Cost  Benefit Analysis (CBA) Metrics
Calculated in ACE

ACEIT Users Workshop
Sep 18-19, 2012
Mike Allen
Overview

- Purpose
- What is a CBA?
- Why is a CBA Important?
- Modeling CBA Metrics in ACE
- Comparing alternatives with ACE and POST
- Conclusion
Decisions about how to allocate resources are often supported by a Cost Benefit Analysis (CBA). CBAs consider both quantifiable and non-quantifiable benefits. Quantifiable benefits can be assigned a numeric value such as dollars and ranked based on project selection criteria. These selection criteria (metrics) can be calculated in ACE with the aid of several functions. This presentation will demonstrate the calculation/modeling of the most common metrics used in CBAs.
EA/CBA Defined

…. a structured methodology that determines the costs and benefits of one or more alternatives and compares them in order to identify the best alternative to achieve a stated goal/objective.


…. a systematic approach to identify, analyze, and compare costs or benefits of alternative courses of action that will achieve a given set of objectives.


…. a conceptual framework for systematically investigating problems of choice. Posing various alternatives for reaching an objective, it analyzes the LCCE and benefits of each one, usually with a return on investment analysis.


…. an objective method for making rational decisions among alternatives. Compares time-phased, economically-adjusted costs and benefits of solutions/alternatives for a defined problem/objective.

- SCEA Online
The CBA Eight-Step Process

Using analysis to make the case for a project or proposal:
Weighing the total expected costs against the total expected benefits over the near, far, and lifecycle timeframes from an Army enterprise perspective.

** - This briefing focuses on steps 7 & 8

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Why CBAs are Important

- Offer a way to systematically assess costs and benefits for each alternative
  - Monetary costs and benefits
    - E.g., Financial outlays, proceeds from sale of assets, savings
  - Non-monetary costs and benefits
    - E.g., Loss or gain in capability or performance

- Compare relative strengths and weaknesses of each alternative to identify the most effective alternative that accomplishes the mission

- Provide information so management can make informed decisions on where to allocate resources
Step 7 – Compare Alternatives
Modeling CBAs in ACE is a two step process

- Estimate the CBA Alternatives
  - The Status Quo and each alternative need to be estimated

- Perform the CBA Alternative Comparisons
  - Compare the results of the alternatives using various metrics

Alternatives can be modeled with a single ACE session (Cases) or with multiple ACE sessions
No matter if you use a single ACE session or multiple ACE sessions, you need to compare the results of the alternatives

Putting the Cases together

- Use ACE to build a CBA Summary Model (ACE 7.4 will include an example/template)
  - Use ACE-to-ACE plug-in to combine results from Status Quo and Alternatives
  - Use POST to develop standard reporting and charting (Hint: tie to CBA briefing template)

A CBA Summary Model makes metric calculations that compare alternatives (cases) easier to perform

- Math across cases is difficult since you cannot reference one case result from within another case
Common Metrics

- **Cost Metrics**
  - NET Benefits – The difference between the benefits and the costs (benefits-costs)
  - Net Present Value (NPV) – The present value (PV) of a project’s benefits minus the PV of a project’s cost; calculated as PV(benefits)-PV(costs)
  - Uniform Annual Cost (UAC) – Method used to compare alternatives with unequal lives; calculated by dividing the present value of the cost of an alternative by the sum of the discount factors for the periods covering the life of the alternative

- **Index Metrics**
  - Profitability Index (PI or benefit/cost ratio) – Relative profitability of any project or financial benefit gained from an investment; calculated as PV(benefits)/PV(costs); higher is better
    - Savings Investment Ratio (SIR) and Benefits Investment Ratio (BIR) are similar to PI
  - Cost/Benefit Ratio – Depicts “unit cost” of benefits; reciprocal of the PI; calculated as PV(costs)/PV(benefits); lower is better

- **Year and Rate Metrics**
  - Pay Back Period – Number of years required to recover initial investment
  - Break Even Year – The year in which the initial investment is recovered
  - Internal Rate of Return – Also known as Return on Investment (ROI); The discount rate that equates the present value of the benefits with the present value of the costs; discount rate where NPV=0
ACE has four Economic Analysis functions to help with CBA metric calculations

