3-1944

Photographic Interpretation Handbook, United States Forces: Section 11 Plotting from Photos

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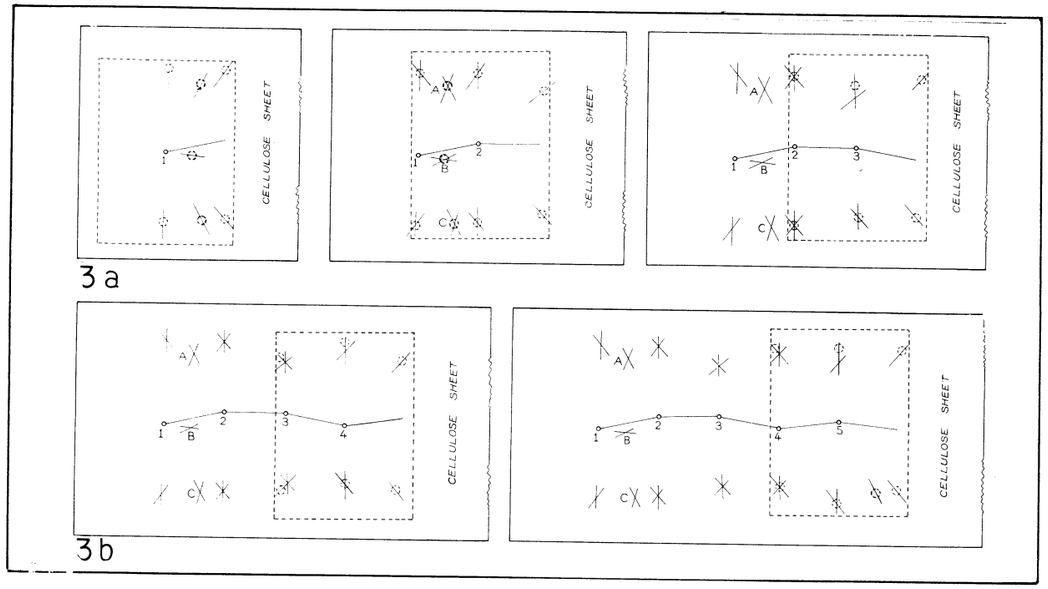
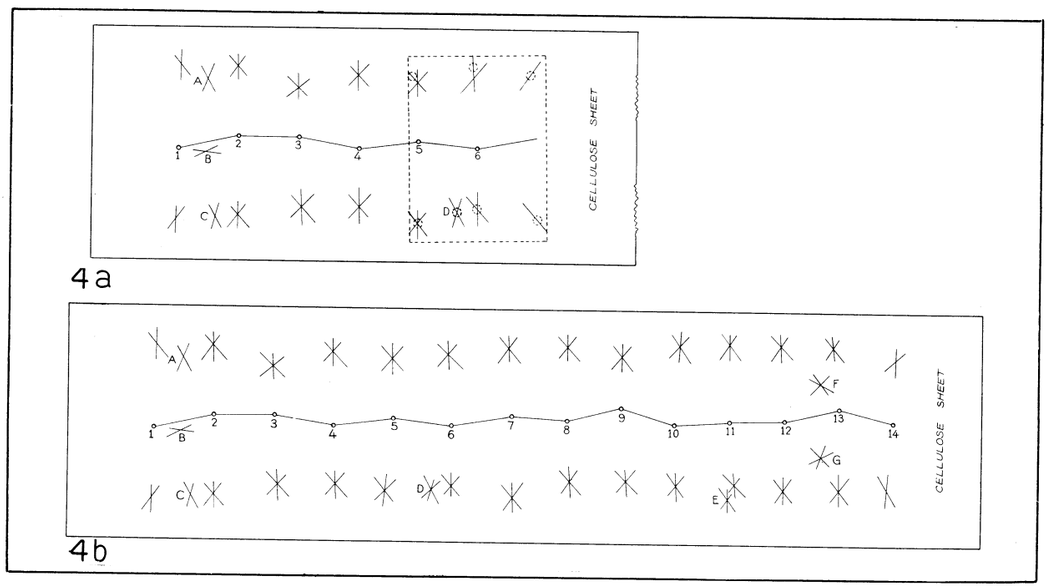
SECTION 11
PLOTTING

