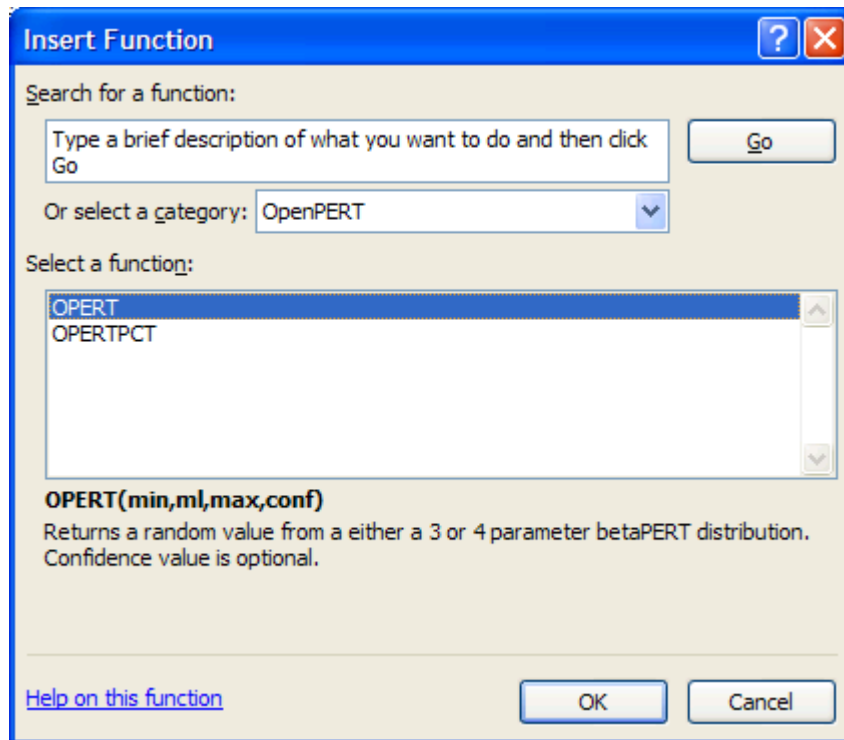


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```

\*\* OPENPERT ADD-IN FOR MICROSOFT OFFICE EXCEL \*\*  
 \*\* REFERENCE GUIDE \*\*



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The OpenPERT add-in for Microsoft Office Excel was created to bring the betaPert distribution to practitioners of numerous professions and disciplines that leverage subject matter expert opinion, without the additional expense of commercial statistical function / simulation add-ins.

REFERENCE GUIDE VERSION: 1.0  
 UPDATED: 8/8/2011



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\*\*\*\*\*

## CONTRIBUTORS

\*\*\*\*\*

Kevin Brown  
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Alex Hutton  
Jack Jones  
Kevin "black fist" Thompson, Minnesota State University, Mankato  
Jeff Williams

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## INTERNET VBA REFERENCES

\*\*\*\*\*

The resources below were invaluable for VBA code snippets and general understanding of VBA. I attempted to reference specific pages, but each web site in its entirety is useful.

Hawley, Dave and Raina. Excel Templates | Excel Add-ins and Excel Help with formulas and VBA Macros. Web. 7 Jul. 2011.  
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# LICENSE:

## OPENPERT MICROSOFT EXCEL ADD-IN

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## OPENPERT REFERENCE GUIDE



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## SYSTEM REQUIREMENTS:

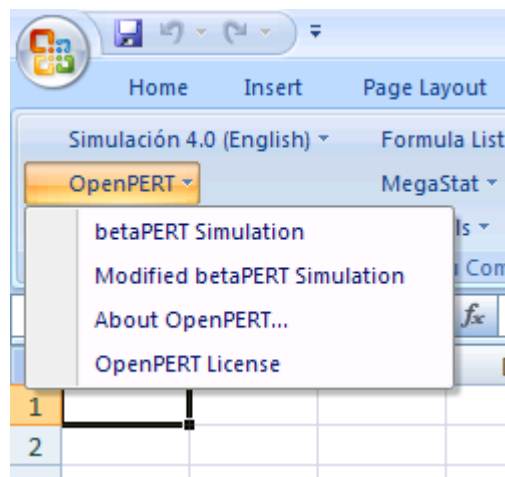
OpenPERT has been tested with the following Microsoft Windows operating systems and versions of Microsoft Office Excel:

Microsoft Windows XP (32-bit)  
Microsoft Windows 7 (32 & 64-bit)  
Microsoft Office Excel 2007  
Microsoft Office Excel 2010

Note: Testing has occurred with various versions of Office for Mac with many errors and inconsistent results. Version 1.0 of the OpenPERT add-in is not supported on any Office for Mac versions.