- **EADiscFact()** - This function calculates the annual discounting cost multiplier (factor) used in present value calculations.
- **EAPayBckPd()** - This function determines the payback period needed to recover an investment cost. It returns the fractional number of years required for cumulative savings to be greater than the total investment.
- **EABrkEvnYr()** - This function determines the break even year for an investment. It returns the first fiscal year in which the cumulative savings is greater than or equal to the total of the investment.
- **EADiscVal()** - This function determines the discounted value of a cost stream by multiplying a value by an annual discounting factor.
The discount factor is used to calculate the present value of future costs and benefits

Use the EADiscFact Function

EADiscFact (project_year, rate, method, [current_year])

- Project Year – zero year of project
- Rate – rate used to develop annual multipliers
- Method – indicator variable for cost accrual method
- All future costs and benefits are discounted to the present value
  - The present value is used in several metric calculations like NPV, PI, and IRR
- **Benefits = Cost Savings + Cost Avoidances + Residual Value**
  - **Cost Savings = Status Quo Operations – Alternative Operations**

<table>
<thead>
<tr>
<th>WES/CES Description</th>
<th>Unique ID</th>
<th>Pha</th>
<th>COA 1 - Status Quo</th>
<th>COA 2 - Propulsion and OM Mods</th>
<th>COA 3 - Propulsion, Ground Station and OM Mods</th>
<th>Equation / Throughput</th>
</tr>
</thead>
<tbody>
<tr>
<td>45 * Status Quo minus Alternative Operations Cost (BY$)</td>
<td>TotBen$</td>
<td>0.000 *</td>
<td>25,932.475 *</td>
<td>37,061.761 *</td>
<td>(SQ_MIPerS + SQ_OS$) - (CstAv$)</td>
<td>P</td>
</tr>
<tr>
<td>46 Total Benefits (BY$)</td>
<td>TotBen$</td>
<td>0.000 *</td>
<td>25,932.475 *</td>
<td>37,061.761 *</td>
<td></td>
<td></td>
</tr>
<tr>
<td>47 Cost Savings (Operation Costs) (BY$)</td>
<td>Save_OpCst</td>
<td>0.000 *</td>
<td>26,032.476 *</td>
<td>37,061.761 *</td>
<td>(SQ_MIPerS + SQ_OS$) - (CstAv$)</td>
<td>CstAv$</td>
</tr>
<tr>
<td>48 Cost Avoidances (BY$)</td>
<td>CstAv$</td>
<td>0.000 *</td>
<td>0.000 *</td>
<td>0.000 *</td>
<td>CstAv$</td>
<td></td>
</tr>
<tr>
<td>49 Residual Value (BY$)</td>
<td>Res$</td>
<td>0.000 *</td>
<td>0.000 *</td>
<td>0.000 *</td>
<td>Res$</td>
<td></td>
</tr>
</tbody>
</table>

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<tbody>
<tr>
<td>50 * Status Quo minus Alternative Operations Cost (Present Value)</td>
<td>PV_TotDen</td>
<td>0.000 *</td>
<td>11,956.320 *</td>
<td>17,195.539 *</td>
<td></td>
<td>P</td>
</tr>
<tr>
<td>51 Total Benefits (PV)</td>
<td>PV_TotDen</td>
<td>0.000 *</td>
<td>11,956.320 *</td>
<td>17,195.539 *</td>
<td></td>
<td></td>
</tr>
<tr>
<td>52 Cost Savings (PV)</td>
<td>PV_Sav</td>
<td>0.000 *</td>
<td>11,956.320 *</td>
<td>17,195.539 *</td>
<td>(CstAv$ + DiscFactor)</td>
<td>CstAv$</td>
</tr>
<tr>
<td>53 Cost Avoidances (PV)</td>
<td>PV_CstAv$</td>
<td>0.000 *</td>
<td>0.000 *</td>
<td>0.000 *</td>
<td>CstAv$</td>
<td></td>
</tr>
<tr>
<td>54 Residual Value (PV)</td>
<td>PV_Res$</td>
<td>0.000 *</td>
<td>0.000 *</td>
<td>0.000 *</td>
<td>Res$</td>
<td></td>
</tr>
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- **Costs = Alternative Investment – Status Quo Investment**

