

Overlaps between scans and the height of the scanned objects

During the flight, TOPODRONE LiDAR scans an area of the surface of a certain width, which is called a "scan". The width of the scan is determined by the technical characteristics of the sensor, the operating altitude of the flight, as well as the difference in terrain.

For correct postprocessing of the data obtained from TOPODRONE LiDAR, it is necessary that neighboring scans have a common overlap. It is recommended to provide at least 30% lateral overlap to adjacent scans. Insufficient overlap between scans, especially in combination with significant relief differences, can lead to the formation of an area without data, which significantly reduces the quality of output materials.

On the other hand, a higher overlap value allows the most accurate calculation of the calibration angles of Roll, Pitch and Heading. When choosing a specific overlap value, it is necessary to take into account such parameters as the maximum length of the laser beam, the scanning angle (106 degrees for ALS) and the height of the scanned object.

To achieve optimal results when performing ALS using TOPODRONE LiDAR, it is recommended to set the following parameters when building a mission:

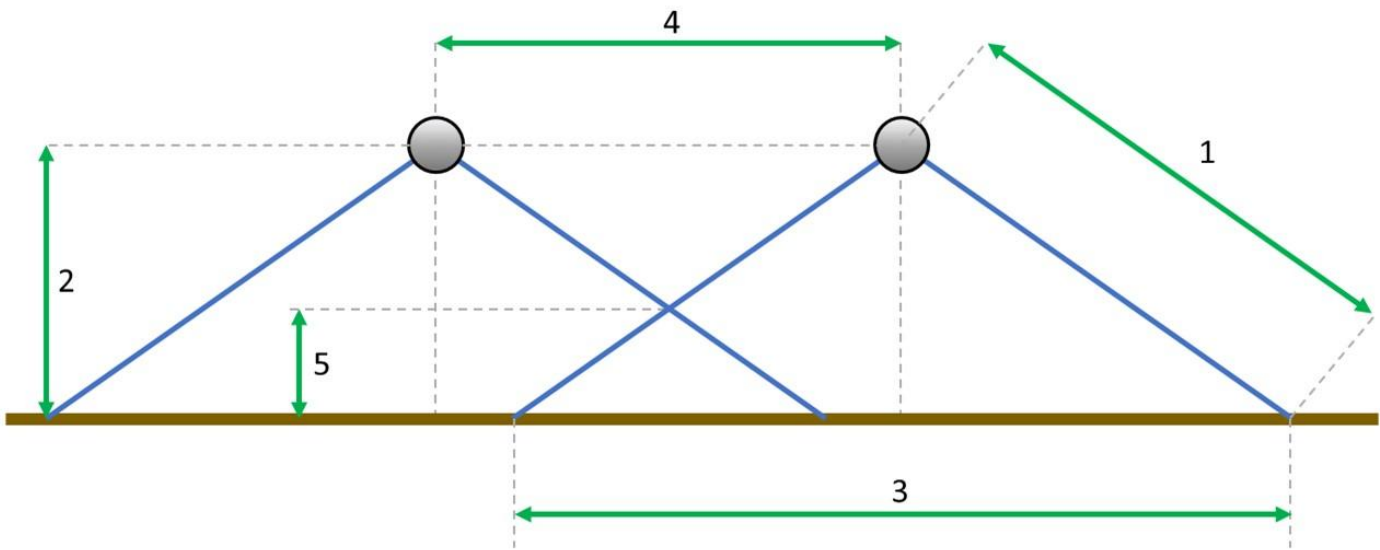
1	2	3	4				5			
LiDAR model, maximum beam length	Working height, m	Scan width, m	Distance between scan centers: % overlap				Maximum height of the scanned object: % overlap			
			30%	40%	50%	60%	30%	40%	50%	60%
TOPODRONE LiDAR 100+ и 100 120 m	50	134	94	81	67	54	15	20	25	30
	60	160	112	96	80	64	18	24	30	36
	70*	187	131	113	94	75	21	28	35	42
	80**	136	96	82	68	55	24	32	41	49
TOPODRONE LiDAR 200 300 m	90	240	168	144	120	96	27	36	45	54
	100	267	187	161	134	107	30	40	50	60

110	292	205	176	146	117	33	44	55	66
120*	240	168	144	120	96	36	48	60	72
130*	260	182	156	130	104	39	52	65	78
140**	235	165	141	118	94	42	56	70	84
150**	250	177	152	126	101	45	60	75	90

Table 1. Dependence of the distance between the scan centers on the overlap and the working height.

* The specifications are given for a scanning angle of 90 degrees.

** The specifications are given for a scanning angle of 80 degrees. With such characteristics, there is a significant decrease in the density of points.



The density of the resulting point cloud depends on factors such as flight speed, altitude, and surface reflectivity. As nominal initial values, it is recommended to conduct flights at a drone flight speed of 6 m/s at an operating altitude of 60 m for TOPODRONE LiDAR 100, 100+ and 100 m for TOPODRONE LiDAR 200+ with 40% overlap.

Further changes to these parameters must be made taking into account the features of the terrain, weather conditions and the maximum height of the scanned objects.

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