Accurately Mapping Third-party Tool Results into ACE

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ACE supports third-party tools very well

- Parametric estimation tools (such as SEER tool suite)
- Risk/Statistical tools (such as @Risk and Crystal Ball)

The results from these tools can be brought into ACE manually (typing the results into ACE) or in some automated fashion (e.g. using the Excel-to-Ace plug-in)

This presentation will focus WHY and HOW to use the results from third-party tools in ACE
SEER Parametric Models

- SEER suite of tools are parametric models that estimate the cost, effort, and schedule for the development and production of hardware and software.

- Model of interest in this discussion is the SEER model for estimating software (SEER-SEM).
  - There also exists SEER models for estimating hardware (SEER-H), and Integrated Circuits (SEER-IC).

- Estimates generated with the SEER models will frequently be used as inputs into the ACEIT model in building a complete system estimate.

- The process employed in this example uses SEER results, but can be used with results from any third-party tool.
There is an issue with using the standard distributions within ACE

- The standard result for SEER configuration items with risk adjusted inputs is the 50% confidence level value (median).
- For non-Normal type distributions, ACE is expecting the Most Likely value (mode).
- Example: A Triangular Distribution

![Triangular Distribution Diagram](image)
Illustration will use examples from SEER

If you enter the output from SEER models (the 50% confidence value or median) into ACE as the Most Likely value, you may introduce statistical error.

For SEER models (and many other parametric models), a Lognormal distribution will provide a very good approximation of the results in the 50% to 80% confidence level areas of the S-curve; However, outside of this range the results may be significantly different.

User-defined Cumulative Distribution Function (CDF) capability in ACEIT 7.1a, allows the results from third party tools to be mapped very accurately into ACE.
Example will use SEER and will demonstrate challenges with using current guidance

Three estimates

- **Estimate 1**
  - ‘Regular’ right-skewed example
- **Estimate 2**
  - Lower risk example
- **Estimate 3**
  - High risk, highly right-skewed example
'Regular' right-skewed example

ENTIRE RANGE, EST 1

- SEER
- TRI
- LN

CL
$0 $10 $20 $30 $40 $50 $60 $70 $80
$M

10% 20% 30% 40% 50% 60% 70% 80% 90%

NOTIONAL DATA
Lower risk example

ENTIRE RANGE, EST 2

SEER
TRI
LN

NOTIONAL DATA

01/09
High risk, highly right-skewed

ENTIRE RANGE, EST 3

- SEER
- TRI
- LN

CL

$M

$13

$63

$113

$163

$213

$263

10% 20% 30% 40% 50% 60% 70% 80% 90%

NOTIONAL DATA

01/09
User-defined Cumulative Distribution Function (CDF)

- **New in ACEIT 7.1**
  - Allows the user to enter percentile/factor pairs to accurately describe a user-defined (or third-party model defined) risk distribution curve.
  - The percentile is the confidence level of the data point; the multiplier is the percentage of the 50% data point.

- **Example: Distribution curve where,**

<table>
<thead>
<tr>
<th>% CL</th>
<th>Value</th>
<th>Percentage to PE (50% CL value)</th>
</tr>
</thead>
<tbody>
<tr>
<td>10% CL = 60</td>
<td>0.50, (60/120)</td>
<td></td>
</tr>
<tr>
<td>30% CL = 85</td>
<td>0.71, (85/120)</td>
<td></td>
</tr>
<tr>
<td>50% CL = 120</td>
<td>1.00, (120/120)</td>
<td></td>
</tr>
<tr>
<td>70% CL = 180</td>
<td>1.50, (180/120)</td>
<td></td>
</tr>
<tr>
<td>90% CL = 285</td>
<td>2.38, (285/120)</td>
<td></td>
</tr>
</tbody>
</table>
The CDF dialog allows the user to enter custom, specific Confidence Level % and Multiplier pairs to be entered.

This information can be:
- Input manually in ACE
  - “Fat-fingered”
  - Copy/Pasted
- Brought into ACE in an automated fashion using the Excel-to-ACE plug-in
The easiest method of getting the risk information for each CSCI is by using the Flexible Export feature in SEER.

In the output section of the Flexible Export dialog are the risk outputs (Risk Development Schedule, Effort, and Cost).

This feature will allow the user to output information to Excel quickly and easily.
Preparing the Data for ACEIT

- This information can be pasted into Excel

![Image of Excel spreadsheet]
Once the information is in Excel, the percentile/factor pairs need to be created.

To input the information into ACE manually, formulas in Excel to divide each value with the 50% value can be used.
Type the Information into the CDF Window

![CDF Window](image)

- **Name:**
- **Confidence and multiplier must be in ascending order.**
  - The next multiplier can be equal to the previous one.
  - Confidence is a percentage number between 0 and 100.
  - Multiplier is a factor of the point estimate. For example, you may have 1.0 at 50% confidence and 1.25 at 75% confidence.

<table>
<thead>
<tr>
<th>Confidence (%)</th>
<th>Multiplier</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>1.00000000000</td>
</tr>
<tr>
<td>2</td>
<td>10.00000000000</td>
</tr>
<tr>
<td>3</td>
<td>20.00000000000</td>
</tr>
<tr>
<td>4</td>
<td>30.00000000000</td>
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<td>5</td>
<td>40.00000000000</td>
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<td>6</td>
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<td>7</td>
<td>60.00000000000</td>
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<td>9</td>
<td>80.00000000000</td>
</tr>
<tr>
<td>10</td>
<td>90.00000000000</td>
</tr>
<tr>
<td>11</td>
<td>99.00000000000</td>
</tr>
<tr>
<td>12</td>
<td></td>
</tr>
</tbody>
</table>

- **Is discrete distribution (no interpolation):**

- **Buttons:** OK, Cancel, Help
To automate the process you need to follow a specific file format

- Sample files available in ACE Admin ("Excel Plug-in Example" files)
- You must leave the name of the ACE Input worksheet. You can delete rows that you are not using.
- Can use CSV macro (in the example files) or build cell using the CONCATENATE function in Excel.
Accessing Plug-in

- From Tools menu -> Excel-to-ACE Plug-in
Plug-in Dialog

- Excel-to-ACE Plug-in Dialog Box

- Use refresh option if updating an existing CDF
Plug-in Dialog

- Select a file. Make sure to check all of the WBS elements and risk distribution.
**ACEIT Session**

- Need to enter EXCEL_TBYC into Equation / Throughput
Results – Much better across the entire range
Lower risk example

Results – Much better across the entire range
High risk, highly right-skewed

Results – Much better across the entire range
Questions?

Please feel free to contact us:

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Thank you for your attention!