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<tr>
<td>55 *Alternative minus Status Quo Investment Cost</td>
<td>Inv_Cst</td>
<td>0.000 *</td>
<td>4,689.360 *</td>
<td>7,823.030 *</td>
<td>(Inv_Cst + FDE + Proc - Inv_FDE - Inv_Proc)</td>
<td>Inv_Cst</td>
</tr>
<tr>
<td>56 Cost Differential (Investment) (BY$)</td>
<td>Inv_Cst</td>
<td>0.000 *</td>
<td>4,689.360 *</td>
<td>7,823.030 *</td>
<td>(Inv_Cst + FDE + Proc - Inv_FDE - Inv_Proc)</td>
<td></td>
</tr>
<tr>
<td>57 Cost Differential (Investment) (PV)</td>
<td>PV_Inv</td>
<td>0.000 *</td>
<td>3,080.570 *</td>
<td>4,360.722 *</td>
<td>(Inv_Cst + FDE + Proc - Inv_FDE - Inv_Proc)</td>
<td>Inv_Cst</td>
</tr>
</tbody>
</table>
Net Present Value (NPV)

- The difference between the present value of the benefits and the present value of the costs
  - $\text{PV(benefits)} - \text{PV(costs)}$
  - Higher is better
Uniform Annual Cost

- A measure of the relative cost of a project used to compare alternatives with unequal lives
  - Calculated by dividing the present value of the costs of an alternative by the sum of the discount factors for the years the system provides benefits
  - UAC = PV(total project cost) / sum of discount factors

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</thead>
<tbody>
<tr>
<td>Uniform Annual Cost (lower is better)</td>
<td>C</td>
<td>46,131.467 *</td>
<td>45,275.670 *</td>
<td>44,898.544 *</td>
<td>SelAlt_TotPV$ / DiscFactSum</td>
<td></td>
</tr>
</tbody>
</table>

**INPUT VARIABLES**

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</thead>
<tbody>
<tr>
<td>DiscFactor</td>
<td>Discount Factor</td>
<td>DiscFactor</td>
<td>F</td>
<td>14.240 *</td>
<td>14.240 *</td>
<td>14.240 *</td>
<td>EADISCFACT(PV_Yr-1, DiscRate, DiscMthd, FYYR)</td>
</tr>
<tr>
<td>DiscFactSum</td>
<td>Sum of Discount Factors</td>
<td>DiscFactSum</td>
<td>C</td>
<td>10.405 *</td>
<td>10.405 *</td>
<td>10.405 *</td>
<td>FYCCUM(@DiscFactor,OpLastYr)</td>
</tr>
</tbody>
</table>

**Present Value for selected case**

<table>
<thead>
<tr>
<th>Category</th>
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</tr>
</thead>
<tbody>
<tr>
<td>SelAlt_TotPV$</td>
<td>Total Cost (Present Value)</td>
<td></td>
<td></td>
<td>$ 480,007.164 *</td>
<td>$ 471,102.421 *</td>
<td>$ 467,178.348 *</td>
<td></td>
</tr>
<tr>
<td>SelAlt_RDTES$</td>
<td>RDT&amp;E</td>
<td>F</td>
<td>$ 37,339.085 *</td>
<td>$ 37,799.418 *</td>
<td>$ 39,093.852 *</td>
<td>SelAlt_RDTES$ * DiscFactor</td>
<td></td>
</tr>
<tr>
<td>SelAlt_Proc$</td>
<td>Procurement</td>
<td>F</td>
<td>$ 332,046.960 *</td>
<td>$ 334,647.203 *</td>
<td>$ 334,650.914 *</td>
<td>SelAlt_Proc$ * DiscFactor</td>
<td></td>
</tr>
<tr>
<td>SelAlt_MilPers$</td>
<td>Military Personal</td>
<td>F</td>
<td>$ 0.000 *</td>
<td>$ 0.000 *</td>
<td>$ 0.000 *</td>
<td>SelAlt_MilPers$ * DiscFactor</td>
<td></td>
</tr>
<tr>
<td>SelAlt_OS$</td>
<td>Operations &amp; Support</td>
<td>F</td>
<td>$ 110,621.120 *</td>
<td>$ 98,655.800 *</td>
<td>$ 93,425.591 *</td>
<td>SelAlt_OS$ * DiscFactor</td>
<td></td>
</tr>
</tbody>
</table>
Profitability Index (PI) & Cost Benefit Ratio (CBR)