## INSTALLATION:

OpenPERT can be installed like any other Microsoft Office Excel compatible add-in. Refer to <http://office.microsoft.com/en-us/excel-help/load-or-unload-add-in-programs-HP010096834.aspx#BMexceladdin> for additional guidance. Once installed there should be an OpenPERT menu in the Add-In ribbon bar section or tool bar section (image below).



## FUNCTION OVERVIEW:

There are two functions that can be used after the add-in has been installed; OPERT and OPERTPCT.

OPERT (MIN,ML,MAX,CONF)

	E	F	G
	no confidence paramter ->	=OPERT(0.25,0.75,2)	
	qualitative confidence parameter ->	=OPERT(0.25,0.75,2,"H")	
	numerical confidence parameter ->	=OPERT(0.25,0.75,2,4)	
	cell referencing ->	=OPERT(A1,A2,A3,A4)	

OPERT returns a random value from a betaPERT distribution given user-provided input parameters. Below are the input parameters for the OPERT function:

Min: The 'minimum' variable is a required parameter, must be a positive integer / decimal and must be less then or equal to the most likely value.

ML: The 'most likely'(or mode) variable is a required parameter, must be a positive integer / decimal and must be less then or equal to the 'maximum' value.

Max: The 'maximum' variable is a required parameter, must be a positive integer / decimal and must be greater then or equal to the 'most likely' value.

Conf: The 'confidence' variable is an optional parameter. It reflects the confidence level of the assessor's estimate for the '**most likely**' parameter. By assigning a confidence variable, we are also assigning a kurtosis value to the distribution. The higher the confidence (kurtosis) the more peaked the distribution, usually around the most likely value and thus a smaller standard deviation. The lower the confidence (kurtosis) the less peaked the distribution and thus a larger standard deviation value. The 'confidence' parameter must be one of five character combinations or a number:



```
"VH" <- assigns Very High confidence (a numerical value of 640)
"H"   <- assigns High confidence      (a numerical value of 160)
"M"   <- assigns Moderate confidence  (a numerical value of 20)
"L"   <- assigns Low confidence        (a numerical value of 4)
"VL"  <- assigns Very Low confidence  (a numerical value of 1)
```

**Note:** If you type the confidence parameter in the function versus referencing a cell containing a confidence value; you must enclose the confidence parameter in quotation marks (e.g. "VH").

**Note:** If you use a numerical value for confidence, the value must be greater than or equal to -1.

**Note:** If you do not declare a confidence parameter, a default confidence level of "LOW" is used.

**Note:** For additional information on kurtosis:

<http://mathworld.wolfram.com/Kurtosis.html>

<http://www.tc3.edu/instruct/sbrown/stat/shape.htm>

OPERTPCT (MIN, ML, MAX, PCT, CONF)

I	J
no confidence paramter ->	=OPERTPCT(0.25,0.75,2,0.5)
qualitative confidence parameter ->	=OPERTPCT(0.25,0.75,2,0.5,"H")
numerical confidence parameter ->	=OPERTPCT(0.25,0.75,2,0.5,3)
cell referencing ->	=OPERTPCT(B1,B2,B3,B4,B5)

OPERTPCT returns an inverse cumulative value of a betaPERT distribution given minimum, most likely, maximum, probability and confidence (optional) parameters. This function is similar to OPERT function with one additional parameter called 'PCT'.

Pct: This parameter allows the user to input a probability (value between 0 and 1) that when combined with the other input parameters, returns an inverse cumulative value. This value must be greater then zero and less then one.

