

## AERIAL PHOTOGRAPHY FOR STATE AND LOCAL PLANNING\*

*Francis A. Pitkin, Executive Director, State Planning Board,  
Harrisburg, Pennsylvania*

IN APPROACHING this subject, we must recognize that the word "planning" is a very inaccurate term. Even when we consider it only in its restricted meaning in the term "state and local planning," it still may embrace many forms of activities—including, among others, the inventorying of resources, the appraisal or delineation of problems, the development of administrative processes, procedures or policies, the development of remedial measures of various kinds, or the development of construction plans and specifications. The term is also misunderstood from the point of view of the persons or agencies who engage in planning. Some professional planners would like to create the impression that it is a mysterious process which is carried on only by officially-created planning commissions or the especially trained technicians engaged in city planning. Obviously this is not the case. By far the larger amount of state and local planning, and some of the most effective, is performed by or for the regular administrative agencies responsible for the various segments of our state and local government.

In general, it is difficult to think of any phase of governmental planning involving the use of large areas of land which cannot be greatly facilitated by the use of aerial photographs. In discussing this subject, I could talk in vague generalities, but to an audience of this kind which is less interested in oratory than in hard facts, it may be more productive to discuss the actual experience which we have had with air photographs in Pennsylvania. In Pennsylvania we have had state-wide, general-purpose air photographs for about ten years. They were acquired as the result of a cooperative program developed by the State Planning Board with the United States Department of Agriculture. When judged by the standards existing ten years ago, these air photographs were excellent, but when compared with more recent photography which we have acquired for part of the state, the early photography is far from adequate. However, despite the limitations of age and quality of those air photographs, we are continually being amazed at the widespread use that is made of them, and the multiplicity of purposes which they have served. To list all of these uses would be quite impossible, but among them the following should certainly be mentioned:

In the field served by the *Pennsylvania Department of Forests and Waters*:

1. The determination of extent of forest cover—both in acres and in percentage of total area.
2. Appraisal of type and timber volume of forest stands.
3. Development of plans for timber harvest.
4. Development of plans for forest fire protection—involving access trails, firebreaks, sources of water supply, etc.
5. Development of plans for insect-pest control.
6. Development of reforestation plans.
7. Analysis of stream channel encroachments.
8. Analysis of proposed dam locations.
9. Analysis of flood plains as to extent, degree and type of development, etc.
10. Analysis of land involved in proposed flood control works.
11. Analysis of land cover, degree and type of development, highway and railroad location, etc., on sites proposed for reservoir developments.

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12. Similar analyses in connection with sites proposed for use as spoil banks in stream dredging programs, as well as analyses of the stream channels to be dredged.
13. Analysis of land proposed for use as State Parks.
14. Detailed studies of park areas incident to preparation of development plans.

In the field served by the *Pennsylvania Game Commission*:

15. Preliminary study of lands proposed for acquisition as State Game Lands.
16. Detailed study of specific areas in developing plans for game refuges, restocking programs, etc.
17. Detailed studies of game feed problems.
18. Development of plans for access roads, fire protection, etc.
19. Planning of boundary markers, etc.

In the field served by the *Pennsylvania Fish Commission*:

20. Analysis of proposed sites for fish hatcheries.
21. Development of plans for wing dams and other stream channel improvements.
22. Analysis of streams as to extent of shade and other factors influencing restocking programs.
23. Determination of points of access to streams in connection with restocking operations.

In the field served by the *Pennsylvania Department of Highways*:

24. Preliminary determination of highway routes—as to topography, type of land use, kind and degree of development, relationship to communities or areas to be served, relationship to other highway facilities, etc. It should be noted that this is preliminary to and quite different from the detailed aerial mapping of the route finally selected which is discussed by Mr. Farley Gannett on this program.
25. Preliminary analysis of critical highway problems—such as grade crossings, traffic “bottlenecks,” etc.
26. Selection of sites for Roadside Rests and the development of plans for such areas.
27. Development of state highway maps—either state-wide or on a county basis.

In the field served by the *Department of Property and Supplies*:

28. Site selection, site planning and facilities development for all State building operations—including buildings for all State agencies, state hospitals and sanitariums, penal institutions, buildings for The Pennsylvania State College and State Teachers Colleges, etc.

In the field served by the *Department of Internal Affairs*:

29. This Department, in cooperation with other State and Federal agencies, uses air photographs in connection with geologic mapping. (In addition to specialized air photographs used in topographic mapping.)

*The Pennsylvania State College* uses air photographs in:

30. Soil surveys.
31. Forestry instruction.
32. Study of mineral industries.

In the field served by the *Pennsylvania Department of Commerce*:

33. Guidance of new industrial developments. Air photographs have been invaluable in helping industrialists select sites for new industries, answering in a few minutes the questions which the industrialist has as to topography and land cover in the proposed area, relationship to water supply, transportation facilities, housing, and all of the other factors pertinent to a satisfactory industrial location job.
34. Selection of routes for power transmission lines, oil pipe lines, telephone cables, etc.