- PI and CBR are the inverse of each other
- PI - the present value of total benefits divided by the present value of the total costs (Benefit/Cost ratio)
  - PV(total benefits)/PV(total costs)
  - >1; Higher is better
- CBR - the present value of total costs divided by the present value of the total benefits
  - PV(total costs)/PV(total benefits)
  - <1; Lower is better

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<tbody>
<tr>
<td>Profitability Index (Benefit/Cost Ratio) (&gt;1, higher is better)</td>
<td>C</td>
<td></td>
<td></td>
<td></td>
<td>IF(PV_Inv=0,0,PV_TotBen / PV_Inv)</td>
</tr>
<tr>
<td>Cost Benefit Ratio (&lt;1, lower is better)</td>
<td>C</td>
<td></td>
<td></td>
<td></td>
<td>IF(PV_TotBen&lt;=0,1,PV_Inv / PV_TotBen)</td>
</tr>
</tbody>
</table>
Both ratios are related to the Profitability Index
- Slight variations in numerator and denominator

**Savings Investment Ratio (SIR)**
- SIR = \( \frac{\text{PV(cost savings)}}{\text{PV(costs)} - \text{PV(residual value)}} \)
- >1; Higher is better

**Benefit Investment Ratio (BIR)**
- BIR = \( \frac{\text{PV(cost savings)} + \text{PV(cost avoidance)}}{\text{PV(costs)} - \text{PV(residual value)}} \)
- >1; Higher is better
Break Even Year

- The point (year) where the investment cost is recovered
- Use the EABrkEvnYr Function

\[ \text{EABrkEvnYr (@savings, @invest)} \]

- @savings – row where the annual savings cost data is contained
- @invest – row where the annual investment cost data is contained

- Calculation is typically in current year dollars but can be done in discounted or BY dollars
Payback Period

- The number of years (period) required to recover an investment cost

- Use the EAPayBckPd Function
  
  EAPayBckPd (@savings, @invest)
  
  - @savings – row where the annual savings cost data is contained
  - @invest – row where the annual investment cost data is contained

- Calculation is typically in current year dollars but can be done in discounted or BY dollars
Internal Rate of Return (IRR) – Also known as Return on Investment (ROI)

- The discount rate at which the present value of the investment cost equals the present value of the savings; discount rate where NPV=0
- Calculate this value using the “Calc with CAIV” option

Set up an IRR CAIV line where PV(Benefits) - PV(Cost) = 0 at the IRR

Use the EADiscVal Function

\[ \text{EADiscVal} (\text{value}, \text{project\_year}, \text{rate}, \text{method}, [\text{current\_year}]) \]

- Value – the cost value to be discounted
- Project Year – zero year of project
- Rate – rate used to develop annual multipliers
- Method – indicator variable for cost accrual method
Add a row for the IRR and give it a starting value

- This will be the free variable row that iterates until \( PV(\text{Benefits}) = PV(\text{Cost}) \)

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<tbody>
<tr>
<td>2</td>
<td>EA/CBA Metrics</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>15</td>
<td>Internal Rate of Return (IRR) - also known as Return on Investment (ROI) (higher is better)</td>
<td>C</td>
<td>3.500 *</td>
<td>3.500 *</td>
<td>3.500 *</td>
<td>3.5 [starting value for CAIV]</td>
</tr>
</tbody>
</table>

Steps to calculate with CAIV:

1. Select Calc/Calc with CAIV
**Steps to calculate with CAIV (cont.):**

2. Set Estimate Row to “IRR CAIV line (where PV(Cost) = PV(Benefits))” row
3. Make sure Target Total (BY) is “0”
4. Set Free Variable Row to “Internal Rate of Return (IRR) row
5. Under Calculation Options select the appropriate case
6. Click OK
- Steps to calculate with CAIV (cont.):

7. Once the CAIV calculation has converged you will have several options. Select “Save case results as case override to free variable row” and click OK.

