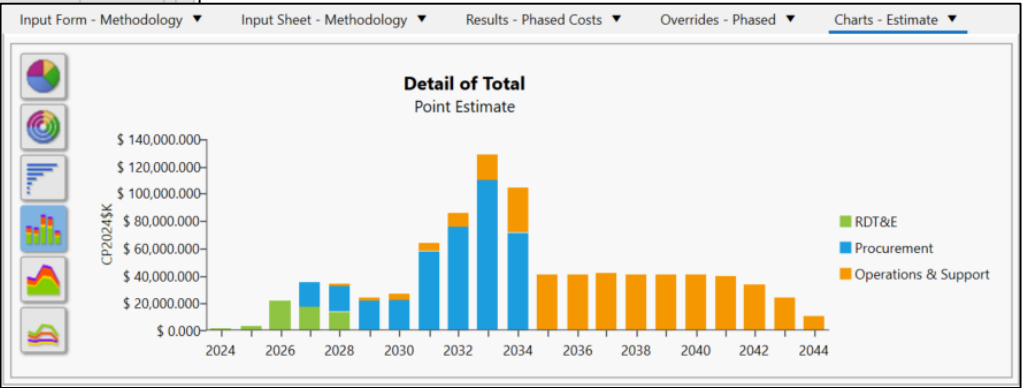
Results

Overrides

Charts

Calculates using the WBS Hierarchy

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	Unique ID	Point Estimate	Equation / Throughput
📁	◢ **WBS**			
2	*Estimate			
3	◢ Total		$ 58,016.272	
4	◢ Manufacturing	Mfg$	$ 41,099.050	
5	Air Vehicle	AV$	$ 35,738.304	AV_UC$*BuyQty
6	Integration & Test		$ 5,360.746	0.15*AV$
7	SEPM		$ 15,206.648	0.37*Mfg$
8	Program Office Costs		$ 1,710.574	[Cost Throughput]

Parent row is always the sum of its children - no equation

Supports Escalation and Inflation Calculations

Supports Data Entry and Results in Constant Price, Then Year Obligations, Then Year Expenditures, Constant Year Obligations and Constant Year Expenditures
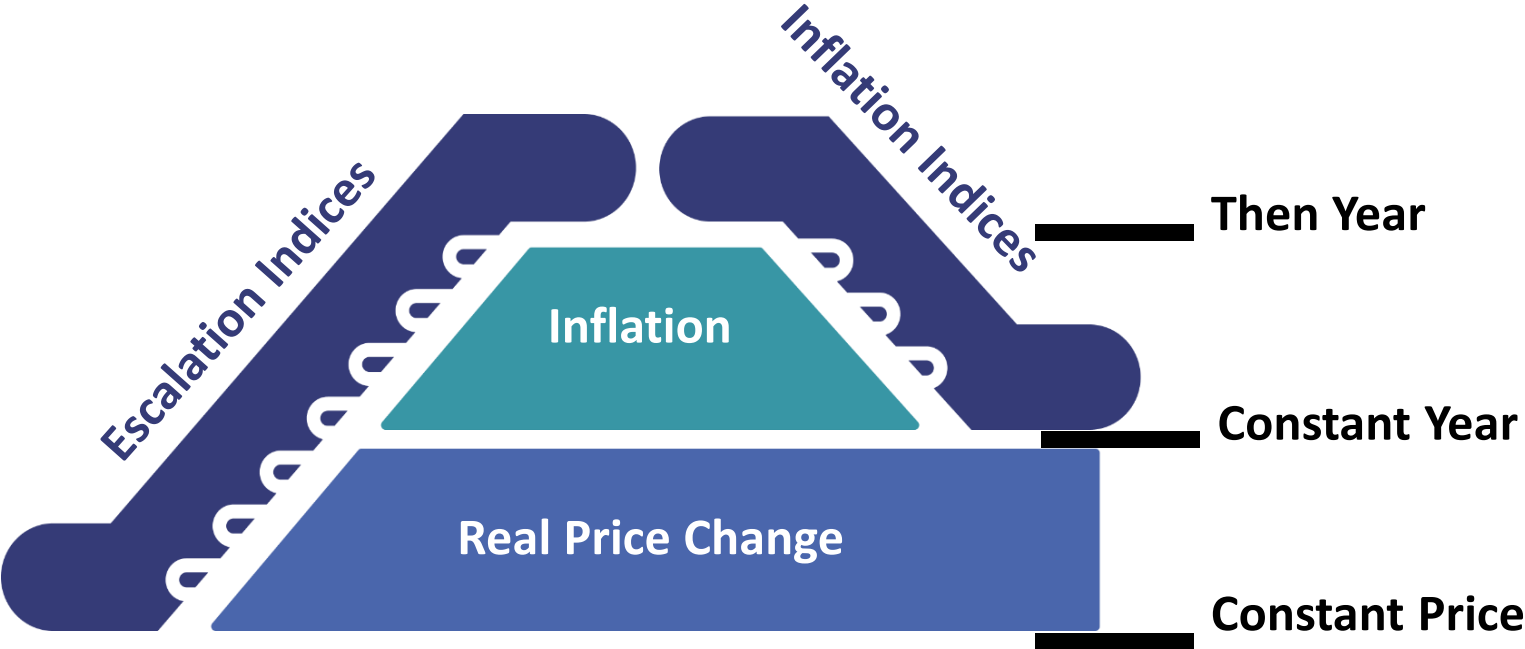
In ACE:

Escalation defined in **Approp** column

WBS/CES Description	Approp	Deflator Index
Basic Structure (AF)	APR	APR_D

Inflation defined in **Deflator Index** column

WBS/CES Description	Approp	Deflator Index
Basic Structure (AF)	APR	APR_D

Breakdown of a Session

Elements of the session that calculate the result

WBS – Row Hierarchy builds to create the estimate **1**

Input Variables – Inputs needed to calculate the estimate **2**

Unique ID – row identifiers used in equations **3**

Equations/Throughput – equation or throughput used to calculate row **4**

Phasing Method – directs the cost phased calculation **5**

Approp/Deflator – directs the normalization calculations **6**

Point Estimate – the calculated total result for each row **7**

Uncertainty Simulation Results – shows the probability level of each uncertain result **8**

Row	WBS/CES Description	Approp	Deflator Index	Unique ID	Point Estimate	Phasing Method	Equation / Throughput	Norm. Year	Trans. Year	Units
1	▲ WBS									
2	*Estimate									
3	▲ Total				$ 51,769.239 (37%)					
4	▲ Manufacturing			Mfg$	$ 36,539.172 (49%)					
5	Air Vehicle	APR	APR_D	AV$	$ 31,773.193 (46%)	R	AV_UC$			
6	Integration & Test	APR	APR_D		$ 4,765.979 (63%)	FP	0.15*AV$			
7	SEPM	APR	APR_D		$ 13,519.494 (26%)	FP	0.37*Mfg$			
8	Program Office Costs	APR	APR_D		$ 1,710.574 (50%)	TYO	[Cost Throughput]			$K
9										
10	▲ Input Variables									
10	*Production Inputs									
11	*Cost Inputs									
12	Air Vehicle T1	APR	APR_D	AV_UC$	$ 8,934.576 (46%)	C	(959*TW^.243+189*RANGE^.652)/2	2020		$K
13	*Quantity Inputs									
14	Buy Quantity			BuyQty	4.000	IS	[Input Throughput]			
15	*General Inputs									
16	Air Vehicle Learning Slope			AVSlope	90.000	C	90			
17	*Technical Inputs									
18	Air Vehicle Takeoff Weight (			TW	12,000.000 (25%)	C	12000			
19	Air Vehicle Range (nmi)			RANGE	250.000 (42%)	C	250			

Includes automated methods and functions

Choose from an extensive library of phasing methods and functions to develop basic to complex estimates

- Phase Methods directs calculating costs over time while functions offer standard calculations

