

A SURVEY OF CURRENT PERIODICALS OF POSSIBLE INTEREST TO READERS

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Photogrammetry—The Evaluation and Calibration of Photogrammetric Systems, B. J. Brettler, Edgerton, Germeshausen and Grier, Inc., Report No. 1140. September 1954.

Author's Abstract.—Photogrammetry is an invaluable measurement technique in many phases of engineering and scientific research. The photogrammetric function of a photograph is to record details in such a way that they can be identified, and a reconstruction made of the original geometric relationships between them. This thesis is an investigation of those aspects of the problem which are due to the non-ideal nature of all photogrammetric components and a report of this work, and of pertinent work appearing in the prior literature, in a manner intended to be useful to the engineering community.

The conceptions and limitations of the more important photogrammetric components, such as cameras, lenses and emulsions, are discussed. The significance of the inner orientation is dealt with at length, in as much as a thorough understanding of the non-ideal behavior of inner orientation is essential to the understanding and use of photogrammetric techniques. Methods are derived which enable one to calculate the probable error in exterior orientation as a function of the parameters and errors of inner orientation.

In particular, the useful three point system for the field determination of the inner orientation in non-calibrated cameras is analyzed. Two existing techniques (Bridgland and Merritt) are discussed and a new technique is introduced. The conditions for optimal calibration accuracy are derived and it is shown that, under present day limitations, the Bridgland technique offers the highest accuracy, but that with the advent of wider angle, low distortion optics, the new solution may be optimal.

The distortion of a lens is perhaps the most important aberration from the photogrammetric point of view. All of the known methods for distortion calibration are discussed and evaluated. This thesis presents

a camera function for the correction of distortion for all lenses of a given type thereby doing away with the necessity for individual lens corrections. The important difference between the distortion calculated by ray tracing and the effective distortion resulting from the interaction of all aberrations is discussed, and data are presented to substantiate the conclusions. The use of the rotating telescope goniometer for the distortion testing of cine lenses is investigated and, to the best of the author's knowledge, the first data on cine lens distortions are presented. From the deviation of the distortion patterns from those calculated by ray tracing, one can qualitatively evaluate other aberrations.

(It is hoped that this thesis will provide an understanding of the utility and limitations of photogrammetry as a tool of scientific research.)

NOTE: This work was originally written as a doctoral thesis for the Mechanical Engineering Department at the Massachusetts Institute of Technology.

Stereo Photomicrography with Cameras of Fixed Interocular Distance, H. M. Lester and O. W. Richards, *Photographic Engineering*, Vol. 5, No. 3, 1954, pages 149-160.

(Author's Abstract.—Stereo photomicrography in color and in black-and-white with cameras of fixed interocular distance requires a suitable prism between each eyepiece of the bi-objective microscope and the camera lenses to bring the two optical axes into coincidence. Monobjective binocular microscopes require a simple system of polarizers to divide their single image into a pair of stereo aspects of the specimen. The monobjective binocular microscope is capable of yielding stereo photomicrographs of high magnification and good resolving power. Equipment and methods are described for securing stereo photomicrographs of good quality with the aid of either type of microscope. Principles of lighting are explained and a practical method for determining correct exposure is offered.)

The Use of Polynomials for Adjusting Strips to Control, D. W. G. Arthur, The Photogrammetric Record, Vol. 1, No. 4, October 1954, pages 50-53.

(A short article presenting some experiences of the Photogrammetric Section of the Ordinance Survey in determining a suitable polynomial expression for adjustment of a strip to control.)

The Adjustment of a Block Aerial Triangulation Evaluated with the Wild A-5, H. H. Brazier and V. A. Williams, The Photogrammetric Record, Vol. 1, No. 4, October 1954, pages 5-16.

(A practical aerial survey operation of the Island of Barbados is described and discussed with specific emphasis on the block adjustment of the aerotriangulated strips. Accuracy figures are quoted.)

Heights from Parallax Measurements, E. H. Thompson, The Photogrammetric Record, Vol. 1, No. 5, October 1954, pages 38-49.

(A method is presented for determining approximate elevations from stereo pairs with a simple parallax bar and adjusting these elevations for the effect of tilt.)

Design Features of a Wide Film Continuous Processor, D. D. Lassiter and J. Barnett, Photographic Engineering, Vol. 5, No. 3, 1954, pages 166-171.

(Author's abstract.—In the field of wide-

film processing a need has existed for some time for a more accurate and rapid means of processing wide film and papers. At White Sands Proving Ground in New Mexico the processing of these materials has been accomplished with Air Force type portable units and aerial type film driers.

Exhaustive tests were conducted with these units to establish good processing controls, but a review of the sensitometric data proved conclusively that consistent processing could not be accomplished. Design was therefore effected of the Model P-5.5 wide film processor for continuous processing and drying of 5½" and 70 mm. films.)

The Effect of Haze and High Solar Altitude on the Density of Air Survey Negatives, R. Hall, The Photogrammetric Record, Vol. 1, No. 4, October 1954, pages 20-36.

(Author's Abstract.—The effect of haze in vertical daylight air photography for various solar altitudes is considered. If appreciable haze is present the density of negatives exposed when the solar rays are inclined to the vertical at angles less than the lens field semi-angle may vary over the field to such an extent that the photographs will be unsuitable for survey purposes. A theoretical investigation is made and practical results analyzed. Methods by which the phenomena may be avoided are suggested. The effect on negative density of the variation in shadow length across the picture is also discussed.)

REVIEW OF BOOKS, PUBLICATIONS AND PAPERS

Photographic Measurements: Problems and Solutions, by Gomer T. McNeil, Pitman Publishing Corp., New York, Unpaged, cloth bound, 1954.

Photogrammetry has come a long way in the past fifteen or twenty years, and more specifically during the last five or ten years. It continues to have an excellent future as a dynamic and progressive industry. The author has ridden along with this growth from his days with the Tennessee Valley Authority, later with the Naval Photo Interpretation Center, and finally with Photogrammetry, Inc., of which he is President. In his latest affiliation it no longer can be said that he "rides along."

Rather, he helps to drive the wagon which is hitched to the star of photogrammetry.

The author does not agree with Mr. Webster in his definition of photogrammetry—"The science or art of obtaining surveys by means of photography; specifically, the process of making maps from photographs, especially aerial photographs." Instead, he defines it as: "The science and art of obtaining reliable measurements from photographs." And his book proceeds to show that the latter definition has more significance and validity than the former.

The book is primarily a compendium of problems illustrating the various tech-