11.01 — 11.99



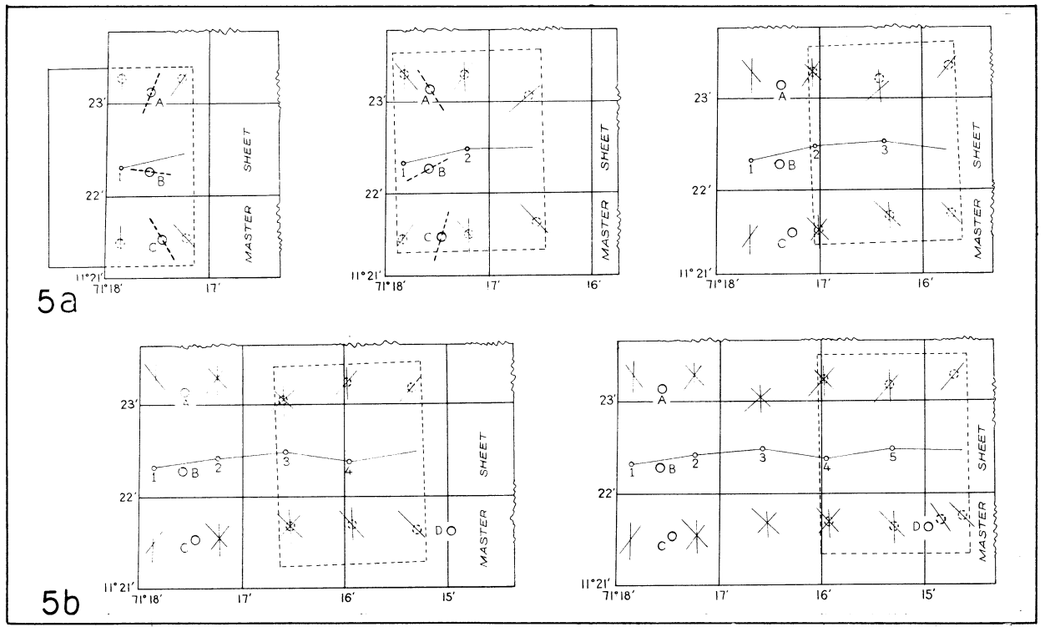
3a. Begin the preliminary radial plot. (All lines shown in 3a, 3b, 4a, 4b, to be drawn on the cellulose sheet in red, using a pencil).

3b. Preliminary radial plot extended.



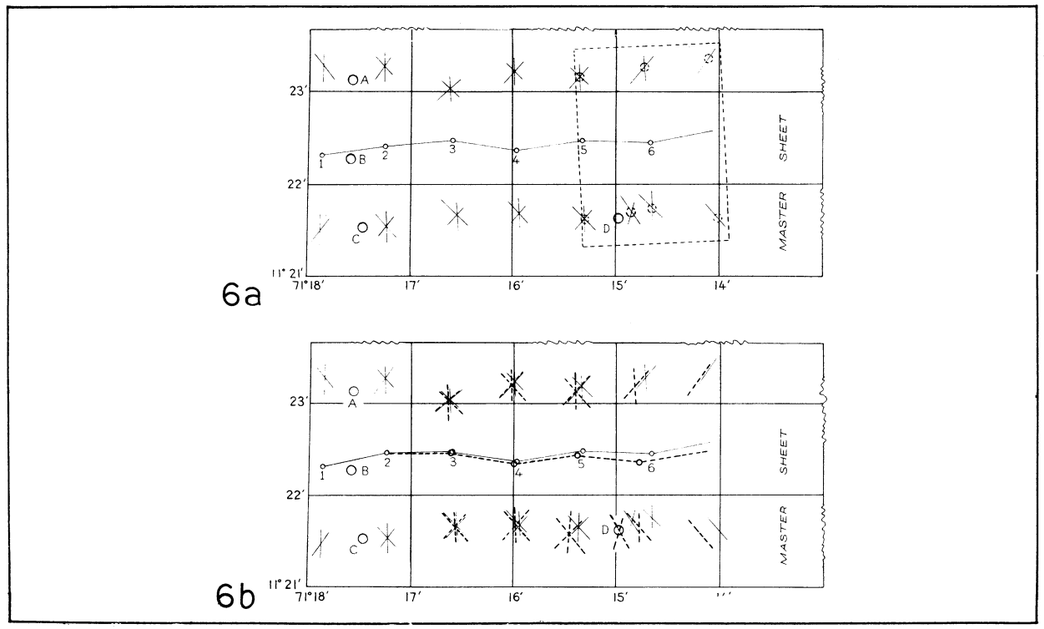
4a. Preliminary radial plot extended.

