Remote Sensing Brief

MIKE L. MATHEWS*
GARLAND N. MASON
School of Forestry
Stephen F. Austin State University
Nacogdoches, TX 75962

High Intensity Dot Grids

Dot grids suitable for accurate area determination were produced from half-tone screens.

INTENSE APPLICATION of high resolution, ultra small-scale aerial photography, and very large-scale, small format photography (1:800 to 1:6,000) to inventory assessment, vegetation analysis, and biomass studies creates a need for modified interpretation methods. Outstanding among these needs is accurate area determination. Physical size of small format photography and object size in ultra small-scale photography (> 1:100,000) is often limiting to standard equipment.

One solution is the use of high intensity dot grids ranging from 2,500 to 10,000 dots per square inch (388 to 1,550 dots per square cm). Grids of this type can be made through a standard photographic reduction process, which is expensive and often unstable. A more efficient method is to use photographic half-tone screens. Half-tone screens are available at any local newspaper or printing shop and consist of a silk string mesh placed in a two-dimensional grid. Light passing through the mesh produces systematically spaced dots of uniform size. Contact exposure of photographic film to a 100 lines per inch half-tone screen for example, produces a dot grid with an intensity of 10,000 dots per square inch. The final processed image provides a perfect placement of dots barely visible to the naked eye. This transparent grid may be projected or magnified to any scale for easy counting as with any standard dot grid. Half-tone screens are available in several dimensions. A screen with 65 lines per inch, for example, has 65 horizontal and 65

* Now with the Remote Sensing Center, Texas A&M University, College Station, TX 77843.

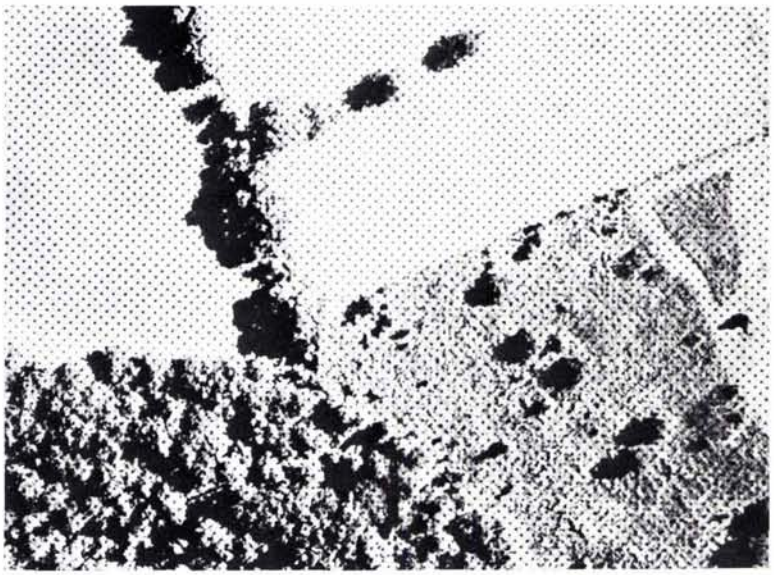

FIG. 1. A 5.3 time enlargement of a 35 mm aerial photograph superimposed with a 7,225 dots per square inch dot grid. (Negative scale 1:10,000).

PHOTOGRAMMETRIC ENGINEERING AND REMOTE SENSING,
Vol. 45, No. 4, April 1979, pp. 517-518.

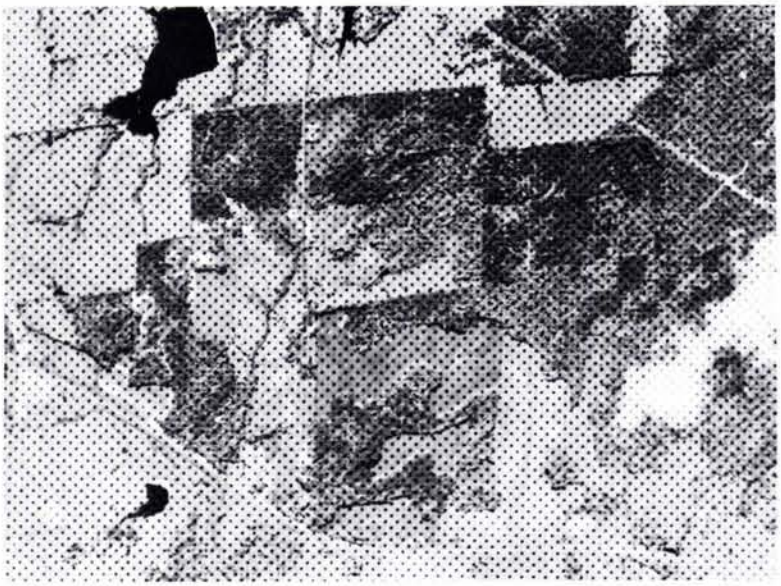

FIG. 2. A 5.3 time enlargement of a high-altitude aerial photograph with a 7,225 dots per square inch dot grid overlay. (Negative scale 1:100,000).

vertical lines. Squaring the number of lines per inch will produce the number of dots per square inch (4,225). The size of the dots can be varied by lengthening exposure- or developing-time. If half-tone screens of desired density are not available, the half-tone dot grids can be photographically adjusted to the intensity desired.

High intensity dot grids are applicable where relatively small spatial areas are to be determined or where greater accuracy is desired. In many regions where forest species have irregular shaped crowns, crown area is being substituted for crown diameter in volume and density estimation. High intensity dot grids are very useful for determining crown area on large- and medium-scale photos. Figure 1 shows an enlargement of a 35 mm large-scale photograph (1:10,000 negative scale) with a 7,225 dots per square inch dot grid inserted in the slide mount. Since the scale of the aerial photo and the intensity of the dot grid are known, simultaneous projection or magnification provides simple area estimation regardless of the size of enlargement. Figure 2 illustrates how a small-scale (1:100,000) photo might look while superimposed with a 7,225 dots per square inch dot grid to be used for land-use area determination. There are many other conceivable uses of high intensity dot grids, such as photomicrographs or radiographs, where greater precision is desired.

(Received June 19, 1978; revised and accepted January 8, 1979)