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Maxir Laser	num Unambi energy rate (none-over	guous Range (Pulse La rlapping pulses)	aser)
	Pulse Rate (Hz)	Max Unambiguous Range	
	10 K	14990 m / 49179 ft	
	71 K	2111 m / 6927 ft	
	100 K	1499 m / 4918 ft	
	167 K	898 m / 2945 ft	







Pulse laser Range distance (R) and range resolution (Δ **R**) $R = c \frac{t}{2} \qquad \Delta R = c \frac{\Delta t}{2}$ where: *c*: speed of light (~299,792,458 meters/second) *t*: time interval between sending/receiving the pulse (ns) Δt : resolution of time measurement (ns)







	No.	e e	Portland State	
Principles o	of LiDAR – "F	Resolution"		
for the Portland City	Boundary			
	20 pulses/sq meter	8 pulses/sq meter	1 pulse/sq meter	
number of points	15,060,000,000	6,024,000,000	753,000,000	
for the LIGB				
	20 pulses/sq meter	8 pulses/sq meter	1 pulse/sq meter	







LiDAR reflectivity exa	amples	
White Paper	up to 100%	-
Snow	80-90%	
Beer Foam	88%	
Deciduous Trees	~ 60%	
Coniferous Trees	~ 30%	
Dry Sand	57%	
Wet Sand	41%	
Asphalt with Pebbles	17%	
Black Neoprene	5%	
Clear Water	< 5%	











199	A DESCRIPTION OF THE OWNER OWNER OF THE OWNER OWNER OF THE OWNER OW	Portland Sta
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Ele Edit Search View Format Document Language Se	<u>t</u> tings Macro Run Plugins <u>?</u>	
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P q45122d61be.txt		
2 7641072.87 667994.95 515.25		
3 7641051.74 667993.51 518.77		
4 7641068.23 667992.64 517.95		
5 7641046.57 667992.03 518.96		
6 7641040.21 667991.04 519.49		
7 7641048.26 667990.36 519.36		
8 7641041.98 667989.97 519.52		
9 7641056.22 667989.82 519.49		
10 7641055.49 667989.35 519.59		
11 7641072.09 667988.97 519.00		
12 7641043.81 667987.58 520.08		
13 /641039.76 66/986.43 319.91		
16 7641040 24 667094 70 521 22		
16 7641021.28 667984.21 521.09		
17 7641018.15 667983.91 521.03		
18 7641035.20 667983.05 522.34		
19 7641016.26 667982.23 522.08		
20 7641005.34 667981.74 523.52		
21 7641030.19 667981.44 523.13		
22 7641013.76 667981.02 522.64		
23 7641022.04 667980.21 521.26		
24 7641029.94 667979.80 523.49		
25 7641038.03 667979.12 523.75		
26 7641039.29 667978.49 523.95		
27 7641019.97 667978.07 522.70		
28 7641017.17 667977.73 522.83		
29 7641085.55 667977.42 524.21		
30 7641033.84 667977.35 524.18		
Normal text file	nb.char:16989327/Ln:1 Col:1 Sel:0	UNIX ANSI INS





	-	Portiand S		
Point Data Record for	ormat 0			
Item	Format	Size	Required	
X	long	4 bytes	*	
Y	long	4 bytes	*	
Z	long	4 bytes	*	
Intensity	unsigned short	2 bytes		
Return Number	3 bits (bits 0, 1, 2)	3 bits	*	
Number of Returns (given pulse)	3 bits (bits 3, 4, 5)	3 bits	*	
Scan Direction Flag	1 bit (bit 6)	1 bit	*	
Edge of Flight Line	1 bit (bit 7)	1 bit	*	
(1.1) Classification	unsigned char	1 byte	*	
(1.1) Scan Angle Rank (-90 to +90) – Left side	char	1 byte	*	
(1.1) User Data	unsigned char	1 byte		
		2 1. 1	*	































