4b. Freliminary radial plot concluded. Now draw polyconic projection to the average scale of the flight. (The projection lines and the scale to be left in pencil, see Plate 7.) All ground control signals are plotted and marked with a small red circle (about ¼ inch diameter), using red cellulose ink. (This sheet is the MASTER SHEET.)



5a. Start the controlled plot. Extend the picture control between, and adjacent, to the located ground control.

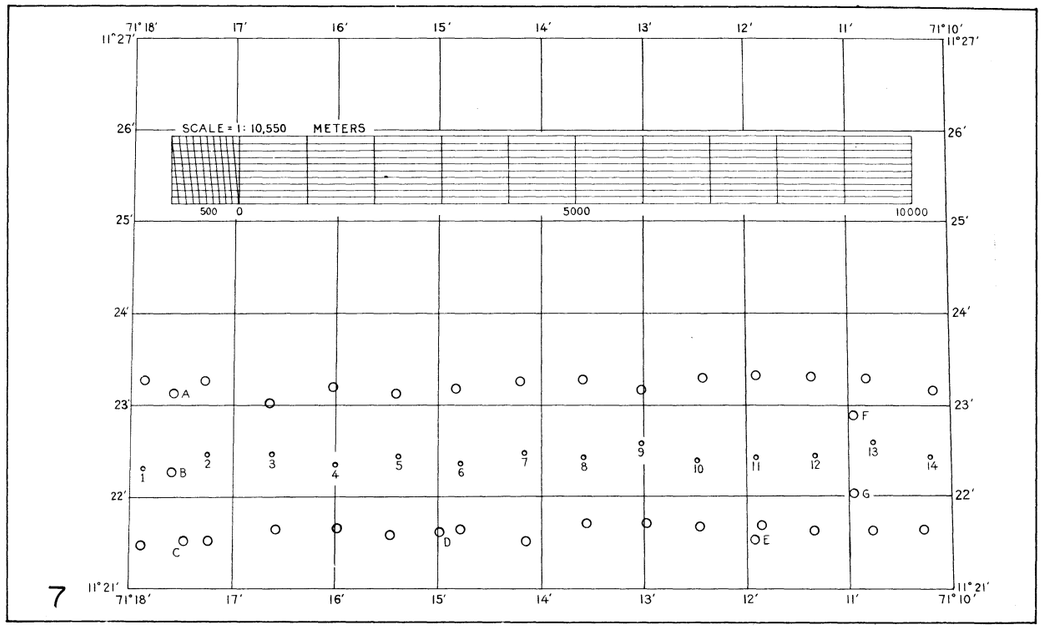
5b. Picture control plot extended.



6a. Picture control plot extended to the nearest ground control point. (All lines shown in 5a, 5b, 6a are drawn on the master sheet in red, using a pencil.)

6b. Adjustment of the picture control plot.

RADIAL LINE PLOT (CONT.)



7. The completed control plot. The radial intersections are marked with a small blue circle (about ¼ inch diameter), using blue cellulose ink, the principal points of all photographs are marked with a small red circle (about 1/16 inch diameter), using red cellulose ink. All points marked on reverse side of master sheet. The projection lines on the master sheet are inked (black cellulose ink) and the scale is inked (red cellulose ink).