During the war years the State Planning Board found the state-wide air photographs of inestimable value. Not only were the air photographs used as an important source of information in selecting sites for war industries, but also (35) they were used in the selection of sites for cantonments, artillery ranges, storage depots, and many other types of wartime governmental development. I could cite just one example—the selection of a site for a TNT plant involving something over ten thousand acres—where the immediate availability of air

photographs enabled us to select a site satisfactory to the Army officials and which involved an expenditure for land acquisition \$600,000 less than the site originally selected by the Army. The saving involved in this one project far exceeds the cost of our state-wide air photography.

You will note that the long list of uses which I have just given apply only to the use of these air photographs by agencies of the State government. An equally impressive list of uses by local governmental agencies could be given.

Perhaps the most important of these local uses is in the field of local planning and zoning (36). Air photographs provide the quickest, most accurate and least expensive method of securing a record of existing uses of land. This obviously is the starting point on which all plans for the future development of the community must rest. Not only do they provide the detailed information on existing use of land, but they form an admirable source from which to trace the base maps on which all of the local planning studies will be recorded. Providing accurate knowledge as to the location of existing streets, public buildings, park areas, transportation facilities, etc., they form a much more reliable source of information than do the maps ordinarily found in the municipal engineers' office.

Since the preliminary studies leading up to the development of a zoning plan and ordinance require an accurate knowledge of the location and type of buildings, set-back from the streets, percentage of lot occupied, etc., air photographs of high quality and at a suitable scale are almost essential. The only alternative is expensive and time-consuming, and necessarily less accurate field studies.

Many local governmental units in Pennsylvania are using air photographs as the base for accurate tax maps (37). Many tax collection agencies have found to their surprise that a considerable amount of untaxed property exists because of deficiencies in tax levying methods. The quickest, least expensive, and most accurate means of insuring taxation of all property is to outline on an aerial mosaic the actual boundary of each piece of property for which taxes are being collected. Untaxed areas are immediately apparent. Most counties or municipalities making such a study of current tax rolls discover a surprising amount of property which has been escaping taxation for many years.

Air photographs are used in schools in teaching geography and conservation (38).

Extremely important is the use of air photographs by County Soil Conservation Districts, as the basis for detailed land-use planning (39).

Perhaps one of the most surprising uses is in finding escaped prisoners (40). The Superintendent of one of our large penal institutions uses an air photo mosaic in directing the search for escaped prisoners. (Perhaps that isn't "state planning"—but I imagine that the captured prisoners have some caustic term for it.)

This list of about forty State and local uses of air photographs might be extended almost interminably. However, I am sure that I have made the point clearly that, in the availability of air photographs, we have one of the most useful tools of governmental operation. At every level of government, it has resulted in more expeditious, more economical, and more effective conduct of governmental operations.

In Pennsylvania, we are now concerned with keeping this tool in such condition as to permit maximum effectiveness of use. The state-wide air photographs which we acquired ten years ago have been invaluable, but already they are losing some of that value through obsolescence. We are now developing a program whereby at least ten percent of the area of the State can be rephoto-

graphed each year. With such a basic program, we would never have to rely on photographs more than ten years old for any area. This basic program would be supplemented by more frequent photography of areas in which there has been an unusual degree of land-use change.

This same interest in state and local governmental use of air photographs exists in other states. As Chairman of the Committee on Mapping and Technical Services of the nation-wide Association of State Planning and Development Agencies, it was my pleasure to recommend to the Association a complete program of the mapping, air photography, and other technical services which we felt were indispensable tools in planning for the development of every state. These recommendations were unanimously adopted by the Association at their meeting in Nashville, in May of this year, and have been called to the attention of state authorities throughout the nation.

In conclusion, I wish to congratulate the members of the American Society of Photogrammetry for the great contribution they have made to this rapidly developing science of air photography. I believe that you are making one of the most important contributions to economy and effectiveness of governmental operation, and I wish you every success in the further development of photogrammetry.

## AERIAL PHOTOGRAPHIC TECHNIQUES IN FORESTRY\*

*Stephen H. Spurr, Assistant Professor of Forestry, Harvard University*

A FORESTER is, in essence, a jack-of-all-trades. He has to know a little about a great many things, and as a result is apt to know only a little about any one thing. Photogrammetry, for instance, is fast becoming an essential tool in forest management: yet working with aerial photographs is only a minor part of the job of the forest manager.

In evolving or adapting aerial photographic techniques to forestry, we must constantly keep in mind the fact that the photographs constitute only one of the several important tools with which the forester must work. We must provide methods that will do the job rapidly and well, and yet which will not require too much in the way of equipment or training. Just as the forester must every so often take his transit out of the closet and run a traverse, so must he be able to take some photographs out of the drawer and obtain from them quickly and easily the information he requires.

Since his working tools are provided by the photogrammetrist, the success of the forester in using aerial photographs depends to a large extent upon the ability of the photogrammetrist to understand and to anticipate the needs of his colleague. I should, therefore, like to discuss briefly three points: (1) What are the forester's special needs with regard to aerial photographs, equipment, and photogrammetric techniques? (2) How does the forester use the photographs in his work? and (3) To what extent can specialized photogrammetric personnel anticipate and provide the ultimate information which the forester requires?

First, as to the specialized needs of the forester. These can be pointed up by remembering that the forester is primarily interested in the trees themselves, and only secondarily in the ground beneath them. That means that the most

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