From Theory to Practice: Wave based methods applied in Olive Tree Lab – Terrain

a presentation at

«PROVIAMO A PENSARE DIVERSAMENTE AL CONTROLLO DEL RUMORE AMBIENTALE» Padova 3 Luglio 2014

TERRAIN

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EROM THEORY TO PRACTICE AN EXAMPLE: Piazza dei Signori- Padova SIMULATING SOUND MEASUREMENTS



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MODELING



- The model was created ENTIRELY based on Google Earth image
- No distances were measured on site



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NOISE SOURCE

Mr Amadasi clapping wooden boards as noise source. Microphone on ground at 10m





SOUND PATHS IN MODEL

1	Paths P									
7		ID 👻	Name	Distance m	R	D	Time ms	EA	Real	Imaginar ^
		193	Path	193.346	2	1	563.3	-51.92	0.000	-6.521
DXF		192	Path	130.296	0	1	379.6	-51.88	-1.747	0.000
		191	Path 4	37.158	1	1	108.2	-51.87	-0.000	0.000
0		190	Path	149.137	2	1	434.5	-51.83	-0.000	0.000
-1		189	Path 7	37.479	1	1	109.2	-51.82	-0.000	0.000
		188	Path	85.070	0	2	247.8	-51.54	-0.000	-0.000
		187	Path 11	37.629	1	1	109.6	-51.5	6.168	-0.000
		186	Path 6	37.347	1	1	108.8	-51.46	0.000	-6.537
U		185	Path 3	37.146	0	1	108.2	-51.27	-0.000	0.000
		184	Path	105.045	1	2	306.0	-50.88	-0.000	6.624
	The second se	183	Path	126.906	1	1	369.7	-50.81	0.000	1.431
\square		182	Path 5	37.338	0	1	108.7	-50.69	0.000	-0.000
ă		181	Path	//.905	2	1	226.9	-50.61	0.000	0.000
		180	Path	87.645	1	2	200.3	-50.58	-0.000	-4.925
		179	Path	142.570	2	1	332.3	-50.35	0.000	3.042
Ø		177	Path	142.370	2	2	720.1	-30.21	4 999	0.000
		176	Path	127 527	1	2	371.5	-50.15	0.000	-3.745
		175	Path	88 649	0	1	258.2	-50.03	0.000	-0.000
		174	Path	69 233	1	1	201.7	-49.86	-0.000	-0.000
		173	Path	77.896	1	1	226.9	-49.8	0.000	0.000
		172	Path	88 666	1	1	258.3	-49 64	0.000	9 527
			Path	142.075	1	1	413.9	-49.51	-0.000	-0.000
		170	Path	116.448	2	1	339.2	-49.42	9.656	-0.000
		100	Path	60 497	0	1	176.2	40.20	0.000	0.000 ~
Excess	Level (dBA): 💛 Ready Editing Plane: Origin 0, 0, 0 Normal 0, 0, 1 L = 1 Perspective: ON Select By Pick 5.881, -53.783, 0.000	▶ C ©	ξC 🎉	P] 品 O	💐 S	B •	R 🎆v	1 🌩 D	 C	🖁 G 🛃 R



- The calculations took into account the top 5,000 contributing sound paths between source and receiver
- On the right panel, details for each path such as, time distance of arrival, contribution in dB, orders of reflection and diffraction and other information

IMPULSE RESPONSE - MODEL



IMPULSE RESPONSE - MEASUREMENTS

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REVERBERATION TIME – MEASUREMENTS vs OTL - TERRAIN



• Notice how close are the results at and above 1 kHz.



IR - MEASUREMENTS vs OTL TERRAIN (dB)



- The RED curve represents measurements
- The BLUE OTL-Terrain simulation



• PLEASE NOTE THE BACKGROUND NOISE LEVEL DUE TO TRAFFIC IN RED CURVE (BEGINNING AND END OF CURVE)

IR – MEASUREMENTS vs OTL – TERRAIN (Pa)



- The RED curve represents measurements
- The BLUE OTL-Terrain simulation
- 1st we hear anechoic voice at 1m
- 2nd again anechoic at 10m
- 3rd voice simulated by OTL-Terrain in the piazza at 10m
- 4th the voice from the IR of measurements at 10m (including traffic noise)







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Thank you for your attention.

I would welcome questions or comments.



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