Heights from Stereo Parallax (Parallax Equation)

Elevations of two points from their stereoscopic parallaxes on an overlapping pair of vertical photos, from flying height, air base and focal length.

Method: Parallax equations for vertical photos

Input parameters

Unit system: SI

Parameter	Value	Unit
Flying height above datum	1,220.0	m
Air base (distance between exposures)	390.00	m
Focal length	152.40	mm
Parallax of point A	90.500	mm
Parallax of point B	88.200	mm

Calculated results

Parameter	Value	Unit
Elevation of A	563.25	m
Elevation of B	546.12	m
Height difference	17.126	m
Height change per 0.01 mm of parallax at A	72.569	mm

Notes for this case

• A point appears in both photos of a stereo pair shifted by its parallax p (x on the left photo minus x on the right). Higher points have larger parallax: h = H − Bf/p. The sensitivity Bf/p² shows how finely parallax must be measured; a larger base-to-height ratio gives better height accuracy.

Formula and method

$$h = H - \frac{Bf}{p}, \quad \frac{\partial h}{\partial p} = \frac{Bf}{p^2}$$

Variables

H	Flying height above datum	m
B	Air base (distance between exposures)	m
f	Focal length	m
p_a	Parallax of point A	m
p_b	Parallax of point B	m
h_A	Elevation of A	m
h_B	Elevation of B	m
$h_A - h_B$	Height difference	m
$\partial h/\partial p$	Height change per 0.01 mm of parallax at A	m

Method and standards

Parallax heights.

Assumptions and limits

- Truly vertical photos at the same height; parallel flight line.

References

Parallax equations for vertical photos

Report details

Report reference	FCC-V5ZD-B78Y (the same inputs always give the same reference)
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Calculator	Heights from Stereo Parallax (Parallax Equation)
Method last reviewed	17 November 2026
Software release	FireCAD Calc, release of 22 November 2026
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/parallax-height-difference

Open this case on calc.firecad.com →

Reopens the calculator with the inputs of this report.