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

- Attach documents to the session for further documentation

Use Content Panes to aid Productivity
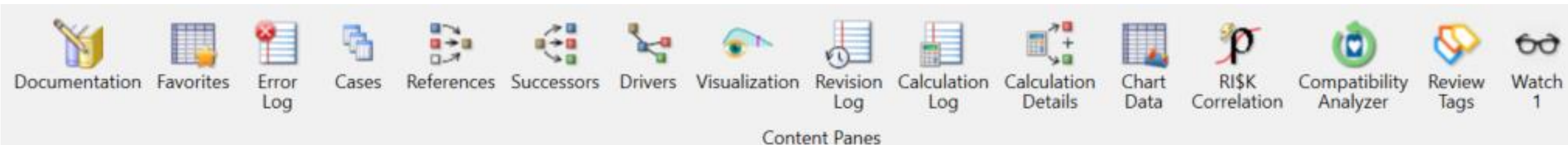
Content panes add **insight** to the workspace

- Many views covering documentation, visualization, cases, error log, reference rows, driver rows, revision log, calculation details, and more
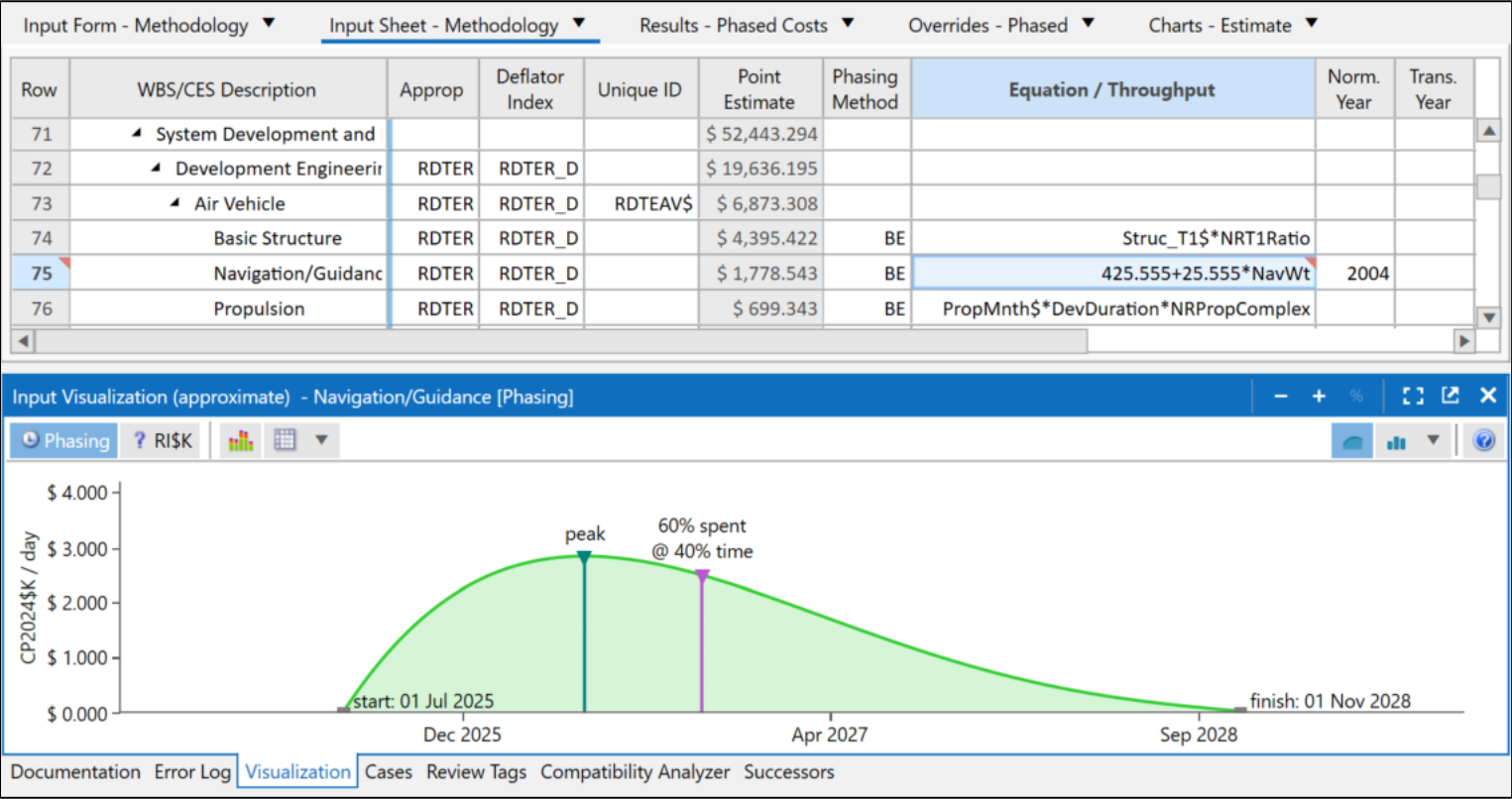
Create Unlimited What – if Cases

- Create unlimited number of cases saved in the *same* file

- Override inputs to view and compare results of alternate scenarios

Generate Robust Charts

- Estimate
  - One case
- Case Comparative
  - Multiple cases
- Uncertainty
  - CDF
  - PDFs
  - Contributors
- Analysis
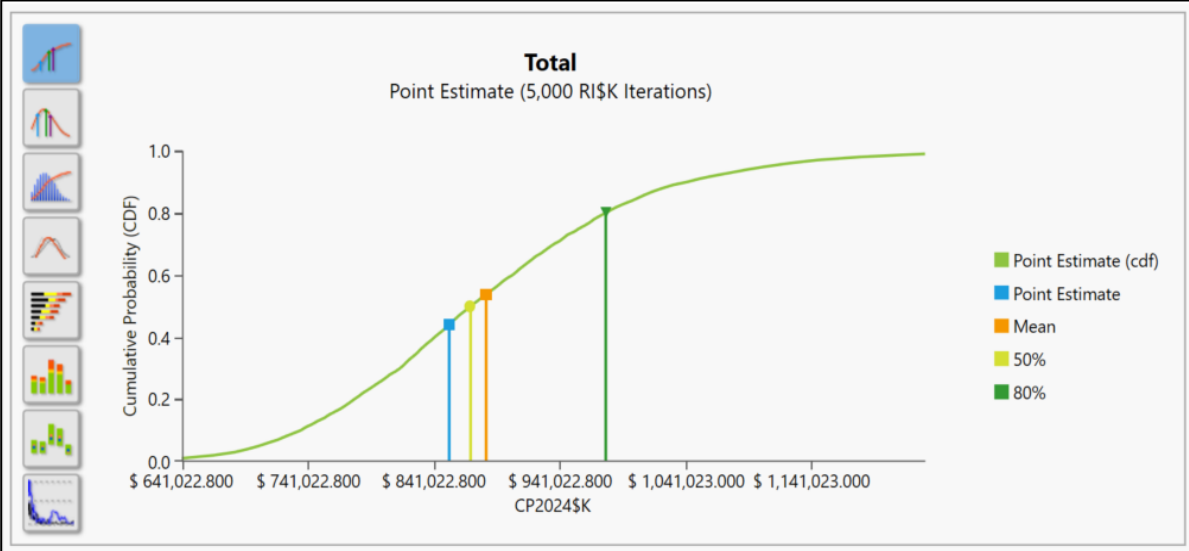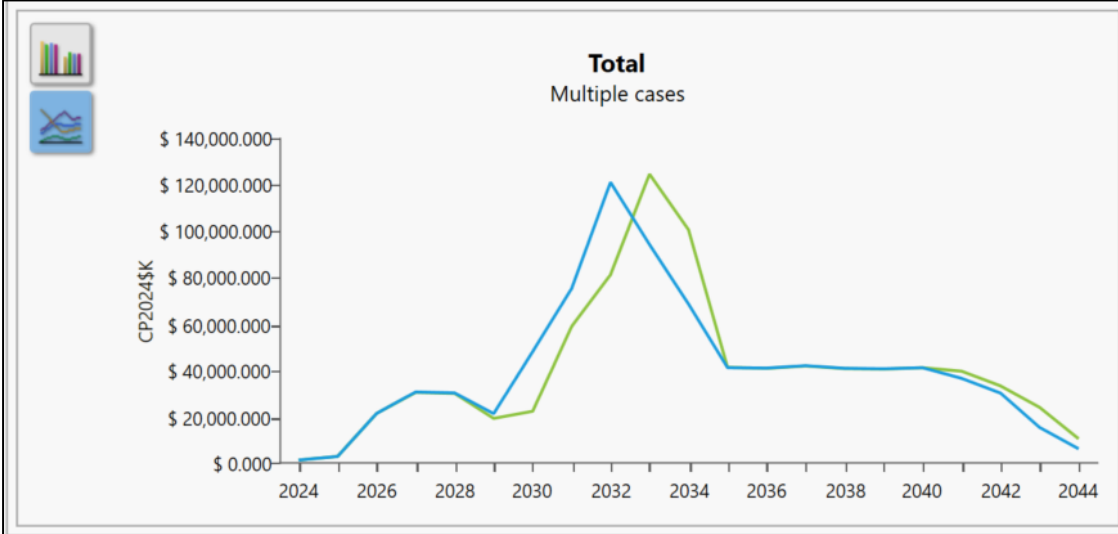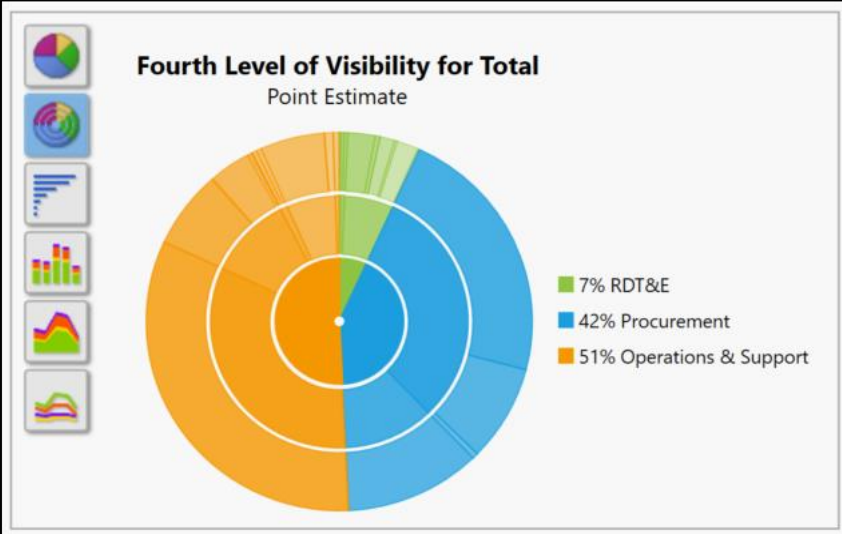
POST: Program Office Support Tool