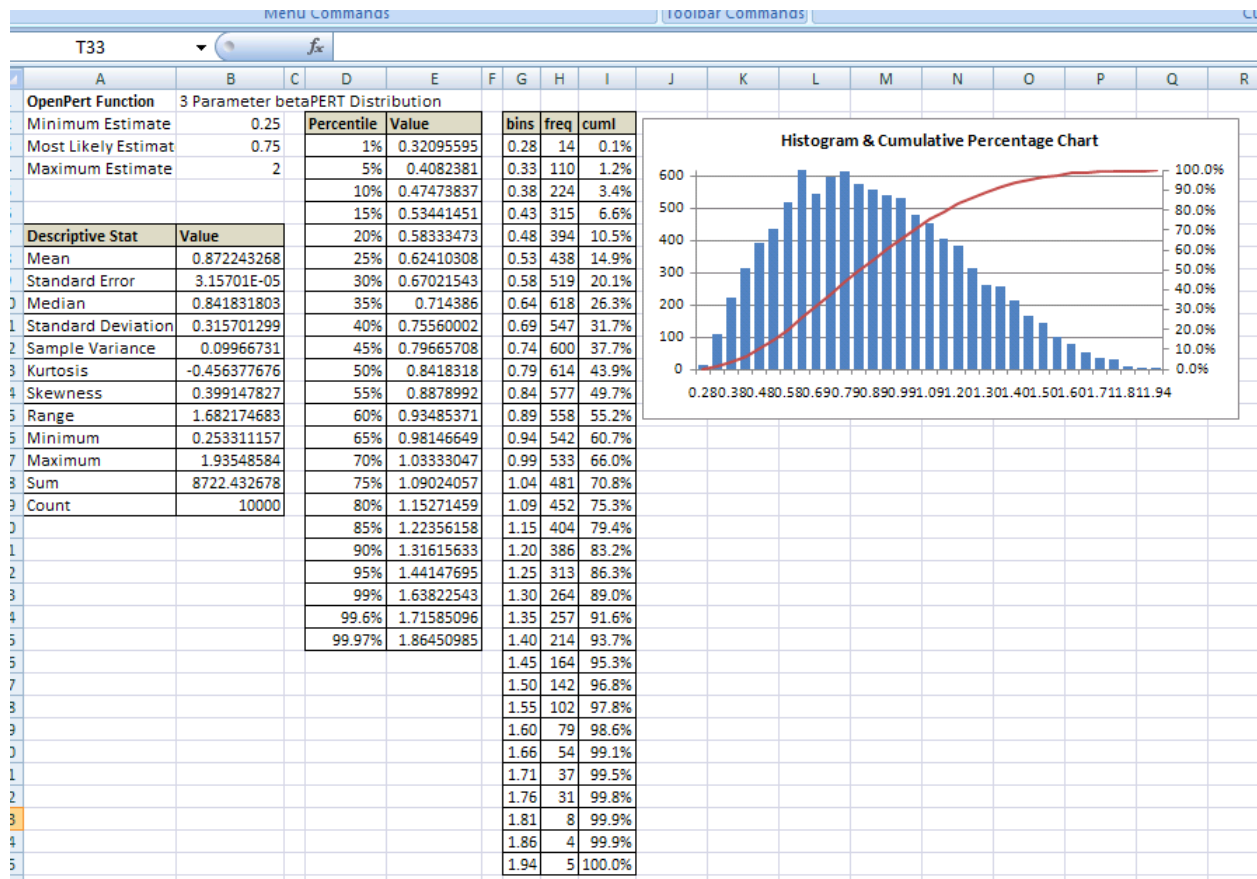


## SIMULATION OVERVIEW:

There are two simulation macros that can be invoked via the OpenPERT add-in menu; "betaPERT" and "Modified betaPERT".

