

PANEL ON AERIAL PHOTOGRAPHY*

MODERATOR

W. E. Harman, Jr., U. S. Geological Survey, Washington, D. C.

PARTICIPANTS

E. H. Pallme	<i>Camera Mounting for Photogrammetric Purposes</i>
Raymond H. Miller	<i>The Role of the Airplane in Aerial Photography</i>
J. L. Tupper	<i>The Influence of Atmospheric Haze on the Quality of Aerial Photographs</i>
Herbert Trager	<i>Precision Lenses and Shutters</i>
Earl Knibiehly	<i>Mass Production of High Quality Contact Prints</i>
Gomer T. McNeil	<i>Miniaturization of Aerial Photography</i>

Introduction

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THE purpose of this panel is to discuss some of the operational aspects and related problems and certain types of equipment and procedures which govern the final quality of aerial photography.

The aerial photograph comes to the user in some form of reproduction from the aerial negative. We who are primarily concerned have noted a constant improvement in the quality of aerial photography in the last few years. Some of this can be attributed to the efforts of the participants in this panel. Each one is a recognized expert in his field.

The majority of this audience is undoubtedly a user of the pictures rather than a producer. Therefore the material to be presented will serve to acquaint the user with some aspects related to production but will also be of interest to the producer, so that he can compare his own operations and equipment with those described today.

In any line of endeavor, research and development are absolutely essential. But from time to time it is necessary to stop and assess the developments which have taken place and ascertain if full use is



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being made of the capabilities and potentialities of the available information on these developments.

The end result of the photographic mission is the aerial negative, whose quality, both geometric and photogrammetric, controls all of the later operations, both

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as to accuracy and cost, whether the purpose be mapping or photo interpretation. Of paramount importance also is the reproduction made from this negative, since it is from this medium that the information is gleaned.

As stated on the program Mr. Pallme will read the first paper. He will be fol-

lowed by the others in the order given on the program. Following the end of each paper there will be a ten-minute period for questions and discussions. Each speaker will be glad to answer, or try to answer, any question that you may have concerning some aspect or detail that was discussed in his paper.

Camera Mounting for Photogrammetric Purposes

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ABSTRACT: *When using an aerial camera for mapping purposes it must be mounted in an aircraft so that the mapping system will produce photography to meet the requirements of the contract or mission. These requirements vary according to the contract or mission, the aircraft and camera used and the flight conditions. Requirements for steadiness producing high resolution are separate from those for verticality. According to the needs different mounting methods are available, the Twinplex mount representing one of the specialized types. Future developments include improved verticality and higher resolution by techniques now under consideration.*

AERIAL mapping is the product of a complete system integrated from the initial planning through the final delivery of the map. Requirements vary for different agencies and different producers but in each case the end product or mission requirement describes the entire system needed to produce the desired result. The mission requirements are always compromised somewhat by the equipment available to perform the mission, and this equipment should be steadily improved where such improvement results in an economic gain for the using or producing agency.

In aerial mapping, photographs are required with proper orientation in roll, pitch, azimuth, altitude, transverse position, longitudinal position and time. Today any of these seven degrees of freedom can be controlled to almost any degree of the accuracy one wishes to demand of the system. The only limit to such accuracy is the cost in time, money, weight, com-

plexity and reliability. A generalized curve is shown in Figure 1 and applies to any of the relationships in question by proper modification. In the commercial mapping field one point on the curve may apply to a particular problem or contract whereas in the military field another point may apply. The commercial mapping system has certain allowable tolerances but has the requirement that these tolerances must be met economically. In the military system the timeliness is often of a much higher degree of importance.

The seven degrees of freedom will be reviewed in their reverse order.

1. Time is a rather broad degree of freedom. The need for photography at the right time of year, the urgency of need, the politically motivated and controlled desire to obtain photography of an inaccessible area, the availability of equipment: all of these items are factors in the time domain.

2. Longitudinal position control is accomplished by an intervalometer often