Open ACE Session in Excel

- ✓ Excel add-in
- ✓ Open Session
- ✓ View Inputs/Results
- ✓ Create POST Cases

Manage Session in POST
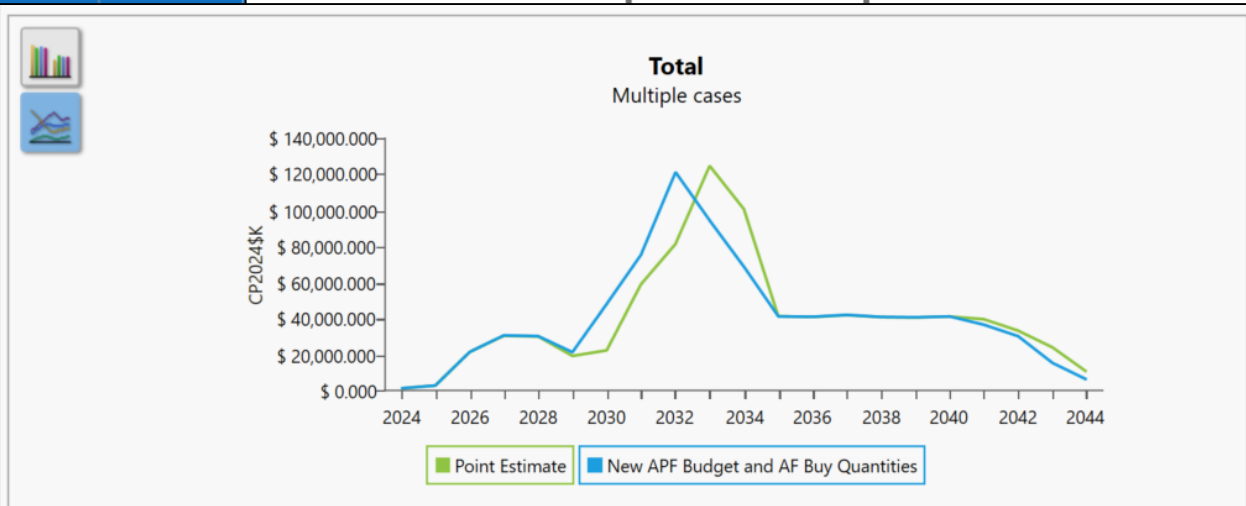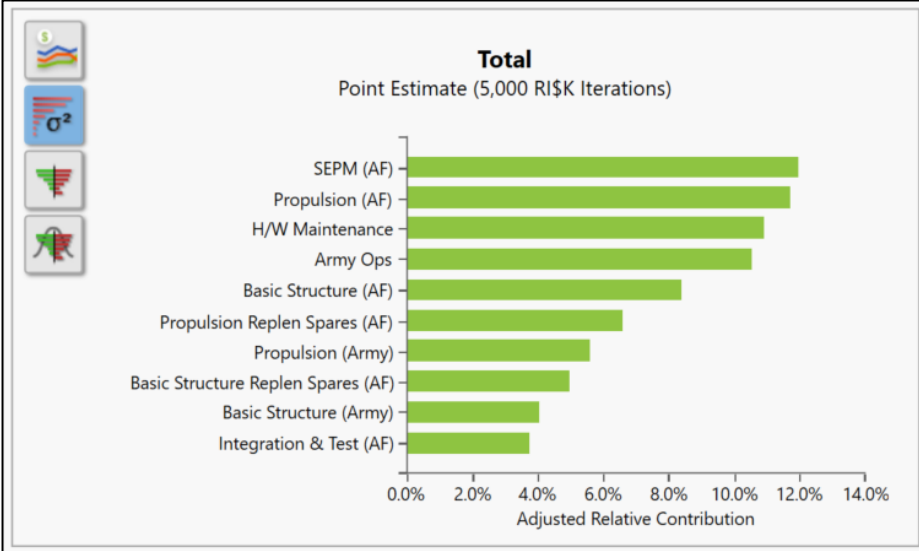
- ✓ Open, close, and update Sessions in the POST Environment

Reports and Charts

- ✓ Create Reports and Charts from multiple Sessions
- ✓ Reports
  - ✓ Estimate
  - ✓ Comparative
  - ✓ RI$K
- ✓ Charts
  - ✓ Estimate
  - ✓ Comparative
  - ✓ RI$K
  - ✓ Analysis
- ✓ Format Reports and Charts with Excel graphics

Export to PowerPoint

- ✓ Export reports and charts to PowerPoint
- ✓ Automatically update exported reports and charts

