Aerial Survey Flight Plan: Lines and Photo Count

Ground coverage, air base, flight line spacing, number of flight lines and number of photographs for a rectangular area from scale, frame size, endlap and sidelap.

Method: Flight planning for aerial photography

Input parameters

Unit system: SI

Parameter	Value	Unit
Area length (along the flight lines)	12.000	km
Area width (across the lines)	8.0000	km
Focal length	152.40	mm
Flying height above ground	1,830.0	m
Frame size (square)	230.00	mm
Endlap	60.000	%
Sidelap	30.000	%
Extra photos at each end of a line	2.0000	

Calculated results

Parameter	Value	Unit
Ground coverage of one photo	2,761.8	m
Air base	1,104.7	m
Flight line spacing	1,933.3	m
Number of flight lines	6.0000	
Photos per line	16.000	
Total photos	96.000	

Notes for this case

• Coverage of a photo G = frame × H′/f. With endlap PE the air base is B = G(1 − PE); with sidelap PS the lines are W_s = G(1 − PS) apart. Lines = ⌈W/W_s⌉ + 1 (outer lines along the area edges), photos per line = ⌈L/B⌉ + 1 plus extra photos at each end to be sure of stereo coverage. 60 % endlap gives full stereo; drone mapping often uses 75–80 % endlap and 60–70 % sidelap.

Formula and method

$$G = \frac{wH'}{f}, \quad B = G(1 - PE), \quad W_s = G(1 - PS), \quad N_L = \left\lceil \frac{W}{W_s} \right\rceil + 1$$

Variables

L	Area length (along the flight lines)	m
W	Area width (across the lines)	m
f	Focal length	m
H'	Flying height above ground	m
w	Frame size (square)	m
PE	Endlap	-
PS	Sidelap	-
n_x	Extra photos at each end of a line	-
G	Ground coverage of one photo	m
B	Air base	m

W_s	Flight line spacing	m
N_L	Number of flight lines	-
N_P	Photos per line	-
N	Total photos	-

Method and standards

Flight plan.

Assumptions and limits

- Rectangular area; flat terrain; lines parallel to the long side.

References

Flight planning for aerial photography

Report details

Report reference	FCC-1J2R-TVHJ (the same inputs always give the same reference)
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Release checks	3 reference cases of this calculator, computed independently, are checked on every release

Results are for engineering estimation. Verify critical designs against the referenced standards and your own data.

This calculator online

https://calc.firecad.com/civil/surveying/flight-plan-photo-count

Open this case on calc.firecad.com →

Reopens the calculator with the inputs of this report.