TRACING DETAIL FROM PHOTOS TO WORK SHEET

PROCEDURE:

1. Select additional points to control planimetric detail (detail points). Such points may be along shore line, outlying rocks, drainage lines, buildings and other critical points necessary for tracing detail.
2. Transfer these detail points to each succeeding and preceding print. (¼ green circles)
3. Place photo under work sheet and orient it according to center point and intersections of picture control points on work sheet. Then get radial intersection of detail points by same method as picture control intersections were obtained. (¼ green circles)
4. Place each pair of photographs under stereoscope and outline ground detail desired by drawing on photographs.
5. Place photograph under work sheet in its proper orientation.
6. When tracing detail, move detail point of intersection on sheet exactly over the corresponding detail point on the photograph, keeping in line with the principal point. Then trace the detail around this detail point and gradually move the work sheet so that when tracing arrives at the next detail point, the detail point on the work sheet is exactly over the same detail point on the photograph. This movement from point to point, should be from the principal point, in or out, as the case may be.

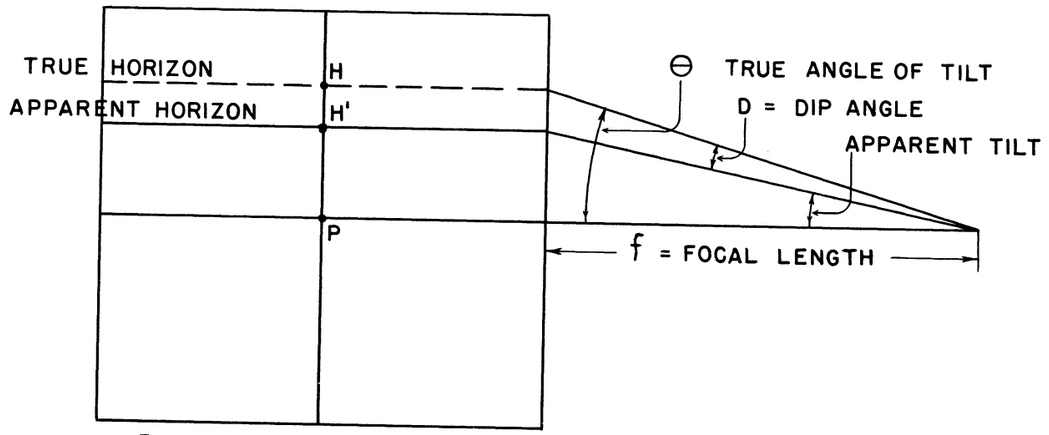
CONSTRUCTION OF CANADIAN GRID

Three conditions are required:

1. Precise focal length
2. Flying height
3. Visible horizon

PROCEDURE:

I Establish true horizon.



P - principal point
A - altitude
Θ - True angle of tilt (apparent tilt + dip angle)
H1 - Apparent horizon
H - True horizon
D - Dip angle

$$\tan \text{ of apparent tilt} = \frac{\text{PH1 measured on photo in inches}}{\text{focal length in inches}}$$

Dip angle in minutes = .98 altitude in feet

Distance PH is found from formula

$$PH = f \tan \Theta$$

Line PH is perpendicular to the apparent horizon.

Draw a line thru H parallel to the apparent horizon.

II Erect a construction line AA' parallel to the true horizon thru point G. (Diagram on following page).

$$HG \text{ in inches} = \frac{\text{Altitude}}{\cos \Theta} \times \text{Scale}$$