Use POST to Tell the Story of Your Project

Offers various reports and charts
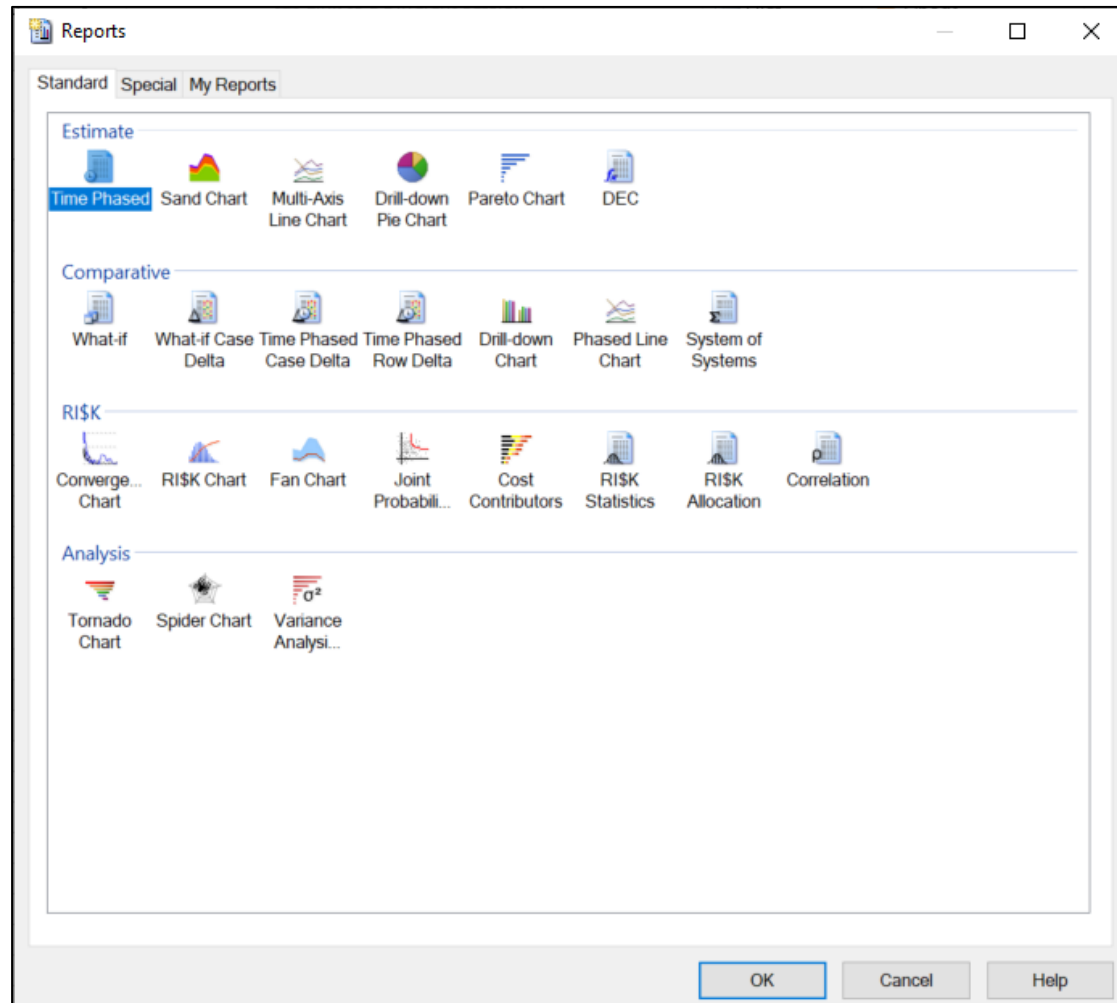
Tabular Reports

- **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/reports for ACE or POST cases

- Save charts/reports in individual worksheets
- Generate charts from the data stored on the worksheet
- Change cases, cost properties, rows with the worksheet buttons
- Generate visuals with cases from different ACE Sessions
- Save the charts/reports in an Excel file
- Share Excel workbook with other stake holders

*Charts/reports can be viewed by all in Excel. ACEIT is required on the machine to activate the worksheet buttons
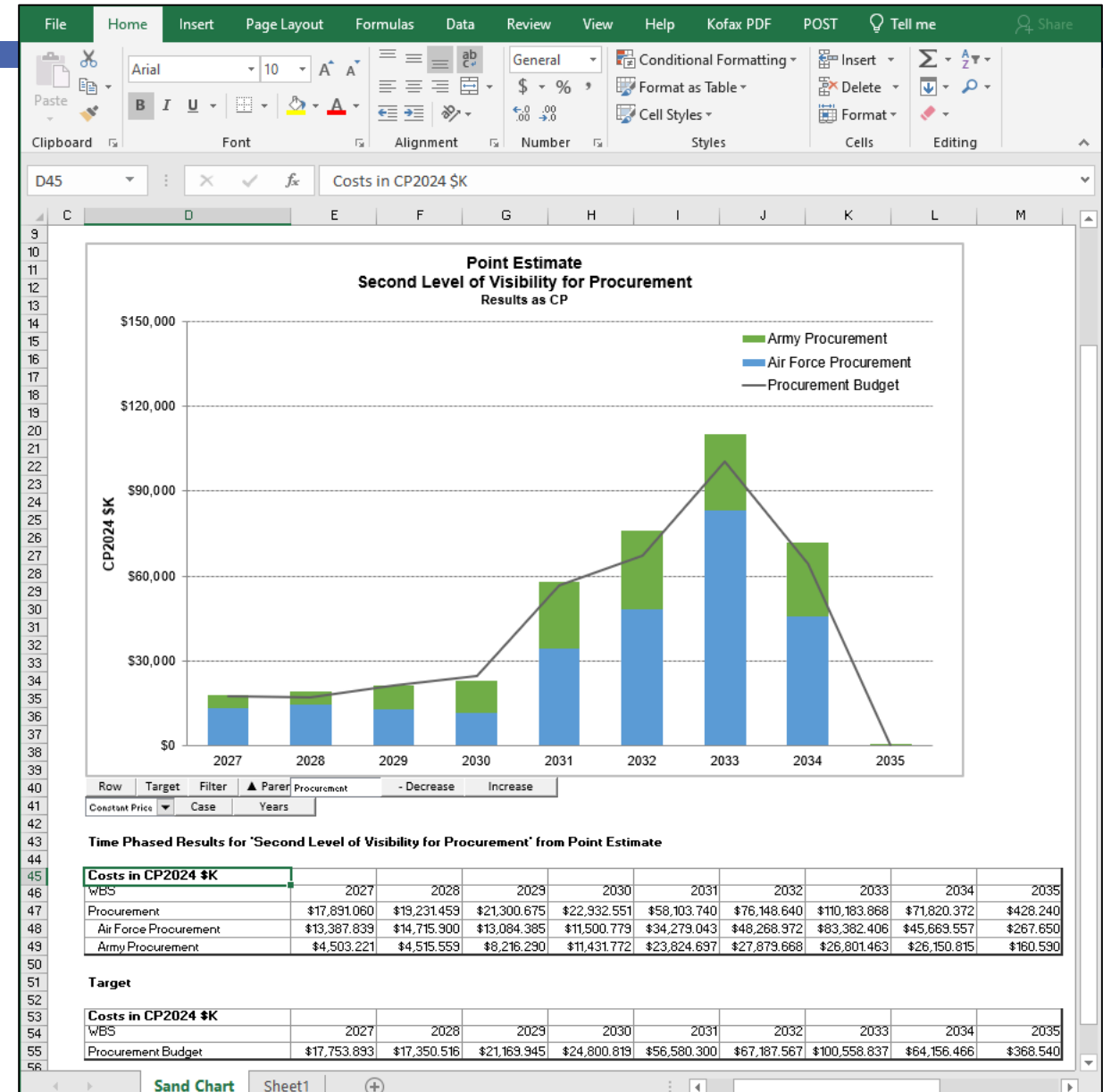
Create and Automatically-Update Presentations