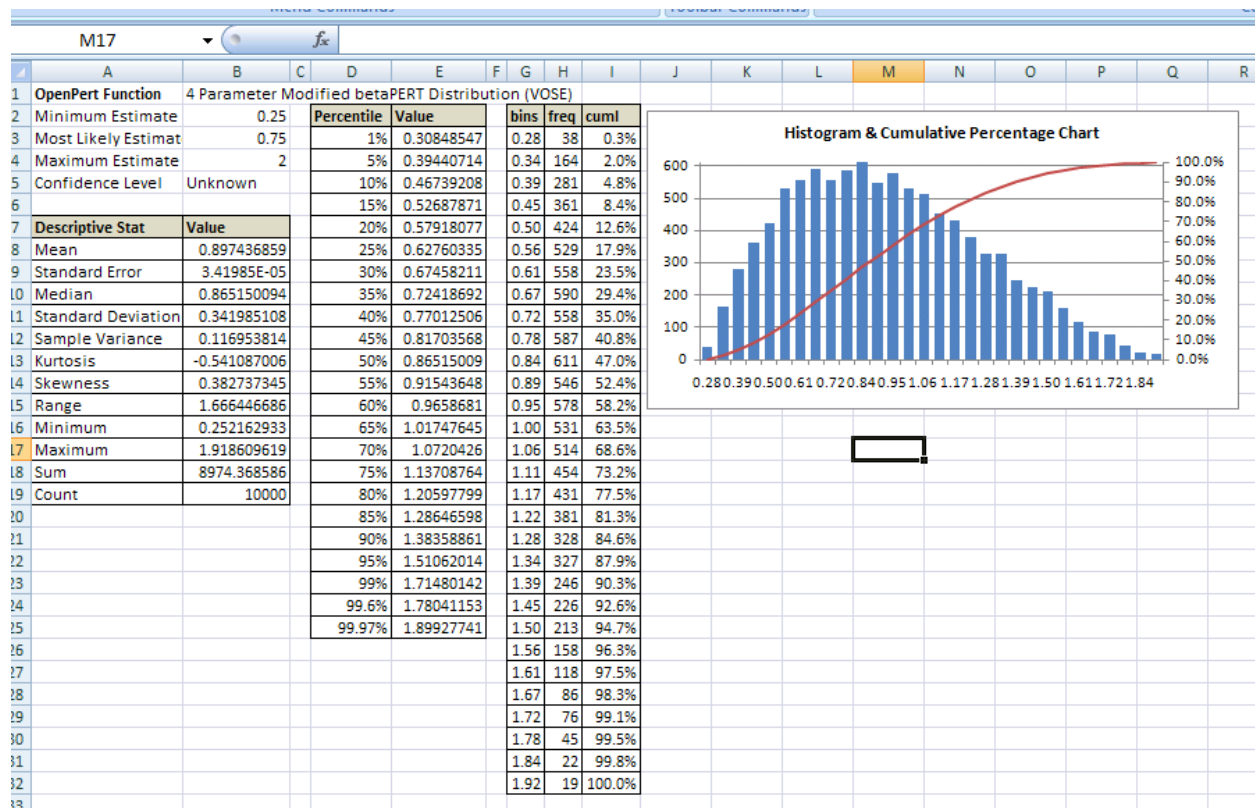
### BETAPERT SIMULATION

This simulation will prompt you for minimum, most likely, and maximum values. The simulation will then generate an array of values based off the betaPERT distribution, create a new spreadsheet, and display: input parameters, descriptive statistics of the array that was created, percentile values from the array, and a histogram / cumulative percentage chart. Every time you run this simulation a new sheet will be created.



## MODIFIED BETAPERT SIMULATION

This simulation will prompt you for minimum, most likely, maximum and confidence values. The simulation will then generate an array of values based off the modified betaPERT distribution, create a new spreadsheet, and display: input parameters, descriptive statistics of the array that was created, percentile values from the array, and a histogram / cumulative percentage chart. Every time you run this simulation a new sheet will be created.



## REFERENCES:

For those interested in learning more about the betaPERT distribution, modified betaPERT distribution, and VBA code snippets used in the OpenPERT Microsoft Excel add-in:

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### ACADEMIC TEXTS

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Vose, David. Risk Analysis: A Quantitative Guide. The Atrium, Southern Gate, Chichester, West Sussex, PO19 8SQ, England: John Wiley & Sons, Ltd., 2008. Print.

Also see:

[http://www.vosesoftware.com/ModelRiskHelp/index.htm#Distributions/Continuous\\_distributions/Modified\\_PERT\\_distribution.htm](http://www.vosesoftware.com/ModelRiskHelp/index.htm#Distributions/Continuous_distributions/Modified_PERT_distribution.htm)

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