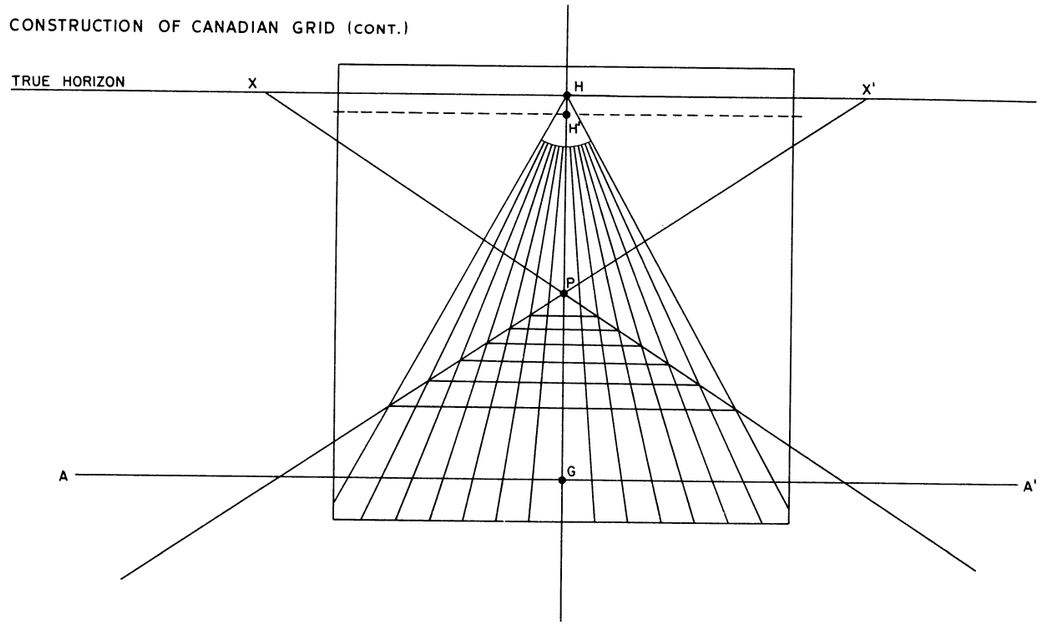
Scale Scale of grid

Example: Scale - 1" on grid = 660' on ground
Altitude - 5,000
Tilt - 30°

$$HG = \frac{5000}{866} \times \frac{1"}{660'} = 9.99"$$

Point G is plotted along a line thru P. The construction line AA' parallel to the true horizon is drawn thru G.

CONSTRUCTION OF CANADIAN GRID (CONT.)



III Lay off along AA' equal space units(previously determined as the scale of the grid)originating spaces at point G. Draw meridians connecting these points and point H.

IV The vanishing points for a system of parallel lines that make an angle of 45^{o} on the ground with the meridian lines is located on the true horizon at a distance HX or HX^{1} from point H.

$$HX \text{ or } HX^{1} = \frac{f}{\cos \Theta}$$

Plot X and X^{1} and draw lines thru P from X and X^{1} cutting across the meridian lines.

V The points where the diagonals cross the meridian lines will give the proper spacing for the horizontal lines.

METHOD OF MAKING BASE MAP FROM AN OBLIQUE

Four conditions are required:

1. Precise focal length
2. Flying heighth
3. Visible horizon
4. Comparatively flat terrain

I Establish true horizon.

Θ = Apparent tilt + dip angle
(Same as Canadian grid)

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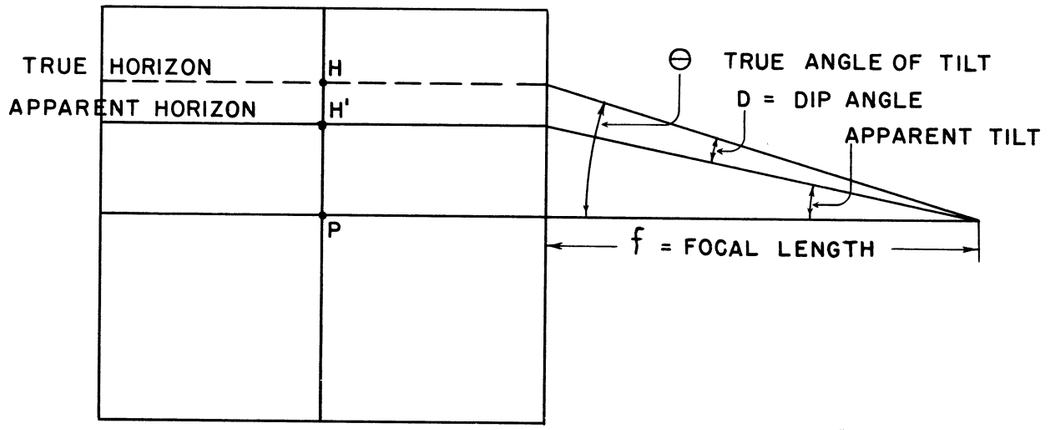