- Manage and update estimate briefings

- Export 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
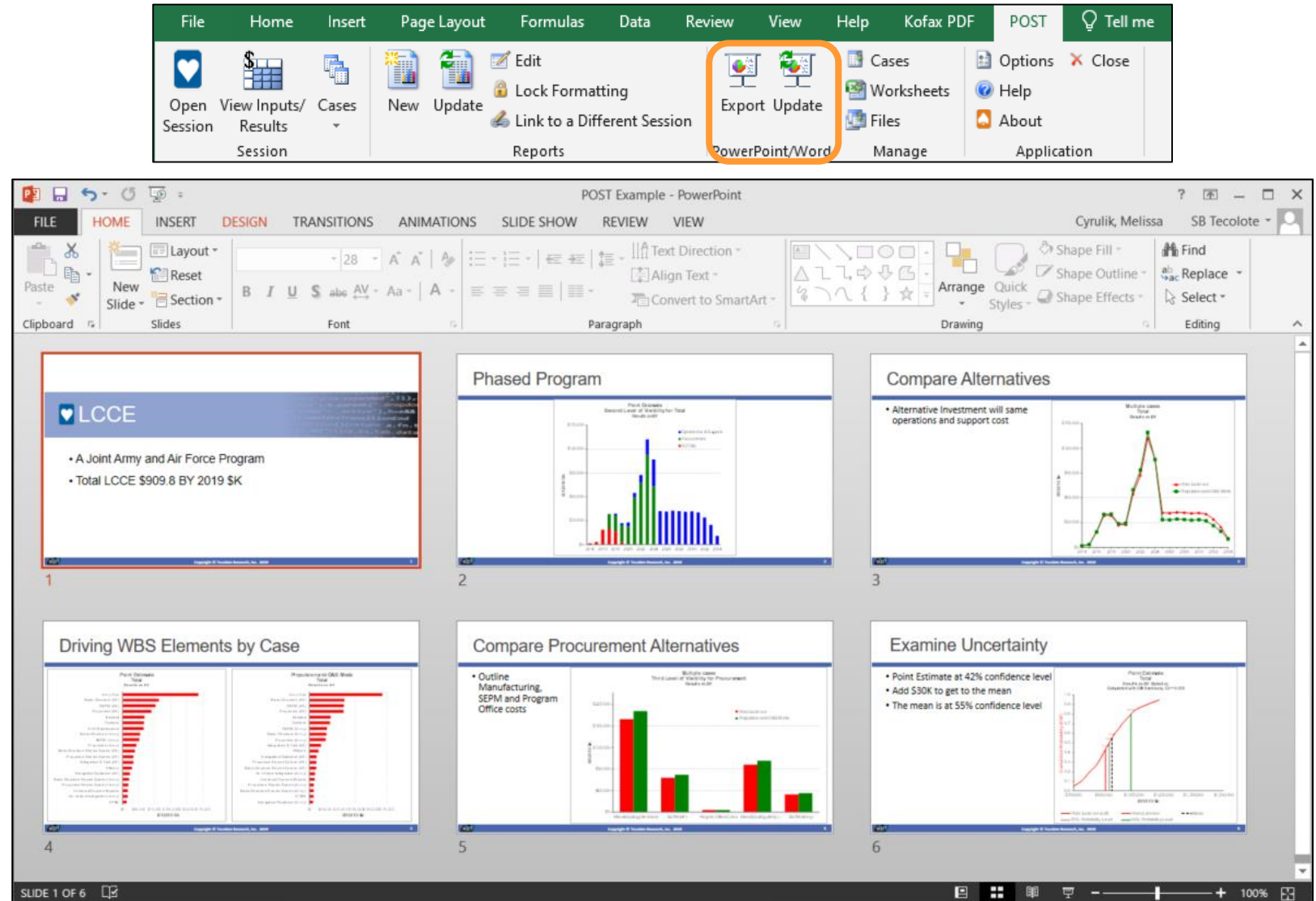
CO$TAT: Cost Analysis Statistical Package

Basic Operation

- ✓ Excel Hosted
- ✓ Format Dataset
- ✓ Test Hypotheses
- ✓ Understand a dataset
- ✓ Develop a CER
- ✓ Develop a Learning Curve
- ✓ Determine data distributions
- ✓ Generate a Prediction Interval

Analysis Results

- ✓ Understand data correlations
- ✓ Generate Statistical Reports
- ✓ Apply Rules of Thumb
- ✓ Interpret the CER
- ✓ Export Analyses to ACE

Analysis

- ✓ Pairwise
- ✓ Distribution Finder
- ✓ Univariate
- ✓ Beta
- ✓ Learning
- ✓ Linear
- ✓ LogLinear
- ✓ NonLinear
- ✓ Ridge Regression
- ✓ Stepwise
- ✓ Prediction Intervals
- ✓ Weighted Regression
- ✓ Outlier
- ✓ Dummy Variables
- ✓ MUPE
- ✓ ZMPE

Available Statistics
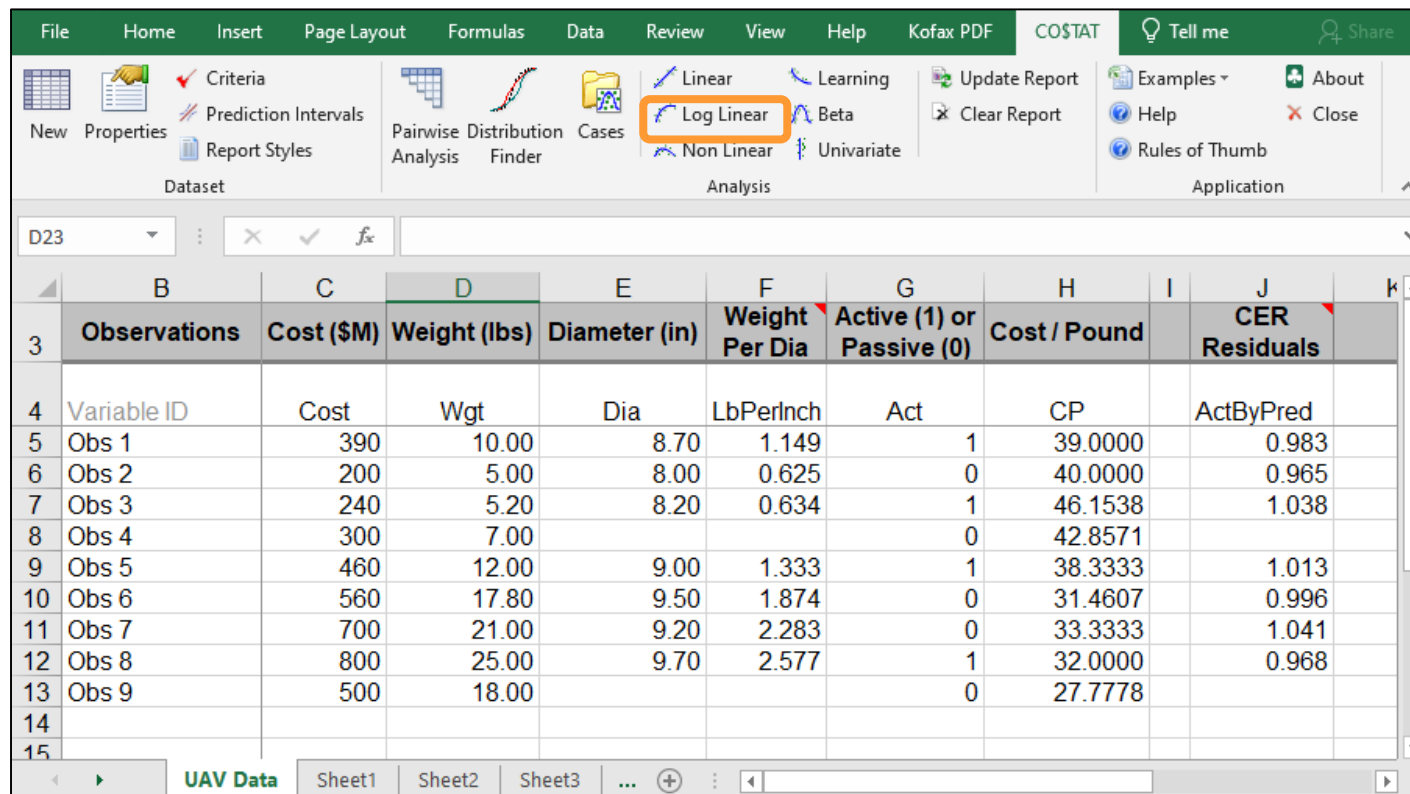
- ✓ P-value / Prob Not Zero
- ✓ Coefficient of Determination (R2)
- ✓ Coefficient of Determination - Adjusted (R2 Adj)
- ✓ Coefficient of Variation Based upon the MAD of the Residuals
- ✓ Coefficient of Variation Based upon the Standard Error
- ✓ Cooks D
- ✓ F Ratio
- ✓ Individual % Error
- ✓ Leverage Value
- ✓ Mean Absolute Deviation % Errors
- ✓ Root Mean Square % Error
- ✓ Standard Error of Slope Coefficients
- ✓ Standard Error of the Estimate
- ✓ Standardized Residual
- ✓ T-Test

