The VLTI Observation Preparation Tools VisCalc and CalVin P.Ballester¹, D.J.McKay^{1,2}, A.Richichi¹, M.Wittkowski¹ ¹European Southern Observatory, Karl-Schwarzschildstr. 2, D-85748 Garching ²Rutherford Appleton Laboratory, Didcot, OX11 0QX, United Kingdom

In order to plan an interferometric observation and to assess its feasibility, one needs adequate tools to model the visibility for a specified array configuration, taking into account constraints like shadowing effects or the range of the delay lines. In addition, appropriate calibration stars must be selected. Two specific tools are provided for this purpose: the VLTI Visibility Calculator (VisCalc) and the calibrator selection tool (CalVin). VisCalc provides calculations of simulated dispersed visibilities based on software models of the VLTI instruments. The declination and spectral energy distribution, as well as the source geometry, are parameters used to specify the observation target. Visibilities are calculated analytically for uniform discs, gaussian discs and binaries. Visibilities may also be calculated numerically for a user-provided brightness distribution which is uploaded as a FITS file. The user-specified observation conditions include the starting hour angle and the duration of the observation, as well as the instrument and array configuration. Different results can be displayed (Fig. 1) including the uv-tracks, the input image and its Fourier transform, plots of visibility versus time, visibility squared versus time, loss of correlated magnitude, or the illumination distribution.

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	Comparative graphs for "Target" vs. 7 calibrators - Normalized Vinbilities Loss of Correlated Magnitudes Target Altitudes Shadow											tudes Targ	et Altitudes		-7					
Ne	o. Name	R.A.	Dec. (d,m.s	Ang Dist (deg ⁰)	Ang Diam (mas)	Mag	a Spec. Type	Lum. Class	Qual Flag	Normalized Visibility ave ± err range	Loss of Correlated Magnitude ave ± err range	RiseTime SetTime Duration	Culmination MaxAltitude	Shadowing		+ES++	03-11/1			
1	*Targe	6 45 8.90	-16 42 58.00	0.0	15.00 ± 0.00					0.38±0.000 0.26-0.57 graph ascii	2.11 ±-0.00 2.95-1.23 graph ascà	23.75UT 32.00UT 8.25hrs	28.75 UT max = 81° graph ascii	max = 0% graph ascii						
2	hd4891	6 45 8.92	-16 42 58.00	0.0	6 06 ± 0 13	-1.23	A1	v	t.	0.87±0.005 0.83-0.92 graph ascii	0.31±0.01 0.40-0.19 graph ascii	23.75UT 32.00UT 8.25hrs	28.75 UT max = 81° graph arcii	max = 0% graph ascii		Visibility (of my solute)		-	1	
3	hd5077	6 54 11.40	-12 2 19.10	5.2	3.95 ± 0.22	0.67	K4III	ш	ц.	0.86±0.006 0.93-0.97 graph ascii	0.33±0.01 0.17-0.07 graph asca	23.75UT 32.00UT 8.25hrs	28.75 UT max = 77° graph ascii	max = 0% graph ascu		visionity (of uv points)	ASCII data Weisterd Wassleroth UT2. UT3 UT2 UT2			
4	hd6193	5 7 41 14.83	- 9 33 4.10	15.4	2.26 ± 0.12	1.64	G9Ш	ш	2	0.82±0.002 0.98-0.99 graph ascii	0.43±0.00 0.05-0.02 graph asca	24.50UT 32.00UT 7.50brs	29.50 UT max = 74° graph ascii	mast = 0% graph ascsi		Zoom	Dirpetre Mode UT2-UT3 UT2-UT9		111	
5	hd3607	5 28 14.72	-20 45 34.00	18.6	2.97 ± 0.16	0.90	G5∐	п	2	0.88±0.003 0.96-0.98 graph ascii	0.28±0.01 0.09-0.04 graph asci	23.75UT 32.00UT 8.25hrs	27.50 UT max = 85° graph ascii	max = 0% graph asca				<u>_</u>		
6	hd3553	5 25 1.74	-10 15 44.00	20.5	2.16 ± 0.12	1.95	к5Ш	ш	2	0.92±0.002 0.98-0.99 graph ascii	0.17±0.00 0.05-0.02 graph asca	23.75UT 32.00UT 8.25hrs	27.25 UT max = 75° graph ascii	mast = 0% graph ascs		0.8		24		
7	h43536	5 23 56.83	- 7 48 29.00	21.7	1.88 ± 0.09	1.95	G8III	ш	2	0.93±0.001 0.98-0.99 graph ascii	0.16±0.00 0.04-0.02 graph ascà	23.75UT 32.00UT 8.25hrs	27.25 UT max = 73° graph ascii	max = 0% graph ascu				<u>P-</u>		
8	hd3940	5 52 26.44	1 51 18.50	22.7	2.39 ± 0.14	1.59	K1.5D	ь пь	2	0.83 + 0.002 0.97-0.99 graph ascii	0.39±001 0.06-0.03 graph asca	23.75UT 32.00UT 8.25hrs	27.75 UT max = 63° graph ascii	max = 0% graph ascs		10.6		r E		
9	hd6595	8 1 13.33	- 1 23 33.40	24.2	3 05 ± 8 59	1.07	К4Ш	ш	2	0.70±0.010 0.96-0.98 graph ascii	0.78±0.03 0.10-0.04 graph asca	25.00UT 32.00UT 7.00hrs	30.00 UT max = 66° graph ascii	max = 0% graph ascu			国シーナ国シーナ国	2++1		
10 18	hd4916	6 47 19.83	8 2 14.10	24.8	2 88 ± 0.17	1.42	К4Ш	ш	r	0.72±0.003 0.96-0.98 graph ascii	0.70±0.01 0.09-0.04 graph ascii	24.25UT 32.00UT 7.75hrs	28.75 UT max = 57° graph ascii	mast = 19% graph ascu))		
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Fig. 1: Sample results from the calibrator selection tool CalVin (left) and from the visibility calculator VisCalc (right).

The calibrator selection tool (CalVin) provides a similar interface and involves a two stage selection process. On the first input page, the target coordinates, the array and instrument configurations can be selected. The default search criteria are displayed on an intermediate page which allows the search parameters to be refined. On the results' page, the table of matching calibrators (Fig. 1) is listed. For all matching calibrators, the visibility and "observability" information is calculated and displayed. It is then possible to use VisCalc for a more comprehensive calculation of the visibility information.

Both tools can be accessed from the VLT Exposure Time Calculators page on <u>http://www.eso.org/observing/etc</u>. The standard version shows only those configurations that are offered for the current Call for Proposals. It is updated for each new Call for Proposals in order to reflect the offered VLTI baseline configurations and instrument modes. An "expert" version, accessible from the ETC preview page (<u>http://www.eso.org/observing/etc/preview.html</u>) offers an extended interface with many more choices. It supports the modes and configurations that are currently not offered.