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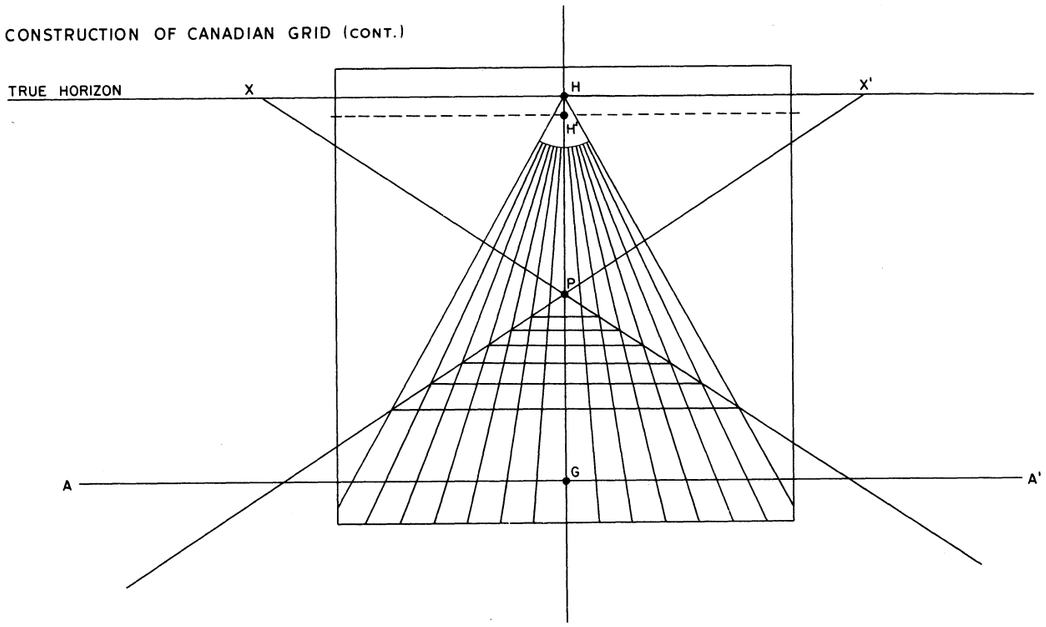

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METHOD OF MAKING BASE MAP FROM AN OBLIQUE (CONT.)

II Draw perpendicular (principal line) from true horizon passing through principal point.

NOTE: Procedure involved in I and II is the same as that for Canadian grid.

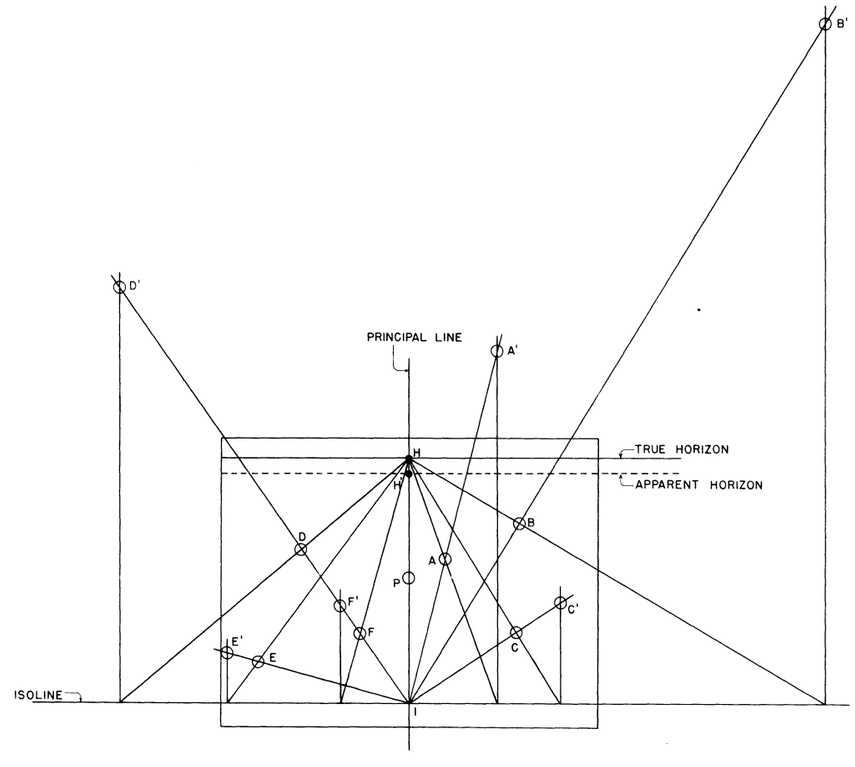
III Determine isocenter.