Manage Datasets and Run Analysis

Easily create, update, and manage datasets in Excel workbooks

Set analysis options and select dependent and independent variables

UAV Dataset

Set up Analysis

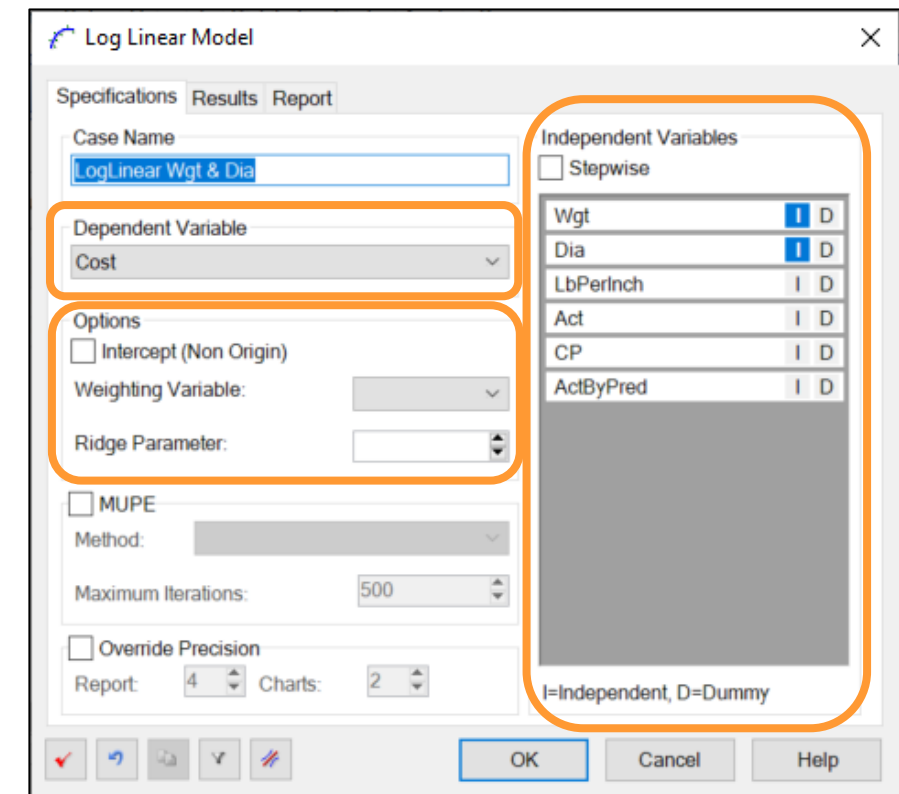# View Comprehensive Statistics

View statistical results and charts in reports stored in the Excel workbook

LogLinear Analysis for Dataset UAV Data, LogLinear Wgt & Dia
Tuesday, 30 July 2024, 12:2 PM

I. Model Form and Equation Table

Model Form:	Unweighted Log-Linear model
Number of Observations Used:	7
Equation in Unit Space:	Cost = Wgt^0.572 * Dia^2.133

**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						
Wgt	0.5720	0.0539	0.2377	10.6140	0.0001	0.9999
Dia	2.1329	0.0623	0.7662	34.2154	0.0000	1.0000

Goodness-of-Fit Statistics

Std Error (SE)	R-Squared	R-Squared (Adj)	Pearson's Corr Coef	PRESS	R-Squared (Predicted)
0.0748	99.99%	99.98%	0.9999	0.0543	99.98%

Analysis of Variance

Due To	DF	Sum of Sqr (SS)	Mean SQ = SS/DF	F-Stat	P-Value	Prob Not Zero
Regression	2	258.9119	129.4560	23158.3798	0.0000	1.0000
Residual (Error)	5	0.0280	0.0056			
Total	7	258.9399				
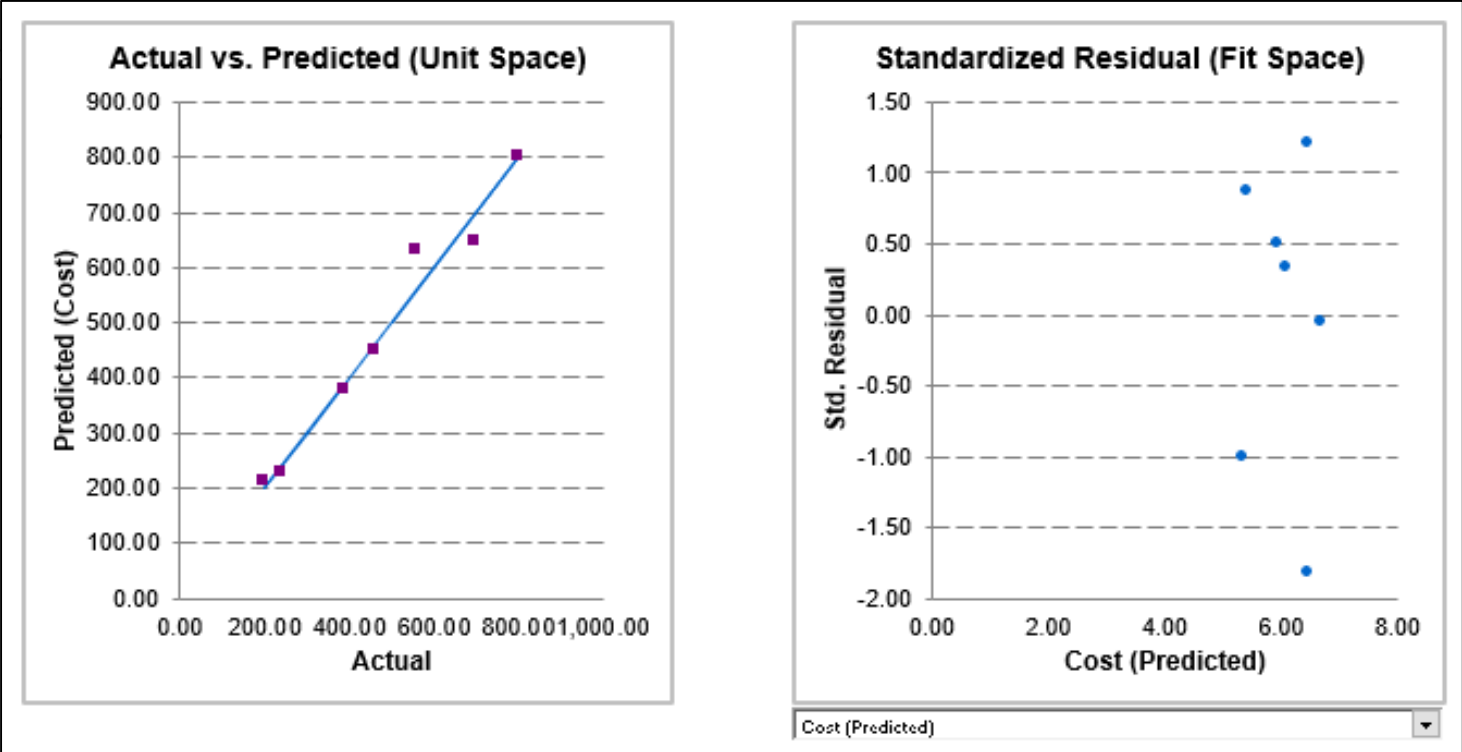
Understand Data Distributions

