

Photogrammetric Brief

Two Cameras for Parallax Height Measurements*

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COMPARATIVE PANCHROMATIC aerial photographs of Hastings, New Zealand was obtained at a scale of 1:3,000 with two precision aerial cameras. One camera had a 24-inch focal length with a 30-degree lens angle; the other had a 12-inch focal length with a 60-degree lens angle.

The objective was to determine whether several photographic interpreters could measure heights of objects within ± 3 to 5 feet on the two sets of photographs by using a mirror stereoscope (4X) and a parallax bar.

Within an area common to both photographic flights, the heights of 10 objects (7 structures and 3 trees) were measured on the ground; the range of heights involved was from 10 to 65 feet. Objects were then measured by six photographic interpreters, designating A through F. Resulting height differences, as compared to ground heights, are summarized in Table 1.

Based on height differences that exceed ± 3 to 5 feet, results from the 12-inch photography were slightly superior to those from the 24-inch coverage. This is apparently due to the fact that the 12-inch photographs exhibited a greater degree of stereoscopic parallax and thus provided a more favorable parallax/height conversion factor.

Results from both sets of photographs were regarded as satisfactory, but it is interesting to note that all six interpreters expressed a personal preference for the 24-inch photography. The most logical explanation here is that the 24-inch camera lens used in this particular trial provided a higher degree of resolution than the 12-inch lens. An added advantage of the 24-inch lens, of course, is that it permits the taking of large-scale aerial photographs from twice the altitude above ground as compared to a 12-inch lens.

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TABLE 1. SUMMARY OF PHOTO HEIGHT DIFFERENCES FOR 12-INCH VERSUS 24-INCH FOCAL LENGTHS

Camera: 12-inch Lens Angle: 60 degrees	<i>Photo Interpreters</i>					
	<i>A</i>	<i>B</i>	<i>C</i>	<i>D</i>	<i>E</i>	<i>F</i>
Average Height Difference (ft)	2.1	2.9	1.2	1.7	1.2	1.0
Maximum Height Difference (ft)	+5	-7	-3	-3	+2	-3
No. of differences over 3 ft	1	2	0	0	0	0
No. of differences over 5 ft	0	2	0	0	0	0

Camera: 24-inch Lens Angle: 30 degrees	<i>Photo Interpreters</i>					
	<i>A</i>	<i>B</i>	<i>C</i>	<i>D</i>	<i>E</i>	<i>F</i>
Average height difference (ft)	2.9	4.2	1.5	1.5	1.5	2.6
Maximum height difference (ft)	+5	-15	-5	+3	-2	+7
No. of differences over 3 ft	4	3	2	0	0	3
No. of differences over 5 ft	0	3	0	0	0	1