8. You must now calculate the case to see results on the IRR row.
Step 8 – Report Results
Compare Costs Across Alternatives

Second Level of Visibility for Total Cost (Present Value)

BY2012 $K

COA 1 - Status Quo
COA 2 - Propulsion and OM Mods
COA 3 - Propulsion, Ground Station and OM Mods

Total Cost (Present Value)

BY2012 $K

COA 1 - Status Quo
COA 2 - Propulsion and OM Mods
COA 3 - Propulsion, Ground Station and OM Mods
Net Present Value

**Multiple cases**
**NET Present Value (higher is better)**

- COA 2 - Propulsion and OM Mods
- COA 3 - Propulsion, Ground Station and OM Mods

**NET Present Value (h...s better)**

- Units
- 0,000
- 2,000,000
- 4,000,000
- 6,000,000
- 8,000,000
- 10,000,000
- 12,000,000
- 14,000,000

**Units**

- 2012
- 2013
- 2014
- 2015
- 2016
- 2017
- 2018
- 2019
- 2020
- 2021
- 2022
- 2023
- 2024
- 2025
- 2026
- 2027
- 2028
- 2029

**Multiple cases**
**NET Present Value (higher is better)**

- COA 2 - Propulsion and OM Mods
- COA 3 - Propulsion, Ground Station and OM Mods

- Units
- 0,000
- 500,000
- 1,000,000
- 1,500,000
- 2,000,000
- 2,500,000
- 3,000,000

- 2012
- 2013
- 2014
- 2015
- 2016
- 2017
- 2018
- 2019
- 2020
- 2021
- 2022
- 2023
- 2024
- 2025
- 2026
- 2027
- 2028
- 2029
### Time Phased Delta Report

- Highlight the magnitude of Costs and Savings

#### Costs in BY2012 $K

<table>
<thead>
<tr>
<th></th>
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<th></th>
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<tbody>
<tr>
<td>COA 1 - Status Quo</td>
<td>$480,007,164</td>
<td>$47,078,654</td>
<td>$29,080,591</td>
<td>$28,365,880</td>
<td>$26,312,060</td>
<td>$54,140,531</td>
<td>$66,023,125</td>
<td>$90,387,824</td>
<td>$59,516,422</td>
</tr>
<tr>
<td>Delta (Δ)</td>
<td>-$3,415,405</td>
<td>-$11,311,048</td>
<td>-$18,388,357</td>
<td>-$19,422,002</td>
<td>-$21,902,574</td>
<td>-$25,761,080</td>
<td>-$21,595,146</td>
<td>-$19,415,042</td>
<td>$-$1,442,630</td>
</tr>
<tr>
<td>Percent Δ</td>
<td>(1.35%)</td>
<td>1.87%</td>
<td>6.61%</td>
<td>6.97%</td>
<td>7.25%</td>
<td>8.87%</td>
<td>8.58%</td>
<td>7.05%</td>
<td>1.24%</td>
</tr>
<tr>
<td>Threshold</td>
<td>Low Save</td>
<td>Low Cost</td>
<td>Low Cost</td>
<td>Low Cost</td>
<td>Low Cost</td>
<td>Low Cost</td>
<td>Low Cost</td>
<td>Low Cost</td>
<td>Low Save</td>
</tr>
</tbody>
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<table>
<thead>
<tr>
<th></th>
<th>Total</th>
<th>2020</th>
<th>2021</th>
<th>2022</th>
<th>2023</th>
<th>2024</th>
<th>2025</th>
<th>2026</th>
<th>2027</th>
<th>2028</th>
<th>2029</th>
</tr>
</thead>
<tbody>
<tr>
<td>COA 2 - Propulsion and OM Mods</td>
<td>$471,102,421</td>
<td>$47,489,344</td>
<td>$23,244,399</td>
<td>$28,554,415</td>
<td>$26,396,596</td>
<td>$54,466,469</td>
<td>$66,475,906</td>
<td>$91,111,719</td>
<td>$59,000,775</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Delta (Δ)</td>
<td>-$8,904,743</td>
<td>$411,290</td>
<td>$163,808</td>
<td>$188,535</td>
<td>$84,536</td>
<td>$325,938</td>
<td>$452,781</td>
<td>$723,896</td>
<td>$1,078,597</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Percent Δ</td>
<td>(1.96%)</td>
<td>0.87%</td>
<td>0.56%</td>
<td>0.68%</td>
<td>0.32%</td>
<td>0.60%</td>
<td>0.69%</td>
<td>0.80%</td>
<td>0.80%</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Threshold</td>
<td>Low Save</td>
<td>Low Cost</td>
<td>Low Cost</td>
<td>Low Cost</td>
<td>Low Cost</td>
<td>Low Cost</td>
<td>Low Cost</td>
<td>Low Cost</td>
<td>Low Save</td>
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<th>2026</th>
<th>2027</th>
<th>2028</th>
<th>2029</th>
</tr>
</thead>
<tbody>
<tr>
<td>COA 3 - Propulsion, Ground Station and OM</td>
<td>$467,178,348</td>
<td>$48,312,889</td>
<td>$29,420,694</td>
<td>$28,779,724</td>
<td>$26,368,863</td>
<td>$54,435,134</td>
<td>$66,444,634</td>
<td>$91,079,697</td>
<td>$58,973,133</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Delta (Δ)</td>
<td>-$12,828,816</td>
<td>$1,234,235</td>
<td>$340,103</td>
<td>$431,843</td>
<td>$56,803</td>
<td>$294,803</td>
<td>$421,509</td>
<td>$631,873</td>
<td>$545,123</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Percent Δ</td>
<td>(2.67%)</td>
<td>2.62%</td>
<td>1.17%</td>
<td>1.46%</td>
<td>0.22%</td>
<td>0.54%</td>
<td>0.64%</td>
<td>0.77%</td>
<td>0.77%</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Threshold</td>
<td>Save</td>
<td>Low Cost</td>
<td>Low Cost</td>
<td>Low Cost</td>
<td>Low Cost</td>
<td>Low Cost</td>
<td>Low Cost</td>
<td>Low Cost</td>
<td>Low Cost</td>
<td>Low Cost</td>
<td>Low Cost</td>
</tr>
</tbody>
</table>
ACE and POST have numerous standard tabular and graphical output options.