Analyze the distribution shape of a data set to inform uncertainty analysis
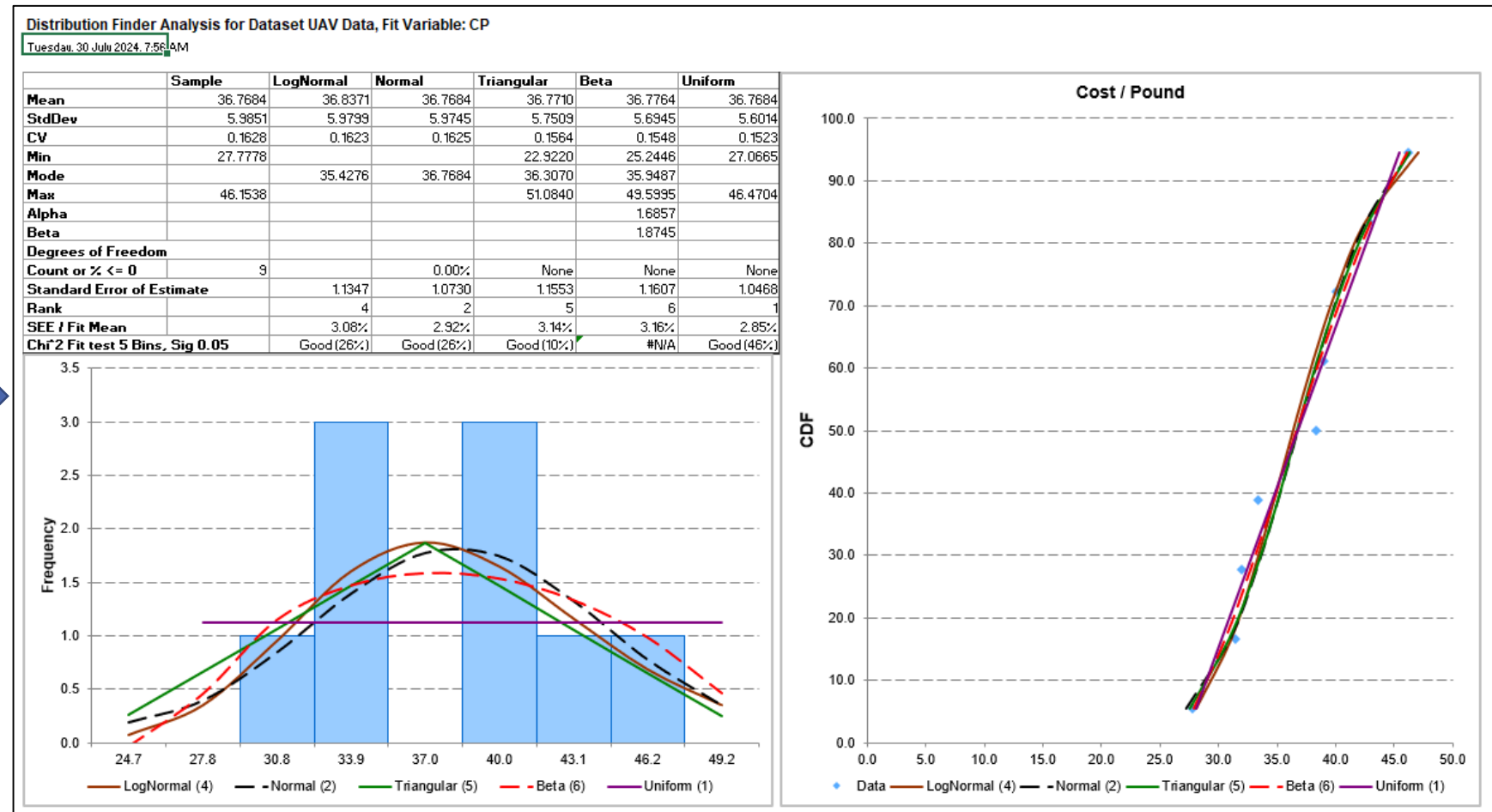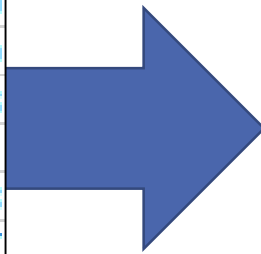
Select the "Best fit" Equation and Export it to the Estimate

Compare metrics for different equation attempts to select the "Best fit"

Export CER to ACE

Select CER

Import CER

Includes Documentation

JACS: Joint Analysis Cost and Schedule

J

Basic Operation

- ✓ Conduct a Schedule Risk Analysis
- ✓ Conduct a Joint Confidence Cost and Schedule Analysis

Capture Uncertainties

- ✓ Durations
- ✓ Time Dependent (TD)
- ✓ Time Independent (TI)
- ✓ Risk Events/Risk Register

JACS Components

- ✓ JACS Add-in (MS Project)
- ✓ JACS Application (P6)
- ✓ JACS Insight

Concepts Covered

- ✓ Analysis Schedule
- ✓ Program Events
- ✓ Risk Events
- ✓ Risk Factors
- ✓ Critical Path
- ✓ Slack
- ✓ Cruciality
- ✓ Hammock Tasks
- ✓ Correlation
- ✓ Custom Fields
- ✓ RIFT

Charts

- ✓ Cash Flow
- ✓ Drivers
- ✓ Gantt
- ✓ Overlay
- ✓ Sand
- ✓ Scatterplot
- ✓ Contribution to Estimate - Schedule
- ✓ Contribution to Estimate - Cost
- ✓ Estimate Total Slack
- ✓ Estimate Annual Cost
- ✓ Schedule CDF vs PDF
- ✓ Cost CDF vs PDF
- ✓ Criticality Index
- ✓ Cost Cruciality Index

- ✓ Schedule Cruciality
- ✓ Correlation to Total Duration
- ✓ Correlation to Total Cost Uncertainty
- ✓ Duration Tail Contingency Delta
- ✓ Cost Tail Contingency Delta
- ✓ Cost Contributor
- ✓ Finish Date vs Total Cost
- ✓ Multi-Metric Driver
- ✓ Annual Cost Uncertainty
- ✓ Cost CDF Comparison
- ✓ Schedule CDF Comparison
- ✓ Scatter Comparison
- ✓ Criticality Index Comparison
- ✓ Convergence

ACEIT

JACS Provides 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 (JCL) analysis: uncertain cost/schedule & risk events

Work with the JACS MS Project Add-in or the JACS Application
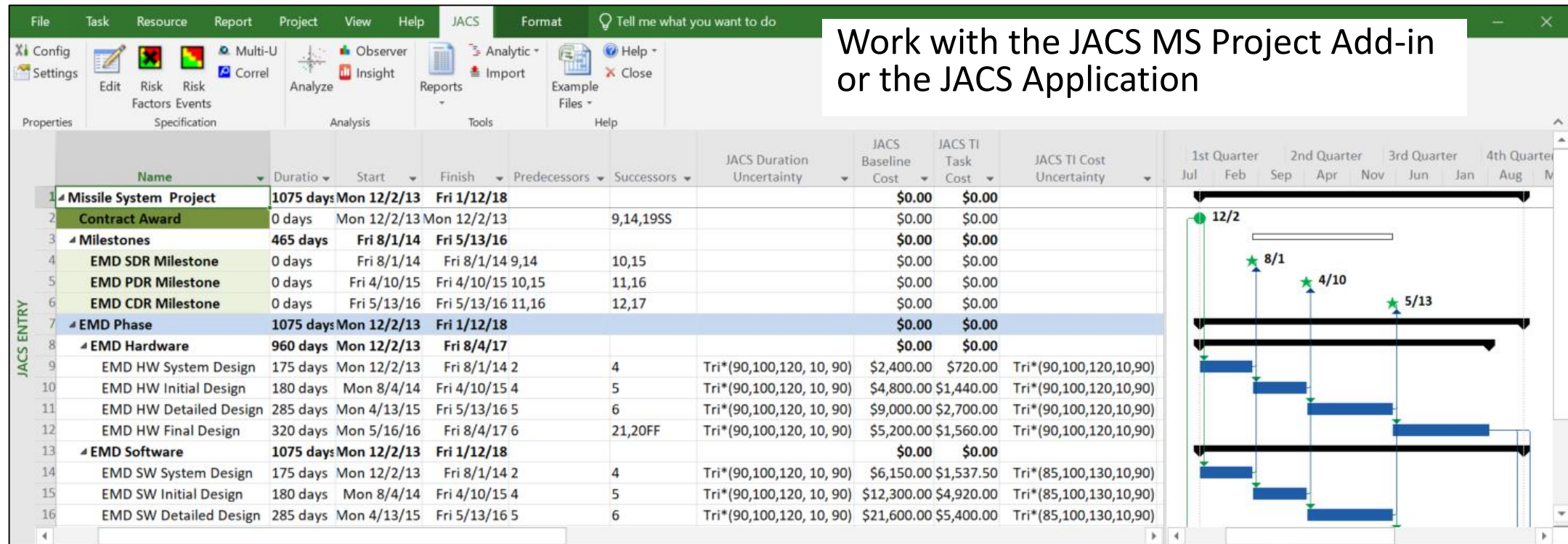
JACS provides a Standard Process for Assembling JCL

The Four Key JCL Inputs

Schedule
The network schedule of activities is the foundation of the JCL analysis.

Cost
Project cost data by element is linked to the schedule and mapped to activities.

Risk
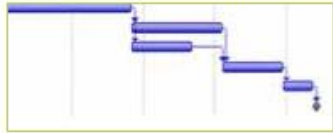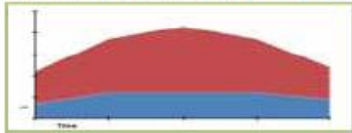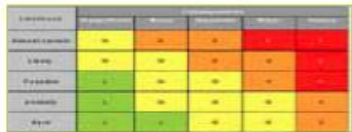An itemized list of risks with likelihood and impact is included in the JCL.