$$\text{Distance HI} \quad \frac{\text{Focal length in inches}}{\cos \Theta}$$

IV Erect a construction line (isoline) parallel to the true horizon passing through the isocenter. This construction line gives a scale equal to that of a vertical photograph of same focal length and same altitude.

V Draw rays through image points selected as control from the perspective center H. Project these rays through the image point to the isoline and at this intersection erect a line parallel to the principal line.

VI Then, from the isocenter draw rays through the image points, and points where these rays intersect the parallels erected from the isoline are the rectified positions in a horizontal plane.



TRI · METROGON PHOTOGRAPHY & MAPPING

In trimetrogon photography an assembly of three cameras is used. One camera is directed vertically downward and two are mounted at an angle of 30° from horizontal and perpendicular to the line of flight. The two oblique cameras are so placed that they photograph both the horizon and a small area covered by the vertical camera. All cameras are exposed simultaneously, so that the area from horizon to horizon, perpendicular to the line of flight, is covered by the three photographs.

For mapping large areas at a small scale (1:1,000,000 to 1:250,000) trimetrogon photography has the following advantages:

1. The distance between flight lines can be much greater than in single lens photography (about 25 miles apart at 20,000 feet.)

2. Flight lines need not be flown as accurately as in single lens photography.

3. Less ground control needed.

4. More economical for mapping large areas (less film, fewer flying hours.)

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II Draw perpendicular (principal line) from true horizon passing through principal point.

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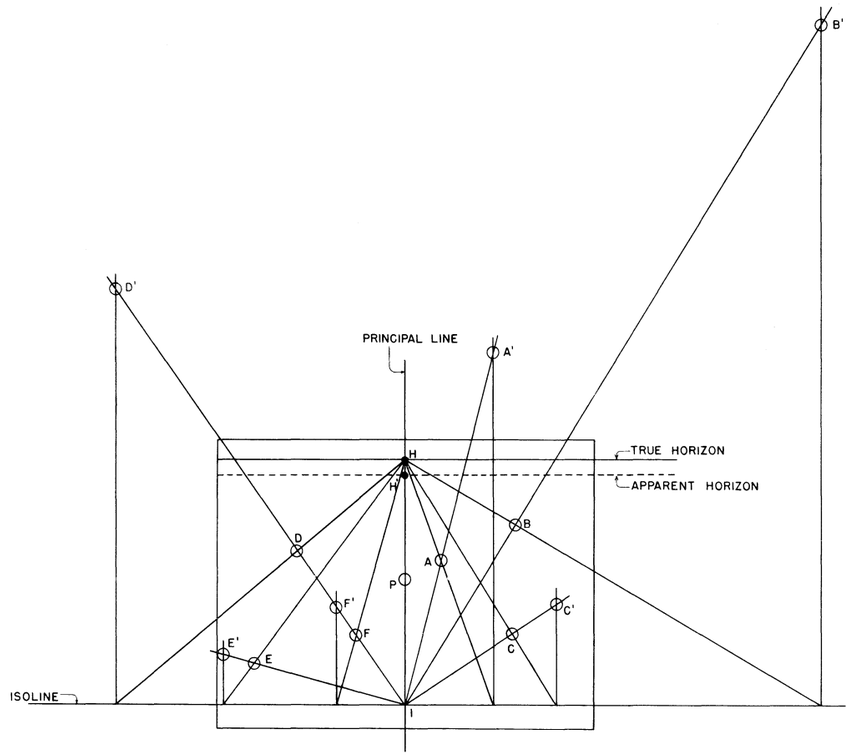

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