Organizations sometimes like to see results in a format not part of the standard output options.

Use POST to create a custom output format and export to PowerPoint.
Creating Custom Reports

- Use Excel and POST to create/export standard reports
  1. Create a custom output in Excel and link to results from a standard POST report
  2. Give it an “Export” range name
  3. Export to PowerPoint as usual

![Excel and POST interface](image-url)
Export Wizard recognizes range name
Custom Report can be updated like other POST reports

## Detailed Decision Matrix

<table>
<thead>
<tr>
<th>Criteria</th>
<th>Weight</th>
<th>COA 1 - Status Quo</th>
<th>COA 2 - Propulsion &amp; OM Mods</th>
<th>COA 3 - Propulsion, Ground Station and OM Mods</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td></td>
<td>Data</td>
<td>Rating</td>
<td>Score</td>
</tr>
<tr>
<td>Total Cost (Constant dollars)</td>
<td>0.40</td>
<td>$736,028</td>
<td>1</td>
<td>0.4</td>
</tr>
<tr>
<td>Budget Impact (Current dollars)</td>
<td>0.25</td>
<td>$844,668</td>
<td>1</td>
<td>0.25</td>
</tr>
<tr>
<td>Maintenance Downtime</td>
<td>0.15</td>
<td>10 Hrs</td>
<td>2</td>
<td>0.3</td>
</tr>
<tr>
<td>Response Time</td>
<td>0.10</td>
<td>Very Good</td>
<td>2</td>
<td>0.2</td>
</tr>
<tr>
<td>Reduced Failure</td>
<td>0.10</td>
<td>5 per 100</td>
<td>2</td>
<td>0.2</td>
</tr>
<tr>
<td>Total Score</td>
<td>1.00</td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

ACEIT Example Files, 18 September 2012
Approved for Public Release
Conclusions

ACEIT can be used effectively to support Army CBA requirements

- At the core of a successful CBA is a solid estimate – ACEIT implements the standard Army Cost Estimating Process
- Status Quo and multiple Alternative estimates easily combined via ACE-to-ACE Plug-In (not shown)
- CBA Metrics are easily calculated
- POST can be used to automate reports and link to the CBA briefing template

Extensions

- For apples-to-apples comparison, use ACEIT/RI$K to perform CBA with consistent risk-adjusted estimates (e.g., normalized to 50% cost confidence level).