Uncertainty
Uncertainty in the cost and duration can capture additional unknown risk.
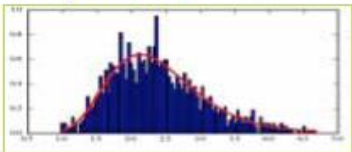
1. **Build a JCL schedule/logic network**
   - Logic network
   - Minimize use of constraints
   - Link to major milestones
   - Schedule health check for viability for analysis

2. **Cost load the schedule**
   - Map cost to schedule
   - Load as resources if using schedule system
   - Determine phased fixed/variable costs and assign to schedule/logic network

3. **Implement risk list**
   - Quantify likelihood and cost/schedule impacts
   - Link to schedule/network activities
   - Load risks

4. **Conduct uncertainty analysis**
   - Schedule uncertainty
   - Cost uncertainty
   - Discrete Risk uncertainty

5. **View results & plot**

6. **Analyze results and refine (steps 1-5)**

15.9 % 32.4 %

Expected Finish and Final Cost

Cost

39.2 % 12.6 %

Time
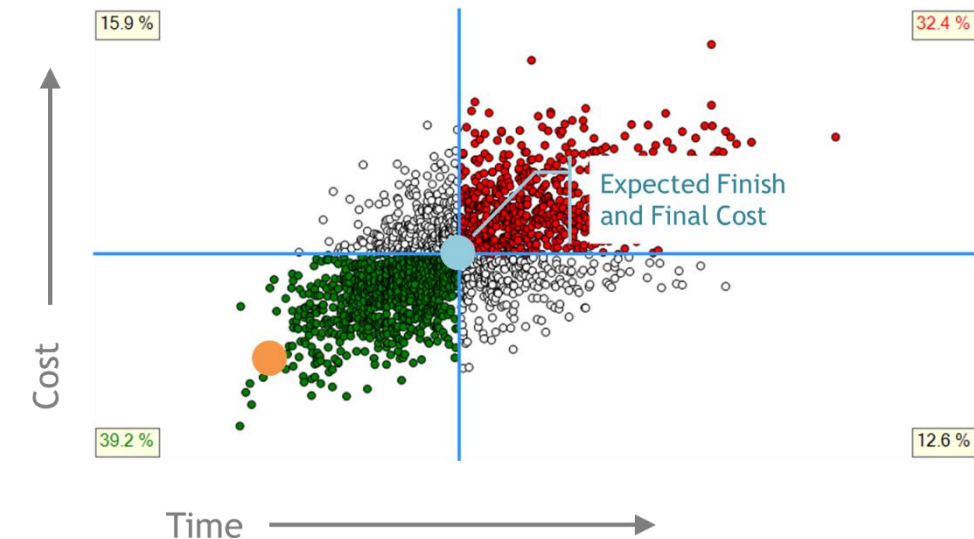
JACS Dashboard Charting Tool: **Insight**

- View Risk Adjusted Schedules
  - Generate updated schedules with higher confidence of completion
  - Understand schedule drivers
- Quickly view JACS top-level results in dashboard format
- Customize the dashboard to your areas of interest
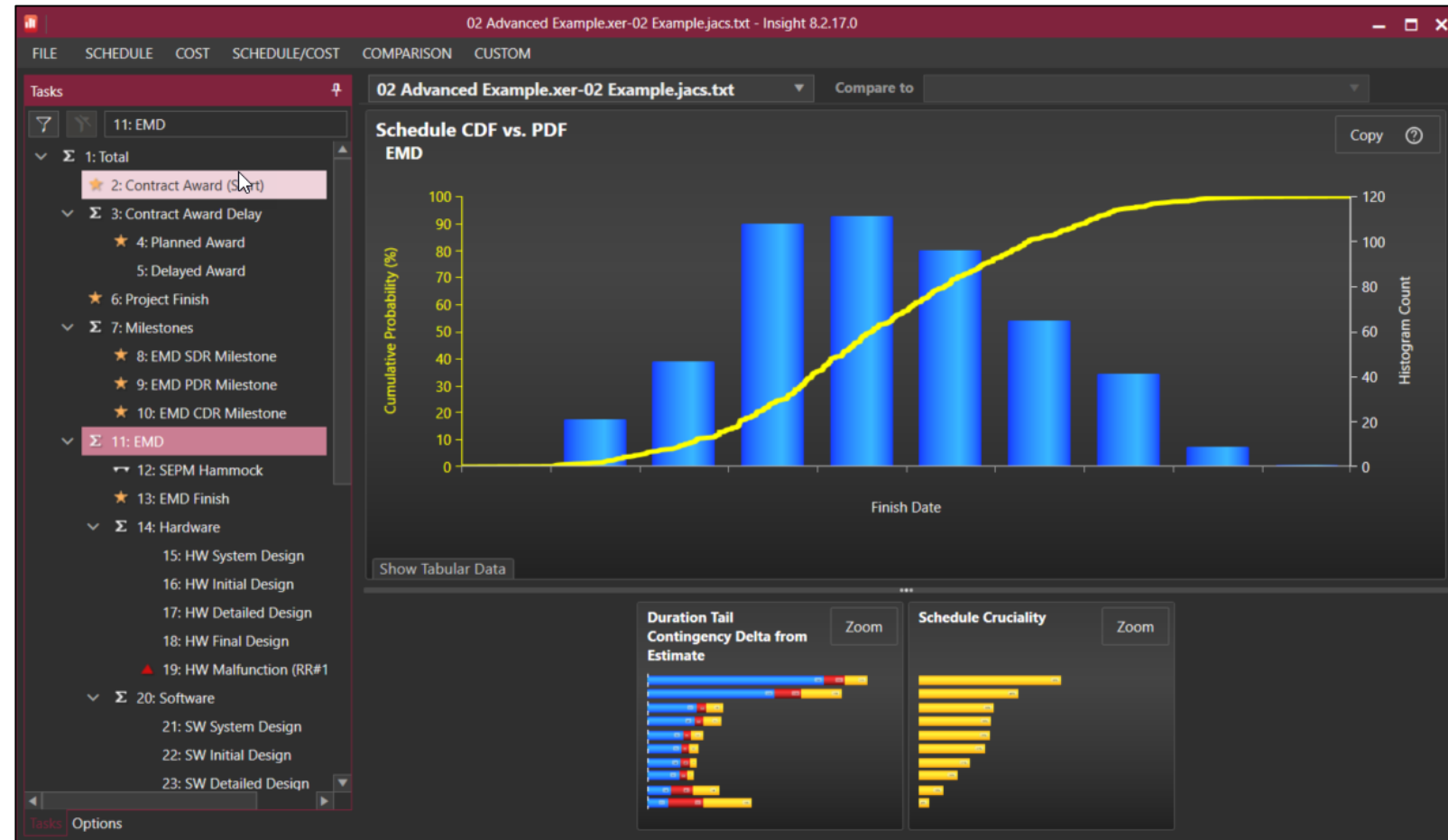
ACEIT 8.2 Training

Instructors with real-world experience with ACEIT provide hands-on training.

In-person   Self-paced   Onsite

ACEIT for Model Builders

- Construct an estimate
- Enter methods
- Incorporate Uncertainty
- Generate a CER
- Create What-if Cases
- Open estimate in POST

Introductory Course
4 Days of Instruction

ACEIT for Reviewers

- Review an estimate
- Understand methods
- Understand Uncertainty
- Generate Reports

Introductory Course
2 Days of Instruction

ACEIT for Advanced Model Builders

- Modeling Durations
- Advanced Functions
- Data Table
- Advanced Uncertainty Analysis
- Model Integration

Advanced Course
4 Days of Instruction

ACEIT for CER Developers

- Dataset Organization
- Understand the dataset
- Analyze the dataset
- Validate the analysis
- Document

Independent Course
2 Days of Instruction

ACEIT for Schedulers

- Introduction to Joint Confidence, JACS, and MS Project
- Using JACS to build a JCL
- Analysis Results
- Working with JACS files

Independent Course
2 Days of Instruction

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